Environmental Politics

Steel forests or smoke stacks: the politics of visualisation in the Cape Wind controversy

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While wind power is now considered both technologically mature and economically feasible, it faces bitter opposition from local communities on the grounds of visual pollution. The role that visual impact analyses play in policy debates about the siting of wind energy facilities is critically examined. The production of viewshed simulations and their reception by members of diverse publics are examined in the context of the Cape Wind project in the United States. The official public comments record for this project is used to explore how viewshed controversies challenge administrative politics. Some ways in which visual impact assessments can better register cultural rationality and enroll civic epistemologies are suggested.

Keywords: visualisation; deliberation; wind energy; environmental impact assessment

Introduction

On 16 January 2009, the US Mineral Management Service released its final environmental impact statement (EIS) on the siting of the Cape Wind project in the northeastern state of Massachusetts. The agency determined that Cape Wind's 130 turbine project posed no serious environmental threats that could not be mitigated. Cape Wind is poised to be America's first utility-scale offshore wind energy facility. Since it was proposed in 2001, the project has faced tremendous political, social and legal challenges. Dueling images of smoke stacks, from the coal powered plants that would be displaced, and the 420 foot steel towers that will mar the seascape of Nantucket Sound, have waged a powerful media war over the last 9 years.

In several countries, including the United Kingdom, the Netherlands, France, New Zealand and Australia, contestations over wind energy have been 'largely due to its visual impact on landscapes' (Wüstenhagen *et al.* 2007,

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p. 2683). In the United States, visual impact concerns are creating unusual fissures within local and national environmental movements. Visual debates often revolve around the need to balance local interests for protecting landscape identity and quality with the responsibilities of global environmental citizenship in the face of climate change.

In response to these concerns, wind energy developers now routinely produce visual impact assessments as part of the overall EIS for a project. Developers contract analysts to create viewshed simulations that represent how the seascape or landscape will change as the result of a wind energy project. Using Cape Wind as a case study, this article describes both how experts represent visual impacts and how their analyses become legitimated and subverted in the public deliberations that ensue over a project.

As a technological controversy, the Cape Wind case presents an interesting challenge for environmental policy scholars. The 1970 US National Environmental Policy Act (NEPA) established the procedural requirements for impact reviews. The law mandated an extensive public engagement process that begins with a notice of intent and ends with a record of decision. While NEPA is regarded as the single most important American environmental law, scholars have argued that public engagement protocols are unevenly interpreted and applied by administrative agencies (Hendry 2004). In the context of wind energy siting, NEPA-led public engagement most often takes the form of charged public hearings where interest groups argue from their entrenched positions.

I contend that visual controversies further challenge the public engagement politics of environmental impact reviews. Visual impact debates signal the need for public participation processes that go far beyond conventional public hearings towards more inclusive ways of legitimating and deliberating cultural rationality. Some members of the public view wind turbines as majestic, whereas others see them as an industrial blight on the landscape. In cases of competing public aesthetics, how can impact reviews better enroll and register diverse sets of cultural claims? I suggest that opening up the visual impact process means re-imagining both how visual impact is recorded and how visual simulations are deployed and negotiated in the public domain.

The case study research is based on textual and image analysis of material published from four key sources. First, the 4000 page draft EIS produced by the Army Corps of Engineers in 2004. Second, a keyword coding of the 5000 public comments that were submitted to the agency in response to the project's environmental review. Third, coverage of the project in national, regional and local media outlets, including internet news forums. Fourth, documents and images published on the websites of project supporters and opponents, including the Cape Wind Associates, the Clean Power Now and the Alliance to Protect Nantucket Sound. In addition, the research includes interviews with the staff from Cape Wind, the Army Corps and the main consulting firm, Environmental Design and Research (EDR).

The visual realm of deliberative democracy

This discussion is situated within a growing set of international scholarship about wind energy politics and planning, drawn predominantly from Western Europe and Australia. This research focuses on several key issues related to the social acceptability of wind energy. Scholars have argued that while national opinion polls and attitude surveys often report broad socio-political approval for wind energy, communities routinely oppose the siting of concrete wind energy projects (Szarka 2004, Bell *et al.* 2005, Wolsink 2007, Barry *et al.* 2008). Industry and media accounts often attribute community opposition to classic NIMBY (not in my backyard) self-interest driven parochialism (Kahn 2000, Michaud *et al.* 2008). Many wind policy scholars see greater complexity underlying the NIMBY explanation (Devine-Wright 2005, Kempton *et al.* 2005, van der Horst 2007). They contend that local opposition is often symptomatic of a 'democratic deficit' in wind policy and project planning (Hindmarsh and Matthews 2008). Wolsink (2007, p. 2702) has argued that local perceptions of disenfranchisement are most often triggered by a sense of unfairness in local decision making that reflects a 'consultation after design' position by developers and public agencies.

The wind policy literature is quite clear that visual impact remains the most important factor that determines community support or opposition to siting decisions (Haggett 2008, Toke *et al.* 2008). Wolsink (2007, p. 2694) has argued that the most salient public concerns about the costs and benefits of a wind power scheme relate to how the project fits into the landscape. The European Wind Energy Association's 2008 guide *Wind Energy — The Facts* argues that community perceptions are based on three interrelated factors: (1) the characteristics of the technology or project (such as turbine size, colour and project layout), (2) an individual's psycho-social background (such as education and understanding of energy issues) and (3) the broader institutional processes for local project implementation (such as the inclusion of participatory planning and/or local ownership models). These interrelated factors also affect how an individual or organisation interprets the visual impact of a wind project on a familiar landscape.

While the wind policy literature has largely addressed the challenges associated with community acceptance in the European context, I argue that we still lack a nuanced understanding of how the visual realm and visualisation technologies, in particular, work in the context of American environmental regulation. There is a subset of wind energy research, mostly European, that deals with visual perception issues. This literature reports on the results of psycho-social experiments that test the parameters of turbine visibility, such as the impact of different viewing distances, prior experience or notions of visual intrusion and harmony (Bishop and Miller 2007, Johansson and Laike 2007, Ladenburg 2009). One exception is a small case study of the siting of three turbines on a university campus in Switzerland where researchers implemented both three-dimensional (3D) visualisations and a participatory planning approach (Lange and Hehl-Lange 2005).

I aim to advance wind energy policy scholarship by drawing attention to the importance of visualisation technologies and techniques as opportunities for articulating and deliberating landscape value and place identity. Rather than discount community opposition as NIMBYism, my interest is to understand how visual impact analyses in American regulatory contexts can better enroll civic epistemologies and cultural rationalities. I draw upon insights from two broad areas of scholarship that are rarely connected: deliberative democracy and visual studies, with a particular focus on the contributions made by science and technology studies (STS) scholars working within these fields.

Deliberative democracy theory is rooted in Habermasian concerns for popular sovereignty and the collective judgment of the citizenry (Gutmann and Thompson 2004). Deliberative democracy scholars are interested in the state/civil society relations that enable citizens to 'form their opinions and *come to* their policy preferences' (Chambers 2007, p. 12). Public deliberation occurs across a spectrum of scales, issues and institutions. Chambers argues that there is a tension in deliberative theory between the concepts of 'democratic deliberation' and 'deliberative democracy'. While democratic deliberation focuses on how mini-publics participate in decision making on discrete initiatives, she claims that deliberative democracy more broadly addresses the nature of democratic legitimacy. She contends that deliberative opinion polls, citizen juries and citizens' assemblies provide 'safe havens of deliberation' that are insulated from the messier and 'distorting effects of the broader public sphere' (Chambers 2007, p. 9).

STS scholars have also cautioned that recent shifts towards more democratic deliberation of science and technology policy may come at the expense of deliberative democracy. Irwin (2006, p. 301) is concerned that the state's interests in a 'new social contract of dialogue, transparency and consultation' are meant to convince skeptical members of the public to trust technological progress. He fears that these attempts deflect attention away from a 'more fundamental reappraisal of the relationship between science and social change' (ibid. p. 306). In a similar vein, Jasanoff (2004, p. 94) has argued that debates about public participation and expertise have the potential to degenerate into 'purely instrumental comparisons of alternative procedural formats for bringing publics into technical decisions'. She encourages us to think about how we can re-focus our interests in advancing public participation on the rights, obligations and cognitive capacities of citizens to steer science and technology towards shared visions of societal betterment (Jasanoff 2005).

The STS scholarship also argues that public deliberation processes must legitimate the role of cultural rationality in the formation of public opinions and policy preferences. Experts and citizens often express disparate registers of reasoning in the context of technoscientific controversies, whereas the technical rationality of experts privileges logical consistency and the universality of findings, Plough and Krimsky (1987, p. 9) have claimed that citizens express a

form of cultural rationality that seeks technical knowledge, but incorporates it within a broader decision-making framework that includes personal, emotive and subjective values. Building on their work, Fischer (2000, p. 133) has argued that public perceptions of risk are shaped by the 'impacts, intrusions and implications of a particular event or phenomena on the social relations' of a community's life world. He suggests that cultural rationality becomes more pronounced in environmental politics because there is a low level of trust in administrative agencies and a latent suspicion as to whether the public has a meaningful role in decision making.

In summary, the promise of deliberative democracy hinges on more than the technical approaches whereby public input is solicited at hearings and for reports. Ideally, deliberative models involve citizens in all phases of public policy, including research and discovery stages, to avoid parochial NIMBY responses to policy decisions. Political theorists caution us about the dangers of over-investing in the techniques of deliberation while losing sight of the potential trade-offs between deliberation and public sphere citizenship. They also urge us to legitimate and accommodate the forms of cultural rationality through which citizens express concerns about risk, vulnerability and security.

Despite the remarkable scholarship that has emerged on deliberative democracy over the last 20 years, there has been a striking lack of attention to the visual dimensions of technoscientific policy debates. Since the 1980s, sociologists, anthropologists, art historians and cultural studies scholars have taken what Mitchell (1994) referred to as the 'pictorial turn'. These diverse scholars shared a resounding concern for the 'invisibility of the visual' in humanities and social science scholarship (Fyfe and Law 1988, p. 1). The emerging field of visual studies studied 'not only visual objects but also modes of viewing and the conditions of spectatorship and circulation of objects' (Dikovitskaya 2005, p. 64). While visual studies scholars are concerned with image encounters, they focus as much on image production and distribution, and the institutional 'contexts, imperatives and constraints' in which image makers work (Lister and Wells 2001, p. 68).

STS scholars have contributed to this field through their focus on the modes and roles of visualisation and representation in technoscientific practice. They have described the processes by which scientific instruments and technological artifacts produce ways of seeing microorganisms, natural flows, human bodies and infrastructure systems (Latour 1990, Lynch and Woolgar 1990, Daston and Galison 1992, Dumit 2003). This literature is also concerned with how images encode representational politics and express moral positioning.

In *The Reconfigured Eye*, Mitchell (1992) asserted that society has moved into an era of 'post-photographic truth'. He argued that the shift from photography to digital imaging had profound impacts on our willingness to believe what we see, whereas the public's trust in photographs was based on the unassailable effect of 'displaced witnessing', when the viewer felt connected to the events experienced by the photographer at one moment, the 'digital image

blurs the customary distinctions between painting and photography and between mechanical and handmade pictures' (ibid. p. 7).

Mitchell has argued that social difference becomes dramatically expressed in interpretations of visual culture. As the output of complex everyday experiences of diverse publics, visual cultures affect how deliberative democracy works. In the wider public sphere, citizens routinely engage in normative policy discussions about the regulation of visual claims making, such as in advertising, or the behavioural effects linked to watching violent media. We pay less attention to how state agencies and civil society networks negotiate aesthetic policies. Visual impact assessment (a process described below) is the main tool administrative agencies employ to calculate and record aesthetic resources. Yet, to evaluate the significance of these resources for diverse publics, visual impact analyses must stretch to encompass expressions of cultural rationality.

In the Cape Wind case, contributions from visual studies and deliberative democracy are combined to explore the epistemic conflicts and claims making at work in controversies over visual impact. I contend that competing visual cultures within communities are framing the meaning of landscape change and environmental citizenship beyond the narrowly defined practices of regulatory agencies. So in contexts of visual controversy, environmental impact studies must follow suit and widen their scope towards more inclusive approaches to citizen deliberation that happen far upstream of siting conflicts. In other words, my goal is to think about how the rather technical act of producing a visual impact analysis can become part of a broader deliberative democracy process that engages new languages and registers of reasoning.

The Cape Wind proposal

A *Boston Globe* journalist recounted the vision behind the Cape Wind project through the eyes of its founder Jim Gordon:

> Already drawn to Nantucket Sound, whose steady winds promised a sturdy flow of electricity, Gordon watched as a computer program drew tighter and tighter borders around a spot less than 6 miles off of Cape Cod ... One diagram showed that the site, called Horseshoe Shoal, could hold enough windmills to supply three-quarters of the Cape and Islands' electricity needs during peak winds. Another showed that the site was clear of flight paths. Ferry routes neatly skimmed both edges. Shipping channels – not a problem. The water was shallow and sheltered enough to limit construction costs and protect wind turbines from the ravages of crashing waves. 'We said, 'Oh, my God, this is incredible,' said Gordon, president of Cape Wind Associates. 'It all came together. It was so optimal.' (in Ebbert 2003)

This moment of 'blinding insight' tells us almost as much about what was concealed as revealed. Figure 1 depicts Gordon's sense of the perfect wind energy site. Like the flash of lightning that illuminates some things while blackening the rest of the night sky, Gordon's vision of technical efficiency
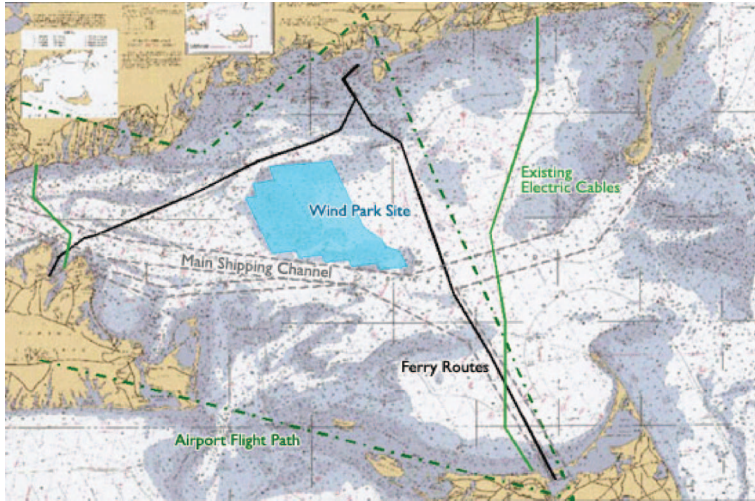
Figure 1. Location of Cape Wind project with Cape Cod to the north, Martha's Vineyard to the west and Nantucket to the southeast.[1]

frames out the cultural significance of the parcels of land that ring Horseshoe Shoal, along the coasts of Cape Cod, Martha's Vineyard and Nantucket Island.

The Cape Wind project captured Massachusetts political spotlight at an important historical juncture. In 2007, the state legislature passed a renewable energy portfolio standard that mandated that electricity providers generate at least 15% of their total output from renewable energy by 2020. The Cape Wind project was the first utility-scale wind energy enterprise proposed in the state. The developers argue that it will generate enough power to meet the seasonal requirements of 170,000 households and reduce regional emissions of carbon dioxide by 880,000 tons per year. Consequently, Massachusetts legislators and citizens must treat the Cape Wind proposal very seriously if the state is to meet its targets.

The Cape Wind project has been mired in regulatory hurdles from the outset. Cape Wind permitting was originally under the jurisdiction of the US Army Corps of Engineers because it is located in federal waters, but the 2005 Energy Policy Act transferred the oversight of off-shore energy development to the US Minerals Management Service, the same agency which manages off-shore oil drilling. The permitting process began in January 2002 when the Army Corps released its 'notice of intent' that it was preparing an EIS required by the NEPA, the Massachusetts Environmental Protection Act and the Cape Cod Commission. NEPA also requires that visual impacts be assessed as part of the overall EIS. Cape Wind Associates paid a New England based consulting group, Engineering and Environmental Solutions, approximately $13 million to prepare the EIS.

Sensitive to the highly fractious political climate around this project, the Army Corps followed the letter of the law in soliciting citizen input at various stages of the EIS preparation. The interagency review assessed issues including sediment and geological conditions, avian effects, water quality and transportation hazards and visual impacts. The EIS screened for alternative project locations, including private lands and brownfield sites. They also examined the implementation of other renewable energy technologies. After 34 months of study, the 4000 page draft EIS was released to the public in November 2004. The Army Corps concluded that the social, environmental and economic benefits of a wind energy project located at Horseshoe Shoal far outweighed its costs. Public hearings were held on Martha's Vineyard, Cape Cod, Nantucket Island and Cambridge during the 105-day public comment period that followed the release of the report.

The Army Corps posted nearly 5000 public comments it received related to the draft EIS on its website.[2] The official comments record indicates how divided the public was on this project. I coded these public comments according to their expressions of: project support, project opposition, climate change concern, public health concern, need for additional review and visual impact. Within the visual impact category, comments were further broken down into pro-visual, neutral and anti-visual concerns. Of the total comments, 43% of respondents wrote in support of the project, 38% in opposition and 19% undecided with interest in additional evaluation and review. Of the total comments, 22% cited concern for visual impact, with 646 individual comments, or 11% of the total submitted, in strong opposition to the visual impacts of the turbines.

Since the Army Corps began its permitting process, steadfast opposition to the project has been led by the Alliance to Protect Nantucket Sound, which was formed in 2001. The Alliance has collaborated with a range of wildlife interest groups, including the Ocean Conservatory, Earth Island Institute and Humane Society. Their leading supporters have included the billionaire energy tycoon William Koch and the late US Senator Ted Kennedy. Most project opponents are reticent to argue that Cape Cod is a pristine environment or that climate change mitigation is unnecessary. Instead, they contend that Massachusetts need not become a national off-shore wind energy experiment.

Calculating the view

The Alliance and Cape Wind Associates' websites abound with images depicting the potential views of the turbines. As part of the EIS, the developer created a viewshed analysis to serve as an objective process for ascertaining visual impact. Producing a simulated view of the Cape Wind project requires a range of political decision making about where to rest one's gaze. In addition, a complicated series of atmospheric conditions must be brought into focus. How will the project look under rain, on a hazy summer day or against the night sky?

This section describes how the Army Corps arrived at its conclusions about visual impact. Before interrogating their research methodology, it is important to define what a viewshed is and how a viewshed analysis is performed. The term viewshed describes an individual's field of vision from a given point. Viewshed analyses, usually performed by development planners and landscape architects, assess how a development project will alter what an individual may see in a 3D space. Analysts create their simulations with standard visualisation software packages, such as *Windpro, WindFarmer* or *3D Studio Max*. These programs use digital elevation models to draw lines of sight in all directions from a viewpoint until an obstacle is encountered. The surface analysis calculates the extent of one person's viewed area while standing in place.

Preparing a viewshed analysis for a development project involves two sets of procedures. First, the viewpoint locations must be selected. Source photographs from those locations record time of day and sun angles. Second, visual analysts then take the information a developer has given them about project features, in this case the height of the towers and the sizes of blades, and superimpose them onto the source photos. Photos are 'rendered' by digitally casting them against a simulation of the development project. The simulations depict how the sunlight will hit the turbines, and the shadows that may be produced, at different times of the day and under a narrow range of atmospheric conditions.

The viewshed analysis for the Cape Wind EIS was performed by the EDR, Inc. based in Syracuse, New York. According to Mark Rodgers of Cape Wind Associates, EDR was hired because of their broad base of experience with wind farm simulations (personal communication, 5 April 2005). The Army Corps (2004, p. 173) provided EDR, with 12 locations to examine, based on their concerns about impacts on 'visual character and culture, tradition, and heritage, as well as visual effects on recreational resources'. They wanted to know how visible the wind farm would be from important sites, including the Kennedy Compound and the Nantucket Historic District. The draft EIS includes more than 150 pages of photographs taken by EDR, including 30 pages of simulated views (see Appendix), and it concluded that the project would have no 'long-term visual or physical effects on inland recreational resources'. The draft EIS found that the project would adversely affect two national historic properties, including the Kennedy Compound, 4 historic districts, and 10 individual historic properties. To mitigate visual impacts, the report suggested painting the structures 'a marine grey color, to minimize contrast with the surrounding sea and sky'.

It is important to ask why these viewpoints were chosen and whose imaginations were interpreting and framing the simulations. According to the Army Corps, these 12 viewpoints were deemed representative of Cape and Islands history and recreational opportunities. The Kennedy Compound was an important choice because of its prominence in the national memory as the place from where Jack and Bobby sailed their boats as children. Oak Bluffs on Martha's Vineyard seems an obvious inclusion because it is a major ferry

terminal and tourist attraction. The Army Corps also chose Craigsville Beach because it is one of the Cape's most popular attractions. While other beaches and properties could have warranted investigation, it is impossible to simulate every location and every person's vantage point.

Regardless of which viewpoints are ultimately chosen, viewshed analyses in general suffer from two major limitations. First, they assume that the viewer is looking in one direction and do not simulate peripheral vision. According to Mark Rodgers of Cape Wind, it would be great if the viewshed analysis was 'more like an IMAX experience' (personal communication, 5 April 2005). Second, source photos are most often taken under full sunlight conditions. The simulations lose their accuracy when they model haze or high wave activity. Yet, local opposition is driven by the fact that the wind turbines will be visible by everyone from a multitude of locations in most weather conditions. As the late iconic newsman, and Cape Cod resident, Walter Cronkite once argued, 'it will be most unsightly for what is now open bay. Everyone will see it, anyone who wanders on the water, who has a home that faces the water' (Burkett 2003).

While major parameters for producing simulations are pre-set, visual analysts do frame and interpret the ways in which simulations are prepared. What choices and contingencies matter? The decisions that simulators made in the Cape Wind case became apparent in debates about accuracy. The Alliance hired another firm, Earth Tech, to produce a set of counter simulations. In press reports, the Earth Tech and EDR simulations were deemed to be surprisingly comparable. According to EDR staff, however, the main differences between their images and those produced by Earth Tech were in the choice of light, horizon line and blade alignment (personal communication, 9 Dec 2008).[3] The Earth Tech simulations were backlit and placed the turbines in front of the horizon. Both of these design choices make the turbines appear more prominent. While ever more parameters can be set by agency officials to standardise simulations, an important margin of decision making will remain with visual analysts. Given the dynamism of project development, simulations can fail to conform to lived experience when the parameters of the final project, including the locations of the turbines and the actual turbine models used at the time of construction, do not match what has been simulated. While at least one more set of simulations had been prepared for the Cape Wind project, they do not appear anywhere in the official report.[4]

In this section, I have described the representational politics at work in producing viewshed simulations. American environmental law requires that visual impact studies are produced and made available to the public for deliberation. Yet, these assessments provide a technical rendering of landscape change that is often disconnected from the socio-cultural values that link up with place identity. The public comments record for the Cape Wind case indicates how citizens overlay simulations with additional concerns that reflect personal experience, political orientation and a sense of global responsibility. The following sections describe the range of meanings attributed to the

changing landscape and examine how forms of cultural rationality may be incorporated into public deliberations about wind energy's visual impact.

A beautiful technology?

In environmental policy domains, the terms 'airshed' and 'watershed' are widely accepted concepts for delineating geographical space constrained by the flows of natural elements. In contrast, a 'viewshed' is far more ambiguous because it describes everything, including land, water, biotic and cultural elements, that is visible to a person standing at a particular location. A viewshed is different from a 'view' because it is used as a planning tool to calculate and map the subunits of a landscape. Producing visual simulations entails making representative decisions about who is looking, where they are looking from and the aesthetic value they attach to that view. The idea that there can be a single, normalised view also suggests that there can be a uniform viewer.

While the viewshed analysis calculates the potential visibility of a project from different historical and recreational points, it tells little about the significance or value of current or potential views. This section examines citizen statements about visual impact that appeared in public comments to the EIS, at public hearings and in media discourse. The visual simulations catalysed and elicited public reactions that represented divergent visual cultures. The range of public concerns substantiates Mitchell's assertion that we have entered into an era of 'post-photographic' truth. In their flexible interpretation of visual simulations, citizens stretch these images off their digital canvases and imbue them with values that reflect community identity and notions of environmental stewardship. The comments selected express the range of aesthetic meanings being attached to the placement of modern wind turbines in Nantucket Sound. Building on Thayer and Freeman's 1987 categorisation of the visual perceptions of wind power, I demonstrate that project proponents interpret wind turbines as symbolic statements of modernism, patriotism and justice, while opponents see them as visual intrusions on a sacred landscape.

In their wind power ad 'Shift', Greenpeace juxtaposes a montage of coal plant plumes and oil spills with the swishing of shiny turbine blades against a clear blue sky. Reinforcing a similar aesthetic sensibility, Cape Wind's slogan, seen on many car bumpers in Massachusetts, reads 'It's not the view; It's the vision'. Jim Gordon and his supporters argue that seeing wind turbines at work at Horseshoe Shoal will evoke a sense of twenty-first century technological modernism and innovation. Members of the public writing in support of Cape Wind felt that the project's architectural features will enhance the visual experience of visiting Nantucket Sound. In his submission, Paul Lefebvre wrote that

> In the end, the aesthetics of windmills on the horizon is really just a matter of personal opinion, and I find windmills attractive ... I personally feel these windmills will be a rare manmade enchantment to the landscape, and already am

making plans to use the very same wind they exploit to sail my sailboat out among them if they are erected.[5]

Similarly, a sailor from Martha's Vineyard, Tony Nevins, was quoted in *The Boston Globe* as saying, 'I went sailing last Saturday to Horseshoe Shoals and it was beautiful ... And it's going to be beautiful in a different way. I can just imagine how glorious it would be to sail about (the turbines).' (Daley 2004). These statements demonstrate that Cape Wind supporters share a Promethean optimism that technology can be both beautiful and liberating. In this framing, wind turbines in Nantucket Sound derive elegance from their efficiency.

Proponents also see the wind project as a potential symbol of environmental justice. The Cape and Islands are currently powered by coal fired plants, including the Mirant Canal Plant, one of the state's top five most polluting sources. Clean Power Now, an energy organisation founded in 2003 to support the Cape Wind project, has translated the view of turbines into a set of statistics. Based on data extrapolated from a Harvard School of Public Health report, they argue that wind power on Nantucket Sound will eliminate 'approximately 12 to 15 premature deaths every year, 20 cases of bronchitis, 200 emergency room visits, 5000 asthma attacks and 35,000 cases of daily upper respiratory symptoms' in the state.[6] Echoing this concern, Piotr Rojek stated that 'to someone who is dying of asthma, bronchitis or pollution caused illnesses the view does not matter ... You can't admire the view strapped to the oxygen tank'.[7] Jed Thorp, of Clean Water Action, stated that the choice was not whether to have a wind farm, 'The choice is whether we want a wind turbine here or a smokestack over there' (Kibbe 2004). While the simulations cannot depict the microscopic particulates that may ultimately choke our forests or lungs, proponents rhetorically juxtapose the invisible outputs of fossil fuel generation against the visibility of wind energy.

For Cape Wind supporters, seeing modern turbines in Nantucket Sound would evoke a new kind of national identity and political solidarity. Laura Tino argued in her public comment that

> I cannot imagine that these small structures could be more offensive than oil rigs or coal mines or nuclear power plants. Certainly, they are much more pleasant to view than the body of a soldier who has died for oil, or the body of a miner who has died of lung cancer, or the fried body of anyone who has died from a nuclear accident ... If I were to stand on the shore of our ocean and see a patch of windmills way off in the distance, tiny white specks, I would feel a surge of pride that, even in America today, we can make progress.[8]

In a similar statement, Walter Brooks wrote 'I endorse the wind farm because it's the patriotic thing to do while our sons and daughters are dieing [sic] for us to protect the Iraqi oil fields'.[9]

The Alliance to Save Nantucket Sound challenges such claims by romanticising the Cape Cod landscape. They engage in a form of 'defensive

localisation' by turning the terrain into unique personal biographies and community histories that can withstand globalising forces (Escobar 2001). In the strategic making of place, Alliance members often use sailboats as a scalar device to compare the wind technology of the past with that of the future. The images in Figure 2 juxtapose a romantic, peaceful pre-turbine nature with the artist's anticipated post-turbine 'nightmare'.

Public comments link the view of turbines with a potential loss of place identity. According to the Reverend Gregory Hoppough, the Trustees of the Stigmatine Fathers are opposed to the wind farm because its construction will cause 'visual, noise and light pollution to an area that stands as one of the world's most beautiful and pristine seascapes'.[10] Christopher Mandy attested to the sacredness of the Nantucket seascape when he stated

> That area is God's country and He has blessed those of us who are fortunate enough to live here year around, and all of its visitors, with beautiful sights, sounds and smells. To put those monstrosities in the midst of it all would change the face of the Cape.[11]

Another comment, from Dr. Kenneth Quickel, expressed outrage at the siting of the wind farm in such a 'sensitive' location. He argued that

> These will not be quaint, scenic windmills, such as the numerous grist mills scattered across the Cape. This will be an industrial site, and it should be located where it will not detract from our most important assets.[12]

Echoing these concerns, Topher Fearey claimed in his comment that 'The Cape Wind project would transform a sparkling ocean jewel into an industrial complex'.[13]

Thus, there is a range of public perceptions about the visual impact of wind power on Nantucket Sound. While few public comments make direct reference
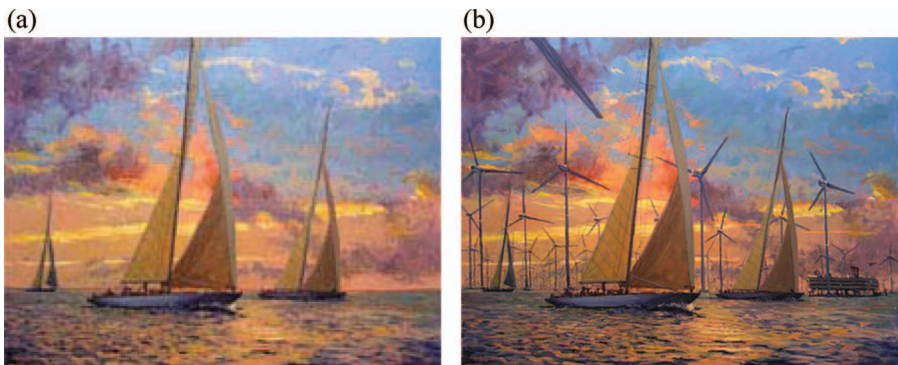
(a)   (b)

Figure 2. Captions and illustrations as they appear on the Windstop website. (a) A beautiful picture of Nantucket Sound by world famous artist Louis Guarnaccia of Nantucket Island. (b) Louis decided to paint his worst nightmare. The industrialisation of our virgin Nantucket Sound.

to the simulations, EDR's images in the official EIS have governed the public's imagination of the project. Mitchell (2005, p. 352) has argued that visual images create 'scopic regimes' where social difference is constructed by visual producers who exert power over viewing publics. Yet, he goes on to caution that 'vision is never a one-way street but a multiple intersection teeming with dialectical images'. In this vein, the testimonials demonstrate how members of the public have attempted to both support and subvert the dominant view of the turbines presented in the EIS.

Viewed through the lenses of public perception, we see the immaturity of visual impact assessment as a policy craft and tool for democratic deliberation. While the draft EIS and the work of consultants like EDR, followed standard NEPA protocol, administrative agencies must create more constructive outlets for open discussion about the politics inherent in creating visualisations and how we measure the significance of visual concerns that go beyond the scope of simulations. The Cape Wind controversy also begs a range of normative questions about how we should configure our institutions to make *reasoned* choices about balancing the aesthetic value of smallness, invisibility and tradition with desires for the majestic, conspicuous and modern. In the context of conflicting visual cultures, whose views should count towards deliberating the acceptable landscape impacts of wind energy?

Public discourse about wind energy development currently follows an 'information deficit model' of public engagement, where interested members of the public receive packaged one-way flows of information from which to base their deliberations. This model has been widely debunked as a paternalistic and ineffectual means for catalysing deliberative democracy. While we cannot assume that collaborative planning approaches will necessarily produce broader social acceptance of wind power, it is an important issue worthy of empirical investigation in the United States. Comparatively, far more scholarly and policy attention has been directed to understanding modes of collaborative wind power planning in the European Union and Australia (Hindmarsh and Matthews 2008). Given intense community conflicts over visual impact in the United States, policy and planning scholars need systematically to evaluate how citizens can deliberate the environmental impacts of wind energy upstream of project controversies. The following section proposes ways that visual analyses can better engage critical lay understandings of landscape change and place identity.

Deliberating visual democracy

Recent scholarship from the field of landscape visualisation suggests some potential opportunities for re-imagining visual impact analysis. This section proposes some deliberative approaches that span the spectrum from improving consultation procedures to catalysing community wide conversations about landscape identity and aesthetics. New software applications and decision theatres are at one end of this deliberative spectrum.

The Orton Family Foundation has invested in increasing the participation of local communities in landscape planning through the development of participatory visualisation software. Their software product, 'CommunityViz', allows publics to envision development impacts by creating alternative siting scenarios that can be viewed in photo-realistic 3D scenes. The Foundation developed an application of CommunityViz to help the residents of Manchester, Vermont, evaluate the visual impacts of the Little Equinox wind farm. Through a day interactive Wind Forum, citizens were presented with a range of tools including, 3D visualisation, roundtable discussions and keypad polling, to deliberate over the project.

In his 2006 article on landscape visualisation, Sheppard (2006) notes the potential effectiveness of 'community-based visioning hubs'. Sheppard describes visioning hubs as neutral settings where members of the public can access 'advanced interactive, immersive visualisation capabilities in a Decision Theatre setting' (p. 79). Arizona State University is home to one of the few Decision Theatres in the United States. This $3 million facility features a 260-degree faceted screen that displays panoramic computer graphics or 3D video content to enable stakeholders to envision and deliberate landscape change. While these technical interventions have the potential to be managed by experts in ways that disempower citizens, they do point towards more collaborative approaches for engaging publics in project planning.

Though new visualisation applications may enable more inclusive deliberation over specific projects, they are unlikely to seed the kind of far reaching conversations that create baseline scenic values and common landscape protection goals. In contrast, staff members at selective US National Park and Forest Service units have been engaged in community dialogues and symposia aimed at long-term land use planning. Local stakeholders deliberate visual resources by inventorying, photographing and mapping their most valued places. The data gained from these processes can potentially feed into the creation of zoning codes or energy development guidelines that respect the special character of places as defined by their distinctive geographical features, cultures and ecologies. Paired with sophisticated geovisualisation technologies, scenic management processes hold great promise for open deliberation about the localised impacts of wind energy development. In the absence of such efforts, community participation in visual analyses will continue to be inserted as an afterthought into the urgent and often conflictual politics of EIS production.

Any new approach for deliberating landscape values and identities at the local level will be marginal unless it is part of a clearly articulated national wind energy policy that creates nuanced ways of researching, registering and deliberating aesthetic concerns. In 2007, the National Research Council (NRC) delivered to the US Congress its report on the environmental impacts of wind energy. While the study discussed the need for 'locally affected inhabitants' to be involved in evaluating potential aesthetic and visual impacts, its main recommendation was that independent experts be hired by communities to peer

review visual analyses. As the Cape Wind case suggests, the NRC's suggestions simply do not go far enough towards building deliberative democracy into wind energy planning.

New models or methods for deliberating visual impact must be built upon an understanding that controversies over wind energy siting are often expressions of divergent modes of rationality. In these contexts, the bounds of expert and lay knowledge need active articulation and negotiation. Public consultation processes often define the norms for deliberation in ways that privilege technical and scientific rationality over more culturally situated forms of claims making. Leach *et al.* (2005, p. 2) argue that mainstream approaches to citizen participation are based in implicit models of public deliberation where citizens are either expected to engage passively with expert scientific institutions, especially those linked to the state, or to participate in forums orchestrated by such institutions. They describe the more 'performative and embedded' ideas of scientific citizenship that recognise knowledge as 'inalienably cultural in that it embodies, reflects and projects commitments' in the social life world (ibid. p. 12). They also argue that the goals of 'substantive participation' depend on the spaces that enable deliberative democracy and the epistemic authority afforded to those who can and should inhabit those spaces.

Conclusion

Cape Wind is just one of many contested new clean energy projects in the United States. Visual controversies over the siting of new wind, geothermal and solar power facilities are affecting the nation's ability to produce more renewable energy. Wind energy is perhaps the most disputed domain, evidenced by current project opposition in states as diverse as Wisconsin, Nevada, New York, Vermont and Oregon. In the absence of a national policy dialogue about the landscape impacts of our new energy choices, public deliberation about wind power will continue to be reduced to dueling images of smoke stacks and steel forests. While industry public relations campaigns promote wind power as 'homegrown' and 'green', the Cape Wind case signals that enculturating renewable energy will be as much about new civic processes as it is about new projects. Alternative energy sources have often been defined by the absence of heavy pollution. Yet, these sources have temporality and materiality. They leave footprints. As one public commentator on the draft EIS noted, 'Nantucket Sound is not renewable'.[14] Viewed in this light, the Cape Wind project enters an interesting space in environmental politics and prompts us to ask how our regulatory agencies can reasonably value and measure the affective realms of renewable energy.

Melding insights from visual studies and deliberative democracy, this article has argued that there has been a striking lack of attention to the visual realm as a site of political claims making. By documenting both the production of viewshed simulations and their reception and subversion by members of the public in the Cape Wind debate, it has demonstrated that visual impact

assessment is an immature policy craft that requires greater public scrutiny. When we open up these processes to critical investigation, we find that visual simulations encode social and cultural values. Yet, when these simulations 'go public', the politics inherent in their production get erased. As these images circulate in public discourse, they exert power over viewing publics who chose to support or subvert the images based on individual and collective cultural rationalities. Most surprisingly, the deliberations that ensue about visual impact have little place or space in administrative decision making beyond conventional and confrontational EIS protocols.

The new energy economy requires policy frameworks, and deliberative spaces, that open up environmental impact processes to expressions of cultural rationality. Bocking (2004) argues that shifts in deliberative processes can help produce social acceptance. He suggests that we need a vision of science and technology that closely integrates research and deliberation as complementary approaches for understanding the world. Such a vision, he argues, is 'closer to how knowledge is viewed by people outside the scientific community: tied to its social, political, economic and cultural contexts' (p. 225). Given the current wind energy development frenzy, we are at an important juncture for policy makers and citizen groups to ask a range of descriptive and normative questions about how visual impact analyses are performed, whose views should count and what mechanisms are most appropriate for public engagement in the process.

Acknowledgements

Notes

1. This map is drawn from the Cape Wind Associates website. Accessed on March 6, 2009 at http://www.capewind.org/article7.htm
2. The comments are available at http://www.nae.usace.army.mil/projects/ma/ccwf/deiscomments.htm. In addition to the first 5,000 public comments, the MMS received 40,000 further public comments regarding its 2008 review of the Cape Wind project (Cassidy 2008).
3. This information is also cited in a EDR presentation that appears in PDF form at http://wind.raabassociates.org/Articles/Visual%20Simulation%20Process.pdf
4. The draft EIS included comments from a Peer Review Committee that consisted of six international wind power experts. The committee felt that overall the draft EIS was adequate, without specific reference to the viewshed analysis or visual impacts. The Garrad Hassan Group also prepared a review of the draft EIS with reference to wind speed, water depth and extreme weather events.
5. Public comment No. 187.
6. Clean Power Now's '21 Reasons to Support the Wind Farm on Nantucket Sound'. Accessed on July 31, 2006 at www.cleanpowernow.com
7. Public comment No. 237.
8. Public comment No. 181.

9.   Public comment No. 170.
10. Public comment No. 576.
11. Public comment No. 808.
12. Public comment No. 239.
13. Public comment No. 925.
14. Public comment No. 333 by John D. Meyer.

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Appendix

The following images are part of official viewshed simulations prepared by EDR. In descending order they present: Cotuit on Cape Cod, Craigville Beach on Cape Cod and Edgartown on Martha's Vineyard.