

Thermonuclear Fusion and ITER International Collaboration

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- For mankind, a sustainable development requires that industrialized countries develop a range of safe, environmentally-friendly and economically viable energy options for the near, medium, and long-term.
- Fusion of light nuclei (hydrogen isotopes), which is the process at the origin of energy radiated by the stars, offers the long-term prospect of an intrinsically safe, virtually inexhaustible and environmentally acceptable energy source.
- Fusion research has now reached the stage where it is scientifically and technically possible to proceed with the construction of the first experimental reactor. It has the potential to become one of the major sources of electricity in the next century.
- The 4 large fusion programmes of the world (European Union, Japan, Russia, U.S.A.) are working together on the Engineering Design of the first experimental reactor called ITER (International Thermonuclear Experimental Reactor), in the frame of an Agreement signed in 1992, for a duration of 6 years, with a financial volume of about 10^9 US \$; the Agreement is based on the principle of equal status, equal participation, and equal benefits. Canada participates to the European contribution to ITER.
- ITER is a 1.5 GW (thermal) reactor of the Tokamak-type, whose magnetic confinement system would be made out of superconducting coils; its construction cost is estimated at about $7.5 \cdot 10^9$ US \$; it is designed to fully confirm the scientific feasibility of fusion, and also to contribute substantially to the demonstration of its technological feasibility and of its environmental acceptability.
- In parallel with the Engineering Design Activities (EDA), explorations are presently under way between the 4 partners in order to define the scope and frame of the post-EDA (after July 1998) ITER activities. Among the many questions to be solved before possibly concluding a Construction Agreement, two are outstanding : the selection of a site, and the financial shares of the partners. For the time being, Japan, Europe (in Italy) and Canada have indicated that they were studying the possibility to offer in due time a candidate site.