

Green investment schemes: financing energy-efficiency in CEE and a model for post-2012 climate mitigation finance?

Maria Sharmina
Central European University
Center for Climate Change and Sustainable Energy Policy
Hungary
sharmina_maria@student.ceu.hu

Andreas Tuerk
Joanneum Research
Austria
andreas.tuerk@joanneum.at

József Feiler
Office of the Parliamentary Commissioner for Future Generations
Hungary
feiler@obh.hu

Diana Ürge-Vorsatz
Central European University
Center for Climate Change and Sustainable Energy Policy
Hungary
vorsatzd@ceu.hu

Keywords

green investment scheme, carbon trade, EU ETS, Emissions Trading System, hot air, flexible mechanism, Kyoto Protocol, international emissions trading (IET), energy efficiency, assigned amount unit (AAU)

Abstract

Green Investment Schemes (GIS) have been introduced to ensure the climate integrity of international emission trading (IET) involving first commitment period excess assigned amount units (AAUs) in former communist countries for the purpose of other countries' compliance with Kyoto commitments. GIS could provide a new and significant source of GHG mitigation financing in the seller countries. The article investigates how the flexibility of GIS can be best utilized for maximizing benefits to climate and society, but also to ensure that environmental integrity is not compromised at the expense of its simplicity and flexibility. The paper demonstrates that improved energy efficiency, especially through thermal retrofitting of the old inefficient building stock, is the most optimal area where such benefits can be best maximised.

The paper identifies different architectural modalities of GIS, and how the choices in these affect its effectiveness. It then reviews the developments in GIS and characterizes different countries' GIS architectures in the making. Learning from CDM/JI as well as other constraints related to GIS, recommendations are made for GIS architectures. The article emphasizes that GIS provides a unique opportunity for significant funds for abatement investments such as efficiency improvements. Optimally, these revenues could be targeted towards areas not easily reached by business-as-usual investments and policies, but fundamental for a long-term low carbon economy. Such

areas in CEE include infrastructure investments, like retrofitting of old buildings or ensuring very low carbon footprints of new buildings, and certain bioenergy projects. To accommodate such long-term climate investments, it is crucial that the combination of allowable crediting period, greening ratio and AAU price ensures adequate bankability for investments with long payback times. The paper also proposes that more innovative and simpler M&V approaches than in CDM/JI are used, while additionality enforcement is crucial to ensure climate integrity.

The paper concludes that GIS's significance goes beyond the first commitment period and the Kyoto Protocol. It outlines in which areas GIS could serve as a potential alternative carbon financing instrument to complement other mechanisms in order to better utilise energy-efficiency related opportunities.

The aims of this paper

The eceee Summer Study in 2007 has reported about a potential new instrument for energy-efficiency finance in Central and Eastern Europe (CEE): Green Investment Schemes (GIS) (Urge-Vorsatz et al 2007). What happened since 2007 in this area? Is GIS delivering its promise?

The aim of this paper is to provide an update in the developments in GIS, from two key perspectives:

- Will they deliver their promise in CEE in unlocking significant amounts of the energy efficiency potentials, especially in areas hard-to-reach by other policies? What progress has been made since 2007 in this area?

- Could GIS serve as a model for energy-efficiency (or other carbon mitigation) finance in other world areas and under other schemes as well, beyond serving compliance with the Kyoto Protocol?

Introduction: background on GIS

Green Investment Schemes, a new carbon finance mechanism under the Kyoto Protocol, could potentially become a significant alternative to presently existing ones in the CEE region, especially joint implementation, and serve as the testing ground for potentially superior future global climate change mitigation flexibility mechanisms compared to existing ones or for ones that fill in present niches in the domain of climate change action financing. They could potentially unlock a significant part of the energy-efficiency potentials in the CEE region, possibly also in areas hard-to-reach by policies and other instruments. At the same time, the remaining window of opportunity is closing fast: the architectural design, the legal framework, the negotiations, the completed transactions, and potentially all revenues disbursed and investments implemented from them, or possibly even most emission reductions – all have to be completed by 2012.

The Green Investment Schemes (GIS) have been introduced to ensure the climate effectiveness of international emission trading (IET) involving first commitment period excess assigned amount units (AAUs) in former communist countries for the purpose of complying with the Kyoto commitments of other Annex I countries.

The Central and Eastern-European (CEE) countries, together with Russia and Ukraine have app. 57.8 billion surplus AAUs (Point Carbon 2008) for the first Kyoto commitment period. While these could be utilised through IET by Annex I countries to meet their targets, most of the potential buying countries, such as the majority of the EU-15 and Japan, have already expressed that they do not intend to achieve their compliance by purchasing surplus AAUs that are not the result of real emission reduction activities (Gorina 2006; Carbon Finance in World Bank 2006). In order to bridge this gap, GIS is established to unlock the surplus AAUs in the region for Annex I compliance, as well as to leverage the potential financial revenues from such sales for climate benefits in CEE countries (Tangen et al 2002; Blyth and Baron 2003).

From a legal perspective, GIS is a self-imposed binding commitment by the potential seller countries, to fulfil the conditions of the potential buyers. As there is no international requirement on how to model the GIS, countries have major flexibility in drawing up their schemes. This substantial flexibility offers major new opportunities: it could potentially “correct” the shortcomings of other carbon finance mechanisms. However, this flexibility also poses significant risks: environmental integrity is harder to assure without the robust international legal and institutional frameworks designed for this purpose.

GIS could play a major role on the carbon market, as well as in providing a new and significant source of GHG mitiga-

tion financing in the seller countries in the approximate order of 9 billion Euro if we assume a price of 10 Euro/t¹. This could dwarf most other funds or budget items devoted to climate change mitigation or energy efficiency finance in these selling countries, and thus representing a unique opportunity to address key climate change mitigation related priorities that could not or only hardly be financed through other carbon market mechanisms.

Due to the very short window of opportunity, as well as its potential lessons to be learned for future climate regimes and carbon mechanisms, it is essential to understand better the potential implications of various decisions related to the design of a GIS. At the same time, the body of research and preparatory work on GIS is dwarfed by that on other carbon mechanisms. Due to a lack of research and experience on GIS, exacerbated by the more significant risks and opportunities resulting from the lack of international regulation on GIS, significant cooperation and careful planning are required to unlock the real benefits of GIS for climate and the societies of the selling and buying parties.

History and future opportunities for GIS

The dynamics of development in green investment schemes has been extremely fast since the last Summer Study, having progressed from an early consideration level to several completed first transactions in fall 2008. In June 2007, the Hungarian parliament has approved the pioneer national law on GIS implementation, and had secondary legislation in place by the end of 2007. As of October 2008, Latvia also had the legal framework and institutional system in force. The Czech Republic, Ukraine and Romania have adopted general legislature on GIS. Bulgaria and Poland demonstrate a strong interest in the development of the scheme. Hungary was also the first to announce the first AAU transaction with Belgium for the sale of 2 million AAUs in September 2008 (MoEW 2008a), jump-starting the competition among CEE countries, and announced a further sale of 6 million AAUs to Spain in November 2008 (MoEW 2008b). Ukrainian and Romanian officials expect their first AAU deals to take place by the end of 2008 or early 2009 (Filonenko 2008).

Another advantage of this “virgin” nature is that GIS, having been shaped only during the past few years, could potentially be elaborated to become a superior carbon finance instrument, avoiding the pitfalls of other existing ones, and perfected based on the experiences learned from several years of their operation. One of the chief concerns with the present mechanisms, mainly CDM and JI, is that they do not sufficiently mobilise investments in the area housing the most cost-effective and largest potential: improved energy-efficiency, especially in buildings.

It could also serve as a testing ground for an important potential future carbon finance mechanism: if the scheme works well, the model could be applied for the recrafting of the KP’s flexibility mechanisms beyond 2012, for voluntary schemes in developing countries, or other setups. If the scheme proves to

1. Although a 10 Euro/tCO₂ price for greened AAUs maybe realistic as viewed in November 2008, the deals made public in fall 2008 were concluded at higher prices than this.

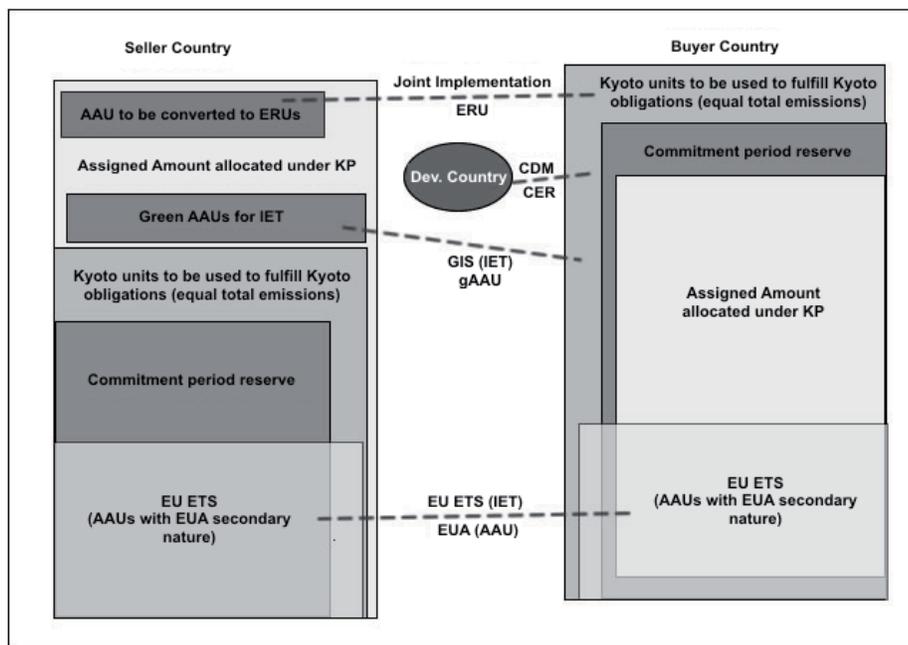


Figure 1. Transaction types of carbon assets among countries under the Kyoto Protocol including transactions under the EU ETS. The example of a buyer and seller country.

be effective in harvesting potentials not-easy-to-reach by other mechanisms, the scheme could be considered to be continued even within Annex I countries. For instance, in the future EU ETS auctioning revenues might be earmarked for climate spendings through extended GISs. We refer to post-2012 GIS as second generation GIS, indicating that, while it would build on the basic concept of first generation GIS until 2012, its legal foundation could be extended from the Kyoto Protocol, and as well as its revenue sources.

DESCRIPTION OF GIS AND ITS ARCHITECTURAL MODALITIES

GIS is a “hybrid” of two mechanisms: International Emission Trading (IET) of the AAUs as defined by the KP’s Article 17, and the greening activities from the revenues from their sale. While IET is regulated by the Kyoto Protocol, the Marrakesh Accords and the COP/MOP decisions, the domestic greening activities are not covered by international regulation. Figure 1 reviews how GIS fits among other carbon transaction types and greened AAUs relate to other carbon assets.

PRIORITISATION OF TARGET AREAS TO BE SUPPORTED BY GIS:

THE IMPORTANCE OF IMPROVED EFFICIENCY

As highlighted above, the potential revenues through GIS are significant for the host countries, especially in the light of historic funding sizes for climate related activities in this region. This fact, combined with other characteristics of first generation GIS, influences the choice of priority target areas for GIS spendings. These characteristics include that first generation GIS is likely to be a unique source of carbon finance, not likely to continue after 2012 in its current form. At the same time, there is likely to be a significant oversupply of (greened) AAUs on the market during its operation. In addition, due to environmental integrity concerns, monitoring and verification of emissions reductions are important for most types of GIS. Finally, the window of opportunity is very short for disbursing and effectively investing these funds.

These characteristics lead to the following suggested main criteria for the determination of priority GIS target areas:

- On a buyer’s market, the buyer’s preferences are extremely important to observe. Among these, the authors found that the assurance of the environmental and climate integrity of the scheme is the most fundamental one, followed by the priorities on price and achieving maximized climate benefits. Environmental integrity is assured through the additionality of the investments.
- Maximizing gains towards national social, political and regional development priorities (i.e. maximizing co-benefits).
- Channeling the funds towards GHG reduction needs that are important but are difficult to foster by business-as-usual policies or available/foreseeable support schemes and satisfy additionality. This is especially important in EU member states or other countries with ambitious GHG reduction targets that already have many policies and mechanisms in place to reduce emissions significantly. In such countries the one-time GIS revenues could be spent on targeting investment areas crucial for a low-carbon economy in the long run, but that are hard to reach by other policies/measures.
- Practical feasibility, dispensability and transaction costs of the given GIS model in the chosen target sector.
- Transparency and accountability regarding GIS operations, along with other safeguards for buyers (e.g. third party audits).

Since GIS revenues represent a rare, one-time, but potentially significant window of opportunity for mitigation financing, the authors argue that it is advisable to direct this to GHG reduction priorities that are important but cannot be easily tackled by other means in the near future, rather than towards captur-

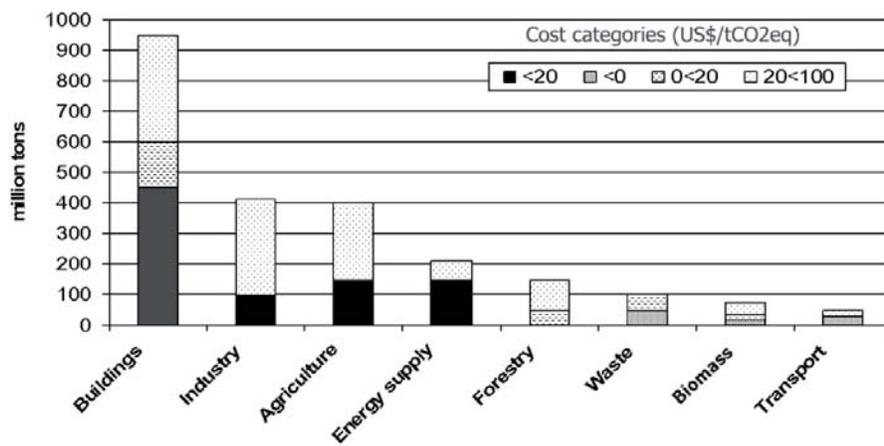


Figure 2. GHG mitigation potential in EIT by economic sector, 2030. Please note that the potential figures are not necessarily additive. (Source: Urge-Vorsatz and Novikova 2008, with data from IPCC 2007)

ing the lowest-cost measures. Such areas include low-carbon infrastructure that determines emissions in the long term but is difficult to finance through other mechanisms, and where emission reduction monitoring and verification are feasible. In addition, if political, social and development gains are considered as key factors of selection, this will maximize societal benefits from the utilization of GIS revenues. Finally, additionality, and therefore the environmental integrity of GIS, is also questionable if GIS investments capture the low-cost potential in areas where existing or incoming legislation requires emission reductions in the near or mid-term anyway.

In order to ensure environmental integrity through additionality but avoid the pitfalls of CDM/JI in this regard (see the relevant section below), simpler and innovative approaches are needed to ensure additionality. For instance, the Hungarian GIS is set up in a way that it provides finance only for investment types that would not take place in absence of GIS funding but are important for climate.

Before identifying some concrete areas for priority target areas, it is necessary to review the mitigation potentials in the EIT region. As Figure 2 demonstrates, by far the largest cost-effective potential is in the buildings sector; that amounts to as much in the cost-effective category as all other sectors combined. 37% of emissions in this region can be avoided at a net profit. This is larger than the world average of 29%, mainly because of the poor state of the building stock and lack of historic incentives for efficiency. In terms of renewable energy, bioenergy offers significant emission reduction in CEE. Most of these countries have large forest and woodland coverage, ranging from 20-55% cover (Viglasky et al. 2004) and therefore a large potential for the use of wood residues or residues for energy production. The potential for crop residues' use as a source of bio-energy is largest in CEE countries which have extensive areas of arable land. For some CEE countries however, such as Romania, existing biomass resources are inadequate and they will need to grow energy crops. Some CEE countries have significant scope also for forestry activities, such as afforestation/reforestation in Russia, Ukraine and Romania, or forest management in Poland

and Romania². In Russia, for example, it would be possible to enhance the sequestration by 20 MtC/yr for less than USD 13/tC (Zamolodchikov 2006).

In addition to their contribution to climate change mitigation, GIS projects come with a broad range of socio-economic, political and environmental dividends. For instance, investments in building energy efficiency can yield a wide spectrum of benefits beyond the value of saved energy, such as health and comfort improvements, increase in social welfare and reduction of fuel poverty, employment creation and new business opportunities, higher energy security, increased value of real estate, and reduced social pressures from energy tariff increases. These benefits substantially enhance the value of GIS investments in certain target areas, such as domestic building efficiency, from a societal perspective. Assessing the criteria for target area choice, in combination with the potentials in different cost categories, as well as other considerations above, the following areas have been identified by the authors as potentially important GIS target areas in CEE.

While buildings house the largest cost-effective potential, many policies have been enacted in this field, especially in the EU. However, retrofitting existing buildings is difficult to achieve through policies and existing funds or carbon finance instruments such as JI could only reach an insignificant fraction of the existing building stock in the region. Therefore the low-energy retrofit of the old, inefficient building stock has been identified by the authors as a high priority target area, also associated with especially important and numerous co-benefits. Within this particular field it is pivotal that GIS spurs investments to very low energy construction and retrofit, potentially nearing passive solar standard levels of app. 15-30 kWh/m²/year. The reason is that the lifetime of the building stock is one of the longest among carbon-related capital stock, and suboptimal retrofits not only lock these buildings into a GHG-wasting future for many decades to come, but also make subsequent later efficiency retrofits prohibitively expensive due to the eroded future savings with comparably high costs and reduced energy savings.

2. Based on an assessment by the Quest JIFOR project and FAO data on available land.

Table 1. Selected key GIS modality elements and options (based on Stoyanova 2006, Ürge-Vorsatz et al. 2007)

Modalities	Design options	Explanations
Type of greening	Hard greening	GIS funding invested in projects with quantifiable emission reduction
	Soft greening	Funding to an area with non-quantifiable emission reduction
	Mixed	If mixed model is to be chosen, the key question will be how to decide on the ratio between the two.
Greening ratio		The ratio of emission reductions accruing from greening activities to the amount of AAUs transferred in exchange of the funds channeled to these activities
Additionality	Legal additionality	There is no obligation under law to materialize the project/investment
	Financial additionality	There is no double support for the same emission reduction
	Environmental/Climate additionality	New environmental/climate benefits will arise
Crediting period	First commitment period	Emission reduction from the GIS investment is monitored and accounted for only during the first commitment period
	Extends beyond the first commitment period	Emission reduction from the investment is monitored and accounted for beyond 2012
Policy/program approach vs. project approach	Project approach	Stand-alone project, with a clear-cut project boundary
	Policy/program approach	Greening activities with discrete nature, dispersed but in great aggregate number
	Combination	Combined project and programmatic/policy approaches
Timeframe of the GIS	Standard crediting	The greening activities take place between 2008 and 2012
	Early crediting	Early crediting is defined as the greening activities could happen before 2008 (violating additionality)
	Late crediting	The greening activities take place after 2012
Monitoring and verification of the GIS greening activities	Intervention type baseline	Baseline is established according to the type of emission reduction intervention among given circumstances
	Sectoral standard baselines and multi-project emission factors	A baseline calculation is grounded on shifting the focus of monitoring and verification "from a project-by-project level to a sector-wide level"; GHG emissions are considered to originate from "a range of sources defined as a sector" (Baron and Ellis, 2006)
	Domestic version of internationally approved track two JI and CDM methodology	CDM and JI methodology, verified not by third party but by the hosting country
	Negotiated baselines	Buyers and sellers negotiate the baseline by each transaction
Project selection process	Top-down	National priority area, depends on government decision, through regional or sectoral distribution
	Bottom-up	Open application procedure where additionality and emission reduction potential decide priorities

DESIGNING GIS ARCHITECTURES: KEY MODALITIES

Table 1 summarizes the main modalities of potential GIS architectures. Given the length restrictions of this paper the authors summarise the impact of only a few selected modalities. However, the main report on the conducted study describes each of these in detail as well as the impact of the modality choice on the effectiveness of GIS from a climate and social perspective (see Ürge-Vorsatz et al. 2008).

With regard to the type of greening, most buyers insist that GIS revenues are spent on climate related activities. Since governments use tax revenues for purchasing AAUs to comply with Kyoto Protocol targets, taxpayers typically expect that their money is spent on mitigating climate change. While some non-mitigation or non-climate related greening may be

accepted by some buyers, this is likely to play an insignificant role in first generation GIS.

While behavioural measures, education and awareness raising, capacity building and training are all fundamental to reducing emissions, their role in GIS will remain limited since the resulting emission reductions cannot be monitored, easily quantified and verified. In association with this, funds for these purposes are easier to be misused than those for verified hard greening activities. Such "soft" greening activities, thus, are now expected to play a minor role in GIS schemes in all host countries, except perhaps in Ukraine. Hungary is the only country so far that does not include soft greening in its GIS.

Ensuring additionality of GIS is crucial for its environmental integrity. At the same time, stringent additionality monitoring and verification in CDM and JI have posed a major barrier

to the proliferation of energy efficiency and other small-scale emission reduction activities. Presently, however, most GIS host countries do not have explicit rules ensuring additionality. Hungary has legislation spelling out the criteria of the three types of additionality requirements regarding JI. In GIS, it ensures additionality through the setup of its GIS scheme: it only allows for investments that are additional to standard measures or those required by legislation.

Certain financial additionality is regulated in EU member states. They need to make sure that the same reductions are not sold under GIS that would already take place with the support of other EU funding. In the case of the EU Structural Fund, EU Regulation 1083/2006 sets out legal additionality requirements, expressing that the same environmental achievement shall not receive financial contribution under different legal rights or the state government shall not use the same reduction for collecting money under different legal titles. However, emission reductions over legally mandated levels can be triggered with additional funding in the same activity if there are no specific requirements for such in the given EU-funded support scheme.

The greening ratio is presently not a strict modality. Most buyers and hosts do not specify a precise greening ratio target; however, many schemes aim to maximize this ratio. Observing the discussions above, from an environmental perspective it is the combination of the greening ratio, the crediting period, and potential co-funding availability that determines the long-term climate effectiveness of GIS. Following the logic above, long-term climate investments that typically have long payback times become financially feasible and bankable under GIS if either the greening ratio is low, or a longer crediting period is accepted, or there is significant co-funding – or a combination of these. If a 1:1 greening ratio is mandated (i.e. emission reductions accruing from greening activities are equal to the amount of AAUs transferred in exchange of the funds channeled to these activities) with a crediting period concluding in 2012 and no co-funding is available, GIS will be able to catalyze investments only into investments with very short payback times – i.e. those that are anyway implemented by the market or will be captured soon by an emerging carbon value. Fortunately the first GIS deal that might set the model for subsequent transactions allows certain reduction areas with guaranteed long-term effectiveness to be credited until 2020.

Monitoring and verification are crucial to ensuring environmental additionality as well as that the investments are taking place. While there is a temptation for GIS to copy-paste baseline-setting and M&V procedures from CDM/Track-2 JI, similar to Track-1 JI in most GIS host countries, the authors conclude that this would have a very detrimental impact on the effectiveness of GIS in high priority target areas. For example, one of the main barriers of Joint Implementation projects is a cumbersome validation and verification of energy efficiency measures. Since a typical project in energy efficiency in buildings uses a combination of many measures, it is a formidable task to observe all the requirements. In addition, some measures are difficult to verify with methodologies provided by JI procedures. An innovative solution that both ensures environmental integrity and does not impose the level of unjustified scrutiny potentially prohibiting certain target areas is, for

instance, the Hungarian approach of using ISO standards for emission monitoring and verification. Other measures, such as using sampling instead of universal monitoring, can also help reduce transaction costs associated with M&V, while keeping the goals of the process intact.

In addition to the crediting period, another important decision remains with regard to GIS timeframes. If greening activities cover more complex areas than other mechanisms of carbon finance, fund disbursement and administration can present serious bottle-necks for the magnitude and effectiveness of GIS schemes in general. This is compounded by the general challenge of initiating and starting up a new scheme and financing mechanism that all require time for a full-volume operation. This is especially the case for schemes that have a bottom-up disbursement approach, i.e. those that require projects to be initiated and proposed by investors.

This means that if all aspects of GIS need to be completed by the end of the first commitment period, i.e. including the disbursement of the revenues, this substantially strengthens the risk that the revenues cannot be spent in an otherwise optimal way. Therefore, it would be important to allow post-2012 disbursement, although this is typically not acceptable for the buyers. A possible extension to the first Kyoto commitment period can be that Kyoto Parties are allowed to settle their emission balance with Kyoto emission right units till the middle of 2014. This might allow some flexibility in the 2012 end-date in disbursements. Further disbursement of the funds after this period is also possible, but necessary safeguards for fund management need to be worked out.

LEARNING FROM CDM/JI

Since many carbon finance instruments, leading among them is CDM, have not delivered their promise in the field of energy-efficiency, the research has studied the reasons for these and draw the relevant conclusions for GIS design. The constraints were found to originate from the requirement of the additionality test, the methodology approval process, the monitoring and verification requirements as well as the high transaction costs and long approval cycle. The assessment of the experiences with JI and CDM revealed a few important lessons for GIS. JI and CDM have largely failed to deliver in mitigation areas with the highest sustainability benefits. These areas include, but are not limited to, building energy efficiency, small- and medium-scale bioenergy utilisation, and LULUCF. In the latter area, for instance, there is a need for large upfront investments and long crediting periods which lead to a delayed rate of return as trees need several years to grow until they can generate a significant amount of credits. This barrier can be addressed under a GIS as AAUs can be sold now for emission reductions and removals being generated in the future. Under a GIS any crediting period can be implemented, while under JI longer crediting period can only be implemented in the form of late crediting with AAUs. Furthermore, when a large number of small units are geographically dispersed, such as in the case of households or municipal buildings, stringent verification under JI/CDM might pose a prohibitive barrier to the projects. These not only have very significant mitigation potentials in CEE (proportionally much more than in other world regions), but also substantial social, political and economic co-benefits, including improved social welfare, fuel poverty reduction, increased real

estate value, new business opportunities, employment creation, and reduced energy dependence.

It would be detrimental for GIS to “copy-paste” CDM/JI (Track 2) architectures in its modality design since in this case GIS may also fail in these high-priority areas. The authors found that while ensuring additionality and thus monitoring and verification are fundamental for the environmental and financial integrity of GIS, applying simpler approaches to M&V and additionality enforcement than in CDM is essential. While the model of programmatic CDM may partially be applied, it is important that some restrictions of pCDM are not transferred, such as limiting a program to focus on one type of emission reduction only, which can make EE projects for example impossible as most of the EE related projects involve multiple procedures or multiple projects.

SUMMARY OF GIS DEVELOPMENTS AND ARCHITECTURES IN CEE AND THEIR PROJECTED IMPACT ON ENERGY-EFFICIENCY FINANCING

Based on the review of the GIS developments in the region as well as our country case studies, it can be concluded that Hungary and Latvia are the front-runners in GIS as of October 2008. However, the situation has been dynamically changing over the past few years, and therefore those now hesitant with GIS may still generate sudden progress.

Table 2 compiles a selection of the modality choices used in GIS designs in CEE countries. It is important to note, however, that these countries are in different stages of development of the scheme, so the final architectures may still change for a few, and some decisions have not yet crystallized for most. Some countries have already got GIS fully established, some are in the process of establishing it. A few general statements can be made about GIS schemes in the CEE region as of December 2008.

While some EU legislation mandates certain financial and legal additionality provisions in EU member states in respect to certain schemes such as the ETS or aid such as the Structural Funds, these do not fully ensure the environmental integrity. From the research only Hungary was revealed to make a concerted effort at enforcing additionality. Presently additionality, however, is not mandated in a legislative sense, but through the setup of the scheme that provides funds only for investments that are intrinsically considered as advanced investments from a climate perspective. At the same time, some countries do not opt to focus on additionality, such as Romania.

For the modality of greening choice, most countries have a programmatic approach. Soft greening is included in most of the countries, except Hungary. In Ukraine, the soft greening is planned to take 25% of the total revenue after 2009. Given the total amount of AAU available in Ukraine, 25% will be a major amount of money, so the ramifications for transparency and emission reduction effectiveness are important. For the modality of emission monitoring and verification, most countries have this function in GIS. However, Romania is going to have this section of modality missing as their approach is not based on emission reduction calculation and verification.

It was pointed out that the detailed and rigorous M&V requirements are one of the primary obstacles towards energy efficiency projects in CDM and JI. Hungary's attempt at easing M&V, but still providing the required evidence of emission reduction, is to apply the ISO 14064 GHG monitoring procedure in case of large-scale and complex projects within the GIS

framework. The ISO procedure is similar in transparency to the procedures followed for JI, but can be executed in a more cost efficient manner. For small emission reduction interventions in the programmatic window of Hungarian GIS an even cheaper option is applied, which builds on the building certificate system of the EU and the connected energy balance calculation thus making transaction costs less than prohibitive.

Currently, in most of the countries, the greening ratio is not employed as a standard to regulate the greening. Buyers in most of the cases are provided with a list of projects as the greening options, rather than provided with a certain amount of emission reduction to be achieved.

In the Hungarian and Latvian GIS, the monitoring systems are structured in a similar format. The monitoring systems all consist of two parts: A) a financial monitoring plan that is done through an annual financial audit; B) a project performance monitoring plan that supervises the conformity of the projects. Furthermore, the monitoring system as well as the financial records of the GIS is audited annually by international auditors.

Regarding the baseline for the GIS, most of the sellers choose the sectoral baseline and expect that the simplified methodology could be employed.

Table 2 demonstrates that hard greening activities dominate in the majority of GIS host countries. In addition, as documented in the case studies conducted by the authors (see Frieden et al. 2008, Sharmina et al. 2008) and summarized in Ürge-Vorsatz et al. (2008a), most host countries choose energy efficiency improvement as a high priority area. Retrofitting old buildings, through measures such as improving thermal insulation and energy efficiency improvement in appliances and lighting system are a typical priority. This choice fills in the gap where the CDM and JI have largely failed.

THE ROLE OF GIS ON THE CARBON MARKET

The overall market potential for AAUs is estimated to be long by 1.3 Gt/year, summing up to 6.5 Gt over the first commitment period. In the outset, gross demand under the Kyoto Protocol amounts to 557 Mt/year, excluding potential demand from Canada. However, considering gross demand and supply gives a somewhat misleading picture of the market situation by indicating a large supply surplus. In order to affect market and prices, the surplus will have to become available to the buyers, e.g. offered to the market. This has not happened so far and as discussed below, it is questionable to what extent it will happen.

When we take the current JI and CDM purchasing programs and other actions into account, as well as the sink provisions given in Annex Z of the Kyoto Protocol, we end up with a remaining net demand of some 900 Mt aggregated over the five-year commitment period³, as illustrated in Figure 3.

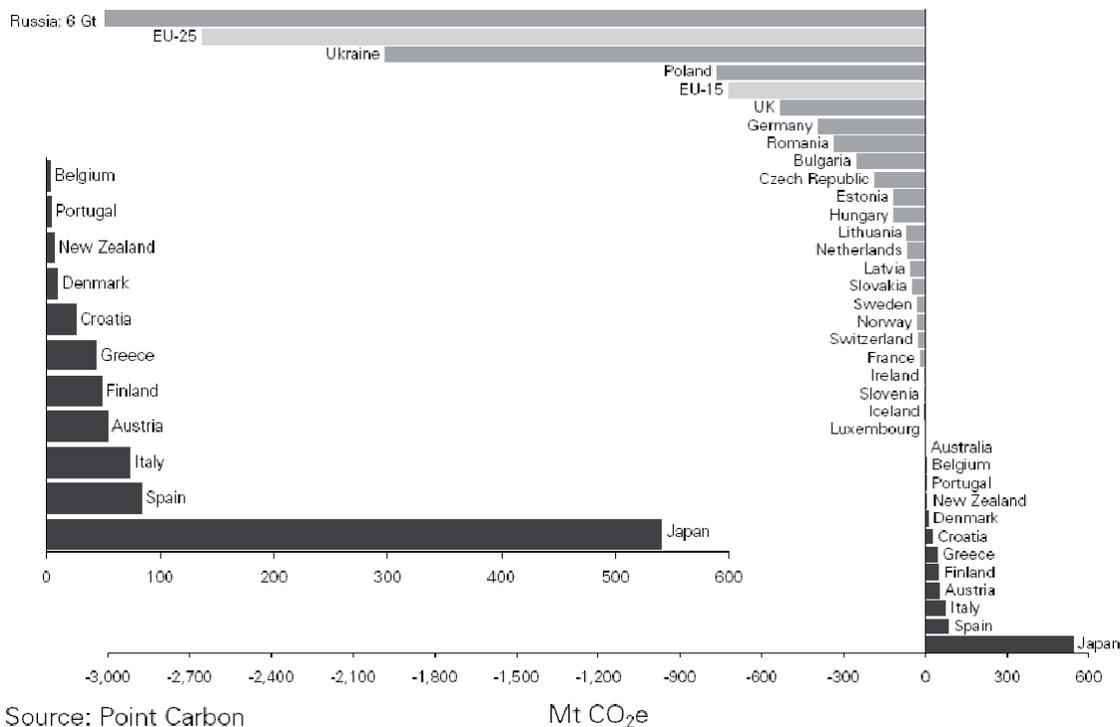
According to the estimates as of November 2008, the equilibrium price might approximate 10 Euro per ton of AAU, which is lower than several of the completed transactions and than it

3. The CDM/JI dynamics assumes a total aggregated supply of a little less than 2 Gt by Q2 2013. This estimate by Point Carbon (PC, by Kristian Tangen) is largely based on an extrapolation of current trends in the project market, using PC's forecasting framework. PC believes that this supply estimate is fairly unelastic to prices. Purchasing of individual countries is based on their announced purchasing plans.

Table 2. GIS architectures in the countries with GIS in progress: modality choices and estimated GIS-based AAU supply (Source: Úrge-Vorsatz et al. 2008a)

	Hungary	Latvia	Ukraine	Czech Rep.	Romania
Estimated GIS-based AAU supply 2008-2012	Up to 50 MtCO ₂ -eq	Up to 30 MtCO ₂ -eq	100-1200 MtCO ₂ -eq	Up to 100 MtCO ₂ -eq	Up to 100 MtCO ₂ -eq
Greening option	Hard	Hard + soft	Hard + soft	Hard + soft	Hard + soft
Programmatic/ project	Project + programmatic	Project + programmatic	Project	Project + programmatic	Project + programmatic
Budgetary option of the fund	Money goes directly to the special account at Ministry of Environment and Water	Money enters budgetary account in state treasury, then disbursed to CCFI	Money enters a special account within the national budget	Money enters a special account under MOE, not entering the state budget	Revenues go into a special budget of the Environmental Fund or a Specialized Unit in the Ministry
Additionality requirements*	Climate additionality: all GIS activities will result in quantified emission reductions, which are verifiable. Legal additionality: support in the areas where there is either no financing or other state or EU funding is available, but there is a need for producing additional emission reduction over what is mandated by requirements for other support.	No information	UKR wants to ensure additionality through projects in the areas which were not adequately addressed by JI (e.g. buildings sector, afforestation). In addition, UKR does not have international financing (such as EU structural funds), and national financing is not enough, so financial additionality is in place.	No information	Not applicable (the country has dismissed the notion of additionality altogether)
Baseline	Programmatic windows – sectoral baseline Project window: TBD	TBD	Sectoral baseline; domestic version of CDM and JI methodology	Sectoral baseline & negotiate with buyers	No baseline
Verification	Small project: a) carbon efficiency calculation and desk review; b) a random check; c) after the project realization check on performance of the applicant. Large project, ISO standard is employed.	TBD	Independent entity, mostly likely domestic, to issue determination report; a window for buyers' participation in M&V (but it is not legally warranted, as of November 2008)	Independent national auditor, most likely National Environmental Fund to perform M&V	No or simplified verification
Monitoring and verification	Financial audit; Reported by the MOEW in the format of a report according to ISO 14064 standard; An advisory board monitoring of GIS overall.	Financial + project conformity; assessment of the greening result	Monitoring plan is proposed by the project beneficiary, no concrete rules on the monitoring is regulated at this stage	Yearly report which covers the monitoring of money, projects and results	Only monitoring of projects implementation (in some cases simplified monitoring and verification of emission reductions)
Crediting period	Till 2020 in case of buildings related projects and end of 2012 in other cases	TBD	First commitment period	15 years	Post 2012, no defined crediting period
Timeframe	First commitment period	TBD	First commitment period or beyond	TBD	Extended to next commitment period
Greening ratio	Not predetermined – will be established ex-post, but studies show efficiency and potential of measures		Not applicable	1:3 to 1:4	Not applicable

Note to Table 2: *In the EU countries, under the directly applicable 1083/2006 Council Regulation the criteria for additionality to structural funds apply without additional country level legislation.



Source: Point Carbon

Figure 3. Net demand and supply, after taking into account sink provisions under Annex Z in the Kyoto Protocol, planned purchases of CERs and ERUs, and domestic reduction measures such as direct control regulations and the EU ETS.

Table 3. GIS-based AAU supply by major selling countries during first commitment period and the potential respective revenues (estimates made by Point Carbon 2008, unless otherwise indicated)

Country	Czech Rep.	Hungary	Latvia	Poland	Romania	Russia	Ukraine
MtCO ₂ -eq	Up to 100	50	30	Up to 100	Up to 100	0	100-1200*
Billion Euro	Up to 1	0.5	0.3	Up to 1	Up to 1	0	1 - 12

Note to Table 3: *Estimate by the Carbon Trust

had been expected even a month before due to the influence of the financial crisis on carbon prices. In view of slumping prices, there have been reports of delays of planned AAU sales. However, the financial crisis and economic recession might provide an advantage for GIS over the other two Kyoto flexible mechanisms as it has lower project risk. The value of the AAUs expected to be transacted could be in the range of 9 billion Euro.

However, although the reality may bring a GIS dwarfed by the CDM as opposed to its potential, it is still an important market for the sellers. As noted above, the value of the AAUs expected to be transacted could be in the range of 9 billion Euro. Table 3 shows estimated amounts of AAU supply through GIS by major selling countries and the potentially achievable respective GIS revenues, assuming an AAU price of 10 Euro.

Since total EU investments into AAUs are likely to run in the order of magnitude of 3.8-4.0 billion Euro, the EU might consider adopting guidelines on the preference towards purchasing AAUs from another member state, all else equal. This is because if these funds are invested in other EU member states on climate mitigation, this will help the EU comply with its

post-2012 CC commitments⁴, avoiding significant investment needs necessary in the next commitment period.

Summary and recommendations

The research underlying the article showed that there is likely to be a net demand of some 900 Mt greened AAUs aggregated over the five-year commitment period, with a significant oversupply of up to 6.5 Gt. At an assumed price of 10 Euro, this could bring as much as 9 billion Euro carbon finance into the CEE region, dwarfing all energy-efficiency finance and support sources.

The purpose of the paper was to examine how GIS designs can be optimized in order to maximize the benefits of this significant but potentially unique amount of money for climate and society. The paper concluded that improved energy-efficiency is an ideal way through which GIS can maximize its effectiveness in these areas, which is demonstrated in more detailed country-wise GIS case studies.

4. Assuming that mitigation-related investments will be in long-lifetime projects, such as infrastructure or other long-lifetime capital stock.

Table 4. Summary recommendations for GIS architecture design modalities, in order to optimize their impacts for climate and society

Modality category	Issues in modality choice and recommended modality, if applicable
Greening option	Dominance of hard greening is required to ensure climate effectiveness. A small share of soft greening can be important to facilitate the effectiveness of the hard greening part, but this should be a minor share to avoid potential risk of misuse, since ensuring the integrity and effectiveness of spendings through soft greening are difficult.
Programmatic/project approach	A purely project-based approach may compromise climate effectiveness in areas where small and dispersed investments are needed such as end-use efficiency or small-scale renewables, because of transaction costs. A programme-based approach has lower transaction costs and can have larger scale roll-out.
Budgetary option of the fund	Due to relatively low financial discipline and major budgetary problems of CEE host countries, it is important that revenues enter special accounts from which the money cannot be legally paid out on other spendings.
Additionality requirements	Additionality is essential for ensuring the environmental integrity of GIS. 3 types: financial, legal and environmental. Some financial additionality is mandated for EU member states, but not enough to ensure environmental integrity. Additionality should ideally be stipulated in GIS legislative framework , but at least be ensured by the scheme setup. Rigorous quantitative additionality enforcement, on the other hand, may be counterproductive for many areas of high priority for GIS in CEE.
Baseline	Sectoral baselines rather than individual baselines substantially reduce transaction costs and can overcome methodology problems.
Monitoring and verification	M&V are essential for ensuring the environmental integrity. They are a crucial supervision tool and the proof of the projects taking place as agreed between the buyer and seller. However, rigorous M&V as in CDM could kill GIS in important priority target areas. Simplified, innovative M&V methods are suggested, such as calculations confirmed by random checks, using ISO standards, etc. Since compliance is <i>not</i> dependent on M&V and the precise quantities saved, as opposed to CDM and JI, it is possible to apply a less detailed but still rigorous M&V that assures the integrity but does not compromise cost-effectiveness.
Crediting period	Allowing post-2012 crediting is important in order to avoid that GIS only picks the low-hanging fruit. If, however, flexibility is applied to the greening ratio, or AAU prices are high, or substantial co-funding is applied, long-term investments may still be bankable. The key is that the combination of greening ratio, crediting period, and guaranteed availability of co-financing jointly ensure that economic investments having a long payback period are accommodated by the scheme
Timeframe	Normally transactions will be allowed only in the 1 st commitment period. However, extending the timeframe for funds disbursement beyond 2012 is essential for optimizing climate effectiveness. The remaining time is too short for a careful scale-up of funding schemes, and disbursement capacity will either be a serious bottleneck limiting the total volume of GIS, or the climate effectiveness will be jeopardized if funds are spent compromising the optimal framework in order to expedite disbursement.
Greening ratio	1:1 ratio would be ideal, but may not be feasible (too narrow circle of enabled investments) if the crediting period does not extend beyond 2012 or there is no co-financing. The key is that the combination of greening ratio, crediting period, and guaranteed availability of co-financing jointly ensure that economic investments having a long payback period are accommodated by the scheme
Priority areas targeted	Due to the one-time window of opportunity, high-priority climate abatement areas not easily targeted by business-as-usual activities and policies are ideal target areas. These often include low-energy infrastructure determining long-term emissions, but typically associated with long payback times (buildings, transport). Societal co-benefits for host countries can also be maximized. In particular, in CEE attractive areas that fall into these categories include: energy efficiency in residential and public sectors; renewable energy for heating; biogas production for transportation purposes; other small-scale bioenergy investments; land-use if applicable in host country.

Learning from the lessons from CDM/JI as well as other constraints related to GIS, the following selected recommendations can be made for GIS architectures. Table 4 summarizes the main lessons learnt for the choices in various modalities. The text below details a few of these that have particular importance for climate effectiveness and maximizing GIS' ability to unlock the significant EE potentials in the CEE region.

First, in order to ensure environmental integrity through additionality but avoiding the pitfalls of CDM in this regard, simpler and innovative approaches are needed to guarantee additionality. For instance, the Hungarian GIS is set up in a way that it provides funds only for investment types that would not take place in absence of GIS funding but are important for climate. For example, building retrofits are supported through GIS to efficiency levels that are not attractive under other fi-

ancing schemes, but lay the foundations of a low-carbon future building stock.

On the other hand, the *lenience towards additionality* by many host countries is a worrying trend. So far no CEE GIS schemes legislated that revenues are to be spent on investments that are additional (although EU member states are subject to certain additionality requirements by EU law, but these are not sufficient to ensure climate additionality), and some countries even announced that additionality is not an important criterion in their GIS. The realization of such trends raises significant environmental concerns about GIS.

In general, the article pointed out that GIS, as it stands today, provides a unique, one-time opportunity for significant funds for abatement investments. Therefore, an optimal way to use these revenues is to target these towards areas which are not

easily reached by business-as-usual investments, and policies in place or in the pipeline, but that are fundamental for a long-term low carbon economy in the host countries. Such areas in CEE include infrastructure-related investments, such as the retrofitting of the building stock or ensuring that new buildings have very low carbon footprints, and certain bioenergy projects, such as biomass based heating. However, these typically have very long payback times, and these have important implications on GIS architecture optimality.

If such long-term climate investments are to be accommodated in GIS, it is crucial that the combination of allowable crediting period, greening ratio and AAU sales price ensures adequate bankability for long-term projects. In case the crediting period does not account for emission reductions earned beyond the end of the first commitment period, and a strict 1:1 greening ratio (or close) is required, with current ranges of AAU prices this will severely limit the investment types to picking the very low hanging fruits – which is typically already taking place by JI or for other policies/mechanisms. Therefore, a realistic post-2012 crediting period (such as, e.g. until 2020) is important so that GIS can accommodate investments that determine long-term emissions and are not taking place without GIS.

Finally, an important bottleneck in first generation GIS posed by its short window of opportunity remaining is its capacity to expend its revenues. Fund disbursement and administration can present serious challenges for the magnitude and effectiveness of GIS schemes in general. This is compounded by the general challenge of initiating and starting up a new scheme and financing mechanism that all require time for a full-scale operation. This is especially the case for schemes that have a bottom-up disbursement approach, i.e. those that require projects to be initiated and proposed by investors. This problem can be partially addressed by utilizing existing and well-known funding schemes and institutional structures as much as possible, but typically other funds were set up for different purposes and therefore they may not cater best to meet the goals of GIS.

The authors conclude that GIS, if well designed and operated, can offer significant climate advantages over JI. GIS accommodates longer-term horizons and allows governments to place emphasis on areas where early investment is crucial for the transition to de-carbonized economy in the long-term and which require ambitious action.

In the areas investigated in the authors' case studies (e.g. Sharmina et al. 2008) as well as in the full report on the conducted research (Ürge-Vorsatz et al. 2008a), GIS could have a major role for realising greenhouse gas reductions which have not been captured by existing instruments, such as JI. A special strength of GIS is the flexibility regarding project types and implementation.

Another important conclusion is that EU member states might consider adopting an EU-wide guideline on the preference towards purchasing AAUs from another member state, all else equal. This is because total EU investments into AAUs are likely to run in the order of magnitude of 3.8-4.0 billion Euro, and if these funds are invested in other EU member states on

climate mitigation, this will help the EU comply with its post-2012 CC commitments⁵.

Finally, the significance of GIS runs beyond the first commitment period. If the experiences prove to be positive, GIS could potentially become the model for a superior carbon finance mechanism that operates more effectively in unlocking energy-efficiency potentials or for one that fills in important carbon market niches. Its experiences could be directly transferred or indirectly utilized in post-2012 flexibility mechanisms, used as a model to finance climate activities in developing countries, or to disburse climate funds such as the auctioning revenues from EU ETS. GIS-type schemes could be particularly effective for mobilizing small-scale investment opportunities, such as energy efficiency.

References

- Baron, R. and J. Ellis. 2006. Sectoral Crediting Mechanisms for Greenhouse Gas Mitigation: Institutional and Operational Issues. International Energy Agency. Organization for Cooperation and Development: May, 2006. Available at: <http://www.iea.org/textbase/papers/2006/greenhouse.pdf>
- Blyth, W., and R. Baron. 2003. Green Investment Schemes: Options and Issues. Paris: Organisation for Economic Co-operation and Development, International Energy Agency.
- Filonenko, O. 2008. World Bank Involvement in GIS development. Presentation at the CEU/REC Workshop, Budapest, April 2008.
- Frieden, D., A. Tuerk, V. Blujdea. 2008. Options for Land-Use and Bioenergy Projects under a GIS in Romania. Convened by Climate Strategies. Available at: <http://www.climatestrategies.org/our-research/category/36.html>
- Gorina, N. 2006. Cooling down hot air. GLOBAL CARBON, http://www.icfi.com/Markets/Energy/doc_files/surplus-aaupdf.pdf.
- Intergovernmental Panel on Climate Change (IPCC). 2007. Summary for Policymakers. In: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- MoEW. 2008a. Klímavédelem: még idén elindulhat a Zöld Beruházási Rendszer. Hungarian Ministry of Environment and Water. Available at: www.ktm.hu/index.php?pid=1&sid=1&hid=2025
- 2008b. Klímavédelem: tovább bővültek a Zöld Beruházási Rendszer forrásai - hazánk mintegy 6 millió tonna kibocsátási kvótát értékesített Spanyolországnak. Hungarian Ministry of Environment and Water. Available at: www.ktm.hu/index.php?pid=1&sid=1&hid=2075
- Point Carbon. 2008. Kyoto market long, but several countries short. Available at www.pointcarbon.com/aboutus/press-room/pressreleases/1.982308

5. Assuming that mitigation-related investments will be in long-lifetime projects, such as infrastructure or other long-lifetime capital stock.

Sharmina, M., D. Ürge-Vorsatz, and J. Feiler. 2008. Green Investment Scheme: Case Study on Hungary. Convened by Climate Strategies. Available at: <http://www.climatestrategies.org/our-research/category/36.html>

Stoyanova, P. 2006. Energy efficiency through Green Investment Schemes. The case of the Bulgarian building sector. Department of Environmental Sciences and Policy, Central European University, Budapest.

Tangen, K., A. Korppoo, V. Berdin, T. Sugiyama, S. Egenhofer, J. Drexhage, O. Pluzhnikov, M. Grubb, T. Legge, A. Moe, J. Stern, and K. Yamaguchi. 2002. A Russian Green Investment Scheme: Securing Environmental Benefits From International Emissions Trading Climate Strategy.

UNFCCC. 1997. Kyoto Protocol: UN. 2001. Marrakesh Accord, edited by UNFCCC: UNFCCC.

Ürge-Vorsatz, D, A. Novikova, and P. Stoyanova. 2007. A new window for a new instrument: Can and will green investment schemes unlock the high efficiency potentials in Eastern Europe?: European Council for an Energy Efficient Economy.

Ürge-Vorsatz, D. and A. Novikova. 2008. Potentials and Costs of Carbon Dioxide Mitigation in the World's Buildings. Energy policy. Vol. 36, no 2, pp.642-661

Ürge-Vorsatz, D., A. Tuerk, M. Sharmina, J. Feiler, L. Qiao. 2008a. Green Investment Schemes: Maximizing their benefits for climate and society. Convened by Climate Strategies. Available at: <http://www.climatestrategies.org/our-research/category/36.html>

2008b. Green Investment Schemes: Maximizing their benefits for climate and society: Synthesis report. Convened by Climate Strategies. Available at: <http://www.climatestrategies.org/our-research/category/27/104.html>

Viglasky, J. and J. Suchomel. 2004. Philosophy and Strategy for Development of the Slovak Bio-Energy Sector.

World Bank (WB). 2006. Green Investment Scheme in the context of the second commitment period under the Kyoto Protocol in Ukraine”

Zamolodchikov, D. 2006. Stocks and Flows: Carbon Inventory and Mitigation Potential of the Russian Forest and Land Base. WRI Side Event SBSTA, SBI 24th session, 20 May 2006.

Abbreviations

AAU	Assigned Amount Unit
CDM	Clean Development Mechanism
CEE	Central and Eastern Europe
COP	Conference of the parties
EE	Energy efficiency
EIT	Economy in transition
GHG	Greenhouse gas
GIS	Green Investment Scheme
Gt	Gigaton (one billion metric tonnes)
IET	International emissions trading
JI	Joint Implementation
KP	Kyoto Protocol
LULUCF	Land use, land-use change and forestry
MOP	Meeting of the parties
MOU	Memorandum of understanding
M&V	Monitoring and verification
MRV	Monitoring, reporting and verification
Mt	Million tonnes
pCDM	Programmatic CDM
UNFCCC	United Nations Framework Convention on Climate Change