The Next Twenty Years – IAEA's Role

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The twentieth anniversary of an institution is an appropriate time to look back and to ask what has been achieved. It is also an appropriate time to look ahead and to ask what should be the mission for the future. How can the strengths of the International Atomic Energy Agency (IAEA) be best utilized, what new opportunities should be seized upon, and what challenges should the IAEA be prepared to meet in the next twenty years?

Forward planning is a very necessary activity in today's world. There are so many demands on national or institutional resources that careful analysis of options is necessary to establish priorities and ultimately to provide for implementation. But such planning must be done carefully with full appreciation for the validity and sensitivity of the input assumptions and data. Furthermore, today's plan, while setting goals and directions, cannot be so inflexible that it cannot be responsive to ever-changing political, economic and technical constraints or opportunities. Thus in looking ahead, the plan must contain provisions for flexibility to provide for further modifications in the light of ever-changing knowledge, attitudes, and world conditions. The experience of the past five years in the energy field, and especially in nuclear energy, underscores this need.

In looking ahead for the next twenty years, we are attempting to describe the International Atomic Energy Agency and its role through the twentieth century. In doing so, we are automatically laying the base for the Agency's work going into the twenty-first century. In short, we are trying to visualize a programme that can serve the coming generation and, in doing so, creating a base from which the needs of the succeeding generation can be met. This is a large order and the crystal ball is less than clear.

Nuclear fission — an acceptable energy resource

There are a number of factors that would argue for little change in the Agency's role in the next twenty years. This is especially true in the gross sense, less true in a detail. First and foremost, it is difficult to imagine that nuclear energy will play a less important role in the next twenty years than it has in the past. Granted there are challenges to the acceptance of nuclear power, but these are challenges that must be met because it is necessary that nuclear fission be an acceptable alternative energy resource to more costly and diminishing resources of natural gas and oil.

Some other general points should be noted:

– The IAEA must continue to serve the needs of its Members. This will of necessity mean continuation of a diverse programme serving nations at all stages of nuclear development.

– Nuclear energy and its applications will continue to be the dominant theme of the IAEA since it is the one international body to which responsibility for that subject has been assigned.

– The core programmes of technical assistance, informational and promotional services, and safeguards will continue though changing, to be sure, in degree and detail to meet the current needs of Members.

– Experience and success to date suggest that it will be unlikely that a better forum than the IAEA could be established for bringing together east-west-north-south on nuclear energy issues.

Factors for the Agency's programme

There are a number of factors that should cause the Agency's programme to change in degree and emphasis. In some cases, these new emphases could dominate the future programme. Most of the anticipated changes, I visualize, would be in direct response to

(1) utilizing nuclear fission energy as a viable additional energy resource;

(2) answering the challenge of public acceptance of nuclear energy arising out of concerns for safety, waste management and proliferation; and

(3) preparing the base for national decisions as to the use of "inexhaustible" energy resources in the next century.

Let me be more specific:

- Realism and experience have shown that a simple transfer of technology and an infusion of capital do not change a developing nation into a developed nation. Development of an indigenous capability able to utilize and build on such transfers is necessary. The nation becomes "developed" when it amasses the "trained and experienced human capital" able to put the technical and fiscal capital to work. Technical assistance will become even more important, but only when it is an integral part of well thought out, strongly supported domestic programmes.

- National reliance on one type of energy resource or one national exporter of key equipment and services is no longer a prudent practice, if it ever was. Diversification of resources used and of national origins of suppliers will become more common. Nuclear energy will be more widely used and additional nations will build nuclear power plants but not exclusively. Nations will strive to avoid becoming dependent on any one imported energy resource, e.g., oil or uranium, or on any one or a collection of exporting nations, e.g., the USA for enriched uranium, Organization of Petrol Exporting Countries (OPEC) for oil.

- New demands and constraints that extend beyond normal marketplace factors are becoming more controlling as to the mix of energy resources used and total energy growth. Included are environmental, health and safety, and proliferation concerns. These impact in one way or another on all forms of energy – hydro, fossil and nuclear, but most strongly on nuclear. At present these concerns seem to have more influence on public opinion and public acceptance than factors such as normal competitive economics and security of supply. The effect, coupled with the current emphasis on conservation, has resulted in a slowing down of additions to generating capacity, especially in more industrialized nations.

- Capital availability, especially for nuclear power plants and for fossil plants with necessary pollution control devices, is increasingly becoming a problem. The sums are large and the problem is made even more difficult by a long construction period exacerbated in

considerable measure by the public expression of concerns noted earlier. Developing nations already have proportionally high demands for capital acquisition, and the ever-increasing demands to meet current costs of necessary imports puts them in an extremely difficult squeeze.

- Current energy resources being utilized are "exhaustible" or limited, for example, useful hydro sites, oil and gas, and uranium utilized in once-through water reactors. Long term needs must be satisfied by the use of "inexhaustibles" such as solar, breeders, fusion. As of today, each technology has its problems and/or uncertainties; solar, while promising for some heating and cooling applications, has, for major electric applications, many economic, system and environmental uncertainties; plutonium breeders, while technically feasible today, face unresolved problems of economics and proliferation control; uranium-233 breeders require much engineering development and face in varying degrees other unresolved problems similar to the plutonium breeder; fusion, though promising, must first prove its technical feasibility. The most optimistic predictions would not claim significant contributions from the utilization for electric generation for these "inexhaustibles" until sometime in the next century.

- Since the use of "inexhaustible" resources is a long term development, conservation of "exhaustibles" in the next twenty years is a pressing problem. Interrelated, also, is the question of minimizing pollution and protection of the environment. Efficiency of energy use in production, processing and end-use is thus becoming more important. Nuclear tools and techniques will be ever more useful in helping to answer questions and in assisting in developing new approaches, not just in basic energy production, but also in agriculture, nutrition, water resources, industrial processes, etc.

New institutional mechanisms

Given the present status, trends and concerns, how might the IAEA and its activities be affected during the next twenty years? As noted earlier, in the broadest outline there is little need for change; the theme will continue to be nuclear, and the programme will continue to be broadly categorized as technical assistance, informational and promotional services, and safeguards. But I visualize significant changes, especially in emphasis; also, new institutional mechanisms involving the IAEA may need to be created.

The objectives contained in Article II of the Statute were broadly and wisely stated. The first objective addressed making the benefits of nuclear energy widely available.

> "... seek to accelerate and enlarge the contribution of atomic energy in peace, health and prosperity throughout the world."

This type of activity is dispersed throughout the Agency and generally has been described as "promotional". The programme includes direct technical assistance for individual developing nations as well as the variety of research, development and information activities carried out to serve the collective interests of all nations.

Technical Assistance generally

Developing nations differ in their needs. Each nation has its own geographical, sociological and political assets and constraints; each is in a different stage of development. Its development is coupled closely to the capability of its human resources and the exploitation

of its indigenous natural resources. Development time scales can be shortened through technical assistance and the infusion of capital; however, the strength and capability of a nation will ultimately rest on its own initiatives and determination and creation of its indigenous strengths.

The Agency, with its extensive experience, will have to work more closely with developing nations to assure that the specific technical assistance provided is well chosen and directed toward priority projects and that the limited assets of the donor nations and the recipient nations are utilized effectively. Although the Agency's conventional technical assistance, such as the provision of fellowships, equipment and experts, will continue to be in demand, as the developing nations evolve, it will have to evolve to meet their more sophisticated demands. A more comprehensive programmatic approach needs to be developed.

Technical Assistance specifically related to the introduction of nuclear power in a country

The Agency now has many activities directed toward assisting a nation in the decision-making process and in the initiation of a national programme leading to the introduction of nuclear power plants. Elements of the programme are found within various departments of the Agency and range from specific technical assistance projects to the more collective activities, such as the establishment of reactor safety codes of practice and guides. The introduction of any new major power system, and especially nuclear power, is proving to be more difficult and time consuming than had once been visualized. The decision to build a nuclear power plant should be taken only after a full evaluation of all of the alternatives has been made. Thus the Agency must be knowledgeable about other potential energy sources and conversion technologies in addition to nuclear, in order to provide sound advice.

As more nations consider installation of nuclear power plants, the demands on the Agency will increase. It would seem that for this specific application a more co-ordinated approach to bring to bear the total resources of the Agency and its programmes of assistance will be necessary.

For example, the building up of an initial corps of trained personnel in a country can be assisted by technical assistance fellowships and by participation in seminars and training programmes. Second, an integrated programme should bring together in a reasonable time sequence the necessary evaluation and analytical studies, training for government officials and utility personnel, generic site studies and preliminary safety studies, and, finally, the development of national regulatory and safeguards programmes.

A third element in this programme would be a kind of broker role by the Agency in helping a country establish its on-going nuclear power programme.

In this latter case, the Agency's role would be catalytic, that is, bringing together suppliers and customers, especially for specialized services, such as training of the personnel necessary for plant operation and maintenance and for various oversight activities, such as safety and safeguards. The cost of such specialized services should be considered as part of plant acquisition, start-up and operation, and should not be financed by the Agency.

Future energy trends and the development of new energy resources

The Agency's own activities in the nature of symposia, surveys, and publications and its liaison with other national and international bodies, all directed toward keeping a watchful

eye on future energy trends and the development of new energy resources, should increase. For nuclear facilities as we now know them, research and development emphasis in the next twenty years will be on fuel supply assurance, reactor safety, waste management, and safeguardability of the entire fuel cycle. Research and development emphasis on energy resources for the next century will be on the inexhaustible fuels, such as solar energy, bred fissile materials, and fusion materials.

Since the needs of various nations differ markedly with time, Members should be fully advised of the then current status and the prospective outlook of all such new energy sources. Furthermore, the impact of these new sources vis-a-vis environmental and non-proliferation concerns are of such importance that there may be overriding reasons for their earlier introduction in some instances. The Statute charge "to accelerate and enlarge the contribution of atomic energy" cannot be carried out without full consideration of other alternatives and what is best for a given nation and the world community.

Informational programmes

The trend has already started and the success of the International Nuclear Information System (INIS) has demonstrated that co-operative efforts can better serve all Members of the Agency than unco-ordinated individual national efforts. The advances in information processing should make it possible for such efforts to become even more cost effective and more useful in the future. Thus, while early applications have been of greatest benefit to industrialized nations, as developing nations utilize more of the technology they will draw more heavily on IAEA informational services and other co-operative endeavours.

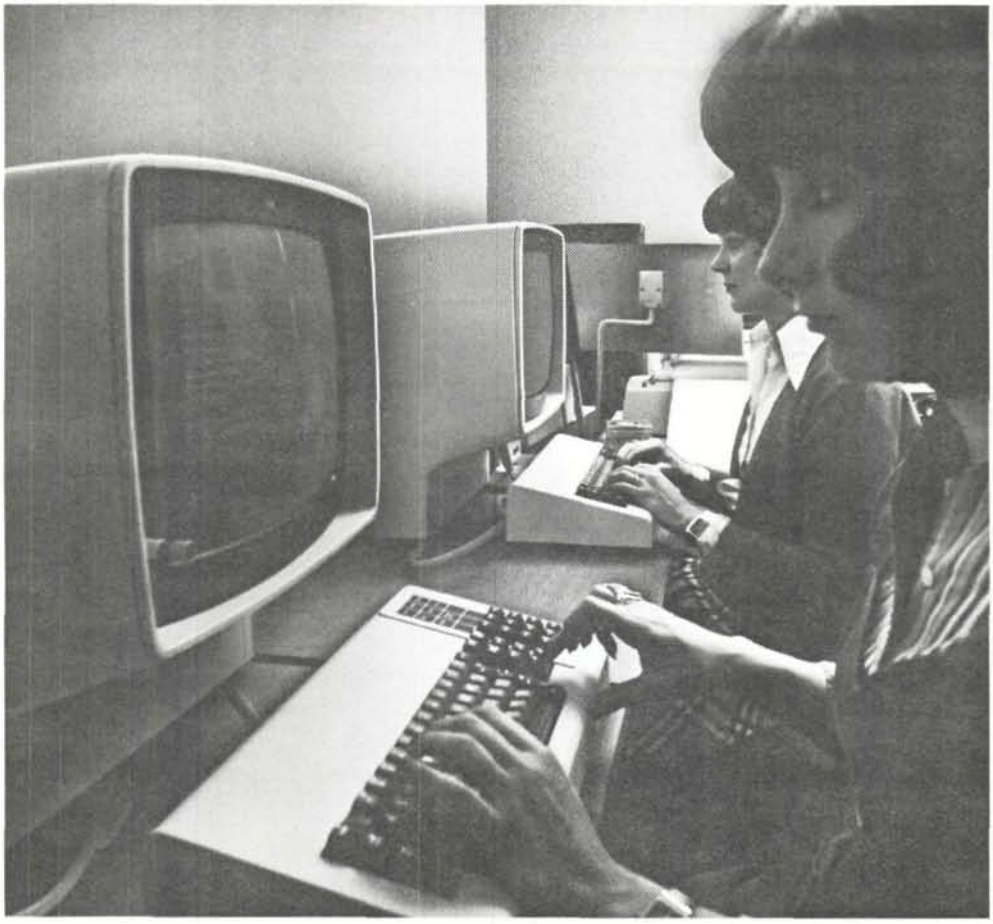
The second part of the objectives statement contained in Article II of the Statute is of a regulatory nature.

> "... ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."

In addition, with the charge to the Agency for implementation of safeguards agreements called for by the Non-Proliferation Treaty, we find the Agency with a much expanded responsibility. Given the trends toward growth in nuclear power and the need to expand available energy resources through the use of bred fissile materials, this charge of assurance takes on an order of magnitude of increased responsibility. The safeguards system as we now know it will require additional trained manpower within both national and international programmes and continuing introduction of improved equipment and techniques to minimize manpower requirements. The Agency's programme is soundly based; it needs, however, the continuing political, technical and financial support of all its Members.

New initiatives to minimize the risks of diversion

Several nuclear fuel cycle alternatives are now being examined to see whether or not the most sensitive parts can be eliminated or so designed and operated to reduce significantly the risk of diversion or seizure of materials usable in nuclear explosives. The Agency itself has examined a concept of multinational or regional fuel cycle centres. It has examined systems that would minimize the quantities of sensitive nuclear materials in national hands and would provide for international storage mechanisms. The international nuclear fuel cycle evaluation study will examine concepts that could, by various technical and process means or the use of the nuclear materials, reduce the quantities at risk.



Today 49 IAEA Member States participate in the International Nuclear Information System (INIS). Together with 13 international organizations, the participating countries contributed in 1976 over 60 000 items of input to the system. When the publication of Nuclear Science Abstracts ceased on 1 July 1976, INIS became the world's only comprehensive abstracting and indexing service in the field of atomic energy.

The successful development and implementation of such alternatives combined with conventional safeguards approaches should provide the world with the assurances called for in the Agency's objectives. These assurances are needed in order to satisfy one of the public concerns for the acceptance of nuclear power. The Agency's role in these endeavours over the next twenty years will be substantial. In addition to its continuing responsibility for safeguards, subsidiary activities devoted exclusively to multinational or international operations might be established under Agency aegis. We should not shy away from such responsibilities where the Agency can play a substantive, constructive role.

Nuclear waste management

Although the objective of the Agency Statute refers to assurance that nuclear material is not used for any military purpose, public acceptance concerns also call for an assurance

that nuclear energy can be used with full and adequate protection for the health and safety of not only the present generation but for those generations to come. The Agency has played a significant role in bringing together those nations confronted with problems of nuclear waste management and disposal. This is still a major issue throughout the world and over the next twenty years increased Agency activity will be required. Again, as with the problem of assurance of no military use, we may find that the solution to the waste management problem will require establishment of several international sites, with the Agency playing a major role in bringing the parties together and in the oversight necessary to assure the world of a fully safe operation.

Summary

The role of the IAEA in world affairs is destined to increase markedly over the next twenty years. The Agency will continue to be faced with difficult challenges that will tax the ingenuity of scientists, administrators and policy-makers alike. Hopefully, the success of the Agency during the past twenty years, due in no small measure to its objectivity in addressing substantive issues, will continue in the future. There is reason for optimism. The dependence of nations upon each other makes even stronger the need for co-operative international action. Furthermore, the positive benefits to be gained from such co-operation will outweigh the possible losses, as perceived by some, of independence of action and political prestige.

The demand for a variety of energy resources will place additional pressure on the utilization of all fissile fuels; but the public must be assured that the risks are acceptable. The risks encompass concerns for health and safety at all portions of the fuel cycle, including waste disposal, for nuclear explosive proliferation and for possible terrorist activities involving nuclear materials.

During the next twenty years the world will be dependent for its energy principally on hydro, oil, gas, coal and nuclear resources with major growth coming from coal and nuclear. The Agency's principal programme emphasis, therefore, will be providing assistance to nations

- in obtaining the benefits from nuclear developments generally,
- in the introduction of nuclear power into their electrical grids,
- in providing the assurance that nuclear power can be utilized with acceptable risk with regard to health and safety, nuclear explosive proliferation, and terrorist activity, and
- in establishing the basis for energy decisions in the twenty-first century.

The IAEA as an institution has flexibility. With the full co-operation of the Member States, it can adapt to evolving world needs. The IAEA safeguards system is an excellent example of how, through the relinquishment of some national sovereignty, an international system has been established to achieve an objective that was not otherwise attainable. Pending problems in nuclear fuel assurance, reprocessing, waste management and nuclear material control, including physical security, will require increased IAEA involvement.

This could extend from providing advice to its Members to establishing new organizational mechanisms and procedures within the IAEA, and to creating new institutions external to the IAEA but which would involve the IAEA in a direct way. The modes to be chosen will be very much dependent upon the objectives of the operation and the need for international co-operation. The possibilities are broad, the opportunities for the IAEA to be of service are equally broad.