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**PROMOTING ENERGY EFFICIENCY AND THE
INTERNALIZATION OF EXTERNALITIES**

**Five proposed regional initiatives for action
under ECE-S programme of work**

(as suggested by the Czech Republic, Turkey, United States of America;
and the World Energy Council (WEC) and Vernadsky Ecological Foundation)

Introduction

Five specific initiatives have been proposed by three country delegations and two non-governmental organizations for consideration by the Committee on Sustainable Energy to support the objectives of CSD-9. At the forthcoming annual session of the Committee, delegates will be asked for their views on these proposals, their inclusion in the programme of work of the Committee and/or its subsidiary bodies, and on the next steps to be taken, including working methods, scope and resources. The initiatives would, in most cases, also require inter sectoral cooperation with other ECE Principal Subsidiary Bodies, such as the Committee on Environmental Policy, Inland Transport Committee, and the Committee for Trade, Industry and Enterprise Development.

1. Clean Coal Combustion in Small and Medium-Sized Boilers in Countries with Economies in Transition (CIT) The initiative is proposed by the World Energy Council (WEC).

Short description: At present, coal covers 25% of primary energy consumption in the economies in transition. Related emissions of pollutants and of CO₂ are recognized as a major source of environmental damage. While clean coal technologies are starting to penetrate the power generating sector, pollution from combustion in the thousands of small and medium-sized coal fired boilers (0.5 to 50 MW, most of them below 10 MW) has not been effectively addressed so far. Equipment is obsolete, emission standards are either inexistent or not enforced, and investments are not forthcoming.

Action suggested: In the World Energy Congress Statement 2000, "Energy for Tomorrow's World - Action Now" WEC states (on page 112) that "the replacement of small coal boilers in central and eastern Europe and inefficient wood and coal-burning stoves in China or India have, for example, the potential to reduce significantly greenhouse gases and local pollution effectively". As one of the supporting organizations of the World Energy Assessment Study (WEA), a background study for CSD-9, WEC has proposed that this issue be addressed within the framework of ECE, and, in particular, to:

- evaluate the existing number and capacities of small and medium-sized boilers and their related pollution as well as perspectives to 2010 and 2020;
- review combustion technologies adapted to the various coal qualities in use in the region;
- identify the financial, legislative and technological obstacles that impede the rapid deployment of clean coal technologies in this market;
- evaluate the strategies open to governments (minimum standards, enhanced enforcement) and to the private sector (improved coal quality, adapted technologies, licencing, energy service companies);
- formulate recommendations for internationally agreed policies and cooperation, (with emphasis on minimum emission standards, incentives for technology transfer and deployment, new financing approaches);
- disseminate the results to other regional commissions.

The Project would require intersectoral cooperation with the Committee on Environmental Policy.

2. The Blue Corridor is an initiative proposed by the Vernadsky Ecological Foundation (NGO in the Russian Federation). The objective of the proposal is to promote the utilization of natural gas in transport, in particular in transboundary freight traffic and, thereby, reduce mobile sources of pollution.

Short description: At present, there are 1.4 million vehicles around the world using natural gas as a fuel. The economic and environmental advantages of natural gas vehicles (NGVs) can be summarized as follows: NGVs emit far less pollutants than gasoline or diesel-fuelled vehicles; natural gas does not emit sulphur oxides or particles; and NGVs currently meet all EU and US-EPA emission standards.

Action suggested: To elaborate and implement an International Agreement for establishing an international transboundary corridor in the ECE region adapted for NGV freight traffic. This would include:

- determining the optimal route for the Blue Corridor, taking into account the busiest freight traffic points in Europe, availability of gas, fuelling stations and proximate gas pipelines;
- assessment of economic and environmental impacts of the Project;
- standardization of fuelling and correspondent vehicle equipment;
- harmonization of national legislation;
- consideration of economic and tax incentives.

The Project would require intersectoral cooperation with the Inland Transport Committee.

3. Introduction of Clean Coal Technologies to Improve Thermal Efficiency of Coal-Fired Boilers in ECE Countries in Transition: This initiative is proposed by the United States Department of Energy.

Short description: Coal is a principal fuel used for the production of heat and power in many of the countries with economies in transition and is a key component in any strategic planning for sustainable energy development. Introduction of Clean Coal Technologies (CCTs) and the improvement of thermal efficiency performance in coal fired power plants are two of the most cost effective, near term solutions towards the reduction of emissions, reduced costs, and improved public acceptability, including ensuring that a market will continue to exist for coal. A strong market for coal will also mitigate social disruptions by continued employment of miners and ancillary support services.

Countries in transition share much in the way of a common economic and political heritage. While all of these countries are encountering economic, energy, and environment related problems, the severity of the problems appears most in the Russian Federation because of its size. More than 30% of Russia's power generation comes from coal. A substantial portion of that is being generated from small and medium sized boilers. In general, almost all thermal power plants of any size are old and inefficient, resulting in low productivity, high pollution, high cost, and reduced public acceptability. The same situation prevails in a number of other countries with economies in transition.

It has been well documented that the introduction of CCTs reduces pollution, while efficiency improvements directly and proportionately reduce the emission of greenhouse gases. While introduction of these technologies is an admirable goal, the reality is that there will not be enough money, equipment and manpower available to make substantive and major changes in a relatively short period of time. Any realistic approach needs to prioritize the various options to ensure that the most benefits are received from the smallest amount of investment.

The approach proposed here attempts to address this need while at the same time being cognizant of resource availability for implementation and the need to focus on appropriate technologies for particular applications.

Action suggested: To establish a Power Efficiency Institute (PEI) as an umbrella organization to initiate, coordinate and disseminate activities and information relevant to the introduction of clean coal technologies and to improvements of thermal efficiency in coal-fired power plants. The project's ultimate objective is to develop curricula and bring training and information on an as-needed basis which can be implemented, resulting in reduced cost and improved environmental performance.

Working with local and regional interest groups, the PEI could become a major resource centre with outreach capabilities to evaluate various technologies and operational procedures involved in the newer technologies as well as in the conversion process. The PEI would be a storehouse for available information related to power plant conversion, power plant efficiency improvement and newer, cleaner technologies. The PEI would also provide technical assistance in power plant related environmental monitoring.

Expertise resides within many ECE member countries that can be applied to the development and operation of such an institute. Those countries that wish to participate in such a programme would constitute a task force to make the initial decisions regarding location of the PEI and the initial objectives, priorities, curricula and training programmes. The areas and activities that would initially be considered would include the following:

- \$ *Curriculum development:* The PEI would establish a broad educational programme to address the issues involved in high efficiency, low pollution, clean coal technologies. Since adoption of technologies in any society depends on acceptance by its people and leaders, the educational programme will be designed not only for the technologists but also for the general public and political leaders. The technical issues will include all the primarily scientific, technical and economic issues as well as any country or region specific issues. The curriculum will include a value engineering approach to achieve the best return on investment.
- \$ *Clean Coal Technology:* The PEI would provide the capability for screening, pre-feasibility study definition, and recommendations for selection and site specific design expertise. Depending upon resources available, this capability could range from technical information exchange and guidance regarding the existence of specific expertise to performing the analytical studies and doing on-site evaluations.

\$ *Efficiency Improvement:* Historically, it has been seen that every older, operational power plant has the potential to improve its efficiency by at least 1-2 percentage points without any major investment required. Improved management practices, better analysis and control, and other near-term actions can be taken at little to no cost to the plant.

\$ *Environmental Monitoring:* Environmental monitoring (and documentation) will be required to ensure that each power plant addressed is operating in an improved environmental manner. The PEI, with its associated task force of interested country experts, would develop the power plant related environmental monitoring criteria, procedures, and acceptable parameters.

Expected Outcome: The PEI would serve as a regional resource for showcasing improvements in the production of heat and power, and demonstrating the ability to meet social and environmental requirements in an economic and efficient manner. It would have the potential of being responsible for reducing emissions, reducing costs, improving the acceptability of coal as a primary fuel for power production, and contributing to a sustainable energy development future for countries with economies in transition.

The project would benefit from intersectoral cooperation with the Executive Body for the ECE Convention on Long-range Transboundary Air Pollution.

4. Bench Marking Data Base Development for Industrial Processes: The initiative is proposed by the Turkish Ministry of Energy and Natural Resources.

Short description: The global CO₂ emissions generated by industry have declined from 22% to 20% worldwide, between 1990 and 1997. The reduction can be attributed to a decline in output of the energy-intensive industries in economies in transition and to the recent restructuring of these sectors worldwide. However, these positive tendencies do not seem sustainable over the medium and longer term if economies in transition and developing countries do not succeed in refurbishing their existing industrial plants with advanced energy-saving technologies. The significant reduction of energy consumption from selected industrial sectors might stabilize for several years the level of CO₂ emissions even with sustained output growth in those sectors.

Action suggested: ECE should develop a Bench Marking System with analysis of sectoral processes, including specific energy consumption for different types of production systems. Results of the evaluation of best and worst performance achieved by different countries, both developed and those in transition, would be recorded in the established Bench Marking Data Base System. The promotion of Best Practices would be most useful, particularly to countries with economies in transition.

The framework would include:

- definition of energy-intensive industries;

- definitions of government policies and strategies for development of these industries;
- breakdown of industries into subgroups according to technologies; and by energy consumption and production costs, to establish the data base;
- analysis of the results;
- identification of different financial, legislative and technological obstacles encountered by countries in their transition and adaptation to the best models and systems;
- elaboration of commonly-accepted recommendations to policy makers related to the lowering of energy intensity in industry.

The Project would benefit from intersectoral cooperation with the Committee for Trade, Industry and Enterprise Development.

5. Elaboration of Guidelines to Reform the Energy Prices for Promoting Sustainable Energy Development: Proposed by the Czech Ministry of the Environment and Ministry of Industry and Trade.

Short description: Prevailing pricing, fiscal and economic instruments in many ECE countries do not support the objectives of sustainable energy development. Existing subsidies and tax distortions exacerbate the adverse environmental impact associated with energy production and use, reduce economic efficiency and place a burden on the public budget. There is a lack of transparency on cross-sectoral subsidies as well as environmental tax revenue distribution. Moreover, environmental taxes are not always levied at the right place, and their environmental benefits and effectiveness are not transparent.

Action suggested: Following up the recommendations made by the joint ECE/OECD Workshop on Enhancing the Environment by Reforming Energy Pricing (Pruhonice, Czech Republic, June 2000), it is proposed that the Committee on Environmental Policy and the Committee on Sustainable Energy establish jointly an Intergovernmental Task Force to elaborate detailed Guidelines with a view to assisting policy makers from the ECE region to reform energy prices in order to promote sustainable energy development. The Task Force would include experts from different stakeholders, for example, energy, environmental and fiscal policy makers, the private sector/industry and NGOs. The Guidelines should be developed in cooperation with OECD, IEA and the European Commission and be submitted to a joint meeting of the Bureaux of the two Committees in early 2002 and thereafter, if agreed, to the Ministerial Conference on Environment for Europe@ (Kiev, 2002) and ARio +10" Conference. The Committee on Environmental Policy will consider the proposal at its session in September 2000.

Output expected: The elaboration of Guidelines commonly accepted by all stakeholders would help policy makers reform existing national fiscal systems and other economic mechanisms by making them more flexible and effective as well as better coordinated internationally. Reducing distortions is a great challenge, but also an opportunity for promoting sustainable energy

development as well as achieving nationally and internationally agreed environmental goals. Getting energy prices Aright@ would entail the removal of environmentally harmful subsidies and tax provisions, and by application of effective market-based instruments, would lead to the internalization of negative externalities. The current fiscal systems need to be reformed, environmental taxes levied as close as possible to the source of pollution, and more transparency given to environmental tax levies and revenue allocation. In sum, a total Aenergy price reform@ is necessary.

The project would require intersectoral cooperation with the Committee on Environmental Policy.