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The EU and Nuclear Safety: Challenges Old and New

Abstract

European cooperation in nuclear energy started as early as 1957 with the adoption of the Euratom Treaty.[1] Against this background, the level of integration achieved in the field of nuclear safety is strikingly low. Indeed, European integration seems to have proceeded much faster in other policy areas which could also be considered politically sensitive. This policy analysis discusses the recently adopted EU legal framework for nuclear safety, which consists of the Nuclear Safety Directive (2009) and the Nuclear Waste Directive (2011). It argues that even if EU Member States are divided on nuclear energy, they should not refrain from finding common ground on safety issues and assuming responsibility on the international scene. Few issues affect the world as much as nuclear safety, as was demonstrated most recently by the Fukushima accident in March 2011.

1 Introduction

The EU Member States have cooperated in the area of nuclear energy since the 1950s, but the EU has not adopted legislation on the safety aspects until recently. In 2009, the EU adopted a directive on nuclear safety for installations (e.g., nuclear power plants) and, in 2011, a directive on nuclear waste. The two Directives are not very far reaching. They do not set up any strict obligations or technical standards, and they largely replicate the international framework. The legislation is 'soft' because the Member States are strongly divided on nuclear energy, and it was not possible to reach a majority in the Council on a more harmonized approach. The EU portrays itself as an important norm exporter in the field, but if it is to be a credible one, it ought to strengthen its legal framework. The Fukushima accident in March 2011 can be seen as having created a window of opportunity to strengthen this legislation. As a political response to the accident, the European Council introduced 'nuclear stress tests' which the Commission now attempts to make legally binding. What are the prospects for the adoption of legislation aiming for a more harmonized approach?

Part 2 outlines the context in which the nuclear safety legislation is adopted: the so-called nuclear renaissance, the Fukushima accident, and the divisions among the EU Member States on nuclear energy. Part 3 explains the legal basis for the cooperation on nuclear safety in the EU, and it addresses the evolution of the legal framework for nuclear safety. Part 4 describes the EU legislation in this field: the two Directives on nuclear safety and nuclear waste. It also discusses how the Directives can be characterized, and why EU involvement is desirable. Part 5 discusses the prospects for a strengthened legal framework.

2 Nuclear Energy in Context: The Nuclear Renaissance and Member State Divisions

Prior to the Fukushima accident in 2011, it was widely recognized that nuclear energy was enjoying a

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1 Some years earlier, however, European countries had started to cooperate within the framework of the OEEC (now OECD).

2 See, for example, William J. Nuttall, *Nuclear Renaissance: Technologies and Policies for the Future of Nuclear Power*, New York, Taylor & Francis, 2005.

'renaissance'.[2] The renewed interest was visible across the world: in Europe and in the United States, in the emerging economies of China, India and Brazil, and in Russia. Interest in nuclear energy had also started to grow in the developing countries. Countries all over the world started to plan and construct new nuclear power plants, and in addition, to review the possibilities of extending the life of existing old reactors.

What triggered the renewed interest in nuclear energy? One of the main arguments in the debate on nuclear power is that it does not contribute to climate change. Nuclear energy is seen by some countries as an attractive alternative to fossil fuels because it yields very low carbon emissions. Nuclear power is also vulnerable to climate change, however, because nuclear power plants are often situated near coastlines, as plenty of water is needed to cool the reactors.[3] As environmental scientists argue, climate change causes sea level rise, shoreline erosion, coastal storms, floods, and heat waves. Another argument in the debate is that nuclear energy ensures a secure energy supply, and that it can make countries less dependent on oil from unstable parts of the world. However, this argument is not actually new as it has been used since the 1950s.[4] These two arguments, coupled with the argument that the demand for energy is increasing, are often described as the main drivers that have put nuclear power back on the political agenda.

The nuclear renaissance has its sceptics, however, who argue that the economic cost of building new plants is so high that nuclear energy is no longer economically feasible. While this might be true in the Western world, there are no clear signs that the interest in nuclear energy will fade in less developed parts of the world. In addition, regulatory measures make nuclear energy more expensive, but high safety standards might also make nuclear energy more accepted by the general public.

Does Fukushima mark the end of the nuclear renaissance in the EU? A third of the electricity consumed in the EU comes from nuclear energy. There are 132 reactors in 14 Member States. But the Member States are divided on the use of nuclear energy, and the Fukushima accident in 2011 seems to have accentuated these divisions. Following the accident, Germany decided to shut down and decommission its nuclear reactors.[5] In a referendum which took place shortly after the accident, Italy decided not to restart its nuclear power programme, which was abandoned in the 1980s. In other countries, the Fukushima accident seems to have had limited political impact. For example, Finland continues with the construction of its new nuclear power plant, and the accident seems also to have had little impact in France, which is highly dependent on nuclear power.[6]

Indeed, it is up to each Member State to decide whether to produce nuclear power. As the Lisbon Treaty clarifies, the Member States decide on their own energy mix.[7] But this does not mean that the EU does not have competence in the field of nuclear power. As mentioned, the Member States have been cooperating on nuclear energy since the 1950s. In fact, one of the EU's 'founding treaties' is a treaty on nuclear energy, the European Atomic Energy Community Treaty (the Euratom Treaty). All the EU Member States have signed the Euratom Treaty, and are thus also Euratom Member States.[8] Before turning to the recently adopted legislation in the field of nuclear safety, a brief account of the Euratom Treaty is necessary, as it constitutes the legal basis for nuclear energy cooperation in the EU.

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3 Natalie Kopytko and John Perkins, 'Climate Change, Nuclear Power, and the Adaptation–Mitigation Dilemma', *Energy Policy*, vol. 39, no. 1, 2011, pp. 318–333.

4 See, for example, the 'Report by the Three Wise Men on Euratom': Louis Armand, Franz Etzel and Francesco Giordani, *A Target for Euratom,* Report submitted by Mr. Louis Armand, Mr. Franz Etzel and Mr. Francesco Giordani at the request of the governments of Belgium, France, German Federal Republic, Italy, Luxembourg and the Netherlands, 4 May 1957.

5 The German Bundestag amended the Atomic Energy Act in June 2011 with a majority of 513 to 79 votes and 8 abstentions. This means that Germany will phase out electricity production in its nuclear power plants step by step by the end of 2022 (AtG – ref. no. 17/6070).

6 Two thirds of France's electricity comes from nuclear energy, and France is also the world's largest net exporter of electricity, see the World Nuclear Association website: http://www.world-nuclear.org/info/inf40.html (last accessed 3 September 2012).

7 The Lisbon Treaty clarifies that measures adopted by the EU institutions shall not affect a Member State's right to determine the conditions for exploiting its energy resources, and its choice between different energy sources (Article 194 TFEU).

8 In this EPA, for the sake of simplicity, I will refer to the 'EU' and the 'EU Member States', although it might be more correct to refer to the 'Euratom' and the 'Euratom Member States'.

3 The Euratom Treaty – The Legal Basis for Cooperation

The Euratom Treaty was signed in 1957, at the same time as the European Economic Community Treaty (the EEC Treaty). A few years earlier, the original six Member States had signed the Coal and Steel Community Treaty. Following the adoption of the 'two Rome Treaties' there were thus three Communities in 'little Europe'[9]: the EEC; the Euratom, and the Coal and Steel Community. The three Communities had the same Member States, and later, the same institutions.[10] In 1992, the Member States created the EU, and at the same time, the EEC changed its name to the European Community (EC). In 2002, the Coal and Steel Treaty was repealed. There were now three founding treaties, two Communities, and a Union.

In 2009, the Lisbon Treaty came into force. One of the major changes was that the EU replaced the EC, but the Euratom remains as a separate Community with its separate treaty.[11] The relationship between the EU and the Euratom will not be dealt with further here. It suffices to say that there are some legal implications following the fact that the Euratom remains as a separate treaty. For example, the principle of subsidiarity does not apply to the Euratom. But perhaps surprisingly, this has not impeded the Commission from referring to the principle in its proposals for the Nuclear Safety Directive and the Nuclear Waste Directive.

The Euratom Treaty's objective is 'to contribute to the raising of the standard of living in the Member States and to the development of relations with the other countries by creating the conditions necessary for the speedy establishment and growth of nuclear industries'. Its prime objective is thus to promote the nuclear industry. What power does the Euratom Treaty provide? Article 2 lists the Euratom's tasks. It shall, *inter alia*, promote research, establish safety standards to protect the health of workers and the general public, facilitate investment, ensure the supply of ores and nuclear fuels, make certain that nuclear materials are not diverted into purposes other than those for which they are intended, create a common market for nuclear material, and establish relations with other countries and international organizations to foster progress in the peaceful uses of nuclear energy.

When the Treaty was adopted in the 1950s, there were enormous expectations of nuclear energy. Nuclear power would be 'too cheap to meter', and it would open the way for an industrial revolution. In light of these expectations, it was perhaps not very surprising that Jean Monnet, the architect behind European unity, saw the Euratom Treaty as the main instrument for integration.[12] However, it did not live up to these expectations. The Euratom has only played a minor role in the European integration process.[13] Among the many reasons for this is that the Member States lacked a common interest.[14]

Among EU legal scholars today, the Euratom Treaty is largely seen as irrelevant. This position needs to be revised. The Treaty is increasingly used as a legal basis for legislation. Paradoxically, the Chernobyl accident in 1986 seems to have been the 'turning point' for the Treaty. Following the Chernobyl accident, several instruments were adopted which take the Euratom Treaty as a legal basis. The Euratom has also acceded to several international conventions, it has concluded many bilateral agreements, and it constitutes the legal basis for financial and technical support to third states. This development went hand in hand with the evolution of international nuclear law, which was set up as a response to the Chernobyl accident. Emergency preparedness conventions were adopted, and discussions started on setting up a framework for preventive measures: an IAEA convention on nuclear safety, and a convention on nuclear waste.

The Chernobyl accident had a widespread transboundary effect in Europe. The EU adopted emergency measures shortly after the accident, but there was no legally binding framework for *preventive* measures. However, the Member States' nuclear safety was not seen as a major

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9 This was the term used for the original six Member States.

10 The Merger Treaty, 1967.

11 On the relationship between the Euratom Treaty and the EU Treaties, Article 106a Euratom has been interpreted by the Court of Justice of the European Union: as long as the EU Treaties are silent, the Euratom Treaty applies.

12 This was also the view of the six original Member States and also the view of John Foster Dulles, the US Secretary of State, see Jonathan E. Helmreich, 'The United States and the Formation of Euratom', *Diplomatic History*, vol. 15, no. 3, 1991, pp. 393 and 400. See also Lawrence Scheinman, 'Euratom: Nuclear Integration in Europe', *International Conciliation*, vol. 36, no. 563, 1967, p. 8.

13 See, for example, Christian Deubner, 'The Expansion of West German Capital and the Founding of Euratom', *International Organization*, vol. 33, no. 2, 1979, pp. 203-228, at 223.

14 Scheinman, pp. 26-53.

concern. The focus was rather on nuclear safety in the former Soviet Union states. In order to improve nuclear safety in those countries, the EU set up technical and financial assistance programmes. Later on, the EU also came to use its leverage to improve nuclear safety in the countries that applied for EU membership. But while the EU was an active international actor in this field, it lacked internal legislation.

One explanation for why it took the EU so long to adopt legislation in this area was the uncertainty on the existence of a legal basis. As the principle of conferred powers provides, the EU's actions must be based on a provision in the EU Treaties.[15] The Euratom Treaty provides the Community with power to establish 'safety standards to protect the health of workers and the general public'. This power was previously only used to adopt a rather vast body of law within the field of so-called 'radiation protection',[16] but it was widely believed that there was no legal basis for nuclear safety for installations or for nuclear waste. In the so-called *Nuclear Safety Judgement* from 2001,[17] the Court of Justice of the European Union clarified that such a legal basis exists.[18] Following this case, there were no longer any *legal* obstacles for the Commission to start the process of adopting legislation on nuclear safety for installations and on nuclear waste. But *political* obstacles remain. The next section outlines this legislation.

4 The EU Nuclear Safety Regime

The EU has adopted two Directives in the field of nuclear safety: the Directive Establishing a Community Framework for the Nuclear Safety of Nuclear Installations of 2009 ('the Nuclear Safety Directive'),[19] and the Directive on Spent Fuel and Radioactive Waste ('the Nuclear Waste Directive') of 2011.[20] Both Directives take Article 31 combined with Article 32 of the Euratom Treaty as their legal basis. Article 31 stipulates that a consultation procedure shall apply, where the Council shall decide by qualified majority after consulting the European Parliament. The Commission shall obtain the opinion of a group of experts appointed by the Scientific and Technical Committee, and the opinion of the Economic and Social Committee.

The legislative procedure turned out to be long and difficult. The Commission presented its proposals as early as 2003, but a majority could not be reached in the Council. The Commission submitted revised proposals in 2004, but it soon had to withdraw them. In 2008, it adopted a new proposal on a nuclear safety directive, and in 2010, a new proposal on a nuclear waste directive. The Council eventually agreed on their content, but the result is two rather watered-down Directives. The Commission nevertheless presents the adoption of this legislation as a big step forward. It proudly points out that the EU is the first regional actor that has adopted binding legislation in the fields of nuclear safety and nuclear waste.[21] However, as will be described below, the Directives largely replicate the international framework, and their value added is limited.

4.1 The Nuclear Safety Directive

The Nuclear Safety Directive was eventually agreed in 2009. It is largely based on the principles endorsed by the international IAEA Nuclear Safety Convention, to which all the Member States were already Contracting Parties.[22] The Directive is also based on the IAEA's 'Safety Fundamentals',[23] which is a non-binding international instrument. The Directive's objectives are rather narrowly

15 See Article 5 TEU.

16 For a definition of 'radiation protection', see 'An Analysis of Principal Nuclear Issues, Radiation Protection Overview: International Aspects and Perspective', *NEA Issue Brief*, No. 10, December, 1994, available at http://www.oecd-nea.org/brief/brief-10.html (last accessed 16 July 2012).

17 Case C-29/99, *Commission v. Council* [2002] ECR I-11221.

18 For an analysis of this case, see Panos Koutrakos, 'Case C-29/99 *Commission v. Council* (re: Nuclear Safety Convention)', *Common Market Law Review*, vol. 41, no. 6, 2004, pp. 191-208.

19 Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community Framework for the Nuclear Safety of Nuclear Installations [2009] OJ L 172/18.

20 Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community Framework for the Responsible and Safe Management of Spent Fuel and Radioactive Waste [2011] OJ L 199/48.

21 See the European Commission website: http://ec.europa.eu/energy/nuclear/safety/safety_en.htm (last accessed 3 September, 2012).

22 It is also based on the technical work of the Western European Nuclear Regulators Association (WENRA), and on input from the European High Level Group on Nuclear Safety and Waste Management established by the Commission in 2007 (later renamed the European Nuclear Safety Regulators Group [ENSREG]).

23 This publication states the fundamental safety objectives and 10 associated safety principles. For an overview of which articles in the Directive correspond to the IAEA's Safety Fundamentals, see Yvan Pouleur and Petr Krs, 'The Momentum of the European Directive on Nuclear Safety – From the Complexity of Nuclear Safety to Key Messages Addressed to European Citizens', *Nuclear Law Bulletin*, vol. 85, no. 1, 2010, pp. 5-33, at 13.

24 Ibid.

formulated, avoiding any impression that the Member States are not already doing enough in this field.[24]

Just like the Nuclear Safety Convention, the Directive provides for the establishment of a 'national legislative, regulatory and organisational framework'.[25] This national framework shall establish responsibilities for the adoption of national nuclear safety requirements; a licensing system; the provision of a system of nuclear safety supervision; and enforcement actions.

The Directive points out that it rests with the competence of the Member States to determine how the national nuclear safety requirements are adopted and through which instrument they are applied. In its initial 2003 proposal, the Commission suggested the creation of a Community body of safety inspectors and common safety standards for existing nuclear installations, but it was not possible to reach a majority in the Council on these issues. In its 2008 proposal, the Commission presented a scaled-back solution – only *new* nuclear power reactors would be subject to common safety standards – but this suggestion did not make it into the Directive either.

Similar to the IAEA Nuclear Safety Convention, the Directive includes provisions on the regulatory authorities,[26] which have to be functionally independent from any body or organization concerned with the promotion or utilization of nuclear energy. The Directive also broadly sets out the duties of the regulatory authorities. The Member States have to ensure that the national regulatory authority is given the necessary legal powers, and human and financial resources. The Directive also sets out the international principle that the prime responsibility for nuclear safety of a nuclear installation rests with the licence holder.[27] The Directive also includes provisions setting up fundamental requirements on licence holders (that is, the nuclear operators), but it does not set out what a permit must contain. The Directive further obliges the Member States to ensure that the national framework requires arrangements for education and training.[28] A similar provision is found in the Nuclear Safety Convention.

There is also a provision on information to the public.[29] The Member States shall ensure that information in relation to the regulation of nuclear safety is made available to the workers and the general public. But the Directive also sets up a restriction in providing this information. The information shall only be made available to the public '*in accordance with national legislation* and international obligations',[30] and provided that this does not 'jeopardise *other interests* such as, inter alia, security, recognised in national legislation or international obligations'.[31] This seems to give the Member States a rather wide scope of discretion in shaping national legislation.

The Member States are obliged to submit a report to the Commission on the implementation of the Directive every three years.[32] In order to avoid duplication of the Member States' international obligations and their obligations under EU law, the Member States may 'take advantage of the review and reporting cycles under the Nuclear Safety Convention'.[33] Just like the Convention, the Directive also provides for a peer review system.[34] Under the Directive's system, the Member States shall arrange for self-assessments of their national framework 'at least every 10 years'. The Member States shall invite an international peer review from the national authorities, and the outcome of the peer review shall be reported to the Member States and to the Commission. This element seems weaker than in the Nuclear Safety Convention, which provides that reporting and peer review shall take place every three years. Further, unlike the Convention, the Directive does not provide for the setting up of review conferences. But the Directive's peer review system is not necessarily weaker than the one in the international Convention. For example, the Directive does not contain a confidentiality clause on the national reports or on the outcome of the review. When the outcome is made public, there is a public pressure in addition to the pressure from peers. However, the main function of the self-assessments

25 Article 4 of the Nuclear Safety Directive. Cf. Article 7 of the Nuclear Safety Convention.
26 Article 5 and Recital 8 of the Preamble of the Nuclear Safety Directive.
27 Article 6 and Recital 8 of the Preamble of the Nuclear Safety Directive.
28 Article 7 of the Nuclear Safety Directive.
29 Article 8 of the Nuclear Safety Directive. Cf. Article 24(1) and Annex IV; UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), Aarhus, 1998.
30 Emphasis added.
31 Emphasis added.
32 Article 9 of the Nuclear Safety Directive.
33 Article 9.1 of the Nuclear Safety Directive.
34 Article 9.3 of the Nuclear Safety Directive.

and the peer review system is not enforcement, as the preamble explains:

> The self-assessments followed by international peer reviews are neither an inspection nor an audit, but a mutual learning mechanism […]. The international peer reviews should be regarded as an opportunity to exchange professional experience and to share lessons learned and good practices in an open and cooperative spirit through advice by peers rather than control or judgement.[35]

The Nuclear Safety Directive sets up 'minimum obligations', as it does not prevent Member States from taking more stringent safety measures. But the Directive is rather weak in the sense that it does not go much further than what is already there on the international level, and it does not harmonize any technical standards.

4.2 The Nuclear Waste Directive

The Nuclear Waste Directive was agreed in 2011.[36] It establishes 'a Community framework for ensuring responsible and safe management of spent fuel and radioactive waste to avoid imposing undue burdens on future generations'.[37] The Directive states that it should be an 'ethical obligation' of each Member State to avoid such a burden.[38] It imposes obligations on all Member States, because all Member States generate radioactive waste, e.g., resulting from industrial, agricultural, and medical activities.[39]

In many aspects, the Directive's structure is very similar to the Nuclear Safety Directive. It is also based on international legislation, in particular the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, adopted under the aegis of the IAEA, and on the non-binding IAEA Safety Standards. The Member States are required to establish a 'national framework'[40] which *inter alia* shall provide: a system for licensing, control, and documentation; enforcement actions; national requirements for public information and participation; and a financing scheme for spent fuel and radioactive waste management.

Just like under the Nuclear Safety Directive, the Member States are required to establish a regulatory authority,[41] which shall be functionally independent. It includes equally broad requirements on licence holders,[42] and it states that the Member States shall ensure that the parties make arrangements for education and training, as well as research and development activities.[43] The Directive also establishes a reporting system and a peer review system very similar to those under the Nuclear Safety Directive.[44] Further, similar to the Nuclear Safety Directive, the Nuclear Waste Directive imposes an obligation on the Member States to inform the public on the management of nuclear waste.[45] The scope of this obligation is equally vague, and leaves space to decision-makers in the Member States. In addition, the Nuclear Waste Directive obliges the Member States to ensure that the public be given opportunities to participate in the decision-making process in accordance with national legislation and international obligations.[46]

Under the Directive, the Member States are required to establish 'national programmes' for the implementation of national policies on spent fuel and radioactive waste management. These programmes shall cover the management of waste 'from generation to disposal'. This means that Member States have to find solutions to deal with radioactive waste on a more permanent basis. The Directive states that 'storage of radioactive waste […] is an interim solution, but not an alternative to disposal'.[47] The national programmes shall, *inter alia*, include 'the overall objectives of the Member State's national policy in respect of spent fuel and radioactive waste management'

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35 Recital 21 of the Preamble of the Nuclear Safety Directive.

36 For a detailed analysis of the Nuclear Waste Directive, see Ute Blohm-Hieber, 'The Radioactive Waste Directive: A Necessary Step in the Management of Spent Fuel and Radioactive Waste in the European Union', *Nuclear Law Bulletin*, vol. 88 no. 2, 2011.

37 Article 1 of the Nuclear Waste Directive.

38 Recital 24 of the Preamble of the Nuclear Waste Directive.

39 The Nuclear Waste Directive is thus broader in scope than the Nuclear Safety Directive, which only imposes obligations for Member States with nuclear power programmes.

40 Article 5 of the Nuclear Waste Directive.

41 Article 6 of the Nuclear Waste Directive.

42 Article 7 of the Nuclear Waste Directive.

43 Article 8 of the Nuclear Waste Directive.

44 Article 14 of the Nuclear Waste Directive.

45 Article 10.1 of the Nuclear Waste Directive.

46 Article 10.2 of the Nuclear Waste Directive.

47 Recital 21 of the Preamble of the Nuclear Waste Directive.

and 'the significant milestones and clear timeframes'. Following the discussions in the Council, the Commission revised the proposal not to include a common timetable for final disposal. The national safety authorities argued that a timetable would potentially endanger the safety of disposal sites and that authorities would be pressed to grant authorization although the technical assessment would point in another direction.[48] In their national programmes, the Member States thus have to formulate their own timeframes. The national programmes shall also include descriptions of implementation activities, cost assessments, and financing schemes. The aim with these, seemingly rather soft, obligations is to 'ensure the transposition of political decisions into clear provisions'.[49] Thus, the idea is that the Member States have to formulate their policy in this area clearly, that is, they have to take concrete decisions on disposal. Member States shall notify the Commission of their national programmes, and the Commission may request clarifications.[50]

The Directive states that each Member State shall have ultimate responsibility for management of the spent fuel and radioactive waste generated in it.[51] But the Member States have very different approaches to the management of radioactive waste. Today, radioactive waste is mainly stored in temporary storage facilities. Some countries, notably Finland and Sweden, are advanced in the development of deep geological disposal sites. In the Commission's initial proposal, it required the Member States to identify and authorize the development of such sites[52] but these formulations were removed in later drafts. It should also be recalled that the Commission never included a proposal to create a common disposal facility, similar to the one that has been discussed in the United States for many years.[53] The Directive, however, recognizes Member States' wish to cooperate in such a way if they so wish.[54]

During the legislative procedure, there was disagreement in the Council on the export of radioactive waste. Both the Commission and the European Parliament suggested a ban on export to non-EU countries. The Council decided that nuclear waste could continue to be shipped to other countries, however, only under certain restrictions. Austria, Luxembourg, and Sweden abstained from voting on the Directive, because of the failure to include an export ban.[55]

4.3 The characterization of the safety regime

With this very brief account of the two Directives now behind us, how can one characterize this general framework? As explained, the two Directives largely replicate what already exists on the international level. The obligations are 'imported' from the international Conventions into the EU legal framework. But the international Conventions are widely criticized for not going far enough in that they do not impose any strict obligations on their Contracting Parties. The EU has thus created an additional 'soft layer' between the national level and the international level. Why then is EU involvement desirable? What is the value added?

The Directives make the 'international' obligations enforceable,[56] that is, the European Commission can

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48 The Commission admitted that '[a] more flexible system leaving the Member States free to fix their own dates, with respect of timetables based on the peer pressure, such as in IAEA conventions, appears therefore preferable'. Amended proposal for a Council Directive (Euratom) Laying Down Basic Obligations and General Principles on the Safety of Nuclear Installations, COM(2004)526 final.

49 Recital 28 of the Preamble of the Nuclear Waste Directive.

50 Article 13 of the Nuclear Waste Directive.

51 Article 4.1 of the Nuclear Waste Directive.

52 Proposal for a Council Directive (Euratom) on the Management of Spent Nuclear Fuel and Radioactive Waste, COM(2003)32 final.

53 Richard B. Stewart, *U.S. Nuclear Waste Law and Policy: Fixing a Bankrupt System*, New York University School of Law, Public Law and Legal Theory Research Paper Series, Working Paper No. 09-28; Law & Economic Research Paper Series, Working Paper, No. 09-22, May 2009.

54 Recital 33 of the Preamble reads: 'Some Member States consider that the sharing of facilities for spent fuel and radioactive waste management, including disposal facilities, is a potentially beneficial, safe and cost-effective option when based on an agreement between the Member States concerned'.

55 In a Joint Declaration, these countries state that they 'regret that the Community has not been able to confirm its full responsibilities to take care of its own spent fuel and radioactive waste, by accepting the possibilities to export waste for disposal in third countries'. See Council of the European Union, 8 July 2011, Brussels, doc.12248/11, Annex II.

56 Indeed, the Directives fill some of the gaps in the international regime. For example, the Nuclear Safety Directive covers all kinds of civilian reactors, and in that sense, it has a wider scope than the Nuclear Safety Convention.

initiate an infringement procedure if a Member State should fail to implement the Directives. This is to make the Member State comply voluntarily with its obligations. If the Member State does not comply, the Commission may refer the case to the Court of Justice of the European Union.[57] Such a mechanism is missing in the international Conventions, which merely relies on a peer review system. The idea is that peer pressure creates 'incentives' for the contracting parties to comply. Indeed, the Nuclear Safety Convention and the Joint Convention state that they are 'incentive instruments'. But the Directives are clearly more than that. They also include peer review systems, but the peer pressure is at most to be described as a mechanism that adds to the regular enforcement mechanism. Instead, as previously mentioned, the main function is to develop and exchange experience, and as a means of building confidence and trust.[58]

Both Directives are so-called framework Directives, which can be defined as 'laws which are binding as to their aim but leave discretion as to the manner of implementation'.[59] They both aim at establishing a Community framework in their respective fields, and they leave autonomy for the Member States in implementation. Indeed, the Directives set up a very flexible framework for the Member States, stating that 'national circumstances' will be taken into account when the Member States develop their national framework.

As explained, the Commission advocated a more harmonized approach than the one eventually agreed upon. The Commission had to remove any phrasing that would imply the development of common safety standards. Common technical standards are thus missing from the Directives. These 'gaps' are filled by standards from international bodies, such as the IAEA, and European 'informal' bodies, such as the Western European Nuclear Regulators' Association (WENRA), which is composed of the regulatory authorities in the Member States having nuclear power programmes. The Directives emphasize the importance of these norm-creating actors, and they encourage Member States to implement the developed standards.[60] The Nuclear Safety framework thus needs to 'import' norms from other *fora* in order to be comprehensive.

The Directives can thus be characterized as a framework for cooperation which includes general and open-ended guidelines rather than rigid rules and straightforward safety standards. They include some 'bottom-up' and 'soft' mechanisms that resemble methods used under the 'Open Method of Coordination' (OMC), which is a tool for EU governance, applied initially for areas where the EU's legislative competence is rather limited, such as employment, pensions, health care, and education. But OMC-like mechanisms are also applied in areas where the EU has substantial legislative powers.[61] Environmental law is perhaps the most conspicuous example, and nuclear safety can now be added to that category. Like the OMC, the Directives provide for the pooling of information through the adoption of national reports, which are subject to peer review. They also rely on participation by civil society to provide legitimacy: they include provisions on transparency, which have a legitimizing effect on the national provisions.

There is only a rather limited element of OMC-like mechanisms, however, as self-assessment and peer review will only take place every 10 years. More importantly, the Directives apply a 'soft' language. For example, the Nuclear Waste Directive obliges Member States to ensure that the national framework requires licence holders to 'assess, verify and continuously improve, *as far as is reasonably achievable*, the safety of the radioactive waste and spent fuel management facility'.[62] Similar 'soft' formulations are found in the Nuclear Safety Directive.

However, this does not mean that the Nuclear Framework could be characterized as 'soft law'. As Trubek *et al* point out, '"Soft law" is a very general term, and has been used

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57 See Article 258 TFEU. Article 106a Euratom refers to this provision. The same provision thus applies to the EU Treaties and to the Euratom Treaty.

58 Recital 40 of the Preamble to the Nuclear Waste Directive, see also Recital 21 of the Preamble to the Nuclear Safety Directive.

59 Gráinne de Búrca and Joanne Scott, 'Introduction' in Gráinne de Búrca and Joanne Scott (eds.) *Law and New Governance in the EU and the US*, Oxford, Hart, 2006.

60 In 2007, the EU created its own nuclear safety body, ENSREG, which consists of the same members as WENRA. Membership of WENRA, however, does not require EU membership.

61 David Trubek and Louise Trubek, 'Hard and Soft Law in the Construction of Social Europe: The Role of the Open Method of Co-ordination', *European Law Journal*, vol. 11, 2005, p. 362.

62 Article 7.2 of the Nuclear Waste Directive.

to refer to a variety of processes. The only common thread among these processes is that while all have normative content they are not formally binding.'[63] The Directives are 'hard law' in the sense that they have legally binding force, and are enforceable. Non-complying states are exposed to sanctions and litigation in the Court of Justice of the European Union. They have been adopted through 'the Community Method', by the central law-making EU institutions. In this sense, the Directives add a 'hard layer' between the national level and the international level. But, as explained, the Directives also include 'soft' elements. The Nuclear Safety Framework is thus not soft law but 'hard law' with a soft content.[64] Given this combination of soft and hard mechanisms, perhaps the EU Nuclear Safety Regime is best characterized as a 'hybrid'.[65]

Are there merits of this 'hybrid' approach? Or should one lament the inability of the Member States to adopt a more harmonized framework? Should it be regarded as a second-best solution? While 'soft law' is often criticized for lacking clarity and precision, it can also 'address broad common concerns while respecting national diversity'.[66] The application of soft language can accommodate different structures and interests, and Member States can adapt their commitments to their particular situation. This also means that the 'sovereignty costs' are lower. In addition, a soft framework is flexible, which is important in a technology driven environment that demands constant adjustment. One should also consider that a hard law solution might not always be more 'efficient'. As Trubek points out, when Member States are transposing Directives into national legislation, 'there is substantial room for delay and slippage', and enforcement may also prove difficult.[67]

Conversely, a hard law approach could strengthen the regulator's independence.[68] Further, as often pointed out, the EU is the first regional actor that has established a legally binding framework for nuclear safety. The Commission points out that 'Europe becomes a real model for the rest of the world in a context of renewed interest in nuclear energy'.[69] With its own legislation on nuclear safety and nuclear waste management, the EU could build on this as a norm exporter, and encourage other regional actors or countries to take similar steps.[70] But the question is how credible the EU actually is, since there are no common technical standards, and since the framework appears to be as 'soft' as the international framework. As the only regional actor with a legally binding framework for nuclear safety and nuclear waste management in place, however, the EU could at least have some possibilities to exert external influence.

The Directives could probably best be described as a first step towards more 'hard law Directives', i.e., as a precursor to harder forms of legislation. This is what some commentators hope for when it comes to the international Conventions, and this should possibly be easier to achieve within the EU. But given the Member States' diverse views on nuclear energy, what are the prospects for a strengthened framework?

5 Post Fukushima: Towards Common Technical Standards?

Following the Fukushima accident, the European Council decided that a comprehensive and transparent risk and safety assessment would be carried out throughout the EU.[71] These so-called 'nuclear stress tests' aimed to assess whether the safety margins used in the licensing of nuclear power plants were sufficient to cover unexpected events, such as risks of flooding, earthquakes, aircraft accidents, cooling system instability, local electricity supply failure and cyber and terrorist attacks. The stress tests began in June 2011, after the Member States had agreed on the

63 David M. Trubek, Patrick Cottrell, and Mark Nance, '"Soft Law," "Hard Law," and European Integration: Toward a Theory of Hybridity', in Gráinne de Búrca and Joanne Scott (eds.), *Law and New Governance in the EU and the US*, Oxford, Hart, 2006, pp. 65-94.

64 Trubek and Trubek, 'Hard and Soft Law in the Construction of Social Europe', pp. 355-361.

65 On 'hybridity', see for example, Trubek, Cottrell, and Nance, '"Soft Law," "Hard Law," and European Integration.

66 Ibid.

67 Trubek and Trubek, 'Hard and Soft Law in the Construction of Social Europe', p. 361.

68 See ENSREG: Discussion document on consequences of EU instruments in the field of nuclear safety, final report, 31 March 2009.

69 See the European Commission website http://ec.europa.eu/energy/nuclear/safety/safety_en.htm (last accessed 28 July 2012).

70 On the EU as a norm exporter generally, see for example Ian Manners, 'Normative Power Europe: A Contradiction in Terms?', *Journal of Common Market Studies*, vol. 40, no. 2, 2002, pp. 235-258.

71 See the conclusions of the European Council (24/25 March 2011), EUCO 10/1/11 REV 1.

details. The nuclear operators and the national regulators, in collaboration with the Commission, are in charge of the nuclear safety stress tests, which consist of an assessment phase, and a peer review phase.

When the European Council decided on these stress tests, it also gave a mandate to the Commission to 'review the existing legal and regulatory framework'. The Commission accordingly started this process in parallel with carrying out the stress tests. The Commission presented its final results from the stress tests in October 2012.[72] By early 2013, it will present some initiatives to strengthen the nuclear safety framework. The Commission explains that it will focus on the following areas:

> (1) Improving technical measures for safety, and improving the necessary oversight to ensure full implementation, (2) improving the governance as well as the legal framework of nuclear safety, (3) improving emergency preparedness and response, (4) reinforcing the EU nuclear liability regime and (5) enhancing scientific and technological competence.[73]

Some of these areas concern the two Directives discussed above, but some of them do not. For example, nuclear liability is connected, but does not traditionally belong to the field of 'nuclear safety'. And long before the Fukushima accident, there were discussions on the adoption of EU measures on nuclear liability.

What are the actors forming the content in the new initiatives? According to the Commission, the initiatives will be based on the preliminary findings of the national reports, on discussions at international level, and on stakeholders' input. The Commission has also held a public consultation. But there is no doubt that some 'informal' bodies such as WENRA play a major role in forming the content of the initiatives. This is already clear from the Nuclear Safety Directive, which emphasizes WENRA's role in setting technical standards.[74] If the new initiatives include provisions on common technical standards, it might be the case that it is WENRA's standards that lead to codification. A similar development can also be seen in other sectors, where private or 'informal' bodies develop standards, which are later codified into hard law.

The principle of national responsibility is a fundamental principle in the international Conventions governing nuclear safety. What restraints does this principle pose on the EU legislator? The Euratom is a party to the Conventions, and one might argue that it is under an international law obligation to respect this principle. Euratom is thus restrained under its international obligations to adopt legislation that would shift the responsibility from the Member States to the Community. In addition, the principle of national responsibility is no longer 'merely' an international principle; it is included in the recently adopted Directives, and is thus a part of the EU acquis itself. If the 'stress tests' were to be codified in EU legislation (or if the EU legislator should otherwise include common technical standards), would this shift the responsibility for nuclear safety from the Member States to the EU? Would the principle be put into question? The answer is clearly no. Under the current scheme, the stress tests shall be carried out by 'independent national authorities and through peer review'. It is thus the national authorities that are responsible for the stress tests. The role of the Commission is to present a report to the European Council on the outcome of the tests and the results from the peer review. If the tests are made legally binding, it is likely that the EU legislator will keep this construction. Further, the fact that the Commission can initiate an enforcement procedure against a non-compliant state does not mean that the responsibility shifts to the EU institutions. The principle does not set up restrictions on the adoption of progressive EU initiatives in this field.

As explained above, there was a long and difficult process to adopt the EU legal framework for nuclear safety. The result is two rather weak Directives. The Fukushima accident provides a window of opportunity for a strengthened legal framework. Some issues that previously were seen as politically sensitive could now perhaps be agreed on. And the stress tests can be seen as a tool to illustrate a need for a more harmonized approach.

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[72] See Communication from the Commission to the Council and the European Parliament on the Comprehensive Risk and Safety Assessments ('stress tests') of Nuclear Power Plants in the European Union and Related Activities, COM(2012) 287 final.

[73] See Communication from the Commission to the Council and the European Parliament on the Interim Report on the Comprehensive Risk and Safety Assessments ('stress tests') of Nuclear Power Plants in the European Union, COM(2011) 784 final.

[74] 'It is useful to build on the process where the national safety authorities of the Member States having nuclear power plants on their territory have been working together in the context of the Western European Nuclear Regulators' Association (WENRA) and have defined many safety reference levels for power reactors.' See Recital 14 of the Preamble.

Unsurprisingly, in the interim report on the stress tests, the Commission claims that there are indications that the national regulators have 'different approaches to safety and use varying criteria to define safety improvements'.[75] In the final report on the stress tests, the Commission confirms its view:

> The stress tests [...] have confirmed that there are not only significant differences between Member States, but also gaps in ensuring comprehensive and transparent identification and management of key safety issues. Moreover a number of weaknesses with the existing EU nuclear safety framework have been identified.[76]

Indeed, European integration seems to proceed much faster in other policy areas, which appear at least equally politically sensitive as nuclear safety.[77] But despite the fact that the EU Member States are so divided on nuclear energy, they should at least be able to find common ground on safety issues. With a strengthened framework, the EU has perhaps most to gain as an international actor. If it is to assume responsibility on the international scene and be a credible 'norm exporter', it is not enough that it has an internal legal framework that is barely 'harder' than the international Conventions in the field, which are renowned for their 'softness'. And strong actors in the field of safety might be needed in a world where the need for energy will just continue to grow.

[75] COM(2011)784 final.
[76] COM(2012) 287 final.
[77] E.g., judicial cooperation in criminal matters.

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