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# The Aesthetics of Wind Energy

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*Beauty speaks a message to us. We are confused about this message because of distractions. Sometimes we even think that it is in the mail. The message is about different kinds of happiness and joy.*  
-Agnes Martin (1994)

## Abstract

*This essay develops a way to think about the aesthetics of wind energy systems. The inquiry begins by considering an increasingly familiar clash between aesthetic responses to wind farms: the NIMBY appreciator of wind farms who likes their ecological rationality but not their look, and the aesthetic appreciator who sees the wind farm as beautiful, in part because of its ecological rationality. I raise the following questions: Is one of these perceptions more objective than the other? Is one of the aesthetic judgments uttered more truthful than the other? Or is this simply a question of subjective or intersubjective preferences? The essay goes on to explore dialectically the various ways we can think about the different aesthetic responses to wind farms. I lay out an argument, using a concept of beauty from complexity theory as the perception of wholeness, to argue that the aesthetic perception of wind farms as beautiful is objectively more truthful than the NIMBY response.*

*Keywords: wind energy, aesthetics, Modernism, wholeness, beauty*

## Introduction

Imagine a wind farm on an otherwise untouched, natural landscape.<sup>2</sup> Then imagine two different people looking at that wind farm. Assume that they both believe the same things about wind energy as an important source of clean, renewable energy, about the global energy-ecological crisis we are confronted with, and about the role of hydrocarbon energies in creating that crisis. One of them finds the sight of the wind farm beautiful in a very deep, heartfelt sense, and if you ask her, she'll say that the perception is intimately connected, even shaped by, her understanding of the larger ecological context of energy. The other literally recoils from the sight of the wind farm, as an ugly, even offensive blemish on the wonderful, untouched naturalness of the vista. Is one of these perceptions more objective than the other? Is one of the aesthetic judgments uttered more truthful than the other? Or is this simply a question of subjective or intersubjective preference?

It is curious, the more you think about it, that aesthetics should be a central issue in debates about wind energy. Right now, across the US, the UK and elsewhere, heated discussions are taking place at zoning hearings, public forums and in private policy board rooms, about the aesthetic properties of wind turbines as features of a new landscape. The conflicting intuitions and perceptions are deep and heartfelt, even if the justifications are obscure or if attempts to explain their respective aesthetic responses sound muddled. Some people are literally mesmerized by wind turbines, as much by the hypnotic motion of the blades as by the ecologically-satisfying idea of wind turbines as sources of clean and renewable energy. Others are literally repulsed by their industrially-constructed look, and even by their very presence as a visual intrusion on the natural amenity of the landscape. I am interested in examining the conflict between the aesthetic intuitions motivating the debate and exploring some conceptual resources available for explaining their larger significance for our experience and understanding of human ecology. Ultimately, I shall take sides and argue that wind farms are

beautiful in an objective, ecological sense, in the sense that an improper understanding of that eco-logicality underlies the perception of them as ugly. However, I myself empathize with the other view — much more than before I wrote this paper — and I see the disagreement as a deeply philosophical one that is much more complex than it seems. Consequently, I am especially interested in arguing dialectically — treating each intuition with maximum seriousness — and using each position to clarify the other. This is a way to shed light on a larger web of philosophical issues regarding how we are to understand the relationship between aesthetics and nature, or as one could put it, the relationship between the nature of beauty and the beauty of nature. My argument will then do double duty by serving as an answer to the question about the aesthetics of wind energy, and also as a conceptual map for understanding the connection between aesthetics and nature. That we need a conceptual map at all will hopefully be shown by the difficulty of simply trying to comprehend the manifold ways we can connect aesthetics to nature, where (a) nature is construed ecologically, as an evolving unity within diversity of cells, organized into organisms, which inhabit niches within ecosystems, which are arranged in bioregions, which holistically make up the biosphere; and where (b) aesthetics is understood as the study of the ways that humans experience the world through their senses, and specifically, in ways that are beautiful or ugly or mesmerizing or revolting. In large part, the aesthetics of wind energy is confusing because the epistemology is confusing: when clarifying conceptually the perception of nature, you are also interested in the nature of perception, and the two themes together form a strange loop of implications. The ethics of the issue make it even more complicated.

### **Aesthetic and NIMBY Responses to Wind Energy**

There are, of course, non-aesthetic reasons to like or dislike wind farms, and it is important to distinguish the aesthetic from the non-aesthetic factors. One might object to a proposed wind farm for a variety of reasons that have nothing to do with, or are at best indirectly related to, aesthetics. One might, for example, be worried about the ways a proposed wind farm is going to harm migrating birds or local sea life, or about ways it might harm the regional economy by injuring neighboring farms or marinas or beaches or property values; or a tourist industry because of its disruption of the perceived natural amenity of the site. Or one might have concerns over a regulatory process involved in the planning and construction of the wind farm, which is granting private, corporate, profit-making control over a public trust resource (Griscom 2002). There are obvious connections to aesthetics

in these objections; for example, worries about how a wind farm is liable to affect tourism are connected to an anticipated loss of visual amenity. But in that case, the primary concern is economic, not aesthetic. The easiest way to single out the strictly aesthetic aspects of the wind farm question is to consider again the example from the beginning of the paper. There we imagined the difference between someone who experiences the wind farm as beautiful and a second viewer who holds the same beliefs about wind farms as the first, but who perceives the wind farm as ugly. I'll call the first person an aesthetic wind appreciator, because she literally sees the beauty of the wind farm and the second, a NIMBY wind appreciator since the latter exemplifies a widespread attitude that otherwise ecologically-minded individuals have towards proposed wind farms: great idea, but not-in-my-backyard, because it's ugly!

The cleavage between these perceptions dramatizes the peculiar importance of aesthetics in discussions about wind farm proposals. An opinion survey of residents of California's Solano County defined 'NIMBYs' (NIMBY appreciators) as those who would accept a proposed wind farm, provided it was not located within five miles of their home (Thayer and Hansen 1989), and this so-called 'NIMBY effect' is pervasive in wind energy debates. A *New York Times* article about Cape Wind's proposal for a huge 420 megawatt offshore wind farm off the coast of Massachusetts noted that those opposed to the project were so because, regardless of its environmental impact, "it is just too ugly — an industrial development that would wreck pristine vistas in a major tourism area" (Dean 2004, 2). Cliff Carroll, a leading opponent of Cape Wind's Nantucket Sound wind farm, who founded WindStop.org, has a NIMBY appreciation of wind energy. Regardless of its virtues as a source of green energy, he sees the \$800 million project, which involves among other structures, 130 wind turbines, mounted on 40-story (400 feet) tall monopile towers and taking up a 24-square-mile site, as a 'steel forest' that will "ruin a beautiful vista from every beach in Nantucket Sound in trade for an industry-scale project that will permanently devastate the unique character of Cape Cod and the Islands" (Carroll 2005, 2). The aesthetic intuition is strong: the wind farm is ugly in an objective sense, because it turns a landscape which is beautiful because it is natural — in the sense that it is not shaped by anthropogenic forms — into a landscape that is ugly, or fatally scarred, because of its perceived industrial character, making the location look like an 'industrial site.' From this NIMBY standpoint, the contrary perspective of the aesthetic wind appreciator is perhaps most easily explained as a pseudo- or imagined perception of someone who doesn't actually live in eyeshot of a wind farm. This is a highly plausible interpretation. We accuse people of having an over- intellectualized view of things all the time.

Carroll (2005) points out that, in a sampling of state voters, only a tiny fraction of the near majority who voice support for the project, lived in proximity to it.

*The clearest sign yet about Cape Wind's respect for local opinion was the political poll they recently promoted claiming that a 'near' majority — or 47% — of a 400-person sample of state voters support their project. Of those 400 interviews, only 16 were actually from the Cape and islands while the rest, presumably, wouldn't care if you painted the Sagamore Bridge pink for all the time they spend looking at it. Why would they care if Cape Wind puts 130 massive steel towers into the middle of our beautiful ocean vista, if you like in Worcester County? After all, they could always go to the Jersey Shore, where that state's Governor has called a halt to offshore windfarms until the proper federal regulations are in place.*

The attitude is that the perception is objectively ugly, and that no one who must face the reality of the visual impact of a large scale wind farm, such as someone who has that wind farm in her backyard, can honestly see it as beautiful.

The perceptual response of the aesthetic wind appreciator seems to be no less visceral than the NIMBY response, except in the opposite direction. From this angle, the wind farm is beautiful precisely because of its larger ecological significance, not ugly in spite of that significance. When aesthetic wind appreciators articulate their perception, they tend to emphasize the ways in which one's sense of beauty is inseparably connected to and shaped by, or rather ought to be shaped by, a larger ecological understanding of the world. If our ecological understanding is misguided or misinformed, then we might very well see things as beautiful that are objectively ugly, or see things as ugly that are objectively beautiful. In an article entitled "The beauty of wind farms," the aesthetic wind appreciator David Suzuki (2005, 1) considers the question, Are windmills ugly?

*I remember when Mostafa Tolba, executive director of the United Nations Environmental Programme from 1976 to 1992, told me how when he was growing up in Egypt, smokestacks belching out smoke were considered signs of progress. Even as an adult concerned about pollution, it took him a long time to get over the instinctive pride he felt when he saw a tower pouring out clouds of smoke. We see beauty through filters shaped by our values and beliefs. Some people think wind turbines are ugly. I think smokestacks, smog, acid rain, coal-fired power plants and climate change are ugly. I think wind farms are beautiful. They harness the power of the*

*wind to supply us with heat and light... And if one day I look out from my cabin's porch and see a row of windmills spinning in the distance, I won't curse them. I will praise them. It will mean that we are getting somewhere.*

Note how Mostafa Tolba's ecological outlook led him to see an industrial site itself, even billowing smoke, as beautiful and how it required a conscious mental reinterpretation of his perceptions in order to retune his intuitive aesthetic response: it took a mental effort to adjust his aesthetic sense to his ecological understanding. From this aesthetic attitude, the NIMBY perspective is objectively wrong and even hypocritical. If, the aesthetic appreciator reasons, one understands how bad the ecological situation is with our depletion of hydrocarbon energy reserves and how wind energy can play an important role in our transition to a post-hydrocarbon, sustainable energy society, then one will see the wind farm as beautiful.

## Basic Questions for Environmental Aesthetics

And so we reach the same dialectical impasse that is being reached across the United States these days in debates about wind farm proposals. Both sides claim that their aesthetic sense is shaped by the perception and love of natural beauty. But whereas the NIMBY wind appreciator recoils from the look of the wind farm because it violates the look of nature, the aesthetic appreciator likes the look of the wind farm because it expresses ecological rationality, regardless of its physical make-up. The disagreement is confusing because both sides are (a) appealing to some objective sense of beauty or ugliness, and (b) relating that perceived beauty to nature and relating ugliness to some kind of destructive degradation of nature. And yet, they are having opposite experiences and contradictory judgments. It's practically a paradox!

It would be surprising if it were easier to discuss the aesthetics of something as ramified as a wind energy system. The topic is confusing because it raises at least three difficult, and interconnected, philosophical questions, answers to which are presupposed by any attempt to articulate why wind farms are beautiful or ugly. These three questions, discussed below, will make up the backdrop upon which to untangle the philosophical disagreements between the NIMBY appreciator and the aesthetic appreciator. Unlike thinking about the aesthetics of a painting or a graphic design, a wind farm has no frame to focus the question, nor anything we could conventionally identify as an artistic intent, or an art-world context. This is one of the first, and perhaps most difficult, philosophical questions that arises in thinking about the aesthetics of wind energy: (1) Given the way that energy systems holistically shape, and are shaped by, our socio-political ecology

— given the intimate and systemically-ramified connections between how we live and the source and quality of the energy we consume — it is not clear how the wind energy system should be properly framed in order to evaluate its aesthetic properties. This reflects a more general problem with talking about aesthetics in an environmental context. As the environmental aesthetician Allen Carlson (2002, 1) puts it,

*... aesthetic experience of the world at large is seemingly very different from the aesthetic experience of art. In the former case, unlike the latter, appreciators are confronted by, if not intimately and totally immersed in, objects of appreciation that impinge upon all their senses, are constantly in motion, are limited in neither time nor space and are of a non-predetermined nature and meaning. Appreciators are within and among objects of appreciation and their risk is to achieve aesthetic appreciation of those objects. Moreover, appreciation must seemingly be achieved without the aid of frames, the guidance of artistic traditions or the direction of artists and their designs.*

So there's a question about how to even frame the object of aesthetic perception. Moreover, it is not clear that a proper aesthetic appreciation of a wind farm can be had simply by perceiving it in some conscious special way. Those whose lives feel affronted by the creeping offshore presence of industrial capitalism likely feel more engaged with the physical presence of the wind farm than anyone else, and will see fancy ecological 'arguments' as perceptual sophistry. But perhaps it's true beauty only becomes apparent when one begins to live one's life, for example, to consume energy, in ways which are in accord with the principles that the wind farm's existence embodies.<sup>3</sup> One can fail to see beauty because no beauty is there, but one can also fail to see beauty because one has been anaesthetized. And the technologies embedded within our habitat can have anaesthetizing effects on our mind and our behavior and our interaction with the environment and with other beings. This is the point of saying that, as the media ecologist Marshall McLuhan put it, the medium is the message.

The framing issue is clearly a point of contention between those drawn to and those repelled by the sight of wind turbines on a mountain ridge, insofar as the former seem to frame the actual physical deployment of wind turbines and power equipment within a larger, bioregional or global-ecological frame, the latter a smaller organismic-phenomenological or viewshed frame. As I show below, the answer to how we should frame the relevant object of aesthetic appreciation needs to consider, and even juxtapose, a number of different frames of reference in order to capture the complex factors

contributing to the aesthetic effect.

Examining these different frames will offer us a way to address a second, related philosophical question in aesthetics that concerns (2) the objectivity of aesthetic experiences and aesthetic judgments. Despite the intuitive importance of perceptions of beauty and ugliness, people are often hesitant to place too much weight on them since beauty is often equated with a subjective sense of pleasure, as an experience that lacks any objective basis. Aesthetic objections to wind farms are often couched in terms of concerns over noise, or harm to birds, which seem to be more objectively valid elements of the desirability of wind farms. But the very fact that people argue about aesthetics at all implies that there is some objective dimension to the issue. People do not argue, for example, about what the most beautiful color or the most delicious kind of fruit is per se, since this is taken to be a matter of subjective preference. Of course they do argue, — and passionately! — about the aesthetics of wind farms. As I discuss below, functionalism as a modernist design principle, sheds light on this matter, since it offers a way to think of beauty as objective, in terms of the structure of the thing perceived as beautiful. There is a deeply intuitive connection between beauty, function and purpose, especially when we are thinking about the beauty of nature. The philosopher Immanuel Kant ingeniously argued that the pleasure we derive from beauty is connected to the sense of pleasure as a feeling that arises on the achievement of a purpose. Consequently, to see functionality as form shaped by purpose, is pleasurable, and it is the perceived purposiveness which strikes us as beautiful (Kant 1790). As we shall see, even more illuminating than looking at a wind farm through the lens of aesthetic functionalism is to examine the limitations of that lens; limitations that become evident when functionalism, and its conceptual connections to industrialization, are placed in a larger ecological context.

The question about the objective basis of aesthetic judgments — or what the perception of beauty tells us about the object itself, as opposed to how the object affects us — is related to a third philosophical question, which concerns (3) the status of nature as an aesthetic norm. People who find wind farms to be unpleasant intrusions on the visual amenity of their viewshed often do so because of a perceived disruption of the natural, i.e., non-anthropogenic order of the landscape. Such a visual intuition echoes a classical idea of pristine nature as reflecting certain absolute aesthetic properties of order, symmetry and wildness that can only be harmed by human technological, and especially, modernist-industrial, intervention. But this opens up a huge can of worms because it raises the question, debated among environmental aestheticians, as to the relevant sense in which nature serves as an aesthetic norm, of just what a proper understanding of nature



might be, and what form the relevant aesthetic appreciation of nature might take.<sup>4</sup>

In the end, these issues reflect a more general question of making sense of the different meanings of ecology. If it is undeniable that the human species has altered the biosphere in significant, and surely ominous ways, then all ecology is human ecology, and to appreciate nature is to appreciate the human place within a larger living world; for example, to uncover the ethical relations human beings bear to this larger community of natural beings. Additionally, ecology can be defined within different epistemological contexts, each of which carries different ramifications for how we understand the normativity of nature, as a basis for human values. Ecology construed as the quantitative science of the behavior of ecosystems is very different from the critical social ecology of Murray Bookchin which looks at ethical-political norms from an ecological perspective, while the biocentric mysticism of deep ecology is different from the existential ecology of Henry David Thoreau or the metaphysical gyn/ecology of Mary Daly. What all of these epistemological contexts have in common is an interest in the interdependency of living and nonliving things, but like the aesthetic and NIMBY wind appreciators, they address that interdependency in different ways. In the conclusion, my argument for the beauty of wind farms will turn to an ecological position drawing on Christopher Alexander's theory of living form. I will argue that the geometry of wholeness explains the conflicting aesthetic responses to the wind farms and offers a way to begin to think past them.

### **Beauty, Pleasure and Cognitive Content**

That there is more at stake in the aesthetics of wind energy than individualistic preferences is not entirely obvious, and is completely obscured when the experience of beauty is interpreted in terms of subjective pleasure. This happens unconsciously when, to the question, 'what do you mean by saying that the wind farm is ugly?' you respond by saying 'I mean: I just don't like it,' or something to the effect that beauty is about your personal, subjective experience of displeasure at what you see. This detaches the experience of beauty from anything essentially to do with the form of the object and anchors the true meaning of the beauty within a subject. Now sometimes, this is precisely what we do mean when we speak about beauty, for example, when we are talking about personal preferences for certain colors, or shapes, or voices, or personalities. But if you try to fit all of beauty into the concept of pleasure, then you end up distorting the experience and one's understanding of its larger significance. Put differently, beauty is trivialized if one thinks of it solely or even primarily as a kind of pleasure. This is not because the experience

of beauty is not pleasurable. I think that it often is — although it can also be painful and even terrifying — but because the pleasure experienced is not the reason why we find something beautiful, it is the effect of the beauty, or part of the meaning of the beauty.<sup>5</sup> Identifying beauty with pleasure in fact is the surest way to obscure the importance of aesthetics because it makes the perception of beauty cognitively empty: because in that case, the experience of beauty is understood not to reflect anything about the form of the world, but only about how the world affects us.

Now one might object here that, in fact, beauty is cognitively empty just because it is, as the old saying goes, only in the 'eye of the beholder.' And you might think this because you understand that the beauty experienced when looking at a wind farm is the result of the physical interaction of the physical wind farm with the mind/body of the perceiver, and hence is not an objective property of the wind farm, unlike say, its mass or geometric shape. However, the perception of beauty is no more subjective than the perception of color if you consider that color is also a relational property; which is to say, a property that exists as a relation between two entities. It is true that snow is white, but the whiteness of the snow is not something that the snow has independently of being seen by an organism cognitively-equipped to perceive the snow as white. Likewise, a human face is no less objectively beautiful just because its beauty is a relation between the face and an appreciator. It is the false assumption of a primitive metaphysics that says that 'things' are more real than relations. Everyone intuitively understands that, sometimes, when a relationship ends, it's not like something has died, something has died.

It makes sense, though, that beauty is a relational property, since it is plausible that when we find something beautiful, the beauty is not related solely to the object, but to our relation to it and to the world and even to ourselves. What the equation of beauty as a kind of pleasure leaves out, is the sense in which the perception of beauty is pervasively connected to a more intricate relationship to the thing. A quite ordinary meaning of the perception of beauty is that it registers a kind of attitude towards whatever it is we find beautiful that we think to be important for some reason. Whatever else it is, beauty upsets indifference. To find something beautiful, as opposed to finding it merely attractive or pleasurable, is to become interested in it, to want to understand it, to desire to possess something about it, to become vigilant to the possibility announced through that perception. We do not want our children to take aesthetic pleasure in pulling off the legs of insects, and we would find it reprehensible if someone who was in a position, say, to stop a mugging were instead to take pleasure in the bodily movements or screams sounded in the struggle. This is why the idea that aesthetics is not immedi-

ately connected to ethics — the doctrine of aestheticism — is false. Much like love, the perception of beauty is an act of the will. To find something beautiful means that we find its existence to be something good, something to be reproduced. As Socrates pointed out, the most intuitive response we have to beauty is procreative: to draw it, or to photograph it or to tell someone about it (Plato 360 b.c.e.). If ethics makes any sense at all, it involves our willing to bring more good and less bad into the world. There is an important sense in which we can be said to have obligations to see certain things as beautiful and certain things as ugly. Perhaps seeing something as beautiful is willing to bring more of what it represents into the world.<sup>6</sup>

Of course, we know that different people often find different things beautiful or ugly or neither, and this very lack of consensus can also suggest the relativity or subjectivity of the experience. But just because people disagree does not mean that there is no objective truth to the matter: if objectivity presupposed agreement, then it would be logically impossible for people to ever disagree about anything. As the romantics and the Dadaists and the conceptualists have shown, it is possible to adopt a kind of aesthetic stance to anything in life, suggesting that the perception of beauty is infinitely elastic, and hence, unconstrained by the objective forms of things. But the epistemological significance of this elasticity is misunderstood if it is taken to show that beauty cannot be objective. That a thing can be perceived as beautiful in a number of different ways does not necessarily mean that the perceptions of beauty are subjective; it could mean that the thing is objectively beautiful in a number of different ways, in part due to its complex structure and/or due to the complexity of our relations to the thing, or of the thing's relations with other things. Such richness does not imply that there are not ways to attain synoptic perspectives on those modes in which a thing's beauty can appear which illuminate the thing's true beauty, as opposed to perspectives that are less comprehensive, more contingent on angle or timing, and less informed by, or adjusted to, beliefs, desires and attitudes one has towards the object. This line of thought would suggest that in confronting something as complexly ramified as a wind energy system, a proper understanding of its aesthetic qualities would need to place its various beautiful and ugly aspects into proper perspective.

### Functionalist Aesthetics of Wind Energy Systems

One very intuitive way of doing that is to evaluate those various aesthetic qualities in terms of function. Take something as seemingly subjective as the color of wind farms. Color is a relational property of objects that is notoriously

dependent on its context and elicits widely divergent responses from human perceivers in terms of subjective preference. Some people like neutral grey, others like electric chartreuse, and it would be absurd for two individuals to argue about which color is more beautiful, in an objective sense, because it is clearly a case where the perceived beauty turns on subjective preferences. But even here, there are some common-sensical criteria available for judging the aesthetic merits of colors on wind farms. According to Mick Sagrillo of Sagrillo Power & Light, other things being equal, a grey wind farm would be more beautiful objectively than electric chartreuse wind farm. In what sense is it 'objective'?

*Wind turbines are painted by the manufacturer, and those colors have been thoroughly considered from two angles: to make sure that they blend in with the environment and to make them distinctive from other wind turbine models. In practice, the first takes precedence over the second. Manufacturers shy away from painting their products in fluorescent colors, to keep them from being intrusive on the skyline. Towers are most often made of galvanized steel. They come from the factory bright and shiny, but soon weather to a muted gray color which readily blends in with the sky (Sagrillo 2004, 1-2).*

That is to say, the grey is more beautiful than the chartreuse in a functional sense, and if you grasp its functionality — if you understand the problems it is solving or aims it is serving, you will see its true beauty.

The aesthetic design principle that form should follow function is an ordinary way of making sense of the beauty of structures exhibiting design. The slogan is difficult to argue with, since it essentially states that to be beautiful is to exhibit good design, where good design is design that reflects the functions that an organism or artifact serves. This offers a possible solution to the question raised earlier regarding the objective basis of aesthetic experience: beauty is a quality that indicates a utility or efficiency of the form as a means to an end.

There is something satisfying about the idea of gathering energy — and so enhancing human agency by enhancing the human capacity to do work — from a source as invisible and ubiquitous and as familiar and natural as the wind. The beauty of the idea of making use of wind power is felt, I am sure by many people, when they think about the visual allure of more traditional wind-powered technologies such as sailboats, wind chimes, kites, the older Dutch windmills and the iconic mechanical wind pump towers found on farms all over the American Great Plains. According to aesthetic functionalism, form that technically solves the engineering problem of transducing wind power into electrical energy, and does so

efficiently, with an economy of means, will be objectively beautiful. It is interesting to note, for example, that people are more bothered by the appearance of wind turbines that are not spinning — due to low wind resources and design — than they are by their general appearance (Gipe 1995). Correlatively, one of the more aesthetically compelling aspects of wind farms is their motion which, aside from its immediate kinesthetic quality, expresses their functionality in a direct way. If we consider the engineering problems involved with wind energy more closely, then we can more deeply appreciate the goodness of their design. For instance, for all of their charms, the 65-kilowatt Windmatic turbines (Gipe 1999, 24-25) built in the 1930s and used in the American Great Plains prior to rural electrification do not express the same highly-engineered, efficient and powerful V90 3-megawatt Vestas turbines which are used in large scale offshore wind farms like the Cape Wind project.<sup>7</sup>

Consider the question concerning the aesthetic properties of windmill rotors. In a now-famous incident, while visiting the Paris Air Show with Fernand Léger, Marcel Duchamp and Constantin Brancusi were both taken by the aesthetic perfection of an airplane propeller they saw.

*While visiting the Paris Air Show (1912) with Léger and Duchamp, [Brancusi] noticed a propeller. "Now that is what I call sculpture!" he exclaimed, wonderstruck. "From now on, sculpture must be nothing less than that." The experience strengthened Brancusi's resolve to bring modern form to perfection, but it had a different effect on Duchamp....Here is Fernand Léger's version of what transpired at the Air Show. "Before the Great War, I went to see the Air Show with Marcel Duchamp and Brancusi. Marcel was a dry fellow who had something elusive about him. He was strolling amid the motors and propellers, not saying a word. Then, all of a sudden, he turned to Brancusi, 'It's all over for painting. Who could better that propeller? Tell me, can you do that?'" (Dumitresco and Istrati 1991, 92).*

I must confess, like other visually-interested people I know have expressed, to finding wind farms in general beautiful, and the visual simulations of the Cape Wind project really elegant and even captivating. For many of the same reasons I find minimalist sculpture, the International Style in architecture, and modernist graphic and industrial design in general appealing visually, I find the wind farm visually appealing. The mechanical, highly-engineered look of the turbines, nacelles, rotors and monopiles is visually pleasing for the same reasons that beautifully-designed tools, automobiles, furniture, living structures and logo designs are: the look of some-

thing that is well-crafted, precise, carefully-wrought, efficient, and especially, something that is well-conceived, something we find beautiful because it looks highly-practical. The enemy of functionalism is 'embellishment,' insofar as any design element that cannot be justified as essential from the standpoint of functionality is taken to harm or detract from the well-designedness of the form, and hence to detract from the beauty of the thing in an objective sense. For instance, from a modernist standpoint, a design for windmills that tried to make them look like something other than windmills, for example, huge palm trees or flowers would be objectively ugly in the sense of being dishonest form.

Independently of any actual work that the propeller does, Brancusi and Duchamp were also responding to the sheer look of functionality, and this is essential to understanding the connection between functionalism as an engineering principle and as an aesthetic principle. Functionalist design aims at objects that are not merely functional, but which also look functional: they have a look of efficiency, of being rational in a practical sense, and of a grace that is taken to supervene on the economic use of materials and shape to serve a function well. For modernist sensibilities like Duchamp's and Brancusi's, functionality has a spiritual significance since it serves as a formal-geometric device for visually expressing ideas about order and rationality and perfection that lie at the very heart of modernity. This is what Duchamp referred to when, in defending his revolutionary conceptual sculpture *Fountain* against the charge that it was "a plain piece of plumbing," he said that "The only works of art America has given are her plumbing and her bridges" (Duchamp 1917, 1).<sup>8</sup>

This spiritual significance can be seen more clearly by considering the modernist symbolism of grids. This is another important aspect to the wind farm's functionalist beauty and offers a segue to the real issue I want to address, which is what functionalism reveals about the differences between the aesthetic and NIMBY appreciators.



The geometrically-ordered, serial uniformity of wind farms exhibits beauty in a high modernist sense that is attractive to a wide margin of aesthetic sensibilities. In a discussion of wind energy aesthetics for example, Paul Gipe, says that the “most significant means for improving public acceptance [of wind farms] is by providing visual uniformity,” which means primarily avoiding ‘extensive mixed arrays’ (make sure all of the rotors, nacelles and towers look the same), and avoid seemingly random heights (Gipe 1995, 5). Why is this uniformity pleasing?

Consider the pattern of the deployment of wind turbines at the Cape Wind wind farm project. According to computer simulations, the 130 400-foot, 300-ton steel monopiles that will hold the turbines will be situated approximately one third of a mile apart in a 24-square mile grid pattern.<sup>9</sup> What visual meaning does this grid deployment carry with it? The grid is the architectural essence of functionalist modernism, embodying the ideal of mathematical rationality as the ordering principle of human life, the straight line over the curve, the mechanically-reproduced over the organically-grown, the serial over the unique, and the ‘rational’ over the ‘natural’ (Taylor 2001, 25-33). These oppositions make up the ontological, epistemological and psychological inspiration of modernist aesthetics. According to Le Corbusier (1986, 12),

*Man walks in a straight line because he has a goal and knows where he is going; he has made up his mind to reach some particular place and he goes straight to it. The pack-donkey meanders along, meditates a little in his scatter-brained and distracted fashion, he zigzags in order to avoid the larger stones, or to ease the climb, or to gain a little shade; he takes the line of least resistance. But man governs his feelings by his reason; he keeps his feelings and his instincts in check, subordinating them to the aim he has in view. He rules the brute creation by intelligence. His intelligence formulates laws which are the product of experience. His experience is born of work; man works in order that he may not perish. In order that production may be possible, a line of conduct is essential, the laws of experience must be obeyed. Man must consider the result in advance.*

So much of our modern view of human rationality and its relationship to nature is expressed by this statement, but let’s just focus on its implications for our understanding of beauty. For artists who have been attracted to classical modern principles of design, reason and perfection, the grid solves the problem of how to render in concrete visible form something that is immaterial and perfectly rational in a mathematical-geometric sense. A grid is composed of points and lines,

which do not exist in the ordinary world of nature, except as ideal entities contemplated by the mind. On a grid, equilibrium is static. All compositional elements are equal, regularized and inseparable from the whole. All chaos, individuality, uniqueness, ambiguity, change, uncertainty and aliveness are excluded as inessential.

Now if we return to the NIMBY wind appreciators, the significance of the grid is thrown into a different light. For those who are offended by the industrial look of the Cape Wind project, it is precisely these modernist aspects of its structure that are seen as an ugly imposition on the natural structures and processes of the bay. The last thing they want in their one place in the world where the menacing projection of modern calculative rationality and industrial might has yet to assert itself is a huge modernist sculpture symbolizing a static, mathematical conception of balance and symmetry and order! This is a perfectly understandable response to the proposed wind farm and I have a lot of empathy for it. Independently of the ecological rationality of the wind farm, its geometric structure is, plausibly, a symbolic affront to its value.

It actually took me awhile to realize that my own modernist sensibilities, while conspiring with my ecological sensibilities to give me a deep aesthetic response to the Cape Wind wind farm, were in some ways opposed to each other. The conflict is, I think, illuminating about the larger disagreement between the aesthetic and NIMBY wind appreciators. While I personally find the modernist aspects of the aesthetics of the wind farm attractive, I also feel that those features are ambivalently related to its ecological rationality and for reasons that NIMBY responses make clear. The modern view of nature has often been characterized in mathematical language as physical matter in motion, obeying physical laws and without inherent wholeness or purposiveness. This voluntarist view is reflected in the commonsense idea that nothing within nature has value until it is valued by some intelligent being with rational interests: anti-environmentalists often make use of this idea when ridiculing ecologists as ‘tree-huggers.’ On the other hand, naturalists and ecologists and many people who spend time in nature and love nature, realize that the modern idea is deeply problematic and instinctively reject the idea that nature has no inherent value. This is why the ‘industrial look’ of the wind farm is so irksome: it carries with it an ideology of progress that is perceived as unnatural, hence ugly.

For all of its virtues, functionalism has some critical shortcomings. Le Corbusier’s reduction of the function of residential buildings to ‘machines for living,’ led to the creation of buildings that were alienating and dehumanizing to their residents because their efficiency and functionalist beauty required that they mechanize the processes of human life. What the NIMBY response to the functionalism of wind



energy points to is the sense in which functionalism is an anthropocentric and industrial aesthetic: functionalism looks at form within the tightly circumscribed context of separate human purposes, without being able to see those purposes within a larger ecological context. Take, for example, Allen Carlson's defense of the aesthetic properties of modern industrial farming. Arguing that the industrial scale and structuring that farming has taken on since the Green Revolution are highly functional as a solution to the problem of feeding the world, Carlson concludes by saying that industrial farms are beautiful in a functionalist sense: they are "...paradigms of good design — crisp, clean, uncluttered in appearance and expressive of ingenuity, efficiency, and economy" (Carlson 2002, 187). Relying on the same design criteria, we could look on as beautiful a host of industrially-produced artifacts that are highly 'functional' despite the fact that they are ecologically-irrational, for example, coal-fired power plants, suburban cul-de-sac subdevelopments, sexy gas-guzzling sports cars, or Big Macs. But this just shows that functionalism cannot make sense of how the ecological rationality of an artifact like a renewable energy system, could be beautiful for that very reason, not for the reason of its efficient functionality.

To use a personal example, I used to see automobiles as beautiful, and I did so largely due to my functionalist sensibilities. As the embodiment of functionalist aesthetics, incessant engineering improvements and the ingenuity of modern industrial construction, new automobiles are one of the highest expressions of modernist aesthetics, and yet automobiles are ecologically-irrational because they are destroying the planet. As I have started to grasp the political and climatological liabilities of a hydrocarbon energy regime and the use of automobiles as a system of mass transit, cars themselves have started to look ugly to me. I can still appreciate their industrial functionality in an intellectual way, but the visual appearance of a car now gives me a negative aesthetic response in a visceral sense.

## The Geometry of Wholeness

Now, is there a way to explain how my aesthetic response to the car is shaped by ecological, as opposed to functionalist, reasons?<sup>10</sup> If there were, then we would have a way to take the debate between aesthetic and NIMBY wind appreciators to a deeper level of objectivity, to connect aesthetics and ecology at a deeper level. The geometry of wholeness is one way to go with the thought, and the way that I will be occupied with for the rest of the paper. As we shall see, wholeness also offers a way of understanding the third of the basic questions raised by environmental aesthetics, which has to do with the normative status of nature.

Consider the NIMBY wind appreciator again. If it is precisely the industrial look of the wind farm that irks her sensibilities, then a functionalist aesthetics is not going to speak to her aesthetic intuitions. We can plausibly characterize her dissatisfaction by saying that the wind farm is perceived as ugly because it is seen as destructive of the wholeness of the landscape. What does that mean? It means that the deep aesthetic satisfaction of the land — its spiritual meaning — is a function of the living form that it exhibits. In the case of the Cape Wind project, Nantucket Bay, with its beaches and shoals and marine ecosystems, is a center of living activity. Because it is alive, it makes one feel alive — feel deeply human — to be there. Industrially-produced structure seldom has this quality of being alive, and so of creating a sense of wholeness. All of us can probably think of spaces that's utility was at odds with its functionality in some broader sense of making you feel dignified and inspired and, well, human to be there, as if your presence is being acknowledged as if you feel liberated because you can accept the space around you as beautiful and you can feel gratitude for that. I can think of many ugly, but perfectly utilitarian and 'efficient' classrooms I have taught in where I had to make a conscious effort to deflect the deadening geometry, to resist the ugly meaninglessness of the container we found ourselves in. And then again, I think of how the whole endeavor of learning can be given cosmic support by beautiful surroundings, for example, having a conversation along a path near a lake.

Coded within the negative judgment that the wind farm has an industrial look is the sense that something industrially produced exhibits non-living form, and as such, it is a structure that cannot enhance but only hurt the life around it. The architect and complexity theorist Christopher Alexander has articulated a way to understand and explore the particular geometry of living form. Because we are so habituated into thinking of beauty as a subjective impression that the world makes upon us, we can have a hard time taking seriously the idea that the perception of beauty, as the sense of wholeness, is actually a cognitive insight into the nature of living form and even the underlying process that unfolded that form. As Alexander (2002, 20) puts it,

*What I call wholeness is, to a very rough degree, a mathematical representation of the overall gestalt which we perceive, or which we are aware, which gives the character to the configuration, and which forms, what an artist might call, his most intuitive apperception of the whole.*

Wholeness relates to the perception of living form. The difference between living and non-living form has to do with the process through which the form came to be. Living form comes to be through a living process, while non-living form

comes to be from a non-living process. This is an intuitive, but also subtle idea. Consider the structural differences between a plant and a laptop computer. What is alive or natural about the plant's structure, as opposed to the structure of the computer? One can see, just by looking, that the plant came to be by way of a process of unfolding, where each step of the growing grew out of the prior steps, and where each development enhanced the structure (the wholeness) that already existed. In contrast, you can see just by looking that the computer could not have come to exist through an unfolding process. Because the parts are externally related to each other (i.e., they are what they are independently of their relations to other parts), and because of the distributed industrial processes that produced the parts, the computer has a put-together look. While an Apple iBook bears a highly-refined functionalist aesthetic, it has no life in its structure. While the functionalist asks 'what form will fit the function?,' the geometer of wholeness asks, 'what form will enhance, and so help to unfold, the wholeness (life) that is already present?'

Unfortunately, for a variety of systemic reasons having to do with the nature of industrial building processes, most of our human-generated landscape in industrial capitalist society has this put-together look that is actually deadening, in an objective sense, to the human soul. Commenting on suburban sprawl in Arizona, Alexander (2002, 214) says that:

*Here the accretive process fails, at almost every step, to generate living structure because the entities formed, though they are formed step by step, are not whole-creating. The result is merely a pile of stuff, unrelated, incoherent, and — for the large part — without much profound life.*

Living form is intimately connected to wholeness, since the essence of a naturally unfolding process is that it is a process which, at every step, preserves and enhances the wholeness of the existing structure. This is, plausibly, the geometrical reason why the people on Cape Cod who are so desperately resisting the wind farm proposal see the windmills as ugly. Like almost everyone else, they are fed up with the dissociating effect of industrially-produced environments, like suburban cul-de-sac housing projects, skyscrapers, interstate highways, airports, parking lots and shopping malls. The feeling of being grounded and centered that people often experience when finally alone with nature is not 'subjective,' but rather a keen cognitive awareness of the geometry of the wholeness of living processes. Living within a wholeness-enhancing environment does not simply make one feel more centered, one literally is more centered.<sup>11</sup> The feelings are objective and more precise than 'thinking.' Because life itself is a process of unfolding, to live in an environment that is not alive is to live within a structure that does not allow for the unfolding of

one's own life as an individual. The effect is the experience of meaninglessness and alienation all-too-common in industrial society. If we consider the NIMBY wind appreciator's response in light of the geometry of wholeness, then the objective content of the judgment that the wind farm is ugly is that it will not enhance, but rather hurt, the existing wholeness of the natural location. The view is: the wind farm is industrial ugliness because it ruptures the centeredness of the bay, and the person who claims to see a wind farm as beautiful is overintellectualizing her perception.<sup>12</sup>

What about the perceptions of the aesthetic wind appreciator? Consider some basic principles of ecological design that wind energy instantiates. While functionalism picks out one basic ecological principle — namely, that nature tends to fit form to function — it leaves out many others. Biomimicry, or design that consciously tries to imitate natural processes, strives towards embodying a larger set of principles. In her book on the subject, the naturalist Janine Benyus (1997, 7) offers a list of some of these ecological principles that includes the following:

*Nature runs on sunlight.  
Nature uses only the energy it needs.  
Nature recycles everything.  
Nature rewards cooperation.  
Nature banks on diversity.  
Nature demands local expertise.  
Nature curbs excesses from within.  
Nature taps the power of limits.*

Much of the ugliness of industrially-produced landscape has to do with the ways in which cheap energy sources in the 20th century, and primarily cheap oil, has allowed us to flaunt these ecological principles, and to the point where most people do not even believe that they apply to the human species. Of course, like wind energy, petroleum is a form of solar energy, but it is a solar bank account that took millions of years to fill and only about a hundred years to deplete.<sup>13</sup> It is largely our hydrocarbon energy economy that has led to the destruction of the wholeness of many parts of the world. Global warming is the single most destructive effect that human beings have had to date on the earth's ecosystems. Together with the unsustainable rise in human populations and, in the industrialized North, unsustainable levels of individual consumption, ecosystems around the planet are crashing as intricate webs of interdependency in the flow of energy and nutrients between billions of organisms are ripped apart. Insofar as wind energy serves as a way to reduce carbon emissions, it serves as one hopeful way to begin to heal the wholeness that our hydrocarbon energy regime continues to rupture.

This relates to the question about the normative status of nature, insofar as the event of global warming shows why all

ecology is now human ecology. You cannot separate conceptually the human presence in the world from the world itself. This bears on the NIMBY wind appreciator's claim that wind energy is ugly for the ways in which it disrupts 'pristine' nature. If the human ecological presence is now ubiquitous, then the presence of nature can be said to be ubiquitous as well. Perhaps building a wind farm is one of the more natural things one can do, in the sense of being a healing or restoring act.

There are other ways we can see wind energy as working to heal the wholeness-destroying effects of hydrocarbon energy sources, and specifically oil. The first Iraqi war was just the first of what will surely be a bloody succession of oil wars fought out by the American empire and the other industrial powers, and many foreign policy specialists, from all sides of the political spectrum, are predicting endless and bloody resource wars as the backdrop to 21st century politics (see, for example, Klare 2002). These problems have been generated in part by oil and its geopolitical risks.<sup>14</sup> While the energy equivalent of an estimated 116 million barrels of oil that the Cape Wind project could save is only about one-quarter of the oil we annually import from Nigeria, it is a huge step forward towards an economic and ecological position in which our ordinary habits of energy consumption do not lead us, as they do now, to support the extreme violence of fascist military petrostates that cause the suffering of millions. The very geometry of wind energy embodies part of a healing solution to this predicament, and if you understand that, then plausibly, you will be able to see the beauty of that geometry. You will look through the industrial-functionalist shape of the farm and see the wholeness within which that shape is just an aspect.

To relate this to the question about the normative status of nature: the event of global warming shows why all ecology is now social ecology, in the sense that the ethics of our personal energy consumption habits cannot be separated from the issue of global social justice. As the social ecologist Tom Athanasiou (1996, 13) puts it,

*The oil wars of the Middle East, the toxic wastelands of the U.S.-Mexico borderlands, the clouds of carbon dioxide projected to rise from Northern cities and from the copycat industrialization now sweeping the South — all these mark the time passed since "ecology," once a specialized branch of biology, came to denote a less distinct, more encompassing fear.*

While the NIMBY wind appreciator is sensitive to the local wholeness that the wind farm might be displacing and decentering, she is plausibly blind to the larger wholeness that the wind farm is serving to enhance by moving away from the ethical liabilities of the military-petroleum complex. By heal-

ing the disruptive processes associated with hydrocarbon fuel, wind energy is beautiful because it serves to enhance wholeness, or at least to begin to reverse a life-denying process that began when oil was too cheap not to use.

So whose perception is more truthful? Which perception is a more truthful grasp of wholeness? Which perception understands better the potential for wind energy to enhance or detract from the wholeness and life of human society? I have tried to present the conflict between the aesthetic and NIMBY wind appreciator in a way that would reveal the complexity of the disagreement. Given this complexity, it is by no means obvious what the answer is to these questions. It may be the case, for example, that both perceptions have truth to them, that the Cape Wind project is enhancing and destructive of liveliness, although in different ways. After all, in a culture in which most of the processes used to create environmental structure are not life-enhancing, it is difficult to create life-enhancing forms.<sup>15</sup>

I happen to see wind farms as beautiful, and for reasons having to do with the geometry of wholeness. To conclude my discussion, I want to consider one aspect of wholeness that I think shows what is wrong with the perception of the NIMBY appreciator. This is the aspect of simplicity. In the geometry of wholeness, the life of a form is related to its simplicity. Simplicity, like other concepts connected to complexity theory, does not refer to the number of parts something has, but to the process of unfolding. Simplicity refers to "... the state in which all structure is removed, except that structure which is required" (Alexander 2002, 476). Something that is simple, in this relevant sense, is so because it follows (or enables) the path of least resistance towards the enhancement of life.

*... the simplest thing that can be done to intensify existing centers. It is necessary that it must be simple because if there is too much extraneous clutter, the clutter gets in the way, makes less room for new necessary structure that the unfolding process is trying to achieve (Alexander 2002, 463).*

The intuitive idea here is that when we perceive something as beautiful in a profound sense, we see that beauty as connected to the simplicity of the thing. Again, this does not mean that it is not formally complex, but only that it is the simplest way to unfold a living process. And the perception of beauty in this sense is also connected, as a perception of wholeness, to the unfolding of our own wholeness, hence as a simplifying of our life. This is the sense in which beauty reveals life to be more profound and simpler than it habitually appears to be. This is not a subjective perception, but a cognitive grasp of the geometry of wholeness. In this sense, simplicity is consistent with what functionalism disparaged as 'mere orna-

mentation': A decorative pattern on the side of a building can serve to enhance the life of the structure, and so to make the building simpler than the same building without the pattern!

Now I think that the NIMBY wind appreciator understands this and sees the wind farm as ugly for the ways that it destroys the simplicity of the bay and the honest, tranquil, centered character of life on the backdrop of a natural landscape. It is precisely the quiet and simple sense of order on a beach off Nantucket Bay that literally recuperates one's humanity after it has been decentered by nonliving geometry of suburbia. This is not simply a question of 'subjective' impressions, and that is precisely why the NIMBY wind appreciators feel so strongly about the effect that the wind farm could have on the life of their home. Now here's the decisive point: I think that the NIMBY perception pertains more to an image of wholeness than to the actual wholeness of the region. From the perspective of the aesthetic wind appreciator, the wholeness of the natural landscape, while real, conceals the larger, life-denying effects of the energy regime that supplies the Cape with its power, and of the destructiveness of the ecological footprint of the seemingly simple Cape Cod life. Those against the wind farm see it as making their lives more complicated, but in fact, the complexity they perceive to be intruding on their life is plausibly just the entropic tail of their industrially-supported form of life. No wind farm would have been required at all if the levels of consumption and energy use they assume to be normal and natural were not ecologically-insane. Perhaps the perceived industrial ugliness that they see in the project is the kind of ugliness that Narcissus would have seen in the lake if he had suffered the same ecological derangement that we do. Narcissus, the god of artists, reminds us that the perception of beauty is often connected to self-knowledge, albeit in ways that are not immediately apparent to us: a cognitive failure that can prove to be fatal.

Now, if the aesthetic wind appreciator sees the wind farm as beautiful, what simplicity might it herald? When one puts the wind aesthetics debate into the larger context of a looming energy crisis and the advent of peak oil, the complaints by those most closely located to the wind farm start to look increasingly ironic. Currently, there is a growing chorus of human ecologists and petroleum geologists predicting that our bubble of unprecedented material affluence in the North is going to burst. No matter what combination of renewable energy resources and energy efficiency improvements we come up with, we will never again have at our disposal the degree of cheap, abundant, high quality energy we have enjoyed during the 20th century. The ecological upshot is that the energy crisis is going to make our lives simpler by requiring us to downsize massively our expectations for material affluence. As power failures like the August 2003 black-out — the largest in North American history — become more

frequent and the costs of heating fuel, food and transportation spike, the NIMBY wind appreciators living most proximate to renewable energy resources will be shielded by the most chaotic and violent contractions of the hydrocarbon energy infrastructure. According to an interview with Jim Gordon, the president of Cape Wind Associates, the Cape Wind farm will not be able to divert electricity to the northeast energy grid in the event of an energy emergency, such as a regional black-out. As the interviewer Michael Kane infers, "So it will be the residents of this predominantly rich area who will have renewable wind energy running into their homes" (Kane 2005, 7). At some point in the near future when the rest of New England is struggling to heat their homes and cook their food, life on the Cape is going to be a lot simpler. It will be simpler because the people there will be living off of a local, clean renewable source of energy that implicates them in no life-destroying processes of industrial society. Perhaps then the NIMBYs will be able to appreciate the beauty of the wind farm.

This view of the relation between beauty and ecology brings us full circle back to one of the first thinkers to address our ecological predicament and the role that our need for beauty plays in finding our way back to simplicity.

*We must learn to reawaken and keep ourselves awake, not by mechanical aids, but by an infinite expectation of the dawn, which does not forsake us in our soundest sleep. I know of no more encouraging fact than the unquestionable ability of man to elevate his life by a conscious endeavor. It is something to be able to paint a particular picture, or to carve a statue, and so to make a few objects beautiful; but it is far more glorious to carve and paint the very atmosphere and medium through which we look, which morally we can do. To affect the quality of the day, that is the highest of arts. Every man is tasked to make his life, even in its details, worthy of the contemplation of his most elevated and critical hour. If we refused, or rather used up, such paltry information as we get, the oracles would distinctly inform us how this might be done.*

*I went to the woods because I wished to live deliberately, to front only the essential facts of life, and to see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived (Thoreau 1995, 59).*

## Endnotes

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2. The image above is of an original oil painting by Louis Guarnaccia, a Nantucket Sound resident who is passionately opposed to the Cape Wind project proposal for a 420-megawatt wind farm off the coast of Massachusetts in Nantucket Bay. He wanted to paint “his worst nightmare.” Permission to use this image granted by the artist. [[www.windstop.org/pages/1/index.htm](http://www.windstop.org/pages/1/index.htm)]
3. In his framework, Carlson distinguishes two basic approaches to environmental aesthetics, which he terms the ‘engagement approach’ and the ‘cognitive approach.’ While the cognitive approach focuses on the structure of perception or the structure of the object as the basis for aesthetic experience, the engagement approach considers ‘engaged experience’ in a holistic sense. (Ibid.) The distinction can be helpful to keep in mind, but also misleading if taken too seriously, since both ‘approaches’ are necessary and necessarily interconnected.
4. For instance, within this debate, the position that pristine nature considered in itself supplies the relevant categories for its aesthetic appreciation — *cognitive naturalism* — can be contrasted with views that either (a) do not fully separate the perception of nature from its human significance — *iconographic formalism* — or which (b) hold that nature can be appreciated by way of the properties it has in virtue of its interaction with human beings — *cultural cognitivism* (see Heyd 2001; Newman 2001; Carlson 2001).
5. The tag here — that pleasure might also make up ‘part of the meaning’ of beauty — is not trivial. There is a long tradition in aesthetics, going back at least as far as Immanuel Kant’s *Critique of Judgment* that sharply distinguishes beauty and pleasure, and it is the root of all formalist views of art and aesthetics. This distinction is based on the idea that the perception of beauty is disinterested, in the sense that it is not connected to having practical or theoretical interests with the beautiful things. I think that the distinction is helpful in some ways, but that it can easily be over-exaggerated. Far from being disinterested by beauty, I think that beauty makes us ‘interested’ in things in a holistic sense. True beauty ‘turns us on’ epistemologically.
6. This view of the connection between aesthetics and ethics is from the ecofeminist philosopher Jennifer L. Taylor. It is a helpful way to understand the connection between ethics and aesthetics because it does not begin by distinguishing perception from the will. From private discussion.
7. When one considers the various constraints on transducing wind power into electricity, such as that the power contained in wind is a function of (a) the density of the air, (b) the area intercepting the area, (c) the instantaneous wind speed, and that (d) the power in the wind varies with the cube of wind speed (so that if you double the speed of the wind, you increase the power eightfold), and that (e) because obstructions near the ground disrupt the flow of the wind, wind speeds typically increase with height, then one can better appreciate the functionality, and hence the beauty, of well-designed turbines.
8. Notice that he is not referring to America’s contribution to engineering or plumbing, but to art, to plumbing *as a form of art*. Wood, B., H.P. Roché, and M. Duchamp. 1917. The Richard Mutt Case. [[www.columbia.edu/~eer1/duchamp.html](http://www.columbia.edu/~eer1/duchamp.html)].
9. See [www.capewind.org](http://www.capewind.org).
10. Ned Hettinger (2005) tries to defend Allen Carlson’s use of functionalism by arguing that if we include considerations of sustainability into the conception of a thing’s proper function, then we can still use functionalism to critique an ecologically-unsound process like industrial farming on the grounds that it is unsustainable, hence dysfunctional. I do not think this solution works because it continues to employ a concept of function that has no reference to an ecological relation to the world. Hence, as I argue below, it cannot shed light on the essential property of living form that distinguishes it from most modernist form — the property of wholeness.
11. My colleague Alysia Johnson, a trauma specialist, sometimes asks patients suffering from post-traumatic stress disorder, to imagine themselves as trees, so that they can begin to recuperate a centeredness within their lives, as a relationship of being grounded in a living process of unfolding.
12. Christopher Alexander (2002, 164) argues that this is precisely the case with the Altamont Pass wind farm in California, the poster-child for unaesthetic wind energy projects: “...the hundreds of wind turbines at Altamont Pass, near Oakland, California, loved by ecologists (intellectually) because they harness wind energy, are nevertheless strongly structure-destroying. They do not leave the hills of Altamont alone; they are not innocent in themselves.”
13. In speaking of depletion, I am referring not to actually running out of oil, but running out of cheap oil. This is the place on Hubbert’s curve which marks a) the point at which approximately one-half of the natural resource has been extracted, and b) the point of maximum extraction rate, after which the cost to extract the resource begins to rise inexorably. In the case of the extraction of an energy resource, the cost of extracting the resource soon becomes nonviable, since the net energy yield (energy returned minus the energy used to extract the energy resource) becomes negative. See <http://peakoil.com/>.
14. For example, civil peace is a necessary condition for the preservation and enhancement of the wholeness of human societies, but historically, oil has tended to undermine civil security in many cases. The Worldwatch Institute’s (2005, 110) *State of the World* issue, which is devoted to the topic of global security, states that:

*In addition to great-power maneuvering, military interventionism, and alliances of convenience, oil is associated with a variety of other actions that undermine civil security. For example, oil vividly illustrates the ‘natural resource curse’ — the tendency for resource wealth to support corruption and conflict rather than growth and development. The effects have been evident in a number of countries, including the United States.*
15. The turbines for the Cape Wind project, for example, are being built by General Electric which, according to CorpWatch.org, is currently attempting to overturn the US Superfund Law of 1980, which allows the government to hold polluters responsible for cleaning up their toxic chemicals. GE is also on their war profiteers list. [[corpwatch.org/article.php?list=type&type=16](http://corpwatch.org/article.php?list=type&type=16)].

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