

**The EURATOM Treaty –
A flawed instrument to deliver sustainable development?**

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Abstract

If, as many claim, it is a carbon free or low carbon secure energy source then nuclear electricity has an important role to play in energy provision in the European Union (EU). As such it should also be subject to the same policy objectives (including sustainable development) as other sources of energy. The EU's competences in the arena of nuclear energy policy are however complex, established on the basis of the two Treaties adopted in 1957 – the EURATOM Treaty which formed the European Atomic Energy Community and the Treaty on the European Community. In addition much competence for action remains with the national governments of the EU's Member States. Recent debates within the EU about Treaty changes have left this complex framework for nuclear governance within the EU unaltered. The EURATOM Treaty which established the European Atomic Energy Community in 1957 remains as a separate legal instrument from the Treaty on European Union. As the national governments of the EU's Member States appear reluctant to repeal the EURATOM Treaty (or indeed make substantial changes to it) this article questions the impact of this decision on the EU's goal of achieving a low carbon, sustainable and competitive energy policy.

The EURATOM Treaty –

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Introduction

Sustainable development is a complex process of change in economic development, environmental protection, enabling justice or equity to be established in society. It requires a long term perspective to be taken by the policy-makers and the general public alike to initiate policies enabling public participation in the decision making process with the objective of ensuring rational use of resources now and in the future. There is an important dimension of international action and co-operation within this overarching concept in order to achieve these objectives. Considerable concern remains that although the differing dimensions of sustainable development have been included in environmental and economic debates and discourse since the 1980s they are not yet fully recognized in an appropriate integrated policy environment. This is despite the fact that since the mid 1990s sustainable development has become “...an overarching objective of the European Union set out in the Treaty, governing all the Union’s policies and activities”.¹

A sustainable energy strategy is perceived to be a crucial element of any effective sustainable development strategy. The adoption of the Energy Policy for Europe (EPE) (2007)² purports to be that strategy³ for the EU’s Member States to use in their attempts to achieve a competitive and sustainable energy policy for Europe. If, as many claim, (notably Nuttall W 2005:24⁴) nuclear electricity has an important role to play in establishing a low carbon sustainable economy in Europe it is argued in this article that it should also be subject to the same policy objectives as any other energy source used within the EU. An issue recognised by the Commission in presenting the EPE but met with some reluctance by the national governments, concerned that vital national interests might be undermined if changes were made to the Treaty competences which impact on the nuclear sector.

The EU’s competences in the arena of nuclear energy policy are complex, established on the basis of the two Treaties adopted in 1957 – the EURATOM Treaty which formed the European Atomic Energy Community and the Treaty on the European Community, but with much competence remaining with the national governments. Recent debates within the EU about Treaty changes have left the resulting complex framework for nuclear governance within the EU unaltered. As the national governments of the EU’s Member States appear reluctant to repeal the EURATOM Treaty (or indeed make substantial changes to it) this article questions the impact of this decision on the EU’s goal of achieving a low carbon, sustainable and competitive energy policy. What opportunities do present themselves within competences which the national governments have made available to the EU to ensure that nuclear

¹ Council of the European Union (2006:2) “Review of the EU Sustainable Development Strategy (EU SDS)” Note from the General Secretariat to the Delegations, 1011/06, Brussels, 9th June 2006.

² CEC (2007) “An Energy Policy for Europe”, SEC (2007) 12, Brussels.

³ European Council, 8/9th March 2007, Presidency conclusions 7224/07, Annex 1, “European Council Action Plan (2007-2009), Energy Policy for Europe,” Brussels.

⁴ Nuttall W.J. (2005) “Nuclear Renaissance”, Institute of Physicists Publishing.

electricity is incorporated into an effective strategy for to deliver sustainable development? In short is there any ‘value added’ to the current legal and constitutional basis for action or would a new Treaty on climate change and energy policy be the most effective way forward to provide the framework to build sustainable energy policy for the EU?

For the purposes of this article a number of assumptions have been made. Firstly, that there is no energy technology which is carbon free or indeed carbon neutral.⁵ Secondly, that “Nuclear energy as a key element in Europe’s future low carbon energy system, (is able) to address simultaneously the three challenges:- security of supply and lesser dependence on foreign hydrocarbon fuel imports for primary energy, reduction of greenhouse gas emissions and increase of competitiveness of European industry.” Furthermore that “...with its 31% share of electricity production the nuclear sector represents a ‘non-emission’ of nearly 900 million tonnes of CO₂ per year in the EU”.⁶

A number of specific measures have been identified for discussion in this article as the means to achieve sustainable development objectives in the nuclear electricity sector:-

- Social justice/equity - mechanisms to assuage public concerns about safety in the nuclear industry, accidents emanating from the nuclear sector (in particular their potential trans-national impact), disposal of radioactive waste and problems related to de-commissioning of the EU’s ageing reactors. It is through the opportunity for the public to participate in the decision making process (an important aspect of sustainable development) that an open and transparent debate is possible to constantly confront safety. A view held by the International Atomic Energy Agency as an approach which leads to a very high level of safety.⁷
- Economic development – mechanisms to ensure that the ‘true costs’ of the technology, (the viability of costs structures maintained over time, the most efficient and effective way of dealing with de-commissioning of nuclear reactors, costs associated with reactor build and operation and the benefits which may accrue from investment in advanced technology developments) are identified.
- Environmental protection - measures to include impact assessment of the construction of sites.

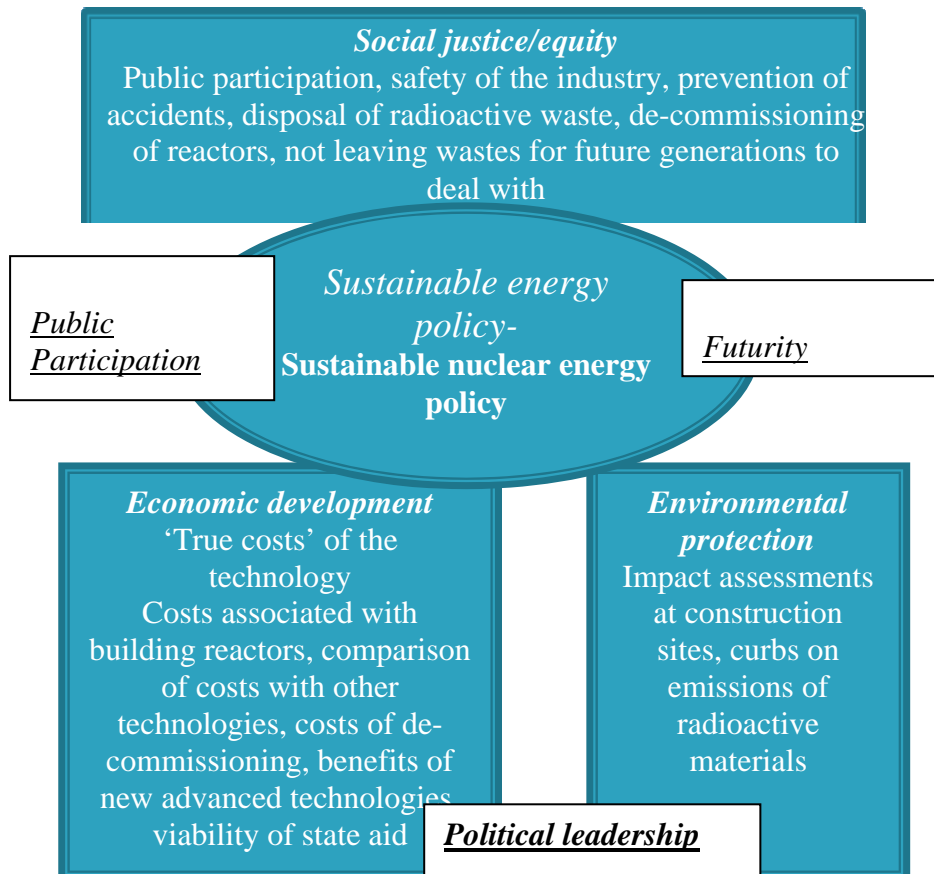
Although these measures are considered separately the different objectives of sustainable development (social justice or equity, economic development and environmental protection) are of course inextricably linked. Indeed it is a major criticism of the EU’s SDS that the crucial ‘joining up’ of policies on the different dimensions of sustainable development has not been accomplished by the EU’s Member States.

⁵ Sustainable Development Commission (2006;5), “The role of nuclear power in a low carbon economy” , SDC Position Paper, www.sd-commission.org.uk

⁶ CEC (2007:10-11) “The Sustainable Nuclear Energy Technology Platform – a vision report” Special Report no EUR 22842, DG Research: EURATOM, Brussels.

⁷ Nuclear Energy Agency/Organisation for European Co-operation and Development (NEA/OECD), (2002:17) “Improving versus maintaining nuclear safety”, OECD, Paris.

Figure 1. Sustainable Nuclear Energy Policy



Sustainable energy policy

There is widespread familiarity with the debates post 1960s about the underlying problems of sustainable development. The term has come into common usage since the World Commission on Environment and Development (WCED) published its findings in 1987 (known as the 'Brundtland Report' in recognition of the work of the former Norwegian prime minister Gro Harlem Brundtland who chaired the Commission). The seemingly simple definition which was given in the Brundtland report for sustainable development "...development that meets the need of the present without compromising the ability of future generations to meet their own needs..." (WCED, 1987:43) has proved to be difficult to explain or to achieve. It encompasses balancing economic development with ecological protection in a manner which results in the development of an equitable society both now and in the future. For this to happen resources must be used in way that provides the levels of development which all groups in society require now and also leave resources for future generations to use.

In 2006 the UK Sustainable Development Committee identified five underlying principles to guide policy making across the different UK government departments.⁸ These were:-

- Living within environmental limits
- Ensuring a strong, healthy and just society
- Achieving a sustainable economy
- Promoting good governance
- Using sound science responsibly

In reviewing these principles it is apparent that that in order to achieve sustainable development strategies clear political leadership with co-ordination and coherence in policy is required. Institutional and administrative infrastructures which enable co-ordination of all those involved in the policy process are an important complement to the policy measures. It is also evident that sustainable Development is a long term process of change which depends upon "...10% regulation and 90% commitment..." which must come from all members of society.⁹ But the supporters of the introduction of strategies for sustainable development point to the benefits of economic growth, full employment and a high level of environmental protection which will result.

The EU's Sustainable Development Strategy was launched in 2001 with the energy sector being a particular early target for action.¹⁰ In late 2005 the European Commission completed a review of the 2001 SDS and outlined a "Platform for the Future"¹¹ which was adopted at the Brussels June Council Summit, 2006. In

⁸ Sustainable Development Commission (2006:3), "The role of nuclear power in a low carbon economy", SDC position paper, March. <http://www.sd-commission.org.uk>

⁹ Baachelot-Narquin R (2004:42) in "A New Sustainable Development Strategy for the EU" Conference Report, European Environmental Bureau Annual Conference, Brussels 20th September 2004, EEB, Brussels.

¹⁰ CEC (2001) "A sustainable Europe for a Better World: a European Union Strategy for Sustainable Development" COM (2001) 264

¹¹ CEC (2005) "On the review of the Sustainable Development Strategy : a Platform for the Future" COM (2005) 658

presenting this plan for action the Commission began by highlighting the linkages between the economic, social and environmental dimensions of the SDS. Amongst the key areas identified in the Platform for the Future as the necessity for "...a push at the highest political level to engage the public and speed up decision-making and ...encourage more 'joined up' thinking ..." is the fight against climate change. With "Action on sustainable energy...being taken with a view to enhancing security of energy supply, reducing climate change and local air pollution, poverty and improving security, while promoting rural and local development "(CEC 2005:5).

Here is the problem for the European Union – how to achieve that '*joined up*' thinking in the arena of energy policy. The EU does not have an effective common energy policy despite actions in the area of energy policy since the 1970s. Current policy is based on the three pillars of security of supply, integration of the energy market and environmental protection with the tool of market functionality being the predominant paradigm of action. The Energy Policy for Europe (EPE) Action Plan (2007) ¹² has established a minimum level of overall strategic objectives to be achieved in the energy sector. The core of the EPE is to ensure reliable, affordable and sustainable energy flows into the EU with the energy mix based on diverse, secure, low carbon resources. Regulation of the nuclear sector remains outside the framework of the TEC which is the legal basis for this strategy and is instead based on the terms of the EURATOM Treaty. But the EURATOM Treaty is part of the EU's energy '*acquis*' which all its Member States have accepted at their accession to the Union irrespective of their level of support for the nuclear technology.

15 of the 27 states of the EU are currently generating electricity from a total of 152 nuclear reactors (**c.f. Table 1. Number of reactors in operation and planned in the EU**). Nuclear electricity is the most cost effective form of electricity produced in Slovakia, widely used in France and provider of 50% of electricity needs in Belgium and Sweden. Concerns that despite major investments in alternatives to fossil fuels the renewable energy technologies are not yet capable of meeting the demand for energy for the foreseeable future were a major factor in the decision of French and Finnish governments to commission new reactors in the mid 2000s. Lack of alternatives and concerns about reliance on Russian energy sources resulted in discussion between the Lithuanian, Latvian, Estonian and Polish governments in 2006 for a joint project to build a new reactor at the Ignalina site in Lithuania. Bulgaria and Romania, joining the EU in 2007 had a high level of dependency on the electronuclear industry and so support its continuance. In the UK and Italy "A new spirit of realism has forced governments to acknowledge that nuclear energy offers the best chance of combating climate change and ensuring the secure supply of electricity that the world craves."¹³ So it would appear that, although the EU's states have highly divergent national views, the nuclear sector cannot be ignored. ¹⁴

¹² CEC(2007), "An energy policy for Europe" [COM(2007) 1 final, Brussels

¹³ European Nuclear Society (2006), "e-News", Issue no.12, April <http://www.euronuclear.org/e-news>

¹⁴ Globally 441 nuclear power plants were in operation as of 31st December 2005, 27 under construction, Asia is the main centre of expansion accounting for 16/27 reactors under construction and 24/34 last reactors to be connected to a grid.

The legal and constitutional framework which supports the nuclear sector -

The EURATOM Treaty does not address a number of issues pertinent to the generation of nuclear electricity in an integrated energy market and the development of sustainable energy policy. The Treaty is a limited instrument constrained by the underlying paradigm of high levels of state support for an energy sector current amongst national governments in the 1950s. This is in contrast to the market functionality paradigm which underpinned the Treaty on European Community and has become extended in the amendments made to the TEC (by the Single European Act, the Maastricht, Amsterdam and Nice Treaties and most recently in the still to be ratified Lisbon Treaty.)¹⁵ Most notably these issues include :-

- Failure to incorporate provisions on competition similar to the provisions of the TEC to prevent distortions occurring in the integrated energy market,
- Support for the award of state aid and subsidies to the industry which may render this energy sector incompatible with the free market,
- The limited role of the European Parliament in the introduction of EURATOM legislation,
- Limited competences with regard to the safety of installations, de-commissioning programmes and waste management,
- The omission of the integration of environmental protection requirements.

The Preamble to the Treaty establishing the European Atomic Energy Community in 1957 stated a clear intention to support the European integration process by "...Recognising that nuclear energy represents an essential resource for the development and invigoration of industry and will permit the advancement of the cause of peace...". The specific objective of the European Atomic Energy Community was to raise the standards of living in its member states '...by creating the conditions for speedy establishment and growth of nuclear industries'. (Preamble, EURATOM) Thereby supporting the creation of a strong nuclear industry to provide extensive and secure energy resources and lead to the prosperity of the people of Europe. (Haghighi, 2007:74)¹⁶

The rationale for the commitments made by the EAEC signatory states was that as new technology, nuclear technology would be very costly and would need a great deal of investment. Underpinning this was a view that all the member states of the EAEC would gain from co-operation as the investment needed was not something which they were in a position to make on their own. But if all the states worked together to integrate their nuclear energy policies and shared the costs, all would benefit from the "...prospect of achievements commensurate with the creative capacities of their countries." (Article 1, EURATOM). Thus the creation of the EAEC would contribute to the goals

¹⁵ The Treaty of Lisbon (EU Reform Treaty), if ratified by the Member States, will operate by amending the two treaties that embody the EU's fundamental rules. These are:-

- the Treaty on European Union (TEU) i.e. the Maastricht Treaty (1992), as amended;
- the Treaty establishing the European Community (TEC) i.e. the Treaty of Rome (1957) as amended. Its title will change to the Treaty on the functioning of the European Union (TFEU).

¹⁶ Haghighi SS (2007) "Energy Security" Hart Publishing

of European integration at the same time as harnessing the new energy technology and encouraging economic growth.

Further development of the electronuclear industry would be achieved through the promotion of research by funding from an agreed budget for the EAEC and dissemination of the information gained amongst the signatory states. Such a commitment seemed to be contradictory when compared with the objective of promotion of use of coal supported in the ECSC. But coal was dependent on old established technology which did not need such high levels of capital investment and sharing of the cost burden of future developments. Subsidies to the coal industry appeared to be necessary to maintain existing mines and the local economy of the areas in which they had long been established. Nuclear was the newer technology and was deemed to be the way forward for the future. It was considered that in the post experimental research phase other benefits, including lower prices and cleaner energy technology, would result. Thus in turn this would ensure that the long term benefits of the technology would outweigh the costs involved.

In order to ensure the Treaty provisions were carried out the European Commission was given considerable power over the implementation of its terms. These competences focused on eight main areas of action which were outlined in Article 2 with prominence being given to safety of the workers in the industry and the general public.¹⁷ Other areas for supranational action included co-ordination of the supplies of the basic raw materials used in the generation process (Chapter IV) and which led to the establishment of the EURATOM Supplies Agency (ESA) in June 1960 to ensure an equitable and regular supply of nuclear ores and fuels for the EU's nuclear utilities. The Agency continues as a common supply agency for ores, source materials and special fissile materials under the supervision of the European Commission, currently within the Directorate-General with responsibility for Transport and Energy (DG TREN). Much of its work has disappeared in the light of re-processing of nuclear fuels. However, as the interest in the nuclear sector has intensified so too has concern

¹⁷ Article 2 EURATOM In order to perform its task, the Community shall, as provided in this Treaty:

- a. promote research and ensure the dissemination of technical information;
- b. establish uniform safety standards to protect the health of workers and of the general public and ensure that they are applied;
- c. facilitate investment and ensure, particularly by encouraging ventures on the part of undertakings, the establishment of the basic installations necessary for the development of nuclear energy in the Community;
- d. ensure that all users in the Community receive a regular and equitable supply of ores and nuclear fuels;
- e. make certain, by appropriate supervision, that nuclear materials are not diverted to purposes other than those for which they are intended;
- f. exercise the right of ownership conferred upon it with respect to special fissile materials;
- g. ensure wide commercial outlets and access to the best technical facilities by the creation of a common market in specialised materials and equipment, by the free movement of capital for investment in the field of nuclear energy and by freedom of employment for specialists within the Community;
- h. establish with other countries and international organizations such relations as will foster progress in the peaceful uses of nuclear energy'.

about depletion and the longevity of uranium resources. As a result the work of the Supplies Agency may have a heightened relevance in the future.

The EURATOM Safeguards Office (ESO) was also established as a supranational agency (Chapter VII) based under the supervision of the European Commission (DG TREN). Its role is that of dealing with measures to ensure all EU states do not divert or acquire materials for the purposes of manufacturing nuclear weapons. The provisions of the EURATOM Treaty brought international agreements and co-operation to the European Commission's competence in order to enable the Commission to conclude agreements on the common supply of the raw materials for the industry.

Essentially however the Treaty was limited to the one specific arena of energy development and within its terms further limitations were imposed. One of the most notable was the omission of EAEC competence for safe operation of the nuclear installations themselves. These limitations on the competences given to the EAEC were the result of the powerful national interests that had resulted in the development of differing national nuclear policies in the 1950s. Two factors played a role in the reluctance of the Member States of the EAEC during the negotiations of 1956/1957 to *open up* the nuclear sector. One was the link between the use of nuclear technology for electricity generation and the evolving nuclear weapons technology. Both energy and military strategic competences were and continue to be considered by national governments as vital aspects of national security interests. At the same time strong national commercial interests were evolving in the electronuclear sector and the Treaty negotiations were constrained by concerns by the national industry (particularly those of France) that commercial information would have to be revealed in order to ensure enforceable nuclear safety regulations by the EAEC.

Despite changes to the political and socio-economic environments in which the electronuclear industry is operating the EURATOM Treaty has remained an element of the *acquis* which all EU states must adopt on their accession to the EU. As such the Treaty encompasses a group of signatory states with national nuclear policies as diverse as that of Austria (anti-nuclear), France, Finland, Lithuania and Bulgaria (supporting new reactor developments), the UK and Italy (thinking again). Despite much criticism the utility of the Treaty has been demonstrated in the interpretation and application of its terms throughout the history of the EAEC. (Barnes 2008)¹⁸

The search for political leadership

The EURATOM Treaty has remained substantially unaltered since its ratification more than 50 years ago. The terms of the EURATOM Treaty gave the European Commission a role in the EAEC as a de-politicised and *benevolent* technocracy, based on a model outlined and supported by Monnet. As a result of the transfer of competences to the Commission under its terms, its officials (now based in DG TREN) have developed a considerable expertise in dealing with nuclear safeguard controls in EU nuclear installations and the monitoring of levels of radioactive

¹⁸ Barnes P.M. (2008 forthcoming) "The Resurrection of the EURATOM Treaty – contributing to the legal and constitutional framework for secure, competitive and sustainable energy in the EU" in Etty T and Somsen H (eds) *The Yearbook of European Environmental Law*, Volume 8, Oxford University Press.

materials in the environment including radioactive waste. The outcome of which has been to develop a high level nuclear safety regime which is based on regulation supported by the terms of the EURATOM Treaty and voluntary harmonisation of action by the national nuclear regulatory authorities. Does this imply that the European Commission is able to provide the political leadership and direction needed to develop a sustainable nuclear energy policy? It is not the intention of this article to investigate the role of the Commission in exercising its autonomy and competences in the area of nuclear energy. But there has been an important change during the Barroso Commission of 2004-2009 in levels of support within the Commission for the use of nuclear technology.

Although the European Commission had has a great deal of autonomy in dealing with nuclear issues on behalf of the EAEC throughout its history it had traditionally been seen as *agnostic* in the debates about the use of the nuclear technologies. This was to respect and acknowledge the right of the national governments to choose the energy mix they considered appropriate for their national energy policies. But following some high profile comments made by Commission President Barroso,¹⁹ Commissioner for Energy Andris Piebalgs²⁰ and Commissioner for Competition Neelie Kroes²¹ in autumn 2007 it would appear that there is support for an increased use of the technology within the Commission. This change of stance by the Members of the Commission was further confirmed in another speech by Commissioner Piebalgs. “The European Commission is well aware of the renewed interest for nuclear energy we witness today....The Commission is therefore particularly attentive to the benefits ...Nuclear energy increases our energy independence and our security of supplies and contributes to the reduction of carbon dioxide emissions, but it is also still confronted by a number of outstanding issues that need to be tackled...”²²

As these statements were also coupled with agreements to establish an EU High Level Group on Nuclear Safety and Security and enhanced co-operation between the Commission (on behalf of the EAEC) and the International Atomic Energy Agency (IAEA)²³ on issues such as non proliferation and nuclear safety and security it appears that support is continuing for the nuclear industry and the EURATOM Treaty within the EU. Other recent developments include the launch of the Sustainable Nuclear Energy Technology Platform in September 2007 to contribute to research

¹⁹ ‘I believe that we are now standing on the brink of a Third Industrial Revolution – the Low Carbon Age...this will be driven by technology and new forms of energy....I believe that the Member States cannot avoid the question of nuclear power there has to be a full and frank debate about the issue’ Speech 07/580 Commission President Barroso “*Europe’s energy policy and the third industrial revolution*” at Loyola de Palacio Energy Conference, Madrid, 01.10.2007

²⁰ ‘Europe has so far always enjoyed leadership in the area of nuclear technology. We have mastered all aspects of the nuclear fuel cycle and we market equipment and services throughout the world. This is a non negligible part of the EU competitiveness and surely a valid input to our Lisbon strategy on growth and job creation’ Speech 07/564 Commissioner Andris Piebalgs *The Energy Challenges in the EU – security of supply, sustainability and competitiveness – focus on nuclear*” at Sustainable Nuclear Energy Technology Platform, Brussels, 21.09.2007.

²¹ ‘On Monday, 1st October 2007 Commissioner Neelie Kroes stated at a high level energy conference in Madrid that she was completely in favour of nuclear power’ Statement in letter from the Greens/European Free Alliance in the European Parliament to Commission President Barroso on 04.10.2007.

²² Speech 07/599 Commissioner Andris Piebalgs “*The Euratom Treaty and development of the nuclear industry*” at the International Law Association Congress, Brussels, 03.10.2007

²³ 12th October 2007 launch of the High Level Group on Nuclear Safety and Waste Management

into the development of carbon-free sources of energy²⁴ and the agreement to *co-host* the European nuclear energy forum in Bratislava and Prague. The first meeting of this forum took place on 26-27th November 2007 in Bratislava with subsequent meetings planned to alternate between the two capitals.

But despite the commitments of the national governments to the EPE and the above initiatives they continue to '*jealously*' guard their competence to choose their national energy policies, particularly their rights to choose the mix of energy resources which they use. Nuclear generated electricity accounts for more than a third of EU current needs, but is forecast to decline within the next 20-30 years as the current reactors reach the end of their technical and economic lives. However the demand for electricity is likely to increase during the same period as it is an essential ingredient of economic development.²⁵ The EPE highlights the importance of an energy strategy which includes a role for all the electricity generating technologies. But there is no legal basis in the EURATOM Treaty or in the TEC to *oblige* the EU's Member States to adopt nuclear technology. During the launch of the EPE it was concluded that "The new Energy Policy for Europe should.....fully respect Member States choice of energy mix".²⁶ and the divergent national views". Indeed for some states, such as Austria, the use of nuclear energy is "...not an option for the future"²⁷. The fragmented competences therefore remain and contribute to undermining attempts to incorporate the nuclear sector into an overall sustainable energy policy.

Ensuring social justice.

1. Public participation and the promotion of a sustainable nuclear energy policy.

In 2001 the so-called 'Green Eight' of environmental non-governmental organizations presented their conclusions about the EU's Sustainable Development Strategy including the view that there is much about the nuclear sector which is not consistent with sustainability and the objective of integrating sustainable development objectives to nuclear energy policy was flawed.²⁸ There is undoubtedly much about the industry which may be questioned with regard to the sustainability of its practices – the nature of the mining of the uranium, the unacceptably high risk of accidents, the costs of generating electricity by the technology and the high levels of state aid awarded by national governments to the industry. These are not arguments to ignore the nuclear industry in the EU at the current time, given the seemingly supportive economic and political environment which is emerging for the industry. Rather the issues raised by the Green 8 add to the urgency of bringing objectives relating to

²⁴ CEC (2007), "The Sustainable Nuclear Energy Technology Platform – a vision report", D-G for Research, EURATOM, report no EUR 22842

²⁵ Scientific and Technical Committee EURATOM (2001) "A Fresh Look at Nuclear Power" European Commission, DG Research.

²⁶ Council of the European Union (2006:2) 2717th Meeting of Transport, Telecommunications and Energy Council, Brussels 14th March.

²⁷ Bartenstein M. (2006), Austrian Energy Minister in speech following the Extraordinary Energy Council meeting held in Brussels, 14th March.

²⁸ EEB (2004:33) "Green Eight Review of the EU Sustainable Development Strategy" August, EEB, Brussels.

sustainable development into the development of future nuclear energy policies in the EU.

The integration of sustainable development objectives to the nuclear sector has the potential to provide additional reassurances to those concerned about the safety of the energy policy both within their own state and in the other member states of the EU. Safety issues do change over time as new technology is developed and greater awareness and understanding of the dangers from exposure to ionising radiation grows. It also appears to the writer of this article that, irrespective of any new developments in safety technology, emissions and accidents do not occur in installations where issues of environmental protection, rational allocation and management of resources, careful monitoring of wastes are constantly reviewed.

The IAEA standards which form the basis of the EU's standards are underpinned by the principle of protection of people to the same level all the time. This is extremely difficult to achieve in a situation where states have retain much of the competence for safety. But as the safety problems which are being addressed are the same the national operators and regulators of the nuclear power plants should be asking themselves similar sorts of questions. The underlying approach which has been adopted by the European regulators is that there should be a continuous improvement in the levels of safety at nuclear installations of all types. In France the conclusion is that "an acceptable level of risk can only result from a constant confrontation between what is desirable and what is possible."²⁹ The existence of the EURATOM Treaty as part of the energy '*acquis*' of the EU provides a legal framework for all EU states to facilitate this approach of 'constant confrontation' and work together to ensure that people are protected to the same level all the time.

Safety performance relies on openness and transparency in the nuclear power plants and the industry. It relies on co-operation between all the stakeholders involved in the industry backed by appropriate regulatory and legislative regimes, effectively implemented. Information, openness, public participation all form important aspects of this process and are crucial in any strategy for sustainable development. Within the EU a recent Eurobarometre survey, June 2008,³⁰ showed that there was a positive change in attitudes towards nuclear energy in the vast majority of EU states (17/27). Whilst there is strong support for national governments to be fully responsible for radioactive waste management there is equally strong support for the EU to monitor national practices. Furthermore an earlier 2005 Eurobarometer³¹ survey showed evidence that the citizens of the EU may have more confidence in the information provided by the EU than national governments or the electronuclear industry.

2. The legal basis for public participation in the nuclear sector

The nuclear sector is one however which is characterized by a lack of openness. But there is some relevant legislation based on the EURATOM Treaty, the TEC and international conventions to which the EU is a party which may be used as the basis

²⁹ See note 11.

³⁰ CEC (2008) "Attitudes towards radioactive waste" Special Eurobarometer Survey Report 297, June.

³¹ CEC (2005) "Radioactive waste" Special Eurobarometer Survey Report 227, September.

of more open debate. Gadbois et al (2007)³² highlight the importance of the following pieces of legislation:-

- Directive 89/618 EURATOM on the informing of the general public about health protection measures to be applied in the event of a radiological emergency
- The use of the Environmental Impact Assessment Directive (85/337/EC as amended 97/11/EC, 2003/35/EC, the Strategic Impact Assessment Directive (2001/42/EC (which require the inclusion of the public in decision making about large scale projects, including the construction of nuclear power stations which may have an impact on the environment)
- The Aarhus Convention³³ (which establishes participation in decision making about the nuclear sector as a right)

In this study it was concluded that “The European Commission should make clear references to these requirements in future regulation on particular aspects of nuclear activities (emergency planning, de-commissioning, waste management) and invite member states to specify them as well in national regulation” (Gadbois et al, 2007:15)

3. A role for the European Parliament?

The EURATOM Treaty has been castigated by the European Parliament for what is seen as its ‘democratic deficit’ at the European level. The EP’s criticism comes from a number of aspects of the Treaty provisions. They primarily relate to the unchanged nature of the Treaty which dates from the period prior to the introduction of direct elections to the EP in 1979. Under the provisions of the EURATOM Treaty the unelected European Economic and Social Committee (EESC) and the Scientific and Technical Committee (with a membership nominated by national governments) have similar formal rights of consultation as the European Parliament. With regard to safety related issues which are considered of highest risk by the public “(It can be plausibly argued that it is in these areasrelating to safety that the public most feels the need for rigorous democratic scrutiny, control and accountability”³⁴ and thus the role of the EP is important. Specific criticisms are voiced by MEPs about the role of the EP as co-budgetary authority for expenditure which is based on the Treaty but without any requirement for the Council of Ministers to do anything more than formally consult the EP on measures.

In other areas of action covered by the provisions of the Economic Community there have been substantial changes made to the role of the EP which now has the power to act as co-legislator with the Council on a considerable number of market related issues which have an impact on the electro-nuclear industry. EURATOM legislation is subject to vote by qualified majority (QMV) in the Council of Ministers, but not to

³² Gadbois S et al (2007) “Situation concerning public information about ant involvement in the decision making process in the nuclear sector” Final Report for DG TREN Contract no. 04.NUCL.S07-39556

³³ United Nations Economic Commission for Europe (UNECE), Convention on access to information, public participation in decision making and access to justice in environmental matters ‘the Aarhus Convention’, adopted in Aarhus, Denmark, 25th June 1998, by July 2008 had a total of 41 parties to the Convention.

³⁴ European Parliament (2002:2) “The EP and the EURATOM Treaty; past, present and future” Energy and Research paper ENER 114, European Parliament

the co-decision procedures. Criticism of this inconsistency has also been made by the European Commission where there is support for the extension of QMV and co-decision to nuclear energy policy proposing that "...Parliament is restored to the institutional system, as it is given the power to adopt with the Council, 'Laws' for basic standards whereas at present it is very much outside the decision-making process".³⁵ Further "...the first and the most important in many ways would be to give the EP a greater role rather than just a consultative one. Make more decisions, co-decisions with a qualified majority voting for more issues"³⁶

Arguably it would appear appropriate for the EP, the directly elected representative body of the citizens of the EU, to be involved in making decisions about the use of the highly controversial nuclear energy resource. But to introduce more opportunity for co-decision procedures to be invoked to involve the EP requires a situation of alternatives which can be bargained for, where co-operation and compromise may be achieved by the national governments. In the nuclear sector there is little within the EU which may be bargained for, there are two quite clearly conflicting policy paradigms at national level - either there is national policy supporting a nuclear industry or there is national policy which opposes the nuclear industry. And the EU nuclear energy policy is to leave the choice of this technology to the national governments. As such in the face of the political reality of highly divergent national views towards the electronuclear industry it is very difficult to envisage a situation where there could be more involvement for the EP. One possible change might be to the consultation procedures currently used in programmes under the EU budget for nuclear research to enable co-decision procedures to be adopted. But this would require a change to the current Treaty base of action.

Futurity

1. Managing nuclear waste

Page (2006) in his book on intergenerational justice and climate change³⁷ reminds his readers of a core element of sustainable development that is that it is unethical and unjust to future generations to leave unresolved problems from the current unsustainable use of resources. No matter what happens with regard to the nuclear industry in the future this is an aspect of the industry which will have to be dealt with. Whatever the future may hold for the electronuclear industry the enormous legacy of these past developments must be dealt with otherwise no future nuclear energy policy could be considered to be one that is compatible with sustainable development objectives.³⁸

There is a considerable amount and diversity of waste material already produced by the industry. The approach for both the industry and governments where there is nuclear electricity generation has been for those producing the waste to deal with it.³⁹ Several types of procedures are in place. For the low level waste repositories at the

³⁵ The "Penelope Paper" first preliminary draft submitted to the Convention on the Future of Europe, prepared by task force led by Francois Lamoureux, Director-General DG TREN

³⁶ Commission official DG TREN, in correspondence with the author, July 2005.

³⁷ Page E (2006:9) "Climate Change, Justice and Future Generations" Edward Elgar

³⁸ EEB (2004:33) "What happened to the 80 Commitments?", EEB, Brussels

³⁹ NEA/OECD (2000:9) "Nuclear Energy in a Sustainable Development Perspective" OECD, Paris

nuclear power plants have been used. The smaller amount of high level waste presents many more problems. The emphasis to date has been on adequate and safe interim storage until such time as the technical and economic alternatives could be found to render it completely safe.

The scientific evidence currently available suggests that deep geological disposal is the appropriate way to deal with the high levels of radioactive waste. However there are geological and security problems which have led to proposals for regional depositories as an appropriate way to deal with the storage of this waste. There are trans-national as well as intergenerational implications to these proposals in addition to concerns about the transport of such waste within the EU. The public is increasingly involved in debates about the location of these depositories. Active participation of the public in decision making is an important aspect of any sustainable development strategy. This is important to achieve “As regards the management of radioactive waste, citizens are almost unanimous as to the need for there to be no further delay in setting up a national strategy for high level radioactive waste ...” (but with the EU to monitor national practices and programmes). Further “While 45% of respondents consider that deep underground disposal sites represent the most appropriate solution for long term management of highly radioactive waste, 38% disagree. The divergence of opinion in this respect shows that although experts believe that these sites represent the best solution, this information does not yet seem to have reached the public”.⁴⁰

In the 2002 the European Commission had introduced a package of legislative proposals with the objective of improving aspects of safety in the nuclear industry and ensuring that appropriate levels of finance were available for de-commissioning programmes as reactors were reaching the end of their operating licenses (known as the ‘nuclear package’).⁴¹ The vested national interests of individual states led to much controversy about this body of proposals and they remained un-adopted in August 2008 and are likely to remain so for some considerable time.⁴² In the UK there was considerable reservation about the legislative package “...we do not think it would be desirable that the nuclear package as drafted should be adopted. Instead...we would recommend that the Council of Ministers should adopt a thematic strategy on the management of nuclear safety and waste. This should focus on achieving globally approved, transparent

⁴⁰ CEC (2005:16) “Radioactive waste – Summary” Special Eurobarometer Report, September, Brussels.

⁴¹ The legal basis for these proposals came from several articles of the EURATOM Treaty. Article 2b) EURATOM stipulates that the Community should establish uniform safety standards to protect the health of workers and the general public and have the competence to ensure that they are applied. Article 30 EURATOM gives greater clarity and definition of what the expression standards means. Article 31 EURATOM provides for the scrutiny of the legislation by a group of scientific experts appointed by the Member States and consultation of the European Parliament. Article 32 EURATOM provides for revision of the basis of the safety standards. Although these articles do not include the safety of the installations, a ruling by the European Court of Justice in December 2002 (ECJ C-29/99, 10th December 2002) had confirmed that the technical competence of national authorities to deal with the safety of nuclear installations did not preclude the EU from legislating on the issue. In the opinion of the ECJ, it was not appropriate for an ‘artificial distinction’ to be drawn between the protection of the health of the public and workers and the safety of the installations themselves.

⁴² CEC (2004) “Amended proposal for a Council Directive (EURATOM) laying down basic obligations and general principles on the safety of nuclear installations” and “Amended proposal for a Council Directive (EURATOM) on the safe management of spent nuclear fuel and radioactive waste” COM (2004) 526 final, Brussels, 23.09.2004

approaches...and require Member States to set out policies for the long term management of their high level radioactive waste.”⁴³

But the House of Lords Select Committee did pose a highly relevant question – what possible value added could Community involvement have in the areas of nuclear safety and waste management. They concluded that an important role did exist for the EU take a lead because of “.....grave concerns that Member States are failing to educate citizens about the use of nuclear power, how the safety of nuclear installations is maintained and of the action taken and options available to Member States to manage the radioactive waste produced”.⁴⁴ Inspection of the use of nuclear materials, record keeping and monitoring at the nuclear power plants, information transfer to the European Commission are an important aspect of this role. It also has to be acknowledged that laws do not create safety but that “The real gain perceived by France is the security the nuclear package would give the French public that other Member States take nuclear safety and waste management seriously”.⁴⁵

2. Safety of nuclear installations

A result of the omission of safety of nuclear installations from the EURATOM Treaty was that regimes of installation safety have evolved in independent ways in the differing national contexts. But all the EU’s nuclear generating states use safety standards based on International Atomic Energy Agency (IAEA)⁴⁶ and the International Convention on Nuclear Safety (ICNS).⁴⁷ These are standards which have been developed on the basis of experience in the EU’s nuclear generating states and other major users of nuclear power such as the US since the 1950s. The European Commission and the IAEA work in close collaboration on the development of these standards. At the same time a *non-binding acquis* has been developed within the EU combining and harmonising national practices on safety.⁴⁸ In addition to this harmonisation of national practices a number of legislative acts, based on the legal

⁴³ House of Lords (2006: foreword) “Managing nuclear safety and waste: the role of the EU” 37th Report Select Committee on the EU, July.

⁴⁴ Ibid House of Lords (2006:para 110)

⁴⁵ Ibid House of Lords (2006:para 67)

⁴⁶ The International Atomic Energy Agency (IAEA) is an independent international organization reporting to the General Assembly and the Security Council of the United Nations. It was established as an autonomous agency by the United Nations on 29th July 1957, as the world’s *Atoms for Peace* Organisation, IAEA Statute, Article 2. ‘The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose’.

⁴⁷ International Convention on Nuclear Safety, adopted June 1994, opened for signatures on 20th September 1994, entered into force 24th October 1996. The EAEC acceded to the Convention in 1999. By 2008 the Convention’s signatory states numbered 65, including all 31 states with operating nuclear power plants globally.

⁴⁸ Also supporting the development of the voluntary harmonisation of national practices is the work of the Western European Nuclear Regulators Association (WENRA) established in 1999 by the regulatory authorities of the EU and Switzerland to build a network of European states to determine a common approach to safety and develop an independent capability to examine nuclear safety in the applicant states of the EU. In 2008 the regulatory authorities of 17 European states were parties to this association.

framework of the EURATOM Treaty have been adopted, all of which do have an indirect impact on installation safety.⁴⁹ (Barnes 2003)

True (2006) pointed to the way in which these legislative acts have been adopted as an adjunct to activities in related areas such as radiation protection, research and investment.⁵⁰ Despite this limitation by the beginning of the 2000s the European Commission had confidently concluded that the EU had the most effective safety regime and system of control of nuclear materials in the world.⁵¹ A conclusion, that appears to have been substantiated, by the close co-operation which has been achieved between the EAEC and the IAEA on the safeguarding of nuclear materials.⁵² There is overlap but not duplication in the work of the IAEA and the European Commission on nuclear safety and safeguards of nuclear materials. In order to avoid duplication of effort within the EU's Member States the IAEA procedures are invoked to verify the EU's procedures but not to replace what the EU is already doing. This is in recognition of the fact that through the European Safeguards Agency (established on the basis of the competences of the EURATOM Treaty) the EU states have in place a more comprehensive and effectively monitored system than the IAEA is able to achieve in some of the nuclear generating states, e.g. Canada. In the absence of the EURATOM Treaty the EU's Member States as signatories of the ICNS and parties to the IAEA would be required to initiate alternative national mechanisms to meet their international obligations.

Despite the continued lack of support by the national governments for the nuclear package safety of the electronuclear industry sector continues to be identified as a high priority in the development of the EU's energy policy, both within the EU and in its relations with other states. At EU level the Heads of Government of the Member States have declared that the role of the EU should be "...to develop further, in conformity with Community law, the most advanced framework for nuclear energy in those Member States that choose nuclear power, meeting the highest standards of safety, security and non-proliferation⁵³ as required by the EURATOM Treaty ...".⁵⁴ And as "...nuclear power also raises important issues regarding waste and decommissioning so nuclear waste management and decommissioning should also be included in future Community work. The EU should also continue their efforts to ensure that such standards are observed internationally."⁵⁵

⁴⁹ Barnes P.M. (2003), Nuclear safety for nuclear electricity – the search for a solid legal basis for nuclear safety in a enlarged EU, *Managerial Law*, Vol. 45, No.5/6, pages 115-139.

⁵⁰ True C (2006) "The EURATOM Treaty's prospects at the start of the new millennium" , *International Journal of Nuclear Law*, Vol 1 No 3:247-260.

⁵¹ CEC (2002), *Nuclear Safety in the European Union*. COM (2002) 605, Brussels.

⁵² Co-operation based originally on a Cooperation Agreement between the EAEC and the IAEA 75/780/EURATOM, OJ L 329, 23.12.1975 p 28-29, strengthened in a joint statement by Commission President Barroso and Director-General of the IAEA Dr. El Baradei in May 2008, IP/08/719, Brussels 07.05.2008

⁵³ This article is concerned with the peaceful, civilian use of nuclear technology. However as a result of the mandate to establish international agreements in the EURATOM Treaty the EAEC acceded to developments within the framework of the Nuclear Non-Proliferation Treaty (NPT) signed on July 1st 1968. In 2008 the NPT had 188 signatory states, although Israel, India and Pakistan where nuclear weapons have been developed since 1970s have not signed.

⁵⁴ European Council (2007:para 32), Conclusions of the European Council Brussels Summit, March

⁵⁵ CEC (2007:17), *An Energy Policy for Europe* , COM (2007) 1 final, Brussels, 10.01.2007

Economic growth and sustainable nuclear energy policy

Whilst the arguments about the contribution which the nuclear sector may make to producing carbon free electricity may or may not be conclusive the integration of sustainable development objectives to nuclear energy policy would enable a range of other issues to be monitored and dealt with. These include the commitment which is proving to be elusive within all sustainable development strategies to find the '*true price*' of the different energy technologies including the environmental damage caused by the generating mechanisms in addition to providing an appropriate legal basis for the technology to operate in an integrated European market.

To turn firstly to the issue of costs involved in the nuclear sector. In the light of current high prices and political instability in the producing regions coupled with changing costs of technology development the costs of nuclear electricity generation are appearing more attractive. Against this background of change in the single integrated European energy market conditions of competitiveness for the different energy resources are altering. The nuclear option is acquiring credibility as technology to provide secure supplies of volume base load energy to augment other electricity generating technologies in a diversified energy policy. This is particularly the case when the reactors are operating at almost full capacity throughout their lifetimes thus offsetting the high costs involved in the initial construction phases. (c.f **Table 2 Comparison of costs of selected sources of electricity production**). As a result it is argued by supporters of the technology that the advantage of nuclear energy is the availability of the electricity and the stable prices which may be guaranteed to the consumer. If it is to be accepted as an important element of a diversified sustainable and competitive European energy policy the nuclear sector should be subject to the same policy objectives (including sustainable development) as other energy sources. The apparent greater attractiveness of the economics of the nuclear industry will be the driver of changing political willingness amongst the EU governments where the technology is not currently utilised. This will in turn lead to the necessary changes to the legal and constitutional framework of the EU.

1. Support for state aid to the industry

But does the legal framework currently deliver a competitive level playing field for all the generating technologies enabling it to contribute to the desired rational allocation of resources which is part of sustainable development. The logic of the market is that the resource should be able to survive without support in a freely operating European energy market. The question of how much state aid support should be given to the electronuclear industry is highly controversial, anomalous and unsustainable. Clearly as shown in Table 2 the investment costs and capital costs of the sector are the major factor of costs. The EURATOM Treaty was conceived as a way of promoting the development of the new technology to achieve certain political goals. The level of provision of state aid to the industry for power plant construction was not of concern in the adoption of the Treaty. The EURATOM Treaty was to support measures in a very limited industrial field producing a very specific product. It is contradictory to the ideas of the creation of a free market in products and a level playing field for industry contained within the provisions of the European Economic Community Treaty. All the signatory states of the Treaty were making a commitment in 1957 to sharing the costs of the nuclear technology and in return all would benefit.

As the EU has enlarged the number of member states which are not committed to the use of the technology and are not in favour of participating in the benefits of the technology has grown. Logically they should not be required to bear the costs of the technology. But all states have accepted the *acquis* associated with the EURATOM Treaty. For states not generating nuclear electricity there are costs incurred from support for the electronuclear industry as a result of the loss of the level playing field of competition for their electricity utilities within the internal energy market. As such it may be argued that the financing of the nuclear industry by national governments it is not appropriate nor is the provision of state aid to the industry. But national governments are very protective of their energy industries because of the major political significance of the sector and the problems of governments' failures to provide electricity. To change the Treaty would require unanimity amongst the national governments and for some states (eg France and the 2004/7 entrants) the continued existence of the EURATOM Treaty provides some opportunities for support for the development of newer nuclear generating technologies.

The EURATOM Treaty is based on the paradigm of a high level of state support for the development of the new technologies because of the high costs entailed. As such the Treaty supports what is an out-dated concept in EU energy policy where the paradigm of market functionality appears to have replaced it. The argument of this article is not that it is desirable to maintain this support for the electro-nuclear industry. Rather the argument is that in the light of a number of practical issues with regard to the provision of alternative sources of energy a pragmatic decision has to be taken about the use of the technology. The costs of the renewable and other alternative sources of low carbon energy remain high. The nuclear option is therefore one considered by many national governments as the way forward to meet their national energy demands.

Whilst there is strong support for the completion of the internal markets for gas and electricity through the adoption of market opening Directives and Regulations the accompanying measures needed to ensure that this happens appear also require high levels of state funding. This is particularly the case with regard to measures to increase interconnectivity of the infrastructures needed to transfer energy within the integrated European energy market. There is also strong support for what is considered to be an *ambitious* programme of energy efficiency measures at local, regional, national and EU levels⁵⁶ as outlined in the Commission Action Plan of 19th October 2006.⁵⁷

A great deal of state aid is required in order to advance the renewable technology and energy efficiency developments. It appears somewhat contradictory to castigate, in the interests of the market, support to the electro-nuclear industry and not to these other aspects of energy policy developments. Indeed "...onshore wind energy is two and a half times and offshore wind energy over three times more expensive per kilowatt hour than gas or nuclear energy. No sensible community would ever support so outrageously expensive and unreliable an energy source were it not that the true costs have been hidden from the public by subsidies and the distortion of market forces through legislation."⁵⁸

⁵⁷ CEC Action Plan for Energy Efficiency, *realising the Potential*, COM (2006) 545, Brussels.

⁵⁸ Lovelock J (2006:106-107), "The Revenge of Gaia", Penguin.

It is clear that the EURATOM Treaty does not provide support for curbs on state aid to the nuclear industry. Exactly the opposite is true – the Treaty is to support the development of the technology. But the TEC may be used in dealing with questions relating to state aid to the electronuclear industry and as a brief review of the following rulings would suggest there are opportunities to deal with issues of state aid without a requirement to change the EURATOM Treaty. In 2002 state aid was agreed for British Energy (BE). British Energy (the UK's privately owned nuclear generator), had been experiencing financial difficulties during 2002, and an approach was made to the UK government for aid to continue operating. It was agreed by the Commission as an appropriate measure to address the stated objectives. In this case it was also considered to be consistent with the EURATOM Treaty articles relevant to worker safety and public protection.⁵⁹

Again the TEC rather than the EURATOM Treaty was the basis of the 2006 ruling of the Court of First Instance (CFI) in the case of a German tax exemption scheme as applied to nuclear power plants.⁶⁰ Provisions in German law require nuclear power plants to set up reserves to cover the costs of disposing of irradiated fuel and radioactive waste and closure of plants. These reserves may be counted amongst the liabilities of the undertakings and are subject to a reduction in the tax burden. In 1999 three German utilities requested that the European Commission should investigate the tax exemption scheme which was being applied to those reserves. In presenting its findings the CFI found that there was an advantage from lower taxes to the nuclear power plants but that it did not grant the specific advantage inherent to the idea of state aid.

In February 2005 the Finnish government issued a licence for the construction of an advanced Generation III European Pressurised Water Reactor (EPR) based on Pressurised Water Reactor (PWR) technology at the Olkiluoto site in Finland. The impression given of the project was that it was being built and developed without state aid. Subsequently two complaints were filed with DG Competition of the European Commission calling for an investigation of the new reactor development. One by Greenpeace concerned an export credit guarantee given by the French credit agency COFACE to the French nuclear company AREVA. The European Renewable Energies Federation (EREF) filed a broader action on the grounds of infractions of EU state aid requirements, export credits, public procurement legislation and safety. The EREF complaint listed organizations not just in Finland and France but also in Sweden and Germany and the governments of those countries as being in probable violation of EU legislation. The complaints were lodged with DG Competition in 2004 but no resolution had been reached when the Commission launched an investigation of competition in the electricity sector as a whole in 2006. The overall objective of the sector enquiry was to address a number of matters impeding the development of a functioning, open and competitive EU wide energy market by 1st July 2007.

⁵⁹ CEC, Decision on State Aid which the UK government is planning to implement for BE Plc. COM (2004) 3474 final

⁶⁰ Case T-92/02 Stadtwerke Schwabisch Hall GmbH et al v the European Commission, 26th January 2006

In September 2007 the Commission found that the financing of the Olkiluoto reactor did not constitute state aid nor did the export credit guarantee from COFACE to AREVA. The importance of the challenges by Greenpeace and the EREF were that, depending on the ruling the principle could have been established that the electronuclear industry should be subsidised as it requires considerable input of capital. But the agreement of the Commission for state investment, loans at special rates, and support for the export of materials was not based on the difficulty of the nuclear sector operating in the market without state support. The findings of the Commission were based on the overall impact on the European energy market of the production of electricity from the new reactor development.

In reviewing these findings both Greenpeace⁶¹ and the EREF⁶² however expressed a view that the Commission had not acted impartially but had acted in contradiction of early decisions about the use of export guarantees in intra-Community trade. In addition for Greenpeace the ruling raised concerns that the result would be to discourage investment in alternative renewable energy technologies.⁶³ An impression that the 2008 notification by the Commission of the '*balancing test*' applied to applications to aid for environmental protection does not entirely allay. On the one hand "... the Commission will when relevant strengthen its economic approach to state aid analysis"... (but) balances the positive impact of the aid measure in reaching an objective of common interest (ie environment, energy security) against its potentially negative side effects such as distortion of trade and competition."⁶⁴

2. New Technology Developments

The primary objective of the EURATOM Treaty was to support the development of the nuclear industry and provision for funding for research and technology developments was included in the Treaty in 1957 (Article 7 EURATOM). The TEC on the other hand had no such provision for research and technology funding in its original provisions. However, since the 1980s, the EU's has developed a successive series of Research and Technology Development (RTD) programmes, which now include the EURATOM programmes. In the Seventh Framework RTD programme (FP7) proposed by the European Commission (2007-2013) the proposals for funding of the EURATOM Research Programme were also identified. But FP7 is a multi-annual programme to run for seven years, and the EURATOM regulations are for a multi-annual programme for five years. The possibility of an extension of the EURATOM funding is included for 2011-2013 to bring the funding for both areas into line and enable more effective management of the transfer of the funds to the national level. The EURATOM budget was not forwarded for scrutiny to the European Parliament with the other elements of the FP7 Budget, as this is not a requirement under the terms of the Treaty.

Agreement on the budget for the EURATOM Research Programme 2007-2011 was difficult to achieve because of the divergent views of the national governments about further developments in nuclear fission technology. The Austrian government

⁶¹ Greenpeace – Press release, 26th September 2007.

⁶² EREF – Press release, 26th September 2007

⁶³ Note 63 above

⁶⁴ CEC (2008:5) "Community Guidelines on state aid for environmental protection", Notices from European Institutions and Bodies, 2008/82/01, OJC 82 01.04.2008

exercised its prerogative of veto with regard to funding for nuclear fission technology, other than that associated with decommissioning reactors and safe disposal of radioactive waste.⁶⁵ Agreement was eventually reached in the Council of Ministers on July 24th 2006 with the bulk of available funding being directed to new fusion technology developments.⁶⁶ The resolution of the controversy on this funding showed the flexibility of the EURATOM Treaty to respond to the concerns of those who are not in favour of the continued use of nuclear technology as well as those Member States which are.

Of the total budget for EURATOM research of 2.7 billion euros, 2.1 billion are to be allocated to fusion research and in particular the development of the International Thermonuclear Experimental Reactor (ITER) which is under the auspices of the International Atomic Energy Agency (IAEA). The agreement for the ITER development in Cadarache, France, was signed in June 2006 and will include input from partners in Japan, China, India, Russia, South Korea and the United States. Fusion technology is regarded by many as having the potential to make a major contribution to sustainable and secure energy supplies in Europe but is unlikely to be at the stage of commercial production before 2050 because of the difficulties of achieving and maintaining the high temperatures needed for the reaction to take place.

In 2007 Energy Commissioner Andris Piebalgs concluded that “Europe has so far always enjoyed leadership in the area of nuclear technology. We have mastered all aspects of the nuclear fuel cycle and we market equipment and services throughout the world. This is a non negligible part of the EU competitiveness and surely a valid input to our Lisbon strategy on growth and job creation” (Piebalgs (2007) see note 22 above). In response to concerns that this leadership of the EU states in nuclear technology was being challenged by initiatives from the US, Russia, China and India the European Technology Platform on Sustainable Nuclear Energy was launched at the end of 2007. This strategy was presented as a *roadmap* to ensure that high safety standards, waste management, and security of nuclear materials are maintained. The basis of the technology efforts outlined in the strategy are to enhance “...co-operation between national and industrial programmes while guaranteeing the most effective use of framework funding...also underlines the important research dimension of the nuclear sector...”⁶⁷

3. Cross-border electricity exchange

Rational allocation and use of resources in the integrated energy market may be achieved through increased trade. But this requires a high level of interconnectivity between the national energy markets. European electricity networks were developed with the national market requirements in mind. Liberalization in the electricity markets has brought more competition to the national markets but cross border trade i.e. the physical exchanges of electricity between countries within the EU, remains low. The European electricity market remains segmented. There is however clear and continuing pressure to remedy these shortfalls which are fragmenting the integration

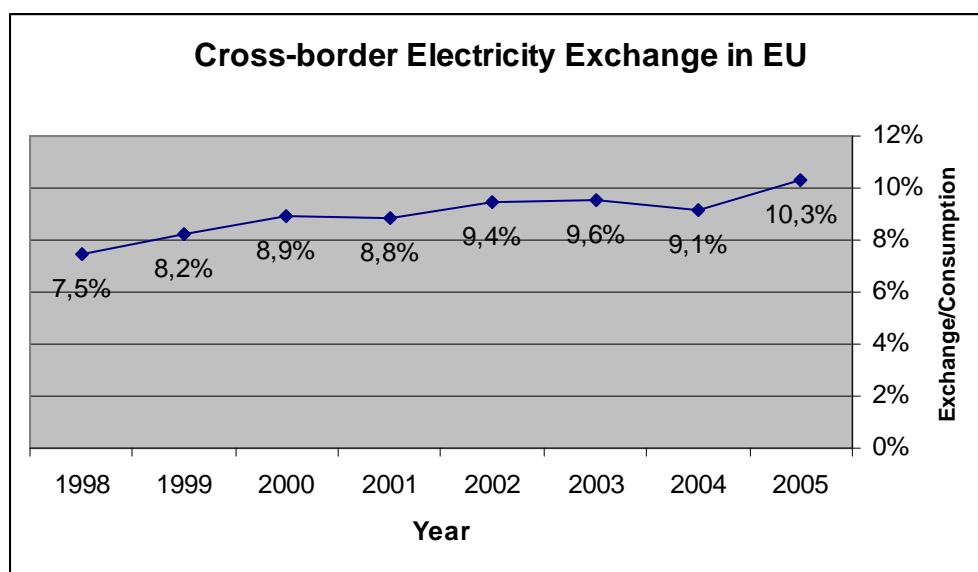
⁶⁵ Nuclear fission – is the process of splitting molecules of uranium-235 in order to produce energy and is the basis of the nuclear technology currently used.

⁶⁶ Nuclear fusion – is the process of fusing two hydrogen atoms to form a single atom of helium. One gramme of the fuel produced can develop the same energy as 45 barrels of oil. However the process requires extremely high temperatures which it is not yet possible to achieve and sustain in a reactor.

⁶⁷ As note 26 CEC 2007:9

of the energy market. Targets were set during the Barcelona Summit in 2002 for all Member States for an initial level of electricity interconnectivity of at least 10% of generation capacity to be achieved within a reasonable time.⁶⁸ As some Member States had already reached this level, higher targets were set in specific cases, as were targets for states which are 'transit' states. (The transit states include Belgium, the Netherlands, Denmark, Sweden, Germany, Austria and France). But nevertheless the amount of cross border trade in electricity remained at about 10 % of total electricity production in 2005.

Figure 2 Cross-border electricity exchange in the European Union (1998-2005)



Source CEC (2007:) "Report on the experience gained in the application of the Regulation (EC) No. 1228/2003

⁶⁸ Lisbon Summit, March 2000

"Rapid work is required in order to complete the internal market in certain sectors and to improve under-performance in others in order to ensure the interests of business and the consumers.....The European Council accordingly asks the Commission, the Council and the Member States, each in accordance with their respective powersto speed up liberalisation in areas such as gas, electricity, postal services and transport".

Stockholm Summit, March 2001

"....the creation of an effectively functioning internal market in services is one of Europe's highest prioritiesand must go hand in hand with a framework for developing effective cross-border markets supported by an adequate infrastructure capacity".

Barcelona Summit 2002

"Priority should be given to reaching agreement on the basis of proposals relating to the opening and further development of the energy markets, taking into account the requirement to satisfy consumer needs and the need for transparency.....". The Barcelona presidency also determined a timetable for the introduction of the liberalised energy market.

Brussels Summit, March 2006

"The European Council notes that Europe is facing a number of challenges in the energy field.....the need for increased transparency on energy markets and further integration and interconnection of national energy markets with the energy market liberalisation nearing completion (July 2007)....".

Cross border trade is being undermined as the result of limited access to the national transmission grids and congestion of those grids which do exist. This has enabled protection to be provided to those who have no desire to use electricity derived from nuclear power plants. The German government was able to agree to the programme of nuclear phase out in the early 2000s as electricity could be imported from elsewhere to make up the shortfall.⁶⁹ Interconnectivity of grids between areas where nuclear production is predominant (as in France) with areas (such as Germany) with a commitment to phase out, will move public participation in the decision-making process to a higher place on the policy agenda.

Increased interconnectivity will not only affect those states that are involved in the export and import of the electricity but also those states which are in the direct path of the electricity to the consumer. Because of the technology and flow of the electricity itself, loops may occur in the transfer of the electricity which brings in neighbouring states not engaged in the direct transfer. "In a simulation, it has been shown that in the case of a transport of 1,000 MW from Northern France only around 60% of the electricity reaches Italy directly by crossing the French - Italian border or through Switzerland. The remainder reaches Italy indirectly causing flows on the networks of Belgium, the Netherlands, Austria and Slovenia" (CEC 2001:5).⁷⁰ In presenting the EPE the European Commission reported that "...some new interconnection projects have been realised over the past five years, there is still a large need for further investment to come closer to reach minimum interconnection levels between Member States of 10%.....and investment needs for grid related energy supplies in the EU (gas and electricity) amount to approximately 800 billion euros in the next twenty years." (CEC 2006:15-16)

Following their accession to the EU in 2004 the objective was to integrate the New Member States as quickly as possible to the energy market. The networks of the New Member States of the Czech Republic, Hungary, Poland, Slovakia and Slovenia were linked to the EU electricity system. All of these states are producers of nuclear generated electricity or wish to maintain their options open with regard to its future use. The ability to participate in trade of electricity within the integrated market formed an important part of the rationale which the governments of the Baltic States highlighted in making their decisions to collaborate on a new reactor in 2006.

Increased connectivity between the Central and Eastern European states of the EU and Russia has support within the EU as a mechanism to remove existing and potential bottlenecks in the infrastructure for electricity transfer. Russia is a nuclear electricity generating state and also is engaged in the development of new reactors to meet increased demand in its domestic energy market. In concluding agreements with Russia and also the nuclear generating states of Ukraine and Armenia in the context of

⁶⁹ For example - Germany has reciprocal bilateral agreements with Switzerland, Poland, and the Czech Republic to trade in electricity, Austria agreements with Switzerland, the Czech Republic, Hungary, Slovenia, Italy with Switzerland and Slovenia i.e. non nuclear or states of the EU committed to phase out with nuclear states! The Swedish phase out and closure of the Barseback-2 reactor is underpinned by a policy of increased power-up rates to other reactors to meet the shortfall it will leave in the country's electricity provision.

⁷⁰ CEC (2001:5) Proposal for a regulation on "Conditions for access to the net-work for cross-border exchanges in electricity and proposal for a directive amending directives 96/92/EC and 98/30/EC concerning common rules for the internal market in electricity and natural gas", COM (2001) 125.

the Neighbourhood Policy ⁷¹ "..... care should be taken to ensure that the development of trade does not in the medium term lead to the placing on the Community market of electricity produced in nuclear power stations whose safety is not guaranteed"⁷². And as such "The European Council undertakes to maintain a high level of nuclear safety in the Union. It stresses the need to monitor the security and safety of nuclear power stations. It calls for regular reports from the Member States' atomic energy experts, who will maintain close contact with the European Commission". ⁷³.

Environmental protection and sustainable nuclear energy policy.

The linkage of unsustainable use of energy resources and climate change appears clear to all groups – scientists, environmentalists, the public, policy makers, so the importance of the inclusion of energy policy developments as part of a SDS is recognized. The evidence for global warming and climate change grew during the late 1990s and early 2000s. Even Bjorn Lomborg in presenting his commentary on the 'real state' of the world in 2003 accepted that "There is no doubt that mankind has influenced and is increasing atmospheric concentrations of CO₂ and this will influence temperature....Global warming is important. Its total costs could be about \$5 trillion...." ⁷⁴ It is also increasingly accepted that this is a global problem which needs global solutions (apart from in the United States where the administration of George W. Bush refused to ratify the Kyoto Protocol to the International Convention on Climate Change). However the member states of the EU 27 which have ratified the Protocol have had mixed success in meeting the emission targets which were agreed

Levels of energy demand are increasing at the same time as the supplies of easily available fossil fuels are being both depleted and discredited themselves on environmental grounds. The search for viable alternatives has intensified. Acknowledgement that all forms of electricity generation are costly and that each has its own advantages has come at the same time as it would appear the nuclear industry's potential contribution to curbing the problem of climate change has been recognised. The view of nuclear electricity presented is that of provider of virtually carbon free energy resource at the point of generation and which already meets 30% of EU 27 electricity needs. Renewable energy technologies do not yet provide sufficient quantities of cheap carbon free electricity to replace it. Natural gas prices are increasing as competition for the resource as a means of generating low carbon electricity has increased.

Amongst the environmental community the support for the nuclear sector is much divided but there is a surprising level of support from some who were formerly vehemently opposed to its use. For example the environmental writer and long time critic of the nuclear sector Joan Bakewell "The odds at present are that global warming will wreak more havoc across the planet than nuclear power stations....I'm going to have to think it all through again" ⁷⁵ and James Lovelock "Only nuclear

⁷¹ CEC (2004), *European Neighbourhood Policy – Strategy Paper*, COM (2004) 373 final, Brussels.

⁷² CEC (2002:74) Final Report on the Green Paper "Towards a European Strategy for the security of energy supply" COM (2002) 321 final, Brussels, June.

⁷³ Laeken European Council Summit December 2001

⁷⁴ Lomborg B (2001:317-319) "The Skeptical Environmentalist" Cambridge University Press

⁷⁵ Bakewell J, writing in the Guardian newspaper, 13.05.2005. She is a well-known UK writer and broadcaster and a long time anti-nuclear campaigner.

power can halt global warming”.⁷⁶ Patrick Moore “In the early 1970s when I helped found Greenpeace, I believed that nuclear energy was synonymous with nuclear holocaust, as did most of my compatriots. That's the conviction that inspired Greenpeace's first voyage up the spectacular rocky northwest coast to protest the testing of U.S. hydrogen bombs in Alaska's Aleutian Islands. Thirty years on, my views have changed, and the rest of the environmental movement needs to update its views, too, because nuclear energy may just be the energy source that can save our planet from another possible disaster: catastrophic climate change.” Further expressing his support for a diversified energy strategy “We should be building the backups, in other words, the continuous reliable power sources, such as nuclear and hydroelectric and biomass and geothermal and plug-in cars. But it doesn't make sense to charge a plug-in hybrid on a coal-fired power plant. Therefore, we should be moving our electricity from 50 percent coal, 20 percent nuclear (as in the US) to 50 percent nuclear, 20 percent coal.”⁷⁷

Indeed many would argue, as Lovelock does, that the “...important and overriding consideration is time; we have nuclear power now...All of the alternatives... require decades of development before they can be employed on a scale that would significantly reduce emissions. In a few years, renewables will add an increment of emission-free energy, mainly from wind, but it is quite small when compared with the nuclear potential.”⁷⁸ Lovelock further argues that of itself nuclear electricity is not just a low carbon energy resource but fulfils all the objectives of sustainable development. (Not a view shared by the author of this article however.) “The development of nuclear energy broadens the natural resources base useable for energy production and increases human and man-made capital without consuming irreplaceable natural resources...(Thus fulfilling)...A central goal of sustainable development to maintain or increase the overall assets (natural, man-made and human or assets) available to future generations”⁷⁹.

On this issue of environmental protection it must be remembered that neither the EEC Treaty nor the EURATOM Treaty had contained explicit references to environmental protection when they were adopted in 1957. The first explicit statement of commitment to environmental protection was included in the Single European Act in 1987 which amended the TEC (although the European Commission had introduced the First Environmental Action Programme, adopted in 1972). The EURATOM Treaty has not been subject to any such amendment. The EAEC competences have remained substantively unchanged. But there is a requirement that Member States establish facilities to carry out the continuous monitoring of the level of radioactivity in the air, water and soil and to ensure compliance with basic standards (Article 35 EURATOM). In addition national governments are required to transfer information to the Commission so that an impact assessment of disposal of radioactive waste is possible. “Each Member State shall provide the Commission with such general data relating to any plan for the disposal of radioactive waste in whatever form as will make it possible to determine whether the implementation of such plan is liable to result in the radioactive contamination of the water, soil or airspace of another Member State” (Article 37 EURATOM).

Lovelock J, one of the founders of Greenpeace, cited in Economist Special Report on Nuclear Power, July 9th 2005:67.

⁷⁷ Moore P, (2006:B01) “Going Nuclear - A Green Makes the Case”, Washington Post, April 16.

⁷⁸ Lovelock (2006) co-founder of Greenpeace and author of “The Revenge of Gaia: Earth's climate crisis and the fate of humanity”. <http://www.nei.org/newsandevents/>

⁷⁹ NEA/OECD (2000:7) “Nuclear Energy in a Sustainable development Perspective” OECD, Paris

Also the TEC has provided the legal base for the introduction of two pieces of legislation which have an impact on environmental protection. The focus of the Environmental Impact Assessment Directive (EIA) ⁸⁰ and the Strategic Environmental Assessment Directive (SEA) ⁸¹ is to ensure that there is public participation in the decision making process, (as discussed earlier in this article) not specifically on identifying standards for the protection of the environment. However "...sustainable development mechanisms are often driven by the need to integrate the environment into decision-making processes and so there is an important link between the two..." ⁸² As both the EIA and the SEA are regulatory instruments requiring reports to be prepared for the information of the public concerned there is an implication that if there are cross-border impacts of major projects that these reports will also be available to groups in other member states from the one in which the project is being initiated in.

What is the way forward?

The primary tools which are available to the EU are those of the market. If a market based strategy is to function appropriately and contribute to sustainable development there are two underlying issues which it are crucial. the 'true costs' of the different technologies must be established and then translated into the final energy costs to the consumers, whether they are industrial concerns, businesses or private households. Secondly the legal framework must be established so that there is a level playing field established within the context of a competitive energy market. Here lies the problem for the EU in dealing with nuclear energy.

Nuclear governance within the EU is the result of differing legal bases which have been established for action and is as a result complex. It is the nuclear electricity as a tradable product in the market which may be subject to the competences supporting the paradigm of market functionality in the TEC. But on issues such as future development of the technology, safety of the public and workers in the industry then the nuclear energy sector is be subject to competences of the EURATOM Treaty. This is further complicated by the existence of highly divergent national nuclear energy policies in the EU's 27 member states. All the national governments share a concern about how to ensure security of access to energy resources.

There are a number of possible alternative scenarios to ensure that the objectives of sustainable development become the basis of operation in the nuclear energy sector:-

- Make changes to the EURATOM Treaty which would introduce an increased role for the EP and or controls on the levels of state aid to the industry.
- Add nuclear safety and disposal of nuclear waste to the EURATOM Treaty.

⁸⁰ Council Directive 85/337/EEC, 27.06.1985 on the assessment of the effects of certain public and private projects on the environment, OJL 175 05.07.1985, as amended by Council Directive 97/11/EC, 03.03.1997, OJL 73 14.03.1997 and Directive 2003/35/EC of the European Parliament and of the Council 26.05.2003, OJL 156 25.06.2003.

⁸¹ Directive 2001/42/EC of the European Parliament and of the Council 05.06.2001, OJL 197 31.07.2001 on the assessment of the environmental impact of certain plans and programmes

⁸² Imperial College Consultants (2005:1) "The relationship between EIA and SEA Directives" available at http://ec.europa/environment/eia/final_report_0508.pdf

- Repeal the Treaty and replace it with an energy/climate Treaty which incorporates the objectives of sustainable development in a clear and unambiguous manner into all aspects of EU energy policy.

The last scenario would arguably be the most effective but would without doubt be the most difficult to achieve. It could potentially bring the best outcomes for sustainable development but is the *least likely to occur* in the current political climate as evidenced in the debates of the Convention on the future of Europe (2002/3), the development of the European Energy Policy (2007) and the proposed Lisbon Treaty (2007). Commitments to an Inter-governmental conference on the EURATOM Treaty made during the Irish Presidency of 2004 have not been addressed.

In 2006 True proposed the use of the enhanced co-operation as currently outlined in articles 43 TEU and 11 TEC as a means of overcoming the legitimacy problems of the EURATOM Treaty (in particular the lack of role for the European Parliament).⁸³ Whilst at first sight this appears to be an attractive and achievable proposition it would nevertheless require changes to be made to both the EU and EURATOM Treaties. The EURATOM competences would have to be included in those of the EU Treaty as an initial step and as argued above this is unlikely in the foreseeable future in the EU. The Member States have continued throughout the history of the EU to demonstrate a preference for what may be termed energy ‘unilateralism’. Energy is considered by national governments to be an aspect of national security and there is little or no political willingness to cede competences over an aspect of national security to the supranational level of the EU. Choice of energy resource remains a decision for national governments. The traditional nuclear energy policy paradigm of high levels of state intervention and national control would appear to continue to satisfy the EU’s highly divergent national interests. It offers protection for those states which wish to pursue nuclear energy policies and those where there is no desire to do so. In addition there are financial benefits to the EURATOM Treaty which will make it attractive for both France and the new Member States to maintain.

CONCLUSIONS

The Energy chapter of the Lisbon Treaty (Article 176a TFEU) will establish four elements for action:-

- ensuring the effective functioning of the energy market
- ensuring security of supply
- promoting energy efficiency and renewable energy
- promoting interconnection. (c.f. **Annex 1 Articles of the Lisbon Treaty relating to energy policy**)

National governments competences to determine the conditions and choices of energy supply are re-affirmed in Article 194 TFEU paragraph 2.

Nuclear energy policy revolves around three key priorities – promoting nuclear non-proliferation, nuclear safety and nuclear security. Recent developments to support these priorities include as :-

⁸³ True (2006:255) as note ?

- the formation of a High level group on Nuclear Safety and Security
- enhanced co-operation between the EU and the IAEA on safety,
- the Sustainable Nuclear energy technology platform
- the Nuclear Energy Forum (Bratislava and Prague)

These are areas where the EURATOM Treaty provides the EU with a framework for action. Protocol 2 of the Lisbon Treaty begins by “**Recalling the necessity that the provisions of the Treaty establishing the European Atomic Energy Agency should continue to have full effect**”.⁸⁴ The outcome of these articles of both the TFEU and the EURATOM Treaties is to support and maintain the current status quo of an energy policy predominantly based on the paradigm of market functionality and not an effective sustainable energy policy despite the rhetoric of the Energy Policy for Europe.

This article has been mainly concerned with attempting to identify the value added of the legal and constitutional framework currently in place to build the appropriate policies for sustainable nuclear energy in the EU. The evidence shows that there is a much broader failure by the EU’s Member States to address the question of how to incorporate the objectives of sustainable development into its energy policy. Both the EURATOM Treaty and the TEC are flawed instruments to deliver sustainable energy policy for two reasons:-

1. The lack of political willingness of the national governments of the EU to make necessary changes to the Treaties of the European Atomic Energy Community and the European Community. In the search for sustainable and competitive energy policy the economic growth dimension of sustainable development, as seen in the emphasis on the functioning of the market, continues to dominate.
2. The direction of energy policy and strategy at EU level leads to unbalanced actions. A priority is given at the supranational level to energy security, currently defined as access to energy supplies. The competences at European level focus on mechanisms to ensure security of energy supply to meet growing energy demand. But the competence for mechanisms to meet that demand through supply and choice of energy resource itself is left to the national governments. Diverse national interests endanger the effective integration of public participation and development of comprehensive sustainable development mechanisms within the EU.

But the title was a question – is the EURATOM Treaty (as the nuclear energy ‘acquis’ of the EU’s Member States) a flawed instrument to deliver these objectives. Undoubtedly the answer to this question is *yes*. The EURATOM Treaty is an undeniably limited instrument at the EU’s disposal to effect changes to achieve the goals of a sustainable and competitive energy policy. There has been little political willingness to make changes to articles of the Treaty during its more than fifty year history. *In the absence of political willingness to make any changes the Treaty*

⁸⁴ Protocol no 2 Amending the Treaty establishing the European Atomic Energy Community, OJ C 306:199, 17.07.2007

which established the European Atomic Energy Community in 1957 (EURATOM) continues as one of the main instruments which the EU's Member states have in their search for sustainable nuclear energy policy. It has provided the legal basis for measures to improve the safety standards for the industry, for monitoring of the use of nuclear materials, commitment to nuclear weapons non-proliferation and research into new aspects of the nuclear technology for commercial use and as a result does provide some 'value added' for the EU's Member States.

Annex 1 Maintaining the status quo of energy governance within the EU

Articles of the Lisbon Treaty

Consolidated version of the Treaty Council of the EU, 6655/1/08 REV 1, Brussels,
30th April 2008

Article 4 TFEU

The Union shall share competence with the Member States ...para 2e) environment,
para 2i) energy

Article 122 TFEU

para 1... ...in a spirit of solidarity between Member States, upon the measures
appropriate to the economic situation, in particular if severe difficulties arise in the
supply of certain products, notably in the area of energy

Article 192 TFEU

Para 2 By way of derogation from the decision making procedure provided for in
paragraph 1 (ie the ordinary legislative procedure) ...the Council acting unanimously
in accordance with a special legislative procedure and after consulting the European
Parliament, the Economic and Social Committee and the Committee of the Regions
shall adopt...c) measures significantly affecting a Member State's choice between
different energy sources and the general structure of energy supply.

Title XXI

Article 194 TFEU

1. In the context of the establishment and functioning of the internal market and
with regard for the need to preserve and improve the environment, Union
policy on energy shall aim, in a spirit of solidarity between Member States to:
 - a) Ensure the functioning of the energy market
 - b) Ensure security of energy supply in the Union
 - c) Promote energy efficiency and energy saving and the development of new and
renewable forms of energy and
 - d) Promote the interconnection of energy networks

Para 2 ...Such measures shall not affect a Member State's right to determine the
conditions for exploiting its energy resources, its choice between different energy
sources and the general structure of its energy supply....

Preamble to TEU

DETERMINED to promote economic and social progress for their peoples, taking into
account the principle of sustainable development and within the context of the
accomplishment of the internal market and of reinforced cohesion and environmental
protection, and to implement policies ensuring that advances in economic integration are
accompanied by parallel progress in other fields,

Article 3 TEU

(ex Article 2 TEU)

1. The Union's aim is to promote peace, its values and the well-being of its peoples.
2. The Union shall offer its citizens an area of freedom, security and justice without internal frontiers, in which the free movement of persons is ensured in conjunction with appropriate measures with respect to external border controls, asylum, immigration and the prevention and combating of crime.
3. The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance.

**Table 1 Number of reactors by Member and Candidate State
(to December 2007)**

	% of national electricity produced by the nuclear sector	Number of operable reactors	Reactors under construction	Reactors planned and proposed
Belgium	55	7		
UK	19	23		
Finland	26	4	1	
France	78	59		2
Netherlands	4	1		
Spain	23	9		
Sweden	52	10		
Germany	32	17		
Czech Rep	41	6		2
Hungary	34	4		
Lithuania (1)	72	1		1*
Slovakia	55	6		2
Slovenia (2)	39	1		
Bulgaria	44	4		2
Romania	8	1	1	3
Croatia		(with Slovenia)		
Turkey (3)		0		3/5
EU 27 + candidates		152	2	11
World (4)		442	28	204

Source: various European Commission and IAEA, (cited in Barnes 2008 forthcoming).

Notes

- (1)Lithuania, - planned new nuclear power plant with Latvia, Estonia and Poland
- (2)Croatia, - no nuclear power plant of its own but Croatian national electricity company has co-ownership of plant at Krsko in Slovenia
- (3)Turkey, accession to the EU estimated by 2020
- (4) 68 of the global total of planned reactors are in China

Table 2 Comparison of costs of selected sources of electricity production

	Coal	Gas	Nuclear	Wind	Hydro	Solar
Construction times in years	4	2-3	4-5	1-2	Na (3)	Na
Lifetime of use in years	45	25	30-60	Na	Na	Na
Cost (2005) in euros/MWh (1)	30-50	35-75	40-45	35-175	25-95	140-430
Projected cost (2030) Euros/MWh with 20-30 euros/t(CO2)	45-70	40-85	40-45	28-170	25-90	55-260
Investment costs as % of total costs	30	15	50	Na	Na	Na
GHG emissions (kg CO2 eq/MWh)	750-800	400-440	15	10-30	5-20	100
EU 27 Import dependency 2005	39%	57%	Almost 100% for uranium ores (2)	Nil	Nil	Nil
2030	59%	82%				
Proven reserves/Annual Production	155 years	64 years	85 years of reasonable reserves	Renewable	Renewable	Renewable
Operation and maintenance costs as % of total costs	20	10	30	13	Na	Na
Efficiency	40-48%	40-50%	33%	95-98%	95-98%	Na
Fuel costs % of total costs	45	80-90	20	Na	Na	Na
Fuel price sensitivity	Medium	Very high	Low	Nil	Nil	Nil

Source Various – IEA and Commission (cited in Barnes 2008 forthcoming)

Notes

- (1) Dependent on the technology used
- (2) Uranium is however available from a wide range of sources including reprocessing. Also in the opinion of the Nuclear Industry Association “...it would be possible to purchase the entire lifetime supply for a reactor and stockpile it next to the reactor if it was considered that there was any danger to supplies” House of Lords (2006,83)” *Managing nuclear safety and waste: the role of the EU*” EU Committee 37th Report 2005-2006, July 6th.
- (3) Na Comparable figures not available