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Conflict Resolution for Addressing Climate Change With Ocean-Altering Projects

by Mark J. Spalding and Charlotte de Fontaubert

Editors' Summary: It is often remarked that the global problem of climate change will require local solutions. Wind and wave energy projects are just two examples of alternative energy sources that may slow the effects of climate change, but may also have detrimental effects for the immediate regions in which the projects are located. In this Article, Mark J. Spalding and Charlotte de Fontaubert discuss the challenge of balancing local impacts against global benefits. They begin with a description of the nature of the conflict and identify stakeholders and their interests. They then offer several options for possible conflict resolution strategies, ultimately concluding that a new type of conflict resolution mechanism is needed to balance the conflicting needs of global and local environments.

I. Introduction

Most threats to oceans health, such as point-source pollution runoff, overfishing, or the introduction of invasive species, tend to be highly specific and targeted. By contrast, the current and expected effects of climate change are broader in scope and potentially more devastating to the health of all the world's oceanic ecosystems, particularly through global oceans warming and sea levels rising.

Some basic (and largely undisputed) assumptions on climate change[1]:

- The earth is expected to become a few degrees warmer in the next couple of decades.
- The International Panel on Climate Change (IPCC) has concluded that human activities were the main contributor to "most of the warming observed over the last 50 years."
- An overwhelming majority of scientists believe that continued growth of greenhouse gas (GHG) emissions will raise average global temperatures and change regional climates; the only questions are how much and how fast this will occur.
- Global warming will destabilize ocean heat transfers.
- When the average annual temperature of a tropical sea increases by one degree Celsius, coral reefs bleach, and many do not recover.
- Climate change is very likely to alter substantially the distribution and abundance of major fish stocks.
- Loss of stratification/upwellings leads to a decrease in nutrients at the surface and detritus in the deep sea.
- Accompanying loss of all related biodiversity and productivity can be expected.
- Over one-half of the world's population lives along the coast, increasing the threat of disruption from rising sea levels, more intense storm systems, and the loss of productive coastal ecosystems.

Compounding the problem is the fact that many new emerging technologies designed to address climate change through the development of alternative sources of energy are increasingly being deployed in marine ecosystems. The most promising of these technologies are also the most threatening to marine ecosystems: offshore wind farms; carbon sequestration; tidal and wave energy; and ocean thermal

Mark J. Spalding is the president of The Ocean Foundation. Dr. Charlotte de Fontaubert is a marine consultant based in Washington, D.C., and a member of the International Union for the Conservation of Nature and Natural Resources' Commission on Environmental Law. The views in this Article do not represent those of IUCN—the World Conservation Union or any of its members.

1. As the International Panel on Climate Change (IPCC) has stated: "Most of the observed increase in globally averaged temperatures since the mid-20th century is very likely [90%] due to the observed increase in anthropogenic greenhouse gas concentrations." For more information on the IPCC, see IPCC, *Homepage*, http://www.ipcc.ch/ (last visited Aug. 21, 2007). Similarly, the Arctic Climate Impact Assessment observed: "There is an international scientific consensus that most of the warming observed over the last 50 years is attributable to human causes." For more information on the Arctic Climate Impact Assessment, see Arctic Climate Impact Assessment, *Homepage*, http://www.acia.uaf.edu/ (last visited Aug. 21, 2007). *See also* Michael Gerrard, Global Climate Change and U.S. Law (2007); Fred Pearce, With Speed and Violence: Why Scientists Fear Tipping Points in Climate Change (2007); Tim Flannery, The Weather Makers: How Man Is Changing the Climate and What It Means for Life on Earth (2006); National Research Council, Abrupt Climate Change (2002); Richard Alley, Sixth Annual Roger Revelle Commemorative Lecture: Abrupt Climate Change, Oceans, and Us (Nov. 10, 2004).

energy conversion (OTEC).[2] While the impact of these new technologies is often localized, the benefits expected from their development are global in scale, leading to the question of how to know whether "a few places shall be sacrificed for the good of the whole."[3]

Table 1. Examples of Problems With Wind and Wave Energy Projects

Issues With Wind Energy	Issues With Wave Energy
Damage to natural sea floor at placement and under cables	Disturbance or indirect destruction of marine life
Fragmentation of habitat	Site closed to fishing
Relatively low return of energy per built acre	Turbine blade mortality to marine life
Noise pollution from construction and operational vibrations	Threat to navigation accident/spills
Seabird kills from turbine blade collisions	Vulnerable to sea-level rise, changes in current patterns, and storms
Threat to navigation	
Vulnerable to climate pattern shifts and intense storms	

The problem of balancing local impacts against global benefits is not addressed by the decisionmaking process currently in place, which generally examines each energy project proposal on a location-by-location basis. This Article addresses how a given proposal is expected to affect local conditions, without necessarily taking into account the beneficial impacts on larger issues such as climate change, which by nature are less tangible for the local stakeholders. In essence, individual battles are being fought without an overall strategy toward winning the global war. In addition, there is an inherent conflict between mainstream recommendations for addressing climate change, i.e., developing alternative, non-fossil fuel sources of energy, sometimes in marine ecosystems, and mainstream aspects of ocean conservation, which suggest that the oceans are dying the death of a thousand cuts and are not likely able to deal with further assaults from these new technologies.

The dilemma can be put in ethical terms by asking whether we will show our stewardship for the ocean by doing all that is in our power to address the overarching impact of climate change or by stopping those who seek to build structures that will alter the very nature of oceans. Finding an answer will require establishing adequate conflict resolution procedures to reach a better balance between local costs and global benefits and to ensure that projects likely to alleviate climate change are not watered down or killed outright to appease local conservation concerns. These conflict resolution procedures need to identify areas where projects are to be allowed, the appropriate technologies to be used, and the means to mitigate environmental, social, and economic harms.

II. The Nature of the Conflict

Because of its potential for widespread devastation, addressing climate change will require an attitudinal shift for government and the public. Whereas the majority of damage caused to the environment is local in nature and can be effectively *addressed* locally, climate change has the potential to create irreparable damage on a *global* scale, including to the oceans as a whole, in spite of efforts to reverse or minimize the damage that may be undertaken *locally*.

One of the problems with addressing climate change is that some of the sources of clean energy that can help reduce the severity of climate change may require placing structures on the sea floor, in the water column, or on the coast—solutions involving structures that the ocean conservation community normally views as threats to coastal and benthic habitats, waves, or various marine species. Unfortunately, it is becoming more accepted that climate change cannot be slowed without the development of clean energy, which, paradoxically, may be detrimental to the health of local oceans. There is an increasingly vocal interest in tapping the oceans for alternative energy sources such as wind and tidal/wave power.

At the very least, then, the costs of clean energy projects in the ocean must be compared against those that would result from likely offshore oil and gas developments. Great untapped oil resources likely lie in offshore reserves, as recently evidenced by the large reserves found in the Gulf of Mexico by Chevron.[4] Likewise, proposals for new oil and gas rigs and pipelines, as well as facilities for liquefied natural gas, have appeared mostly along the coasts, particularly in the United States. There are increased risks and impacts from seismic surveys on the continental shelf, particularly for marine mammals, and the exploitation of seabed methane is being considered.

2. For a comprehensive primer on the various technologies and potential environmental impacts of offshore wind and wave and tidal power projects, see Surfrider Foundation, *Coastal A-Z: Alternative Energy*, http://www.surfrider.org/srui.aspx?pgTitle=COASTAL%20A-Z&uiq=a-z/alternative_energy (last visited Aug. 2, 2007).

3. For a series of recent articles that report on the impacts that are expected, see, e.g., Allister Doyle, *Greenhouse Gas Ocean Burial Okayed From Feb 10*, Reuters News, Feb. 12, 2007, *available at* http://www.reuters.com/article/worldNews/idUSL0965553220070209; Goska Romanowicz, *Green Light for Offshore Windfarms*, Edie News Centre, Dec. 18, 2006, *available at* http://www.edie.net/news/news_story.asp?id=12417&channel=0; Jeanette J. Lee, *Tidal Energy Companies Staking Claims*, Associated Press, Nov. 6, 2006, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2006/11/04/AR2006110401300.html.

4. *Huge Oil Reserves Found in the Gulf*, CBS News, Sept. 5, 2006, *available at* http://www.cbsnews.com/stories/2006/09/05/business/main1969353.shtml.

Table 2. Environmental Accounting (Cost-Benefit Analysis) of Clean Energy Projects and Offshore Drilling in Marine Ecosystems

"Clean" Energy Projects in Marine Ecosystems	Offshore Oil and Gas Drilling
Short-term destruction of local coastal and marine ecosystem	Short-term destruction of local coastal and marine ecosystem
Potential permanent long-term benefits of new structures as artificial reefs	Potential mid-term, but ultimately ephemeral, benefits of new structures as artificial reefs
No risks of discharge due to the absence of hydrocarbons	Long-term destruction risk due to operational discharges (ultimately unavoidable)
No increased risks of discharge due to the absence of hydrocarbons	Increased short and long-term risks due to accidental discharges (risks linked to collisions, explosions, etc.)
Sustainability of the projects, which do not call for the development of new sites, particularly if sufficient conservation measures are undertaken in parallel	Long-term exhaustion of resources and need for further sites, even if sufficient conservation measures are undertaken in parallel

As shown in Table 2, the question is not one of knowing whether there will be potentially destructive projects in coastal and marine areas, but rather, whether these projects will be devoted to clean energy or the further exploitation of hydrocarbon resources known to contribute greatly to climate change. In both cases, local communities are often vocal in their opposition to such developments. States like California have succeeded in opposing federally mandated offshore oil exploration, while others, such as Alabama, Louisiana, Mississippi, and Texas, have been more welcoming, anticipating economic benefits from such developments, especially in the wake of a new law returning a greater portion of the revenue to states' coffers.[5]

Perhaps the best-known example of local opposition to coastal energy development is playing out in the near-shore waters off Cape Cod in Massachusetts, where eight energy generation wind farms have been proposed. The wind farms are expected to provide alternative sources of energy to supplement other more conventional sources to meet prospective energy demand, and to thus improve air quality and contribute to a reduction in GHG emissions. There has, however, been strong and vocal opposition from local communities and environmental groups who are opposed to the projects on aesthetic and habitat disruption grounds. The Cape Wind project includes a proposal for a 130-turbine wind farm in Nantucket Sound and is the first offshore wind energy project to go through the federal permitting process. Opponents believe that the project will have negative impacts on navigation, fishing, boating, birds, and commercial recreation and tourism. In this location, some groups seek responsible project implementation, while others seek ocean protection, aesthetic protection, and no project alternatives.

Recently, the U.S. Army Corps of Engineers (the Corps) issued its draft environmental impact statement on the Cape Wind project,[6] which states that while the project would have adverse visual impacts, it would do little or no harm to fish, birds, and the surrounding sea floor, and would not curtail tourism or drive down local property values. It should be noted, however, that the Corps has indefinite discretion because no federal standards exist for, e.g., how many bird deaths are tolerable at a wind farm. On the other hand, the report estimates the public health savings from generating energy without emitting pollutants at about $53 million per year. According to a *Boston Globe* news article, the "report's release promises to intensify the controversy over the wind farm, which has been a political flash point since it was proposed three years ago."[7]

There are numerous reasons to be concerned about projects like Cape Wind and others requiring the expansion of energy infrastructure in marine and coastal ecosystems. These include the disruption of the benthic communities and other ecosystems on the ocean floor; routine discharge of contaminated drilling muds, cuttings, and produced waters; disturbance of toxic muds along coastal waters that would release polychlorinated biphenyls (PCBs), heavy metals, and other poisons now capped; disruption of migratory paths for large pelagic species and interference with their ability to communicate; additional release of mercury into the oceans through oil drilling[8]; spill-induced mortality of marine mammals, seabirds, and other animals; noise pollution, including from seismic techniques used for oil exploration and the constant vibrations throughout the exploitation stage; and possible permanent changes to near-shore fisheries through alteration of key ecosystems.

To build anything in the oceans will induce change, which is a major reason why marine and coastal conservation groups have worked so hard to get restrictions on construction of everything from piers to drilling platforms. Clearly, the Cape Wind opposition has to decide whether a Cape Wind project is worth the sacrifice of the benthic community and seabirds, as well as disturbance of other marine plants and animals. Some groups will continue to answer no, often on not-in-my-backyard grounds, while others are clearly arguing that the local sacrifice is justified in the face of the larger global threat of climate change.

On the other side of the equation, many scientists argue that climate change could be the single biggest threat to the oceans, now and in the future, making reductions in the emission of GHGs one of several priorities. Tapping alternative energy in the ocean could replace fuels that are far more dangerous from a climate change perspective, and

5. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594.

6. The report's release had been delayed by a high-level Pentagon review, which was the subject of a serious policymakers' debate. See *infra* note 18, for a discussion of this debate.

7. Beth Daley, *Report Sees Few Drawbacks on Wind Farm*, Boston Globe, Nov. 8, 2004, *available at* http://www.boston.com/news/local/articles/2004/11/08/report_sees_few_drawbacks_on_wind_farm/?page=1.

8. Most of the mercury comes from the drilling muds brought from elsewhere, and past practices in using such muds for lubrication have led to very serious problems with mercury in the sediments around drilling rigs and even in marine life. Another means by which the operation of oil platforms contributes to environmental degradation is their discharges, since these discharges contain various heavy metals—such as lead, zinc, and chromium—along with polycyclic aromatic hydrocarbons (PAHs). For more information on the environmental effects of these discharges, see United Nations Environment Program, *Offshore Oil and Gas Environment Forum: Emissions*, http://www.oilandgasforum.net/emissions/index.htm (last visited Aug. 21, 2007).

thus, may be worth the immediate environmental risk. Wind farms can cause local disruption to marine ecosystems and coastal communities, but they may also bring regional improvements in air quality and reductions in airborne nitrogen deposition into watersheds if they replace "dirtier" sources of electric power.

A deep skepticism of all energy development has affected views on an energy policy for the ocean. The poor environmental track record of oil production and the shipping industry reinforces this skepticism. However, the complex intersection with the climate change issue and the promise of cleaner fuels argues for a careful, thoughtful, and to the extent possible, unemotional reassessment of the U.S. attitude toward coastal energy development. A positive environmental agenda with regard to energy may help leverage progress on marine-protected areas, ecosystem-based planning, and vital reforms to ocean governance, as all of these issues are interconnected and will relate to efforts on ocean zoning and use designations.

This debate also plays out on the congressional stage. Recently, Sen. John Warner (R-Va.) attempted to bar the Corps from carrying out further work on offshore wind energy projects (including pending projects) until the U.S. Congress could study the issue further. Sen. Hillary Clinton (D-N.Y.) blocked Senator Warner's attempt after a failed effort by Sen. Pete Domenici (R-N.M.) to insert a fast track approval process that would have prevented anyone other than the U.S. Department of the Interior from commenting on proposed offshore wind energy projects. The opposition to Senator Warner's proposal was brutal and strong. The debate lasted into the early morning.[9]

Driving the debate between the need to address global climate change and the willingness to resort to local clean energy ocean-based projects are the enduring dichotomies between costs and benefits, local and global considerations and short- and long-term effects. If successful clean energy ocean-based projects are developed, one can reasonably expect the following costs and benefits:

- The costs will be borne mostly in the short term;
- The costs will be borne primarily by local communities that are directly affected;
- Those who bear these costs will be clearly identifiable;
- The cost-bearers may not be the ones most responsible for climate change in the first place, particularly if such projects are sited in the coastal waters of developing countries[10];
- The benefits will be accrued regionally through cleaner air and globally through a reduction in climate change, or at least climate that changes more slowly;
- The benefits will apply to all, though no one in particular may be able to identify themselves as the beneficiaries;
- Since they are difficult to identify, the beneficiaries are very unlikely to compensate the cost-bearers;
- At this point, no mechanism has been established for the beneficiaries to compensate the cost-bearers[11];
- Benefits are more likely to appear in the longer term; and
- The benefits may be "hijacked" by a free rider entity (be it a state or an industry) that does not fulfill its share of obligations to mitigate the impacts of climate change.

III. The Need for Conflict Resolution

The current state of local decisionmaking over energy proposals demonstrates the need for a clear and predictable conflict resolution mechanism. There is a serious rift in the conservation community on how to deal with projects that are potentially damaging to the local environment but necessary to reduce reliance on fossil fuels. At this point, there is no adequate process in place to resolve or prevent the conflict, and one is unlikely to develop; the solution will require the bridging of language and priorities of ocean conservationists with those whose jobs are more focused on addressing climate change and reforming energy policy. Unfortunately, many of the critical constituencies for coastal and watershed protection, including grass-roots organizations, may prove to be obstacles to reducing GHG emissions with coastal energy strategies. There are few conflict resolution efforts to address the intersection between ocean conservation and renewable energy proposals, and local communities have no incentive to agree to a project, even if the benefits (spread among numerous and unidentifiable beneficiaries) exceed the costs.

Furthermore, there appears to be a form of policy paralysis among some of the larger nongovernmental organizations (NGOs), and even within the conservation funding community. The few organizations that work on both energy policy reform and oceans conservation appear to resolve differences between departments through agreeing to disagree in private and remaining silent in public concerning their divergence of priorities. Meanwhile, funders with both climate change and ocean conservation grantmaking pro-

9. For a very thorough review of the work of various congressional committees on this issue, see American Geological Inst., Government Affairs Program: Summary of Hearings on Energy (2006), *available at* http://www.agiweb.org/gap/legis109/energy_hearings.html. Wendy Williams & Robert Whitcomb, Cape Wind: Money, Celebrity, Class, Politics, and the Battle for Our Energy Future on Nantucket Sound (2007).

10. The question of whether developing countries have a lesser obligation to curb GHG emissions than more industrialized countries is at the core of the current Administration's decision not to ratify the Kyoto Protocol. It has been argued in the past that developing countries can and should take some of the more adaptive measures because such an approach would be less onerous (assuming said countries are adequately and fairly compensated). *See* James Gustave Speth, Red Sky at Morning: America and the Crisis of the Global Environment (2005); Ani Agarwal & Sunita Narain, *The Greenhouse Gas Trade—Climate Change: The Debate Heats Up—Kyoto Protocol*, UNESCO Courier, Oct. 1998. Still, some developed countries remain content to export their problems to the developing world, be it in the form of exporting fishing overcapacity through distant water fishing fleets or the illegal export of dangerous chemicals to Africa in violation of the Basel Convention. *See, e.g.*, Basel Action Network, Basel Non-Compliance Notification Report—Country Violation: France (2006), *available at* http://www.ban.org/notifications/BNN2006_1.pdf; Stephen Mbithi Mwikya, *Fisheries Agreements and Sustainable Trade: Implications for the Current WTO Negotiations*, Bridges, Sept./Oct. 2005.

11. It should be noted, however, that in contrast to more traditional hydrocarbon-based projects, the source of wind or solar energy cannot be stored and/or transported, so production must take place close to use, thus allowing for a better tie between costs and benefits.

grams have not yet reconciled their ocean conservation funding with their climate change reductions efforts or energy policy reform funding. As noted above, when we examine conflict resolution models, we find few focused specifically on energy or oceans, much less both. As a result, decisions are based upon each side's relative strengths and weaknesses, rather than on the best long-term outcomes for the ocean ecosystem.[12] It is within this context that a more systematic approach to conflict resolution is necessary.

IV. Scenarios for Conflict Resolution

The status quo allows the tension between climate change/energy policy advocates and ocean conservation advocates to serve as a balancing mechanism in some ways—preserving some important ocean and coastal areas while allowing renewable energy installations in other locations that are not the subject of so much scrutiny. The result is policies based on the louder local voice, rather than sound arguments. Project developments are likely to be inequitable at best and self-defeating at worst. One can imagine cases where a more vulnerable and valuable ecosystem will be damaged because it lacked powerful champions, while the sites that are effectively protected are simply those that gathered the most reaction from the public and conservation organizations, regardless of their productivity as marine ecosystems.

While there is no perfect solution, there appear to be several scenarios that can help resolve the current dilemma.

A. Option 1: Implementing the Best Policy

The first scenario is simply to try to determine and then implement the best policy. This process could include undertaking a study of at least two pilot projects to examine in detail the environmental cost-benefit trade offs. The goal of the study should be determining which projects balance in favor of ocean protection. Such a study might be carried out by the National Center for Ecological Analysis and Synthesis (NCEAS) at the University of California at Santa Barbara, or by a similar institution. This approach is precautionary in nature and does not account for the urgency that may be desirable given expert warnings on the imminence of climate change. Conversely, lessons learned from pilot studies may be applicable to future projects, allowing for more decisive action in the longer term.

B. Option 2: Using Available Strategies

A second attractive option is to implement those strategies that can reduce human contributions to climate change in the near term until hydrogen or other technologies fully replace fossil fuels. The near-term strategy, if chosen wisely, could be fully supported by the ocean conservation community as well as the climate change and energy policy advocacy communities. In other words, pursue a "co-strategy" in which groups respond to the full range of threats to the oceans with an increased awareness and focus on climate to speed up implementation of these replacement technologies and efficiency measures. With the right leadership, proper incentives, and a coherent set of actionable alternative solutions, communities can and will become effective advocates for these solutions.

This scenario has the added benefit of getting the top stakeholders from each side into the same room and working on attractive solutions. The results would make a great briefing topic for climate change and energy policy funders. The negative, however, is that even if such a meeting takes place, the well-funded energy sector of industry will likely continue to pursue its own projects and will undoubtedly seek to site some of its projects on the coasts and in the ocean. In addition, the traditional energy projects benefit from existing regulations that have widely been enacted to protect their interest. Thus, at a second or third meeting, policymakers and project proponents from various industries should be included.

Some projects that could be considered were defined by Stephen Pacala and Robert Socolow in the publication *Science*.[13] The article proposed 15 options for creating strategies, which over 50 years would "solve the carbon and climate problem in the first half of this century simply by scaling up what we already know how to do."[14] The strategies are broken out into three categories: efficiency and conservation; decarbonization of electricity and fuels; and natural sinks.

Table 3. Summary of Pacala and Socolow's Findings

Efficiency and Conservation	Decarbonization of Electricity and Fuels	Natural Sinks
- Improved fuel economy for transportation - Reduced reliance on cars - More efficient buildings - Improved power plant efficiency - Improved electrical power distribution grid efficiency[15]	- Substituting natural gas for coal - Storage of carbon captured in power plants - Storage of carbon captured in hydrogen plants - Storage of carbon captured in synfuels plants - Nuclear fission - Wind energy - Photovoltaic electricity - Renewable hydrogen - Biofuels	- Forest management - Agricultural soils management

12. Analyzing those strengths and weaknesses, however, can prove difficult. It is undeniable, for instance, that at the level of foundations or large environmental NGOs involved in this debate, budgets for energy/climate work exceed by far those devoted to oceans conservation, thus revealing some form of bias (this is based on a review of annual foundation surveys in the *Chronicle of Philanthropy* and the 990 return filings of 10 large NGOs). At the local community level, in contrast, the immediate impact on the ocean and vistas will probably be more disliked than intangible climate benefits that may or may not be anticipated.

13. Stephen W. Pacala & Robert Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years With Current Technologies*, SCIENCE, Aug. 13, 2004, at 968-72.

14. *Id.* at 968.

15. This item is the authors' addition.

C. Option 3: Mapping/Zoning Development and Protected Areas

The best and most effective map would require a consensus approach to identify energy development zones as well as key marine areas that should be off limits for development. Part of this effort would involve convincing ocean conservation groups that climate change is such a threat to the ocean that it is necessary to have certain sacrifice zones for the installation of renewable energy generation facilities in the ocean and on the coast.[16] On the other hand, the consensus may focus on whether the ocean and its systems are so important and/or are already under so much threat from other human impact that the ocean and the coastal waters should not even be considered in siting renewable energy generation facilities.

Regrettably, this option would be very difficult to implement given the difficulty in drawing marine-protected area boundaries. In addition, it is unclear how long the parties involved would be committed to the map when local pressure near "sacrifice zones" intensifies.

D. Option 4: Energy Project Criteria

This option calls for the creation of siting criteria and a review process that can be followed when examining all future alternative energy projects. The criteria and process should articulate the information needed from each project and clearly lay out what elements the project must include. The review process may require drafting some credible voluntary industry principles along the lines of the Ceres Principles (formerly the *Valdez* Principles), which lay out a 10-point code of corporate environmental conduct to be endorsed by companies as an environmental mission statement or ethic.[17] The results could be used in an effort to include consideration of oceans in the Hewlett Foundation energy commission effort.[18]

E. Option 5: Conflict Resolution Center

Regardless of what option is used, it would behoove all involved in both marine conservation and climate change advocacy to develop a conflict resolution center with a team of expert facilitators. The facilitators could insert dynamic facilitation into the conflict situations to constructively manage the tension for a multistakeholder-based outcome at the intersection between coastal and offshore energy and ocean conservation. Such a center could also provide training for grass-roots advocates on collaborative processes for reaching consensus. It could be housed by a nonprofit center, a university law school, or some similar neutral host.

V. Conclusion

The oceans and the life within are under threat from an array of human activities, the most global of which is climate change. It is hoped that the effects of climate change on oceans can be mitigated by the rapid deployment of alternative energy sources and an accompanying reduction in GHG emissions. There is a conflict between proposals to site alternative energy projects such as wind farms in the oceans or use the wave energy and efforts to prevent putting any structures in the oceans so that we continue to protect local marine ecosystems and the species that depend on them. There are divisions within organizations working on both marine conservation and climate change on how to resolve conflict. There are similar divisions within major funders and government regulatory structures (to the extent the latter exist). There is a clear need for a conflict resolution framework that permits thoughtful decisions and priority setting for efforts to address GHG emissions and efforts to protect vulnerable marine ecosystems.

In view of the complexity of the issues and the extent to which conflicting interests are at play (sometimes even within a single entity, such as local governments or a large environmental NGO), a new approach to the problem is clearly needed. In the absence of such a paradigm shift, we can expect to see more of the same: inaction at best and poor siting of marine-based clean energy projects at worst. Whereas the relative strengths and weaknesses of divergent interests may shift and evolve through time, real progress, in the form of a clear conflict resolution mechanism, must be achieved. Climate change must be addressed; some of the solutions will necessarily take the form of clean energy developments, and some of these developments will inevitably take place in marine and coastal ecosystems. At the very least, one of the very first steps needs to be a coming together of the representatives of these conflicting interests—those who want to see clean energy projects developed and those who insist that coastal and marine ecosystems must be protected. The former need to acknowledge that the oceans are already terribly threatened and must internalize the environmental costs of their proposed projects on the oceans. Conversely, the latter must face the fact that clean energy projects will be developed, and some of them will take place in the ocean, but the impacts of such projects can be anticipated and limited through appropriate siting.

The next steps toward this meeting of the minds may take several forms and might include the convening of congres-

16. Mitigation in the ocean is an unproven strategy. Thus, negotiating siting criteria partly means setting criteria for identifying sacrifice zones and the circumstances in which they will be used. Unfortunately, prior experience has shown that when similar structures have been built, they are rarely ever removed—recent and mostly unsuccessful efforts to remove superfluous dams are a case in point For more information on the problems associated with dam removal, see University of California at Berkeley Library, *Clearinghouse for Dam Removal Information*, http://www.lib.berkeley.edu/WRCA/damremoval/ (last visited Aug. 21, 2007). For more information on current efforts at dam removal, see American Rivers, *Dam Removal Tool Kit—Dam Removal: Current Efforts*, http://www.americanrivers.org/site/PageServer?pagename=AMR_content_12d1 (last visited Aug. 21, 2007). Once the structure is there, the harm has been done and the alternatives are limited.

17. For more information on the Coalition for Environmentally Responsible Economies principles, see Department of Soc. & Econ. Affairs, U.N. Div. for Sustainable Dev., *CSD-6 Follow-Up: Multi-Stakeholder Review of Voluntary Initiatives and Agreements for Industry*, http://www.un.org/esa/sustdev/mgroups/via/viaprofiles_CERES.html.

18. After more than two years in development, the National Commission on Energy Policy released its groundbreaking report, *Ending the Energy Stalemate: A Bipartisan Strategy to Meet America's Energy Challenges* in December 2004. National Comm'n on Energy Pol'y, Ending the Energy Stalemate: A Bipartisan Strategy to Meet America's Energy Challenges (2004), *available at* http://www.energycommission.org/files/contentFiles/report_noninteractive_44566feaabc5d.pdf. The report, funded by the Hewlett Foundation, is being used in part as a guide to the grantmaking of that foundation. For more information, see The William & Flora Hewlett Foundation, *National Energy Commission Report Frames Energy Debate*, http://www.hewlett.org/Programs/Environment/Energy/News/energycommission.htm (last visited Aug. 21, 2007).

sional hearings. For instance, the U.S. House of Representatives' Committee on Natural Resources recently held a hearing to explore carbon sequestration technologies, some of which may involve carbon sequestration in the seabed.[19] Another sign that Congress may be willing to explore this issue further is the recent creation of the Select Committee on Energy Independence and Climate Change. In fact, one of the first steps should be to identify a forum within which these divergent interests can be brought together. While congressional action can sometimes move at a glacial pace, Congress can be a place where the interests of the coastal states, who may have the most to lose from marine-based clean energy projects, are meshed with those of the whole of the United States, which can and should see the urgency of taking remedial actions to address the growing threats of climate change.

Another set of fora where these interests could meet is that of international institutions, such as the IPCC, the meeting of Parties of the United Nations Framework Convention on Climate Change (UNFCCC),[20] or even the Convention on Biological Diversity (CBD),[21] which has a good track record of addressing threats from climate change and threats to marine biodiversity. Likewise, the World Bank and agencies such as the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDEP) are likely to become involved in the financing of ocean-based clean energy projects, and they need to be brought in this debate and informed of the potential risks and cost-benefit analyses. Otherwise, we can expect the same internal conflict within these institutions as we have witnessed elsewhere.

An interesting lesson can be drawn from the so-called climate camp. Organized by the World Wildlife Fund in April 2006, the camp brought together 150 climate and conservation exerts from 34 countries for a week-long educational gathering in Washington, D.C., to redesign conservation approaches to include climate change. This initiative so far has focused on salmon and Bering Sea fisheries issues but could well be replicated to address head-on the relationship between clean energy projects and ocean conservation. In any event, the largest environmental NGOs should feel obligated to pick up this issue. We can only anticipate that this transition will be facilitated if NGOs coordinate their efforts and share their experiences in the matter, rather than going at it alone.

In the end, it does not matter which forum is used to bring these divergent interests together. In fact, the transition is likely to be so difficult that it will need to take place at all levels simultaneously: politically, through congressional action; locally, with better coordinated efforts on the part of local governments; by civil society, through NGOs large and small; and at the international level, through the work of international institutions and treaties. Action is needed, and it must be taken soon. The lack thereof will only aggravate this conflict between two competing but equally important priorities, addressing climate change and protecting our oceans from further threats.

19. *The Future of Fossil Fuels: Geological and Terrestrial Sequestration of Carbon Dioxide, Joint Subcommittee Oversight Hearings Before the House Subcomm. on National Parks, Forests, and Public Lands of the House Comm. on Natural Resources and the House Subcomm. on Energy and Natural Resources of the House Comm. on Natural Resources*, 110th Cong. (2007). For more information on this hearing, see House Comm. on Natural Resources, Natural Resources Committee Calendar, http://resourcescommittee.house.gov/index.php?option=com_jcalpro&Itemid=32&extmode=view&extid=46 (last visited Aug. 21, 2007).

20. For more information on the UNFCCC, see UNFCC, *Homepage*, http://unfccc.int/2860.php (last visited Aug. 21, 2007).

21. For more information on the CBD, see CBD, *Homepage*, http://www.cbd.int/default.shtml (last visited Aug. 21, 2007).