

COMPARATIVE ASSESSMENT OF NUCLEAR POWER AND OTHER ENERGY SOURCES

Regular Budget expenditure: \$1 964 351

Extrabudgetary programme resources utilized: \$121 684

Alleviating and mitigating the impacts of human activities on health and the environment, while continuing to ensure that an adequate supply of electricity is available for social and industrial development, have become global objectives. The Agency's activities in the area of the comparative assessment of nuclear power and other energy sources thus seek to incorporate health and environmental aspects, in addition to technical and economic factors, into policy making for the power sector.

Two studies were conducted jointly by the Russian Federation and the USA, one on alternative strategies for power development — the Joint Electric Power Alternatives Study (JEPAS) — and the second on the options for nuclear power development — the Joint Parallel Nuclear Alternatives Study (JPNAS), both focusing on the Russian Federation. The Agency was asked to evaluate the possibility of using the data and methodologies developed in these studies for similar studies in other countries.

The Agency convened a meeting of experts in November 1995 in Vienna to review the results of these studies. Also reviewed were a number of other cost-benefit studies on electric and nuclear power development, as well as safety studies of older, mainly Soviet designed, reactors that have been carried out by the Agency and different international organizations and national institutes. It was noted at the meeting that the situation in other eastern European countries was significantly different from that in the Russian Federation because most of these countries have only one or two nuclear sites. The studies, however, were considered to be useful as reference material in national or site specific evaluations. A number of

possible future areas for study were identified, such as the cost efficiency of safety upgrades for Soviet designed reactors, decommissioning costs, development of a database, spent fuel management costs and technical co-operation support to individual countries.

Important contributions were made by the Agency to the work of the Intergovernmental Panel on Climate Change (IPCC) during 1995, for example a joint IAEA-OECD/NEA publication entitled *Nuclear Power: An Overview in the Context of Alleviating Greenhouse Gas Emissions*. The Agency also participated in the First Conference of the Parties to the Framework Convention on Climate Change, held in Berlin in March, as well as in meetings of various subsidiary bodies established by the Conference of Parties.

The Reference Technology Database was established in 1995. In addition, a new software package, DECPAC, for electricity system analysis was developed and an intensive testing programme was carried out of the methodology and computer tools developed within the DECADES project. A parallel activity was the implementation of country specific databases for 15 countries, covering more than 1500 technologies at all stages of the different energy chains.

Under the DECADES project, an international symposium on electricity, health and the environment was held in October in Vienna. Organized by the Agency and nine other international organizations, the symposium focused on: implementing sustainable electricity policies; the role of international co-operation; assessment of health and environmental impacts; implementation of comparative

assessment; and national case studies. Many studies and analyses were presented dealing with such subjects as data acquisition and the development of computer models for the analysis and assessment of different energy systems, the risks associated with emissions of CO₂ and other greenhouse gases, the health effects of chemical releases, the problems of including subjective perceptions of risk, and the inclusion of external costs. Significant uncertainties still exist in a number of areas, for example with regard to the risks of CO₂ emissions and the effects on the average temperature, and the risks of small releases of chemical substances. However, the discussion on external costs led to the important conclusion that if greenhouse effects are included in the assessment, hydro power and nuclear power are the only currently available large scale energy sources that have relatively low external costs.

A project was initiated in 1995 on the comparative health and environmental impacts of solid wastes from energy systems and other sources. Five tasks are planned: compiling and reviewing information on waste streams and disposal concepts for energy system fuel chains and other sources; identifying available methods for the assessment and comparison of the health and environmental impacts of radioactive and non-radioactive substances; identifying the available environmental fate and transport models that may be used for comparative assessments; documenting comparative assessments of the potential health and environmental impacts of radioactive and non-radioactive solid wastes from nuclear and other energy systems; and co-ordinating case studies comparing the health and environmental impacts of radioactive and non-radioactive solid wastes from nuclear and other energy systems.