Ocean and Coastal Law Journal

Volume 15 | Number 1 Article 19

2010

Renewable Energy As A Catalyst For Changes On The High Seas Regime

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RENEWABLE ENERGY AS A CATALYST FOR CHANGES TO THE HIGH SEAS REGIME

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I. INTRODUCTION

The vast spaces of the open ocean make it an intriguing location for extracting renewable energy. Oceans make up over seventy percent of the earth's surface,[1] and are almost completely devoid of permanent structures. The oceans also produce incredible amounts of wind and wave power. Winds are stronger over oceans than over land,[2] and offshore turbines can be built larger than onshore turbines, producing exponentially more energy.[3] Wave power, too, while lacking an onshore counterpart, strengthens in deeper water.[4] Both technologies, if employed extensively across the world's oceans, would significantly reduce the need to produce electricity from other sources, if not render additional technologies unnecessary.

Of course, scattering wind turbines and wave-powered buoys across the oceans is, at this point, a daydream. Offshore wind power is in its

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1. Oceans cover 139 million square miles of the earth's surface. Michael Pidwirney, *Ocean, in* ENCYCLOPEDIA OF EARTH (Cutler J. Cleveland ed., 2006), *available at* http://www.eoearth.org/article/Ocean.

2. *See* Press Release, NASA, *Ocean Wind Power Maps Reveal Possible Wind Energy Sources* (July 9, 2008), *available at* http://www.jpl.nasa.gov/news /news.cfm?release=2008-128 ("[W]inds are generally stronger over the ocean than on land because there is less friction over water to slow the winds down–there are no hills or mountains to block the wind's path.").

3. For example, when the length of a turbine blade is doubled, the amount of energy generated is quadrupled. Brit. Wind Energy Ass'n, Offshore Wind Frequently Asked Questions, http://www.bwea.com/offshore/faqs.html (last visited Jan. 9, 2009).

4. Michael Kanellos, *FAQ: Energy on the High Seas*, CNET NEWS, Aug. 15, 2007, http://news.cnet.com/FAQ-Energy-on-the-high-seas/2100-11392_3-6202562.html ("Waves begin to dissipate energy when the water gets less than 200 meters deep. At 20 meters in depth, a wave might have only one third of the energy it had in deep water . . . .").

infancy, and the technology to install or float turbines in water more than thirty meters deep is still being developed. Likewise, wave power technology is still being tested, and large commercial farms are not yet a reality. Additionally, once the technology exists to allow for the proliferation of wind and wave-power installations, financial and other concerns may stall growth.

On the other hand, there is a lot of energy to be derived from the world's oceans, and there is a market back on shore for electricity derived from renewable sources. While still in early stages, deep ocean renewable technology is being developed, and perhaps we are closer than we realize to wind and wave generators on the high seas. If that is the case, existing international laws would have to respond to this new situation. Would it be possible, then, for a willing nation to extract wind or wave power from the high seas? What regulatory steps would need to be taken? What additional regulations or regimes, if any, need to be established?

Despite concerns about cost and feasibility, international demand for cleaner and more reliable sources of electricity is driving developers to look at offshore wind and wave power as viable potential energy sources. In 2007, the European Union (EU) was producing 1100 megawatts (MW) of electricity from offshore farms, with a goal of producing up to 40 gigawatts (GW) by 2020.[5] Although operational farms only existed in the EU as of the beginning of 2009, offshore wind farms are being planned or constructed in countries around the world, including China[6] and the United States.[7] Likewise, the world's first wave farm opened in Portugal in 2008, and increases in capacity are already planned.[8]

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5. EUR. WIND ENERGY ASS'N, DELIVERING OFFSHORE WIND POWER IN EUROPE: POLICY RECOMMENDATIONS FOR LARGE-SCALE DEPLOYMENT OF OFFSHORE WIND POWER IN EUROPE BY 2020 15, 17 (2007), *available at* http://www.ewea.org/fileadmin/ewea_documents/ images/publications/offshore_report/ewea-offshore_report.pdf.

6. *See* Xinhua, *China's First Offshore Wind Power Generator Ready*, CHINADAILY.COM, Nov. 29, 2007, http://www.chinadaily.com.cn/china/2007-11/29/content_6285888.htm; *China's First Offshore Wind Farm*, WINDENERGYNEWS.COM, July 9, 2008, http://www.windenergynews.com/content/view/1344/45/.

7. *See generally* OffshoreWind.net, North American Offshore Wind Energy Information, http://offshorewind.net (last visited Jan. 9, 2009) (with information on over twenty planned offshore wind projects in the United States).

8. Alok Jha, *'Wave Snakes' Switch on to Harness Ocean's Power*, GUARDIAN (UK), Sept. 24, 2008, *available at* http://www.guardian.co.uk/environment/2008/sep/24/renewable.wave.energy.portugal (The farm, off the coast of Aguçadoura, currently produces 2 MW from Pelamis wave machines, and may soon be enlarged to produce 21 MW.).

Additional farms are being planned or researched for Scotland,[9] Australia,[10] and the United States.[11] Thus, while it is not imminent, it is also not impossible to imagine ocean energy-gathering technologies operating on a much larger scale across the world's oceans.

Such a situation would need to be supported by international laws of the sea, of course. Currently, the Third United Nations Convention on the Law of the Sea (UNCLOS)[12] provides fairly clear jurisdiction for countries to establish offshore energy farms off their coasts. Under UNCLOS, a coastal state has the exclusive right to exploit non-living resources found in its internal waters, territorial seas, and exclusive economic zones (EEZs).[13] But beyond the 200 nautical mile boundary of the EEZ–the "high seas"–the right to construct a wind or wave farm is uncertain. Under UNCLOS, the high seas are a commons: open to the use and exploitation of (most) resources by all countries so long as their activities do not interfere with the high seas freedoms of other nations.[14] Even before the recent interest in ocean-based energy, some began to question whether the UNCLOS high seas regime (or, "Freedom of the High Seas") provided enough regulation for these vast areas.[15]

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9. *See* Rosemary Gallagher, *Scotland to Take Lead in Marine Energy Drive*, SCOT. ON SUNDAY, Dec. 21, 2008, at 2, *available at* http://scotlandonsunday.scotsman.com/business/Scotland-to-take-lead-.4811995.jp.

10. *Ocean Power to Build Australia Wave Power*, UNITED PRESS INT'L, Dec. 23, 2008, *available at* http://www.upi.com/Energy_Resources/2008/12/23/Ocean_Power_to_build_Australia_wave_power/UPI-13631230038155/.

11. *See*, *e.g.,* Nina Wu, *Seattle Company Looks at Hawaii for Wave Power*, HONOLULU STAR BULL., Jan. 7, 2009, *available at* http://www.starbulletin.com/business/businessnews/20090107_Seattle_company_looks_at_Hawaii_for_wave_power.html; Kurtis Alexander, *Menlo Park Research Group Eyes the Potential of Wave Power*, OAKLAND TRIB., Dec. 13, 2008, *available at* http://findarticles.com/p/articles/mi_qn4176/is_20081213/ai_n31134377/.

12. United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

13. *Id.* arts. 2(1), 2(2), 56(1).

14. *Id*. art. 87.

15. *See* Jon M. Van Dyke, *International Governance and Stewardship of the High Seas and Its Resources*, *in* FREEDOM FOR THE SEAS IN THE 21ST CENTURY 13, 13 (Jon M. Van Dyke et al. eds., 1993) (posing that "the question now is whether keeping the high seas unregulated is appropriate given the rapidly changing technology that enables exploitation of the resources of this region"); Nina Tannenwald, *Law Versus Power on the High Frontier: The Case for a Rule-Based Regime for Outer Space*, 29 YALE J. INT'L L. 363, 388-90 (2004) (arguing that the Freedom of the Seas principle is not only irrelevant to the development of space, but is also outdated as a regime for managing the high seas); Myron H. Nordquist, *The Changing International Law of High Seas Fisheries*, 40 VA. J. INT'L L. 1155, 1157 (2000) (reviewing FRANCISCO ORREGO VICUÑA,

A factor that surely contributes to the absence of more defined regulation on the high seas is the type of activity in the area. The most common activities, fishing and navigation, are specifically defined as high seas freedoms under UNCLOS.[16] Other than fishing, resource extraction on the high seas has mainly focused on mining of polymetallic nodules from the seafloor, a controversial practice regulated under UNCLOS by the International Seabed Authority.[17] The freedom to collect renewable resources, however, is not explicitly mentioned in UNCLOS.

In this Comment, I will examine the history of the high seas, and explain how it has developed to regulate the extraction of fish and minerals. I will consider whether the extraction of renewable resources is possible under the current UNCLOS regime and, if not, whether regulations based on the current fishing and deep seabed mining systems would serve as effective models for a renewable energy regime. This Comment concludes that while the development of high seas renewables under UNCLOS may currently be possible, a new set of regulations that encourages both the speedy development of energy projects and international cooperation would be effective and, important to the ethic of the high seas, fair.

In Part II of this Comment, I will look at the development of wind and wave power and their potential on the high seas. In Part III, I will examine the origins of the idea of the high seas as a commons, and discuss whether that model is still relevant. In Part IV, I will discuss how high seas resource extraction is currently handled by international law. Finally, Part V examines possible avenues for the regulation of renewable energy extraction on the high seas.

II. WIND AND WAVE POWER ON THE HIGH SEAS

The technology to extract renewable energy from the oceans is coming, and so the law will have to develop along with it. Oceanic wind and wave energy are sustainable sources that could potentially play a

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THE CHANGING INTERNATIONAL LAW OF HIGH SEAS FISHERIES (1999)) (writing that Vicuña's "overall thesis is that the traditional regime for fisheries on the high seas is changing not only from the provisions of the 1982 Convention, but also from increasingly dynamic global environmental forces"); A. Charlotte de Fontaubert, *The Status of Natural Resources on the High-Seas: Legal and Political Considerations*, *in* THE STATUS OF NATURAL RESOURCES ON THE HIGH-SEAS 69 (2001).

16. UNCLOS, *supra* note 12, art. 87(1)(a), (e).

17. UNCLOS, *supra* note 12, art. 151.

large part in America's renewable energy future. While land-based wind power has been exploited for thousands of years,[18] harnessing the wind and wave energy of the oceans (except for wind-powered vessels, of course) is a much more recent development. While electricity from oceanic wind and wave energy is currently being generated in small amounts in spots around the globe, the technologies are restricted to shallow, coastal seas. In order for high seas renewable energy to become a viable solution to the world's energy problems, the technology for deepwater wind and wave energy generation must first be developed.

While the exploitation of wind is not a new phenomenon, American wind power became a more viable source of large-scale electric generation following sharp spikes in oil prices during the 1970s.[19] As oil prices have continued to rise during the last ten years, wind power has increased with it, from 2500 MW of installed capacity at the close of 1999 to more than 28,600 MW in April 2009.[20] At the close of 2009, however, all wind turbines operating in the United States are installed on land.[21] Since 1991, Europe has been operating windmills in the ocean.[22]

Turbines placed offshore have several benefits over their terrestrial counterparts. First, since ships are able to transport larger blades and turbine components than trucks, offshore wind turbines can be built larger than terrestrial turbines.[23] Since the amount of power generated from a turbine grows exponentially as the blade length increases (if the

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18. Shane Thin Elk, Legislative Note, *The Answer is Blowing in the Wind: Why North Dakota Should Do More To Promote Wind Energy Development*, 6 GREAT PLAINS NAT. RESOURCES J. 110, 112 (2001) ("[T]he Babylonian Emperor Hammurabi proposed using wind mills [sic] to pump water for use in irrigation around 2000 B.C. In 200 B.C., windmills were in use in Persia and became widely established there by 600 A.D.").

19. Avi Brisman, *The Aesthetics of Wind Energy Systems*, 13 N.Y.U. ENVTL. L.J. 1, 6-7 (2005).

20. United States Department of Energy, Wind Powering America, http://www.windpoweringamerica.gov/wind_installed_capacity.asp (last visited March 10, 2009).

21. *See* OffshoreWind.net, North American Offshore Wind Energy Information, http://offshorewind.net (last visited Jan. 9, 2009).

22. The world's first offshore wind farm was installed off the coast of Vindeby, Denmark in 1991. Matthew C. Heerde, Note, *Don't Need a Weatherman to Know Which Way the Wind Blows: What Does the Cape Wind Decision Foretell for the Offshore Wind Energy Industry?*, 17 GEO. INT'L. ENVT'L. L. REV. 253, 263 n.61 (2005).

23. *See* Brit. Wind Energy Ass'n, Offshore Wind Frequently Asked Questions, http://www.bwea.com/offshore/faqs.html (last visited March 15, 2009) ("Typical onshore turbines are in the 2 MW range, where as [sic] future offshore developments will be in the 3 – 5 MW range, with a hub height of around 70m and 50m blades.").

length of a blade is doubled, the power generated is quadrupled),[24] farms of larger offshore turbines would produce much more energy. Second, there is simply a lot more available space on the oceans than on land. While terrestrial projects have to compete with existing land uses, offshore developers have more options for project sites, allowing them to develop in areas with a stronger resource or that are closer to coastal cities and energy demand.

Currently, the technology only exists to site offshore turbines in shallow, coastal waters up to a maximum of 50 meters.[25] However, several companies recognize the potential of deepwater offshore turbines and are working to develop technology that would function in deeper areas. The primary efforts seem to be made towards the development of floating turbines, anchored to the sea floor by cables or long supports.[26] Other designs include turbines mounted on long, flexible monopoles[27] and other original designs.[28]

Wave power is a much more recent development than wind energy generation. Like wind power, there are several different types of technology being developed to harness the constant motion of the seas.[29] The only commercially operating wave farm, the Aguçadoura Wave Park off the coast of Portugal, uses snake-like attenuators to generate

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24. *See* Danish Wind Industry Ass'n, Size of Wind Turbines, http://www.windpower.org/en/tour/wtrb/size.htm (last visited Nov. 15, 2008).

25. At fifty meters, Scotland's Beatrice demonstration project remains the deepest offshore wind farm. Press Release, Beatrice Wind Farm Demonstration Project, *World's Deepest Offshore Wind Farm Nearing Installation* (July 18, 2006), *available at* http://www.beatricewind.co.uk/press/viewitem.asp?id=12.

26. *See, e.g.,* Blue H, Out of Sight in Deep Water – But Close to Where Electricity is Needed, http://www.bluehgroup.com/sitedevelopment.php (last visited March 16, 2009); Principle Power–Products –Windfloat, http://www.principlepowerinc.com/products/windfloat.html (last visited March 16, 2009); StatoilHydro, Offshore Wind Projects, http://www.statoilhydro.com/en/TechnologyInnovation/NewEnergy/RenewablePowerProduction/Offshore/Pages/default.aspx (last visited March 16, 2009).

27. *See* SWAY, Changing the Future of Wind Power, http://www.sway.no/ (last visited March 16, 2009).

28. *See, e.g.,* Tom Young, *From Floating Turbines to "Washing Line" Designs, Offshore Projects Get Funding Boost*, BUSINESSGREEN.COM, Jan. 14, 2009, http://www.businessgreen.com/business-green/news/2233966/innovative-offshore-projects (last visited March 16, 2009) (highlighting a new V-shaped, horizontally-operating offshore turbine design).

29. *See* MINERALS MGMT. SERV., U.S. DEP'T. OF THE INTERIOR, PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR ALTERNATIVE DEVELOPMENT AND PRODUCTION AND ALTERNATE USE OF FACILITIES ON THE OUTER CONTINENTAL SHELF 3-10 (2007), *available at* http://ocsenergy.anl.gov/documents/fpeis/Alt_Energy_FPEIS_Chapter3.pdf.

electricity.[30] Unlike wind power, wave energy systems are typically situated in deep water, more than forty meters deep.[31] The ability of existing wave technologies to operate in deep water makes its transfer to the high seas more likely and more probable, at least in the near term, than wind energy.

Once the appropriate technology exists, nations may want to move forward with development of renewable energy projects in international waters. Such a step would present a new challenge for the existing UNCLOS high seas regime, which has developed with an emphasis on international cooperation as opposed to exploitation by wealthy nations. Permanent renewable energy projects on the high seas may threaten the shared character of the high seas by arousing fears of "creeping jurisdiction" and imbalances of power. On the other hand, a properly regulated high seas renewable regime may provide worldwide benefits. In order to understand how a high seas renewables regime would fit into the current structure, it is important to look into the evolving theory of the high seas.

III. THE HIGH SEAS: ORIGIN AND DEVELOPMENT

Under UNCLOS III, the high seas begin after each state's 200-mile EEZ ends. The area is a commons, where any state has the right to exercise the enumerated freedoms of navigation, overflight, laying submarine cables and pipelines, constructing artificial islands, fishing, and conducting scientific research,[32] with only nominal restrictions.[33] No country can claim sovereignty over the high seas,[34] and no country has the right to prevent another states' ships from using the high seas for "lawful purposes."[35]

It has not always been this way, however. Over the centuries, the laws of the ocean have changed along with its rulers. As this Comment

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30. *See id.* at 3-12. The Aguçadoura Park, however, has endured technical and financial problems since its installation in 2008. *See* Lisa Pham, *Waves Start to Make Ripples in Renewable Energy World*, N.Y. TIMES, Oct. 20, 2009.

31. U.S. Dep't of Energy, Renewable Energy: Ocean Wave Power, http://apps1.eere.energy.gov/consumer/renewable_energy/ocean/index.cfm/mytopic=50009 (last visited March 16, 2009).

32. UNCLOS, *supra* note 12, art. 87(1)(a)-(f).

33. Article 88 asserts that the high seas must be used for peaceful purposes. *Id.* art. 88.

34. *Id*. art. 89.

35. *Id*. art. 92; *see also* R.R. CHURCHILL & A.V. LOWE, THE LAW OF THE SEA 205 (3d ed. 1999).

will discuss, the primary driver for changes in the law of the sea is commerce. Originally, the seas were held open as a commons because the sea and its resources were limitless, making ownership irrelevant. More recently, as the idea of a limitless sea has vanished, increasing regulations have been imposed to protect the sea and its resources. Increased regulation to provide for wind and wave energy is simply the continuation of the process of providing for the controlled extraction of marine resources when they are discovered. Unlike the majority of marine resources, however, wind and wave energy *is* limitless. Thus, allowing states to claim sovereignty over parts of the high seas in order to develop renewable energy is a new idea with an old spirit.

A. Grotius and The Free Seas

The seventeenth-century Dutch scholar Hugo Grotius is credited with bringing the concept of the seas as a commons to the modern era.[36] Grotius proposed the theory in his 1609 book *Mare Liberum*, or *The Free Seas*.[37] According to Jon M. Van Dyke, Grotius' ideas were based on natural rights.

> Grotius argued that the seas should be free for navigation and fishing because natural law forbids ownership of things that seem "to have been created by nature for common use." Things for common use are those that "can be used without loss to anyone else." From Grotius' perspective, the use of a sea-lane for transportation by one vessel did not diminish the right of any other vessel to use the same sea-lane. Likewise, the fish of the ocean seemed limitless, and thus fishing efforts by one nation's vessels did not interfere with the right of another nation's vessels to fish in the same region.[38]

Furthering with the belief in an infinite sea, Grotius argued that "[t]he sea is common to all, because it is so limitless that it cannot become the possession of one . . . ."[39] While Grotius' ideas were based on natural rights, they had a commercial impetus. Grotius did not create

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36. The Roman law that the seas were the common property of all, or *commune omnium*, was lost with the Empire. R. P. Anand, *Changing Concepts of Freedom of the Seas: A Historical Perspective*, *in* FREEDOM FOR THE SEAS IN THE 21ST CENTURY 72, 72 (Jon M. Van Dyke et al. eds., 1993).

37. *Id*. at 73.

38. Van Dyke, *supra* note 15, at 14 (endnotes omitted).

39. Anand, *supra* note 36, at 75.

the work as a piece of philosophy, but as a chapter in a larger work written to advocate for the Dutch East India Company in 1604 and 1605.[40] Grotius was asked to write the piece to defend the Company's capture of a Portuguese vessel in the Straits of Malacca.[41] Grotius did so by arguing that "war might rightly be waged against, and prize taken from the Portuguese, who had wrongfully tried to exclude the Dutch (and others) from [trade with eastern countries]."[42] Thus, while Grotius' ideas had their roots in a principle of fairness, it seems that the modern idea of "freedom of the seas" has always existed primarily to further commercial interests.

Grotius' "Free Seas" idea has not gone unchallenged, however. The large seapowers that once used Grotius' ideas to defend their actions against those trying to restrict the seas soon realized that exerting control over the oceans was in their interest. In order to help justify the actions of its increasingly powerful navy, Britain asked scholar and statesman John Selden to write *Mare Clausum, sen de Domino Maris Libri Duo* (*The Closed Sea; or, Two Books Concerning the Rule Over the Sea*) in 1636.[43] Selden advocated for the controlling of as much of the ocean as a state's power would allow, asserting that the seas did not have inexhaustible resources and that the sea had been appropriated in many other instances.[44] With the support of Britain's strong navy backing the idea, Selden's "closed seas" approach became the "most authoritative work on maritime law in Europe for the next 200 years."[45]

While total control of the oceans suited the imperial regimes of the seventeenth and eighteenth centuries, it became unwieldy and impractical once oceanic commercialism began to expand. During the industrial revolution, as "Europeans became more interested in commercial prosperity and trade, and ever more Europeans needed to travel to Asia and Africa, freedom of the seas became a more useful principle, and *mare clausum* came to be seen as an anachronism."[46] As a result, Grotius' "Freedom of the Sea" ideas were revived, and the man who was seen as a false prophet for 200 years was hailed as a great hero.[47]

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40. *Id*. at 73.
41. *Id*. at 75.
42. *Id*. (endnote omitted).
43. *Id.*
44. Tannenwald, *supra* note 15, at 391.
45. Anand, *supra* note 36, at 75.
46. Tannenwald, *supra* note 15, at 392.
47. Anand, *supra* note 36, at 76.

B. The Drive to Codification

As influential as Grotius had become, his ideas fell out of favor once again as efforts to codify a law of the sea gained momentum in the early twentieth century. While Grotius' free seas principles allowed for and encouraged trade, they also gave major maritime powers the ability to exercise their will unrestrained. The lack of laws that existed under a "freedom of the seas" regime "was often used in the nineteenth century by European powers to threaten small states and obtain concessions from them or simply to subjugate them."[48] Smaller countries were almost totally helpless, as a lack of written laws was interpreted to mean that nothing was prohibited.[49]

Likewise, the foundation of Grotius' argument–that the sea and its resources were limitless and, thus, without need of private ownership–was being tested.[50] When fishing technology began to improve, fishermen began to see the effects of overfishing. Also, while the ocean had been seen as a safe garbage dump, those on the coast began to see the effects of pollution. Although Grotius' ideas appealed to those in power, the flaws of a "freedom of the sea" approach were becoming apparent.

Two changes helped push codification of the law of the sea after the Second World War. First, the old European powers that had once ruled the seas were now usurped by the United State and the Soviet Union. With Europe and its colonial systems weakened, previously powerless countries in Asia, Africa, and South America began to assert their rights to the ocean and its resources.[51] Second, large quantities of oil, gas, and mineral resources were discovered under the seas beyond most nations' territorial seas.[52] With these resources appearing off the coasts of many "undeveloped" nations, the opportunity to regulate extraction differently than the overexploited fisheries was evident.[53]

Out of this new environment came the first attempts to codify the law of the sea. In the period after World War II, many countries began expanding their jurisdiction outward from traditional seaward

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48. *Id*. at 77. This lack of law "gave the big powers a license to use their 'freedom' in furtherance of their immediate interests—whether for navigation, fisheries, or military maneuvers—irrespective of the rights of others." *Id*.

49. *Id*.

50. Tannenwald, *supra* note 15, at 393.

51. Anand, *supra* note 36, at 77-78.

52. *Id.*

53. *Id*. at 78-79.

boundaries, and by "1958, at least twenty-seven of the seventy-three independent coastal states had claimed specific breadths of territorial sea in excess of the so-called traditional three-mile limit."[54] In 1958 and 1960, the United Nations convened two conferences to codify an internationally accepted law of the sea. The 1958 conference produced four conventions ("1958 UN Conventions")[55] that, while not answering certain questions (such as the extent of national territorial waters), were important first steps.

Back in the United Nations, it had become apparent that the laws established under the 1958 UN Conventions were not adequate to protect against the rush to exploit seabed resources. Spurred on by Arvid Pardo of Malta, the United Nations, in 1970, adopted a resolution recognizing that "[t]he seabed and ocean floor, and the subsoil thereof, beyond the limits of national jurisdiction (hereinafter referred to as the area), as well as the resources of the area, are the common heritage of mankind."[56] Like the 1958 UN Conventions, the 1970 Resolution came about in order to establish fairness among nations of different economic stature. Representatives of smaller states (like Pardo's Malta) wanted to have the seabed internationalized "in order to avoid a 'land-grab' for its resources from which only the developed States would be in a position to benefit."[57] The days of national jurisdiction creeping seaward were not over, however, and a formal demarcation of a State's territorial seas had not been established. UNCLOS III would tackle these issues directly.

Convened at the behest of developing nations who recognized that it was only the developed nations that profited from unregulated and unlimited seas, the Third UN Conference set out to "review the whole international law of the sea."[58] First convened in Caracas, Venezuela in 1974, the Third UN Conference was able to settle a host of disputed questions:

> Besides a general consensus in favor of a 12-mile territorial sea, a 200-mile exclusive economic zone, and a continental shelf

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54. *Id*. at 79. "These claims ranged between 5, 6, 12 and 200 miles." *Id*.

55. Convention on the Territorial Sea and the Contiguous Zone, Apr. 29, 1958, 15 U.S.T. 1606, 516 U.N.T.S. 205; Convention on the High Seas, Apr. 29, 1958, 13 U.S.T. 2312, 450 U.N.T.S. 81; Convention on Fishing and Conservation of the Living Resources of the High Seas, Apr. 29, 1958, 17 U.S.T. 138, 559 U.N.T.S. 285; Convention on the Continental Shelf, Apr. 29, 1958, 15 U.S.T. 471, 499 U.N.T.S. 311.

56. G.A. Res. 2749 (XXV), ¶ 1, 25 U.N. GAOR, 25th Sess., Supp. No 28, U.N. Doc. A/8028 (1970).

57. CHURCHILL & LOWE, *supra* note 35, at 16.

58. Anand, *supra* note 36, at 82.

> extending to the end of the continental margin, the seabed beyond the limits of the national jurisdiction came to be reaffirmed and accepted as the common heritage of humanity as a whole.[59]

The final Treaty was ready for signature in 1982. It entered into force in 1994, and, as of 2009, the Treaty has been ratified by 157 nations.[60] While the United States has not yet ratified the Treaty, it has adopted many of its provisions (including asserting a 200-mile EEZ) and appears to be headed toward ratification.[61]

C. The High Seas in the United Nations Conventions

While the 1958 UN Conventions could not settle how wide each nation's territorial sea should be, they were clear that every area not included within a territorial sea or a state's internal waters was high seas.[62] The 1958 UN Conventions lay out a regime for the high seas in a vein similar to Grotius' original ideas: "[t]he high seas are open to all States," and "[n]o State may validly purport to subject any part of the high seas to its sovereignty."[63] The 1958 UN Conventions provide a list of "freedoms" of the high seas: navigation, fishing, the right to lay submarine cables and pipelines, and overflight.[64]

Importantly, this list is not complete. The 1958 UN Conventions clearly state that these freedoms are among others recognized by the general principles of "international law."[65] These enumerated freedoms, then, are treated mainly as activities that a state cannot prevent another

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59. *Id*. at 83.

60. DIV. FOR OCEAN AFFAIRS AND THE LAW OF THE SEA, OFFICE OF THE LEGAL AFFAIRS, UNITED NATIONS, STATUS OF THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA, OF THE AGREEMENT RELATING TO THE IMPLEMENTATION OF PART XI OF THE CONVENTION AND OF THE AGREEMENT FOR THE IMPLEMENTATION OF THE PROVISIONS OF THE CONVENTION RELATING TO THE CONSERVATION AND MANAGEMENT OF STRADDLING FISH STOCKS AND HIGHLY MIGRATORY FISH STOCKS 9 (2008), *available at* http://www.un.org/Depts/los/reference_files/status2008.pdf.

61. In her confirmation hearings for Secretary of State, Hillary Clinton indicated her support for the ratification of the UNCLOS Treaty. Joe Klein, *Hillary's Day*, TIME, Jan. 13, 2009, *available at* http://swampland.blogs.time.com/2009/01/13/hillarys-day/; *see also*, *U.S. 'Committed' to Ratifying Law of Sea Convention: Clinton*, AGENCE FRANCE-PRESSE, April 9, 2009, *available at* http://www.google.com/hostednews/afp/article/ALeqM5gB1OPzPfiju89sybtB66q9Sq4f6A.

62. UNCLOS, *supra* note 12, art. 1.

63. *Id*. arts. 87(1), 89.

64. *Id*. art. 87(1)(a)-(c), (e).

65. *Id*. art. 87(1).

state from exercising, rather than a list of activities a state can itself exercise. The result, then, is a notion of "reasonable use" that, on the one hand, allows states to act freely on the high seas and, on the other, allows for a loose, "anything goes" attitude.[66]

The list of enumerated freedoms was lengthened in the 1982 Treaty. In addition to fishing, navigation, overflight, and cables and pipelines, the "freedom of scientific research"[67] and, important to the development of renewable energy on the high seas, the "freedom to construct artificial islands and other installations permitted under international law, subject to Part VI," were added.[68] While the overall size of the high seas was reduced with the establishment of the 200-mile EEZ, UNCLOS III "nevertheless reaffirmed that the governing regime for the remaining high seas is one of freedom of access and use."[69]

As in the 1958 UN Conventions, the high seas freedoms enumerated in UNCLOS III "shall be exercised by all States with due regard for the interests of other States in their exercise of the high seas, and also with due regard for the rights under [the] Convention with respect to activities in the Area."[70] Elsewhere, UNCLOS III reaffirms the traditional theory of the high seas as a commons, providing that the high seas shall be reserved for peaceful purposes,[71] invalidating any attempts to claim sovereignty over any part of the high seas,[72] and ensuring access to the high seas and its resources to all States, whether coastal or land-locked.[73]

One option for a high seas renewable regime, then, is to leave current UNCLOS provisions unchanged and construct projects in a manner consistent, if possible, with international law. Leaving UNCLOS unchanged would, of course, be easier than negotiating and drafting a set of regulations specific to renewable energy generators, but it would not provide the specificity and clarity of a specific set of regulations.

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66. Tannenwald, *supra* note 15, at 395.

67. UNCLOS, *supra* note 12, art. 87(1)(f).

68. *Id*. art. 87(1)(d).

69. Tannenwald, *supra* note 15, at 394.

70. UNCLOS, *supra* note 12, art. 87(2). An important term in regards to high seas resource extraction, "the Area" is "the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction." *Id*. art. 1(1).

71. *Id*. art. 88.

72. *Id*. art. 89.

73. *Id*. art. 87(1).

D. Current Opportunities for High Seas Renewables Under UNCLOS

While not ideally direct, the placement of renewable energy installations on the high seas can be justified under UNCLOS. The trail begins with Article 87(1)(d), which specifies that all States have the "freedom to construct artificial islands and other installations permitted under international law, subject to Part VI."[74] The relevant language in Part VI is Article 80, which provides that "Article 60 applies *mutatis mutandis* to artificial islands, installations and structures on the continental shelf."[75] Article 60, then, establishes that "[i]n the exclusive economic zone, the coastal State shall have the exclusive right to construct and to authorize and regulate the construction, operation and use of: . . . (b) installations and structures for the purposes provided for in article 56 and other economic purposes."[76] Article 60 gives the coastal State complete jurisdiction over their installations and structures in regards to health and safety regulations, etc.,[77] and requires States to give notice of the construction, provide permanent warning systems, and remove abandoned or disused structures.[78] Finally, Article 56 gives the coastal State the sovereign right to exploit natural resources in the EEZ for economic opportunities including "the production of energy from the water, currents and winds."[79]

The current UNCLOS provisions, therefore, seem to establish a system where installations for the production of renewable energy can be installed on the high seas under the authorization and regulation of the coastal State. Once the technology exists to do so, a coastal State could erect energy systems at an ideal area on the high seas, lay transmission lines as provided under Article 87(1)(c), and begin generating energy to transmit back to shore. The coastal State would be responsible for regulating the structures, providing warning of their presence, and removing them when disused.

The major statutory roadblock to such installations is Article 89, which establishes that "[n]o State may validly purport to subject any part of the high seas to its sovereignty." Unlike fisheries and deep seabed mining, the two resources for which UNCLOS sets out specific regulations, renewable energy installations would permanently occupy

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74. *Id.* art. 87(1)(d).
75. *Id.* art. 80.
76. *Id.* art. 60(1).
77. *Id.* art. 60(2).
78. *Id.* art. 60(3).
79. *Id.* art. 56(1)(a).

certain areas of the high seas. Existing offshore wind farms can cover large areas and have small exclusionary zones around each turbine, and high seas farms would likely be no exception. Thus, a large installation of renewable energy generators on the high seas under the sole jurisdiction of a coastal State may run afoul of Article 89.

Additionally, it is unlikely that any high seas renewable installation built under current UNCLOS provisions would follow the spirit of the high seas as a commons. The great expense inherent in a high seas farm would result in only the wealthiest States being able to take part, leaving poorer nations behind–just the type of discrepancy warned of by Arvid Pardo. Similar worries of unfair international competition followed the rise of deep seabed mining, discussed below, an activity eventually subjected to an extensive set of regulations under UNCLOS III. That the United Nations decided to amend its traditional notions of "freedom of the high seas" to protect international fairness in the case of deep seabed mining means that high seas renewables might be treated similarly if they were to become an imminent possibility.

Finally, the general lack of specificity and clarity in UNCLOS hurts its effectiveness as a regime capable of regulating high seas renewable installations. While the authority to place installations can be traced back through several Articles, the conflict with Article 89 is evidence that extensive installations of high seas renewables were not thoroughly considered. For these reasons, the development of a new set of regulations for high seas renewable installations is prudent. Looking at how the extraction of resources is handled elsewhere in UNCLOS provides context, and potential models, for a renewables regime.

PART IV: RESOURCE EXTRACTION ON THE HIGH SEAS

UNCLOS III is concerned with two types of resources that are found in the high seas: fish and minerals. Both resources, currently, are treated differently by UNCLOS III. High seas fishing is unrestricted and open to all states, while mining (primarily for polymetallic nodules) is restricted and uncertain. These differences may stem from the inherent differences in the nature of the resources. Fish, from the time of Grotius, have been seen as cheap, limitless and, perhaps, renewable. Undersea mining, a much more recent discovery, is recognized as expensive and limited. Wind and wave resources share characteristics of both these resources: they are limitless resources, but their exploitation would depend on the permanent occupation of limited sea-space. In evaluating whether existing regimes for fishing and mining could serve as a useful model for the development of high seas wind and wave energy, it is

important to examine how both fishing and mining are treated under international law.

A. Fishing on the High Seas

1. Fisheries in UNCLOS

Under UNCLOS III, the freedom of states to fish on the high seas is granted via two Articles: 87 and 116. Both of these Articles are contained in Part VII: The High Seas. As covered above, Article 87 includes the "freedom of fishing, subject to the conditions laid out in section 2" as one of the "freedoms of the high seas" included in Part VII, Section 1: General Provisions.[80] Article 87 places two conditions on the freedom of fishing on the high seas: the freedom is subject to "conditions laid down by . . . other rules of international law,"[81] and high seas freedoms "shall be exercised by all States with due regard for the interests of other States in their exercise of the freedom of the high seas."[82]

Article 116 is included in Part VII, Section 2: Conservation and Management on the Living Resources of the High Seas,[83] and includes the conditions placed upon high seas fishing. According to Article 116:

> All States have the right for their nationals to engage in fishing on the high seas subject to:
>
> (a) their treaty obligations;
>
> (b) the rights and duties as well as the interests of coastal States provided for, *inter alia*, in article 63, paragraph 2, and articles 64 to 67; and
>
> (c) the provisions of this section.[84]

While the freedom to fish on the high seas is one of the original freedoms as contemplated by the Romans and Grotius, Article 116 places significant restrictions on the freedom. When drafting the Treaty, UNCLOS members understood that fish were not a limitless resource,

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80. *Id*. art. 87(1).
81. *Id*.
82. *Id*. art. 87(2).
83. *Id*. art. 116.
84. *Id*.

and aimed to "dilut[e] the traditional concept of freedom of fishing on the high seas."[85]

In order to comply with the "rights and duties as well as the interests of coastal States" as provided in Article 116,

> States whose nationals intend to fish on the high seas [are required to] make inquiries of other interested States, exchange information and plans of their intentions, and seek agreement on conservation and management measures before they permitted their nationals to engage in fishing or, at a minimum, significant commercial fishing.[86]

Likewise, Article 87 requires that high seas fishing "shall be exercised by all States with due regard for the interests of other States in their exercise of the freedom of the high seas."[87] This duty is maintained as a balancing act between States; "[w]here one State's exercise of its freedom of the high seas unduly interferes with or restricts freedom being exercised by another State, then the balance is upset, and the first State can be said to be acting contrary to this duty."[88] For example, the controversial exercise of driftnet fishing[89] on the South Pacific high seas "was claimed to interfere: (a) with the exercise by merchant vessels of their freedom of navigation through these areas; and (b) with the exercise by long-line and troll fishers of their freedom of navigation and fishing in these areas."[90]

Finally, Articles 117 through 120 establish a duty for States to cooperate amongst themselves in order to regulate high seas fishing towards the conservation of living resources on the high seas.[91] These articles are similar to Articles 63, 64, and 67 (compliance with which is required in Article 116), which establish the rights of fish stocks that

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85. Grant James Hewison, *High Seas Driftnet Fishing in the South Pacific and the Law of the Sea*, 5 GEO. INT'L ENVTL. L. REV. 313, 339 (1993) ("The use [in Article 116] of the term 'right,' for instance, indicates a lesser degree of authority than the word 'freedom.'").

86. *Id*. at 339-40.

87. UNCLOS, *supra* note 12, art. 87(2).

88. Hewison, *supra* note 85, at 342.

89. Driftnets are fishing nets as much as thirty miles long that are suspended vertically in the water up to thirty feet deep. In addition to catching the target species (usually tuna, salmon, or squid), the nets catch a variety of other sea animals, including other fish species, marine mammals, turtles, and seabirds. CHURCHILL & LOWE, *supra* note 35, at 299.

90. Hewison, *supra* note 85, at 342.

91. UNCLOS, *supra* note 12, arts. 117-20.

migrate between the high seas and other areas such as the EEZ. These requirements encourage the establishment of global and regional regimes to conserve, protect, and manage marine species. These creations, especially Regional Fisheries Management Organizations (RFMOs) and Marine Protected Areas (MPAs), could serve as models for countries who want to develop high seas renewables without disrupting the duty of due regard on the high seas.

While wind and waves, unlike fish stocks, are neither migratory nor subject to population changes, their management would require some level of cooperation between states. On the global scale, two "important but poorly ratified"[92] legal documents, the United Nations Fish Stocks Agreement (UNFSA)[93] and the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO Compliance Agreement),[94] have been written to encourage international cooperation on the management of high seas fishing stocks as required under UNCLOS III.

In addition to global regimes, a number of regional bodies called RFMOs have been set up to carry out UNCLOS requirements.[95] RFMOs can focus on a particular area of the high seas or a particular species, and each organization combines the scientific monitoring of fish stocks with the legal aspects of managing fisheries.[96] There are currently four bodies that manage high seas fisheries in a particular region: the Northwest Atlantic Fisheries Organization (NAFO), the North-East Atlantic Fisheries Commission, the General Fisheries Council for the Mediterranean, and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).[97] Single-species organizations exist in the Indian, Pacific, and Atlantic oceans for the conservation of tuna and salmon.[98]

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92. Monsterrat Gorina-Ysern, *World Ocean Public Trust: High Seas Fisheries After Grotius – Towards a New Ocean Ethos?*, 34 GOLDEN GATE U. L. REV. 645, 678 (2004).

93. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, *opened for signature* Dec. 14, 1995, 2167 U.N.T.S. 88.

94. Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, Nov. 24, 1993, 33 I.L.M. 968.

95. *See* Gorina-Ysern, *supra* note 92, at 681; UNCLOS, *supra* note 12, arts. 117-20.

96. Gorina-Ysern, *supra* note 92, at 683.

97. CHURCHILL & LOWE, *supra* note 35, at 297.

98. *Id.* at 311, 315.

While RFMOs have received their fair share of criticism,[99] they have been able to "put considerable pressure on States to curtail unrestricted fishing in high seas areas close to, or beyond, the outer limits of the EEZ in some regional areas."[100] Additionally, "[s]tringent enforcement applied by the U.S., Canada, Russian Federation, and China under the UNSFA in the North Atlantic and North Pacific, has resulted in a considerable decrease in illegal fishing in the region."[101] Small, regional groups modeled after RFMOs could play a factor in a high seas renewable regime. If neighboring states could work together to fund, install, protect, and benefit from projects, the effect may be a maximization of development without raising complaints of "creeping jurisdiction" or wealthy-state control.

Due primarily to the vast area of the high seas, it is very difficult to monitor or pursue those who may be fishing in a manner inconsistent with the provisions of UNCLOS III. As a result of this difficulty, the second half of the twentieth century saw international fishing fleets grow tremendously, while customary international law duties regarding marine resources conservation, which are based on the duties to consult and cooperate, have fallen behind.[102] In addition to vast, remote distances and driftnetting, high seas fisheries, also, have to deal with the problem of free-riders: non-party states that exploit fish stocks whose numbers are sustained by the management policies of member states.[103]

The adoption of MPAs is one strategy that may be gaining popularity as a method of protecting high seas fisheries. Typically, MPAs are reserved areas in national waters that are subject to any number of restrictions, from fishing to navigation. Currently, there are more than 1700 MPAs in the United States, offering a range of protections.[104]

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99. According to Monsterrat Gorina-Ysern, criticisms include:

> [The] length of time spent in negotiating agreements, lack of adequate resources, scientific data and catch statistics, limited decision-making authority, minimal enforcement capability of nation States against vessels flying their flag, and against the illegal actions by nationals of States not members or not participating, non compliance by members with all the requirements, restrictive and reactive, rather than pro-active, approaches to management, and the inclusion of "opt-out" clauses allowing members to pick and choose what regulations suit their interests.

Gorina-Ysern, *supra* note 92, at 683-84.

100. *Id.* at 684.

101. *Id*. at 685-86.

102. *Id*. at 669-70.

103. CHURHILL & LOWE, *supra* note 35, at 301.

104. NAT'L MARINE PROTECTED AREAS CENTER, FRAMEWORK FOR THE NATIONAL MARINE PROTECTED AREAS OF THE UNITED STATES OF AMERICA 1, 2 (2008), *available at* http://mpa.gov/ national_system/final_framework_sup.html.

Many other countries manage their own MPAs. The Pelagos Sanctuary for Mediterranean Marine Mammals, which exists between France and Italy and surrounds Corsica, is the first MPA to cover the high seas.[105]

2. Renewable Energy and High Seas Fisheries Management

The major similarity between the resources of high seas fisheries and high seas renewable energy is that, when managed correctly, both resources can be sustained. While wind and waves are inexhaustible, space is limited. As evidenced by worldwide overfishing and the collapse of many fish stocks, treating a renewable resource as an unlimited resource is not a sustainable practice. Had Grotius recognized that fisheries need to be regulated in order for them to remain plentiful, we might have a better structure for sustaining fish populations today.

It is a lesson that should be heeded before the development of high seas renewable energy. Although wind and waves seem to be even more plentiful than Grotius' fish, modern developers would benefit from treating these energy sources as limited. In fact, the resource is limited: limited by the availability of open water for the placement of renewable energy structures. While at first the high seas may seem an endless expanse, suitable areas for renewable energy development shrink when factors such as shipping lanes, weather, fishing interests, and proximity to onshore demand and infrastructure are taken into account.

B. Mining on the High Seas

1. The Rise of Deep Seabed Mining

Compared to fisheries, the management of mining rights on the high seas is a recent development. While the existence of potato-sized polymetallic lumps of ore, more commonly called "manganese nodules," was first discovered over a century ago by a British scientific expedition, it was not until the 1960s that commercial exploitation of these minerals became a serious possibility.[106] Since the first discovery by the H.M.S. Challenger, it is now known that manganese nodules exist, in varying

105. Tethys Research Institute, Pelagos Sanctuary, http://www.tethys.org/sanctuary.htm (last visited Jan. 18, 2009). Just over half of the 90,000 square kilometer sanctuary covers the high seas. *Id.*

106. Marne A. Dubs, *Minerals of the Deep Sea*, *in* THE NEW ORDER OF THE OCEANS: THE ADVENT OF A MANAGED ENVIRONMENT 85, 89 (Guilio Pontevorvo ed., 1986).

quantities and qualities, in practically all the seas in the world.[107] In particular, manganese nodules are found in the deepest parts of the ocean—between 12,000 and 20,000 feet—in areas with a low rate of sedimentation.[108] The result of these geographic requirements is that the vast majority of the world's manganese nodules lay outside of national sovereignty.[109]

The total weight of manganese nodules on the floor of the earth's oceans is estimated at 23,000 million tons for those manganese nodules with a combined nickel and copper content of 2.29% and 175,000 million tons for those with a combined content of 1.5%.[110] These quantities represent "the largest by far untapped mineral resource on the face of the globe."[111]

Such a large amount of valuable material laying on the seafloor has created much interest from those states with the ability to mine it. Rising alongside international interest in mining manganese nodules, though, was recognition that the resource should not be tapped without proper forethought and oversight. For example, the exploitation of such a large mineral resource would have an effect on current metal markets, with the cobalt market likely facing the most drastic effects.[112] Poorer nations, such as the Democratic Republic of Congo (which currently produces more than double the amount of cobalt of any other nation), Cuba, and Zambia would bear the brunt of a worldwide decrease in cobalt prices due to an increased supply.[113] At the same time, the only countries likely to be able to afford the costs associated with mining and shipping millions of tons of manganese nodules are larger, developed nations such as the United States and Germany, which are among the nations furthest along in their efforts to develop deep-seabed mining technology at the passage of UNCLOS III.[114]

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107. WOLFGANG HAUSER, 7 THE LEGAL REGIME FOR DEEP SEABED MINING UNDER THE LAW OF THE SEA CONVENTION 11 (Frances Bunch Dielmann trans., 1983).

108. Dubs, *supra* note 106, at 89.

109. HAUSER, *supra* note 107, at 12 n. 11 (estimating that only "about 25% of manganese nodule deposits are in regions under the jurisdiction of individual countries").

110. *Id.*

111. *Id.* at 90.

112. HAUSER, *supra* note 107, at 14.

113. The Democratic Republic of Congo produced 22,000 metric tons of cobalt in 2005, while Cuba and Zambia produced 3600 and 9300 metric tons, respectively. Cobalt: World Mine Production, By Country, http://www.indexmundi.com/en/commodities/minerals/cobalt/cobalt_t8.html (last visited Feb. 15, 2009). In 2005, total world production was 57,900 metric tons. *Id*.

114. *See* HAUSER, *supra* note 107, at 18-22.

As mentioned above, Arvid Pardo's concerns about the possibility of unequal exploitation of deep-seabed resources was a driver behind the codification of the freedoms of the high seas. Prior to Pardo's famous 1967 speech before the United Nations General Assembly, the international community was troubled by the three then-available interpretations of the law of the sea as applied to the deep-seabed.[115] First, the international community assumed that as interest in the deep-seabed grew among wealthy nations, the seaward boundaries of international jurisdiction would move further and further out until all of the world's oceans were claimed.[116] Countries that were unable to make rapid technological developments, as well as geographically disadvantaged states, were liable to lose out on a lot of territory.[117] The second possible interpretation was that continental shelf lines could not be pushed so far out to sea, therefore, the deep-seabed was subject to the freedoms of the high seas, allowing any state with the ability to mine manganese nodules to do so without regard for other nations.[118] Once again, this would result in a situation where the wealthiest and most advanced states would be able to exploit deep-seabed minerals at the expense of disadvantaged states. Finally, the deep-seabed could be viewed as an area of *res nullis*, where title could have been gained by occupation through use, a situation which, again, was unfavorable to disadvantaged states.[119]

Motivated by the desire to prevent a rush among developing countries for deep-seabed minerals, Dr. Pardo proposed before the General Assembly that:

> there should be drawn up a 'Declaration and Treaty concerning the reservation exclusively for peaceful purposes of the sea-bed and ocean floor underlying the seas beyond the present limits of

115. CHURCHILL & LOWE, *supra* note 35, at 224.

116. *Id.* at 224-25. The pertinent law at the time, the Convention on the Continental Shelf of 1958, allowed for seaward expansion up to the point where "the depth of the superjacent waters admits the exploitation of the natural resources." Convention on the Continental Shelf art. 1, Apr. 29, 1958, 499 U.N.T.S. 311. Thus, as nations improved their seabed mining technology, they could legally expand their jurisdiction. CHURCHILL & LOWE, *supra* note 35, at 224-25.

117. CHURCHILL & LOWE, *supra* note 35, at 225.

118. *Id.*

119. *Id.*

> national jurisdiction, and the use of their resources in the interests of mankind.'[120]

Pardo had a coalition of developing states on his side, and the following years saw the passage of General Assembly Resolution 2574,[121] which placed a moratorium on all deep-seabed mining pending the establishment of a national regulatory regime,[122] and General Assembly Resolution 2749,[123] which declared the area beyond national jurisdiction, and the resources found thereon, to be "the common heritage of mankind."[124]

The seabed mining question was, as of 1973, allocated to Committee I of UNCLOS III.[125] Tasked with establishing the International Seabed Authority (Authority) envisioned in General Assembly Resolution 2574, Committee I was lobbied by an increasingly polarized set of states. On the one side were developing states, called the "Group of 77" (despite there being more than 120 members), who favored the establishment of an international seabed authority that would itself engage in deep-seabed mining, and dispense the profits among all states.[126] On the other side were developed states who wanted the Authority to merely be a registry of international mining claims with little power to interfere.[127]

2. Deep-seabed Mining in UNCLOS III

The resulting seabed-related provisions are contained in Part XI of UNLCOS III.[128] Part XI and its related annexes, have been called "an extraordinarily complicated legal regime."[129] The theory behind Part XI was clearly influenced by Arvid Pardo and the Group of 77. The high seas seabed, ocean floor, and subsoil, known throughout UNCLOS III as

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120. *Id.* at 226. As the use of the word "peaceful" indicates, Pardo was also motivated to secure the demilitarization of the seabed. *Id*.

121. G.A. Res. 2574, U.N. GAOR, 24th Sess., Supp. No. 30, U.N. Doc. A/7630 (Dec. 15, 1969).

122. *Id.* § D.

123. G.A. Res. 2749, U.N. GAOR, 25th Sess., Supp. No. 27, U.N. Doc. A/8027 (Dec. 17, 1970).

124. *Id.* § 1.

125. CHURCHILL & LOWE, *supra* note 35, at 228.

126. *Id*.

127. *Id.*

128. UNCLOS, *supra* note 12, pt. XI.

129. CHURCHILL & LOWE, *supra* note 35, at 229.

"the Area,"[130] is reserved for the "common heritage of mankind"[131] and all activities conducted there "shall . . . be carried out for the benefit of mankind as a whole, irrespective of the geographical location of States."[132]

In order to meet its humanitarian goal and still provide incentive for individual states to exploit seabed minerals, UNCLOS III established a "parallel system" where individual states would mine side-by-side with the Enterprise, the mining arm of a new regulatory body, the International Seabed Authority.[133] Part XI requires that:

> Miners seeking approval for operations in the Area would have been obliged to make an application in respect of two sites of equal value. The Authority would have chosen one for which it would have given approval and would have "banked" the other, which the Authority would itself have exploited, either through the Enterprise or in association with developing States.[134]

Additionally, the Authority granted itself the power to compel states and commercial enterprises to transfer mining technology to it on fair commercial terms.[135]

Some developed states were dissatisfied with Part XI of the Convention. Those States that invested heavily in deep seabed mining before UNCLOS III was written became concerned about protecting their investments.[136] In an effort to get these States to ratify the Convention, the UN added special rules for "pioneer investors" and added them to the Final Act of UNCLOS III.[137] Pioneer Investors, which were required to have invested at least $30 million in preparation for

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130. UNCLOS, *supra* note 12, art. 1(1)(1).

131. *Id.* art. 136.

132. *Id.* art. 140.

133. *Id.* § 4; CHURCHILL & LOWE, *supra* note 35, at 229.

134. CHURCHILL & LOWE, *supra* note 35, at 229; *see also* UNCLOS, *supra* note 12, Annex III, art. 8.

135. CHURCHILL & LOWE, *supra* note 35, at 229; *see also* UNCLOS, *supra* note 12, art. 144. This compulsory transfer of technology proved a major barrier to ratification for the United States. CHURCHILL & LOWE, *supra* note 35, at 229.

136. CHURCHILL & LOWE, *supra* note 35, at 230. Prior to UNCLOS III, mining ventures had been established by France, Japan, the United States, the United Kingdom, Canada, Belgium, Italy, the Federal Republic of Germany, the Netherlands, India, and the Soviet Union. *Id.*

137. Final Act of the Third United Nations Conference on the Law of the Sea, U.N. Doc. A/CONF.62/121, Oct. 27, 1982, *available at* http://untreaty.un.org/cod/diplomaticconferences/lawofthesea-1982/docs/vol_XVII/a_conf-62_121.pdf.

seabed mining,[138] were given priority over all other seabed mining applicants for both locations and order of approval.[139] While these rules helped convince some states to accept Part XI, other states, including the United States and the United Kingdom, still believed that the Convention was unnecessarily complex and tread on their intellectual property rights.[140]

As UNCLOS III neared the sixty ratifications needed to bring it into force, smaller states became worried that financing the Authority would be too big a burden without the involvement of the United States, the United Kingdom, and Germany.[141] Additionally, there was some regret among these developed nations about their inability to ratify the Convention based on their objections to Part XI.[142] In 1994, an agreement ("1994 Agreement") was reached which provided, most importantly, that the obligations of a state to finance another mine site under UNCLOS III Article 144 would no longer apply to parties of the treaty.[143] The United States signed the 1994 Agreement on July 29, 1994,[144] but, like the rest of UNCLOS III, it has yet to be ratified.

3. Renewable Energy and Deep Seabed Mining

Despite considerable international deliberation, obstination, and debate surrounding the issue of deep seabed mining, very little has come of the resource. The technology needed to efficiently pluck polymetallic nodules from the deepest parts of the ocean remains to be developed, and the discovery of new land-based nickel reserves and shallow-ocean beds of polymetallic nodules have calmed the urgency for deep-sea exploitation.[145] Thus, "[t]he claims made in the 1960s of unimaginable wealth seem unlikely ever to be realized."[146]

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138. *Id.* Res. II(1)(a)(i).

139. CHURCHILL & LOWE, *supra* note 35, at 231; Final Act of the Third United Nations Conference on the Law of the Sea, *supra* note 137, Res. II(6).

140. CHURCHILL & LOWE, *supra* note 35, at 231.

141. *Id.* at 237.

142. *Id.*

143. Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1983 annex § 2(3), Aug. 17, 1994, 33 I.L.M. 1309 [hereinafter Agreement].

144. MARJORIE ANN BROWNE, CONG. RES. SERVICE, THE LAW OF THE SEA CONVENTION AND U.S. POLICY CRS-15 (2006), *available at* http://www.cnie.org/NLE/CRSreports/06Apr/IB95010.pdf.

145. CHURCHILL & LOWE, *supra* note 35, at 253.

146. *Id.*

The problems of expensive technologies and distant resources that face deep seabed mining also apply to renewable energy on the high seas. Even once deepwater technology exists, the vast existing areas within national jurisdiction from which states could extract renewable energy could dampen the rush to the high seas. However, several differences exist which make the extraction of renewable energy on the high seas a more plausible activity than deep seabed mining. First, once deepwater wind and wave technologies are finalized, they will likely be able to operate on the high seas just as they would in deep waters closer to shore. Unlike mining technologies, which battle rising pressures at greater depths, floating energy generators are less dependent on the depth of the water below.[147] Second, unlike polymetallic nodules, wind and waves truly are renewable resources. While energy producers will have to contend with the electricity market, they will likely not have to deal with states' worries about international supply and demand issues that plagued the early seabed mining talks.

V. WHICH MODEL TO USE FOR HIGH SEAS RENEWABLES: FISHERIES, MINING, OR HYBRID?

Energy has the potential to become the third natural resource extracted from the high seas. The other two, fish and minerals, are regulated almost completely differently. Fish are treated, for the most part, as a common resource available to anyone who can catch them. On the other hand, the take of minerals is heavily regulated, perhaps past the point of viability, in the hopes of providing maximum fairness among nations. Renewable energy development shares characteristics with both these other resources. Like a properly-managed fishery, wind and wave power can be extracted without losing the resource. Like deep seabed mining, the land needed for the placement of generating structures is finite, and the installation of structures would result in a permanent (or, at least, long term) occupation of the sea floor. Determining which structure should serve as a model for high seas renewable energy development requires a look at the pros and cons of each system.

A. High Seas Renewables Regime Based on the Fisheries Model

A high seas renewable energy regime based on the current fisheries model would establish energy generation as a "freedom of the high seas"

147. This assumes, however, that deepwater renewable technology develops in such a way as to be less dependent on the sea floor than current monopole technologies.

available under UNCLOS Article 87(2) to any nation or developer so long as the structures are erected "with due regard for the interests of other states." The effect of such a provision would be to minimize the obstacles between a potential developer and the construction of an offshore renewables project.

In this context, "with due regard for the interests of other states" would mean, at least, that developing states take into account navigational routes and fishing grounds. Unlike fishing boats, renewable energy installations would be a permanent fixture; therefore, careful consideration of how occupation of high seas areas would affect other states' high seas uses is important. A provision modeled after UNCLOS Article 116 would ensure that states wishing to put renewable energy structures on the high seas communicate with each other and provide information to ensure safe navigation. For a large deepwater turbine farm, for example, this would likely mean providing charts and coordinates for the project showing the location of each turbine and defining any exclusionary zones.

As South Pacific fishermen complained that driftnet fishing was interfering with merchant vessel navigation and long-line fishing, fishermen and cargo ship captains may complain about large, permanent renewable energy farms installed on the high seas. One way to anticipate these complaints would be to require that high seas renewable energy is a freedom only within certain areas agreed upon by the international community. Another possible solution would be the adoption of articles modeled after UNCLOS Articles 117 through 120 that help ensure that states take measures to conserve the ocean's natural resources. It is uncertain how much deepwater renewable projects would affect fish populations, but if large areas like MPAs are blocked off from fishing, they could possibly be combined with renewables projects. Such an arrangement would bypass fisheries' concerns as well as provide incentives for the conservation of marine areas.

One benefit of a high seas renewable energy regime based on the current fisheries model would be the encouragement of development. Unlike the complex regime currently included in UNCLOS to regulate deep seabed mining,[148] a "freedom of the seas" model for renewable energy extraction would not deter potential development with extra cost or work. Because developers would already be facing enormous costs (constructing, installing, and maintaining the equipment), this is a significant benefit.

148. UNCLOS, *supra* note 12, pt. XI.

Another benefit would be the ease of integrating such a regime into the current UNCLOS framework. As "artificial islands and other installations" are already allowed under UNCLOS Article 87(1)(d), it seems that language would not need to be added or changed to provide for renewable energy structures. Moreover, because a "freedom of the seas" approach would not require the creation and funding of an international regulatory body needed to oversee high seas renewable energy development, costs for all parties would be kept down.

A potential argument against creating a high seas renewable energy regime in the fisheries model is that wealthier states will increase their national jurisdiction into seas that should be held as a commons.[149] Likewise, it can be argued that the international fisheries model has not worked, and has instead left us with too few fish in the seas.[150] The first argument can be addressed by ensuring that high seas waters, like fishing grounds, would not belong to the nation who owns the energy generators placed there. UNCLOS expressly allows for the installation of structures on the high seas in Article 87(1)(d), but it does not provide that the installing nation can claim the seas or seafloor surrounding or below the installation. This point should be clarified in any codification of a high seas renewables regime. The second argument is wounded by the fact that wind and waves are more easily managed than fish populations, which can vary based on overfishing and natural factors.

B. Renewable High Seas Regime Based on the Deep Seabed Mining Regime

A high seas renewable energy structure modeled on Part XI of UNCLOS would presumably start with the preposition that energy generation "shall . . . be carried out for the benefit of mankind as a whole, irrespective of the geographical location of States." An international body akin to the International Seabed Authority would oversee the placement and locations of energy installations. As with the seabed mining applications, developers would apply for two locations:

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149. *See* Joan Eltman, Comment, *A Peace Zone on the High Seas: Managing the Commons for Equitable Use*, 5 INT'L LEGAL PERSP. 47, 48)(Fall 1993) ("The assertion of exclusive claims to living and non-living resources in the Exclusive Economic Zone is antithetical to future peace, because a growing number of nations would most likely extend claims to increasingly scarce and remote resources.").

150. *See* Gorina-Ysern, *supra* note 92, at 645 ("The international law of the sea has not afforded adequate protection to marine life and marine habitats, especially on the high seas, even though the laws of the sea rules in force are virtually universal."); Hewison, *supra* note 85, at 373.

one for them to develop and another to be banked for later development by the new international body. A "parallel system" would provide energy to poorer nations and, presumably, help prevent richer nations– who have the ability to place such expensive structure so far out to sea– from being the only nations to capitalize on high seas renewable energy.

A high seas renewables regime based on the deep seabed mining framework in UNCLOS would have the benefits of information and fairness. An international body tasked with the regulation of high seas energy projects would be in the best position to regulate developers, ensuring that projects are not placed in sensitive waters, such as MPAs or shipping lanes. Such careful considerations would be necessary in order to comply with the "due regard" requirement UNCLOS III Article 87(2). Indeed, because renewable energy installations would permanently occupy high seas space, careful inquiry into existing patterns of use of high seas lands would be very helpful in order for projects to be properly placed. An international oversight body, rather than an uncertain patchwork of interested states, would be an ideal body for such a study.

Additionally, an international body could help locate the most desirable areas and permit their development, thereby ensuring access to developers and regulating developers' competing claims. The ability of an international body to permit projects and establish regulations would encourage consistency for high seas developments as well as help ensure that projects were meeting UNCLOS-mandated environmental, safety, and reporting requirements. Without such regulations in place, developers would have very little oversight and guidance; an unwise situation due to UNCLOS mandates that high seas projects be exercised with "due regard" for other states, and for the navigational, fishing, and environmental impacts from the projects.

Finally, an international regulatory body could ensure that some of the developed energy would find its way to poorer nations, thus keeping in force the spirit of UNCLOS that the high seas should only be used for the benefit of mankind. Just as the Authority is able to exploit its "banked" nodule site, an international high seas renewables body could exploit sites chosen by other developers, and could help ensure the transfer of renewables technology to other interested parties.

However, there are several problems with this approach. First, as with deep seabed mining, it may be too expensive to be viable. Asking developers who are looking to place already expensive equipment onto the high seas to enlarge their projects for an international regulatory body may drive them to look closer to shore. Second, unlike fields of polymetallic nodules, locations for surface energy generation are more easily determined, and would not likely need to be supplied to an

international body by the developer. Third, it could presumably be argued that high seas renewable energy is energy produced "for the benefit of mankind" without having to take additional steps. At a time when so many countries are pledging to take steps to reduce carbon output and increase the production of renewable energy, installations of emissions-free electric generators on the high seas may be just the benefit mankind needs.

C. A Hybrid Solution?

Because many nations have committed to cutting carbon emissions,[151] the focus should be on the development of emissions-free renewable technology. The best way to encourage development is by establishing as few hurdles as possible. Thus, a model for renewable energy extraction on the high seas based on the "freedom of the high seas" approach used by high seas fisheries would likely result in the quickest development. Wind and waves are more renewable than fish, and therefore, renewable energy should be able to be harnessed without a lot of interference.

However, an international regulatory or oversight body would best be able to coordinate and troubleshoot proposed projects so that they were in step with international laws and effective sources of electricity. Such a body, unlike the Authority, would act more as an advisor and registration authority than a regulatory body. For example, dropping the requirements for a developer to propose an additional plot for development and for the international body to construct its own structures in the interest of developing nations would help ease the burdens on developers and the international community. That is not to say that a high seas renewables regime would do away with traditional requirements for development in the interest of mankind: clean, renewable energy is in itself in the interest of mankind, and needs no further justification.

VI. CONCLUSION

Providing energy for our growing civilization while maintaining environmental quality remains the ultimate challenge. Renewable sources of energy such as wind and waves are potentially part of the solution. While it is not an imminent prospect, the wind and wave

151. *See* Kyoto Protocol to the United Nations Framework Convention on Climate Change art. 3, Dec. 10, 1997, 37 I.L.M. 32.

energy found on the vast areas of our planet's high seas may one day be harnessed. The international community would do well to contemplate now how such a system would operate, and how best to regulate it while still encouraging the maximum amount of development.

The system that may work best is a combination of the two regimes currently in place for high seas resource development. A system where those with the ability to fund renewable energy projects on the high seas could do so without more than simple registration and oversight would result in a system that encourages development, while maintaining benefits environmentally and commercially.