

Swedish climate activities in Eastern Europe

What are the
results of Sweden's
investments to
reduce greenhouse
gas emissions in
other countries?





The Swedish Energy Agency's (Statens Energi-myndighet) projects in Eastern Europe have so far resulted in a reduction in emissions of about 1 million tonnes of carbon dioxide (CO₂). It is expected that during their lifetime, the 70 projects that were started between 1993 and 2000 will reduce emissions by about 4 million tonnes of CO₂. These projects have been carried out within the framework of the Climate Convention's pilot phase for "Activities Implemented Jointly." The experience from these projects constitutes an important starting point for Sweden's current work on exploring opportunities for utilising the Kyoto Protocol's flexible mechanisms.

Climate co-operation between countries

The possibility of one country making investments in another country in order to reduce emission of greenhouse gases has been discussed in international climate negotiations since the beginning of the 1990s.

In 1991, Norway proposed that countries should work together to reduce emissions in a region in a cost-efficient manner, carrying out the work in the area where the greatest reduction in emissions could be achieved at the lowest cost.

This type of co-operation was at first suggested to be applicable only for joint projects between industrialised countries, under the name of Joint Implementation (JI). Both countries have obligations under the protocol, and are allowed to negotiate in order to decide how the emission reductions should be apportioned between the two countries.

Under the terms of the Kyoto Protocol, developing countries have no quantitative emission reduction obligations. However, they may participate in a similar type of mechanism, the Clean Development Mechanism (CDM). This proposal was put forward by Brazil just before the Kyoto Protocol negotiations. Previously, Argentina and Brazil had suggested the establishment of a sustainable development fund. In 1997 this fund was realised, in the form of a mechanism under the Kyoto Protocol.

The Kyoto Protocol established three different instruments, the so-called flexible mechanisms:

1. Joint Implementation (JI),
2. Clean Development Mechanism (CDM), and
3. Emissions Trading (ET).

The first two forms are project-based mechanisms, while the third allows individual companies or states to trade in the rights to emit

a certain quantity of greenhouse gases. These rights are thus not the results of a project, but are assigned or auctioned on a national basis.

The flexible mechanisms require a carefully structured regulatory framework. Projects must be of high standards, and this is particularly important for CDM where one party does not have any quantitative emission reduction obligations.

In addition, they must result in real emission reductions that would not otherwise have been achieved. CDM-projects must contribute to sustainable development, and must be designed in accordance with the developing country's environmental plans. An independent third party must check (verify) the emission reductions that result from a CDM project.

The flexible mechanisms are often seen as a result of the industrial countries' obligations and their attempts to find cost-efficient solutions. However, countries which have emission reduction commitments in the Kyoto Protocol (so-called Annex I countries) have agreed to fulfil a significant part of their commitments through domestic action.

The regulatory structure for the flexible mechanisms was not finally agreed at the Kyoto Summit in 1997, but has been the subject of continued negotiations. The parties reached an agreement in principle in Bonn in July 2001 and negotiations were finally concluded in Marrakech in October–November 2001. Apart from the USA, all Annex I countries have accepted the agreements in Bonn and Marrakech. It is expected that the Kyoto Protocol will be ratified by 2003.

The Kyoto Protocol

The Kyoto Protocol was established at the third meeting of the parties (COP 3) in Kyoto in 1997.

The Protocol is an important first step in achieving the agreed objectives in the UN framework convention on climate change. It applies to the following six greenhouse gases; carbon dioxide, methane, nitrous oxide, fluorinated hydrocarbons (HFC), polyfluorocarbons (PFC), and sulphur hexafluoride. Under the protocol, the industrialised countries (known as Annex I countries) undertake to reduce their emissions of greenhouse gases by an average of 5.2 % per annum between 1990 and 2008–2012.

The EU is required to reduce its emissions by 8 %, as also most countries in Eastern Europe, while the USA

is required to reduce its emissions by 7 % and Japan by 6 %. Some countries, such as Russia, are required to stabilise their emissions (0 %), while other countries, such as Australia, are even allowed to increase their emissions (+8 %) due to special circumstances.

The EU has reached agreement on an internal distribution of emission reductions, considering factors such as per-capita emissions and the structure of industrial and energy sectors. Under the terms of this internal distribution, certain countries are required to reduce their emissions by up to 21 %, while others are required to stabilise their emissions or increase their emissions to a limited extent.

The Swedish climate policy

In June 1992, the UN Framework Convention on Climate Change was signed by over 150 countries. In 1993, the Swedish Parliament decided to ratify the Convention.

Soon thereafter, the Swedish government launched a programme aimed at reducing greenhouse gas emissions, improving the efficiency of energy systems, and increasing the use of renewable energy sources in the Baltic states, Russia, and Poland: the EAES programme. In Berlin in 1995, the parties to the Convention agreed to establish a trials period (pilot phase) for Activities Implemented Jointly (AIJ). The purpose of the pilot phase was to test the idea of project co-operation between states. The Swedish EAES programme was modified according to the regulations for the pilot phase.

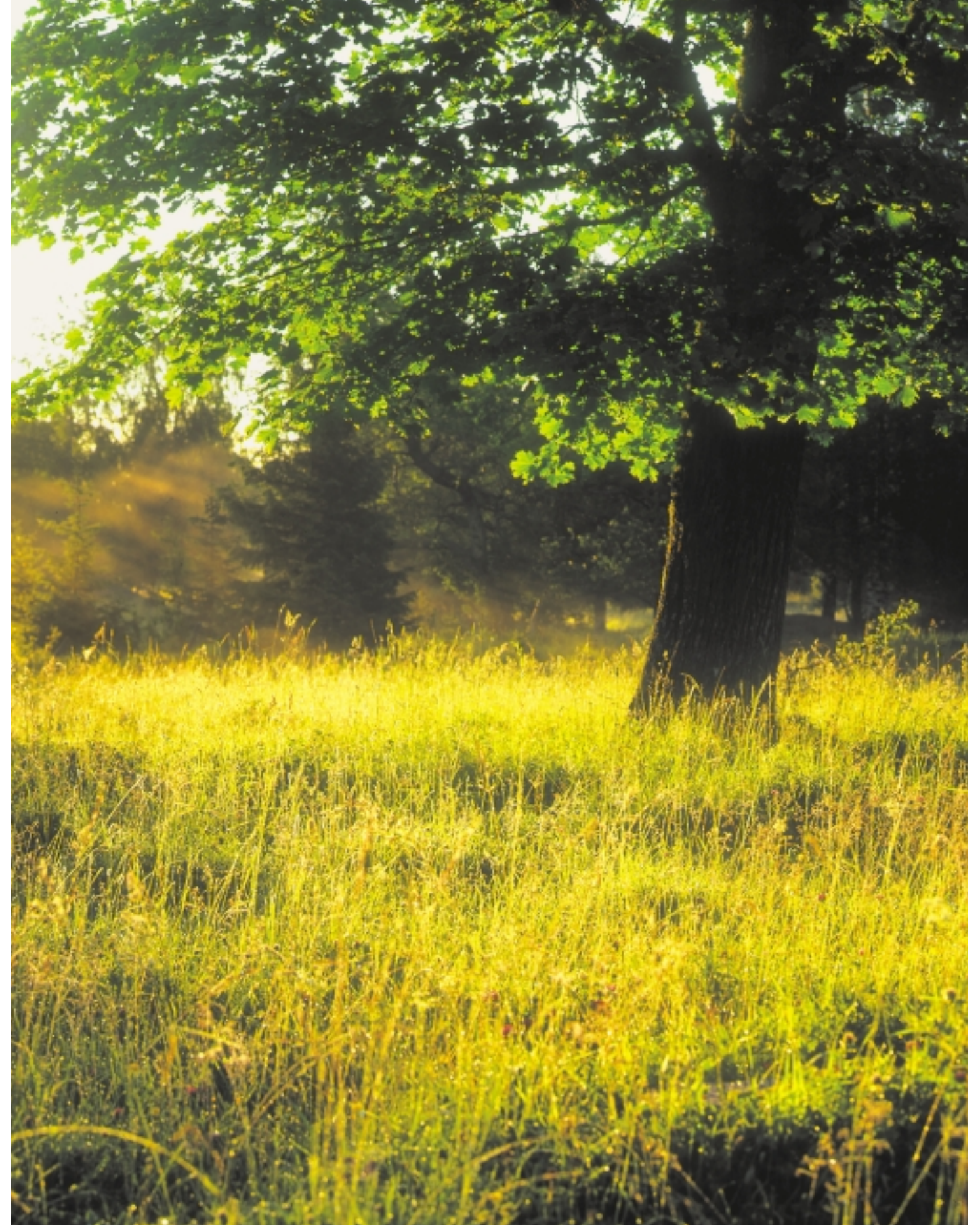
In its 1997 energy policy bill, the government included guidelines for Swedish climate policy in the energy sector. These guidelines say that, as

a member of the European Union, Sweden should act to promote the interests of a common climate policy. In addition, the country should be a driving force in international climate work. The guidelines also state that Sweden should work with other countries and promote cost-efficient activities. This is important in order for climate policy to be credible in the long term perspective.

The Climate Convention also includes the concept of sustainable development, and projects carried out during the pilot phase should therefore also be environmentally sustainable.

In addition, the Climate Convention states

- that there should be no credits for the emission reductions achieved from AIJ projects, and
- that the projects should not be financed from the industrialised countries' normal overseas aid programmes.



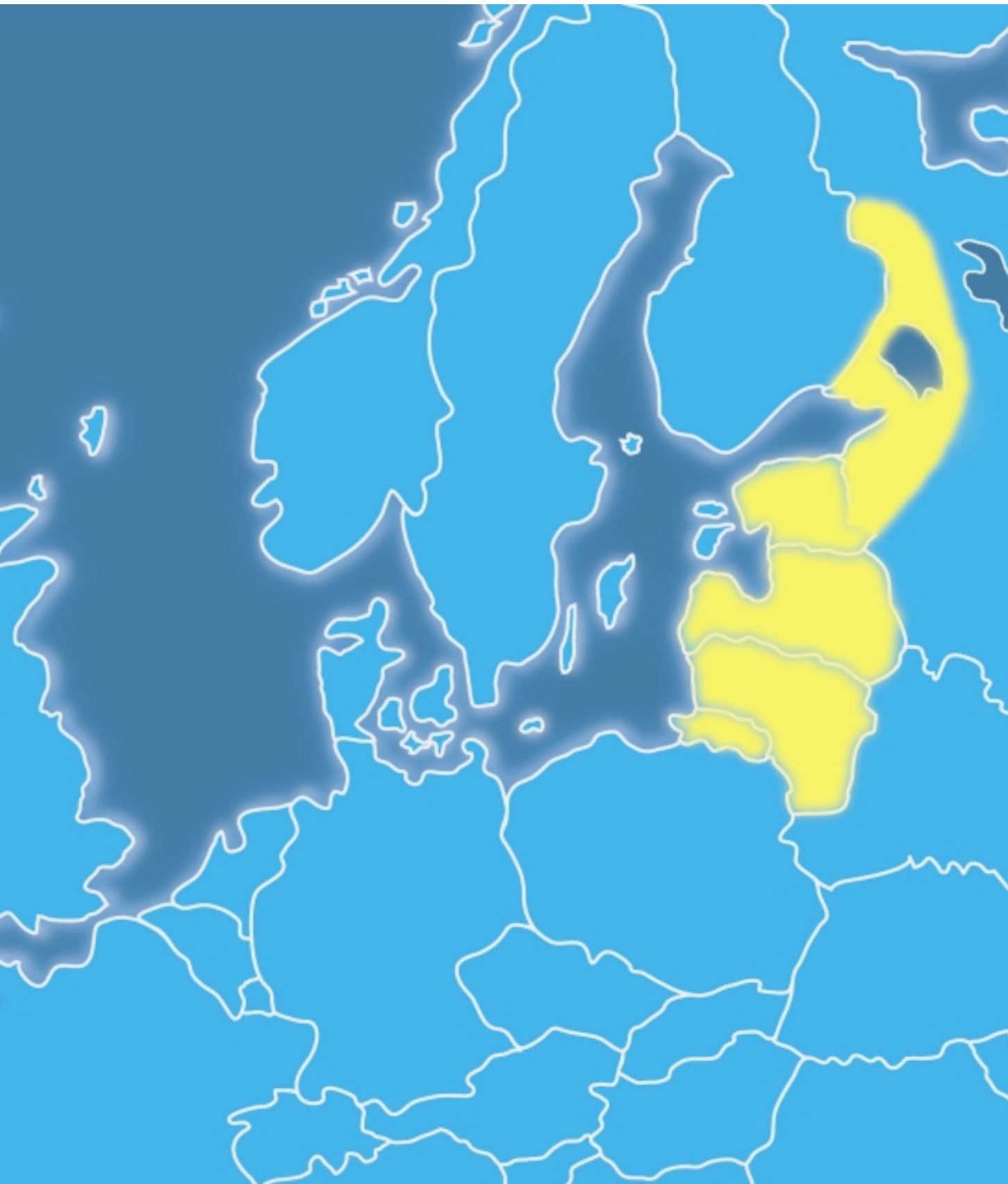
How does Sweden act on the international level?

Sweden contributes in a number of ways to projects aimed at reducing greenhouse gas emissions, working in conjunction with various sources of finance and different executive institutions.

The Swedish Energy Agency has had overall responsibility for the EAES programme. The program has now been replaced by the Swedish International Climate Investment programme. This means that all joint projects now started should result in approved emission reductions within the framework of the Joint Implementation or Clean Development Mechanism.

On the multilateral level, Sweden is participating in the World Bank's Prototype Carbon Fund (PCF), which aims to test and develop JI and CDM-projects. Sweden is also participating in the Baltic Sea Region Energy Co-operation (BASREC) on JI and emission trading. A new investment facility for JI is expected to be set up in 2003 within the framework of BASREC.

Several projects within the framework of the Swedish government's Baltic Billion Fund are relevant for the climate work, as are parts of Sida's development co-operation with Central and Eastern Europe. Further information on Sweden's climate work can be found in the Sweden's Third National Report to the UN Climate Convention, and in the Swedish Energy Agency's 2001 Climate Report.



The Swedish Energy Agency's projects have been concentrated on Estonia, Latvia, Lithuania and the regions of St Petersburg/Leningrad, Kaliningrad and Karelia in Russia.



What are the effects of the EAES Programme?

The objective of the Agency’s EAES programme was to reduce emissions of carbon dioxide and other environmentally harmful substances, to improve the efficiency of energy systems and to introduce renewable energy sources in the Baltic states, Russia and Poland.

About 70 projects have been realised by the EAES programme, of which most have been reported to the UN Climate Secretariat as AIJ projects. In the district heating sector,

projects have been carried out in the Baltic countries, as well as in the St Petersburg/Leningrad region, the Kaliningrad region, and in Karelia in Russia. In addition, a biogas project has been carried out in Poland.

Boiler conversion projects

- conversion of boilers in the 3–10 MW size range in group heating and small district heating boiler plants.
- switch from the use of fossil fuels, such as heavy fuel oil and coal, to biofuels.

- the biofuels consist of wood chips, wood waste and by-products and waste from wood-based industries.

Distribution projects

- renovation of district heating networks by replacement or re-insulation of piping systems.
- measures to counteract corrosion and extend lifetime of systems.
- installation of district heating substations and control equipment etc.

Improving efficiency of energy use in buildings

- rebuilding or re-insulation of roofs.
- installation of district heating substations, heat exchangers, metering and control equipment.
- balancing of systems.
- weatherstripping of windows and doors etc.

These projects were financed by loans on favourable terms to the recipient countries, with the Swedish Energy Agency paying consultants’ costs, e.g. in the form of feasibility studies, the provision of advisory services during implementation and technical follow-up. In general, loans to plant

operators have to be repaid within ten years with a grace period of two years.

Tables 1–3 show the emission reductions that the projects have achieved for the various types of projects and respective countries. Table 4 shows the cost of emission reductions, expressed in US\$ and calculated over the lifetime of the project. The costs have been divided into investment costs and transaction costs. In this case, the investment costs are loans to plant owners in the Baltic states and Russia. Transaction costs are consultants’ support and administrative costs and, in certain cases, write-off of repayment or interest claims.

The total cost of the projects is estimated at around US\$ 27.1 million, of which US\$ 19.7 million is the cost of the recipient countries (mostly in the form of loans from Sweden). Sweden’s net cost (most of the transaction cost) is US\$ 7.4 million. It is estimated that the total reduction in CO₂ emissions will amount to 4 million tonnes, of which 1 million will have been achieved by 2000.

Results of completed projects

Table 1. Conversion projects

Country	Number of projects	Investment costs [US\$]	Transaction costs [US\$]	Total costs [US\$]	CO ₂ reduction year 2000 [tonnes]	Accumulated CO ₂ reduction year 2000 [tonnes]	Accumulated CO ₂ reduction calculated on lifetime expectancy [tonnes]
Estonia	9	4.71	0.94	5.66	82 700	384 000	1 311 000
Latvia	14	4.47	1.41	5.88	68 400	350 000	1 230 000
Lithuania	8	3.90	1.52	5.42	30 300	126 000	625 000
Russia	8	2.75	1.38	4.13	21 300	77 700	509 000
Tot. costs in MUS\$		15.83	5.25	21.08	202 700	937 000	3 676 000

Note: Annual production based on biofuels instead of on fossil fuels is estimated as amounting to 0,65 TWh. In a few cases, the projects also include distribution improvements.

Table 2. Projects to improve district heating distribution

Country	Number of projects	Investment costs [US\$]	Transaction costs [US\$]	Total costs [US\$]	CO ₂ reduction year 2000 [tonnes]	Accumulated CO ₂ reduction year 2000 [tonnes]	Accumulated CO ₂ reduction calculated on lifetime expectancy [tonnes]
Estonia	8	0.95	0.70	1.65	11 500	41 600	190 400
Latvia	5	1.07	0.36	1.43	3 100	18 400	70 600
Lithuania	1	0.08	0.07	0.15	220	1 100	4 000
Tot. costs in MUS\$		2.10	1.13	3.23	14 800	61 100	265 000

Note: These projects have reduced energy use by 0,12 TWh/year.

Table 3. Energy efficiency improvement projects in buildings

Country	Number of projects	Investment costs [US\$]	Transaction costs [US\$]	Total costs [US\$]	CO ₂ reduction year 2000 [tonnes]	Accumulated CO ₂ reduction year 2000 [tonnes]	Accumulated CO ₂ reduction calculated on lifetime expectancy [tonnes]
Estonia	4	1.10	0.43	1.53	1 950	7 900	29 100
Latvia	3	0.39	0.21	0.60	390	1 600	5 090
Russia	4	0.21	0.35	0.56	1 500	3 800	28 600
Tot. costs in MUS\$		1.70	0.99	2.69	3 800	13 300	62 800

Note: These projects are estimated to produce an annual energy saving of 0,05 TWh/year.

Table 4 shows the investment and transaction costs, expressed as US\$/tonne of carbon dioxide reduction. These values relate to the costs as expressed over the lifetime of the projects, which is between 10–25 years. The costs have been divided into investment costs and transaction costs: the investment costs are loans to plant owners in the Baltic states and Russia. Transaction costs are consultants' support and administrative costs and, in certain cases, write-off of repayment or interest claims.

Table 4. Investment and transaction costs per tonne of CO₂ reduction

Type of project	Investment cost USD/tonne of CO ₂ reduction	Transaction cost USD/tonne of CO ₂ reduction	Total cost USD/tonne of CO ₂ reduction
Conversion projects	4.3	1.4	5.7
District heating projects	7.9	4.3	12.2
Energy efficiency improvement projects	27.0	16.0	43.0
Total US\$	4.9	1.8	6.7

Table 4 does not include revenues for the host country in the form of reduced fuel costs as a result of conversion to other forms of energy or of energy conservation measures. Nevertheless, the table shows that those projects are cost-efficient in comparison with most measures in Sweden. The Swedish carbon dioxide tax is around US\$ 53/tonne, and is levied on all fuels except biofuels and peat.

The costs are based on an estimate of carbon dioxide emission reductions over the lifetime of the project, the investment cost and transaction costs up to and including 2000. Further transaction costs for reporting and follow-up may arise, thus slightly increasing the total cost.

In a future Joint Implementation system, the costs for the investing and recipient countries, respectively, will depend on how credits for the emission reductions are distributed between countries. This is something that will have to be decided by negotiations between the two parties.

Other effects of the investment programme

The CTI (Climate Technology Initiative) Technology Award

which is an initiative within OECD and the International Energy Agency (IEA), is intended to support the UN climate work. Work within CTI is intended primarily to accelerate the development of technology to reduce greenhouse gas emissions.

The Energy Globe Award

honours successful projects in the fields of energy efficiency improvements and the use of renewable energy sources. It is awarded by the Austrian Energy Conservation Association (EVA). The award emphasises not only reduced emissions of greenhouse gases, but also other positive effects in the recipient countries and in Sweden.

The programme has been continuously evaluated by local experts and independent consultants, and has attracted international attention as a result of its cost efficiency and successful operation.

The Swedish Energy Agency has received two international awards for its programme, the CTI Technology Award in 1999 and the Energy Globe Award in 2000.

The projects have also improved local air quality by reducing emissions of sulphur dioxide, nitric oxides and soot.

In addition, security of supply of heating to residential buildings has been improved. The programme has had a beneficial effect on attitudes towards environmentally-aware energy policy. This positive effect has also

affected the energy use of those in the recipient countries who have been involved in, or had contact with, the programme. Attitudes have been changed, and awareness of, for example, the UN Climate Convention, has been improved. In addition, the programme has had a positive effect on the establishment of local markets for energy products in the recipient countries, particularly for biofuels and boilers. The programme has also contributed to the establishment of long-term cooperation between Swedish companies and companies in the recipient countries.

The programme has established good relations with the Baltic and Russian energy and environmental authorities. A long-term relationship with Sweden has been established.

Conclusions

Sweden’s climate activities in Eastern Europe has resulted in cost-efficient reductions of greenhouse gas emissions.

Climate projects in other countries make it possible to:

- improve environmental awareness
- improve knowledge of the global climate situation
- improve knowledge of international agreements

The projects also reduce other environmental impact, e.g. through reducing emissions of acidifying substances.

The projects contribute to increased international co-operation between political institutions and administrations in Sweden and other countries.

In addition, the climate projects promote the transfer of environmental-friendly technology from one country to another, and enhance export prospects for Swedish companies.



This brochure presents Swedish climate activities in Eastern Europe. The Swedish Energy Agency's climate projects in the Baltic States, Poland and Russia have resulted in:

- reduced greenhouse gas emissions;
- reduced emissions of acidifying substances;
- increased security of supply;
- increased knowledge of the UN Climate Convention; and
- increased international co-operation between Sweden and other countries in the Baltic Sea region.



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