

Contribution to the debate on the Green Paper
Towards a European strategy for the security of energy supply

Name	Ahti Toivola
Organisation	Teollisuuden Voima Oy (TVO)
What are your areas of interest?	Electricity production (nuclear power)
Contact person	Kaija Kainurinne
E-Mail	kaija.kainurinne@tvo.fi
Telephone	+322 282 8470
Fax	+322 282 8471
Address	Scotland House, Rond-Point Schuman 6, B-1040 Brussels, Belgium

Statement by Teollisuuden Voima Oy

TVO Teollisuuden Voima Oy (TVO) is a Finnish electricity producer. The company's 1680 MW of nuclear and 260 MW of coal-fired energy-generating capacity comprise about one-fifth of Finland's electricity production. TVO is owned by several Finnish industrial and public companies. All electricity produced by TVO is supplied to the owner companies for their own use or further distribution.

We would like to express the views of TVO on some of the issues raised in the European Commission's Green Paper on Security of Energy Supply. It is intended to highlight the importance of maintaining a versatile electricity supply not excluding any of the available energy options for electricity production. Environmental constraints of energy use will become increasingly important in dealing with the growing demand of electricity in the future. Moreover, it will be equally important to produce electricity at a price, which, in the long term, is competitive on the open electricity market.

In brief: Finland is already highly dependent on energy imports

Additional nuclear capacity does not hinder the development of renewable energy sources

Solutions on nuclear waste exist

Kyoto obligations are unrealistic without nuclear energy

Nuclear power is the least expensive method for generating base load energy in Finland

Objective discussion on nuclear energy is needed for public acceptance

Dependency on external energy sources is over 70 per cent in Finland.

The EU is currently dependent on external suppliers for 50% of its energy needs, and the dependency is forecast to increase to about 70% over the next twenty years. Finland already depends for 72% of its energy on foreign imports with a considerable part of imports originating from one country, Russia.

Natural gas supplied by a pipeline from Russia now comprises 10% of the primary energy supply and the amount is increasing. The imports of electricity have, in recent years, risen to about 15 per cent of the country's electricity consumption. In the long

term, however, electricity imports cannot be increased without risking the security of supply by becoming too dependent on one energy supplier.

One-third of electricity in Finland is obtained from domestic resources, such as water, wood and peat. Nuclear power provides one quarter and fossil fuels slightly over one-fifth of electricity, the rest of the consumption being covered by imports from neighbouring countries. Strong actions are already being taken for enhanced energy efficiency.

Based on considerations of growing electricity consumption, TVO applied in November 2000 for approval by the Finnish Government to build a new nuclear plant unit. The new nuclear unit would help to satisfy the increasing demand for energy by 2010 without increasing greenhouse gas emissions. TVO is convinced that the additional nuclear capacity will help to secure the continuous supply of base load electricity at a stable price.

Renewable energy sources

In Finland, the role of the renewable energy sources has been important for several decades as wood, waste and other biomass have been used traditionally with modern and efficient CHP technology. Renewable energy sources now, other than water, comprise around 12% of the total electricity production. Wind and solar energy are increasing slowly due to Finnish climate conditions. Therefore, the share of the renewable energy sources in the overall production of electricity can be increased only by a fairly marginal degree compared to the growing electricity demand.

Solutions for nuclear waste exist

According to the Finnish nuclear energy law, no nuclear waste can be imported or exported. All nuclear waste produced in Finnish nuclear power plants must be stored in Finland.

Low and medium active wastes from Finnish nuclear plants are placed in **on-site final storage facilities excavated in bedrock**. The same type of final storage will be used when the nuclear wastes from the dismantling of the plants will need to be disposed of.

Direct disposal in bedrock several hundred meters deep has been chosen as the method for disposing of Finnish spent nuclear fuel. The plan to build a final repository for the spent nuclear fuel at the Olkiluoto nuclear site in western Finland has been approved by the local municipality and by the Finnish Government. The Finnish Parliament ratified the Government's approval in May 2001.

All nuclear waste management costs are included in the price of nuclear electricity and funded by a national fund administered by the Ministry of Trade and Industry.

The technical means to create final repositories are available, but political and public support is needed to implement practical solutions at the Member State and Community level. Further work to demonstrate the environmental safety of the waste deposition, including research into alternative solutions, is needed to explore the opportunities and constraints, to develop a suitable climate of political and public support, and to circulate sufficient information about proposed solutions in an appropriate and open manner.

Kyoto obligations unrealistic without nuclear energy

According to the "business as usual" scenarios on electricity consumption until 2010, the need to reduce greenhouse gas emissions in Finland is of the magnitude of 20%, one of the hardest in the EU. With the extensive use of combined heat and power and the large

share of the renewable energy sources in the electricity production, Finland already has taken into use methods, which are considered essential for reducing CO₂ emission. Important measures for energy efficiency have also already been taken.

No greenhouse or acid rain gases are produced when nuclear energy is used to generate electricity. This must be taken into account in forming energy policy if the European Union is to meet its commitments under the Kyoto Protocol and under subsequent, more demanding, international agreements. Against this background, the need for replacement nuclear plants over the next few years must be given serious consideration, bearing in mind the fact that many of the older plants will be retired and withdrawn from service.

Nuclear provides the least expensive base-load electricity

Operating records of Finland's four nuclear power plant units are good, and the electricity has been produced at a competitive price in Finland. The long-term stability of the price of nuclear electricity due to non-volatile fuel cost is seen as a vital advantage.

According to a study by the University of Technology in Lappeenranta, the long-term average price of nuclear electricity is lower than the price of electricity produced by coal or gas when the plant full load utilization is high (8000 hours per year). Based on the price levels of April 2001, the study indicates that nuclear electricity maintains its position as the least expensive generating method even when the real interest rate fluctuates up to 10 per cent per year.

Finland is part of the fully liberalised Nordic electricity market, where hydropower dominates supply making the electricity price highly impulsive depending on the amount rainfall. Additional nuclear power will help to maintain stability of electricity prices.

Nuclear electricity can be profitable in the single EU energy market, as it is already competitive with electricity produced by burning fossil fuels, even though the price of fossil-fuel electricity does not include the internalisation of all costs. Policy is needed at the Member State and Community levels to ensure that market rules encourage 'a level playing field' for competition between energy producers within the European Union. It is important that such arrangements do not put EU companies at a disadvantage when competing on local or world markets.

Objective nuclear discussion is important

As an electricity company TVO is committed to transparency and provides policy-makers, the media and the public with a continuous flow of information on its objectives and activities. In Finland this strategy has been implemented both in the operation of the present units and in the decision making process of final repository and the foreseen fifth unit. The nuclear licensing process in Finland gives good opportunities for public consultation as any new nuclear project needs a Parliamentary approval in the early phase of licensing. Thorough public consultation processes have been giving the society as a whole a possibility to take part in this transparent and democratic process.

The European Commission has an important public communications function to perform as well. It has the responsibility to provide accurate and more importantly impartial information on the various industrial activities being undertaken in the European Union.

Conclusion

The Green Paper has an interesting role in opening up a debate on energy policy in the EU in which the contribution of all energy sources, including nuclear, should be discussed in a unbiased way. Despite this positive start, the Commission document

employs negative terms such as “undesirable” or “a source of energy in doubt” when referring to nuclear energy. More seriously, it underestimates in several important areas the value of nuclear energy to the EU, both now and in the context of future requirements.

The Commission should continue its consideration of the role of nuclear energy. This should enable a more thorough and formal assessment of its contribution to the **EU energy mix** and of its future potential. Such a review could be useful in defining new orientations and objectives for nuclear energy at the Community level.

The Commission should recognise the important contribution of nuclear energy to the avoidance of greenhouse gas emissions, which could cause **climate change**. This should be factored into policy measures aimed at ensuring EU standards meeting its Kyoto commitments. In particular, the Commission should not encourage closing any options for environmentally acceptable electricity production.

The Commission should support the political and public processes leading to the creation of permanent solutions for the storage of all **radioactive wastes**.

Nuclear technology R&D should continue to be an important priority in EU energy policy. Areas of strategic importance include studies related to repositories for spent fuel and high-level waste and new techniques for incorporating improved inherent safety, greater efficiency and waste minimisation into the design of future reactors.

Answers to the question(s).

1.	<p>Can the European Union accept an increase in its dependence on external energy sources without compromising its security of supply and European competitiveness? For which sources of energy would it be appropriate, if this were the case, to foresee a framework policy for imports? In this context, is it appropriate to favour an economic approach: energy cost; or geopolitical approach: risk of disruption?</p> <p>Answer:</p> <p>Relying on imports for a large percentage of energy supply carries risks, which have to be managed. Therefore, EU can maintain and develop good relations with the exporting countries. All importing sources should be kept available and the situation of too few suppliers should be avoided.</p> <p>The real concern about security of supply has less to do with the need to rely on imports, than with the availability and diversity of those imports. Where supply of an energy resource is limited to a few external countries, which may be politically unstable, there is a risk of unpredictable price variations and even disruptions to supply. The use of nuclear energy has something very positive to offer because there are abundant quantities of uranium available worldwide from many diverse sources. In addition, nuclear is physically a highly compact energy source, and there are already very large stocks of fuel assemblies and fuel-making materials available in the EU.</p> <p>A free competition between different energy sources is an essential element on an open energy market. No energy source should be excluded from the alternatives and all importing sources should be kept available. A balanced energy mix should be encouraged.</p>
2.	<p>Does not Europe's increasingly integrated internal market, where decisions taken in one country have an impact on the others, call for a consistent and co-ordinated policy at Community level?</p> <p>Answer:</p> <p>The creation of integrated internal energy markets is a sign in itself that significant steps have been taken already towards creating important elements of energy policy at EU level. The function of the market is to ensure competition within a regulatory framework. Punitive rules against the use of nuclear energy could undermine the requirement for security and diversity of supply, the need to conserve non-renewable energy resources for other potential uses, and the necessity to achieve environmental goals.</p> <p>In the years to come, the demands by civil society for action against climate change can be expected to grow. Policy-makers should anticipate this, and build into their plans the need for market mechanisms that will encourage clean energy sources, such as nuclear, to flourish.</p>
3.	<p>Are tax and state aid policies in the energy sector an obstacle to competitiveness in the European Union or not? Given the failure of attempts to harmonise indirect taxation, should not the whole issue of energy taxation be re-examined taking account of energy and environmental objectives?</p> <p>Answer:</p>

	<p>The nuclear industry internalises nearly all the costs associated with the electricity it produces. This includes the costs for managing nuclear wastes and for decommissioning nuclear plants. No other source of energy takes the same high level of responsibility for the management of its environmental effects.</p> <p>If the goal of the European Union is to achieve its environmental targets through the use of fiscal mechanisms, then any taxation system should be consistent with the Union's objectives. By shifting the emphasis towards efficiency and low/non-CO₂ emitting sources, a carbon tax would benefit the security of supply situation and energy independence of the European Union.</p>
4.	<p>In the framework of an ongoing dialogue with producer countries, what should supply and investment promotion agreements contain? Given the importance of a partnership with Russia in particular, how can stable quantities, prices and investments be guaranteed?</p> <p>Answer:</p> <p>This question primarily concerns oil and gas energy sources. However, it is important to promote producer countries to develop secure conditions for investments and business activity. A functional and precise legislation and partnership in treaties and organisations like WTO play an important role.</p> <p>In Finland natural gas supplied by a pipeline from Russia now covers 10% of primary supply and the amount is increasing. The imports of electricity have been about 15 per cent of the country's electricity consumption. In the long term, however, the electricity imports cannot be increased without risking the security of supply by becoming too dependent on one energy supplier.</p> <p>In case it abandons the construction of the fifth nuclear power unit, Finland becomes even more dependent on Russian gas. In this situation, stable quantities and prices might be difficult to guarantee in the Finnish energy market.</p>
5.	<p>Should more reserves be stockpiled - as already done for oil - and should other energy sources be included, such as gas or coal? Should the Community take on a greater role in stock management and, if so, what should the objectives and modalities be? Does the risk of physical disruption to energy supplies justify more onerous measures for access to resources?</p> <p>Answer:</p> <p>Energy reserves should primarily be managed nationally and with the existing arrangements in IEA.</p> <p>Nuclear utilities have their own stockpile management systems that cover their needs for an average period of three years, without resorting to overseas supplies.</p>
6.	<p>How can we develop and ensure better operation of energy transport networks in the European Union and neighbouring countries so as to enable the internal market to function properly and guarantee security of supply?</p> <p>Answer:</p> <p>In the context of security of supply and liberalisation of the electricity</p>

	<p>market in Europe, large interconnected networks are an essential component. The European Commission could foster an improvement of the current network, in particular by lending its support to the creation of more substantial cross-border transmission lines and to the harmonisation of the criteria for quality of supply.</p> <p>Nuclear power plants operate mainly in base load maintaining grid voltage and frequency within acceptable limits. Clearly, in the challenges Europe is likely to face in the future, nuclear definitely has an important contribution to make.</p>
7.	<p>The development of some renewable energy sources calls for major efforts in terms of research and technological development, investment aid and operational aid. Should co-financing of this aid include a contribution from sectors which received substantial initial development aid and which are now highly profitable (gas, oil, nuclear)?</p> <p>Answer:</p> <p>The role of incentives should be studied in greater depth in order to promote renewable energies. Policy-makers should try to find ways to encourage utilities to develop environmentally cleaner methods of electricity production. Negative initiatives such as a nuclear tax do not match strategic interests.</p>
8.	<p>Seeing that nuclear energy is 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 ?</p> <p>Answer:</p> <p>The technical means to create final repositories of the radioactive waste are available, but political and public support is needed to implement practical solutions. Further work to demonstrate the environmental safety of the waste deposition, including research into alternative solutions, is needed to explore the opportunities and constraints, to develop a suitable climate of political and public support, and to disseminate sufficient information about proposed solutions in an appropriate and open manner.</p> <p>Responsibility for the safety of nuclear installations rests with the member states. Satisfactory frameworks for independent regulation already exist.</p> <p>With respect to radioactive waste, further research will refine the current solutions and should form part of implementation and approval process. This should also be taken into account in the preparation of the 6th Euratom Framework Programme, FP6. Research should continue into new reactor types that produce less waste, in terms of activity and volume, into new fuels and new fuel cycles that consume waste materials. It should be remembered that a lot of the technology is currently available. There are already a number of co-operation projects focusing on innovative concepts for nuclear reactors and fuel cycle systems.</p> <p>With regard to nuclear fusion, European wide and world wide co-operation is needed. Fusion offers the possibility of a sustainable energy source that will give the European Union a high degree of self-sufficiency and will address the long term issue of security of energy supply.</p>

Finnish case

Experiences of the utilisation of nuclear energy in Finland have been very good and in our point of view nuclear power is a safe and competitive energy source. Security is the leading principle in operating the existing plants and in the design of the new nuclear power plants.

Direct disposal in bedrock has been chosen as the method for disposing of the Finnish spent nuclear fuel. The local municipality, Eurajoki, has accepted the building of the spent fuel repository on Olkiluoto nuclear site in western Finland. The Finnish Government made the decision in principle in favour of the planned repository in December 2000, and the Parliament ratified the Government's approval in May 2001. According to the plan the detailed bedrock investigations will be finalised by the year 2010 followed by the application for the construction permit. The repository will start operation in 2020. All nuclear waste management costs are included in the price of nuclear electricity and funded in a national fund administered by the Ministry of Trade and Industry.

9. Which policies should permit the European Union to fulfil its obligations under the Kyoto Protocol? What measures could be taken in order to exploit fully potential energy savings which would help to reduce both our external dependence and CO₂ emissions?

Answer:

To meet the Kyoto and subsequent commitments, the EU must sustain and develop the nuclear option. The present level of nuclear power generation is already making a major contribution towards reaching the emission reduction targets. About 550 million tons of CO₂ are avoided every year in the EU through the use of nuclear power. With additional nuclear power plants, this figure would be even greater.

In addition, countries have the sovereign right to determine their own development paths and technology needs. Their energy decisions should not be restricted by international policy.

TVO fully supports measures to increase energy efficiency. However, energy savings themselves will not be enough to reach the commitment made under the Kyoto Protocol.

10. Can an ambitious programme to promote biofuels and other substitute fuels, including hydrogen, geared to 20% of total fuel consumption by 2020, continue to be implemented via national initiatives, or are co-ordinated decisions required on taxation, distribution and prospects for agricultural production ?

Answer:

Alternative fuels, such as those involving hydrogen use, could contribute towards improving security of energy supply at some future stage.

However, in the case of hydrogen-powered fuel cells, for instance, large quantities of electricity will be required, and it is essential for this additional power to be delivered using CO₂-free energy technologies, such as nuclear. If additional use were made of fossil fuels to generate the extra power required, there would be limited overall benefit, in terms of reducing both energy import dependency and greenhouse gas emissions.

As for 'national initiatives' and 'co-ordinated decisions', it must be

	remembered that the ‘hydrogen economy’ is still a long way off and will require a great deal of international collaboration and research.
11.	<p>Should energy saving in buildings (40% of energy consumption), whether public or private, new or under renovation, be promoted through incentives such as tax breaks, or are regulatory measures required along the lines of those adopted for major industrial installations?</p> <p>Answer:</p> <p>TVO supports all initiatives to promote energy conservation and saving, but recognizes that there will definitely be a limit in the potential regarding energy conservation measures in countries where the efficiency of energy use is high and where measures already have been taken e.g. to minimise the energy consumption in buildings.</p>
12.	<p>Energy saving in the transport sector (32% of energy consumption) depends on redressing the growing imbalance between road and rail. Is this imbalance inevitable, or could corrective action be taken, however unpopular, notably to encourage lower use of cars in urban areas? How can the aims of opening up the sector to competition, investment in infrastructure to remove bottlenecks and intermodality be reconciled?</p> <p>Answer:</p> <p>no answer from TVO</p>
13.	<p>How can we develop more collaborative visions and integrate the long-term dimension into deliberations and actions undertaken by public authorities and other involved parties in order to evolve a sustainable system of energy supply. How are we to prepare the energy options for the future?</p> <p>Answer:</p> <p>Preparing the energy options for the future requires taking appropriate steps today. Setting up a framework in which each and every source of energy has its natural place must be the goal of the European Union in collaboration with national governments, public bodies and private companies. As far as nuclear energy is concerned, one can single out three areas of interest:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Preserving nuclear energy as a part of the EU energy mix, alongside fossil fuels and renewables. <input type="checkbox"/> Preserving an investment-friendly climate in which nuclear operators will not be subject to an unfair taxation system or be disadvantaged compared to other sources of energy production. The fact that nuclear power plants do not emit greenhouse gases must be taken into account when formulating possible energy taxation schemes. Furthermore, in order to keep the economic balance right between different energy sources, all external costs (including decommissioning and CO₂ emissions) should be taken into account, as is the case with nuclear energy. <input type="checkbox"/> Preserving an adequate level of funding for nuclear research. The Green Paper identifies several long-term energy challenges facing an enlarged EU. Nuclear physics offers very promising scientific pathways that could be well translated into industrial reality into the future. The European nuclear community welcomes any initiative in that direction. <p>Still, it has to be noted that while nuclear power brings indisputable advantages to the European energy mix, the Green Paper underestimates some of these aspects.</p>

The Green Paper was presented by the European Commission as a vehicle for debate and to stimulate fresh thinking about the future of European energy policy. In addition, as new countries are likely to join the European Union in the years to come, the energy supply question is likely to become more acute.

14.

Any other questions or proposals: