

**PROGRESS IN ACHIEVING BASIC CAPACITY
LEVEL FOR CLEANER PRODUCTION
IN CEEC/NIS**

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**PROGRESS IN ACHIEVING A BASIC CAPACITY LEVEL FOR CLEANER PRODUCTION IN
CENTRAL AND EASTERN EUROPEAN COUNTRIES/ NEW INDEPENDENT STATES**

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PROGRESS IN ACHIEVING A BASIC CAPACITY LEVEL FOR CLEANER PRODUCTION IN CENTRAL AND EASTERN EUROPEAN COUNTRIES/ NEW INDEPENDENT STATES

EXECUTIVE SUMMARY

1. After the Sofia “Environment for Europe” Ministerial Conference, the EAP Task Force established the objective of achieving the “basic capacity level” (BCL) in cleaner production (CP) in all CEEC/NIS by 1998, i.e. that those countries should have an active core of CP advisors and trainers; a set of demonstration projects; one or more functioning CP centres; training materials available in the local language; and CP principles included in university curricula. In 1995, four countries were considered to have achieved the BCL: Poland, Czech Republic, Hungary, and Lithuania (see table 2.).

2. By late 1997, CEEC/NIS could be divided into four groups in relation to the goal of achieving the BCL (see table 1.):

- *Countries that have achieved the BCL:* Poland, Czech Republic, Slovakia, Hungary, Lithuania, Estonia, and the Russian Federation;
- *Countries on the way to achieving the BCL:* Romania, Bulgaria, Ukraine, Latvia, and Slovenia;
- *Countries with some CP activities:* Croatia, Georgia, Uzbekistan, and Kazakhstan;
- *Countries which have yet to establish cleaner production programmes:* Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, FYR of Macedonia, Moldova, and Kyrgyzstan.

3. Thus, overall progress has fallen short of the established target. Three more countries have achieved BCL (Slovakia, Estonia and the Russian Federation), and several others, mostly CEEC, are moving in that direction. In most of the NIS, CP programmes are being, or have yet to be, established.

4. Some of the main lessons learned in achieving BCL have been:

- “training the trainers” is an efficient approach, but it is important that the means and incentives for implementing CP projects are also available;
- while a large number of demonstration projects have been implemented, more effective mechanisms to disseminate results, and to convince senior managers in enterprises in CEEC/NIS of the benefits of CP activities, are needed in most countries;
- many CP programmes have had a strong technological character; there is a need also to explain the benefits of CP activities in economic and managerial terms, and to mainstream environmental management into the overall management in enterprises;

- CP Centres can be effective means for promoting CP activities; they should concentrate on their core functions of dissemination of information, education and training and have a clear mission; initially they may provide advisory services but they should support the development of an environmental goods and services sector which can provide the advice and equipment needed to support effective environmental management in enterprises;
- there is a general need for more training materials in local languages, particularly sector-oriented guides;
- further efforts are needed to integrate environmental management principles more systematically into university curriculum, both in engineering and in business/ economic courses;
- donor support has been crucial in all countries where BCL has been achieved. However, despite the high benefit/ cost ratio, relatively few donors have supported CP programmes. Now, as donors decrease their activities, host countries are taking over support of these programmes.

5. Even in those countries where the BCL has been achieved, experience shows that it is not been sufficient to promote a process of continuous improvement in environmental management in enterprises. In addition to BCL, it is crucial to establish a policy framework to create the incentives/demand for self-sustaining CP/ environmental management, as well as mechanisms to finance “win-win” investments. Thus, in countries which have achieved BCL, further work is needed to consolidate and extend the progress to date:

- strengthening support for CP among policy-makers;
- promoting the use of a wider range of policy instruments;
- emphasising regional and local “ownership” of CP programmes;
- further implementing environmental management systems and standards;
- establishing or strengthening financing mechanisms to provide investment capital at affordable rates, and strengthening capacity to prepare financially viable environmental projects; and
- developing methodologies to assess the impact of CP programmes, particularly in economic terms.

6. In countries without CP programmes, the EAP Task Force Secretariat and EU/TACIS jointly have organised seminars to launch the CP concept. The seminars have been organised in Uzbekistan, Moldova, Kyrgyzstan, Kazakhstan, Armenia and Azerbaijan. However, it has proved difficult to mobilise donor support for these seminars and to stimulate the development of CP programmes more generally. Further efforts are needed to assist these countries establish a better policy and institutional framework to strengthen environmental management in enterprises.

7. To focus attention on these needs and to help mobilise additional efforts, a Draft Policy Statement on environmental management in enterprises in CEEC/NIS is being submitted to the Århus “Environment for Europe” Conference for adoption by Ministers.

INTRODUCTION

1. At its sixth meeting (25-26 April, 1996) the Task Force for the Implementation of the EAP endorsed the Work Programme on Environmental Management in Enterprises. The objective of this Programme is to promote a continuous improvement in environmental performance and economic savings in industry in CEEC/NIS and thereby contribute to the restructuring of industry. The short-term objective is to achieve the Basic Capacity Level (BCL) in all CEEC/NIS by 1998. [Box 1.]

Box 1: Basic Capacity Level for CP

The Basic Capacity Level is the level which is needed for further dissemination of the CP concept and principles throughout industry and society by the host country. Specifically, it involves creating:

- an active core of CP advisors and trainers
- a set of CP case studies, demonstration projects and model business plans
- a functioning CP Centre or Centres
- training materials in the local language
- cleaner production principles, included in university course curriculum, such as business administration, engineering and economics, and
- a monitoring framework and quality assurance

2. This report summarises work carried out to fulfil the Programme objective. Specifically, it:

- assesses the progress in achieving the Basic Capacity Level for Cleaner Production in CEEC¹ and the NIS²; and
- identifies remaining gaps and describes possible next steps.

3. The report is developed on the basis of information compiled by consultants in several CEEC/NIS and information obtained from various sources such as UNIDO, the World Environmental Centre and CP Centres in CEEC/NIS. It is structured in two sections:

- (i) Achievement of the BCL; and
- (ii) Framework Conditions for CP.

1. Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, FYR of Macedonia, Poland, Romania, Slovakia, Slovenia, Yugoslavia

2. Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Ukraine, Uzbekistan

1.0 ACHIEVEMENT OF THE BASIC CAPACITY LEVEL FOR CP IN CEEC/NIS

1.1. General Overview

4. Central and Eastern European countries can be divided into four main groups in relation to the short term objective of achieving the BCL by 1998:

- Countries which have achieved the BCL;
- Countries which are on their way to achieving the BCL;
- Countries with some CP activities; and
- Countries without CP programmes.

5. Several countries could be considered as having achieved the Basic Capacity Level: Poland, Czech Republic, Slovakia, Hungary, Lithuania, Estonia, and the Russian Federation. There are six Cleaner Production Centres in Poland, two in the Czech Republic, Hungary, Slovakia, Russian Federation, one in Estonia and Lithuania. The number of trained persons in the field of CP is sufficient in these countries to sustain CP activities. Training programmes are being carried out in the local language by local trainers. Local case studies have been developed. Integration of CP concepts into University curricula is under development. At the same time, however, the demand for CP is still not highly developed in all of these countries. Some activities in these countries still rely on external support.

6. The second group of countries are those which have cleaner production programmes which are not sufficiently established to continue without external support. In some of these countries, a CP centre has been established, a few case studies conducted and some persons trained. Countries in this group are: Romania, Bulgaria, Ukraine, Latvia, and Slovenia. Further expansion and consolidation of the existing CP activities is needed in these countries.

7. The third group of countries are those where cleaner production activities have been initiated. These countries have a few demonstration projects and other programme elements are largely under development. Countries in this group are: Croatia, Georgia, Uzbekistan, and Kazakhstan.

8. The fourth group of countries have yet to establish cleaner production programmes, namely: Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, FYR of Macedonia, Moldova, and Kyrgyzstan. However, some discussions and work on cleaner production have been initiated in several countries. CP launching seminars have been organised by the EAP Task Force Secretariat/ TACIS in Uzbekistan, Moldova, Kyrgyzstan, Kazakhstan, Armenia, and Azerbaijan in 1997.

9. The EAP Task Force Secretariat collected data on progress in achieving the BCL during the summer/ autumn 1997. The results are presented in Table 1. For comparison, Table 2 presents data on the status of the BCL in CEEC/NIS in autumn 1995.

10. Virtually all the CP programmes in CEEC/NIS have been developed with support from donors/ international organisations. Several OECD countries, particularly USA, Norway, Denmark, the Netherlands, Austria, Sweden are supporting activities in this field on bilateral/ multilateral basis. All programmes pursue similar goals but with different approaches. Experience from countries where different donors/organisations were active shows the complementarity of these approaches for introducing preventive environmental practices into the industrial sector.

11. External assistance is being reduced over time, especially in countries which have achieved BCL. Now, as donors decrease their activities, increasing number of activities are being supported from domestic sources.

12. The most comprehensive CP programmes in CEEC/NIS are the following:

- UNIDO/UNEP National Cleaner Production Centre (NCPC) Programme. The NCPC Programme is administered by the United Nations Industrial Development Organisation (UNIDO), with the United Nations Environment Programme (UNEP) closely associated with its implementation. UNIDO is responsible for overall administration, local liaison, and provision of industrial expertise, especially for sectoral industrial demonstrations. UNEP is responsible for providing strategic environmental expertise in training, information, and policy analysis. The establishment of CP Centres under this programme depends upon the level of local support and commitment, largely from the organisation that volunteers to host the centre. The host institution is selected so that in-country institutions have ownership of, and share responsibility for, the project, making it an active "invested" stakeholder. This programme provides grants to three CP Centres in the Czech Republic, Slovakia and Hungary. UNIDO is also active in some other CEEC/NIS.
- World Environment Centre's (WEC) CP Programme. The WEC is an independent, non-profit, non-advocacy environmental organisation which aims to promote sustainable development world-wide. WEC's activities are financially supported by the US Agency for International Development (USAID) and the Swiss Government. Under WEC's programme, the concept of cleaner production is first demonstrated via pilot projects and subsequently introduced to a broader number of industries. Training is provided to waste minimisation teams formed by the enterprise and WEC provides the majority of funding and expert technical assistance for implementation of the projects. Other elements of the programme include establishment of CP Centres and dissemination of results of the programme to other facilities and industries. Such an approach assumes that dissemination of information down to the plant management level, improved co-ordination among local and foreign donor organisations and local government support are important elements for capacity building in cleaner production and sustainability of the programmes in industry. WEC programmes have been established in twelve CEEC/NIS. CP Centres have been established in Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia. WEC carried out a few demonstration projects in Kazakhstan and Uzbekistan.
- Norwegian CP Programme. The Norwegian Government finances transfer of know-how programmes in cleaner production strategies and assessment in several CEEC/NIS through the Norwegian Society of Chartered Engineers. The programmes aim to implement economically profitable and environmentally favourable restructuring of industrial processes. Cleaner production assessments are conducted in 100-500 production companies (demonstration companies) in each country concerned over a period of 1-6 years. In addition, 200 to 800 qualified CP advisors are trained in each country. Specific educational goals of the programme are: (i) educate a minimum of 35-60 authorised local instructors in the first 1-2 programme cycles (English language); (ii) further education in local language of 200-750 authorised advisors during the following 2-5 years conducted by local advisors authorised earlier. The programmes combine classroom studies, group work, in-company project work, and in-company advice. Programmes have been established in the Czech Republic, Poland, Slovakia, Lithuania, and the Russian Federation.

Table 1: Data on Basic Capacity Level - Autumn 1997

Country	Number of trained persons*	Number of demonstration projects	Number of CP centres	Training materials in local language	Number of universities with courses on CP**
Poland	1800	600	6	+	5
Czech Republic	196	68	2	+	3
Slovakia	163	79	2	+	3
Hungary	<100	<50	2	+	3
Lithuania	80	18	1	+	1
Estonia	40	22	1	+	1
Russian Federation	400	<150	2	+	1
Romania	80	32	1	+	-
Bulgaria	30	23	1	+	n.a.
Ukraine	30	16	1	+(R)	-
Latvia	20	18	1	+	-
Slovenia	26	3	planned	+	planned
Croatia	1	2	planned	under development	-
Georgia	2	-	-	+(R)	-
Kazakhstan	-	2	1	+(R)	-
Uzbekistan	-	2	-	+(R)	-
Armenia	-	-	-	+(R)	-
Azerbaijan	-	-	-	+(R)	-
Kyrgyzstan	-	-	-	+(R)	-
Moldova	-	-	-	+(R)	-
Albania	-	-	-	-	-
Belarus	-	-	-	-	-
Bosnia-Herzegovina	-	-	-	-	-
FYR of Macedonia	-	-	-	-	-
Yugoslavia	-	-	-	-	-

* Persons trained in a long-term training programme (more than five days in length including participation in demonstration projects)

** At least one semester optional course.

R - Materials only available in Russian

Table 2: Data on Basic Capacity Level - Autumn 1995

Country	Number of trained persons	demonstration projects	Number of CP centres	Training materials in local language	Number of universities with separate courses on CP
Poland	700	+	4	+	5
Czech Republic	150	+	2	+	2
Slovakia	100	+	2	+	-
Hungary	25	+	2	+	all?
Lithuania	40	+	1	+	1
Estonia	20	+	1	+	-
Russian Federation	40	+	planned	+	1
Romania	20	+	1	+	-
Bulgaria	20	+	1	+	-
Ukraine	20	+	1	+	-
Latvia	20	+	1	+	-
Slovenia	20	+	planned	+	-
Croatia	-		-	-	-
Georgia	-	-	-	-	-
Kazakhstan	-	-	-	-	-
Uzbekistan	-	-	-	-	-
Armenia	-	-	-	-	-
Azerbaijan	-	-	-	-	-
Kyrgyzstan	-	-	-	-	-
Moldova	-		-	-	-
Albania	-	-	-	-	-
Belarus	-	-	-	-	-
Bosnia-Herzegovina	-	-	-	-	-
FYR of Macedonia	-	-	-	-	-
Yugoslavia	-	-	-	-	-

Source: "Industrial Waste Minimisation Initiatives in Central and Eastern Europe - Progress Report Autumn 1995" prepared by T.Lindhqvist, H.Rodhe and P.Kisch, The International Institute for Industrial Environmental Economics at Lund University, commissioned by OECD, 8 October 1995.

1.2. Active Core of CP Advisors and Trainers

13. Training programmes in the region could be described under two main headings:

(i) Long-term training; and

(ii) Short term training.

14. Long-term training programmes, which include on-site training, aim to create a pool of active consultants and trainers. These programs are oriented towards providing a general understanding of CP principles and participation in demonstration projects in industry. The main programmes of this type in the region are:

- Norwegian CP Capacity Building Programme is a comprehensive, industry-oriented programme based on a “train the trainer” approach. At the outset training is carried out by Norwegian experts, but progressively local experts trained in the programme continue the training activities. This approach proved to be effective in creating an active core of CP advisors, e.g. in the Czech Republic, the Association of Managers for Cleaner Production (AMCP) constitutes a core group of active experts on CP; the AMCP was established in 1993 by the graduates of the first long-term training programme under the Czech-Norwegian CP Project. In Poland, the programme is being continued by the Polish Cleaner Production Centre NIF-NOT which co-ordinates the work of Polish Network for Environmental Management and Polish Network of CP experts.
- The WEC has carried out a number of demonstration projects in the region which also included on-site training and active participation in a CP assessment of a facility. Between 1995-1996, 32 experts were trained in Lithuania within the “Waste Minimisation Opportunity Audits in Lithuanian Furniture Industry” project. 16 local consultants were trained in the WEC “Waste Minimisation Program for Latvian Industries” project. A similar number of experts were trained in WEC programmes in other CEEC.
- A number of experts have been trained in CEEC/NIS within country - specific programmes, e.g. in Nizhny Novgorod, Russian Federation, 20 experts were trained using the CP Assessment procedure based on the PREPARE methodology³. The project is funded by the Dutch Ministry of Environment. In the Smolensk region, Russian Federation, a project on industrial and hazardous waste management is funded by Danish Environmental Protection Agency. 20 experts from 7 companies are being trained on CP in this project.

15. Short-term training programmes, which are up to five days in length aim to familiarise participants with CP concepts. These programmes are targeted mainly at government officials, business managers, etc. Some business managers who have been briefed on CP principles have initiated CP pilot projects in their companies. In most CEEC/NIS there is a significant number of officials and experts trained in such programmes.

16. In addition, several universities in the region are active in CP work and provide courses for students, and some universities - for industrial specialists (see section 1.7).

³ PREPARE: “Manual for the Prevention of Waste and Emissions”. Ministry of Economic Affairs, the Netherlands, 1991

1.3. Set of CP Demonstration Projects

17. The WEC has undertaken demonstration projects in twelve CEEC/NIS. In the period 1993 - 1997, WEC's industrial waste minimisation program in Lithuania saved in 10 participating companies more than US\$ 500,000 total. By decreasing the use of resources such as water, energy, and raw materials, and by reducing the generation of waste materials, the companies significantly improved their productivity, environmental performance, and worker health and safety. Similar results have been achieved in other countries.

18. Within the Norwegian CP programme, prior to receiving their certification, trained experts prepare reports which include three types of projects: (i) zero investment; (ii) payback on investment of less than 1 year; and (iii) long-term measures with larger investments which could be considered after options (i) and (ii) have been exhausted.

19. A number of demonstration projects were developed and implemented within UNIDO/UNEP's CP programmes in several countries of the region. UNIDO is now launching CP programmes in Croatia (in the framework of assistance provided by the Czech Republic) and Uzbekistan.

20. Some other activities in the region include:

- In Croatia, two CP projects were initiated within a programme to promote cleaner production which is being carried out by the APO-Hazardous Waste Management Agency.
- In Slovenia, three demonstration projects have been carried out at the University of Maribor with support of the national government.
- In Georgia, a number of demonstration projects is being prepared with assistance from Sweden.
- In Lithuania, a demonstration project on the "Implementation of Cleaner Production Projects in the Lithuanian Textile Industry", funded by EU LIFE, will be completed in 1997 and small demonstration projects will be implemented in eight textile companies.
- In St. Petersburg, Russian Federation, the "Industrial Waste Minimisation Programme for St. Petersburg" has been carried out as a part of the St. Petersburg Long-Term Water Sector Development Programme being jointly implemented by several consultancies with financial support from SIDA (Swedish International Development Agency). The Project has included studies of a wide range of industrial branches with further scoping of CP assessments extending to 16 companies.

21. The following mechanisms for disseminating the results of demonstration projects were used in the region: seminars, media, brochures, articles, and, in some cases, videos. The demonstration projects are usually presented as technical activity descriptions and very rarely cover the managerial aspects of the projects. Mechanisms to disseminate results and to convince senior managers of the benefits of CP activities are needed in most countries.

1.4. Functioning CP Centre (s)

22. Cleaner Production (CP) centres in CEEC/NIS can play an important role in promoting activities to improve the economic and environmental performance of the industrial sector. Most of CP centres in CEEC/NIS are non-governmental, non-profit and independent foundations. The majority are located at universities (e.g. Hungary, Latvia, Lithuania, Poland) as independent units within the university's structure. A few centres operate in conjunction with industrial associations, e.g. the Clean Industry Center is a separate unit of the Bulgarian Industrial Association; the Czech CP Centre works closely with the Czech Environmental Management Centre, an institution supported by Czech Industry. The Polish Cleaner Production Centre NIF-NOT works within the framework of the Polish Federation of Engineers and co-ordinates the work of eight regional CP centres. One centre in Poland is established at a consultant company (Atmoterm Ltd).

23. Three major sponsors of CP Centres can be identified:

- World Environment Center. There are eleven centres established by the WEC in CEE countries: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland (3 Centres), Romania, and Slovakia. Some of the centres established by the WEC are still financed by external grants. However, a few also have other sources of financing. The Bulgarian Clean Industry Center is financed partly by the Bulgarian Industrial Association and by commercial activities. The PPC (Pollution Prevention Center) at Atmoterm Ltd. is financed by Atmoterm Ltd. The CP Centre in Estonia, established by the WEC in 1994 and financed by US AID in its first two years, was supported by Finland in 1997, with some expenses covered by participating companies. The PPC at the Czech Environmental Management Centre is financed by contracts with industrial enterprises and the Czech Government. The Center for Implementation of CP at the Central Mining Institute (Poland) is financed by industry and the Polish National Fund for Environmental Protection and Water Management.
- Norway. CP centres have been established in Poland, Czech Republic, Slovakia and the Russian Federation. Only CP Centre in Russian Federation is still supported by Norwegian Government. The Polish Cleaner Production Centre is now financed entirely from domestic sources. The Czech Cleaner Production Centre and Slovak Cleaner Production Centre are now financed by UNEP/UNIDO and from domestic sources.
- UNIDO/ UNEP. The UNEP/ UNIDO Cleaner Production Program provides grants to the Centres in the Czech Republic, Slovakia, and Hungary. The establishment of a national CP centre in Slovenia is under way. A national CP centre in Croatia is expected to be established by the end of 1998.

24. Other CP centres in the region have been established through smaller and less comprehensive activities. For example, a CP Centre in Ukraine is financed from local sources such as the Pridneprovie Ecological Foundation. It is not involved in any CP programmes supported by western countries, being more science-oriented organisation; its main focus is on technological development. The Moscow Centre for Cleaner Production, which was established in November 1996, is a similar type of organisation.

25. Some new CP centres may soon be established, i.e. CP centre in Kiev (Ukraine) funded by Denmark, and CP centre in Nizhny Novgorod (Russian Federation) funded by the Netherlands. Georgia is also intending to establish a CP centre.

26. The main activities carried out by the centres are:

- information dissemination and library/ reference centre;
- training;
- consultant services for firms such as on-site assistance (audits);
- support for governmental agencies; and
- translation of key documents.

27. Generally, the CP centres are small units which employ from 3 to 8 persons. However, the actual number of persons involved is often higher as associate consultants work on a part-time basis.

28. Most centres consider that environmental audits in industries, monitoring/ sampling, technical assistance in waste minimisation audits, and other consultant services (including assistance in developing Environmental Management Systems) could be their major source of future funding. However, these activities could be carried out by private enterprises whereas some activities have a public service function and can not be supported by user fees. In view of the present economic situation and policy frameworks in some countries, there are doubts about industry's willingness to pay for the CP services and equipment. Grants from domestic governments and/or international donors are necessary to support public service functions.

29. External assistance is being reduced over time. Further discussions and analysis is needed in order to clarify the mission and objectives of CP centres, taking account of local conditions, and independently of any external support. The sustainability of the centres should be discussed in the context of their contribution to the overall sustainability of CP/ environmental management in CEEC/NIS.

30. Representatives from CP centres have expressed the desire to exchange experience and to discuss the role of CP centres in the transition to a market economy. To respond to this demand, a first meeting of a network of Cleaner Production/ Pollution Prevention/ Energy Efficiency centres in CEE was held on 23 - 25 April, 1997, in Kaunas, Lithuania. The meeting was organised within the framework of the EAP Task Force's work programme on Environmental Management in Enterprises. Issues discussed at the meeting included: (i) the sustainability of CP centres; (ii) main obstacles and opportunities for achieving the BCL; (iii) possibilities for donor - CP centre co-operation. A further meeting of the Network is planned for February, 1998 with support from the UK Know-How Fund, to discuss the development of business plans for CP centres.

1.5. CP Training Materials in the Local Language

31. A number of CP training materials in the local language were translated from English publications developed by various organisations within the existing CP programmes in the region (Norwegian, WEC, UNEP/UNIDO, etc.). Some publications were initiated and financed by local institutions. Additionally, a set of training materials in Russian (as well as in other Eastern European languages) has been developed by the International Institute for Industrial Environmental Economics at Lund University (Sweden). Several documents in Russian were published by the EAP Task Force.

32. Existing CP training materials in the local language could be described under the following categories:

- cleaner production/waste minimisation/ pollution prevention manuals. The Facility Pollution Prevention Guide⁴, published by US EPA, has been translated into Estonian, Latvian, and Russian. The Waste Minimisation Manual⁵, developed by the WEC, has been translated into several languages. In those countries which have undergone the Norwegian CP programme, a training material is available in the local language. The first manual in Croatian, based on the Czech - Norwegian CP training manual will be available in March/April 1998. Two domestic manuals were prepared by the Czech Cleaner Production Centre for use by industry and government. In several NIS such publications are available in Russian.
- publications/manuals on Environmental Management Systems (EMS). For example, the Environmental Management System Training Resource Kit⁶ is being translated into several languages of the region. There are also several other publications available in some CEEC languages, e.g. a textbook “Corporate Environmental Management” in Hungarian which includes six case studies, “Practical approaches for implementation of EMS” published in Bulgarian, and some others. A manual in Czech on integration of CP and EMS is under development.
- case studies, e.g. WEC’s report on “Economic and Environmental Benefits of Industrial Waste Minimisation in Estonia, Latvia and Lithuania” has been translated into the languages of the countries concerned. A similar report is available on WEC’s activities in Bulgaria, Czech Republic, Hungary, Romania, Slovakia, and Ukraine. The case studies are available in all CEEC/NIS where demonstration projects have been carried out.
- specialised publications and guidelines for particular sectors of industry. Some enterprises have funded specialized publications and guides on CP. For example, in Bulgaria, “CP in the Tanning Sector” financed by “LAV” Jsc, Gabrovo.
- in some CEEC/NIS there are some general publications on environment with sections on CP.
- videos. A video on “Pollution Prevention: Swedish Experiences” in Russian developed by Lund University has been used in the NIS. There are several other videos available in the local languages of the region, e.g. two videos in Russian about the Russian - Norwegian CP Programme.

33. Overall, despite a number of existing materials in the local language, there is still significant shortage of sector-oriented guides on CP in the various industrial branches.

4. *Facility Pollution Prevention Guide*, US EPA, 1992

5. *Waste Minimisation Manual: A 10-Step Programme for Success*, WEC, 1996

6. *Environmental Management Systems Training Resource Kit*. UNEP/ICC/FIDIC, 1997

1.6. CP in University Curriculum

34. Courses on cleaner production in universities could be described under two categories:

- universities with separate courses on CP (at least one semester optional courses). There are five universities in Poland, three in the Czech Republic, Hungary and Slovakia, one in Estonia, Lithuania, and Russian Federation. Two Universities in Slovenia and one university in Russia, may introduce such a course in the near future. Examples include:
 - Mechanical Engineering Faculty of the Silesian Technical University (Poland) has a three year course with 30 hours of lectures each semester. The content of the course is fully focused on CP.
 - Tallinn Technical University (Estonia) provides a one semester course on “Fundamentals of Cleaner Production”
 - Veszprém University (Hungary) has a graduate program for environmental engineers and offers specialised courses on CP.
 - Kaunas University of Technology (Lithuania) and Kaliningrad State University (Russian Federation) offer a course on CP which was developed with the assistance of the International Institute for Industrial Environmental Economics at Lund University (Sweden).
- universities with CP integrated into their courses (CP is a part of a course but is not a separate subject). There is a number of such universities in Poland, Hungary, Czech Republic, Slovakia, Lithuania, Estonia, Russian Federation, Slovenia, Bulgaria, Latvia, Ukraine. Several universities in the Baltic region take part in the Baltic University program; starting from spring, 1997 a new course “Sustainable Baltic Region” was introduced which includes a special session on “Sustainable Industrial Production: Waste Minimisation, Cleaner Technology and Industrial Ecology”.

35. Courses fully or predominantly devoted to CP, are generally fairly short (30-40 hours) with a limited number of students each year (10-20). In most cases the courses are not a part of the compulsory curriculum.

36. Most of the people teaching CP at universities seem to be enthusiasts who are prepared to develop and launch courses without any financial or informational resources. International co-operation programmes have generally not supported the development of education in CP at universities.

2.0 FRAMEWORK CONDITIONS FOR CP IN CEEC/NIS

37. Even in those countries where the BCL has been achieved, experience shows that it is not been sufficient to promote a process of continuous improvement in environmental management in enterprises. In addition to BCL, it is crucial to establish a policy framework to create the incentives/demand for self-sustaining CP/ environmental management. This chapter describes the situation in CEEC/NIS concerning:

- (i) Role of other stakeholders in supporting CP activities;
- (ii) Implementation of environmental management systems; and
- (iii) Financing of CP investments.

2.1. Role of Other Stakeholders in Supporting CP Activities

38. Governments in the countries which have achieved the BCL, particularly in Poland and the Czech Republic, provided strong, early support for CP activities. Governments in some other countries have been also active, e.g. in Slovenia, the government co-financed CP projects initiated by universities and institutes (since 1993 the Ministry of Science and Technology has financed several projects on pollution prevention and waste minimisation). Most recently, in Georgia, a declaration to “Create Policy and Implement Cleaner Production Concepts in Georgia” was signed by the Minister of Environment and the Minister of Economy. In Kazakhstan, a project “Reduction of Solid Waste” based on CP approach has been included in to the government’s plan for 1998-2000.

39. Governments in countries like Estonia and Lithuania have gradually increased support for CP programmes. The Estonian government’s National Environmental Action Plan listed CP as one of the 10 priorities and a CP programme will be launched in 1998. In Lithuania, the Ministry of Environmental Protection declared that pollution prevention is the main strategic approach in environmental protection and started development of a National CP Program, which will include CP a dissemination plan and a strategy for CP financing.

40. Generally, local authorities have been passive in most of the CEEC/NIS with very few exceptions. Local authorities in some CEEC and the Russian Federation start showing increasing interest in CP.

41. Industrial confederations, chambers of commerce generally have been involved in CP activities in the countries which have achieved the BCL, as well as in Bulgaria, Slovenia, and Croatia. In other countries these institutions expressed some interest in CP, or were not involved at all.

42. Trade unions in CEEC/NIS have been passive towards CP. Guide on trade union/ employee involvement in CP programmes in CEEC/NIS is being developed by trade unions with assistance of the EAP Task Force, with the objective of catalysing their greater interest in, and commitment to CP. This includes the role which CP can play to improve workplace health and safety.

43. Generally, NGOs in the region have not been actively involved in CP.

2.2. Implementation of Environmental Management Systems and EMS Standards in Enterprises

44. Companies take measures to improve their environmental performance mainly because of environmental regulation being more vigorously enforced. Market pressure is becoming increasingly important. Companies in CEEC seeking to sell their goods in western markets are required to improve their environmental performance. This is not so visible in the NIS. Both regulatory and market pressures in CEEC have been significantly influenced by the EU accession process, as the use of CP is seen a part of the harmonisation process of CEE economies with the standards of the EU. It is also a precondition for deeper and broader economic relationships with world markets.

45. The Environmental Management System (EMS) has quickly become an issue for companies in CEEC, particularly for large exporters. In the Czech Republic, a national version of ISO 14001 was enacted on 12 July, 1997. Companies that have introduced ISO 9000 expressed great interest in this new standard. However, enterprises often perceive EMS only as a certificate that has to be obtained for overcoming a new trade barrier rather than a tool to increase their efficiency and to improve environmental performance.

46. There has been considerable work in the field of EMS in Hungary, Poland, and Slovakia, in the last few years. The implementation of ISO 14001 in many cases follows the implementation of the quality management standard, ISO 9000. In Hungary, by 1996 the number of companies certified to ISO 9000 exceeded 500 and the first steps were also taken to certify according to ISO 14001. In Poland and Slovakia, there are several companies already certified under ISO 14001, mainly big exporters and subsidiaries of international corporations.

47. In some CEEC projects have been developed to promote introduction of EMS. In the Czech Republic two demonstration projects have been carried out. The first project started at Znovín Znojmo, a small wine producer, in 1996. The project is financed by the Austrian Government. Another project focused on small enterprises started in 1997 under the UNIDO/UNEP NCPC programme.

48. In Slovenia, a pilot project on Environmental Management Systems in eight SMEs was completed in 1995. In the first year the companies developed their initial environmental reviews, defined and adopted environmental policies. In 1997 the first Slovenian company was certified under ISO 14001 and this number is expected to rise to ten shortly. The majority of SMEs which have introduced ISO 9000 are planning to implement ISO 14001 by the end of 2000. About forty companies are finishing their training regarding EMAS.

49. In some other countries some work is also being carried out in this area, but for the time being there are few or no enterprises working actively on implementation.

2.3. Financing of CP Investments

50. Financing of CP investments varies among countries and projects. In Poland, CP projects have been financed by enterprises often with support from environmental funds. Within the WEC programme in Latvia, investments by companies from their own sources varied from 20 per cent to 100 per cent, depending on the specific project. Projects developed within the framework of the Norwegian training programme are usually financed by industry or other sources available to companies. Virtually no CP projects were financed by local banks. Due to unattractive lending conditions, very few companies use this mechanism.

51. Some IFIs are active in financing CP investments, e.g. EBRD through credit lines and NEFCO by establishing revolving funds. Such funds are being created in Lithuania and Russian Federation. These are a promising avenue to support CP investment and their experience should be followed.

52. The obstacles to financing CP investments could be described under two major groups:

- On the demand side, enterprises (especially SMEs) in CEEC/NIS have insufficient experience in preparing applications for project financing. Lack of knowledge in evaluating the financial aspects of investments often blocks implementation of CP projects. Even when capital exists, CP is one among a range of investment options.
- On the supply side, there are obstacles in capital markets: banks are weak, there is a lack of environmental expertise and loan rates are unattractive to enterprises. Also, costly administrative requirements result in international financial institutions establishing loan thresholds which are significantly higher than costs of CP investments; it is difficult to receive financing for small projects. Generally, there is little experience with the implementation of economically viable CP projects.