Radmilo Pešić
2003 International Policy Fellow

Flexible Mechanisms Under the Kyoto Protocol in Central and Eastern Europe

Research Paper

Contents

Abstract: *The paper gives an overview of challenges and practices in the field of climate protection in Central and Eastern Europe (CEE). A strong link between climate change issues and energy sector reforms in the course of socio-economic transition has been explored. Experiences from some of the more developed and fast reforming CEE countries should serve as guideposts for all other countries in the region. Economic potential of Flexible Mechanisms and climate protection opportunities has been analyzed. The emphasis is made on the non-Kyoto protocol countries, primarily on Serbia and Montenegro, and on the options they may have. A proposal for Climate Protection Policy Framework for Serbia has been made.*

1. Introduction

There is a wide scientific consensus that global climate change is an outcome of human activities (IPCC, 2001b), and that the social and economic costs either of mitigation or adaptation to its various impacts will be very high (OECD, 2001). There is clear evidence that during a hundred years period, from 1890s to 1990s, a steady rise in average global temperature was 0.6 °C (IPCC, 2001a). The 1990s were the warmest decade since the beginning of instrumental measuring in 1860, and according to the indirect data, obtained from proxy measurements, 1990s were the warmest decade in the last millennium (IPCC 2001b). It is broadly accepted in the contemporary science that the latest climate changes are closely related to the increased atmospheric concentrations of carbon dioxide, methane, nitrous oxide, and other greenhouse gasses (GHG).

In 1988, discerning the potential danger, the United Nations Environmental Program (UNEP) and the World Meteorological Organization (WMO), jointly established the Intergovernmental Panel on Climate Change (IPCC), with an aim to assess the available scientific information about climate change, its socio-economic impacts, and potential response strategies. As a result of the IPCC activities, in 1992, over 180 countries at the "Earth Summit" in Rio de Janeiro adopted the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC presented an international legal framework for joint GHG emission reductions. At the third annual meeting of countries that had ratified the Convention (COP 3), in 1997, in Kyoto, a Protocol to the UNFCCC was adopted, so called the Kyoto Protocol (KP, 1997). The main accomplishment of the Protocol is definition of legally binding quantified constraints on GHG emissions from industrialized countries. The Kyoto Protocol defines allowable amounts of emissions, for each industrialized country, or Party, in terms of assigned amounts for the commitment period from 2008 to 2012. Annex A of the Protocol lists GHG and their sources. The commitments, in a form of quantified emission reductions (as percentages of the base period levels), apply to the countries that had ratified the Protocol, and are listed in Annex B. In order to enter into force the Protocol

must be ratified (approved, accepted or acceded) by 55 Parties, accounting for minimum 55% of 1990 GHG emission level[1](KP, 1997 Art.25).

The Kyoto Protocol stipulates marked-based flexible mechanisms, for international transfer of emissions. By allowing emission reductions to take place where they have the lowest possible costs, the Kyoto flexible mechanisms are aimed to assist UNFCCC Annex 1 countries to achieve their targets in a cost-efficient way[2]. Simultaneously, the flexible mechanisms can foster technology transfers or financial flows from industrial countries to developing and transitional economies.

2. Flexible Mechanisms for Greenhouse Gasses Mitigation

According to the Kyoto Protocol, in addition to national policies, that all of the parties are sovereign to design and to apply, three international market-based flexible mechanisms are created. These are: Joint Implementation (JI), Clean Development Mechanism (CDM) and Emissions Trading (ET).

2.1. Joint Implementation

Joint Implementation (KP 1997, Art.6) is designed to foster technology transfer and enhancement of carbon sinks. Annex I parties may transfer to, or acquire from any other Annex I Party, emission reduction units (ERU), or credits resulting from project activities that reduce emissions. The advantages of JI are:

- Investors are able to lower the costs of emission reductions.
- A significant potential for technology transfer exists in JI.
- JI involves investment in real projects, and creates real economic effects.
- JI can attract investments that otherwise would not occur in the certain countries.
- Owing to the additionality principle, JI has a potential to limit the use of surplus emission reductions, resulting from general economic slowdowns, like that happened in former communist countries (so called “hot air”).
- JI projects are more controllable by the host countries than CDM projects[3]. However, this advantage can become a disadvantage if host countries are incapable of developing

[1] As of September 11, 2003, 117 countries have ratified the Protocol, (32 as Annex I parties) accounting for 44.2% of 1990 emissions.
http://unfccc.int/resource/kpthermo.html

[2] It should be mentioned that, in spite of intentions, the Kyoto Protocol does not guarantee full cost–effectiveness of international GHG emission reductions. A maximum cost-effective international emissions trading program is not compatible with the notion of full national sovereignty regarding the choice of domestic instruments. Costs can be minimized only if Parties use the same mechanisms like the Protocol to meet their domestic targets, not GHG taxes or fixed-quantity standards (Hahn and Stavins, 1999).

[3] JI projects are expected to be mostly intergovernmental activities, with the effects (ERU transfers) recognized and accepted from both sides. The parties involved have incentives and resources to control project quality and the emission transferes. CDM project are primarily oriented to non-governmental sector, incuding local communities and groups, which gives a rationale for strict monitoring and evaluation procedures conducted by the national and interational authorities.

proper control and monitoring mechanisms. If the control mechanisms and institutions are not in place, JI projects can produce bad socio-economic and environmental effects. For example, long-term projects can lock host countries into a situation where they are unable to fulfill their previous commitments, but still have to transfer credits to the other parties involved (Andrei, et. al. 2002).

The main principles regarding JI are: 1) additionality and 2) baseline preparation. The additionality principle means that all JI projects must be additional to the "business as usual" scenario (what would happen without the GHG mitigation project). The additionality is a complex principle covering environmental, financial, technical and legal aspects.

The baseline preparation assumes that, in order to quantify emission reductions, all the parties involved must agree about the amount of emission that would occur without undertaking of the project. The difference between emission levels with and without JI project (emission savings) presents a basis for obtaining JI credits known as ERUs. According to the Article 2 of the Kyoto Protocol each county is allocated an assigned amount of GHGs that are allowed to be emitted during the 2008-2012 period. When a host country wants to transfer ERUs to an investor country, the ERU units are subtracted from the host's assigned amount and added to the investor's amount, with the purpose to avoid double counting of GHG reductions. If the transferred ERUs do not represent additional GHG reductions, a JI host county may encounter difficulties in meeting the Protocol obligations. Therefore it is in the host country's interest to ensure: 1. real additionality of JI projects, 2. accurate estimation of baseline and 3. the appropriate amount of ERU transfers (Anderi et. al. 2002). All the transactions must be entered into national and international registry systems required by the Protocol[4].

2.2 Clean Development Mechanism

Clean Development Mechanism is aimed not only to allow Annex 1 parties to use emission reductions from non-Annex 1 countries, but to help developing countries to achieve sustainable development, via foreign investments (KP, 1997, Art.12). CDM projects, hosted by non-Annex 1 countries, are expected to earn certified emission reductions (CER), which industrialized countries may use to comply with Kyoto Protocol obligations. CDM projects have three overall criteria: 1. Projects must be voluntary 2. Projects must be able to show long-term climate change mitigation benefits and 3. Projects must contribute to emissions reductions above and beyond "business as usual" scenario, in other words projects must be additional (Rosales and Pronove, 2002). CDM projects are expected to generate financing primarily from private rather than from government sources, and will be implemented through non-profit, public and private partnerships, including participation of local communities and groups. The eligible sectors for CDM implementation are: energy, industrial processes, solvent and other product use, waste management, land-use and forestry. Investors from Annex 1 countries can receive credits from CDM projects if the country where they are legally recognized has:

[4] The Kyoto Protocol requires that all Annex 1 countries have to develop national measuring and reporting systems, build national registries, provide timely reporting of the inventories and ultimately reach their targets during 2008-2012 period.

- Commitment quota properly calculated and recorded;
- National accounting system of GHG in place;
- National greenhouse gas inventory submitted;
- Amounts calculated in accordance with Kyoto Protocol communication requirements; (MA, 2001 : F31).

CDM projects can take place in non-Annex 1 countries that will or have ratified the Kyoto Protocol, and that have strong institutional capacities for a regulatory and monitoring framework (Sokona and Nanasta, 2000)[5]. Among the required institutions the most important are: 1. National Authority (NA) which takes part in validation process and has a responsibility of certifying that the project contributes to the sustainable development goals of the host country, and 2. Designated Operational Entities (DOE) that carry out reporting and mediating functions[6].

According to the literature (Baumert, Kete and Figures, 2000) there are three different models of CDM application in practice: A) bilateral B) multilateral, and C) unilateral[7]. The scheme of a bilateral model is shown on Figure 1.

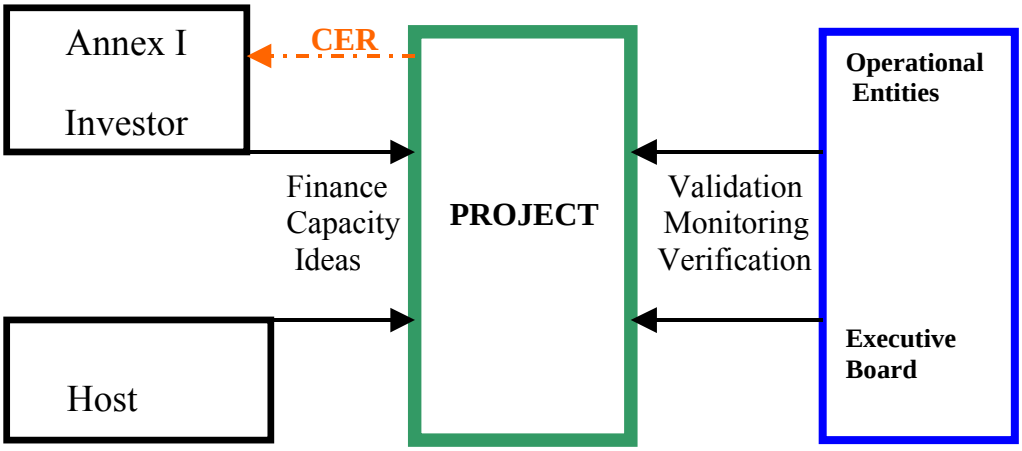

Figure 1. Bilateral CDM model

A) The bilateral CDM model involves the least new institutional capacity, because it is consistent with conventional foreign direct investment models. In the presented structure, the project selection, financing and credit sharing activities are

[5] Sokona and Nanasta (2000) suggest that "other basic capacities that seem indispensable include: an established business environment, an appropriate and well-linked administrative and institutional frameworks, an adequate and well-managed infrastructure, capable project developers and business managers, firm links between the private sector, government and NGOs, and development of accessible project information databases."

[6] The responsibilities of DOE are: to validate CDM project activities, to verify and certify emission reductions, to maintain a public list of CDM projects, to submit an annual report to the Executive Board, and to make information about CDM projects publicly available (MA, 2001: E27)

[7] The idea of unilateral CDM projects, that are generating CERs without an Annex 1 investor, has been raised several times. However, at this moment, it is still unknown how the Executive Board will decide to proceed on the matter. The fact is that such CDM project model is not currently prohibited (Rosales and Pronove, 2002) and it may be very suitable for some of the non-Annex 1 transitional economies.

worked out directly between interested parties on project-by-project basis. However, this may be the reason for quite a high level of transaction costs involved in identifying, preparation, financing and negotiating the project arrangements (Andrei et. al. 2002).

B) A multilateral CDM model, presented in Figure 2, is characterized by a mutual CDM fund, which is organized by a number of Annex 1 investors. Such a model has several advantages. First, it minimizes the investors' risks, spreading them through a group of portfolio holders (analogous to the stockholders' mutual funds) and separating investors from project development and financing. Second, it gives an increased bargaining power to host countries. Instead of a direct dealing with Annex 1 entity, the host country may be negotiating with a fund manager, whose mandate is more compatible to the host's national environmental interests (Andrei et. al. 2002).

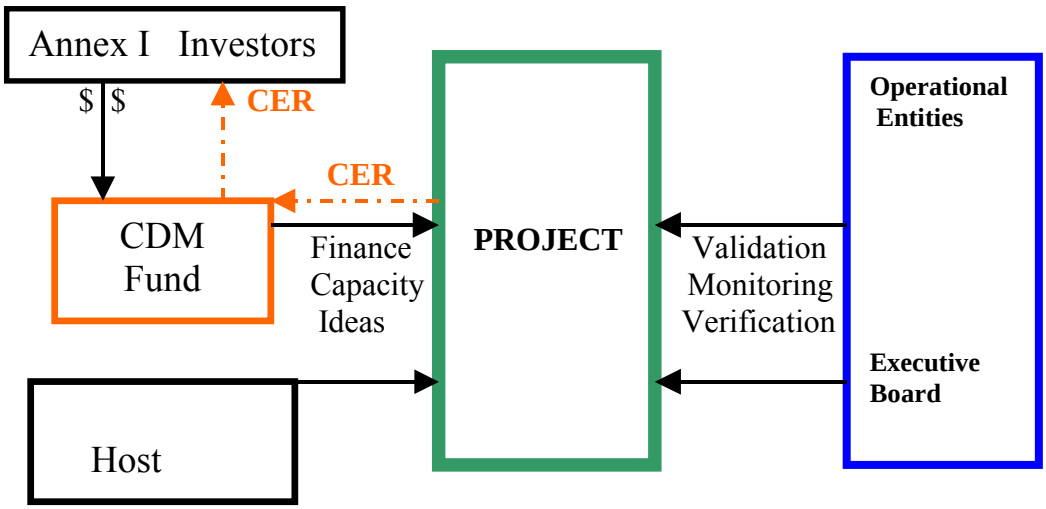

Figure 2. Multilateral CDM model

C) In a unilateral CDM model there is no Annex 1 entity, so the whole project is developed and financed by the host country. Therefore the entire amount of credits belongs to the host entities, which are entitled to sell their credits on the international market. However, host counties are faced with a full range of associated risks. The unilateral CDM projects, presented in Figure 3, need to have an independent third party approval of the: 1. project design, 2. baseline calculations and 3. clamed emission reductions.

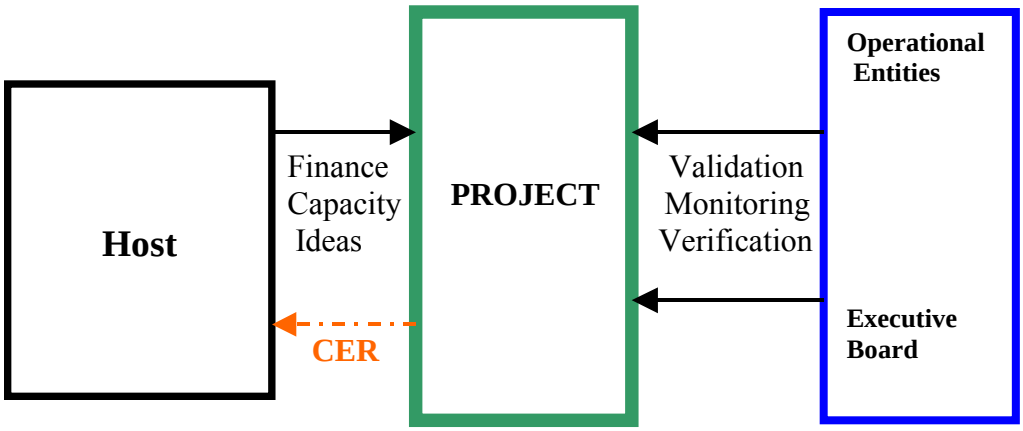

Figure 3. Unilateral CDM model

Generally, the unilateral CDM model is attractive for countries with a sufficient capacity and resources to select, finance and to operate sustainable development projects, but unable to attract enough bilateral or portfolio investments, because of unacceptably high country risks (Andrei et. al., 2002). Some of the transitional non-Annex 1 countries, especially West Balkans, are the exact case. However, lack of domestic capital, inadequate institutional setup, and low social credibility are the most serious obstacles to such CDM model.

The difference between JI and CDM, related to the Annex I membership, may have significant consequences. In JI, any baseline calculation error has globally neutral effects, because it is automatically offset, since both countries are subject to emission reductions. However in the CDM case, errors in baseline calculations may lead to higher global emissions than without the project, since non-Annex I countries have no initial emission limits.[8] This gives a firm rationale for a strict international monitoring and verification of CDM projects (OECD, 1999).

2.3. Emissions trading

An international emission trading (ET) is a "cap and trade" system for Annex B Parties (KP, 1997 , Art. 3, Art. 17). The Kyoto Protocol enables any two of Annex B Parties, at any time, to exchange part of their emission commitment, consequently redistributing the allowed amount of emissions. Owing to the fact that all GHGs are perfectly mixing in the atmosphere, international emission trading has globally neutral environmental consequences, as long as global emission levels are same with and without trading.

[8] CDM baseline errors could also go the other way, leading to lower global emissions. However, both sides have more incentive to exaggerate the impact of the project by inflating baselines than unrealistically diminishing it's initial level. (OECD, 1999)

Different countries and regions have different degrees of carbon-intensity, different productive efficiencies, and various elasticity of fuel substitution. That's why countries and regions are experiencing various marginal abatement costs of GHG mitigation. The essence of emission trading lies in an opportunity that any entity with higher marginal abatement costs can pay, to an entity with lower costs, certain price for a previously agreed amount of emission reduction. Therefore, the overall economic effect is generally positive, with neutral environmental consequences. This mechanism may involve private companies that could trade between each other. The allowances traded are assigned amount units (AAUs) and removal units (RMUs) (KP, 1997 Art. 6, Art.17).

The Kyoto Protocol clearly states that ET should be supplemental to domestic actions to reduce GHG. This reflects an intention to ensure that all the participants will undertake some real measures to reduce domestic emissions, and that they will not relay solely on buying emission rights in order to meet their commitments. This gives the rationale to limit the use of ET to a certain proportion of total allowances.

By allowing carrying over of the unused permits into future commitment periods Article 3 of the Protocol permits the reallocation of emission reductions over time, enabling so called "banking".

Summarizing the flexibility potential offered by the Kyoto Protocol it can be stated that four basic types of flexibilities are envisaged: 1) the WHERE flexibility which allows GHG reductions to be located in countries with the minimal costs; 2) the WHEN flexibility which allows the reallocation of emission reductions in the time dimension; 3) the WHAT flexibility which allows a choice between cutting six different gases and/or enhancing sinks instead of cutting emissions and 4) the HOW flexibility leaving Parities free to chose their domestic climate protection policy mix (OECD 1999).

3. Economic Implications of the Kyoto Protocol

3.1. Costs of the Kyoto Commitments

In order to estimate potential costs and benefits of the Protocol a number of models for assessing economic aspects of climate change and climate protection policies has been developed[9]. All the models are based on a set of simplifying assumptions like

[9] According to the literature (OECD 1999) the most frequently used models for Climate Change analysis are:

AIM (Asian-Pacific Integrated Model) integrated assessment model based on the global recursive general equilibrium model, a warming forecasting and impact model developed by the National Institute for Environmental Studies and the Faculty of Engineering , Kyoto University

CETA Carbon Emissions Trajectory Assessment Model developed by the Electric Power Research Institute

EMF-16 the Energy Modeling Forum at Stanford University produced a study using different 16 models of the Kyoto costing for the OECD regions

EPPA Emissions Projections and Policy Analysis Model, a general equilibrium model developed by the Massachusetts Institute of Technology

the neglect of all non CO2 gasses, neglect of the potential ancillary benefits of GHG mitigation, and to some extent on the assumption of high labor mobility, which means that wages adjust flexibly, leading to underestimation of the adjustment costs.

For the purposes of this paper, results from the OECD's GREEN model have been used. GREEN model has a recursive dynamic structure, in which saving decisions affect future economic growth. Production sectors (11 sectors) operate under constant returns to scale and markets are perfectly competitive. Besides its global nature the GREEN model consists of twelve regional sub-models: a) four OECD regions (USA, Japan the EU and other OECD b) eight non-OECD regions (the Commonwealth of Independent States, Eastern Europe, China, India, Energy Exporter countries, Dynamic Asian Economies, Brazil and Rest of the World group).

In the first step of analysis (OECD 1999) the economic impact of the Kyoto Protocol is estimated assuming of individual implementation of the emission targets, under the so called "no-flexibility" approach[10]. A plausible projection of future emissions as they would be expected in the absence of any policy action is named "business as usual scenario" (BAU) . According to the BAU scenario GDP projections for Eastern Europe are among the World's highest (Table 1). Future CO2 emissions, related to GDP growth, resource depletion, demand shifts, and technological development are shown in Table 2.

G-Cubed a multi-region and multi-sector intertemporal general equilibrium model, currently used by the US EPA

GEM-E3 a general equilibrium model for the EU-14

GTEM Global Trade and Environment Model, dynamic general equilibrium model of the world economy developed by the Australian Bureau of Agricultural and Resource Economics

GRAPE Global Relationship Assessment to Protect Environment Model developed by the Institute for Applied Energy , the Research Institute of Innovative Technology for Earth, University of Tokyo

MERGE Model for Evaluating the Regional and Global Effects of GHG reduction policies, an intertemporal market equilibrium model combining a bottom-up and top-down approaches developed by A. Manne and R.G. Richels

GREEN a multi-counrty, multi-sector, dynamic applied general equilibrium model developed by the OECD with the explicit aim of quantifying global costs of GHG mitigation

MS-MRT a multi-sector multi-region general equilibrium model of international trade, developed at the University of Colorado

Oxford Model a macroeconomic model with a short to medium term focus

POLES a global energy system model used by the European Commission

PRIMES a partial equilibrium model of the European energy system

RICE Regional Integrated Climate and Economy Model Developed by the Yale University

SGM Second Generation Model developed by the Batelle Pacific Northwest National Laboratory

WorldScan a multi-sector multi-region, recursively dynamic applied general equilibrium model of the world economy developed in Netherlands

[10] The rationale for such an approach can be found in: 1) uncertainty about the extent to which flexibility mechanisms will be allowed to work 2) uncertainties about implementation aspects of the mechanisms and little knowledge about technological progress and sink enhancement 3) such approach is expected to provide an upper bound estimate of the costs (maximum) that can be used as benchmark to evaluate the effectiveness of the flexibility mechanisms.

	1995-2000	2000-2005	2005-2010	2010-2030	2030-2050
Eastern Europe	3.6	4.6	4.1	3.6	3.1
Annex 1	2.1	2.6	1.8	1.5	1.2
Non-Annex 1	3.1	3.7	3.6	3.5	3.2
World	2.3	2.8	2.2	2.0	1.8

Average yearly growth rates, percent

Table 1. GDP projections underlying the baseline scenario (BAU) with GREEN (OECD 1999)

	1995-2000	2000-2005	2005-2010	2010-2030	2030-2050
Eastern Europe	1.2	1.8	2.0	2.6	2.3
Annex 1	1.2	2.0	1.9	1.2	1.4
Non-Annex 1	3.9	3.8	3.7	3.9	2.9
World	2.2	2.7	2.7	2.6	2.3

Average yearly growth rates, percent

Table 2. CO2 Emissions in the baseline scenario (BAU) with GREEN (OECD 1999)

The most convenient way of expressing macroeconomic costs of any policy measure is by using GDP changes. The GDP changes can be expressed in a) absolute terms; b) as percentage of the reference case GDP; and c) as variation in GDP growth rates. Absolute amount of GDP may be misleading because it depends on the price base chosen, and if quoted in present value it is highly sensitive to the discount rate choice. The percentage change of the reference GDP avoids discounting problem (because the policy costs and the level of GDP are contemporaneous). GDP growth rates are the most adequate for long-term analysis (Barker and Ekins, 2003). Marginal costs of abating a ton of carbon can also be used in constant prices for presenting the economic costs of the Protocol implementation.

According to the GREEN model, estimates of the economic impact of the Kyoto Protocol implementation, without flexible mechanisms, in 2010 are given in Table 3.

	Emission change in % relative to BAU in 2010	Marginal abatement cost per ton of carbon in 1995 $	Total cost as percentage reduction of GDP in 2010
United States	-36	231	-0.3
Western Europe	-22	189	-0.2
Eastern Europe	-15	32	-0.3
Commonwealth of Independent States	4	0	-0.1

Table 3. Estimates of the economic costs of the Kyoto Protocol implementation in 2010 without the flexibility mechanisms (OECD 1999)

It can be concluded that total cost estimates may appear low compared to the size of emission cuts and their abatement costs. However total costs are expected to be low only if real wages are flexible. At the same time, it must be kept in mind that some sectors and some regions would be faced with much higher costs and GDP reductions than the average[11]. Variation in the marginal abatement costs between countries and the regions is significant, offering a potential for the broad implantation of flexible mechanisms. A substantially different position of the Commonwealth of Independent States (CIS) can be explained by the high amounts of "hot air" created by the transitional recession and structural changes. If we have in mind an important role of Russian forests as carbon sinks, it becomes obvious why marginal abetment costs are expected to be zero. Although not imposing any carbon limitation, the CIS would lose from an adverse terms-of-trade effect due to reduced energy export revenues. Conversely, the slight real income gain in Eastern Europe results from a drop of the world oil price, that has been envisaged by the GREEN model (OECD 1999).

In most of the global economic models, costs of carbon limitations tend to be underestimated, particularly in the short and medium term, owing to the perfect labor and capital mobility assumption. The OECD's GREEN model is an exemption containing some adjustment costs associated with capital turnover. But even with those adjustments, aggregate cost estimations remain modest. However, the existence of wage rigidities may drastically increase the aggregate cost level (Table 4).

[11] It must be stated that the impact of the estimated emission reductions on atmospheric concentrations and climate change will be small. To create a significant impact on the global warming will require much greater efforts, higher emission cuts and broader number of participants in the process, so the significantly higher costs may be expected.

	Fully flexible real wages		Fully rigid real wages		
	GDP	Household real income	GDP	Household real income	Unemeployment rate
United States	-0.3	-0.3	-4.6	-5.1	5.8
European Union	-0.2	-0.9	-4.8	-6.1	5.8
CIS	-0.3	-1.7	-0.3	-1.9	0
Eastern Europe	-0.2	0.1	-0.3	-0.5	0
Total Annex 1	-0.2	-0.5	-3.8	-4.5	4.9

Percent deviation relative to BAU in 2010

Table 4. Economic impact of real wage rigidities on the Kyoto Protocol implementation costs without permit trading (OECD 1999)

From the GREEN model several conclusions can be made: *first*, flexible and adaptable labor markets will do a lot to keep down the aggregate economic costs of implementing the Protocol (OECD 1999); *second*, implementation of the Protocol is expected to have a large impact on the international energy prices, oil prices particularly are expected to drop, which will cause a real income loss of 3% among the oil-exporting countries and simultaneous benefits for oil importing countries including Eastern Europe; *third*, lower oil prices are likely to cause migrations of carbon-intensive and energy-intensive industries from Annex 1 to non-Annex 1 countries, leading to "carbon leakage" phenomenon. "Carbon leakages" can be generated **a**) through non-energy markets, when unilaterally imposed carbon abatements raise production costs which affect the competitiveness of energy intensive industries. The energy-intensive sectors in Annex 1 countries tend to loose role on the international market, to the benefit of the non-Annex 1 industries, faced with the growing demand; **b**) through energy markets, when the unilateral carbon abatement policies in the Annex 1 countries will cause a fall of the international energy-input prices, thus increasing energy demand and carbon emissions in the non-Annex 1 part of the World.

"Carbon leakage" presents one of the greatest uncertainties in the Protocol implementation. Its impacts and influence are still subject of scientific disagreements, although some of the Global Climate Change models are trying to quantify the "leakage" effects.[12]

[12] MERGE model , G-CUBED model and MIT-GTAP model are using "leakage ratio" as the ratio between additional emissions in non-Annex 1 countries and the total emission reductions in Annex 1 countries. According to the mentioned models the leakage ratio is slightly below 10% , whereas GREEN model offer around 5% estimate.

3.2. Cost-reduction Potential of the Flexible Mechanisms

The Kyoto Protocol flexible mechanisms created with an aim of cost minimization and economic efficiency gains are expected to play a crucial role in the implementation processes all over the World. According to the OECD's GREEN model all types of flexibility provisions (WHERE, WHEN, WHAT and HOW flexibility) have a significant potential for cost-savings. Simulations with the GREEN model suggest that total GDP loss for the OECD countries could be cut by more than 30%, becoming virtually insignificant close to 0.1%, by 2010 (OECD 1999).

	Marginal abatement cost per ton of carbon in 1995 $ without trade	Marginal abatement cost per ton of carbon in 1995 $ with trade	Percentage change of GDP in 2010 with emissions trading
United States	231	90	-0.2
Western Europe	189	90	-0.2
Eastern Europe	32	90	0.9
Commonwealth of Independent States	0	90	1.3

Table 5. Marginal abatement costs without and with Emission Trading (OECD 1999) and impact of the Protocol implementation with Emission Trading on GDP (OECD 1998)

About 80% of gains from emissions trading is expected to be a result of efficiency improvements and GHG reductions in the CIS. By 2010 the CIS is expected to sell about 130 million tons of carbon as a "hot air", and about 280 million tons further, as real emission reductions. This will produce about 39 billion US $ (1995 prices) of income annually, and about 30% of it is expected to come from the "hot air" trade. Even the wage rigidity effect, in the Kyoto Protocol implementation, would produce different outcome if permit trading was introduced as a flexibility provision (Table 6).

	Fully flexible real wages		Fully rigid real wages		
	GDP	Household real income	GDP	Household real income	Unemeployment rate
United States	-0.2	-0.4	-2.4	-2.9	3.0
European Union	-0.1	-0.4	-2.4	-3.0	2.9
CIS	-1.1	8.5	-1.1	7.5	0
Eastern Europe	-0.5	1.1	-0.5	0.6	0
Total Annex 1	-0.1	-0.1	-2.0	-2.2	2.5

Percent deviation relative to BAU in 2010

Table 6. Economic impact of real wage rigidities on the Kyoto Protocol implementation costs, with permit trading (OECD 1999)

In spite of the fact that flexible mechanisms are aimed to produce efficiency in the Protocol implementation, certain limitations should be made. According to the Protocol (Article 17) flexible mechanisms, ET particularly, are supposed to be supplemental to domestic actions for the purpose of meeting reduction commitments. This means that it would be unacceptable and contradictory to the essence of the Protocol to rely only on market based instruments. Certain domestic activities are expected to take main part in the Protocol implantation, and that is why restrictions to the flexible mechanisms use must be defined.

Restrictions to the WHERE flexibility can take a form of**:** A) market segmentation, B) trade restrictions, and C) market power control.

A) Market segmentation refers to the possibility that some of the Annex 1 parties will not participate in the global trading, but only in the regional market operations, allowing differentiation in the marginal abetment costs between different regions. So called "umbrella group of countries" will be allowed to trade under the "bubble" scenario. The aim of such scenario would be to limit the "hot air" potential of certain economies, for example Eastern European countries and the CIS. The consequence would be in lowering financial effects and increasing real incentives for carbon reductions. **B)**Trade restrictions, in a form of "caps" or "ceilings", would be more stringent instrument, that may create differences in the marginal abatement costs between the rationed countries and the rest of the world[13]. Those differences would lead to rent incomes, and would affect international distribution of the Protocol gains. **C)** Market power control would be needed in case if the CIS, or Russia only, entered the global

[13] According to the GREEN model simulations, with unrestricted trading among Annex 1 countries the CIS would sell 43% of its Kyoto commitment by 2010. Limiting this proportion to 30% is expected to have only marginal impact on Annex 1 parties.

emissions market. The size of potential supplier in the carbon market may cause its monopolistic behavior, which may result in efficacy loses and wealth redistribution (OECD 1999). Reducing the WHERE flexibility is particularly linked to the CDM provisions. CDM projects undertaken in non-Annex 1 countries are more likely to trigger carbon leakage than Emission trading (Bollen et al 1998). According not only to the GREEN model, most of the CDM projects are expected to take place in China. This gives a rationale either for strict monitoring and scrutiny in certifying the emission reductions, or for limitation of CDM activities.

By allowing "banking" of the carbon reductions the Kyoto Protocol envisages a flexibility in the time dimension too. The fact that the targets are defined in the average terms over a five years period, also gives freedom to choose a cost-effective time path. It is realistic to suppose that abatement costs will be lower over time, owing to the new energy sources and low-carbon technologies, becoming less costly and more available. However, delaying abatement to the later years may increase the effort required to bring emissions down to the levels specified in the Protocol. The answer to the question whether to abate carbon in the early stage, or in the later phase of the Protocol implementation, remains unsettled, because of high uncertainty in the pace of technical progress. Because of that, it is still uncertain whether to restrict the WHEN flexibility or not.

The HOW flexibility relates to a choice of the various domestic policy instruments. The Protocol specifies that Annex 1 countries are sovereign to set their own national climate policy mixes, and to progressively reduce or phase out market imperfections that are in a contradiction to the essence of the Protocol. One of the best examples of a such provision is removal of the energy consumption subsidies in all of the transitional economies. Although it is clear that removing of energy subsidies is a "no regret" measure and it may be very efficient in the Protocol implementation[14] , the choice of other policy instruments remain uncertain. The fact is that costs of the Protocol implementation can be minimized only if Parties use the same domestic mechanisms as the Protocol envisaged for the international application, not GHG taxes or fixed-quantity standards (Hahn and Stavins, 1999).

In the Kyoto Protocol six different types of greenhouse gasses are mentioned. The Parties are free to chose what gasses are to reduce, allowing substitution in the emission reductions. This is part of so called WHAT flexibility. Besides that, Parties are free to use carbon sequestration potential of reforestation activities and land use changes. However, measurement uncertainties for non-carbon dioxide gases are still high. Many unsettled issues are to be clarified before non-CO2 emission trading becomes regular. Also, the sequestration potential of carbon sinks remains insignificant for the first commitment period of the Protocol, because the impact of forestation measures will be significant only after 40-50 years (OECD 1999).

In a conclusion, it can be stated that in spite of the necessary restrictions to the flexibility mechanisms, their economic potential and cost-saving properties remain crucial for the Kyoto Protocol implementation. In the further analysis, those potentials,

[14] The GREEN model simulations also confirm that removal of fossil-fuel subsidies lowers the aggregate economic costs for Annex 1 countries as a group (OECD 1999), however ancillary benefits of the GHG mitigation (lower sulfur dioxide and particle matter emissions) were not included in the model.

along with the additional and ancillary benefits of the GHG mitigation, should be included in the model building, particularly for the Eastern European countries.

4. Climate Protection Activities in Central and Eastern Europe

4.1. Energy and Carbon Landscape in the Region

The challenges of climate protection activities in Central and Eastern Europe (CEE) are significant (Baumert et. al., 1999). There are several reasons for that. *First*, owing to the transitional recession, in all of the post-communist states, current GHG emissions are already far below 1990 levels (Table 9). This gives an opportunity for most of the CEE countries to reach the Kyoto targets without further difficulties and without a deeper macroeconomic contraction. *Second* , during 1980s and 1990s, all of the CEE countries experienced very high carbon intensities, much higher than in OECD (Figure 5). The typically high carbon intensities indicate that a potential for low-cost emission reduction opportunities exist in the region. Most of the energy equipment and facilities in the region are worn out, or technologically are out of date. In order to improve energy landscapes, most of the transitional economies need substantial investments. This creates a well-known opportunity, so called "putty-clay technology"[15]. *Third* , the Kyoto Protocol offers special provisions for the countries in transition, giving them a certain degree of flexibility in the base year selection (Art. 3.4 and Art. 3.5)[16]. *Fourth* , climate protection activities can bring environmental, economic and financial benefits, by fostering technology transfer, sustainable development and financial flows from the West. Upgrading technology, improving energy efficiency, raising human capital potential and improving air quality are the most obvious advantages of climate protection policies adopted in the region.

Emissions trading may be very lucrative for Central and Eastern European counties that encountered transional recession, after 1990. Owing to the general economic contraction on the supply-side, most of the post-communist countries have obtained unintended emission savings, so called "hot air". However, those "savings" do not stream from real environmental improvements, but from a general economic slowdown. By trading "hot air", some reductions that would never have occurred, are being purchased, undermining the whole Kyoto Protocol structure.

[15] Most of the energy and environmental economists are aware of the phenomenon, called "putty-clay technology". The fact is that energy substitutability is much higher when choosing among industrial equipment at the time of an initial investment or major upgrade, than after the equipment is already in place. It is much more cost effective to introduce carbon saving technology in the course of the general reparation and rebuilding of energy systems, than as a part of equipment retrofit (Sachs, et. al. 1999).

[16] The calculated carbon emission base levels in Poland, Hungary, Bulgaria and Romania are on average 22% higher than real 1990 levels, owing to the mentioned flexibility, resulting in significantly easier reduction requirements (Baumert, 1990).

According to the recently published analysis (Pretel 2003), the estimated AAU[17] potential for trading in CEE amount the level of 1019 Mt of CO2eq per year (Table 7).

Group of Parties	estimated AAUs for transfer
EITs in total	1019
EU acceding countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia),	229
EU candidates (Bulgaria, Romania, Croatia)	95
others (Russian Federation, Ukraine)	695

Table 7. Estimated AAUs surplus for EITs in Mt CO_{2eq}/yr. (Pretel, 2003)

The estimated surplus is based on "with measures" scenario[18], considered to be the best assessment for 2010 GHG emission outlook. For the EU acceding and candidate countries the AAU estimation is about 324 Mt CO2 eq annually (Figure 4).

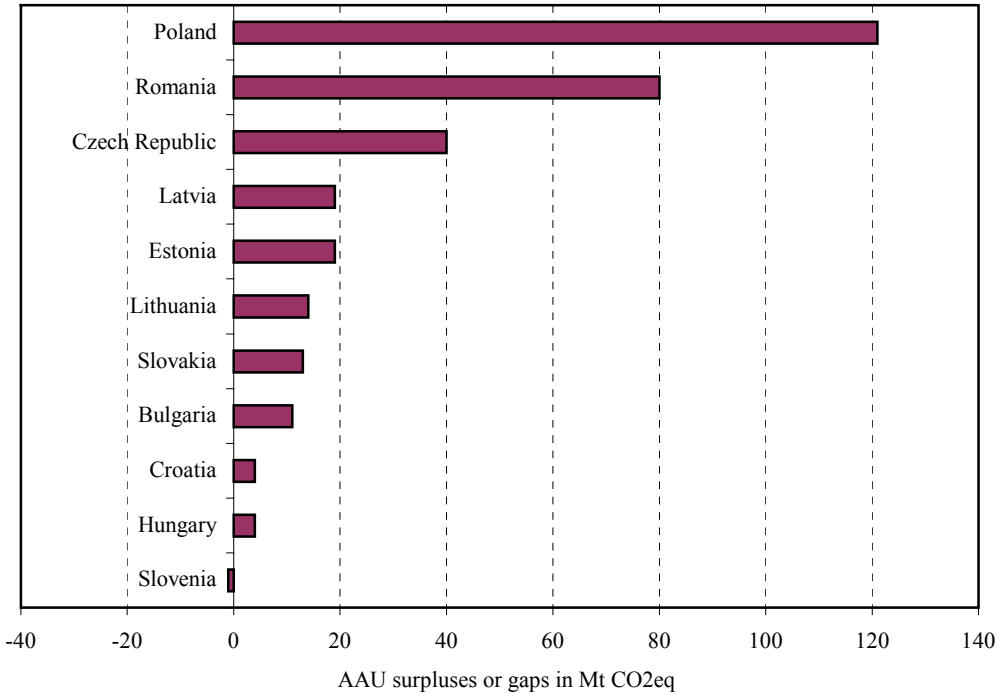

Figure 4. Estimated AAU surpluses/gaps for EU acceding and candidates countries (Pretel, 2003)

On the demand side, applying the same methodology, it has been estimated that the Annex II countries, that have already ratified the Kyoto Protocol, are expected to have

[17] Assigned Amount Units (AAU) represent the total amount of GHG that each Annex B country is allowed to emit during the first commitment period.
[18] The emission projections are expected to be made upon three scenarios: a) "without measures" , b) "with measures" c) and the lest probable "with additional measures"

annual AAU deficits of 525 Mt CO2 eq (Pretel, 2003). The yearly amount of AAU gap in the EU member states is expected to be 193 Mt (Table 8)

Party	estimated AAUs demand
Austria	18
Belgium	32
Denmark	2
Finland	13
France	50
Germany	-153
Greece	4
Italy	75
Ireland	14
Netherlands	26
Portugal	20
Spain	101
Sweden	-2
United Kingdom	-7

Table 8. Estimated AAUs demand for EU Member States without Luxemburg in Mt CO_2 eq/yr (Pretel, 2003)

According to the projection (Pretel 2003), AAU surpluses in the EU acceding and candidate countries are higher than the expected demand. Assuming that the potentially big international carbon-market players, USA and Russia, will stay out of the Kyoto Protocol, the only conclusion is that the AAU price will go down. This gives a rationale for the EU acceding and candidate countries to start emission trading operations as soon as possible (Pretel, 2003).

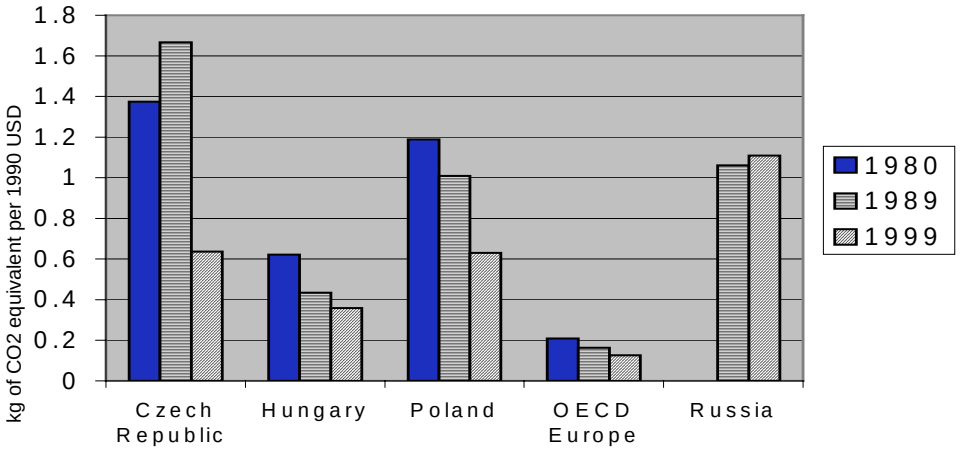

Figure 5. CO_2 emissions per unit of economic output in selected countries and OECD in 1980, 1989 and 1999 (Urge-Vorsatz, et.al. , 2002 ; Source: IEA 2002)

It is not a surprise that some of the most developed and forward-moving CEE countries have adopted Annex 1 status, committing themselves to the significant GHG emission reductions by more than 5 % (Table 9).

COUNTRY	BASE YEAR	KP TARGET	BASE EMISSION **X**	1999 EMISSION **Y**	DIFFERENCE **(Y-X)/X**
Bulgaria	1988	-8%	131,856	58,736	-55.45
Czech Rep.	1990	-8%	180,753	132,310	-26.8
Estonia	1990	-8%	42,470	19,301	-54.55
Hungary	1985/7	-6%	97,628	75,228	-22.94
Latvia	1990	-8%	27,642	12,369	-55.25
Lithuania	1990	-8%	47,472	21,479	-54.75
Poland	1988	-6%	542,579	378,300	-30.28
Romania	1989	-8%	244,323		
Slovakia	1990	-8%	66,795	48,341	-27.63
Slovenia	1990	-8%	17,636		

Table 9. Annex I CEE countries, base emissions[19], 1999 emissions[20], and emission changes. (Source: UNFCCC GHG database)

Table 9 shows that in all of the analyzed countries, except Slovenia[21], the 1999 GHG emissions are approximately from 23% to 55% below the base level. The explanation for this can be found not only in the improved carbon efficiencies, but also in still existing high "hot air" levels.

By the year 2000 only Poland, Hungary and Slovakia have achieved pre-transitional GDP levels. The Czech Republic approached closely to the 1989 GDP level (Figure 6). This means that in the Czech Republic, Hungary, Poland and Slovakia there is no more "hot air", and their further emission reductions can be traced only to the joint effect of reduced carbon intensity (Figure 8) and improved energy efficiency in economy (Figure 7). However, all other CEE countries still may exploit the "hot air" potential.

Although it may seem that in all of the analyzed countries the Kyoto Protocol target is a "low hanging fruit", much remains to be done. There are still significant differences in the carbon intensity, between CEE and EU economies (Figures 9,10), and a high potential for improvements exists. According to the projections (Baumert et. al., 1999) most of the CEE countries are expected to experience a sustained period of economic growth and "hot air" will soon disappear. For example, Bulgaria, under a "business as usual" scenario, is expected to surpass the base year carbon emission levels by 2005, but under a GHG mitigation scenario Bulgarian emissions are projected to

[19] CO_2 CH_4 HFCs PFCs and SF_6 total emissions in Gg of CO2 equivalent. Source: UNFCCC http://ghg.unfccc.int/default1.htf

[20] 1999 data for Romania and Slovenia are not available.

[21] Owing to the very low GHG emission base levels, Slovenia is expected to be the only CEE country that may have problems with the Kyoto Protocol commitments. (Maly, et.al. 1999).

remain below the base level through at least 2015[22]. A similar situation is in Slovakia where, according to several projection scenarios, the 1990 emission level is expected to be reached before 2010. The most important sectors that will contribute to the future emission increases are transportation and tourism, processing industry and, to some extent, energy production. The only sustainable solution for all of the CEE countries is to achieve the Kyoto Protocol targets by diminishing carbon intensity. A review of carbon intensity data indicates that forward-moving reformist countries have already brought their energy intensities significantly down (Figure 7).

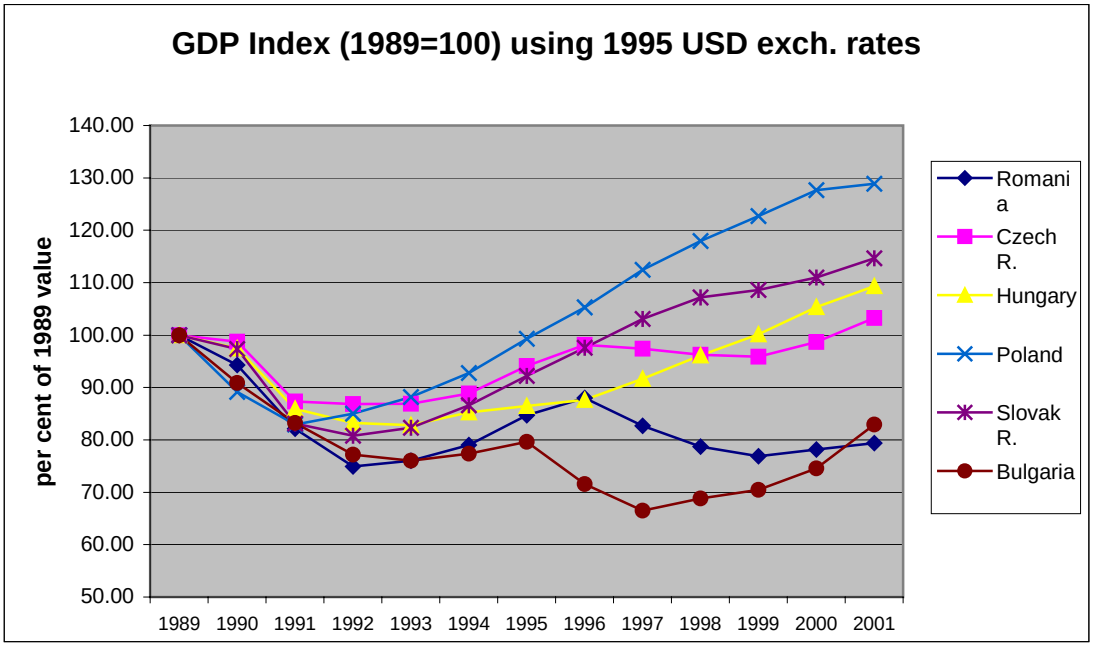

Figure 6. GDP of Annex I CEE countries (1989=100%) (Source: IEA, 2003)

[22] Bulgaria, 1996.

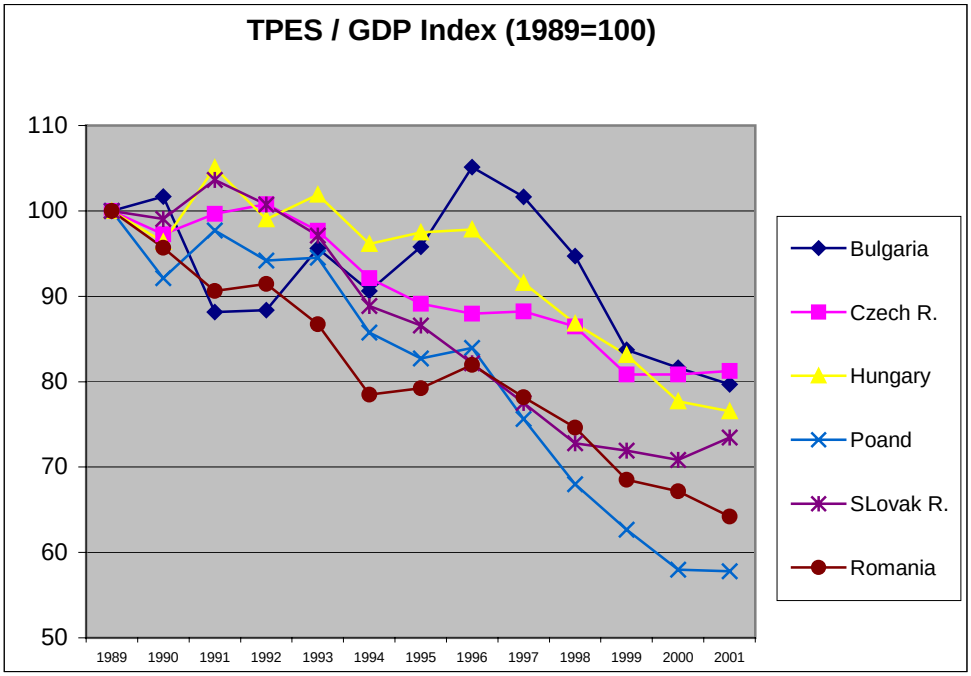

Figure 7: The development of energy intensities in CEE countries, 1989 –2001 (Source: IEA, 2003)

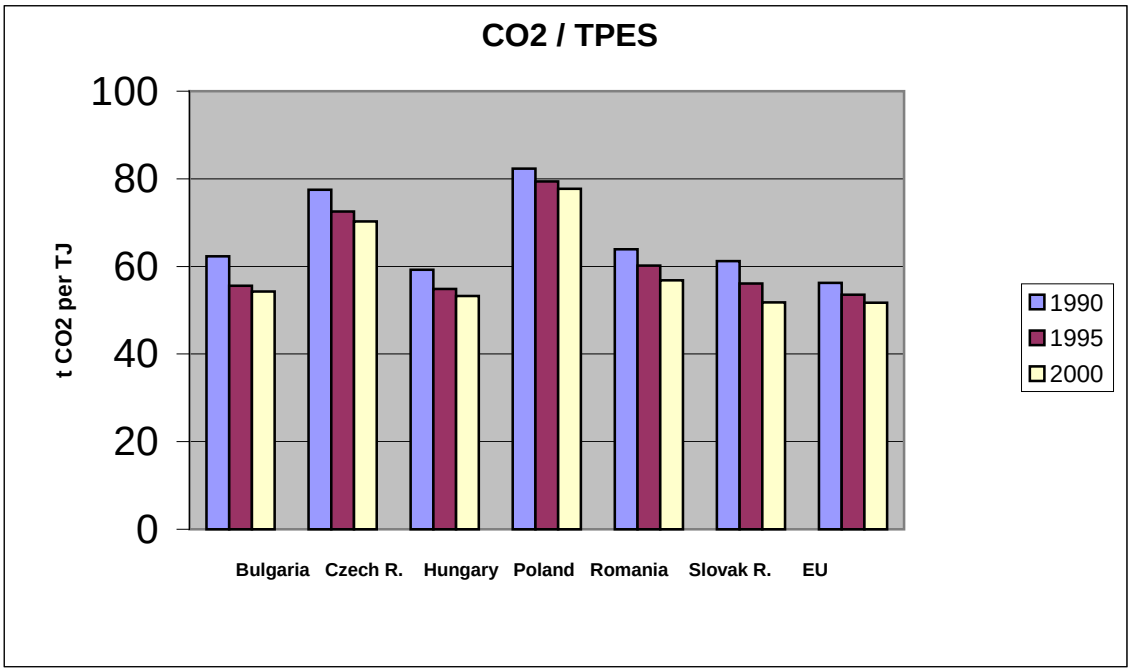

Figure 8. Carbon intensities (CO2/primary energy) in selected CEE economies and EU. (Source: IEA 2003)

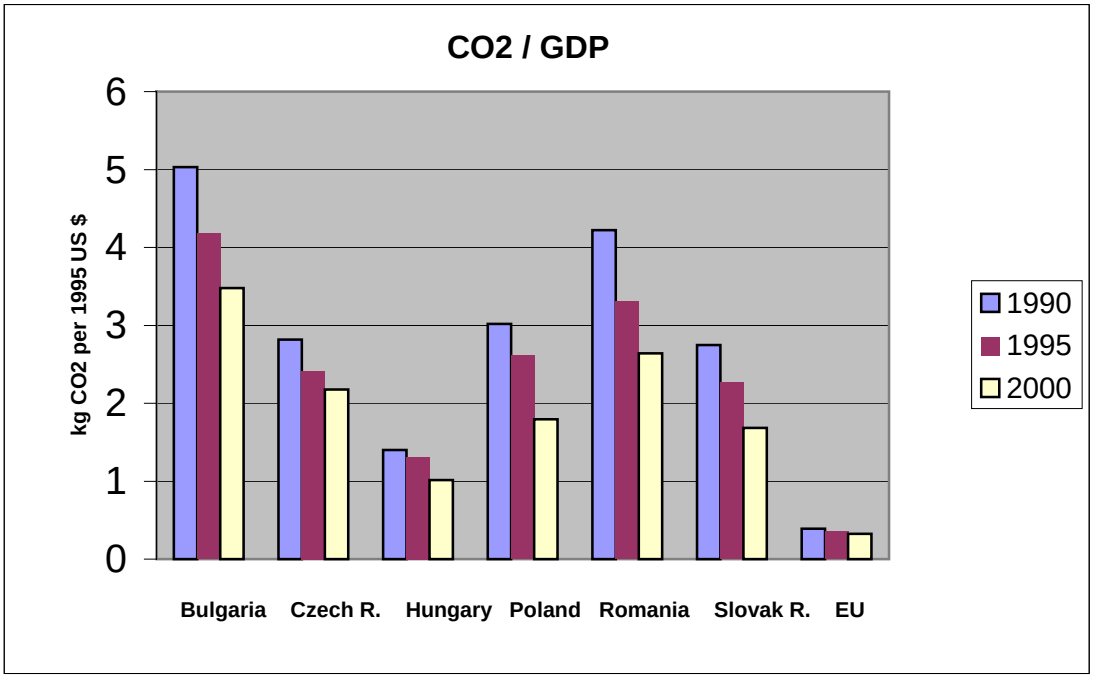

Figure 9. Carbon intensities (CO2/GDP) in selected CEE economies and EU. (Source: IEA, 2003)

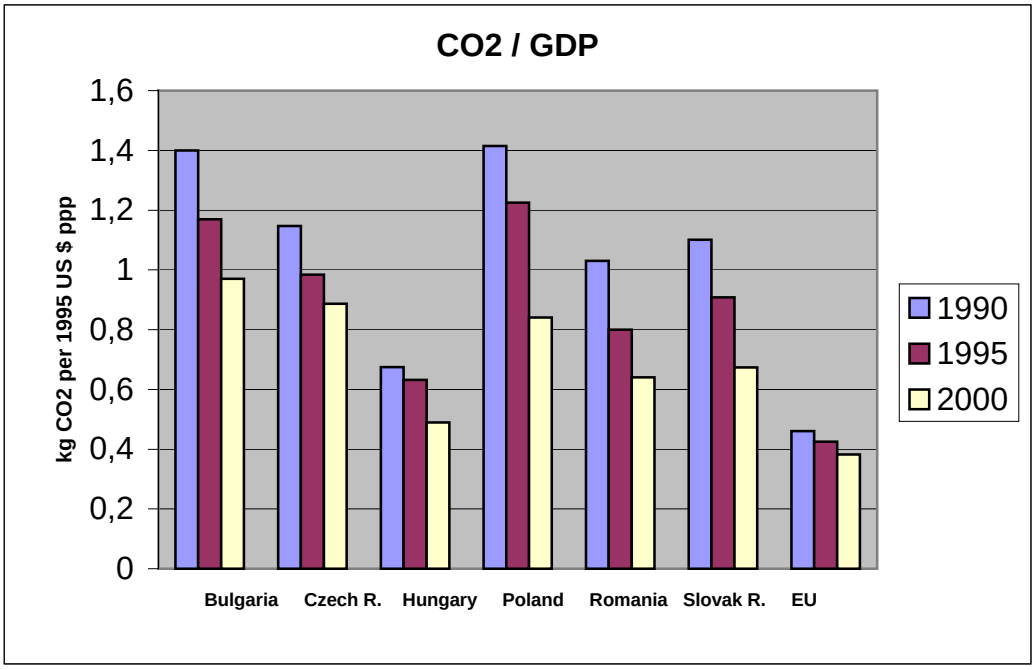

Figure 10. Carbon intensities (CO2/GDP ppp) in selected CEE economies and EU. (Source: IEA, 2003)

4.2 Carbon Saving Activities in the Region

The most important carbon saving activities and policies are connected with the energy sector reforms. Restructuring of energy sectors in CEE is one of the most sensitive and complex transitional issues. Decentralization of energy production, transmission and distribution, breaking up of state monopolies, commercialization of non-core activities, and market liberalization are on the top of the reform agendas in all of the fast-moving economies (Ürge-Vorsatz et.al.2002). A complementary strategy is price liberalization. A combination of regulated price increases, plus elimination of subsidies, adjusting energy prices to approximate full-cost levels are essential for the energy efficiencies. In Poland and Hungary prices have already been raised close to the EU level, while subsides have successfully been cut off. In other CEE countries energy price reforms are still to be completed.

Privatization of energy sector is another key element of the restructuring process. Limited privatization has occurred in Hungary[23], Poland[24], Czech Republic[25]. It is underway in Bulgaria[26], and is in an initial stage in Romania. In most of the transitional economies privatization is seen a revenue raising activity, but also as technology and management transfer stimulus. In the Hungarian energy sector privatization created some positive environmental effects (MVM, 2001).

Liberalization and market opening are essential for a successful energy sector transformation. Empirical evidence from more that a hundred cases all over the world (Pollit, 1995) suggests that the price liberalization and competition, induced by dismantling of monopolies, are more important than privatization, in providing incentives for efficiency improvement and emission reductions (Baumert, et.al. , 1999). However, there is, also, clear evidence from the Ukrainian electricity sector reforms, during 1990s, that there is no successful transformation without privatization, or without at least alteration of ownership structure (Pesic and Ürge-Vosatz, 2001). In CEE the highest level of energy sector liberalization has been achieved in Hungary, Poland and Czech Republic. In the mentioned countries independent Energy Regulatory Offices have been set up, and the domestic electricity and gas markets have been partially opened for a competition. It is worth mentioning that an open energy market has been successfully institutionalized in Poland (Gielda energii).

Most of the CEE countries have undertaken complex multi-sectoral policies, targeted to increase energy efficiency. Hungary, Czech Republic, Estonia and Slovakia

[23] In Hungary the privatization of electricity sector has been practically finished. All of the electricity distribution companies, and all but one generating plants (Paks) have been sold to the foreign strategic investors who acquired majority stakes in key utilities. Electricity transmission grid remains public (MVM 2002). Hungarian Oil Company (MOL) was also privatized in 1996.

[24] The Polish government is in a process of selling shares in the 55 electric power companies and in 33 distribution companies to the foreign strategic investors. French (EDF and GDF), Swedish (Vattenfall), Belgian (Tractabel) and Spanish (Iberdola) companies are the most active players (Maly et.al. , 2002).

[25] In the Czech Republic, the 67% state owned generating company, CEZ is a dominant electric power utility. Independent power producers cover about 30% of the total electricity supply. Among them are U.S. , French and UK companies (Maly et.al. , 2002). Transmission and distribution remain mostly under the governments' control.

[26] In Bulgaria, the first phase of privatization in the energy sector has begun with the planned sale of 22 small hydro plants, with a total capacity of 226 MW. Another 41 hydro plants with a total capacity of 148 MW will follow this sale (Maly et. al. , 2002)

have prepared National GHG mitigation strategies that were included in the National communications to the UNFCCC. A similar document is in a course of preparations in Poland.

National climate change policies include a broad range of fiscal instruments (carbon taxes, energy fuel taxes, electricity taxes, renewables subsides), technical standards (energy labeling and building codes), transportation policies and agricultural policies. Information and awareness programs on energy efficiency are applied in all of the Annex 1 countries in the region. Special attentions deserve "Hungarian Energy Policy Principles" of July 1999, "The Action Program" of October 1999 and "Hungarian Energy Saving Program" with its 11 national sub-projects.

The Czech government, in January 2000, approved "The National Energy Policy" which created founding for "The Energy Management Act" adopted by the Parliament in October 2000. "The State Program to Support Energy Savings and use of Renewable Sources of Energy", a one-year program, set up regularly since 1991, by the Ministry of Industry and Trade, is also worth mentioning. The most successful tool in the Czech climate protection policy was Clean Air Act, that came into force on January 1, 2002. Although the Act was aimed to target all of the air-polluting gasses, not only CO2, it's positive impact on climate protection is undeniable (Pretel 2004). The Czech Government on March 3, 2004 set itself the target of cutting CO2 emissions per capita by at least 30 per cent between 2000 and 2020. The target forms part of a new climate change program, adopted on March 3, 2004 which will help to form the National Allocation Plan.

In Poland two non-governmental organizations, Institute for Sustainable Development and Foundation for Energy Efficiency, undertook a number of activities closely related to the climate protection. One of the most successful was the competition, during 2000, for a financial support of the investment projects in field of GHG reductions, on a municipal level (Maly et.al. 2002). In Slovakia one of the most active organizations in public awareness rising is the Slovak Energy Agency. In Slovenia a similar task has been fulfilled by the Agency for Efficient Use of Energy.

In Bulgaria the Municipal Energy Efficiency Network, involving 23 municipalities, was set up in 1997, with the help of US AID. Later on, the Network has been financed by the Global Environmental Facility (GEF) and the UNDP project on "Energy Efficiency Strategy to Mitigate GHG emissions" (Maly et.al., 2002). In Latvia several information actions and environmental-friendly campaigns were implemented with the international support. In Lithuania, two Energy Efficiency Centers, parts of the Lithuanian Energy Institute, were established in 1993, with the aims of gathering information, disseminating knowledge, participating in implementation activities of the National Program and popularization of new technologies.

In all of the analyzed countries fiscal instruments are represented by the value added tax (VAT) on energy fuels. Tax rates vary from 10% on natural gas, biogas, and district heating in Slovakia to 25% on all liquid fuels in Hungary. Besides VAT, the excise tax on liquid fuels has been levied in most of the countries, by a proportional amount per 1000 liter.

Slovenia is the only CEE country that has implemented carbon tax. The tax came into force on January 1997 and is linked to carbon content of the fuel. The initial tax rate was approximately 5.5 € per ton of carbon dioxide. In March 1998 the rate was increased to 16 € per ton of carbon dioxide. Currently the tax has been levied only on liquid fuels,

but it is intended, from 2004, to tax coal for electricity production too. Energy tax structure in Slovenia is shown on Table 10.

Tax objective	Excise tax rate	VAT rate	CO_2 tax component
Unleaded petrol	368 EUR/kl	19%	31.8 EUR/kl
Leaded petrol	388 EUR/kl	19%	31.8 EUR/kl
Diesel	289 EUR/kl	19%	37.6 EUR/kl
Light fuel oil	24.1 EUR/kl	19%	37.6 EUR/kl
Heavy fuel oil	14.5 EUR/t	19%	44.8 EUR/t
LPG	155.2 EUR/t		

Table 10. Energy tax structure in Slovenia (Maly, et.al. 2002)

There is no earmarking of tax revenues in Slovenia. The aim of the carbon component is to provide the incentive for emission reductions (Maly, et.al. 2002).

In Hungary the excise tax on petrol and diesel includes a 3% product charge, earmarked for environmental purposes. The rest of revenues from Excise tax and VAT go to the central budget. There is additional environmental charge, in amount of 16 € per ton, imposed on heating oil with sulfur content with more than 2.8% sulfur, and on heating oils that do not comply with the Hungarian standards, in amount of 290 € per ton. The revenues go to the central budget, but are predestinated for environmental purposes. Natural gas, electricity and district heating are subject to 12% VAT (Maly, et.al. 2002).

In Poland, besides excise tax on liquid fuels, and 22% VAT (on liquid fuels, coal, natural gas, electricity and district heating) a carbon dioxide emission charge has been introduced in amount of 0.045 €/t . The revenue goes to the environmental funds. (Maly, et.al. 2002).

A high similarity between energy tax systems in Poland and in the Czech Republic is caused by the EU accession status of the mentioned countries. The only difference is that, in the Czech Republic, some products related to energy conservation and renewables are subjects of a reduced 5% VAT rate[27].

In Bulgaria, the 1999 Energy Act opened the door for approximation of the national legislation to the EU directives. The Act aims to introduce market instruments in the energy sector and to promote energy efficient technologies. The import of many energy efficiency related inputs and products in Bulgaria is tax-free. Energy tax structure in Bulgaria is shown on Table 11.

[27] Energy subsidies create a very specific problem in the Czech Republic. The form of energy subsidization had various forms. Driving reasons were social (protect households from massive increase of prices of energy products), and resulted in a very price-deformed structure of the energy-product market. Prices still do not reflect negative external effects on environment (which results in a situation when the most polluting energy forms are unfortunately usually the cheapest ones, thus creating no incentive for using more environmentally friendly means of energy). On a contrary, renewable energies are valued on real prices, which make them less competitive and thus harder to penetrate the energy market (Maly, et.al. 2002).

Tax object	Excise tax rate	VAT rate	Fuel product charge
Unleaded petrol	113 – 189 EUR/kl	20%	9 EUR/kl
Leaded petrol	112 - 207 EUR/kl	20%	14 – 18 EUR/kl
Diesel	48 EUR/kl	20%	6 EUR/kl
LPG (as propellant)	165 EUR/t	20%	
Kerosene	165 EUR/t		
Boiler fuel, mazut (sulphur content over 1%)			11 EUR/t
Industry gasoline			7 EUR/t
Natural gas		20%	
Electricity		20%	
District heating		20%	
Coal		20%	

Table 11. Energy tax structure in Bulgaria (Maly et. al. 2002).

The revenue from fuel charges goes to the National Environmental Fund and is used for air protection projects, while excise taxes and VAT are designated to the central budget (Maly et. al., 2002).

In spite of the differences in impact of transportation upon the regional levels of emissions, in all of the analyzed countries transportation policies are broadly adopted. In the focus of transportation policies is a set of measures aimed to minimize energy consumption and carbon emissions[28].

Comparison of the regional technical-standard policies shows many similarities in the applied instruments (energy labeling, building codes, minimum efficiency standards). Countries closer to the EU accession are more advanced in technical-standards application, like in many other climate protection issues (Reiche, 2003).

However, not all of the CEE countries show the same pattern of development. In spite of the fact that majority of the CEE economies share a common recent past, significant differences in the pattern and the pace of reforms can be seen in the region. All of the countries that have not ratified Kyoto Protocol are slow-reformers. Among them are Albania, Bosnia and Herzegovina, FYR Macedonia, Moldavia and Serbia and

[28] For example in Poland the Draft National Transport Policy, for the period of 2000-2015, provides for:
1.Development of transport needs (rationalization of demand for cargo transport and individual mobility of the public) as well as promotion of passenger collective transport, bicycle and pedestrian transport;
2.Establishing the mechanisms in favor of the performance of passenger and cargo transport (including promotion of transportation means using reduced pollutant emission);
3.Introduction of economic and fiscal instruments focused on sustainable development (road charges, differentiated fuel prices and other fees proportionally to the level of pollutant emission and fuel consumption, etc.);
4.Elimination of the transportation means which do not conform to the environmental standards;
5.Establishing the conditions for alternative fuels to be introduced;
6.Establishing mechanisms to support the use of „cleaner“ transport (railway, shipping);
7.Promotion of combined transport (Maly, et.al. 2002).

Montenegro. A common characteristic of this group (Figure 11) are higher, and in some cases increasing carbon intensities, compared to the levels in CEE countries that have ratified the Kyoto protocol.

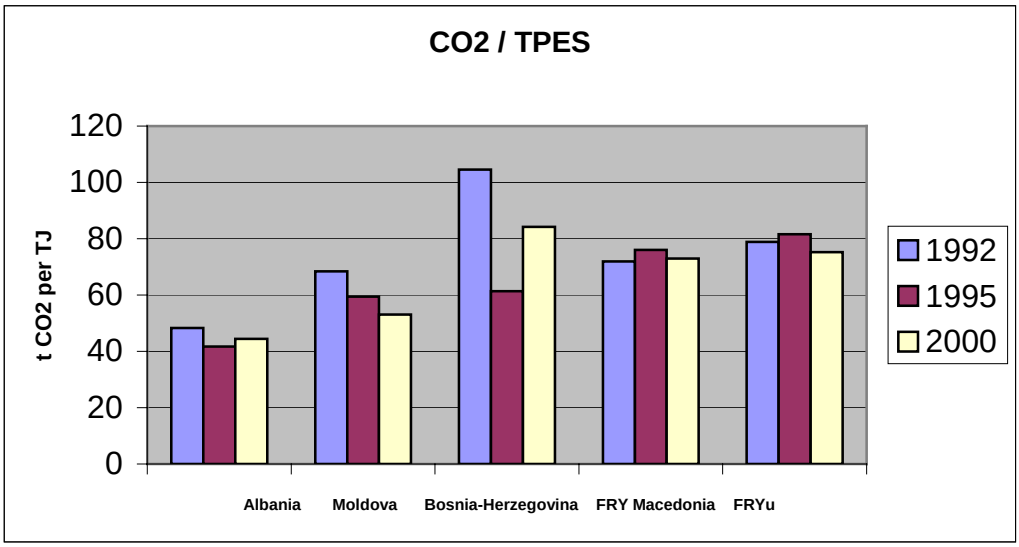

Figure 11. Carbon intensities of energy sectors in the non-Kyoto Protocol CEE economies (Source: IEA, 2002)

It is also worth pointing out that the mentioned countries show no, or very little interest in climate protection. There is a common position in all of the slow-reforming economies that climate change issues are not on the top of the agenda. Assuming that some of the mentioned countries, during the recent, past have experienced serious political troubles and wars, it becomes obvious that other social and economic problems are their priorities. However, a potential for solving some of the problems via efficiency and carbon-intensity improvements is absolutely neglected, or unknown in the region. Regional potentials for CDM investments are still to be explored. Benefits of the "no regret" policies, and other structural changes in energy and transportation sectors, still have to be publicly disseminated. It means that in the mentioned countries an effort has to be made in education of decision makers. Broadly spread ignorance, and a general mistrust in the Kyoto Protocol are serious obstacles to the climate protection activities in the analyzed countries (Carlson, 2003). In spite of the fact that high carbon intensities (Figures 11, 12) offer a remarkable potential for investments, nothing will happen without the previous education and public awareness rising about climate protection opportunities.

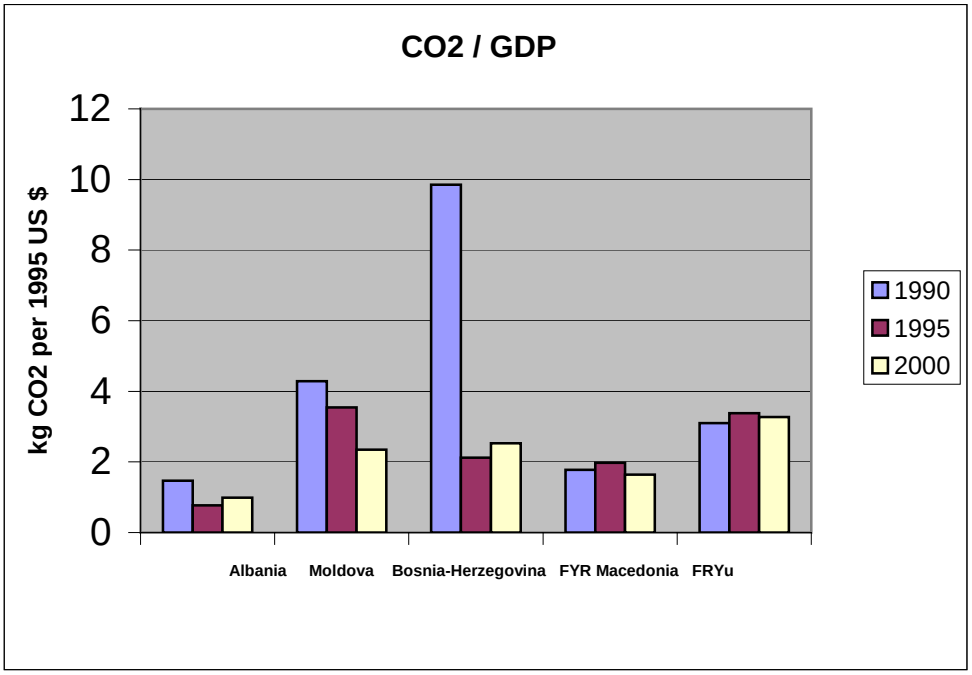

Figure 12. Carbon intensities in the non-Kyoto Protocol CEE economies (Source: IEA, 2002.

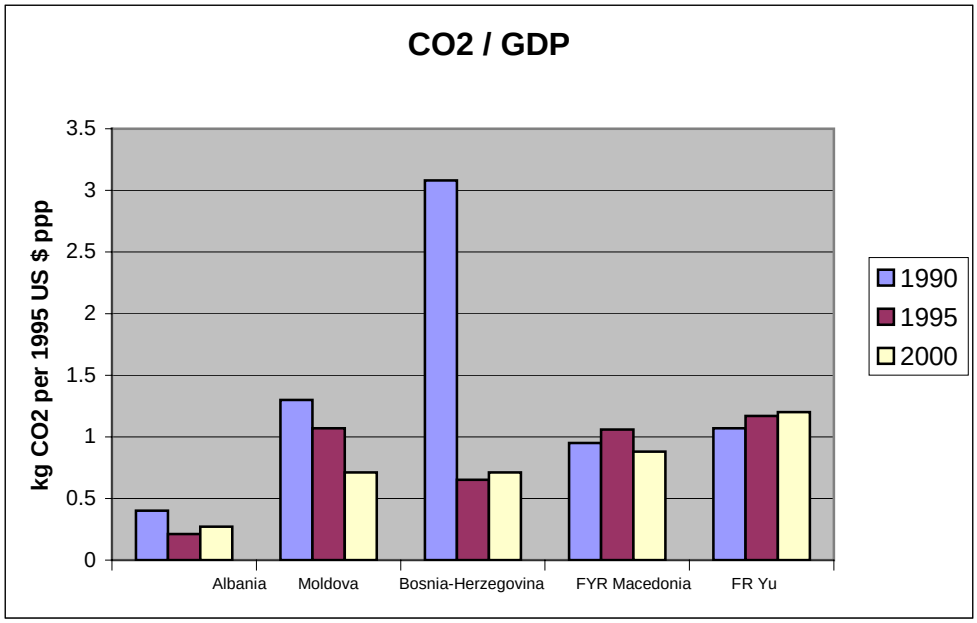

Figure 13. Carbon intensities in the non-Kyoto Protocol CEE economies at purchasing power parity. (Source:IEA 2003)

5. Climate Protection Opportunities in Central and Eastern Europe

One of the advantages of transitional economies lies in an opportunity to include climate protection standards and sustainable development patterns in the restructuring processes. Structural and institutional changes aimed to create market economy, may also have carbon saving and energy efficiency improving effects. High environmental standards are not always linked with rich and prosperous economies. Environment protection policies included in the early stage of transition may be cost-effective in the long run. It is more cost-effective to introduce high environmental standards in the early phase of transition than to cope with the pollution later. That is the case with so called "no regret" policies that produce "double dividend" effects[29].

Identification, elaboration and implementation of "double dividend" polices open a broad field of opportunities for CEE countries. National Climate Change Action Plans have been completed in Bulgaria, the Czech Republic, Poland and Hungary. The Plans identify and prioritize measures that will help countries to meet their Kyoto Protocol commitments. Besides the description of potential GHG reduction policies, cost estimation analysis have been made as a part of the Plans. In spite of the fact that estimated costs of various policies differ from one country to another, the envisaged measures are similar (Table 12).

County	**Opportunities for Cost effective GHG emission reduction measures**
Bulgaria[30]	Gas supply to households, commercial and administrative buildings Demand side measures in industry and households Reduction of thermal and electric losses Hydro potential projects
Czech Republic[31]	District hearting and CHP Hydro potential projects Biomass utilization in public and private sector Wind, solar and geothermal energy use Collection and use of landfill methane
Hungary[32]	Communal district heating and CHP Installation of better-insulated windows Installation of low-flow faucets and shower heads Active solar water heating systems in the household sector Installation of compact fluorescent lights

[29] "Double dividend" can be explained as: 1) positive externalities linked with economies of scale or economies of scope that simultaneously produce environmental benefits and 2) positive economic effects obtained from environmental policies.
[30] Source: Maly, M. et. al (2002)
[31] Source: Maly, M. et. al (2002)
[32] Source: Zilahy, G. et. al. (2000)

Poland[33]	Improving heat insulation in the residential sector Rationalization of heat and energy use Landfill gas collection and use Wind solar and geothermal energy use Agricultural biogas use Wood and straw fired boilers Small hydro-power plants
Romania[34]	District heating modernization Improving heat insulation Hydro energy use
Slovakia[35]	Biomass use in district heating and industry Geothermal and solar energy use Introduction of combined circle in CHP and industry
Slovenia[36]	CHP and district heating Biomass use Hydro power use Waste management improvements Demand side measures in industry and buildings

Table 12. Opportunities for the cost-effective GHG emission reduction measures in some of the Annex 1 CEE countries

Most of the analyzed CEE countries that have ratified the Kyoto Protocol, as UNFCCC Annex 1 parties, have been involved in Activities Implemented Jointly (AIJ). AIJ program was initiated in 1995 as the pilot phase for Joint Implementation (KP Art. 6). Like Joint Implementation, AIJ projects were aimed to reduce GHG emissions and sequester carbon. However, no credits have been obtained from the AIJ projects.

Most of the AIJ projects in CEE are concentrated in three Baltic States. Just 20 AIJ projects are located in other analyzed countries (Table 13). All of AIJ projects applied in the region are oriented to promote and to develop cost-effective GHG reductions mentioned in Table 12. Sectoral structure of the implemented AIJ projects is shown in Table 14.

Experiences gathered from AIJ projects are expected to help CEE countries to identify legal barriers and institutional defects that may deter Joint Implementation Projects. The lack of institutional capacity and a shortage of human and financial resources, create potential hurdles (Baumert, et.al. 1999). In order to prepare ground for JI projects and to cope with the potential difficulties, several CEE countries have established National JI Offices. Among those countries are: Bulgaria, the Czech Republic, Poland, Slovakia and Slovenia. In most cases JI offices are closely connected to the Ministries of Environment.

The lack of experience with market-based instruments, jointly with policy inertia and historical preference for command and control measures may create obstacles for the Flexible Mechanism Implementation. An unclear definition of property rights, strong

[33] Source: Wisniewski, G. ed. (2000)
[34] Source: Maly, M. et. al (2002)
[35] Source: Maly, M. et. al (2002)
[36] Source: Maly, M. et. al (2002)

government interference in regulatory activities, market distortions and still existing energy price-subsidies in some of the CEE countries are expected to create additional problems in Flexible Mechanisms implementation. However, "it should be noted that the mechanisms created by the Kyoto Protocol are beyond the scope and complexity of any environmental regulatory policy ever implemented, even in advanced market economies." (Baumert, et al. , 1999).

Host country	Number of projects
Bulgaria	1
Croatia	1
Czech R.	4
Estonia	21
Hungary	4
Latvia	25
Lithuania	9
Poland	3
Romania	4
Slovak R.	4
Total:	76

Table13. Distribution of AIJ Projects

AIJ Projects by type	Number of projects
Energy efficiency	38
Forest preservation	1
Fuel switching	8
Fugitive gas capture	1
Renewable energy	28
Total	76

Table 14. Sectoral structure of AIJ

(Source: UNFCCC-cc:info , 2003)

6. Climate Protection in Serbia and Montenegro

6.1. Climate Protection landscape in Serbia and Montenegro

The Union of Serbia and Montenegro (FR Yugoslavia)[37] is situated on the area of 102,173 square kilometers[38] with the population of 8,502,620 inhabitants[39]. Economic activity in Serbia and Montenegro is in a process of recovery after a period of sharp decline during 1990s, one of the world highest hyperinflations in 1993, and enormous war damage during NATO campaign in 1999 (Table15, Figure 14).

	Total GDP in current US $ million	Per capita GDP in current US $
1990	28390	2696
1995	15285	1449
1997	16419	1549
1998	15487	1459
1999	10090	1205
2000	8670	1035

Table15. Gross Domestic Product of FR Yugoslavia [40](Source: SYY 2002).

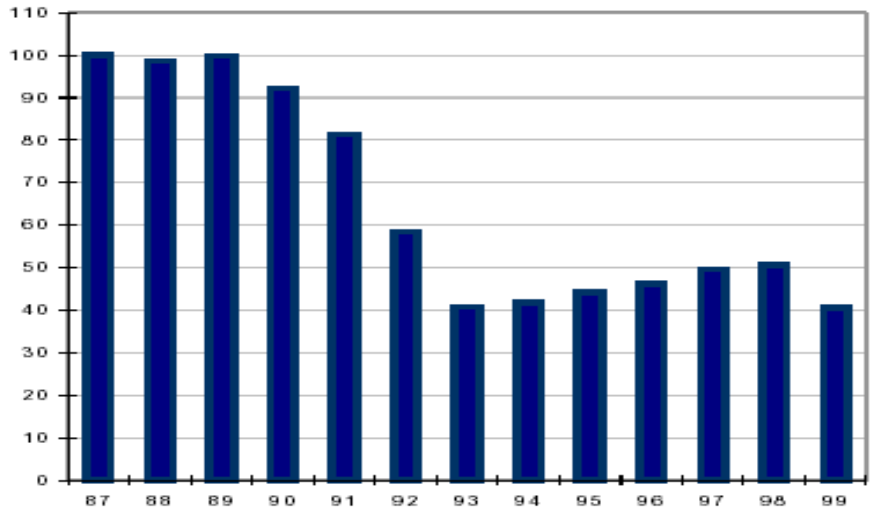

Figure 14 . GDP of Serbia 1987-1999 (index 1987=100) (Source: G17, 2000)

[37] Union of Serbia and Montenegro is a successor of the Federal Republic of Yugoslavia. By adopting of the Constitutional charter, parliaments of both states agreed upon creating of a new country, a union of two sovereign states, former Yugoslav federal republics, Serbia and Montenegro. A legal framework for the new country has still been under construction.
[38] The territory without Kosovo and Metohija is 91,286 square kilometers.
[39] Source: SYY 2002.
[40] Conversion according to the World Bank method by market exchange rates.

At the end of 1980s Serbia and Montenegro (FR Yugoslavia) was one of the biggest energy producers and consumers in the in the region. During the period of economic decline, contraction in energy sector was below the average of economy as a whole (Figure 15). However, energy intensity in FR Yugoslavia, especially during 1990s, was quite high, much higher than in EU or OECD countries, even higher than in Hungary, Poland or the Czech Republic (Figure16).

In 1999, during NATO campaign, Serbian energy infrastructure was exposed to a high damage. The amount of direct damage inflicted on the Serbian electro-transmission grid has been estimated to 270 million US $, on the oil and gas industry above 600 million US $, and on the district heating facilities about 5.3 million US $ (Dinkic, 1999).

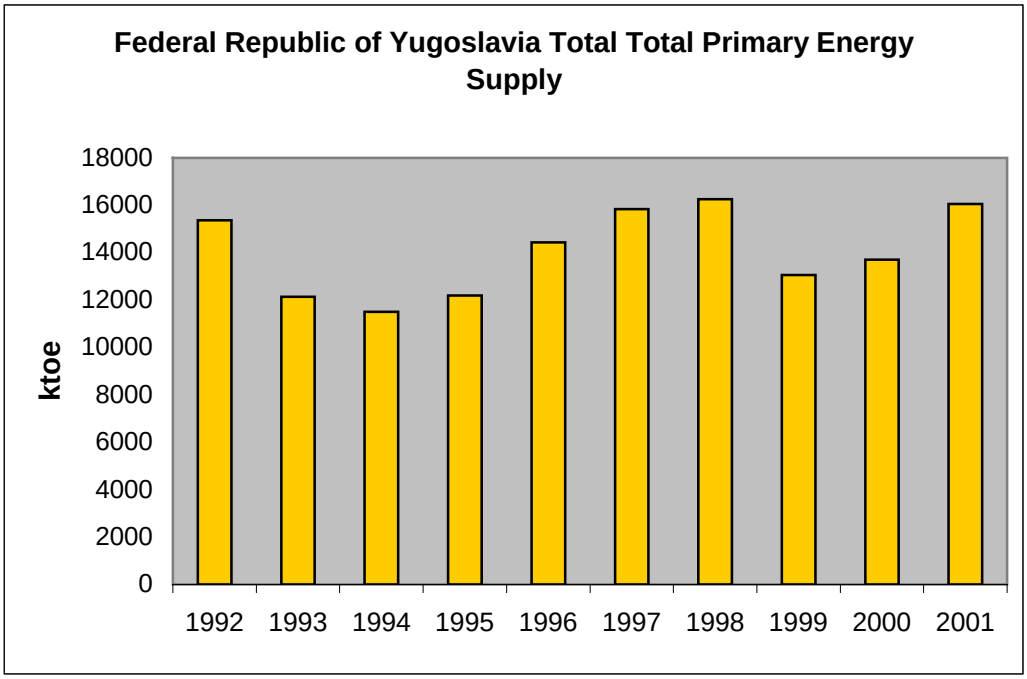

Figure 15. Total primary energy supply in FR Yugoslavia 1992-2001 (Source: IEA, 2003)

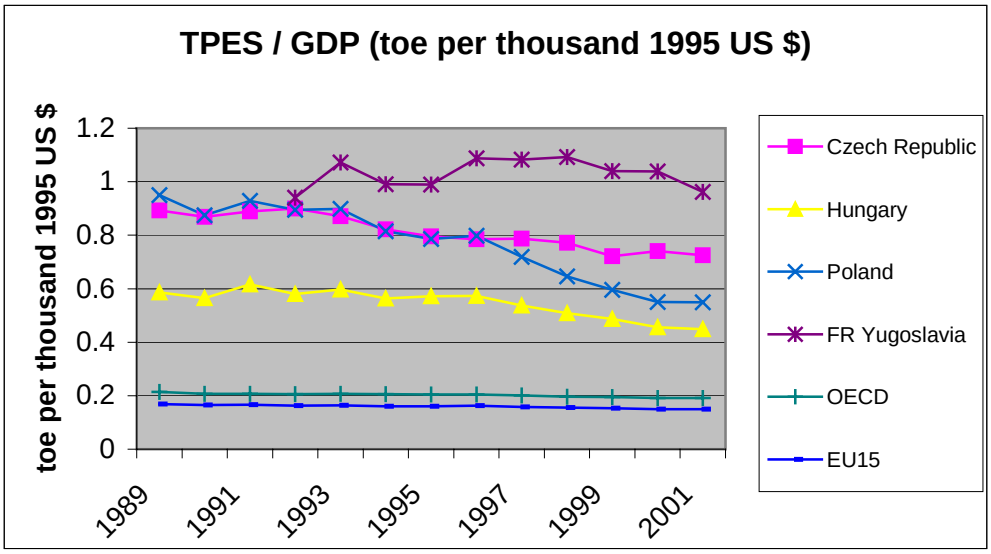

Figure 16. Energy Intensity in some of the transitional countries and FR Yugoslavia. (Source: IEA, 2003)

Carbon intensity of economy in FR Yugoslavia is higher than in Bulgaria, Hungary, Slovakia or Romania, but is lower than in Poland and Czech Republic (Figures 8, 11, 17). Measured by carbon dioxide emissions per amount of GDP, carbon intensity in Yugoslavia is above the regional average (Figures 9, 10,12, 13, 18 and 19).

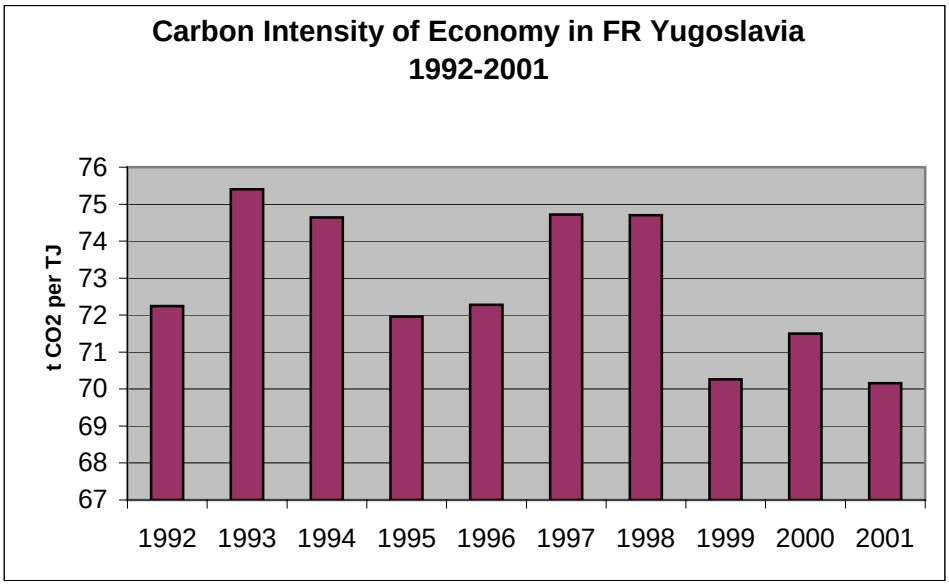

Figure 17. Carbon Intensity Development of the Yugoslav Economy 1992-2001. (Source: IEA, 2003)

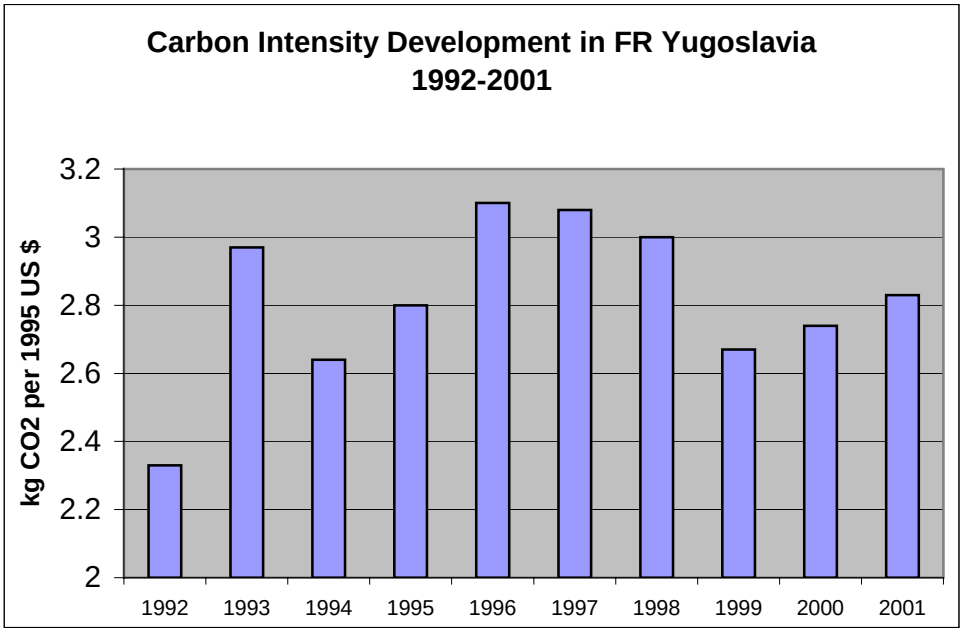

Figure 18. Development of Carbon Intensity in FR Yugoslavia 1992-2001 (CO2/GDP in 1995 US $ exch. rate). (Source: IEA, 2003)

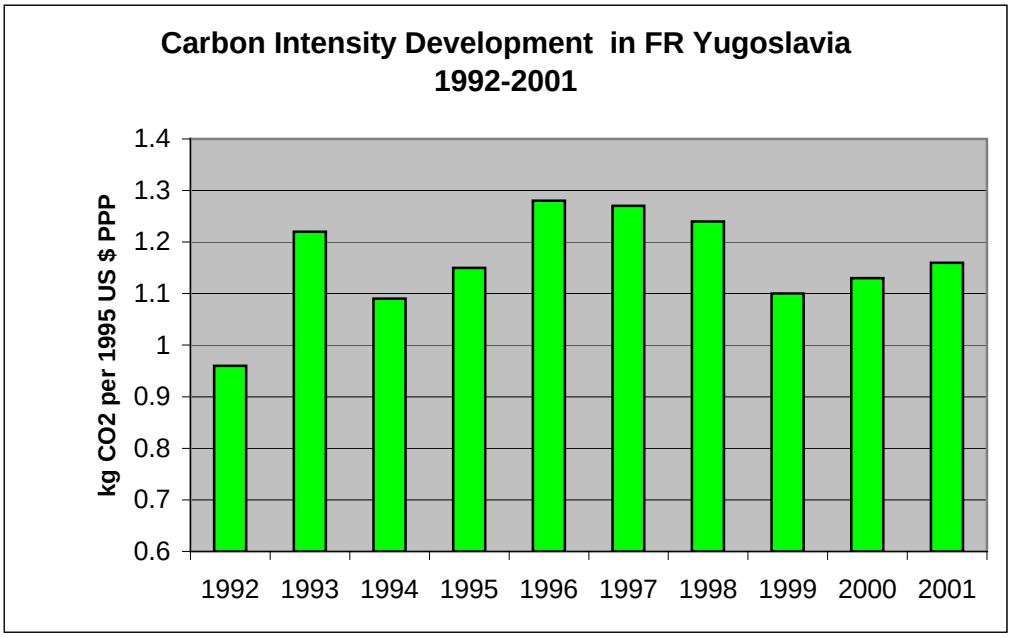

Figure 19. Development of Carbon Intensity in FR Yugoslavia 1992-2001 (CO2/GDP in 1995 US $ ppp). (Source: IEA, 2003)

In spite of the fact that Yugoslav carbon intensities are above the CEE average, nothing has been done in the climate protection. In June 1997, F.R. Yugoslavia has ratified UNFCCC, and that was the only legal act linked with climate change. In June 2002, the Serbian government established Ministry for Protection of Natural Resources and Environment. Initiating the first comprehensive environmental analysis and preparing Framework National Strategies for certain areas, the Ministry created a turning point in environmental policy. Among many other pioneering activities, the Serbian Ministry, with the help of GEF, set up a project aimed to enable Serbia and Montenegro to prepare the First National Communication to the UNFCCC. However, by now, the project has not been completed.

There is no official GHG inventory for Serbia and Montenegro (FR Yugoslavia). The only official data about carbon dioxide emissions from fuel combustion can be found in the International Energy Agency database (Figure 19).

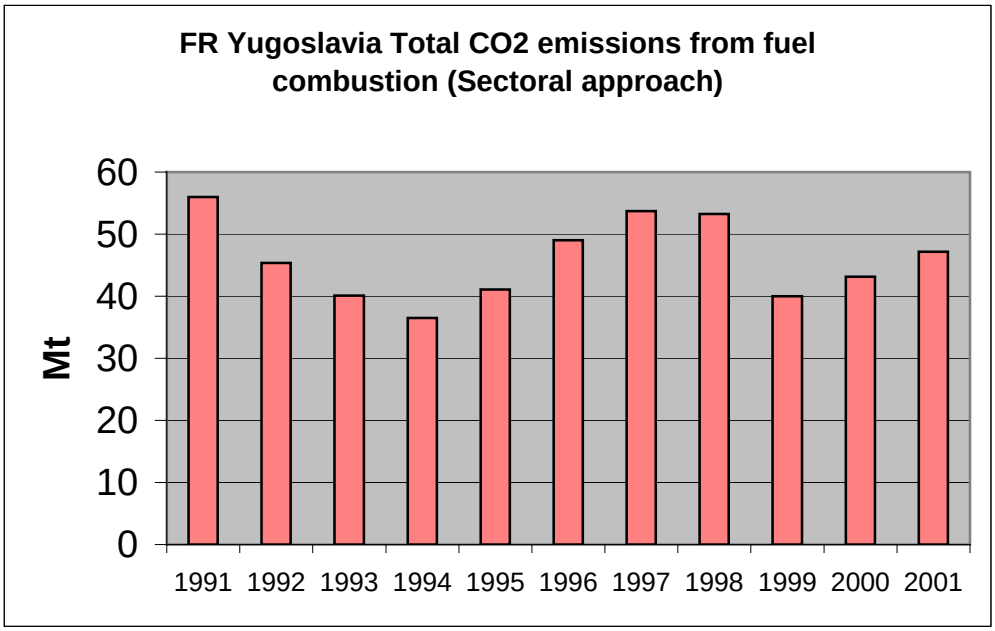

Figure 20. FR Yugoslavia Total CO2 emissions from fuel combustion. (Source: IEA, 2003)

However during late nineties an attempt was made by a group of experts from the Federal Hydro-meteorological Institute in Belgrade to estimate total amount of GHG emissions and sinks from various sources (Dacic, 2003). Although their findings present unofficial and preliminary results from an initial study (Figure 21), a much more precise image of greenhouse gas emissions is given than in IEA database (Figure 20). From the sectoral structure of GHG emissions (Table 10) it can clearly be seen that energy sector was the main source of GHG emissions in FR Yugoslavia. Rationale for a low impact of the industrial sector and a high impact of agriculture on the total level of GHG emissions

lies in a fact that industrial production was badly affected by the economic crisis, during 1990s, and the decline in agriculture was much lower than in other sectors.

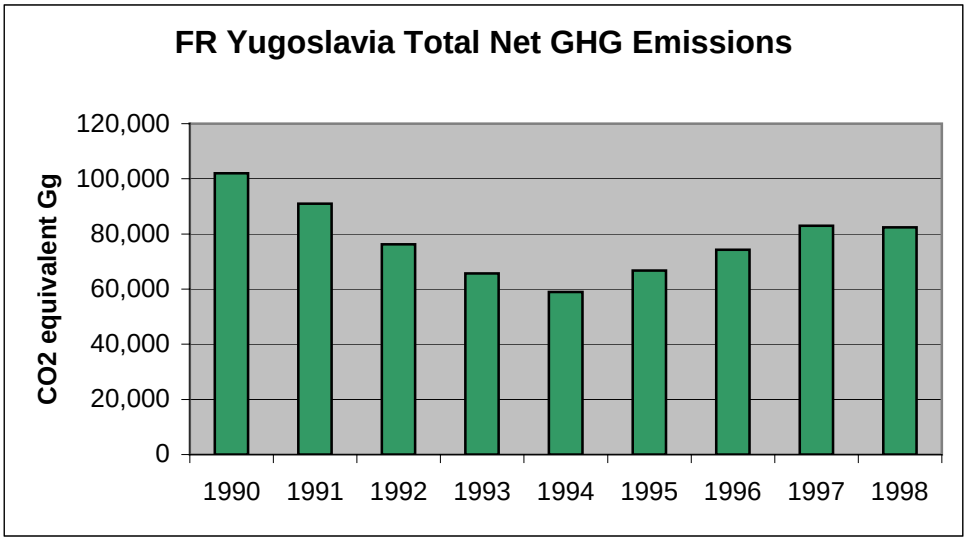

Figure 21. Total GHG Net Emissions in FR Yugoslavia 1990-1998. (Source: Dacic, 2003)

	Energy	Industrial Processes	Agriculture	Land-use Change and Forestry
1990	74.0	9.0	23.0	-5.5
1991	70.7	6.2	23.8	-2.3
1992	68.8	5.2	28.4	-4.7
1993	67.6	1.9	33.0	-6.1
1994	65.6	3.0	35.4	-8.2
1995	66.9	2.6	32.5	-5.0
1996	67.5	4.8	29.5	-4.5
1997	66.8	9.1	26.4	-4.8
1998	64.3	11.4	26.5	-4.7

Table 16. Sectoral structure of GHG emissions in FR Yugoslavia, 1990-1998 (% of total emissions)[41]. (Source: Dacic, 2003)

According to the Table 16, it is obvious that climate protection policy in Serbia and Montenegro should be focused on energy sector, which accounts for more than 10% of GDP. A set of demand-side measures is to be implemented with an aim to increase energy efficiency in economy. First of all, electricity sector, as the main energy producer,

[41] The table is based on unofficial preliminary data from the initial GHG inventories study for FR Yugoslavia.

but also as the main source of GHG emissions, should be entirely restructured in the course of economic transition. After the years of total negligence and disinvestments, the Serbian electricity sector offers a broad field of opportunities for technical and economic efficiency improvements[42]. During the nineties, the electricity demand shifted gradually to the household and tertiary sector. The household sector share in the electricity consumption has increased from 42% in 1990 to almost 58% in 2000, while the industry sector share has dropped from 51% in 1990 to 31.1% in 2000. The main reason for that can be found in heavily subsidized electricity prices, and in a switch from the other energy sources to electricity for the residential space heating.

The industrial share in the final energy consumption in Serbia, during the nineties dropped from about 46% in 1990 to 36% in 1998. At the same time the industrial product share dropped from 41% of the total GDP, in 1990, to 38% in 1998. Iron and steel metallurgy, basic chemical production, and construction materials industry create approximately 50% of the total industrial energy consumption, although the GDP share form those sectors is still bellow 15%. Combined heat and power production in industry is only 6.6% , and the capacity of units is from 0.3 to 25 MWe with an average age of 27 years.

A similar set of problems can be found in the district-heating sector. Only 16% of 2.65 million of households in Serbia are connected to the district heating systems, and 9% depend on autonomous heat sources, using mainly fossil fuels. The efficiency of centralized heat production and distribution in Serbia is lower than 55% (Haga et. al, 2002) which offers an opportunity for the great improvement[43]. However, a realization of this potential remains difficult because of poor economic situation in the sector. All district heating companies in Serbia are in a bad financial situation mostly due to the inadequate tariff levels which, at the moment (0.08-0.11 US $ monthly, per square meter of heated space), do not cover even fuel costs (Haga et. al, 2002).

The share of transportation sector in the total final energy consumption in Serbia is about 30%, and is expected to grow rapidly during the years to come. Like in all other Central and Eastern European countries an upward trend in individual traffic is evident. The growth rate is considered to be about 20% annually. Insufficient capacity of railways and low opportunities for water transport of goods, makes the overall energy landscape even worse.

The fact is that electricity production in Serbia and Montenegro is, and in the next decades will remain being, oriented mostly on the domestic low-quality coal[44]. The increased productive efficiency, achieved by technical improvements, would have

[42] According to the conclusions of the Third Yugoslav Symposium on the Electricity Distribution, held in Vrnjacka banja, in October 2002, the amount of electricity theft in Serbia was about 1 billion KWh , or about 30-40 million US $. According to Mr. Sloboadan Kujovic, from the Electricity Supply Company of Serbia (EPS), technical losses in the electricity distribution, in 2001, in Serbia amounted more than 4 billion KWh, or 15.48% of the total electricity consumption. ("Politika", daily news October 19, 2002, p A13.)

[43] The average district heating plant in Serbia is 20 years old, with low or zero maintenance during nineties. The application of modern technologies and rehabilitation is expected to increase heat production efficiency in Serbia by at least 20% (Haga et. Al,. , 2002).

[44] Electricity production in Serbia during 1990s was based on the following input structure: 62.09% coal fired thermal production , 4.24% gas and oil thermal production, 33.67% hydro production (SSY, 2002) Except for medium and large sized hydropower, no renewable energy sources are significantly being used.

positive effects on carbon intensity. Technical improvements in the energy sector are necessary, but not sufficient precondition for a successful carbon protection policy. Economic policies aimed to improve energy efficiency, including price liberalization and cutting of subsidies, are also essential but not all-inclusive. For a successful climate protection policy a set of carbon minimization measures and instruments is to be implemented.

6.2. Climate protection policy framework

Climate protection framework for Serbia and Montenegro should be based on policy analysis. We have defined four most probable options, connected with various domestic and international political and environmental scenarios.

[A] First option is to absolutely neglect climate protection issues until 2010. The rationale behind such an option can be found in the following:

a) According to the previously mentioned, Serbia and Montenegro (FR Yugoslavia) do not produce globally significant GHG emissions. b) During nineties, Serbia and Montenegro were exposed to an unprecedented economic contraction, hyperinflation and war damage. That is why many other socio-economic problems are on the top of policy agenda. Climate protection issues are to be tackled after a period of rapid economic growth and social stabilization that is expected to take place in the years to come. A country with more than a million of refugees and internally displaced population has much severe social problems that climate protection. c) The main international players and the most significant GHG emitters, like USA, Russia, and China are still out of the Kyoto Protocol.

However, in spite of the reasons to carry on with "business as usual scenario" there is a set of counterarguments.

a) The Union of Serbia and Montenegro has an aspiration to become a EU member. In all of the EU countries climate protection policy is considered to be one of the priorities. By ratifying the Kyoto Protocol, and accepting Annex 1 status, all of the current EU members and also the accession countries have accepted an important set of international obligations[45]. This means that the Union of Serbia and Montenegro will be obliged to join the Kyoto Protocol and Annex 1, before the accession. b) Although it is hard to estimate in pecuniary terms the amount of potential loses caused by the neglect of climate protection, it is clear that without joining the Kyoto Protocol Serbia and Montenegro will be excluded from the European integration processes. c) The so-called argument "first development and than environment" may be used as a powerful toll in obtaining public support for a "status quo" in all socio-economic issues. The fact that economic growth has priority in nearly all of the European countries does not give a justification for environmental hostile pattern of development. On a contrary, in the

[45] Under the "Burden Sharing Agreement" adopted on April 25, 2002 (Decision 2002/385/EC) all 15 EU member sates commited themselves to reduce GHG emissions by 8% below 1990 levels during the first period from 2008 to 2012. By Decision 2004/280/EC of the European Parliament and the Council (entered into force on March 10, 2004) all the requirements under the Kyoto Protocol became legally binding in all Member States. The Decision realates in particular to the way in which emissions have to be monitored, accounted and reported. With this step all provisions of the Kyoto Protocol have become EU law. (EU 2004)

modern economics so-called "putty clay technology" argument favors an economic growth balanced with environmental objectives (Sachs et al. 1999). The "putty clay technology" argument, by stressing the importance of right environmental choices at the beginning of investment cycles, gives a theoretical explanation for policy action. By spending more on initial physical capital in the energy and the other environment-damaging sectors, efficiency gains and input savings are enabled during the later stages of the investment life cycles.

[B] Another policy option can be described as an attempt to introduce climate protection tools but without ratifying the Kyoto Protocol.

This option can be accounted for by the fact that the most important carbon dioxide emitters in the world have not ratified the Protocol yet. It is also based on a scenario of postponed integration of Serbia and Montenegro into the EU. Although not favorable, this scenario is possible, so it requires an adequate response. In the climate protection issues the adequate response will be not to wait for the EU accession, but to act proactively and to adopt international carbon-saving and energy-efficiency standards before the accession deadline, simultaneously trying not to imperil the international competitiveness of Serbian and Montenegrin economy. Economic background for such policy can be found not only in the "putty clay" argument, but also in the need for increasing an overall efficiency of input use in the course of transition.

In the mentioned option, climate protection policy will be mostly oriented on voluntary agreements and "win-win" solutions. Input control in agriculture, technology standards in industry, emission control for motor vehicles in transportation sector, energy efficiency standards in buildings, control of landfill gasses etc. can be chosen among the broad range of command and control policy tools (CEF Consultants, 1994).

A set of policy tools, so called economic instruments, has not been broadly implemented in the environmental policy of Serbia and Montenegro yet. In order to protect international competitiveness of the domestic economy, carbon taxes and emission charges are not expected to be introduced. However, tax incentives, soft loans and credit guarantees will be very welcomed. Instead of subsidies, complicated to administer and expensive to monitor, we strongly recommend creation of a revolving soft-loan fund for energy efficiency retrofits and renewable sources promotion. Government grants for research, development and demonstration projects will also have a role in the climate protection policy mix.

In order to assess various policies in Serbian conditions, we analyzed potential for implementation and applicability of the certain carbon saving tools and instruments. According to experts' opinions, we have graded policy tools from the most applicable (A rate) to the least applicable (E rate). Valuation criteria included administration and monitoring costs, efficiency, and effectiveness of the tools, which are grouped in three categories (Table 17).

From the analysis it becomes obvious that there is a growing need for public awareness and information campaigns. Policy tools aimed to raise public awareness and to disseminate information about carbon-saving potential will be envisaged (positive disclosure advertising, energy audits, environmental labeling, local community information about metering and invoicing, and public education about demand side management, etc).

Tools Group	Type	Costs		Effectiv.	Efficiency	Sectoral Application
		Adm.	Mon.			
COMM. AND CONTR. TOOLS	Input control	A	D	B	C	Agriculture
	Technical stand.	A	D	A	A	Industry, Energy, Transportation
	Emission control	C	C	A	B	Transportation
	Energy effic. Standards	B	C	A	B	Building and Construction
ECON. INSTR.	Carbon tax	C	B	B	D	Energy, transportation industry, resid.
	Tax incentives	B	B	B	B	Energy Industry
	Emission charges	C	C	B	C	Energy, transportation
	Subsidies	C	E	D	D	industry, resid.
	Soft loans& guarantees	B	A	A	A	same
	Grants for R & D	B	A	B	B	Energy, ind., commerce
INFOR-MATION TOOLS	Positive disclosure Advertising	C	A	B	B	Residential, Industry Commerce
	Energy audits	B	A	A	B	Industry, Public adm.
	Environmental labeling	A	A	B	A	Commerce Residential s.
	Local comm. Information	C	A	C	C	Residential s.
	Professional education and training	C	A	A	B	Industry, Energy

Table 17. Applicability of Carbon Saving Policy Tools for Serbia (A-max, E-min applicable)

Described results present an initial step in the attempt to create an adequate carbon-saving policy mix for Serbia. That's why we strongly recommend further inquiries and analysis in the field.

As a general conclusion about the option B it can be stated the fundamental problem remains to be a lack of compulsion on the macro level. Although it seems easy, by using command and control instruments, to compel private entities in business and residential sectors, there is no adequate anchor on the national level. To solve the problem, setting up of a national target will be needed. However, by defining a national benchmark and imposing the national carbon-saving target, we are close to the Kyoto Protocol accession.

[C] The next policy option is to ratify the Kyoto Protocol, but not to accept Annex I status. Although not significant in the global terms, GHG emissions from Serbia and Montenegro are regionally significant, offering a rationale for a public policy intervention. The Kyoto Protocol gives not only the national policy anchor, but it offers a set of instruments, so called flexible mechanisms. Those mechanisms are aimed to help member countries to meet their commitments, and simultaneously, may have positive macroeconomic effects, on employment, technical progress and foreign investments.

[D] Final option for the national climate protection strategy is to ratify the Kyoto Protocol and to accept Annex I status, as all of the EU countries have already done. By choosing this, the Union of Serbia and Montenegro will make the closest step to the EU accession in the environmental policy field.

Summarizing all of the mentioned, it becomes clear that a delicate choice has to be made between the options C and D. If the Governments of Serbia and Montenegro agree to sign the Kyoto Protocol, it will be necessary, before obtaining the Parliamentary approval, to decide whether to become an Annex 1 party or not. The answer, and the right choice should consist of the following:

[1] In the course of EU accession, Serbia and Montenegro will accept Annex 1 status. However it is inadequate to become an Annex 1 country, in the early stage of accession process. There are there types of reasons: political, economic and environmental-policy reasons.

a) Political reasons are connected with still unfinished legal foundations of the Union. Constitutional definition of Kosovo and Metohoija needs to be clarified. Before accepting legally binding quantified constraints on GHG emissions, Serbia and Montenegro must have clear legal responsibilities.

b) Economic reasons can be found in a very deep crisis during 1990s. A period of dynamic and intensive growth is needed to solve most of the serious socio-economic problems inherited from the previous times. Quantified constraints on GHG emissions may hamper economic growth in the early, quantitative, phase. In the later, qualitative phase, carbon constraints may help economic development.

Climate protection effects on development have already been studied in the recent economic literature (Babiker and Jacoby, 1999; Babiker, Reilly and Jacoby, 1999; Bernstein, et al. 1999; Ellerman, Jacoby and Decaux, 1998). "The main conclusions drawn in this literature can be summarized as follows: a) the implementation of the Kyoto Protocol negatively affects developing countries - energy exporting countries above all -

particularly in the absence of emission trading; b) looses are smaller with Annex B trading, and may become gains with global trading; c) economies in transition belonging to Annex B, however, suffer relevant economic losses when emission trading becomes global. These results support a conclusion that climate policy generally reduces growth and welfare in developing countries. In addition, they also show that climate policy reduces equity, by inducing larger economic looses in developing countries than in developed ones." (Bosello et al. , 2003: 602). If the conclusion is made only on macroeconomic statistics, both Serbia and Montenegro can be considered as developing countries and the previous findings are fully relevant for making of the national climate protection policy framework. The god point is that Serbia and Montenegro are not oil-exporting courtiers, and are not expected to face great welfare looses. However, the energy sectors' share in the national economy is quite high, making Serbian and Montenegrin economic growth performance highly responsive to carbon saving policies.

c) Environmental-policy reasons come from the fact that Serbia and Montenegro still do not have official information about GHG inventory. The First national communication to the UNFCCC should be presented and the exact amount of "hot air" should be estimated before any strategic decision is to be made. Before the Kyoto Protocol is ratified, all potential conflicts of interest, about the emission baselines, between former Yugoslav countries, must be solved, especially the conflict between Serbia and Croatia.

[2] Before accepting the Annex 1 status Serbia and Montenegro may be involved in CDM projects. Clean Development Mechanisms can be successfully implemented in Serbia and Montenegro. With the GDP per capita level of about 1250 US $[46], in 2002, Serbia and Montenegro are closer to the developing world than to the European industrial countries. On the other side, in Serbia and Montenegro a sufficient level of capacity and human resources can be found. There should be no impediments for the implementation of CDM projects, not even in the unilateral form. The most striking advantage of the Serbian economy lies in the fact that a high quality human capital, comparable to the highest European standards, can be obtained for very low wages, comparable to the Central Asia levels[47]. However, an unacceptably high county risk creates impediment for foreign investments[48].

Favorable fields for CDM investments can be found in: a) the Serbian Electricity Company (EPS) reforms, that are expected to take place from 2004 to 2007, b) the restructuring and modernization of more than forty district heating local companies, c) modernization of traffic infrastructure and upgrading of railway facilities, d) organic farming and modernization of the conventional animal-husbandry systems, e) improvements in the waste management practices, f) exploiting potentials of small hydro-power plants, g) using thermal, wind, solar and other renewable energy sources[49], and h) using bio-diesel fuels in agriculture and food processing industry.

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[46] Approximate estimation of the author.

[47] In 2002, the average monthly gross wage in Serbian economy was 193.3 Euro. (Source: SSY 2002)

[48] According to the EIU 2002 Country Risk Summary the overall rating for Serbia and Montenegro is D (A-least risky, E-most risky) and the overall score is 71 (100-most risky). Political risk is D, Economic Policy risk is D, Economic Structure risk is D and liquidity risk is C. (Economic Intelligence Unit, 2002).

[49] According to an international study (Euroheat & Power , 2001) the potential of solar energy use in Serbia and Montenegro is around $510 \bullet 10^6$ TJ yearly. The same study stated that by using the geothermal potential more intensively some 180,000 – 120,000 tons of oil could be substituted yearly.

A lucrative field for CDM investments can be found in buildings and communal infrastructure sector. Energy saving activities in buildings are totally neglected in Serbia and Montenegro. Even new buildings in the residential city districts have been made in a very energy inefficient manner[50]. Not to mention a booming individual house sector in suburbs and in villages. A need for energy efficiency improvements, in all kinds of buildings, in Serbia and Montenegro, is urgent. CDM projects in building and construction sectors will produce not only energy efficiency improvements, but will ultimately have a very positive impact on employment.

Assuming investment-multiplier effects of the CDM projects, it can be concluded that the expected amount of 50-80 million US $ per year in CDM investments[51] would create 4000-6400 of the new jobs in Serbia annually. This gives a convincing picture of the expected economic benefits.

In a conclusion it can be stated that an optimal climate protection policy for Serbia and Montenegro should start with the option C, including all of the domestic policy tools mentioned in the B. Later on, in the course of the EU accession, option D will be accepted. When exactly the option D will become relevant depends on: a) future of the Kyoto process; b) speed of socio-economic reforms in Serbia and Montenegro and their approximation to the accession. Both of the factors are still uncertain.

By adopting option C, Serbia and Montenegro will become eligible for the World Bank financing support. The Prototype Carbon Fund set up in 2000, the Community Development Carbon Fund set up in 2002, and the latest, Bio Carbon Fund created in October 2003, are aimed to deliver cost-effective emission reductions while promoting conservation of biodiversity, reduction of poverty and opportunities for developing countries to adapt to climate changes. If Serbia and Montenegro decide to choose options A or B, the opportunities offered by the World Bank Carbon Funds would remain unexploited.

To make the chosen path operational, the Serbian Government needs to designate a National Authority[52]. The National Authority takes part in the validation process and has the responsibility of certifying that projects contribute to the domestic sustainable development goals (Rosales and Pronove 2002).

For Serbia it would be necessary to create a National Climate Protection Office. Besides other activities, connected with the domestic policies, the Office will act as a National CDM Authority. Such an Office would be able to integrate CDM investments with national priorities, in the most efficient way. The task would also be investing in the

[50] In one of the most comprehensive energy studies, ever made for the City of Belgrade (Todorovic, 1982), it is stated that, during 1981, the average energy demand for heating purposes in the residential sector was 140W per square meter, which was much higher than in the EC countries. It can be expected that during nineties such figure has become even higher.

[51] According to Mr. Eric Carlson, during 2001 and 2002 the Serbian Electricity Supply Company (EPS) removed approximately 2 million t CO2 eq from upgrades to the system, essentially through efficiency gains. It is expected that, by 2012, all the planned improvements in EPS system would save about 18 million t CO2eq. According to Mr. Carlson's prediction, the size of CDM potential in Serbia would be of 50-80 million US $ per year, for each of the next ten years. The yields would primarily be oriented towards currently state-owned energy and DH sectors (Carlson, 2003).

[52] According to the Constitutional Charter between Serbia and Montenegro, all of the environmental issues, including climate protection policy, will be under the jurisdiction of the constituencies.

most lucrative carbon-saving projects and keeping them as a domestic asset. The most lucrative projects are one with the lowest cost of GHG mitigation per ton. Such projects, with costs less than 2,5 $ per ton of mitigated CO2, should be kept under a supervision of the National Climate Protection Office, in order to exploit the highest benefit from the international emission trading.

Transaction costs involved with CDM projects can primarily be minimized via Designated Operational Entities (DOE)[53]. It will be necessary to create a number of DOEs in Serbia. Introducing a competition would demand from 3 to 7 DOEs in Serbia[54]. Assuming complexity of the DOE's responsibilities, an international help in the DOE creation would be very welcome.

Besides the CDM activities and other international programs, the National Climate Protection Office will be responsible for the following set of issues:

a) Data keeping, GHG inventories and all other means of accounting, related to the climate change mitigation, will be under the competence of the Office. Policy options to locate the responsibility for GHG inventories in the National Hydro-meteorological Institute, Statistical Office or Ministry of Energy and Mining are not favorable. Each of the mentioned institutions has some other priorities, and climate protection cannot be in their focus. Although each of the institutions is closely related to the climate change problem, only a limited set of activities is under their competence. Therefore it would be better to designate an institution with broader capacities, and with a strictly focused task, to keep the emission inventories as a priority.

b) The National Climate Protection Office will be responsible for preparation, implementation and supervision of the National policy program. Until now, no climate protection activities have been set up in Serbia. Significant potentials for "no regret policies" exist in Serbia (Table 17). Among a broad range of demand side polices are product-labeling campaigns. At the moment, electricity-appliances market in Serbia is absolutely opened to all kinds of foreign commodities. Some of them cannot be sold in the countries of origin, because they are energy inefficient. Regulatory actions and product-labeling campaigns are to be organized jointly with the Energy Efficiency Agency.

Hungarian experience with Energy Service Companies (ESCO) deserves an attention (Ürge-Vorsatz and Langlois, 2003). Energy Service Companies are private energy-efficiency oriented entities that offer a deal, in form of "build operate and transfer" arrangements, to all types of public and private institutions aimed to decrease their energy consumption by a variety of actions. Most of the actions are based on the technical and organizational improvements in institutions like hospitals, schools, administrative buildings, hotels, sport centers etc. In the duration of a performance contact (PC) the benefits from the saved energy are shared between ESCO and a host-company. Three major types of ESCOs exist in Hugary: Classic, or American type (ownership of the equipment is transferred to the contactor after complementation), French type (ownership is not transferred before the conclusion of PC) and Third-party financing type (no self-financing, financing is obtained from the outside sources).

[53] DOE are domestic or international independent legal entities responsible for carrying out CDM projects, reporting and mediating.

[54] DOE must be registered and accredited by the CDM Executive Board. The size of Serbian economy, plus registration and accreditation costs, create limitation for the number of DOEs.

Although domestic legal environment is not as favorable as in Hungary, it may be concluded that in Serbia a potential for successful ESCO operation can be found, owing to the achieved macroeconomic stability, and improved banking system. The role of National Climate Protection Office will be to promote and to institutionally support ESCOs, by offering partial guarantees and beneficial tax treatment.

c) The National Climate Protection Office will manage public education and awareness rising campaigns jointly with the Energy Efficiency Agency. In this specific area the lessons learned from Poland and Hungary may be very useful. The idea to organize a national competition for the best carbon-saving project in the municipal sector and to finance the winner may be very applicable in Serbia.

7. Conclusion

Climate protection policies in the CEE countries offer a broad image of different approaches, measures and instruments. Owing to the common recent past most of the CEE countries shared the same energy and carbon problems. However, the responses are quite different. Some of the fast reforming economies have already achieved significant improvements in many aspects, including energy efficiency, carbon-saving technologies, environmental awareness and international standards application. It is not surprising that fast reformers are closest to the EU accession. A chance of becoming an EU member was among the main accelerators of the reforms and growth. By adopting the UNFCCC Annex 1 status, most of the CEE countries have committed themselves to GHG emission reductions for the 2008-2012 period. According to the latest development, the most advanced CEE economies are expected to fulfill the international obligations with no difficulty. Even more, the Kyoto Protocol requirements have created additional challenges for reforms, and gave pace to the EU integration. The lessons learned from the fast reformers present a valuable set of information for the other CEE countries.

Serious political and economic troubles in the early stage of transition, during 1990s, in some of the West Balkan countries have lead to a total neglect of climate protection issues. After a decade of political catastrophes and economic decline the Union of Serbia and Montenegro (former Federal Republic of Yugoslavia) has a chance to start rapid and essential socio-economic reforms and to become a candidate for the EU accession. It would be a serious fault in Serbia and Montenegro's reform strategy if climate protection policies were ignored. Without joining international environmental treaties, including the Kyoto Protocol, Serbia and Montenegro will be excluded from the European integration processes.

According to the Constitutional Charter adopted in March 2003, the environmental policy issues are under the jurisdiction of constituencies, Republic of Serbia and Republic of Montenegro. In the proposed Climate Protection Policy framework it has been emphasized that the Kyoto Protocol ratification is an unavoidable first step. In the initial stage, it would be beneficial for Serbia to exploit the CDM potentials in a full range. When the EU accession will become close, in the later stage of transition, an Annex 1 status will be accepted, with the full circle of international obligations. In the meantime, the National Climate Protection Office will be established.

The Serbian Climate Protection Office will act as a National CDM authority. The Office will also be responsible for GHG inventories keeping and the domestic policy implementation.

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