

Scientific and Technical Committee Euratom (STC)

STC's view on the Commission's Green Paper "Towards a European strategy for the security of energy supply" COM (2000) 769; 29 November 2000

Summary:

STC has analysed and discussed nuclear power aspects related to the Commission's Green Paper "Towards a European strategy for the security of energy supply" with the following conclusions:

- STC welcomes the European Commission's Green Paper on Security of Energy Supply as a comprehensive and informative discussion document on the future needs of the European Energy policy securing a long-term and sustainable energy supply for Europe. It opens an important discussion on future energy demand and supply and in a realistic way. The importance of nuclear energy is mentioned in the Green Paper. STC would, however, very much welcome a continued discussion on the importance of existing nuclear power and possible contributions from new technologies, presently under consideration at the research level, to meet the expected large future demands of electricity.
- STC shares the views that forceful development and other activities are needed to balance the demand for prime energy - in time and quantity - with ensured production capacity. In line with this and to mitigate the strong dependency on external energy sources within the European Union, STC wholeheartedly agrees with the conclusion of the Commission's Energy Research Working Group (E-WOG)⁵ that "*given the present status of the (potentially sustainable and affordable energy) technologies and the uncertain future, none can be relied on for more than a **contribution** to solving the overall problem and that **all appropriate** options should be kept open and further development be pursued.*" Improved energy efficiency, renewable energy sources, fossil fuels with CO₂ sequestration, nuclear fission and nuclear fusion; all need to be developed. In this context, nuclear energy and coal should not be singled out as being "undesirables"; all energy options are in one way or other "undesirable".
- The Green Paper is based on predictions up to the year 2030. Since this is rather short-sighted and the situation will probably be much more difficult to manage when considering the conditions in mid and longer term (for instance when current energy systems must be replaced), STC recommends that the periods between 2030-2050 and beyond 2050 are analysed as well.
- Nuclear fission, based on improved or newly developed modern reactors can play an important role already in the mid-term. Fusion and new innovative fission systems could be significant contributors to the need for large electricity and heat production in the longer-term. STC fully shares the views of the Green Paper saying that the "*European Union must retain its leading position in the field of civil nuclear technology in order to retain the necessary experts and develop more efficient reactors and enable fusion to become a reality.*" STC has summarised its views on actions to be undertaken in the short, medium and long-term in the Documents ^{1, 2, 3} and ⁴.
- When considering energy stockpiling in Europe, the existing significant energy stockpile in the EU in form of nuclear fuel should not be overlooked. It is easy to handle and could be enlarged at reasonable cost.
- The issues of radioactive waste and radiation are central for the existing nuclear programme – regardless of the future development – but certainly also a key issue for consideration of new future nuclear power. To move forward in these fields, public confidence and support must be won. Experience in Finland and Sweden with Environmental Impact Assessments shows that this could be a way forward.
- Finding solutions in Europe for the energy related problems would necessitate broad public acceptance. This acceptance will not be gained without clear political leadership and support at EU and national level. A significant step forward in this direction would be to publish at the end of the debate, that has been launched by the publication of the Green Paper, a comprehensive White Paper on the future European Energy (Research) policy, proposing concrete measures for securing a long-term and sustainable energy supply for Europe.

These points are further developed in the following text.

1. Background

The Scientific and Technical Committee Euratom (STC) is attached to the European Commission and advises the Commission on all nuclear issues, covering the whole range from fission and fusion to radiation protection. One of its main tasks is to analyse future needs for research and competence within the area of nuclear energy.

The Green Paper encourages and asks for a broad discussion/debate of the issues at stake, and also requests for views and comments. STC has in several reports discussed many of the aspects in the Green Paper in a broad and more general way. The views are summarised in an STC report related to the new Euratom Framework Programme¹, in the STC Opinion on the new Euratom Framework Programme² and in the STC paper “A Fresh Look at Nuclear Power”³. Besides some more general reflections, the STC statements below concentrate on Question 8 of the Green Paper.

It is also understood that STC members may submit additional comments in their personal expert capacity or relation to other appropriate groups.

2. General Comments

STC has with great satisfaction noted the Commission’s Green Paper “Towards a European strategy for the security of energy supply”, aiming at a sustainable and coherent future energy supply strategy for Europe. It is a basic and missing document today, but it constitutes only a first welcome step towards a sound and responsible EU energy (research) policy.

STC very much shares the concern of the Green Paper regarding the very likely development in need for prime energy in Europe and globally. STC is pleased to note that the European Commission turns its attention to Europe’s structural weakness regarding energy supply and its growing future energy dependency. The important effects of the liberalised energy market have also been taken into account.

To discuss the future energy demand in relation to development and implementation of new technologies and approaches, STC believe that the time perspective used in the Green Paper is too short-sighted. For discussion of R&D needs, STC has found it useful and important to discuss possible contributions in three time frames – short-term¹ (to date - 2020), mid-term³ (2020 - 2050) and longer-term⁴ (beyond 2050) - to consider outputs from existing systems and the time for the development and implementation of future measures and systems in a realistic way.

A main conclusion is that the planning must expect – at least for the mid-term - a large gap to bridge in production of electricity some decades from now. Energy conservation and production from renewable sources will not be enough. During that period, the main sources for fossil-free production of electricity in Europe will be hydro- and nuclear power.

It is obvious that the expected increase in demand will very much stress our abilities to generate and supply prime energy under a number of limiting conditions. To cope with this – and to provide a real and realistic choice for future generations - STC wholeheartedly agrees with the conclusion of the Commission’s Energy Research Working Group (E-WOG)⁵ that “*given the present status of the (potentially sustainable and affordable energy) technologies and the uncertain future, none can be relied*

¹ Report of the Scientific and Technical Committee Euratom (STC) “Strategic Issues related to a 6th Euratom Framework Programme (2002-2006)”; Document EUR 19150 EN

² STC Opinion on the new Euratom Framework Programme; 22 May 2001

³ Report of the Scientific and Technical Committee Euratom “Fresh Look at Nuclear Power”; Document EUR 19786 EN

⁴ Report under preparation

⁵ Report of the Energy Working Group (E-WOG) “Sustainable and Affordable Energy for the Future – Priorities for European Union Energy RTD”; EUR 19790 EN

on for more than a **contribution** to solving the overall problem and that **all appropriate** options should be kept open and further development be pursued.” Improved energy efficiency, renewable energy sources, fossil fuels with CO₂ sequestration, nuclear fission and nuclear fusion; all need to be developed, and the EU should support adequate resources in research and development in these areas. Nuclear energy and coal should not be singled out as being “undesirables”, as in fact all energy options are in one way or other “undesirable”.

In this context, STC also supports the Green Paper in calling for a real change in consumer behaviour in order to reduce Europe’s energy demand. In the long-term, only a drastic limitation of the world-wide increasing energy demand might bring real relief as regards keeping the gap closed also in the future between energy demand and supply. European energy policy should focus on measures to reduce energy demand in Europe. Developing countries should be supported pro-actively in their endeavour to base their economic growth on efficient production and use of energy.

Finding solutions in Europe for the energy related problems would necessitate broad public acceptance. This acceptance will not be gained without clear political leadership and support at EU and national level. A significant step forward in this direction would be to publish at the end of the debate - that now has been launched by the publication of the Green Paper - a comprehensive White Paper on the future European energy (research) policy, proposing concrete measures for securing a long- term and sustainable energy supply for Europe.

3. Specific statements and questions of the Green Book

Green Paper:

“The contribution of atomic energy in the medium term must, in its term, be analysed. Among the issues which will certainly form part of the debate will be the decision by most Members States to relinquish this sector, the fight against global warming, security of supply and sustainable development. Whatever the conclusion of this reflections, research of waste management technologies and their implementation in the best possible safe conditions must be actively pursued.”

Question 8:

*“Seeing the nuclear energy as one of the elements in the debate on **tackling climate change** and **energy autonomy**, how can the community find a solution to the problem of **nuclear waste**, reinforcing **nuclear safety** and developing research into **reactors of the future**, in particular **fusion** technology?”*

Tackling Climate Change and Energy Autonomy

STC is of the opinion that in the future, Europe will be competing world-wide for a secure energy supply. The same is true if the world will suffer from the negative consequences of climate changes due to burning of fossil energy resources. It is obvious that limitation of the release of CO₂ has to be introduced on a world-wide level.

Anticipating future circumstances, STC has found it crucial that society takes a “fresh look” at modern nuclear power that offers technology for improved safety and can be developed today on a much broader basis of experience. Because of this, STC very much agrees with the Green Paper’s view that “*the contribution of atomic power in the medium term must be analysed*”.

STC expects that such an analysis would demonstrate that modern fission technologies are sustainable in view of existing uranium resources and offer technological possibilities for a further improved fuel cycle. Although significant - it constitutes, however, only one possibility to help to reduce the emission of CO₂. In the longer time perspectives, fusion and new innovative, fuel efficient and proliferation resistant nuclear reactors can be utmost important both in relation to climate and energy autonomy.

For the time being, there is no urgent need to take a final decision to build new nuclear capacity. It is, however, crucial to ensure that adequate RTD is done so that sound decisions can be made when they are needed. Here, STC concurs with the Commission's Green Paper on the necessity to prepare the future by carrying out now the appropriate R&D.

As regards (partial) energy autonomy, STC points to the abundance and availability of Uranium, Thorium and Deuterium/Tritium as nuclear fuels (Thorium has been completely omitted in the Green Paper). Nuclear fuel stockpiles covering the need for several years could easily be created at rather low cost. This could help to dampen fluctuations in electricity prices. In contrast to that, liquid and gaseous fossil fuels might increasingly be needed for transport purposes or as a raw material for the chemical industry and no longer be available in the future in large quantities for electricity production.

Radioactive Waste

The issues of radioactive waste and radiation are central for the existing nuclear programme – regardless of the future development – but certainly also key issues for consideration of new future nuclear power.

In relation to *radioactive waste*, STC would very much like to see a much more nuanced discussion, differentiating between scientific, technical and social-political issues. First, it is important to be aware of the larger shares in volumes – mainly low-active waste - that can be and are in many cases well looked after through final disposal under industrial and accepted conditions today.

For the long-lived products - used fuel or vitrified waste, today in interim storage - R&D has been carried out on a large scale in close international collaboration since the 1970s. Because of this comprehensive work for decades, society today has general technology and solid knowledge available for safe long-term solutions based on emplacement deep down in geological formations. For realising the next important step – building site specific repositories - society must however develop the decision-processes much better than today in a way that considers major social-political obstacles encountered at present and this in an open and trusted way. Experience from Finland and Sweden indicates that the process related to Environmental Impact Assessments might be a way forward.

One of the contributors to the negative public attitudes towards waste disposal is concern over the risk from exposure to radiation. Uncertainties exist as to the level of this risk; while they exist, they amplify public concern and result in a less than efficient use of resources due to the need to use a precautionary approach. Research to better quantify the risks of radiation exposure, in particular regarding low doses and low dose-rates - would, therefore, have both social and economic benefits.

Nuclear Safety

Ageing reactors and facilities within the European Nuclear Systems, the Enlargement and pressure to cost-cutting measures in a deregulated electricity market are important factors that will increase the requirements on broad and deep knowledge of safety nature and qualified management to ensure continued safety. Although this falls under national responsibility, it is at same time crucial to *further develop common approaches to and views on safety aspects at European level*.

Maintaining European competence on nuclear safety requires efficient networks between the qualified relevant industry and research organisations with due participation and co-operation of the competent authorities and others within the regulatory sector.

Thus, in order to reinforce nuclear safety on European level it is important to continue to support the competence networks established during the fourth and fifth Framework Programmes and related research. To STC, it is obvious that a strong shared-cost component in the European Research Programme would contribute to this as well as be important for the realisation of the European Research Areas.

Reactors of the Future (Fission and Fusion)

In a longer-term perspective, the inter-related problems of a world population that continues to grow significantly, world-wide increasing electricity consumption in correlation with the development of economy and living standards, and the strategic importance for Europe to ensure the security of its energy supply will have to be solved. In this context, it seems today that new innovative nuclear fission systems and certainly nuclear fusion energy will have to be introduced too as paramount energy producers.

Nuclear fission reactors of the next generation and even more innovative future fission system could certainly contribute in an energy resource efficient way to produce electricity while producing only a limited amount of well-characterised radioactive waste. Ongoing research and development activities on new reactors like High-Temperature Reactors (HTR) as well as on Partitioning and Transmutation (P&T) demonstrate these potentials and possibilities. New nuclear fuel and fuel cycles, reactors of the next generation and P&T have the potential to make nuclear fission based on uranium and other similar resources as sustainable and safe as other large scale alternatives for producing base-load electricity. To trigger this development, a clear political signal would have to be given to the European nuclear sector.

Although still at the level of research and not yet demonstrated on a reactor scale, comprehensive analyses and successful experiments have shown that nuclear fusion offers the prospects of meeting the far-reaching requirements of operational safety, environmental compatibility and sustainability. Even if large development steps still remain to be taken successfully, STC is of the opinion that nuclear fusion has the potential to play an increasingly important role in the world in base-load electricity production in the second half of the 21st century.

Concluding words

STC has noted that the Green Paper underlines today's importance of nuclear energy in Europe and the need to discuss further the possible contribution of nuclear energy in the overall context of meeting the future energy demand. As the nuclear issues have only been touched upon in the Green Paper, STC would very much welcome a continued discussion on these subjects and is certainly prepared to participate therein with its experts.

For the Euratom Scientific and Technical Committee

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