Foreign Investment, International Law and Common Concerns

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15 Foreign Investments in the Offshore Energy Industry

Investment Protection v. Energy Security v. Protection of the Marine Environment

Seline Trevisanut

15.1 Introduction

The offshore energy sector has greatly expanded in the last 20 years. The reasons are manifold. Technological development has allowed exploiting resources located deeper and farer away from the coast. Concerns for the environmental consequences of fossil fuels' exploitation and for their depletion have caused an increase in the exploitation of offshore natural gas and the development of offshore renewable energy sources. The offshore energy industry is a major sector of foreign investments. For example, the Sakhalin Island, located on the Russian Pacific coast and very rich in offshore oil and gas, is with Moscow the leading destination for foreign investment in Russia.[1]

Offshore energy projects touch upon several fields of international law: law of the sea, environmental law, economic international law and international energy law. They implicate multiple jurisdictions, with the location of the resource, the path of the distribution system, the source of the capital/investment and the final destination of the product. Investments in offshore energy projects do not consist only of the installation or structure, but include also the distribution system. The two are not necessarily located within the jurisdiction of a single coastal state.[2]

Another peculiarity of offshore energy projects is the close connections between them in the event of a major incident. Take the incident of the

1 R.N. Dean and M.P. Barry, 'A Conflict of Interest for Russia: Offshore Oil vs. the Problems of Environmental Regulation', in M.H. Nordquist, J.N. Moore and A.S. Skaridov (eds), *International Energy Policy, the Arctic and the Law of the Sea*, Leiden/Boston: Martinus Nijhoff, 2005, p. 215. See also the UNCTAD, *World Investment Report 2012: Towards a New Generation of Investment Policies*, Geneva, 2012, p. 57. Online. Available: http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/WIR2012_WebFlyer.aspx (accessed 1 October 2012).

2 The distribution system and the consequent transit of energy pose problems which are not discussed here. On the issue, see *inter alia* L. Ehring and Y. Selivanova, 'Energy Transit', in Y. Selivanova (ed.), *Regulation of Energy in International Trade Law, WTO, NAFTA and Energy Charter*, Alphen aan den Rijn: Kluwer Law International, 2011, pp. 49 ff.

Deepwater Horizon – a 350 million USD offshore oil-drilling rig, which operated more than 1,500 m deep in the Gulf of Mexico. Following an explosion in April 2010, killing 11 crewmembers, the rig sank and an oil spill affected more than 1,000 km of coastline. It severely damaged the environment, caused immense costs for the private economy in the region, and continues to weigh heavily on the public budget.[3] The National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling pointed out that this disaster 'stopped all drilling in the Gulf for a period of time and cost virtually all oil and gas companies involved in that region a great deal of money'.[4] Not only the marine environment, but also the other investments in the area of a major disaster are at stake and might suffer serious consequences from it.

The present chapter wants to identify and discuss the legal challenges posed by the offshore energy industry in the light of the relevant international legal framework, which is fragmented among the different fields of international law mentioned above, and among different sectors of activities (e.g., oil and gas industry, renewable energy). It aims to assess the inadequacy of such a legal framework in order to deal with the protection of three common concerns, which are threatened by the existing situation: the protection of marine environment, energy security, and the protection of foreign investments in offshore energy projects.

The increasing participation of private investors in the offshore energy sector raises some specific problems. As has been pointed out: 'Contracts between energy companies and host governments are unique transactions. The duration of energy contracts and risk exposure is long-term, capital investment is intensive, and the project risk (geological, commercial, and political) is particularly acute'.[5] This statement is particularly salient concerning offshore energy production where the investor bears considerable costs before the beginning of the production: the study for locating and estimating the resource; the construction of the platform or installation which cannot be used anywhere else; the construction of pipelines or other distribution system.[6] On the other side, the host state often fears that the firm operating

3 See, *inter alia*, R. Abeyratne, 'The Deepwater Horizon Disaster – Some Liability Issues', *Tulane Maritime Law Journal*, 2010, vol. 35, p. 125.

4 National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *Industry's Role in Supporting Health, Safety, and Environmental Standards: Options and Models for the Offshore Oil and Gas Sector*, Staff Working Paper No. 9, p. 13. Online. Available: http://www.oilspillcommission.gov (accessed 1 October 2012). US President Barack Obama established this Commission through the Executive Order 13543 on 21 May 2010.

5 M. Flores, 'A Practical Approach to Allocating Environmental Liability and Stabilizing Foreign Investment in the Energy Sectors of Developing Countries', *Colorado Journal of Environmental Law and Policy*, 2001, vol. 12, p. 147.

6 P.B. Stephan, 'Energy Development and Distribution – What Can the Law Do?', in Nordquist, Moore, and Skaridov (eds), op. cit., p. 202.

the structure will hide or steal part of the production. The private investor wants to render its investment as valuable as possible and at the same time protect its assets, the host state wants to have guarantees concerning the implementation of the investment, which is of fundamental importance for its economy as well as its energy security.

The chief concern for energy security is vulnerability to disruption of energy supply,[7] which concerns net energy importers, of energy demand, which concerns net energy exporters, and of receiving a reasonable return on investment, which concerns transit countries.[8] More specifically, the chief concern for energy security is vulnerability to politically motivated disruption: 'Political turmoil, armed conflict, terrorism, piracy, natural disasters, nationalism and geo-political rivalry threaten to various degrees to interrupt the everyday trade in oil, natural gas, coal and electricity'.[9] The existing legal framework gives little guarantees against such risks, which are usually dealt with following 'an investment protection approach', but not an energy security approach.

Offshore energy projects have moreover a considerable impact on the marine environment, of whose protection the coastal state is in charge under international law. The main impacts of offshore oil and gas industry on the marine environment include tanker spills (daily and incidental), discharge of drilling muds and cuttings, pipelines (oil spills), and seismic surveys (effects on marine mammals).[10] Even if the renewable energy sector is a very important tool for mitigating climate change effects and for ensuring energy supply by replacing fossil fuels, it has a considerable impact on the marine environment.[11] For instance, the construction of barrages and dams can affect other uses of the coastal area such as navigation and fisheries as well as the natural habitat of the local species. Furthermore, some renewable energy technologies

7 The possible disruption of energy supply is even more problematic if the always increasing need of energy is taken into consideration. According to the World Energy Outlook 2010, the global demand for primary energy will be, by 2035, 36 per cent higher than in 2008. See IEA, *Word Energy Outlook 2010*, Paris, p. 77. Online. Available: http://www.worldenergyoutlook.org/media/weo2010.pdf (accessed 1 October 2012). Similar, but slightly diverging, projections have been elaborated by ExxonMobil: 'Global energy demand will be about 30 percent higher in 2040 compared to 2010': see ExxonMobil, *2012 The Outlook for Energy: A view to 2040*, p. 1. Online. Available: http://www.exxonmobil.com/Corporate/files/news_pub_eo.pdf (accessed 1 October 2012).

8 G. Coop, 'Preface' to 'The Energy Charter Treaty's Investor Protection Provisions: Potential to Foster Solutions to Global Warming and Promote Sustainable Development', in M.-C. Cordonier Segger, M.W. Gehring and A. Newcombe (eds), *Sustainable Development in World Investment Law*, Alphen aan de Rijn: Kluwer Law International, 2011, p. 511.

9 OECD, *Competition, International Investment and Energy Security*, December 2007, p. 2. Online. Available: http://www.oecd.org/dataoecd/3/19/40699061.pdf (accessed 1 October 2012).

10 Dean and Barry, op. cit., pp. 221 ff.

11 R. Pelc and R.M. Fujita, 'Renewable Energy from the Ocean', *Marine Policy*, 2002, vol. 26, p. 471.

use pollutant elements, such as ammoniac,[12] whose impact on the environment has not yet been completely assessed.

In order to gauge how these three common concerns find a balance and consider if one of them should prevail, the following analysis falls into three main sections. Section 15.2 gives a brief and not exhaustive overview of the relevant legal framework. Section 15.3 critically discusses the main challenges posed by the offshore energy industry in light of recent technological and normative developments. Section 15.4 presents some concluding remarks, which suggest 'an integrated, interdisciplinary and intersectorial approach'[13] to the offshore energy sector in order to find a balance between the protection of foreign investments, the protection of the marine environment and energy security.

15.2 Regulating the Offshore Energy Industry

The offshore energy sector touches upon four main fields of international law: the law of the sea because of its physical location; environmental law because of its impact on the marine environment; investment law because it is an economic sector that highly attracts foreign investments; and, quite self-evidently, energy law. The interplay of these sectors is not necessarily conflicting. To the contrary, common and supportive tools exist in the law of the sea and environmental law (section 15.2.1). In addition, energy law has developed in close connection with investment law (section 15.2.2).

15.2.1 Law of the Sea and International Environmental Law

Considered the 'Constitution for the oceans',[14] the United Nations Convention on the Law of the Sea (LOSC)[15] is supposed to set out 'the legal framework within which all activities in the oceans and seas must be carried out.'[16] The

12 For example, the Ocean Thermal Energy Conversion (OTEC) harnesses the solar energy stored in the ocean's waters by using the temperature difference between warm surface water and cold deep water to spin a turbine and generator. The warm seawater heats a fluid with a low boiling point, such as ammonia. OTEC impacts the surrounding marine environment by heating the water, which might induce algal growth and changes in the microclimate, and by eventually releasing toxic chemicals. See Pelc and Fujita, op. cit., p. 473; M. Tsamenyi and M. Herriman, 'Ocean Energy and the Law of the Sea: The Need for a Protocol', *Ocean Development and International Law*, 1998, vol. 29, p. 9.

13 *Oceans and the Law of the Sea*, UNGA resolution 60/30, 8 March 2006, p. 2.

14 See the remarks by the President of the Third United Nations Conference on the Law of the Sea, Tommy T.B. Koh, at the final session of the Conference, on 6 and 11 December 1982. Online. Available: http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm (accessed 1 October 2012).

15 Entered into force 16 November 1994.

16 See *Oceans and the Law of the Sea*, UN Doc. A./RES/62/215, 22 December 2008.

LOSC does not of course regulate all maritime activities. It divides the oceans into multi-jurisdictional zones:[17] internal waters and territorial sea, the contiguous zone, the exclusive economic zone (EEZ), the continental shelf, high seas and the area of the deep seabed. It affirms and regulates the rights and obligations of states in each zone. It creates a legal framework which is not rooted exclusively in the concept of sovereignty and in its extension over adjacent maritime areas, but which is also anchored in the notion of jurisdiction, specifically of functional jurisdiction;[18] that is, the exercise of jurisdiction in areas where states do not have full sovereignty and which is functional to the implementation of rights and duties provided by the LOSC.

Offshore energy projects can be located in territorial waters, on the continental shelf or in the EEZ. In territorial waters, the coastal state fully exercises its sovereignty (Art. 2 LOSC). The continental shelf is the submerged prolongation of the coastal state's landmass (Art. 76 LOSC), where the coastal state exercises '*sovereign rights* for the purpose of exploring and exploiting its natural resources' (Art. 77.1 LOSC, emphasis added). Those rights 'do not depend on occupation, effective or notional, or on any express proclamation' (Art. 77.3 LOSC). In the EEZ, after due proclamation, the coastal state exercises '*sovereign rights* for the purpose of exploring and exploiting, conserving and managing the natural resources, *whether living or non-living*, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to *other activities for the economic exploitation and exploration* of the zone, such as the *production of energy* from the water, currents and winds' (Art. 56.1(a) LOSC, emphasis added).[19]

The meaning of 'sovereign rights' remains unclear,[20] except that it is something less than full sovereignty.[21] In fact, as far as the EEZ is concerned, sovereign rights do not exist without an explicit proclamation of the zone. Moreover, in the EEZ foreign states continue to enjoy the freedoms of the high seas (Art. 58 LOSC), among which 'the freedom to construct artificial islands, and other installations permitted under international law, subject to

17 Y. Tanaka, *A Dual Approach to Ocean Governance*, Farnham: Ashgate, 2008, p. 5.

18 M. Gavouneli, *Functional Jurisdiction in the Law of the Sea*, Leiden: Martinus Nijhoff, 2007; W. Riphagen, 'Some Reflections on "Functional Sovereignty"', *Netherlands Yearbook of International Law*, 1975, vol. 6, pp. 121 ff.

19 Offshore energy projects could also be located in areas beyond national jurisdiction, i.e. on the high seas (Arts 86 ff. LOSC) and in the Area of the deep seabed (Arts 133 ff. LOSC). However, the existing technology does not allow yet the realization of projects in those areas and, consequently, their legal framework is not analysed in the present chapter.

20 Gavouneli, op. cit., p. 64.

21 Ibid. According to the International Law Commission, these rights include 'all rights necessary for and connected with the exploitation of the continental shelf [including] jurisdiction in connection with the prevention and punishment of violations of the law'; as reported in R.R. Churchill and A.V. Lowe, *The Law of the* Sea, 3rd edition, Manchester: Manchester University Press, 1999, p. 151.

Part VI [on the continental shelf]' (Art. 87.1(d) LOSC). The sovereign rights of the coastal state are limited *ratione materiae* to the economic exploration and exploitation of the natural resources of its continental shelf and its EEZ.[22]

Within their EEZ and continental shelf, coastal states have an 'exclusive right to construct and to authorize and regulate the construction, operation and use of: a) artificial islands; b) installations and structures for the purposes provided for in Art. 56 and other economic activities' (Arts 60.1 and 80). Over the continental shelf, coastal states have sovereign rights 'for the purpose of exploring and exploiting, conserving and managing' 'the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species' (Art. 77 LOSC). Coastal states also have 'the exclusive right to authorize and regulate drilling on the continental shelf for all purposes' (Art. 81 LOSC).

Coastal states have a duty to protect and preserve the marine environment in relation to the exploration, development, and production of non-living resources (Arts 194, 208, 214). They have a duty to ensure that pollution arising from activities within their jurisdiction and control does not extend beyond those areas (Art. 194). If there is an imminent risk of damage to the marine environment, the coastal state has an obligation to notify any other state, which might be affected by such damage (Art. 198). The LOSC similarly provides for the protection of the marine environment from activities in the area of the deep seabed (Arts 145, 209, 215, 221 LOSC).

Art. 208 of the LOSC regulates the prevention, reduction and control of the pollution from seabed activities subject to national jurisdiction, for instance the pollution generated by the offshore extractive industry located in the EEZ or continental shelf. Coastal states are required to adopt laws, regulations and measures that 'shall be no less effective than *international rules, standards and recommended practices and procedures*' (Art. 208.3, emphasis added).[23] Moreover, states, 'acting especially through *competent international organizations or diplomatic conference*, shall establish global and regional rules, standards and

22 Y. Tanaka, *The International Law of the Sea*, Cambridge: CUP, 2012, p. 126. Tanaka also recalls Art. 2 of the 1958 Geneva Convention on the Continental Shelf: 'The rights referred to in paragraph 1 of this Article [sovereign rights] are exclusive in the sense that if the coastal state does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal state'; ibid., p. 127.

23 The LOSC does not define concepts such as 'international rules', 'standards' and 'recommended practices and procedures', which remain vague also in practice. See Churchill and Lowe, op. cit., p. 346; B. Oxman, 'The duty to Respect Generally Accepted International Standards', *New York University Journal of International Law and Politics*, 1991–92, vol. 24, pp. 109 ff.; S. Trevisanut, 'La Convention des Nations Unies sur le droit de la mer et le droit de l'environnement : développement intrasystémique et renvoi intersystémique', in H. Ruiz Fabri and L. Gradoni (eds), *La circulation des concepts juridiques : le droit international de l'environnement entre mondialisation et fragmentation*, Paris: Société de législation comparée, 2009, pp. 416 ff.

recommended practices and procedures to prevent, reduce and control pollution of the marine environment referred to in paragraph l' (Art. 208.5, emphasis added). This provision builds an important bridge between the LOSC and other relevant normative sources, which do not necessarily generate from treaties but derive from the work of relevant actors, such as international organizations, diplomatic conferences, and professional associations which develop recommendations and best practices in a specific economic sector.

Art. 237 of the LOSC consists of a specific compatibility clause between the convention and obligations deriving from other agreements on the protection and preservation of the marine environment.[24] This provision facilitates the application of the LOSC in the relevant normative context and of environmental law instruments in the context of marine environment protection.[25] Many international instruments are relevant for the protection of the marine environment in the context of offshore activities. Leaving aside the regional mechanisms of cooperation,[26] it is worth noticing that there are no specific instruments regulating the pollution generated by the offshore industry. There are instruments tackling a particular source of pollution and its consequences, e.g. the 1972 London Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter and the 1996 Protocol thereto,[27] the 1969 Convention on Civil Liability for Oil Pollution Damage[28] and the 1971 Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.[29] There are then instruments which regulate wider questions relevant for the protection of the environment and which provide for specific obligations concerning the protection of the marine environment. For instance, the 1991 Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)[30] and the 1992 Rio Declaration on Environment and

24 Art. 237 LOSC: '1. The provisions of this Part are without prejudice to the specific obligations assumed by States under special conventions and agreements concluded previously which relate to the protection and preservation of the marine environment and to agreements which may be concluded in furtherance of the general principles set forth in this Convention. 2. Specific obligations assumed by States under special conventions, with respect to the protection and preservation of the marine environment, should be carried out in a manner consistent with the general principles and objectives of this Convention.'

25 Trevisanut, op. cit., pp. 414 ff.

26 See above, note 5; see also the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters of the United Nations Economic Commission for Europe, entered into force 30 October 2001. Online. Available: http://ec.europa.eu/environment/aarhus/ (accessed 1 December 2012).

27 Respectively entered into force 30 August 1975 and 24 March 2006.

28 Entered into force 19 June 1975, being replaced by 1992 Protocol, entered into force 30 May 1996.

29 Entered into force 16 October 1978, superseded by 1992 Protocol, entered into force 30 May 1996.

30 Entered into force 10 September 1997.

Development[31] contain an obligation of environmental impact assessment, which applies to the offshore sector. The United Nations Framework Convention on Climate Change (UNFCCC)[32] and the 1992 Convention on Biological Diversity (CBD)[33] apply in areas submitted to the jurisdiction of the coastal state, i.e. its continental shelf and EEZ, and integrate principles such as the precautionary principle and the sustainable development in the context at stake.[34]

15.2.2 International Investment and Energy Law

Foreign investments in the offshore energy sector are submitted to international investment law just like any other foreign investment. The relevant bilateral investment treaties (BITs) are thus applicable (when natural resources are not expressly excluded from their scope of application),[35] as well as multilateral investment treaties and investments chapters in free trade agreements, which are discussed in detail in other chapters of the present volume.[36] However, because of the specificities of the energy sector highlighted in the Introduction, in particular the longevity of the investment, the important costs investors bear before getting any profit, the strategic importance of the energy sector for states, and the consequent need for stability in the relationship between the investors and the host states,[37] some instruments contain dedicated chapters, such as the North American Free Trade Agreement (NAFTA),[38] and there also exists a dedicated instrument, i.e. the Energy Charter Treaty (ECT).[39]

31 UNGA, *Report on the United Nations Conference on Environment and Development*, Annex I, doc. A/CONF.151/26 (vol. I), 12 August 1992.

32 Entered into force on 21 March 1994. The role of climate change instruments in encouraging the development of the sector of the offshore renewable energy sector is analysed below, see *infra* section 15.2.2.

33 Entered into force 29 December 1993.

34 In general, on the relationship between multilateral environmental treaties (MEAs) and the investment sector, see in this volume the chapter by F. Romanin Jacur.

35 For instance, investments in natural resources are excluded from protection under the BITs concluded by Russia; see S. Nappert and F. Ortino, 'International Resolution of Energy Trade and Investment Disputes', in Selivanova (ed.), op. cit., p. 318.

36 See, in particular, in this volume the chapter by M. Potestà.

37 Y. Selivanova, 'The Energy Charter and the International Energy Governance', in Selivanova (ed.), op. cit., p. 381.

38 Entered into force 1 January 1994; see Chapter 11 on investment and Chapter 6 NAFTA on the exploration, production and distribution of energy goods. For a comment, see R. Rios Herrán and P. Poretti, 'Energy Trade and Investment under the North American Free Trade Agreement', in Selivanova (ed.), op. cit., pp. 335 ff. Some other regional integration processes deal directly with trade and investment in energy: Association of Southeast Asian Nations (ASEAN); Mercado Común del Sur (MERCOSUR); Asia-Pacific Economic Cooperation (APEC); Free Trade Area of the Americas (FTAA).

39 Entered into force 16 April 1998. The ECT regulates investments but also the trade and transit of energy. The present contribution is focusing only on the ECT provisions dealing

Under Chapter 6 of NAFTA, 'energy and basic petrochemical goods refer to those goods classified under the Harmonized System' (Art. 602.2), which also includes electricity. However, Chapter 6 of NAFTA does not cover energy-related goods, such as equipment used in the different segments of the energy industry, from exploration and drilling machineries, to refining and electrical equipment, to wind and solar energy equipment, such as turbines and solar-voltaic panels.[40] Conversely, the scope of investment protection under the ECT is wider in view of the definitions of 'economic activity in the energy sector' and 'investments' (Art. 1 paras 5–6 ECT). In fact, the former means 'an economic activity concerning the exploration, extraction, refining, production, storage, land transport, transmission, distribution, trade, marketing, or sale of energy materials and products',[41] and also the 'construction and operation of power generation facilities, including those powered by wind and other renewable energy sources'.[42]

Art 18.1 of the ECT recognizes 'state sovereignty and sovereign rights over energy resources'. The ECT also clearly states that it 'shall in no way prejudice the rules in Contracting Parties governing the system of property ownership of energy resources' (Art. 18.2). This affirmation originates from the doctrine of the permanent sovereignty over natural resources.[43] It does not add anything to what has already been secured under international law[44] with, in particular, UN General Assembly's resolutions 1803, 3201 and 3281,[45] and the above mentioned LOSC provisions. The meaning of the expression 'energy resources' is however not specified. This might be problematic in order to apply the ECT to renewable energy technologies, which use natural elements, such as water, wind and sun, as energy resources.

with the protection of foreign investments (Part III on Investment Promotion and Protection) and of the environment (Art. 19).

40 Those goods can eventually fall under the definition of investment contained in Art. 1139 NAFTA. See Rios Herrán and Poretti, op. cit., pp. 350 ff.

41 See Annex EM, Energy Materials and Products (in accordance with Art. 1(4)), which lists energy materials and products: nuclear energy (e.g., uranium, other radioactive chemical element, heavy water), coal, natural gas, petroleum, petroleum products and electrical energy.

42 Final Act of the European Energy Charter Conference, para. IV.2(ii). Online. Available: http://www.encharter.org/fileadmin/user_upload/document/EN.pdf#page=55 (accessed 12 December 2012).

43 For a general discussion on the topic, see R. Barnes, *Property Rights and Natural Resources*, Oxford: Hart Publishing, 2009; N. Schijver, *Sovereignty over Natural Resources: Balancing Rights and Duties*, Cambridge: CUP, 2007.

44 See P.D. Cameron, *International Energy Investment Law, The pursuit of Stability*, Oxford: OUP, 2010, p. 30.

45 Respectively, Permanent Sovereignty over Natural Resources, UNGA resolution 1803 (XVII), 14 December 1962; UN Declaration on the Establishment of a New Economic Order, UNGA resolution 3201 (S-6), 1 May 1974; Charter of Economic Rights and Duties of States, UNGA resolution 3281 (XXIX), 12 December 1974.

The exercise of sovereignty over energy resources entails duties.[46] The ECT Preamble recognizes 'the necessity for the most efficient exploration, production, conversion, storage, transport, distribution and use of energy', recalls the UNFCCC and 'other international environmental agreements with energy-related aspects', and recognizes 'the increasingly urgent need for measures to protect the environment, including the decommissioning of energy installations and waste disposal, and for internationally-agreed objectives and criteria for these purposes.' Concerning environmental issues, on the one hand, Art. 19 provides that 'each contracting party strive to minimize, in an economic efficient manner, harmful environmental impacts resulting from all operations within the energy cycle in its area'. The Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA), on the other hand, obliges the contracting parties to formulate policies for improving energy efficiency and reducing adverse negative environmental impact of energy production or use.[47]

Pursuant to Art. 27.2 of the ECT, the remedy of inter-state arbitration is not available for disputes arising from the interpretation of ECT provisions concerning environmental issues, i.e. Art. 19, unless the parties decide otherwise. The eventual damaged investor can anyway resort to investor–state arbitration, according to Art. 26 of the ECT.[48] This remedy is particularly important in the energy sector where most investments are made on the basis of individual contracts between the investor and the state. Under the ECT, a breach of an individual investment contract by the host country becomes a violation of the treaty itself (Art. 10(1)).[49] This is particularly important in relation to the protection of investors in 'clean energy projects', which are largely based on local support scheme or governmental incentives.[50] In the light of the considerable governmental presence and the long-term nature of energy projects, stabilization clauses play a major role in energy contracts.[51]

46 Schrijver, op. cit., p. 168. Concerning the duties of states in relation to expropriation, see in this volume the chapter by P. Vargiu.

47 Schrijver, op. cit., p. 388.

48 For an extensive analysis of the practice in the field of investor–state arbitration, see in this volume the chapter by S.W. Schill.

49 Australia, Hungary and Norway have opted out from the application of this provision in compliance with Arts 26 and 27 ECT; see Selivanova, op. cit., p. 386.

50 E. Sussman, 'The Energy Charter Treaty's Investor Protection Provisions: Potential to Foster Solutions to Global Warming and Promote Sustainable Development', *Oil, Gas and Energy Law*, 2008, vol. 6, pp. 9 ff. Multilateral development banks, such as the World Bank and the European Investment Bank, and other institutions, such as the Multilateral Investment Guarantee Agency, increasingly condition the funding of energy projects on the satisfaction of various environmental criteria. They then increase the 'public presence' in energy investments. See Dean and Barry, op. cit., pp. 231 ff. See also, in this volume the chapters by L. Boisson de Chazournes and S. De Maria.

51 On stabilization clauses in general, see *inter alia* L. Cotula, 'Stabilization Clauses and the Evolution of Environmental Standards in Foreign Investment Contracts', *Yearbook of*

In particular, energy contracts contain 'hybrid-stabilization clauses', which are 'a combination of freezing clauses with adaptation mechanisms'.[52] In the event that the host government imposes new and unforeseeable environmental regulations, the hybrid-stabilization clause would allow the investor to receive an additional amount of the produced resource to compensate for any economic loss incurred as the result of the changed environmental liability. The clause can be considered a 're-negotiation clause' that obliges each party to negotiate in good faith to restore the agreement's original equilibrium.[53] Only after such a re-negotiation, would the parties be allowed to resort to arbitration.

15.3 The Challenges Posed by the Offshore Energy Industry

Problems of compatibility between legal obligations in the offshore energy sector raise issues which are not different from those in the energy sector in general and in other investment sectors.[54] The offshore energy sector however poses today two specific challenges. First, conflicts of norms and of enforcement powers may rise when dealing with an investment located in a disputed maritime area or concerning disputed resources (section 15.3.1). Second, the renewable energy sector is expanding, but the legal framework within which such a development takes place is far from clear (section 15.3.2).

15.3.1 Offshore Energy Investments Located in Disputed Maritime Areas or Concerning Disputed Resources

Many international disputes arise from conflicts over resources. In some cases, the dispute focuses on the lack of delimitation between the maritime zones of adjacent states;[55] in others, the disagreement mainly concerns the

International Environmental Law, 2006, vol. 17, pp. 111–38; R. Dolzer and C. Schreuer, *Principles of International Investment Law*, Oxford: OUP, 2008, pp. 75 ff.; W. Peter, 'Stabilization clauses in state contracts', *Revue de droit des affaires internationales*, 1998, vol. 1998, pp. 875–91.

52 Flores, op. cit., p. 161.

53 Ibid.

54 See M. Hirsch, 'Interactions Between Investment and Non-Investment Obligations', in P. Muchlinski, F. Ortino and C. Schreuer (eds), *The Oxford Handbook of International Investment Law*, Oxford: OUP, 2008, p. 156. In this volume, see in particular the chapters by G. Bigi, S. Brugnatelli, C. Pitea and A. Tanzi.

55 Among the many cases and agreements in the field of maritime delimitation, see *Land and Maritime Boundary Between Cameroon and Nigeria, Cameroon* v. *Nigeria*, ICJ, Judgment, 10 October 2002, specifically paras 303 ff; Convention sur la délimitation de la mer territoriale et de la zone contiguë dans le golfe de Gascogne (golfe de Biscaye) et sur la délimitation des plateaux continentaux des deux Etats dans le golfe de Gascogne (golfe de Biscaye), entered into force 5 May 1975.

exploitation of a resource, which straddles the settled maritime boundary;[56] and sometimes, the dispute is about both, the delimitation and the straddling resources.[57]

The legal status of the zone in which the investment takes place has of course fundamental importance in determining the applicable legal framework. If the zone and the resource in question are not disputed, the coastal state will exercise its sovereign rights (and duties), as analysed above.[58] If the area or resource are disputed and the parties have not reached any final agreement about the delimitation or about the exploitation of the resources, it might be complicated for the investor to understand which state can lawfully grant the useful licences, and which domestic law and which BITs regulate the investment.

Two situations must be distinguished. First, two adjacent or opposite states have overlapping claims on a maritime area and have not yet settled the delimitation dispute. Second, two adjacent or opposite states have agreed on the delimitation of their respective maritime zones but not on the use of the resources, which straddle their border.

In the first situation, pursuant to Arts 74.3 and 83.3 of the LOSC, parties have the obligation to seek to enter into 'provisional arrangements of practical nature' and, pending the adoption of the final agreement, parties have also the obligation 'not to jeopardize or hamper the reaching of the agreement'.[59] The 2007 *Guyana* v. *Suriname* case focused specifically on the interpretation and application of these two obligations.[60] In the case at stake, Guyana and Suriname had not reached any provisional arrangement and they both patrolled, issued fishing licences and granted concessions for oil and gas exploration and exploitation in the area of overlapping claims.[61] Until, one day, Suriname used its navy to oblige an oil rig and drill ship

56 See, *inter alia*, 1979 Joint Zone Agreement between Malaysia and Thailand; 1995 Joint Declaration on Co-operation over Offshore Activities in the South West Atlantic between the United Kingdom and Argentina, whose application was officially suspended in March 2007; 2001 Memorandum of Understanding between Australia and the UN Transitional Administration of East Timor. It is worth noticing that in the two latter cases, the dispute concerned the exercise of sovereignty on the disputed zone, as a consequence of the disputed sovereignty on land and of the application of the well-established principle 'the land dominates the sea' (*North Sea Continental Shelf, Germany* v. *Denmark*, *Germany* v. *Netherlands*, ICJ, Judgment, 20 February 1968, para. 96).

57 *North Sea Continental Shelf* cases, op. cit.

58 See *supra* section 15.2.1.

59 For a detailed analysis of Arts 74.3 and 83.3 LOSC, see E. Milano and I. Papanicolopulu, 'State Responsibility in Disputed Areas on Land and Sea', *Zeitschrift für ausländisches öffentliches Recht und Völkerrecht*, 2011, vol. 71, pp. 611–18.

60 *Guyana* v. *Suriname*, PCA, Award 17 September 2007, para. 460. Online. Available: http://www.pca-cpa.org/showpage.asp?pag_id=1147 (accessed 1 December 2012).

61 Ibid., paras 137 ff., *spec.* para. 149.

(whose presence was authorized by Guyana) to leave the contested area.[62] Economic activities in the area had then to be suspended, pending the adoption of a final decision, with subsequent losses for the investors.[63]

The arbitral tribunal found that, pending the adoption of a final agreement, the interested states can unilaterally perform activities in the disputed areas, but those activities should not have a 'permanent physical impact on the marine environment';[64] if they do, such as the exploratory drilling authorized by Guyana, they are not allowed because they violate the obligation not to jeopardize or hamper the reaching of the agreement.

Besides setting limits to the unilateralism, the arbitral tribunal also stressed that '[provisional arrangements of a practical nature] promote the realization of one of the objectives of the Convention [i.e., LOSC], the equitable and efficient utilization of the resources of the seas and oceans'.[65] States parties to the dispute do not have an obligation to reach an agreement, but they have an obligation to seek it, i.e. to engage in negotiations in good fate. Those provisional arrangements of practical nature are mainly seen as means for regulating economic activities in the contested areas and they can also consist of mutually agreed abstention from undertaking any activity.[66] State practice shows that these provisional arrangements can consist of formal agreements but also of not-formalized *modus vivendi*.[67]

The provisional arrangements can in particular take the form of joint development agreements, which are also the main available option in order to settle the above-mentioned second situation, i.e. in order to manage and exploit resources straddling settled borders. A joint development agreement has been defined as 'the cooperation between states with regard to exploration for and exploitation of certain deposits, fields or accumulations of non-living resources which either extend across a boundary or lie in an area of overlapping claims'.[68] International courts and tribunals have particularly encouraged joint exploitation of resources that straddle maritime boundaries.[69]

62 For a comment on the use of force by Suriname in the case at stake, see Milano and Papanicolopulu, op. cit., pp. 621–6.

63 *Guyana* v. *Suriname*, op. cit., para. 152.

64 Ibid., paras 470 and 481. For a comment, see Y. van Logchen, 'The Scope for Unilateralism in Disputed Maritime Areas', paper presented at the LOSI Conference on 'The Limits of Maritime Jurisdiction', Wollongong, 28 November – 2 December 2011 (file with the author).

65 Ibid., para. 460.

66 See Milano and Papanicolopulu, op. cit., pp. 614–15.

67 Ibid., p. 615, where the authors recall for instance that '[a]n informal *modus vivendi*, based on equidistance, is in place between Italy and Malta for some years' (note 84).

68 R. Lagoni, 'Report on Joint Development of Non-Living Resources in the Exclusive Economic Zone', Report of the International Committee on the Exclusive Economic Zone, International Law Association, *Report of the Sixty-Third Conference (Warsaw)*, 1988, pp. 511–12.

69 See, *inter alia*, *Aegean Sea Continental Shelf* case, *Greece* v. *Turkey*, ICJ, Request for the Indication of Interim Measures of Protection, Order of 11 September 1976, para. 30.

Joint exploitation is a useful tool in order to attract investors as it guarantees a (provisional) stability in the area.[70] In the case of oil and gas reservoirs, where the extractable resource can be fugacious (i.e., has the capacity to migrate), the practice of unitization has emerged as a government-sanctioned industry practice. Lang Weaver and Asmus defined unitization as 'the joint, coordinated operation of a petroleum reservoir by all the owners of rights in the separate tracts overlying the reservoir.'[71] The preservation of the 'unity of deposits' was already an imperative in the *North Sea Continental Shelf* cases.[72]

The existence of a joint development agreement is however not an absolute guarantee of stability. If a final agreement over the delimitation of the maritime area, and thus about the exercise of sovereign rights, is not reached, there is always a risk of tensions and consequent disruption in the economic activities performed in the concerned area. See, for instance, what happened in the Falklands/Malvinas. In this 30 years' long sovereignty dispute, there was a (brief) moment, from 1995 to 2000, where the parties decided upon the joint development in an agreed area, which is very rich in oil and natural gas.[73] The agreement was suspended after only a few years[74] but the exploration activities continued. This provoked a strong reaction from the Argentine government in February 2010.[75] Notwithstanding, several companies obtained exploration licences in 2011 from the Falklands administration,[76] which included the following disclaimer: 'There may be

70 T.A. Mensah, 'Joint Development Zones as an Alternatives Dispute Settlement Approach in Maritime Boundary Delimitation', in R. Lagoni and D. Vignes (eds), *Maritime Delimitation*, Leiden: Martinus Nijhoff, 2006, p. 149.

71 As quoted in A. Chircop, 'Managing Adjacency: Some Legal Aspects of the Relationship Between the Extended Continental Shelf and the International Seabed Area', *Ocean Development and International Law*, 2011, vol. 42, p. 312. See also C. Robson, 'Transboundary Petroleum Reservoirs: Legal Issues and Solutions', in G.H. Blake, W. Hilldeslaey, M. Pratt, R. Ridley and C. Schofield (eds), *The Peaceful Management of Transboundary Resources*, Dordrecht: Kluwer, 1995, p. 6; D. Roughton, 'Rights (and Wrongs) of Capture: International Law and the Implications of the Guyana/Suriname Arbitration', *Journal of Energy and Natural Resources Law*, 2008, vol. 26, pp. 389–98.

72 *North Sea Continental Shelf, Germany* v. *Denmark*, *Germany* v. *Netherlands*, ICJ, Judgment, 20 February 1968, para. 99.

73 See *supra* note 56. The 1995 Declaration created a Joint Commission, which promoted and coordinated the activities in the area delimited by the agreement. The work of the Commission was suspended in 2000. For a comment, see R.R. Churchill, 'Falkland Islands – Maritime Jurisdiction and Co-operative Arrangements with Argentina', *International and Comparative Law Quarterly*, 1997, vol. 46, pp. 463 ff.

74 The application of the 1995 Declaration was officially terminated when in March 2007 the British government received a note from the Argentine government. Online. Available: http://www.mercosurabc.com/ar (accessed 2 December 2012).

75 See 'Argentina steps up Falklands row', in *BBC News*, 17 February 2010. Online. Available: http://news.bbc.co.uk (accessed 2 December 2012).

76 M. Waibel, 'Oil Exploration around the Falklands (Malvinas)', 13 August 2012. Online. Available: http://www.ejiltalk.org/oil-exploration-around-the-falklands-malvinas (accessed 12 December 2012).

other unforeseen matters such as disputes over borders. Investors will be aware that the Falkland Islands were, in 1982, the subject of hostilities between the United Kingdom and Argentina'.[77]

Pursuant to Art. 70 of the International Centre for Settlement of Investment Disputes (ICSID) Convention, the Convention 'shall apply to all territories for whose international relations a Contracting State is responsible, except those which are excluded by such State by written notice'. Accordingly, the ICSID Convention applies to the Falklands/Malvinas as far as the United Kingdom (UK) is concerned. So, investments there carried out fall under the protection of the UK BITs. But they presumably fall also under the protection of BITs concluded by Argentina which, in case of arbitral proceedings, would not miss a chance to assert its sovereignty claims. This overlap of treaties undermines the legal certainty and the protection of the investors.

15.3.2 New Challenges Posed by the Marine Renewable Energy Sector

In 2010 in Cancun, at the UNFCCC conference of the parties, developing countries agreed to undertake 'national appropriate mitigation actions' in order to achieve 'a deviation in emissions relative to "business as usual" emissions in 2020'.[78] In the last 20 years, many incentives have been adopted for the development and use of those technologies at the national and regional level in order to make them cost competitive with fossil fuels energy.[79] In 2008, for instance, the leaders of the European Union agreed upon the objective of a 20 per cent reduction in its greenhouse gas emissions by 2020,[80] to be achieved, *inter alia*, by promoting the renewable energy industry, including offshore wind power.[81] Up to 12 per cent of renewable generation in 2020 is expected to come from offshore installations, notably in the Northern Seas.[82] To this end, many incentives, grants and investment

77 Ibid.

78 *Report of the Conference of the Parties on its sixteenth session*, held in Cancun from 29 November to 10 December 2010, Addendum, Part Two: Action taken by the Conference of the Parties at its sixteenth session, FCCC/2010/Add.1, para. 48.

79 T.J. Griset, 'Harnessing the Ocean's Power: Opportunities in Renewable Ocean Energy Resources', *Ocean and Coastal Law Journal*, 2011, vol. 16, p. 395.

80 Communication from the Commission of 13 November 2008 – Energy efficiency: delivering the 20% target, COM (2008) 772 final.

81 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 10 November 2010 – Energy 2020 A Strategy for competitive, sustainable and secure energy, COM (2010) 639 final.

82 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of

opportunities in offshore renewable energy sources projects are now available in Europe.[83]

Encouraged furthermore by financial mechanisms provided by environmental treaties[84] and by several international financial institutions,[85] renewable energy technologies have recently become commercially valuable and are attracting the attention not only of policy makers and international bureaucracies, but also of private investors.[86] The increasing importance of this sector has convinced the United Nations Open-ended Informal Consultative Process on Oceans and Law of the Sea (Consultative Process) to focus on 'marine renewable energies' in its thirteenth session.[87] Many of the challenges highlighted in the Consultative Process' report on marine renewable energy are relevant for the offshore energy sector in general: the environmental challenges (duration of the energy projects and of their impact on the marine environment); economic and institutional challenges (private–public partnerships; the creation of a favourable private investment environment); social challenges (impacts on local communities).[88]

Assessing the environmental impact of the development and operation of offshore renewable energy installations is one of the major unresolved issues. In particular, for the time being, there is little experience with commercial-scale ocean energy projects and, hence, little scientific data on the nature and scale of environmental impacts.[89] The potential harmful

17 November 2010 – Energy infrastructure priorities for 2020 and beyond – A Blueprint for an integrated European energy network, COM (2010) 677 final.

83 See P. Salvatore, E. Ercolu, A.S. Julien and M. Kristine, *ORECCA Report, Investment and Grant Opportunities for Offshore Renewable Energy Projects in Europe*, 13 September 2011. Online. Available: http://www.orecca.eu/c/document_library/get_file?uuid=3f2f5122-906a-4b82-9fa2-c626aba62399&groupId=10129 (accessed 12 December 2012).

84 The Global Environmental Facility (GEF) is an independently operating financial organization, which serves as a financial mechanism for many conventions, such as the CBD and UNFCCC. It has promoted and supported many projects in the field of climate change mitigation and adaptation, in particular in the field of renewable energy; see GEF, 'Investing in Renewable Energy, the GEF Experience', 2012. Online. Available: http://www.thegef.org/gef/sites/thegef.org/files/publication/gef_renewenergy_oct2012_r16.pdf (accessed 12 December 2012). See also in this volume the chapter by F. Romanin Jacur.

85 See European Investment Bank (EIB), Activity Report 2011, p. 21: 'Lending for power generation in the EU reached EUR 4.6bn in 2011, with 80% supporting renewable energies while 16% helped to finance gas generation and 1% coal or oil power generation'. See in this volume the chapter by S. De Maria.

86 Ocean energy was believed to offer great promise during the 1960s and 1970s, but only in the past decade have ocean energy projects moved beyond the pilot project stage to full-scale commercialization. See Pelc and Fujita, op. cit.

87 United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (Consultative Process), *Marine Renewable Energies*, thirteenth meeting, May–June 2012, unedited reporting material. Online. Available: http://www.un.org/depts/los/reference_files/new_developments_and_recent_adds.htm (accessed 1 October 2012).

88 Ibid., paras 82–93.

89 Leary, op. cit., p. 113.

impact on the marine environment is not only the result of using pollutant chemicals and materials, but also of constructing structures. Actually, the construction of barrages and dams can affect habitats for wildlife. It can affect the other economic uses of the coastal area, such as fishing and navigation.

The creation of a favourable investment environment for renewable energy largely benefits from the participation of international institutions which guarantee financial assistance to the governments and private actors interested in the specific sector. However, as mentioned above, the major role played by the public sector in funding such investments can put the private counterparty in a weak position, i.e. to be dependent on public subsidies. Moreover, in the absence of a clear legal framework, both at the international and domestic levels, the multiplicity of actors participating in the funding and/or financial assistance poses additional difficulties to the private investor.

Concerning the social challenges, it must be noted that public participation is an integral part of environmental impact assessment procedures.[90] Particularly relevant in this respect is the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.[91] Notwithstanding the recognition at the international level of the individual right to participate, public participation in marine renewable energy projects remains problematic due to the lack of scientific data on the marine environment and the impact of those technologies on it.[92] Moreover, these new technologies are still fairly unfamiliar. The lack of knowledge and awareness undermines the effectiveness of the public participation.

15.4 Concluding Remarks: Towards 'An Integrated, Interdisciplinary and Intersectoral Approach'

Global problems, such as climate change and energy security, have highlighted the limits of the legal framework applicable to the offshore energy industry. The zonal fragmentation of the oceans can be an obstacle

90 In general on environmental impact assessment, see *inter alia* N. Craik, *The International Law of Environmental Impact Assessment, Process, Substance and Integration*, Cambridge: CUP, 2008; E. Olufemi, 'Environmental Impact Assessment', in M. Fitzmaurice, D.M. Ong and P. Merkouris (eds), *Research Handbook on International Environmental Law*, Cheltenham: Elgar, 2010, pp. 227 ff.; S. Tromans, *Environmental Impact Assessment*, 2nd ed., London: Butterwoths, 2012.

91 See *supra* note 29.

92 M. Portman, 'Involving the Public in the Impact Assessment of Offshore Renewable Energy Facilities', *Marine Policy*, 2009, vol. 33, p. 334. See also K. Jonhson, S. Kerr and J. Side, 'Marine Renewables and Coastal Communities – Experiences from the Offshore Oil Industry in the 1970s and their Relevance to Renewables in the 2010s', *Marine Policy*, 2013, vol. 38, pp. 491 ff.

to the implementation of concerted actions. Old holistic ideas, e.g., Scelle's 'domaine public international'[93] and Bastid's 'espace d'intérêt international',[94] have re-emerged and there is a general movement, of scholars and practitioners alike, towards 'an integrated, interdisciplinary and intersectoral approach'.[95]

This approach does not consist of mere mechanisms of cooperation, as in the joint development of common offshore hydrocarbon deposits. It suggests the creation of institutions and/or mechanisms capable of implementing an optimal and sustainable exploitation of non-living resources,[96] which follows, for instance, the example set by the regime of international watercourse.[97] The idea of promoting the conservation of non-living natural resources is particularly referenced in the energy security debate as a tool for promoting efficiency.[98] Such an approach might also contribute to creating a favourable environment for investments by guaranteeing stability in price and supply of energy.[99]

93 G. Scelle, *Manuel élémentaire de droit international public*, Paris: Domat-Montchrestien, 1943, p. 276; see also G. Scelle, 'Plateau continental et droit international', *Revue générale de droit international public*, 1955, vol. 63, p. 52. Scelle constructed his theory of 'domaine public international', which encompassed all oceans, including the areas submitted to coastal states' jurisdiction, on the basis of de Lapradelle's theory of servitude; see A.G. de Lapradelle, 'Le droit de l'État sur la mer territoriale', *Revue générale de droit international public*, 1898, vol 5, pp. 264–84, 309–47; A.G. de Lapradelle, *Le droit de l'Etat sur la mer territoriale*, Paris: Pedone, 1898, p. 24 where the author stated: '[l']Etat riverain, qui n'est pas propriétaire, ni souverain de la mer territoriale, a seulement le droit d'imposer au souverain de la mer, la société des Etats, des restrictions basées sur les nécessités de sa protection personnelle'. Ruzié (D. Ruzié, *Droit international public*, 7th ed., Paris: Dalloz, 1987, p. 82) and Nguyen Quoc Dinh (Nguyen Quoc Dinh, *Droit international public*, 1st edition, Paris: L.G.D.J., 1975, p. 525) developed the concept of 'domaine public international'. These authors however recognized that territorial waters were submitted to the territorial jurisdiction of the coastal state; see Y. Tanaka, *A Dual Approach to Ocean Governance*, Farnham: Ashgate, 2008, p. 12.

94 P. Bastid, *Cours de droit international public*, Paris: Université de Paris, 1976–77, p. 1221.

95 *Oceans and the Law of the Sea*, UNGA resolution 60/30, 8 March 2006, p. 2.

96 'Non-renewable resources which are consumed as they are used shall be exploited with restraint, taking into account their abundance, the rational possibilities of converting them for consumption, and the compatibility of their exploitation with the functioning of natural systems'; *World Charter of Nature*, UNGA res. 37/7, 28 October 1982, para. 10(d).

97 See A. Tanzi and M. Arcari, *The United Nations Convention on the Law of International Watercourses: A Framework for Sharing*, The Hague: Kluwer International Law, 2011, p. 115.

98 D.M. Ong, 'Towards an international law for the conservation of offshore hydrocarbon resources within the continental shelf?', in D. Freestone, R. Barnes and D.M. Ong (eds), *The Law of the Sea, Progress and Prospect*, Oxford: OUP, 2009, pp. 105–6.

99 OECD, *Competition, International Investment and Energy Security*, December 2007, p. 2. Online. Available: http://www.oecd.org/dataoecd/3/19/40699061.pdf (accessed 1 October 2012).