
Nuclear Energy in the OECD

Towards an Integrated Approach

Report by the
High Level Advisory Group
on the
Future of the
OECD Nuclear Energy Agency
to the Secretary-General of the
Organisation for Economic Co-operation and Development

January, 1998

This report was prepared at the request of the Secretary-General of the OECD as a contribution to deliberations about OECD reform. Views expressed in the report are those of the High Level Advisory Group.

OECD High Level Advisory Group on the Future of the OECD Nuclear Energy Agency

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Preface

In May of 1997, the Secretary-General of the Organisation for Economic Co-operation and Development (OECD) invited me to review, together with colleagues from industry and the public sector involved with nuclear energy, the OECD future role in nuclear energy. We were asked to consider how this area of OECD activities should evolve in the next decade and beyond and how it should be integrated with the Organisations' work in related areas such as energy, environment, and economics.

When our "High Level Advisory Group on the Future of the OECD Nuclear Energy Agency" started its work, we were well aware of the very different and often contradictory views in OECD countries on nuclear energy and nuclear safety issues. I personally was concerned about the lack of rigorous discussion of issues underpinning these differences – virtually a "nuclear taboo" in the energy debate – in a situation where nuclear energy is an important source of electricity for many Member countries and where continued access to competence in nuclear technology is critically important to all. In my view, if no actions are taken, we risk losing a significant part of this competence in the coming years.

How could our external advice be helpful in that situation for the evolution of an OECD sector which is not independent but under control of Member governments? We concluded that we needed to strive for broad views using our personal experience of the needs in the nuclear sector as well as a wide range of information from related areas and about the perception of different societal groups. Therefore we were very grateful for the many discussions we had with representatives of various OECD sectors, industry and trade unions, and representatives of national governments involved in the activities of the OECD family. We found a broad comprehension of relevant problems and an astonishingly consistent perception of the need for a thorough discussion of nuclear issues in the context of energy, environmental and industry questions.

After nearly nine months, our group has completed its work and presents the results of its deliberations in this report. Our main finding concerns the integration of nuclear energy into a broader context. We think that the important scientific and technological dimension of the work of the OECD Nuclear Energy Agency should be integrated more closely with related issues in other sectors of the OECD and the IEA, and we believe that the concept of sustainable development is an appropriate context in which to do that. Thus, we recommend initiating, within the OECD, a thorough discussion of nuclear energy in a sustainability context.

While this is likely to require considerable efforts at various levels within the OECD, we found a promising basis for this in the spirit of openness and co-operation we experienced in all our discussions and in the external comments received. We would like to thank the many interlocutors within the OECD and its associated bodies, and from Member governments for their important contribution. Anselm Schaefer's assistance with the writing of our report and Elizabeth Dickson's contributions to our deliberations have been extremely valuable. We thank in particular the Secretary-General of the OECD for his initiative and personal interest in our work. We hope that our advice can help him and the Governments of Member countries in shaping a strong future for the OECD.

Adolf Birkhofer
29 January 1998

Over 80% of the world's installed capacity for electricity generation from nuclear power is located in OECD Member countries. Those OECD Member countries involved in nuclear programmes have achieved a high degree of mastery of nuclear technology. In providing some 24% of OECD electricity with almost no carbon dioxide emission, nuclear power has provided, and continues to provide, considerable economic and environmental benefits.

However, the coming years pose significant challenges to maintaining the bases for a safe and economic use of nuclear energy. There are several factors in play:

There will be no new nuclear power plants built in OECD countries, other than Japan and Korea, before 2005.

For various reasons, including the transition to a deregulated electricity sector, there has been a tremendous shift of emphasis by many players in the electricity sector from long-term to short-term objectives.

In many OECD countries low price natural gas is now widely available. Its use in combined cycle gas turbines provides a financially attractive and environmentally relatively benign way of generating electricity which many generating companies currently find more attractive in the short term than nuclear or other fossil fuels.

Government support for national and international programmes that contribute to the nuclear knowledge base has been greatly reduced.

Limited public acceptance of nuclear power remains a crucial problem.

There is little public visibility of facts about the economics, safety, environmental impact, and health effects of nuclear generation, nor of the potential future significance of nuclear energy as part of an overall energy supply in which fossil fuels may be scarcer and their burning may become unacceptable in environmental terms.

There is a real possibility that attention to nuclear issues will drop to such a low level that the scientific and technological competence in nuclear technology, built up over many decades in the OECD and essential for the safe and economic use of that technology, will be lost. This would prevent OECD countries from receiving the benefits of their enormous earlier investments in nuclear technology if they should need nuclear energy in the future as an economic, non-fossil, energy source.

Under these conditions, it is important to reconsider the role of nuclear energy in the light of current trends and to make nuclear energy an integral part of OECD discussions on energy and environmental policies.

Need for and Role of the OECD Nuclear Energy Agency (NEA)

Nuclear Energy and Sustainable Development

For OECD member countries, achieving economically, environmentally and socially sustainable development is a top priority. A sustainable energy supply is a key issue in that context but it is important to recognise the large differences between short- and long-term expectations in that sector. In the short term, fossil fuels are expected to remain abundant and relatively cheap. In the longer term, securing energy supplies whilst achieving important environmental objectives related to energy and continuing to compete globally is expected to be a significant challenge.

⇒ *The Advisory Group believes that if the OECD wishes to identify robust policies which support sustainability of energy supplies, it must take an integrated approach to energy, environment and economics, with due consideration for both long- and short-term signals.*

Key Findings and Recommendations

Given the current role of nuclear power as an important non-fossil source of electricity and the likely future need for such sources, prudence requires OECD members to maintain this technology as a realistic option and to make nuclear energy an integral part of discussions about sustainable energy policy.

⇒ *A more thorough discussion of nuclear energy in a sustainability context is required within the OECD. The Advisory Group recommends that the OECD Secretary-General take steps to achieve this, including raising the visibility of nuclear energy at OECD Council meetings.*

⇒ *More consistency is needed in statements about nuclear energy by different OECD sectors. The OECD should aim to provide its Members with a consistent and balanced view, based on facts, of the economic potential, safety, and sustainability of nuclear energy and of its possible contribution to addressing key environmental problems such as climate change.*

Why and How the OECD Should Act in the Nuclear Sector

To realise its economic and environmental benefits and to ensure safety, all users of nuclear power must make a long-term commitment to it. Current trends in the energy sector strongly emphasise short-term objectives, so it is of crucial importance that governments provide stability in policy and regulation and also ensure the maintenance of those scientific and technological bases which nuclear power needs. In today's globalised world economy, this is best dealt with as a shared, international task.

Nuclear power is of particular significance for the OECD. Some 24% of OECD electricity is nuclear and more than 80% of world nuclear electricity is used in the OECD Member countries. Many have received considerable economic, environmental and employment benefits from that use. OECD countries should therefore be especially concerned to maintain the basis for safe and economic use of nuclear power, whilst not ignoring its public acceptance problems.

Important practical needs are technological competence and suitably qualified people, required both for the safe operation of existing nuclear power plants and also for keeping open a realistic option to build new nuclear power plants in the future, if this is considered necessary. This requires international centres of nuclear competence.

⇒ *There is a continuing need in the OECD for a strong, technically-based body whose main task is to provide a sound understanding of the scientific and technical basis for the safety, environmental and economic aspects of nuclear energy. The NEA is just such a body and it would be sensible to maintain its capabilities.*

Strategic Directions and Priorities for the NEA

Strategy for the NEA

The NEA has been very successful and useful as a forum for high-level technical analysis, discussion and co-operation among experts on nuclear technology, carried out in a climate of mutual trust and collaboration.

⇒ *A central feature of the NEA's role should continue to be assistance to the Member countries in sustaining and improving the scientific and technological basis for the safe use of nuclear energy in those OECD countries where this use is desired.*

However, the Advisory Group believes that there is a need for greater attention to nuclear issues within a broader policy context. It seems that other OECD sectors have not seen nuclear as an essential part of their mandate or they have been inhibited by the political reluctance of some Member countries to engage in nuclear debate, lack of direct expertise to deal with nuclear issues, or by a perception of the NEA as an advocate for nuclear energy.

⇒ *The Advisory Group recommends that the NEA extend its focus beyond specialist areas in order to make an input to broader policy debate, but within a newly defined “non-promotional” role.*

The Advisory Group has considered how best the OECD can maintain a strong, technically-based body in nuclear energy and also broaden the contribution of nuclear energy to overall OECD energy/environment policy. The former is easier to achieve via a separate NEA that can assign a high priority to technical competence. The latter may be better done by close involvement of the NEA with broader-based bodies in the OECD family such as the International Energy Agency.

⇒ *Given the current situation of nuclear energy within the OECD, the Advisory Group believes that it is sensible to keep the NEA separate for now, while integrating it more closely with other bodies, and to review its status in a few years.*

Future NEA strategy should then aim to achieve both traditional narrow and new broad objectives, incorporating a suitable balance of vertical and horizontal lines of action:

For the vertical action line, the classical field of NEA activity, emphasis should be maintained on technological issues, strengthening the NEA’s role as an international centre of nuclear competence.

New horizontal lines of action should involve close co-operation with other concerned OECD sectors, in order to make facts about nuclear energy and its economic, safety, health and environmental impact more visible in a broader context.

⇒ *The NEA should develop a Mission Statement and a Strategic Plan from which priorities and actions can be derived. These should provide guidance on goals, objectives, and how to achieve them for both vertical and horizontal actions over the short, medium and long term.*

NEA Structure, Work Programme and Resources

The Advisory Group believes that the basic working methods of the NEA, such as its technical committees, are sound and ensure tight accountability to the Member countries. It also accepts that the priorities and trends of the current NEA programme would be sensible in a context of constant resources and no new demands. However, coping with reduced resources and adding new horizontal actions will require changes:

⇒ *The NEA programme and organisation should be tailored to fit its new Mission Statement, taking into account outside assessment of the NEA.*

⇒ *The Advisory Group believes that periodic outside assessments of the NEA programme would be of significant value for the NEA Members and that it might be useful for the NEA Steering Committee to be advised, from time to time, by external experts for this purpose. Early subjects of such assessment could be the science area and the publication programme.*

⇒ *A review should be performed of the possibilities for operating cost savings, including an eventual reduction of the number of Standing Committees, and/or proceeding to more task-oriented work procedures.*

⇒ *The NEA should be given more freedom to manage its activities more efficiently and look for ways of reducing its net costs, e. g. by buying overhead services from outside OECD as well as by being able to use revenues from its publications.*

Improving Visibility and Communication

The NEA’s visibility needs to be improved. The Agency should become, in co-operation with other OECD sectors, an active and recognised player in the debate on the achievement of

sustainable energy practices world-wide and on the role of nuclear energy as a sustainable energy source. The NEA should not, however, perform as, or be perceived as, an uncritical advocate for nuclear energy.

⇒ *The NEA should develop a communications strategy consistent with the overall OECD publications strategy but focused on the specific target audiences relevant to the respective areas covered by the NEA's work. In that context the NEA should take steps to make its publications more attractive to a broader readership. Furthermore the Agency's Secretariat should have more freedom with a view to more timely and effective dissemination of its products.*

The NEA and Its Relations with Other Bodies

The NEA and the International Energy Agency (IEA)

The need for a more consistent policy on nuclear issues, within the OECD family and within a broader energy context, is a top priority. Close co-operation between the NEA and the IEA is key to this.

⇒ *The NEA should be enabled to provide, systematically, a "nuclear input" to IEA deliberations, activities and publications of a cross-sectoral or policy character. Likewise broad energy policy input by the IEA should be systematically integrated into the work of the NEA. The closer co-operation between the two Agencies should also be supported by organisational components such as joint task teams and co-operation between the IEA Governing Board and the NEA Steering Committee.*

The NEA and the OECD Environment Directorate

There are a number of broad environmental issues where similar problems have to be solved in the nuclear and other areas. It would be beneficial to put strategies on a common foundation in such cases.

⇒ *The Advisory Group believes that closer co-operation between the NEA and the OECD Environment Directorate would enhance the quality and credibility of work on environmental issues of broader significance.*

Integrated OECD Approach to Sustainable Energy Policy

Identifying economically and environmentally efficient energy strategies is likely to be a key issue for the OECD over the coming years. The Advisory Group believes that a more formal, multilateral, co-operation should be established between all OECD sectors relevant for achieving sustainable energy supply. Such co-operation would support the bilateral co-operation of the NEA with other OECD sectors and would contribute to implementing the horizontal action lines of the NEA successfully. Working together on joint projects should be a key element of that co-operation.

⇒ *The Advisory Group recommends setting up a horizontal co-ordinating group for Sustainable Energy Policy, responsible to the Secretary-General, to integrate OECD approaches to energy, environment, technological and industrial policy issues more effectively. The group would include the heads of the IEA, the NEA, the Environment Directorate, the Directorate for Science, Technology and Industry and the Economics Department. This group could also prompt discussion on the role of nuclear energy within the context of sustainable energy supply strategies at the Ministerial level when appropriate.*

Links with Industry

The role of industry as owner of knowledge and as decision-maker in the nuclear field has become more important over the years. A competence-oriented organisation like the NEA needs to adapt its relations with the industry to recognise this.

⇒ *The NEA should further develop appropriate participation of industry in its work. Contributions to the activities of NEA Committees as well as liaison and advisory groups should be considered.*

The NEA and the International Atomic Energy Agency (IAEA)

The relationship between the NEA and the IAEA calls for further definition. The interaction of the agencies needs to be both more strategic and more systematic, making effective use of their respective strengths.

⇒ *A common understanding of the distinctive strengths and the complementary roles of the NEA and the IAEA should be developed by their top managements and actively pursued in practice. A Memorandum of Understanding between the NEA and the IAEA would be a useful starting point.*

Membership and Relations to Non-Member Countries

The NEA Steering Committee will inevitably have to consider the possibility of adding new members from time to time. In doing so, existing Member countries should consider carefully not only the benefits which an additional member would bring but also the impact on the fundamental strengths of the NEA, which come in part from its small size.

⇒ *New memberships should be offered to very few countries, those with demonstrated capacity to contribute substantially to maintaining and strengthening the NEA as an international centre of competence.*

⇒ *On the other hand, individual NEA activities, including participation in committees and working groups, could be opened more widely to countries which offer significant added know-how and have the financial means for the engagement in question. Of particular importance is the integration of Russia and China, given their large nuclear knowledge base.*

Statute of the Agency and Role of the Steering Committee

NEA Statute and Mission Statement

Better integration of OECD actions in the energy sector will require a reconsideration of the mandate of the NEA but any revision should allow the NEA to reinforce its current role as an objective and authoritative source of useful information and analysis.

⇒ *The Advisory Group believes that a review of the NEA Statute could be valuable but should only be undertaken once a new Mission Statement and a Strategic Plan have been elaborated.*

The Role of the Steering Committee

If, as the Advisory Group recommends, the NEA becomes more involved in energy policy and in the discussion of nuclear issues within a broader energy, economic and environmental context, the Steering Committee will need to take closer account of the broader policy context in which the activities of the NEA need to be carried out.

⇒ *Responsibilities and working procedures of the Steering Committee, as well as representation on it, should be adapted in light of a more policy-oriented future role for the NEA.*

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The High Level Advisory Group on the Future of the OECD Nuclear Energy Agency (NEA) is an independent panel of senior experts from public and private sector institutions relevant to the safe and peaceful use of nuclear energy. The Group was constituted by the Secretary-General of the OECD to advise him on the appropriate role of the Nuclear Energy Agency over the next decade and beyond.

In following its terms of reference¹ the Advisory Group considered:

Need for and Role of the NEA (Chapter 2)

The role of international co-operation on nuclear power in NEA Member countries.

Whether the NEA should address broader policy issues than has been the case previously.

Strategic Directions and Priorities of NEA Activities (Chapter 3)

The strategic directions NEA ought to adopt, taking into account both external factors and internal ones such as budgetary constraints, and how these might be translated into near- and medium-term priorities.

The importance of greater visibility for the Agency and its work.

The NEA and Its Relations with Other Bodies (Chapter 4)

The appropriate interactions of the NEA with other OECD sectors, in particular the International Energy Agency (IEA), the Environment Directorate, the Directorate for Science, Technology and Industry and the Economics Department.

The NEA's distinctive strengths compared with the other regional and global institutions in the nuclear field, particularly the International Atomic Energy Agency (IAEA). How can these strengths be best used? What are the implications of the wide membership of the IAEA for the size of the NEA?

The desirable links between the NEA and:

- private sector institutions and the nuclear industry; and
- non-member countries, including potential new Members.

Revisions to the Existing Statute of the Agency (Chapter 5)

What revisions to the existing Statute of the Agency need to be considered in the light of new circumstances and new directions.

The Advisory Group undertook to form an independent view of the NEA, from the perspective of typical "users" of NEA products. In this context, it did not set out to perform a detailed review of the NEA programme and activities; rather, its analysis has been strategic and top-down. During its deliberations, the Group has drawn upon a number of strategic documents prepared by OECD directorates and agencies and other international organisations such as the IAEA (see Annex B); discussions and communications with representatives of selected OECD sectors and Standing Committees covering energy, environmental, technological, industrial and budgetary issues (see Annexes C and D); and discussions with many other high level experts in the areas of energy and environment.

The Advisory Group recognised that the NEA is not an independent body but one that responds to Member countries, as does the OECD itself. Its recommendations should be understood in that light.

The OECD is engaged in a process of restructuring, driven by the dramatic political and economic changes accompanying globalisation and by the decline in financial resources made available to it by its Members. These changes inevitably influence its plans for the future, forcing the OECD to streamline its organisational structure, reduce its costs, and focus resources on areas where it has the greatest comparative advantages. To assist in this process, the Secretary-General established two high level advisory groups to examine the OECD role in relation to environment and nuclear energy, respectively.

2.1 Sustainability: A Challenge for the OECD

The Advisory Group agrees wholeheartedly with the overall conclusion of the OECD High Level Advisory Group on the Environment that "..... sustainable development (should) not be seen as one among many important items on the OECD agenda. Instead, it should become a way of ordering and approaching all other issues"². Certainly, these other issues should include energy supply and use.

As the OECD stated in a recent policy report¹, democratic government and **market-based economic development** are spreading across the world; international trade and investment are increasing. New major players such as Brazil, China, India, Indonesia and Russia are emerging on the world scene. A truly global economy is emerging in which an increasing number of countries take an active part, drawing resources from and impacting on the global environment.

Population growth will continue for some decades. Virtually all the growth in world population, from 5 billion in 1990 to about 8 billion in 2020, will occur outside the OECD. This rapid increase is expected to be accompanied by further **urbanisation**, as more countries move from agriculture toward industry and services. According to United Nations' estimates, the fraction of the population of less-developed countries which is urban may rise from one-third in 1990 to over one-half by 2020, with a dramatic rise in the number of megacities, particularly in Asia.

These developments will lead to a large increase in the demand for commercial energy and will have a tremendous impact on the environment:

The need for effective protection of the environment will grow with the increasing number and standard of living of people. Even if national economies moderate their impact on the environment by moving from raw-materials-based manufacturing to knowledge-based service industries, it seems certain that overall resource consumption and environmental pollution will increase.

The globalisation of markets, coupled with wide-spread technological advances, will pose major challenges to remain efficient and hence competitive. There will be winners and losers; the winners will be those most successful in finding cost-effective responses to the many challenges. Strengthening the efficiency of economic activities at all levels and harnessing the benefits of international co-operation will be crucial factors for success.

⇒ In light of the challenges and uncertainties facing OECD countries, the Advisory Group believes that an essential element of the Organisation's sustainability strategy should be to maintain a broad range of options for the future, especially in the area of energy.

2.2 Towards Sustainable Energy Supply

Energy supply is an important component of the sustainability discussion. Today, fossil energy is abundant and comparatively cheap. For oil, the market mechanisms introduced after the oil crisis have proved their effectiveness. Large resources of natural gas have permitted the increased use of gas in many parts of the world at rather low prices. In addition, efforts to use energy more efficiently have slowed the growth of energy consumption in industrialised countries. In some countries, restructuring of the electricity sector has resulted in considerable increases in available capacity.

However, from a longer term perspective, the increasing population of the world and the need for more energy per person in the large and quickly developing countries will put more pressure on supplies. If the current broad trends in the world economy continue, the growth in fossil fuel consumption during the next decades will be large and the dependence of many countries on imports from a few, potentially unstable regions will increase.

Table 1: Net oil imports as a percentage share of oil consumption

	1994	2010
Brazil	39	45
China	3	40
India	54	87
Indonesia	net exporter ¹	43
OECD	50	66

Source: IEA, World Energy Outlook (OECD: Paris, 1996)

Note: OECD projections are based on existing OECD membership.

Oil remains the most important source of primary energy. With many non-OPEC fields expected to pass their production peaks in the period up to 2020, the supply of oil is likely to become concentrated once again in the hands of Middle East producers. The expected effect on dependence on imports is shown in Table 1. For other fossil energies, dependence on imports will also significantly increase in many countries.

According to a forecast by the European Commission⁵, the import of gas by the European Union, currently at 40% of the EU's consumption, could reach 70% by 2020. Imports of coal, currently at 37% of EU consumption, could be near 80% by 2020. This evolution will weaken the security of energy supply to OECD countries and almost certainly put upward pressure on the prices of oil, gas and coal. Although it is difficult to predict the timing of these impacts, a major shift to non-fossil energy will become unavoidable.

The trend to an even more important share of imported oil and gas in the energy supply of the OECD has also an important employment aspect. While there are obvious benefits from increased use of imported fuel if that reduces the overall costs of energy supply, the situation is much less favourable if imported fuel replaces long-term investment in domestic technology at comparable overall costs. This holds, for example, for a comparison between a gas fired combined cycle plant and a nuclear power plant. While both options can, in well managed programmes, produce electricity at comparable overall costs, the use of resources is quite different. In the case of the combined cycle plant, the cost of capital for the investment in the plant is low compared to the expenses for the fuel whereas the cost of capital for the investment in a nuclear plant constitutes the major part of the costs of nuclear electricity. Thus, building a combined cycle plant instead of a nuclear power plant can have a significant negative impact on employment in the power industry.

Closely linked to fossil fuel use is the global environmental issue of greenhouse gas emissions and the associated threat of climate change. The continued growth of the world economy over the next 25 years is expected to increase substantially the atmospheric emissions of CO₂, which could double between 1992 and 2020⁶. Since living standards in non-OECD countries are comparatively low, those countries will strive for rapid growth of their economies, thereby increasing the pressure on OECD countries to do more rather than less than the average in moving to non-fossil sources. Otherwise, limits to future growth of greenhouse gases, such as those agreed to under the United Nations Framework Convention on Climate Change, may not be achieved.

The Advisory Group draws an important conclusion on energy supply, namely that short-term and long-term signals are very different:

In the short term, fossil fuels are abundant and relatively cheap, and further efficiency gains are expected. Natural gas is particularly attractive; it is currently cheap in many places and has about half the carbon dioxide emissions of coal per unit of energy consumed. It can be used very efficiently in many applications, including the generation of electricity.

In the longer term, as overall energy demand grows and electricity grows even faster, fossil fuel use is likely to be much more restricted by environmental concerns and prices are likely to increase as lower-cost resources and efficiency opportunities are used up. Economic supplies of fossil resources will be increasingly concentrated in certain parts of the world, with their uses possibly increasingly restricted to selected applications such as transport. In the long term, it seems inevitable that renewables and/or nuclear energy will play a much larger role in electricity production. Yet, at the present time, despite significant efforts since 1974, the new renewables (i.e. apart from traditional hydropower) have made only a minor contribution and nuclear power is seen by many as undesirable.

Thus, meeting security, economic and environmental objectives related to energy in an increasingly global economic competition is expected to be a significant challenge during the coming decades. It is essential to find ways of taking both long-term and short-term signals into account in devising sustainable energy policies.

⇒ The Advisory Group believes that if the OECD wishes to identify robust policies which support sustainability of energy supplies, it must take an integrated approach to energy, environment and economics, with due consideration for both long- and short-term signals.

2.3 Nuclear Energy within a Sustainability Strategy

Nuclear energy is a substantial contributor to the world's electricity supply and an important non-fossil source of energy⁷. Its world-wide significance is comparable with hydropower. Its importance for the industrialised countries is even greater, representing 24% of electricity generated in OECD countries; for several it is indispensable. OECD countries account for more than 80% of the world's electricity generation based on nuclear energy.

When properly managed, as in OECD countries, nuclear energy provides economic, environmental and employment benefits. In the early days of commercial nuclear power, some significant incidents occurred and problems were encountered in nuclear facilities of OECD countries but appropriate countermeasures have been taken. Overall, the performance and the safety record of nuclear facilities in OECD countries are quite satisfactory.

Of particular relevance with regard to sustainability is the potential of this technology for very long-term use, given the large nuclear fuel resource base and the possibility of recycling. In addition, the small volume of nuclear fuel waste makes its long-term containment and isolation from the biosphere practical; for most energy sources this is not the case.

However, assuring the safe operation of nuclear facilities and securing the safe disposal of nuclear waste requires both vigilance and continued efforts. Moreover, the future availability of the nuclear option cannot be taken for granted, given the relative stagnation of its development in OECD countries, the problems of public acceptance, reduced government support, and the current low prices of fossil fuels. While the immediate priority for most OECD countries which use nuclear energy is to ensure the continued safe and economic operation of existing plants and to resolve radioactive waste management issues, there is also a key issue of maintaining the option to use nuclear energy in the longer term if that proves to be necessary or desirable.

Given the current and potential future role of nuclear power as an important non-fossil source of electricity, the Advisory Group believes that its availability is a significant asset to the OECD in facing an uncertain future. Prudence requires maintaining the technology as a realistic option and making it an integral part of discussions about sustainable energy policy.

⇒ *The Advisory Group believes that a more thorough discussion of nuclear energy in a sustainability context is required within the OECD. It recommends that the OECD Secretary-General take steps to achieve this, including raising the visibility of nuclear energy at OECD Council meetings.*

⇒ *More consistency is needed in statements about nuclear energy by different OECD sectors. The OECD should aim to provide its Members with a consistent and balanced view, based on facts, of the economic potential, safety, and sustainability of nuclear energy and of its possible contribution to addressing key environmental problems such as climate change.*

2.4 The Role of Governments and International Co-operation

The capital investment in a nuclear plant is much larger than in a fossil fuelled plant of the same capacity and takes longer to recover. A stable policy framework is required over the lifetime of the plant if the investment is to produce a fully satisfactory return.

The specific conditions of deregulation and privatisation of the electricity sector make this argument even more important. There is no doubt that deregulation is an important and necessary contribution to sustainable economic growth and that this holds for energy supply as for any other sector. However, the coincidence of deregulation with a number of other factors forces many players in the electricity sector to focus their attention very sharply on short-term objectives. Such factors include the current comparatively low prices of fossil fuels and the possibilities for more effective use of existing generating capacity. Furthermore, deregulation of the electricity sector is an ongoing process in many countries which will require further adaptation of the industry and utility structures, thus introducing considerable uncertainties about individual long-term perspectives. Under these conditions it is not surprising that the industry and the utilities are often reluctant to make long-term commitments and prefer to invest in options where less upfront capital is needed and a more rapid return is expected. Even though this situation may be temporary, it will last for some time, and the technological competence of the nuclear sector could be seriously eroded before conditions are normalised. As a consequence, there is a crucial role for governments to ensure that long-term issues of electricity supply are properly addressed, particularly by the generating companies.

High standards of nuclear safety call for maintenance of a significant safety margin over the whole period of plant operation. To achieve this, continuous efforts are required in a number of fields, including interdisciplinary research and in-depth evaluation of operating experience.

Finally, some of the current expansion in nuclear energy use is taking place in countries, such as China, which were not involved in the early international efforts to establish technological know-how nor in the western consensus about how to achieve high levels of safety. This presents a major challenge since public acceptance of nuclear power depends on achieving safety wherever it is employed, and on regulations based on broad agreement about safety needs.

All these issues share an important international dimension. Long-term stability requires international consensus and certain long-term costs can and should be shared. Maintaining an adequate level of relevant nuclear know-how and ensuring a stable long-term basis for nuclear safety and for waste disposal are tasks which many countries have in common. If the tasks are shared, the work will be cheaper for each participant and the outcomes more convincing. Thus, there is a need to address long-term aspects of nuclear energy within a reshaped international context.

⇒ *The Advisory Group recommends that OECD Member governments aim to stabilise their policy framework for nuclear energy, and that they fully recognise the international dimensions of that task. In particular, it is necessary to give a higher priority to international co-operation in those areas where long-term efforts are required.*

2.5 Why Should the OECD Act in the Nuclear Sector?

As noted above, nuclear power accounts for a substantial percentage of electricity generation in OECD countries. Member countries with nuclear programmes have, by applying substantial efforts, achieved a high level of scientific, technological, industrial and managerial mastery of the different aspects of nuclear energy: the design, construction and safe operation of nuclear power plants, and of the nuclear fuel cycle. They have received and are still receiving considerable economic, environmental and employment benefits from their investments in that technology. Nuclear power is of particular significance for the OECD.

On the other hand, many OECD countries face weakening knowledge bases and are beset by public acceptance problems which are strongly influencing the value of earlier, and the prospect of future, investments in nuclear technology.

⇒ Given the significance of nuclear energy for its Member countries, the Advisory Group recommends that the OECD take a particular interest in addressing key issues in nuclear technology and nuclear safety on an international basis, as well as the technical and policy dimensions of factors contributing to the lack of public acceptance of nuclear energy. The knowledge accumulated in Member countries puts the OECD in a strong position to conduct in-depth discussions and make the realities of nuclear energy more visible.

2.6 How Should the OECD Act in the Nuclear Sector?

To have the desired impact, OECD Members need an objective and authoritative organisation through which the realities of nuclear energy can be assessed and firm, common positions established. The Nuclear Energy Agency (NEA) is just such an organisation. A central aspect of the future role of the NEA should therefore continue to be assistance to its Members in sustaining and improving the scientific and technological base required for the safe use of nuclear energy in those Member countries which choose to use it.

Two fundamentally different benefits flow from co-operation on nuclear energy within the OECD:

Technological competence in the nuclear sector can be more easily and efficiently maintained and further developed. This includes sustaining a supply of highly qualified human resources and know-how. It is relevant both for the safe operation of existing nuclear power plants and for keeping open a realistic option to build new nuclear power plants if this comes to be considered necessary. An important objective in this period is to concentrate know-how in international centres which can attract capable younger people to work in the nuclear field.

Balanced and consistent views of the economic, safety and environmental perspectives of nuclear energy will be more readily achieved, because of the high level and breadth of expertise available, the effectiveness of established co-operation mechanisms and the homogeneity of conditions in the OECD Member countries.

⇒ There is a continuing need in the OECD for a strong, technically-based body whose main task is to provide a sound understanding of the scientific and technical basis of the safety, environmental and economic aspects of nuclear energy. The NEA is just such a body and it would be sensible to maintain its capabilities.

The NEA is a relatively small, semi-autonomous agency within the OECD. Its history dates back to the foundation of its predecessor, the European Nuclear Energy Agency (ENEA), in 1958. With an annual budget in 1997 of 77 million FF, the NEA has 37 professional and 38 support staff. However, NEA activities draw on a much larger number of national professionals in Member countries. Furthermore, it frequently sponsors joint projects using additional funding provided by participating Members. These working methods increase the significance of the NEA far beyond the level indicated by the number of its staff and the size of its budget.

Over the lifetime of the NEA, its direction has been the subject of a number of reviews. The Advisory Group looked at the recent reviews, in particular the Report on NEA Long-term Orientations issued in 1995 by the NEA Steering Committee⁸. The Group agrees with many of the recommendations of that report. However, it believes that overcoming the challenges facing the nuclear sector will require fundamental and strategic changes which surpass the scope of traditional approaches to reviewing and adapting the NEA work programme.

3.1 Characteristics of the NEA

The NEA is a unique forum for co-operation on the scientific, technical, economic and legal issues of nuclear energy which are of interest to advanced industrialised countries. Important features are its focus on peaceful uses, with no involvement in safeguards and non-proliferation issues, and its position as part of the OECD family. The collective know-how and capability of its Members, brought together and harnessed under the NEA umbrella, is substantial.

The primary purpose of the NEA is one which Members cannot easily achieve through other international organisations in the nuclear sector: the forging of a common understanding of the technical and economic issues involved in nuclear power, based on good science and solid experience. The entire organisation operates on the basis of decisions arrived at by technical consensus rather than by political negotiation. This objective, consensus-based approach to issues in nuclear energy is the foundation of the NEA's effectiveness and value, and it is essential that it be preserved.

Unlike the International Atomic Energy Agency (IAEA), the NEA is small and has a relatively homogeneous membership. In all respects, including membership, staffing, and budget, it is much smaller than the IAEA. This is a great strength. It obliges the NEA to be selective and flexible in the choice of topics to be pursued and helps keep the costs of facilitating international co-operation relatively small. The NEA has established efficient work processes, so that Member countries derive substantial leverage on their financial contributions and considerable value is added to their domestic programmes.

Control of the Standing Technical Committees by participating Member countries is also one of the NEA's strengths, ensuring the Agency is truly accountable to Members. Important decisions are made through discussion and consensus among the experts brought together in various committees, working groups and specialist meetings.

Many valuable activities are first proposed and explored in the restricted circle of the NEA and subsequently continued jointly with other agencies, or taken over by them. An example is the nuclear incident reporting system which was originally developed within the NEA as a framework for sharing the operating experience of nuclear power plants. This system has been taken over by the International Atomic Energy Agency for application on a world-wide scale. An important advantage of the NEA is that it can undertake this kind of pioneering work with well focused objectives and relatively low administrative burden.

The NEA gains much from being part of the OECD family. Its like-minded Members bring a broad range of technical capabilities and an open, objective approach. Its position within the OECD should also allow the NEA to share views and expertise with other OECD agencies and to place nuclear issues in their broader energy, economic, and environmental context. Whilst there are some examples of excellent co-operation of this type, there are also areas where improvements warrant close attention. Indeed, the concentration of nuclear expertise in the NEA may well have been counterproductive in some respects. It seems that other OECD sectors have not seen nuclear energy as an essential part of their mandate or they have felt inhibited by lack of direct expertise to deal with it. Furthermore, and perhaps most importantly in terms of its significance for considering future strategic directions, the Advisory Group encountered a reluctance to draw too much on the NEA because it is perceived as an advocate for nuclear energy.

The result has been that nuclear issues have received little attention in the broader OECD context, to the detriment of both the NEA and the OECD. In this regard, it is symptomatic that

there are no regular contributions from the NEA to the conferences of ministers of OECD Member countries. The geographical separation of the NEA and other OECD agencies (distributed over a half dozen sites in Paris) is another factor that works against greater co-operation.

The lack of an effective mechanism for NEA participation in energy policy formulation, which has been observed in the past, could be especially serious for the OECD in dealing with sustainable energy and climate change in which a nuclear input will be essential.

⇒ The Advisory Group believes that the NEA should extend its focus beyond specialist areas within a newly defined non-promotional role. It should take the initiative to provide high quality input on nuclear issues for broader OECD policy discussions on energy and environment. As expressed by the NEA Steering Committee in its report on long-term orientations, these horizontal activities need close co-operation with other concerned OECD sectors, with a strong lead from the OECD and a close involvement of the NEA.

3.2 Strategy for the NEA

The Advisory Group concludes that the current NEA is fairly close to what the OECD needs. However, to integrate a realistic appreciation of nuclear energy into the OECD thinking about sustainable development, there will need to be two important adjustments: the NEA needs to be increasingly recognised as a source of objective information and rigorous analysis as opposed to being perceived as an advocate; and the OECD will need to make very clear from the top that nuclear energy must be part of the work on sustainable energy supply and that the work must draw on NEA's expertise.

The Advisory Group sees three major factors in future energy supply, which will become important on different time scales, on which an OECD-wide approach to the role of nuclear power needs to be developed. The first is that many existing nuclear power plants are expected to be taken out of operation in the second decade of the next century. The maintenance of a nuclear knowledge base within the OECD to serve existing plants until the end of their lives is clearly essential. Also important is whether these plants should be replaced by new nuclear stations, in order to retain the current nuclear contribution. Investment decisions will have to be taken soon, and the general climate for nuclear power within the OECD and the availability of know-how will be essential in that regard. In the medium term (10 - 20 years), the part nuclear should play in dealing with air quality issues, in particular the mitigation of climate change, needs to be defined. In the long term (beyond 2020), it seems likely that energy security will once again be a significant problem for the economically developed countries. An appropriate NEA strategy needs to be based on consideration of all these issues and their likely time frames.

In tackling these issues, the Advisory Group believes there should be much more effective integration of the NEA into the overall work of the OECD. Given the wide scope of subjects and the input needed from other key parts of the OECD family such as the IEA, the currently inadequate integration cannot be improved by the NEA alone. A wide involvement across the OECD is necessary. In this way the OECD and its various agencies would obtain useful expert input from the NEA and the NEA would have a broader context for its work, as well as feedback on the content and relevance of that work from others in the OECD.

The Advisory Group has considered how best the OECD can maintain a strong, technically-based body in nuclear energy and also broaden the contribution of nuclear energy to overall OECD energy/environment policy. The former is easier to achieve via a separate NEA that can assign a high priority to technical competence. The latter may be better done by close involvement of the NEA with broader-based bodies in the OECD family such as the IEA. While the NEA cannot merge with all the OECD bodies with which it must interact, joining it with the IEA should be seen as a serious option.

⇒ Given the current situation of nuclear energy within the OECD, the Advisory Group believes that it is sensible to keep the NEA separate for now, as an agency within the OECD family, while integrating it more closely with other bodies, and to review its status in a few years.

In supporting the OECD in maintaining a capability to use nuclear energy economically and safely in the future, the NEA will have to act along two axes:

Vertical actions: This will build on the strengths of the NEA in its traditional fields of activity. The NEA should defend its integrity in that task and try to strengthen its classical function as an international centre of nuclear know-how. This should include strengthening the internal procedures to assure the quality of NEA products.

Horizontal actions: Improved integration into the overall work of the OECD will be a challenge to the NEA and the OECD. In this area the NEA should contribute objective evaluations of nuclear energy and its economic, safety, health and environmental impacts to considerations of energy in broader contexts. As this horizontal action line calls for a wide range of inputs and must lead to broadly accepted conclusions, it will require a cross-cutting approach in co-operation with other concerned OECD sectors.

⇒ The NEA should develop a Mission Statement and a Strategic Plan from which priorities and actions can be derived. These should provide guidance on goals, objectives, and how to achieve them for both vertical and horizontal actions over the short, medium and long term.

3.3 The NEA Structure and Work Programme

The Advisory Group did not seek to make a detailed assessment of the NEA management structure or of its programme. It believes that, especially in a context of constant resources and no new demands, the report of the NEA Steering Committee on NEA Long-term Orientations provides a good review of priorities and future directions. However, given pressure on OECD resources and the Group's own proposals for extending external activities and for greater engagement in policy, it believes there is a need for hard decisions on priorities.

As mentioned above, the priorities of the NEA programme have been regularly reviewed in the past. However, these reviews were mainly conducted as "in-house" exercises, in which there is a natural tendency for each manager to defend his or her interest strongly. In future reviews, a significant external input should be sought. In the opinion of the Advisory Group, this should always be accomplished within the context of a well put together strategic plan for achieving the overall mission, from which the need for each element of the work programme would logically flow.

The Advisory Group accepts that the NEA does need to concern itself with all the current main topic headings of legal affairs, nuclear safety, radiation protection, radioactive waste management, fuel cycle, nuclear science and technology data. However, its impression as a group of experienced senior managers is that savings could be achieved in the classical field of NEA activities (i.e. the vertical line of action) by streamlining the NEA programme guided by a clear mission statement, especially if the NEA is given reasonable freedom in the ways it chooses to achieve the resulting objectives.

The Advisory Group also believes that Standing Technical Committees constitute an important foundation of the NEA. They provide flexibility for adapting to short-term issues, help to achieve consensus quickly and support accountability to the Member countries.

⇒ The NEA programme and organisation should be tailored to fit its new Mission Statement, taking into account outside assessment of the NEA.

⇒ The Advisory Group believes that periodic outside assessments of the NEA programme would be of significant value for the NEA Members and that it might be useful for the NEA Steering Committee to be advised, from time to time, by external experts for this purpose. Early subjects of such assessment could be the science area and the publication programme.

3.4 Resources

Extending activities while facing reduced resources is always a challenging task. It requires strong management efforts to increase efficiency. The Advisory Group believes there are a number of possibilities to do so and recommends that the NEA look systematically for ways of managing its activities more efficiently.

⇒ *A review should be performed of the possibilities for operating cost savings, including an eventual reduction of the number of Standing Committees, and/or proceeding to more task-oriented work procedures.*

⇒ *The NEA should be given more freedom to manage its activities more efficiently and look for ways of reducing its net costs, e. g. by buying overhead services from outside the OECD as well as by being able to use revenues from its publications.*

3.5 Improving Visibility and Communication

The NEA needs recognition by the sponsors who provide its financial support and by the users of nuclear energy in its Member countries. In neither case is the current visibility of the Agency sufficient.

The strengthening of its consideration of broad energy policy issues of importance to senior officials in Member countries should improve the current situation. The NEA should also systematically seek to become an active player in the international debate on how to achieve sustainable energy practices world-wide and in evaluating the role of nuclear energy in a sustainable energy context. The NEA should not, however, perform as, or be perceived as, an uncritical advocate for nuclear energy.

The NEA should develop a systematic way of finding out what its different stakeholders are looking for in its work and how much they value its products, so that a strategy to meet the communication needs of different activities and audiences can be developed.

Ways of speeding up publication of NEA studies should be found, and the costs and benefits of various alternative means of publication should be considered. The dissemination of results by electronic means through the Internet should continue to be developed.

Furthermore, NEA publications should be designed to make their conclusions more accessible to a broader readership. This could be through publications on energy and environmental policy issues in co-operation with other OECD sectors. The NEA might also more regularly publish reviews on nuclear technology and safety issues and state-of-the-art reports on important issues and on recent developments.

⇒ *The NEA should develop a communications strategy consistent with the overall OECD publications strategy but focused on the specific target audiences relevant for the respective areas covered by the NEA's work. In that context the NEA should take steps to make its publications more attractive for a broader readership. Furthermore the Agency's Secretariat should have more freedom with a view to more timely and effective dissemination of its products.*

4

The NEA and Its Relations with Other Bodies

4.1 Interaction of the NEA with the International Energy Agency

The International Energy Agency (IEA) was founded in 1974 following the oil crisis of 1973-74 by Treaty (the Agreement on an International Energy Programme) as an autonomous agency linked with the OECD. The essential original objective was to take action to guard against future vulnerability to a major disruption in oil supplies. Member countries made a commitment to co-operate in responding swiftly and effectively to future oil emergencies and to reduce their dependence on oil, to take longer term policy measures to promote energy efficiency and conservation and to diversify their energy supplies through alternatives to oil.

Oil security and emergency preparedness is still a central issue for the IEA as can be seen from the 1992 revision of the "Agreement on an International Energy Programme". At the same time, the objectives of the IEA have expanded over the years since its founding. In particular, the IEA has become a focal point for comprehensive policy analysis and authoritative information about economic aspects of the energy sector. This is reflected in the statement of *Shared Goals*, adopted by IEA Ministers in June 1993, which summarises a broad spectrum of issues, ranging from basic conditions for longer-term energy security to co-operation among energy market participants (see Annex E).

Regarding the relationship between the NEA and the IEA, it is interesting to note the broad scope of the *Shared Goals* in comparison with the *Agreement on an International Energy Programme*. In the latter, there is a clear focus on oil. The only nuclear activities which are addressed explicitly are nuclear safety, waste disposal and uranium enrichment. On the other hand, the *Shared Goals* cover virtually all aspects of all energy technologies on an equal footing. Thus, Articles 1 and 4 of the *Shared Goals* mention nuclear energy in the context of diversity, efficiency and flexibility within the energy sector and of encouragement and development of environmentally acceptable energy sources. Furthermore, Article 6 addresses research, development and market deployment of new and improved energy technologies and international co-operation for all energy sources, with no exemptions. Thus, a considerable potential overlap between the responsibilities of the IEA and the NEA has been introduced through the broad scope of issues identified in the *Shared Goals*.

The Advisory Group believes that the most practical and effective way to clarify the respective responsibilities of the two Agencies is through closer co-operation between the NEA and the IEA, particularly at the time of defining the scope and timing of future work. As explained above, the Group believes that the NEA should remain intact for the time being. However, relations between the Agencies and ways of integrating them more effectively into the overall work of the OECD merit further discussion.

There are many areas where joint NEA-IEA activities already achieve or would promise considerable benefit. For instance, the two Agencies could work with other OECD sectors such as the OECD Economics Department to examine the effects of privatisation and deregulation on the prospects for the different energy technologies and the needs for energy research. The NEA and the IEA could jointly investigate the impact of privatisation and deregulation on safety and reliability of nuclear power plants and on the entire nuclear fuel cycle in a longer time perspective. The NEA could call, for example, upon experts in its Member countries for an assessment of the technical significance of non-technical factors and the IEA could focus its systems expertise on a joint study of how economic driving forces might affect management and operational decisions. It could also be useful for the IEA and the NEA to provide a forum for a serious review of precisely how governments should adapt their regulatory requirements and public policies to the changes which appear to be sweeping electricity generation world-wide.

↳ *The NEA should be enabled to provide, systematically, a "nuclear input" to IEA deliberations, activities and publications of a cross-sectoral or policy character. Likewise broad energy policy input by the IEA should be systematically integrated into the work of the NEA. The closer co-operation between the two Agencies should also be supported by organisational components such as joint task teams and co-operation between the IEA Governing Board and the NEA Steering Committee.*

4.2 The NEA and the OECD Environment Directorate

Many broad issues would benefit from a closer link between the NEA and the OECD Environment Directorate. This could help achieve more consistency and transparency of approaches and strategies. An important subject is the role of nuclear energy with regard to questions related to climate change. Closer co-operation between different sectors is probably a key to better consensus on viable strategies to reduce emissions of green house gases. Another example is waste management. Most human activities generate waste, and many aspects of the

management of waste are common to different sectors. There could be many benefits to putting waste disposal strategies in different areas on a common foundation. Similarly, assessment and management of risks associated with hazardous substances in the environment, including the assessment of low level chemotoxic and radiotoxic effects, need to be dealt with in common ways. In that regard, it could be very useful to have an exchange of ideas between the NEA and the Chemicals Group, illuminating similarities and differences of the respective approaches.

⇒ The Advisory Group believes that closer co-operation between the NEA and the OECD Environment Directorate would enhance the quality and credibility of work on environmental issues of broader significance.

4.3 The NEA and the OECD Economics Department and the Directorate for Science, Technology and Industry (DSTI)

The role of the Economics Department relates directly to the OECD's overall objective of promoting policies to achieve the highest sustainable economic growth and a rising standard of living. The Department works with the Member countries to examine macroeconomic problems and policies, as well as a wide range of structural issues and their relationship to macroeconomic developments. That includes balance of payments and foreign trade, the international monetary system, the impact of policy instruments in areas such as agriculture, industry, energy, the environment, regional development and labour markets.

The mission of the Directorate for Science, Technology and Industry (DSTI) is to help Member countries adapt their policy approaches to the challenge of a developing knowledge-based economy, marked by increased competition and globalisation. The DSTI provides governments with information, analyses and evaluations concerning emerging trends in the scientific, technological and industrial environment; it fosters policy dialogue in selected areas of science, technology and industry; and identifies areas of science, technology and industry where it would be useful to develop OECD-wide standards. For instance, DSTI undertakes international comparisons of innovation systems, framework conditions for industry and specific policies to promote small and medium enterprises, while also seeking to make research subsidies more transparent.

The Advisory Group did not review the possibilities of co-operation of the NEA with these sectors in detail. Nevertheless the Advisory Group believes that there are important issues where such co-operation could be fruitful. For instance, issues such as "education and training" and "employment effects of nuclear and other technologies" which are highly significant for nuclear energy could be addressed using the integrated competence of the NEA with the Economics Department and/or DSTI.

4.4 Integrating the OECD Approach to Sustainable Energy Policy

Given the strategic importance of sustainable development, finding economically and environmentally efficient energy strategies is likely to be a key issue for the OECD over the coming years. For many questions in that area, viable solutions will only be found through the use of well-balanced approaches based on the best available knowledge in several different fields.

The Advisory Group therefore believes that a more formal co-operation procedure for relevant OECD sectors (i.e. the NEA, the IEA, the OECD Environment Directorate, DSTI, and the Economics Department) would be extremely helpful. For the NEA, this would also provide an effective way to address nuclear energy issues in a broader perspective.

The Advisory Group believes that working on well-defined projects should be a key element of that co-operation. The development of a consistent sustainable development approach is the key issue to address in that context.

⇒ *The Advisory Group recommends setting up a horizontal co-ordinating group for Sustainable Energy Policy, responsible to the Secretary-General, to integrate OECD approaches to energy, environment, technological and industrial policy issues more effectively. The group would include the heads of the IEA, the NEA, the Environment Directorate, the Directorate for Science, Technology and Industry and the Economics Department. This group could also prompt discussion on the role of nuclear energy within the context of sustainable energy supply strategies at the Ministerial level when appropriate.*

4.5 Links with Industry

The roles of utilities that operate nuclear plants, and of manufacturers and fuel companies have become increasingly important over the years as owners of knowledge and decision-makers in the nuclear field. A competence-oriented organisation like the NEA needs to adapt its relations with industry to recognise this.

Taking into account the important role of non-Governmental organisations in the debate on nuclear energy, some interaction of the NEA with those groups could be sensible. Of particular value would be qualified discussions with groups already active in the OECD context such as the OECD Trade Union Advisory Committee (TUAC) and the Business and Industry Advisory Committee to the OECD (BIAC). Early topics of such discussions could be employment issues and the role of nuclear energy in a sustainable energy context.

⇒ *The NEA should further develop appropriate participation of industry in its work. Contributions to the activities of NEA Committees as well as liaison and advisory groups should be considered.*

4.6 The NEA and the International Atomic Energy Agency (IAEA)

The interface and co-operation between the NEA and the International Atomic Energy Agency (IAEA) has repeatedly been the subject of attention. The relationship is of considerable relevance in implementing a strategy for achieving higher impact and visibility for the NEA. Since the two Agencies work in many of the same areas, it is important that their roles be distinct from one another and that people not close to either organisation perceive clear roles for each. The fact that the IAEA is so much larger than the NEA gives particular importance to this question.

The IAEA has traditional roles in the area of non-proliferation and technical assistance to developing countries. However, its programme has been progressively diversified and now covers a broad variety of issues which overlap with the NEA. Some important IAEA strengths (and weaknesses) come directly from its large size and its broad, heterogeneous membership. Examples of IAEA activities with a large impact are international policies regarding the safety of nuclear power plants built to earlier standards, the Nuclear Safety Convention, and the Radioactive Waste and Spent Fuel Management Convention.

Other important roles of the IAEA are international dissemination of information, and development of codes and standards providing internationally agreed requirements for nuclear safety. These are often derived from work in technologically advanced countries such as members of the NEA.

In view of the potential for overlap, it is important to shape the interface and the co-operation between the two agencies so as to make better use of their complementary strengths and avoid wasteful duplication. The NEA as an international centre of know-how is a good source of technical information which could be shared widely via IAEA with mutual benefit. Reference solutions for problems, developed by the NEA for its members, could similarly be systematically distributed by the IAEA. On publicly controversial issues such as reactor safety and disposal of nuclear wastes, close co-operation between the agencies could yield scientifically-sound, consensus solutions. It should be possible to make effective use of the advantages of both

organisations, i.e. the flexible organisation of the NEA focusing the expertise and competence in nuclear technology of its small but highly capable membership; the IAEA exploiting its broader impact with its wider scope of activities and membership.

⇒ A common understanding of the distinctive strengths and the complementary roles of the NEA and the IAEA should be developed by their top managements and actively pursued in practice. A Memorandum of Understanding between the NEA and the IAEA would be a useful starting point.

4.7 NEA Membership and Relations to Non-Member Countries

Traditionally, the membership of the NEA has been almost identical with the membership of the OECD itself. At its founding as the ENEA in 1958, its membership was restricted to Europe and included the 17 member countries of the OEEC (which became the OECD in 1961). Over the years, as new members joined the OECD, they have also tended to become members of the NEA, although this is not automatic. In fact, all but two OECD Members – New Zealand and Poland – are Members of the NEA as of January of 1998 (see Annex F for the full membership of the NEA).

Recently the OECD and the NEA welcomed several new Members. Others have indicated their wish to join. While it is positive for the NEA's value and relevance to be recognised through pressure for increased membership, the Advisory Group believes that unlimited acceptance of new members could harm the quality of the traditional technical work of the NEA.

Serious consideration should therefore be given to setting criteria to be met by new Members. Existing NEA Member countries should look at the costs of enlarging membership, bearing in mind that many NEA strengths will not be increased and may even be eroded by departure from a small and relatively homogeneous membership.

Here the Advisory Group is echoing the recommendations of the NEA Steering Committee on future evolution of membership and relations with non-member countries. As set out in its 1995 report on NEA long-term orientations, the Steering Committee concluded that: "Maintaining these strengths of the NEA is an important objective in itself and necessitates that considerable caution be exercised with respect to accepting new Members. Each potential new Member country should be considered in terms of whether it would contribute to NEA strengths and be committed to doing so, and whether the overall relationship would be mutually beneficial. Generally, the possibility of membership should be reserved for very few countries, and in most cases other types of relationships should be considered".

The Advisory Group agrees that any new membership or any outreach action should provide significant added value to NEA Members in meeting their strategic objectives. That implies that the NEA should generally not get involved in international assistance and leave this function to the IAEA and other international organisations. However, there are areas, in particular nuclear law, where the NEA has provided useful assistance to countries in central and eastern Europe and the former Soviet Union for several years, filling in gaps in assistance provided by the IAEA, G-7 and the G-24. The Agency must be careful not to duplicate the work of these other organisations, and should attempt to phase out its assistance programme consistent with progress in those countries and taking into account the evolving assistance programmes of the other organisations. The NEA's goal should be to shape its relationships with those countries, and all other non-member countries, on the basis of co-operation and mutual benefit.

For its vertical actions (the main focus of the Steering Committee report), an aim of the NEA should always be to maintain and develop itself as an international centre of nuclear competence. Co-operation between the NEA and non-member countries should be focused on that objective. Accordingly, participation in projects could be opened to non-members if they can contribute significant competence and resources of their own. That should lead to closer co-operation with certain key non-OECD countries such as Russia and China which have, or are developing, strong nuclear programmes.

Such a performance-oriented strategy for membership and co-operation with non-members would achieve several things: the value added to NEA work by integrating the most competent non-member countries into the NEA activities would be large; the NEA would stay small and flexible, with a relatively homogeneous membership; and the proportion of NEA Members contributing technical know-how on the basis of active nuclear energy programmes would remain high, ensuring continued quality and efficiency in the work of the NEA.

The Advisory Group discussed the possibility of different classes of membership but concluded that it is best to have a single class. Among non-members, however, there could be different levels of participation according to the expertise and resources that countries might bring to different areas of NEA activities. They and the NEA would obtain benefits in proportion to their level of competence in each area, but they would achieve the rights of full membership only when they meet the full range of criteria. Their participation at different levels could be seen as steps along the path to full membership.

⇒ *New memberships should be offered to very few countries, those with demonstrated capacity to contribute substantially to maintaining and strengthening the NEA as an international centre of competence.*

⇒ *On the other hand, individual NEA activities, including participation in committees and working groups, could be opened more widely to countries which offer significant added know-how and have the financial means for the engagement in question. Of particular importance is the integration of Russia and China, given their large nuclear knowledge base.*

5.1 NEA Statute and Mission Statement

A major finding of the Advisory Group in the consultative phase of its work on this Report was that the NEA is widely perceived to be an Agency for the promotion of nuclear energy. A basis for this may be found in the NEA Statute, Articles 1b and 8a which read, in part: "... the purpose of the Agency shall be to further the development of the production and uses of nuclear energy, ..." and "... contribute to the elimination of obstacles to international trade or to development of the nuclear industry". Gaining recognition for objective and rigorous analysis is made more difficult by this perception. For this reason, an early opportunity should be found to review the mandate of the NEA as specified in the Statute in the context of the most pressing needs of the decades ahead. These include closer integration of issues related to energy and sustainability. Any revision should allow the NEA to reinforce its role as an objective and authoritative source of useful information and analysis.

⇒ *The Advisory Group believes that a review of the NEA Statute could be valuable but should only be undertaken once a new Mission Statement and a Strategic Plan have been elaborated.*

5.2 The Role of the Steering Committee

The Advisory Group's recommendations, if accepted, will mean changes in the mode of operation of the Steering Committee. In terms of the traditional work of the Agency, the Steering Committee's role of overseeing the budget, the allocation of resources among programmes and projects, and the monitoring of results will continue. However, in view of resource constraints, it will have to intensify oversight to ensure that the overall NEA programme remains focused on the highest priority items, and that lower priority projects do not obtain more resources than they merit.

The Committee should also develop mechanisms to respond more quickly to developments that cannot wait for its twice-yearly meetings. It may need to delegate some authority to its Bureau or to a subcommittee, or look at ways of making decisions by other means, including the use of modern communications devices.

The need to involve the NEA in broader policy discussions, in co-operation with other sectors of the OECD, will require more effective co-ordination by delegates to the Steering Committee of national positions, but also more freedom for delegates to discuss and negotiate positions in the Steering Committee itself. The Steering Committee should be prepared to discuss nuclear policy positions in the broader context of energy and environment. It will also have to liaise more closely, as a body, with its counterparts in other OECD agencies such as the IEA Governing Board, and with the proposed Horizontal Co-ordinating Committee reporting to the Secretary-General.

We recognise that our recommendations would require nuclear issues to assume more prominence in policy discussions in the Member countries and make increased demands on Steering Committee delegates, and probably on the Secretariat as well. However, we feel that the importance of the NEA, in view of challenges facing Member countries in the nuclear energy sector, more than justifies an urgent call to focus the NEA programme on high-priority items and expand its policy role in the energy/environment area. This will indeed require more intensive management. The challenge is to do this effectively with the available resources.

A corollary of the proposed energy policy engagement of the NEA and its participation in the discussion of nuclear issues within a broader energy, economic and environmental context, is that the Steering Committee will need to take closer account of the broader policy context in which the activities of the NEA need to be carried out.

⇒ *Responsibilities and working procedures of the Steering Committee, as well as representation on it, should be adapted in light of a more policy-oriented future role for the NEA.*



End Notes

¹ The terms of reference are appended as Annex A. They have been regrouped here in order to serve as basis for the logical organisation of the report.

² *Guiding the Transition to Sustainable Development: A Critical Role for the OECD*, the Report of the High Level group on the Environment to the Secretary-General of the Organisation for Economic Co-operation and Development, November 1997

³ *Towards a New Global Age: Challenges and Opportunities*, OECD, 1997

⁴ In 1994 Indonesia's net export of oil was 59% of its indigenous production.

⁵ *European Energy to 2020*, European Commission, 1996

⁶ *The World in 2020: Towards a New Global age*, OECD, 1997

⁷ A large nuclear power plant of 1000 megawatts electrical capacity saves about 8 million tonnes of carbon dioxide emissions every year compared to an average coal plant of similar size, while consuming less than 200 tonnes of mined natural uranium equivalent in its fuel. On a global basis, nuclear power saves about 2.8 billion tonnes of carbon dioxide emissions every year when compared to coal, and somewhat less than half of that amount when compared to natural gas. These are very significant amounts in terms of the challenge faced by the world in reducing greenhouse gas emissions while maintaining economic growth.

⁸ *Steering Committee for Nuclear Energy, Report on NEA Long-term Orientations, 1995*, (an internal NEA document).

General Mandate

To advise the Secretary-General on the appropriate role of the Nuclear Energy Agency (NEA) over the next decade and beyond, including:

The role of international co-operation with respect to the nuclear power sector in NEA Member countries.

Taking into account external factors, as well as internal factors such as budgetary constraints facing the OECD in the near term, the NEA's strategic directions and how these might be translated into near- and medium-term priorities.

Whether the NEA should address broader policy issues than has been the case previously.

The NEA's comparative advantage given the other regional and global institutions in the nuclear field, particularly the International Atomic Energy Agency (IAEA). (How can this advantage be utilised most effectively? What is the appropriate role of the NEA vis-a-vis these institutions? What are the implications for the size of the Agency's membership?)

The linkages to be maintained by the NEA with:

- a) private sector institutions and the nuclear industry; and
- b) non-Member countries, including potential new Members.

The appropriate interactions of the NEA with other OECD sectors, in particular the IEA, the Environment Directorate and the Directorate for Science, Technology and Industry.

In view of the evolution of the Agency and its appropriate future strategic directions, revisions to be considered to the existing Statute of the Agency.

The importance of greater visibility for the Agency and its work.

Note: In addition to the publicly available documents listed below, the group was provided privileged access to a wide range of documents covering internal strategic planning, activities and structures for the OECD, OECD/NEA, OECD/IEA and IAEA.

General OECD Documents

- BIAC: Annual Report 1996
- BIAC Statement to the 1997 OECD Council Meeting at Ministerial Level , May 1997
- Economic Globalisation and the Environment (1997) OECD
- Environmental Taxes and Green Tax Reform, (1997) OECD
- OECD Environmental Policy Committee at Ministerial Level: Communique, (1996)
- OECD International Futures Programme, (1997)
- Reforming Environmental Regulation in OECD Countries, (1997) OECD
- Sustainable Consumption and Production (1997) OECD
- Sustainable Development: OECD Policy Approaches for the 21st Century, (1997) OECD
- The annual report of the OECD ,1995
- The OECD Report on Regulatory Reform: Synthesis (1997) OECD
- Towards a New Global Age: Challenges and Opportunities - Policy Report, (1997) OECD
- Trade Union Statement to the 1997 OECD Council Meeting at Ministerial Level and to the Denver G7 Economic Summit, (1997)

OECD/NEA Documents

- NEA Activities in 1996: Twenty-Fifth Annual Report of the Nuclear Energy Agency, Paris (1997) OECD
- NEA Activities in 1995: Twenty-fourth Annual Report of the OECD Nuclear Energy Agency

Annex A:

Terms of Reference

Annex B:

List of Documents Consulted

- Statute of the OECD Nuclear Energy Agency, 1995
- Steering Committee for Nuclear Energy, Report on NEA Long-term Orientations, (1995), (an internal NEA document)

OECD/IEA Documents

- Agreement on an International Energy Program (As amended to 7th August 1992)
- Climate Change and Nuclear Power's Future - Conference Paper Presented at the Annual Conference of the Japan Atomic Industrial Forum, Tokyo 1997
- International Energy Agency: Annual Report 1996
- International Energy Agency "Shared Goals" (4 June 1993), OECD/IEA (see Annex E)

IAEA Documents

- IAEA Draft Medium Term Perspective 1998-2003, Note by the Secretariat, 27 May 1997 (IAEA)

European Commission Documents

- Communication from the European Commission on The nuclear industries in the European Union (An illustrative nuclear programme according to Article 40 of the EURATOM Treaty), 1996, European Commission
- Opinion of the Economic and Social Committee of the European Parliament on the Communication from the European Commission on The nuclear industries in the European Union, 1997, European Commission

Annex C:

Communications and Comments

Letters inviting comments sent to the Heads of

- Business and Industry Advisory Committee to the OECD (BIAC)
- IEA Committee on Energy Research and Technology
- IEA Standing Group on Long-Term Co-operation
- OECD/DSTI Committee for Scientific and Technological Policy (CSTP)
- OECD/DSTI Group on the Science System
- OECD/DSTI Megascience Forum
- OECD/DSTI Megascience Forum Working Group on Nuclear Physics
- OECD/DSTI Working Group on Innovation and Technology Policy (TIP)
- OECD Environment Policy Committee (EPOC)
- Trade Union Advisory Committee to the OECD (TUAC)

Written Comments received from

- Mr. Steven Bate, Executive Director, BIAC
- Mr. John Evans, Secretary-General, TUAC
- Mr. Conny Hägg, Member, EPOC
- Dr. Martin Hum, Member, EPOC
- Mrs. Eldrid Nordbo, Chair, EPOC
- Mr. Christian Prettre, Chairman, Steering Committee for Nuclear Energy
- Mr. Robert Priddle, Executive Director, IEA
- Amb. William Ramsay, Chairman, IEA Standing Group on Long-Term Co-operation
- Dr. P. Tindemans, Chairman, OECD/DSTI Megascience Forum
- Mr. Theo Van Rentergem, Belgian Member of NEA Steering Committee
- Mrs. Caroline Varley, Head, IEA Energy Diversification Division

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- Mr. P. Vereker, Permanent Representative, United Kingdom Delegation to the OECD
 - Mr. Bo Wahlström, Chair, Chemicals Group and Management Committee
 - Mr. G. Zaralis, Member, EPOC

Annex D: Meetings

May 30, 1997

First High Level Group Meeting in Paris

Introduction by OECD Secretary-General, Mr. Donald Johnston

Briefings by Mr. Samuel Thompson, Deputy Director-General, NEA
Ms. Julia Schwartz, Administrator, Legal Affairs, NEA
Mr. Claes Nordborg, Head, NEA Section Nuclear Science/Data Bank
Mr. Geoffrey Stevens, Head, NEA Division Nuclear Development and the Fuel Cycle
Mr. Gianni Frescura, Head, NEA Division Nuclear Safety
Mr. Jean-Pierre Olivier, Head, NEA Division Radiation Protection and Radioactive Waste Management
Mr. Robert Priddle, Executive Director, IEA
Mr. Risaburo Nezu, Director, OECD Directorate for Science, Technology and Industry
Mr. Jeremy Eppel, Counsellor, OECD Environment Directorate

Observers from OECD/NEA:

Mr. Luis Echavari, Director General
Mr. Samuel Thompson, Deputy Director General
Mr. Philippe Savelli, Deputy Director, Science and Development
Mr. Makoto Takahashi, Deputy Director, Safety and Regulation

July 8, 1997

Chairman's consultations in Paris:

Mr. Steven Bate, Executive Director, Business and Industry Advisory Committee to the OECD (BIAC)
Mr. Jean-Jacques Noreau, Executive Director, OECD
Mr. John Evans, Secretary General, Trade Union Advisory Committee (TUAC)
Mr. Christopher Brooks, Director, Public Affairs and Communications, OECD
Mr. Wolfgang Michalski, Director, Secretary-General's Advisory Unit on Multidisciplinary Issues and OECD's Futures Programme

September 15-16, 1997

Second High Level Group Meeting in Paris:

Working breakfast with OECD Secretary-General, Mr. Donald Johnston

Mr. Bill Long, Director, OECD Environment Directorate,
Mr. Ferriter, Deputy Executive Director, IEA
Mr. Gabriel Drillhon, Special Assistant to the Director, OECD Directorate for Science, Technology and Industry

Observers from OECD/NEA:

Mr. Luis Echavari, Director General
Mr. Samuel Thompson, Deputy Director General
Mr. Philippe Savelli, Deputy Director, Science and Development
Mr. Makoto Takahashi, Deputy Director, Safety and Regulation

Meeting with Mr. Christian Prettre, Chairman of Steering Committee for Nuclear Energy

September 25, 1997

Meeting with the Trade Union Advisory Committee to the OECD (TUAC):

Mr. John Evans, Secretary-General (TUAC)
Mr. David Feickert, Officer, Trades Union Congress (TUC), Brussels Office
Mr. Reg Green, Health, Safety and Environment Officer, International Federation of Chemical, Energy, Mine and General Workers' Unions (ICEM)

Mr. Jyrki Raina, Energy Officer, International Federation of Chemical, Energy, Mine and General Workers' Unions (ICEM)
Mr. Lucien Royer, TUAC consultant
Mr. Anselm Schaefer, Gesellschaft für Anlagen-und Reaktorsicherheit (GRS) mbH
Dr. Elizabeth Dickson, Adviser to the Secretary-General, Interdisciplinary Issues, OECD

October 10, 1997

Chairman 's meeting with the Steering Committee for Nuclear Energy

November 12, 1997

Chairman's meeting with OECD Secretary-General, Mr. Donald Johnston

November 19-21, 1997

Third High Level Group Meeting in Paris:

Observers from OECD/ NEA:

Mr. Luis Echavarri, Director General

Mr. Samuel Thompson, Deputy Director General

Mr. Philippe Savelli, Deputy Director, Science and Development

Mr. Makoto Takahashi, Deputy Director, Safety and Regulation

December 16, 1997

Chairman's presentation of preliminary findings to IEA Governing Board

December 17, 1997

Chairman's discussion of preliminary findings with IEA's Energy Policy Committee, Standing Group on Long-Term Co-operation and Policy Analysis

Secretariat for High Level Group

Mr. Anselm Schaefer, Gesellschaft für Anlagen-und Reaktorsicherheit (GRS) mbH

Mr. John West, Principal Administrator, OECD (May 1997-September 1997)

Dr. Elizabeth Dickson, Adviser to the Secretary-General, Interdisciplinary Issues, OECD (September 1997-January 1998)

Annex E:

**International
Energy Agency
" Shared Goals"**

The 23 Member countries* of the International Energy Agency (IEA) seek to create the conditions in which the energy sectors of their economies can make the fullest possible contribution to sustainable economic development and the well-being of their people and of the environment. In formulating energy policies, the establishment of free and open markets is a fundamental point of departure, though energy security and environmental protection need to be given particular emphasis by governments. IEA countries recognise the significance of increasing global interdependence in energy. They therefore seek to promote the effective operation of international energy markets and encourage dialogue with all participants.

In order to secure their objectives they therefore aim to create a policy framework consistent with the following goals:

- Diversity, efficiency and flexibility within the energy sector are basic conditions for longer-term energy security: the fuels used within and across sectors and the sources of those fuels should be as diverse as practicable. Non-fossil fuels, particularly nuclear and hydro power, make a substantial contribution to the energy supply diversity of IEA countries as a group.
- Energy systems should have the ability to respond promptly and flexibly to energy emergencies. In some cases this requires collective mechanisms and action: IEA countries co-operate through the Agency in responding jointly to oil supply emergencies.
- The environmentally sustainable provision and use of energy is central to the achievement of these shared goals. Decision-makers should seek to minimise the adverse environmental impacts of energy activities, just as environmental decisions should take account of the energy consequences. Government interventions should where practicable have regard to the Polluter Pays Principle.
- More environmentally acceptable energy sources need to be encouraged and developed. Clean and efficient use of fossil fuels is essential. The development of economic non-fossil sources is also a

priority. A number of IEA members wish to retain and improve the nuclear option for the future, at the highest available safety standards, because nuclear energy does not emit carbon dioxide. Renewable sources will also have an increasingly important contribution to make.

- Improved energy efficiency can promote both environmental protection and energy security in a cost-effective manner. There are significant opportunities for greater energy efficiency at all stages of the energy cycle from production to consumption. Strong efforts by Governments and all energy users are needed to realise these opportunities.
- Continued research, development and market deployment of new and improved energy technologies make a critical contribution to achieving the objectives outlined above. Energy technology policies should complement broader energy policies. International co-operation in the development and dissemination of energy technologies, including industry participation and co-operation with non-Member countries, should be encouraged.
- Undistorted energy prices enable markets to work efficiently. Energy prices should not be held artificially below the costs of supply to promote social or industrial goals. To the extent necessary and practicable, the environmental costs of energy production and use should be reflected in prices.
- Free and open trade and a secure framework for investment contribute to efficient energy markets and energy security. Distortions to energy trade and investment should be avoided.
- Co-operation among all energy market participants helps to improve information and understanding, and encourage the development of efficient, environmentally acceptable and flexible energy systems and markets worldwide. These are needed to help promote the investment, trade and confidence necessary to achieve global energy security and environmental objectives.

The "Shared Goals" were adopted by IEA Ministers at their 4 June 1993 meeting in Paris.

Australia	Greece	Portugal
Austria	Hungary	Republic of Korea
Belgium	Iceland	Spain
Canada	Ireland	Sweden
Czech Republic	Italy	Switzerland
Denmark	Japan	the Netherlands
Finland	Luxembourg	the United Kingdom
France	Mexico	the United States
Germany	Norway	Turkey

Annex F:
NEA
Member Countries



*Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

