
Property Law and Climate Change

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Out of the old fields must come the new corn.

—Sir Edward Coke

Most proposals to deal with global climate change are legislative and administrative, and the major elements of property law are taken as a given. Although the complex problems associated with global warming make a focus on legislative and administrative approaches understandable, property law has an important yet neglected role to play in addressing global warming.

Property law determines how people acquire rights of ownership. It also controls use of land. The reach of these tenets has not kept up, however, with the development of novel technologies for harvesting the sun and the movement of air and water, each of which offers great potential for reducing carbon emissions. Addressing global warming effectively requires generating more power from environmentally friendly resources—solar and wind power and kinetic, wave, and tidal hydroelectric power—to reduce our consumption of coal-generated electric power. Without rules defining who owns these resources and the expectations they may lawfully have with regard to permitted and prohibited use, the widespread expansion and implementation of environmentally friendly technologies will be severely handicapped.

This article will deal with these issues, beginning with the issue of rules for acquiring property rights in natural resources. The article will then discuss land use controls, such as restrictive covenants, and how they can impede the progress of environmentally friendly power sources when such sources are considered aesthetically offensive. Lastly, the article will focus on the question of how property law should deal with uses of land that are inefficient and contribute to global warming.

Property law has been slow to recognize rights in the sun and the movement of air and water because property law has traditionally focused on entitlements to tangible things. Traditional property law easily determined ownership of coal and sites for power plants, the source of most of the power in the United States. Control over the land underlying the water behind a conventional dam gave the control necessary to run the dam. An upstream dam could delay water flowing down but not interfere with the downstream dam's ability to impound and use the water.

Property law is less satisfactory in dealing with the ownership of the motion of water and air and photons. This failing

is important because in-stream hydropower and wind turbines are promising tools for producing electricity. In-stream hydropower, also known as kinetic hydropower, is like the more familiar wind turbines. It operates by having turbines that the naturally moving water spins, obviating the need for dams to raise the water to create a drop to power a turbine. Because kinetic hydropower depends on the motion of water, the location of one project can adversely affect others by altering how the water flows. Wind turbines work in the same way and create the same problems, although the possibility of shifts in the wind makes it harder to identify which project is upstream. The use of solar electricity is less challenging because the sun's rays follow a straight line, but even here there can be conflicts in uses. One person might plant trees to shield his house from the sun, shading another's solar cells.

All these issues present conflicts among claims to the same resource. Because the traditional rules for appropriating property do not address things as fluid as the motion of water, air, and photons, closely relevant precedent is scant. From a property owner's perspective there needs to be a new property right, in the form of a negative easement, that would prohibit another person from using her property to interfere with another property owner's access to the movement of water, air, or to photons. However, American courts have not recognized negative prescriptive easements. It would unfairly surprise people to generate that doctrine and apply it retroactively to bar claims. Moreover, unless individuals from whom the easements would be exacted failed to act in the future, developments could be made economically infeasible after they were established.

A famous case, *Prah v. Maretti*, 321 N.W.2d 182 (Wis. 1982), holds that buildings affecting a neighbor's solar panels might constitute a nuisance. Despite this authority, nuisance law provides an inadequate basis for analysis. Nuisance law addresses harm caused by dissimilar uses, such as the stockyard that harms the homeowner. Nuisance law does not address similar attempts to harvest the same resource. While this limitation does not pose a problem for multiple stockyards in a single neighborhood, when two neighbors' wind turbines compete for wind, a complaint that one neighbor's wind turbine interfered with the other's wind turbine is unlikely to succeed under nuisance law.

Because easements and nuisance law are inadequate, the use of the motion of air and water should be treated as involving a claim to property based on taking and using something previously unowned and unused. Although the courts addressing this right use different rules, the rules embody several common underlying principles. First, all courts recognize the general principle that society benefits

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from capturing a resource for productive use. Thus, the courts applying these principles fashion rules that are calculated to promote this result.

Second, the courts recognize the need for predictability. Unlike nuisance law, which may involve relatively small interferences that only require compensating the user, rules determining ownership of a resource necessarily put at risk the entire operation. Without predictable rules, people are often unwilling to make the investments necessary to harvest the resources.

Third, the courts recognize that the first person to have the ability to appropriate a resource physically may nonetheless have rights inferior to those of someone whose ability to appropriate comes later. For example, downstream water users, who have the physical opportunity to appropriate water molecules only after upstream users, may nonetheless have rights to that water superior to upstream users. Having the sure ability to take an animal may give property rights in it, even if someone else seizes the animal first. The same principle is accepted in English “ancient lights” law, although that right arises only after a prescriptive period.

Fourth, in many cases involving appropriation, courts and legislatures recognize that overly intense efforts to extract a resource can be duplicative and can waste the resource, thereby leading to social harm. This is a tragedy of the commons and is especially true with extractive industries involving pools, oil, or natural gas. A good deal of oil and gas law is designed to prevent the waste of common resources.

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Of course, adapting existing rules to address global warming means choosing from a variety of conflicting rules. The water rules, which are particularly relevant to appropriating streams of air or water or sunlight, differ among jurisdictions. In many western states, prior appropriators have nearly absolute priority for beneficial uses. Rules elsewhere require that appropriation be reasonable and limited to riparian uses. Although a rule limiting the location of the consumption does not make sense in this context, a rule of reasonable appropriation is better suited to power from the sun and from moving air and water. This is true even though a rule of absolute priority requires

fewer judgments about when interference exists than a rule requiring appropriations to be reasonable.

One reason for the difference between prior appropriation (absolute priority) law in the West and riparian rules (reasonable appropriation) in the East is that the physical use of water necessarily provides clear notice of what the appropriator has claimed and set aside from other water. The water either is in the stream or it is not. When the challenge is only to upstream interference with flow, not to upstream appropriation, any harm downstream must be traced to upstream structures that incidentally interfered with flow of the air or water. Sorting out what downstream effects are the result of which upstream project would be difficult or impossible. An additional reason is that multiple uses of the same water may be possible if development is done carefully. Water can reach a terminal velocity so that a reduction in speed upstream has no effect downstream. Moreover, prohibiting all development that affects downstream uses would give downstream users an unjustifiable veto of all upstream development no matter how beneficial it may be.

Of course, in jurisdictions that follow a prior appropriation rule, a new in-stream use of streamflow would be subject to existing appropriations of water. Courts in such jurisdictions should allow in-stream use for power generation to count as an in-stream appropriation sufficient to prevent others from appropriating water above the in-stream use. This would resemble recognized in-stream uses for conservation. The rejection of a rule of absolute priority in this area is consistent with the decline in other protections for prior uses, such as the declining influence of “coming to the nuisance” as a defense in modern nuisance law. It is also consistent with academic criticism of prior appropriation rules as inefficient. A reasonable use standard for streamflow would be consistent with a reasonable use rule for groundwater and diffuse surface water. Many jurisdictions, including those that have an absolute priority for prior appropriation for surface water, have reasonableness standards for these waters.

The problem with a reasonable use standard is its uncertainty when applied. Fortunately, many things will make this less uncertain than it seems at first glance. For example, in areas with setback and height limits, building within those limits would ordinarily be reasonable. However, even building within zoning limits would be prohibited if it were a purely malicious interference in another’s attempts to collect energy, akin to the prohibition of spite fences or of the discharge of guns near the plaintiff’s bird trap, as in *Keeble v. Hickeringill*, 103 Eng. Rep. 1127 (Q.B. 1707). Thus, in residential neighborhoods or business districts, collectors of the sun or wind would have to obtain easements to guarantee that future construction would not interfere with their access. Conversely, one building within those limits would be free of challenges from those downwind or down-sun.

Applying a reasonableness standard to the issue of appropriation of the flow of water is more complex. Water flow, propelled by gravity and directed by geography, can suffer the effects of obstruction or use even at a distance. Conversely, the existence of old ox-bow lakes shows that large changes in streamflow can happen without human intervention. The complexity of the modeling involved might make a claim that new, upstream con-

struction had caused a change in streamflow well beyond the ability of ordinary landowners to rebut. Fortunately, the building of multiple dams on a river can be handled by the Federal Energy Regulatory Commission (FERC) licensing process. That offers the possibility of an agency with expertise applying standards of property ownership to determine whether a new dam conflicts impermissibly with an old one.

Also fortunately, those who do not intend to use the flow of the water have reason to design their structures to minimize the obstruction to streamflow. Otherwise, they will have to make the structures stronger and therefore more expensive. With respect to buildings, such as piers, that have an incidental effect on streamflow, there could be an administrable rule that permitted the pier if the base of the stream where the pier existed was above the turbine. Otherwise, a pier builder would have to pay for damages commensurate with the interference the pier caused the in-stream hydroelectric resource.

Although a doctrine of reasonable use of streamflow may have some uncertainties around the edges, these seem preferable to an appropriation doctrine in the streamflow context. Indeed, Professor Carol M. Rose suggests that the key reason for different rules between East and West in the United States is that eastern water rights were concerned with use of the streamflow, and western water rights were concerned with appropriation of the water. Carol M. Rose, *Energy and Efficiency in the Realignment of Common-Law Water Rights*, 19 J. LEGAL STUD. 261–96 (1990).

There is no developed law of air rights to parallel that of water rights. Nonetheless, the problems of traceability argue even more strongly for a rule of reasonable use rather than one of absolute priority. Fields of wind turbines seem generally to be based on the developers' obtaining agreements with upwind landowners not to obstruct the wind. Recognizing air rights would reduce the ability of holdout landowners to block development or to extort disproportionate payments. Interestingly, developers of wind resources often do not obtain restrictions on downwind development. Unless a property law rule of appropriation is adopted, a prior, upwind developer is vulnerable to claims by subsequent downwind developers.

A rule of reasonable appropriation should also apply to interference with solar collectors. Because the rising and setting sun casts a long shadow, absolute priority for the solar developer would veto many developments. This would unjustifiably interfere with other property owners. This is especially true because light near dawn or dusk is weaker and likely to strike solar collectors at acute angles for the same reason that it casts a long shadow. Under such circumstances, the harm to other development outweighs the harm to the solar appropriator.

Aesthetic Values and Global Warming

A second concern in dealing with global warming is aesthetic values. Conventional power plants can be (and usually are) tucked out of sight. Coal, the source for most conventional power plants, is mined underground or far away from most people. In contrast, environmentally benign forms of power, designed to harvest natural flow where it exists, can

raise aesthetic issues. In the large-scale appropriation of natural resources, these concerns are especially important in the area of wind power. Modern wind-power turbines are hundreds of feet off the ground, have lights and large rotating blades that cast long shadows, and seem quite out of place in rural or arboreal landscapes.

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Aesthetic objections have also been the basis for many prohibitions of the small-scale appropriation of natural resources. For example, clotheslines are frequently prohibited by restrictive covenants or similar rules in homeowners' associations and apartment complexes. Although the stakes are small enough for any individual prohibited from hanging clothes on a clothesline that homeowners are unlikely to bring this issue to the attention of legal counsel, the collective effect of these prohibitions is enormous. Tens of millions of Americans, including myself, live in a desert development that prohibits drying clothes on a line. Using a dryer generates heat that, during much of the year, I remove with air conditioning. Both processes consume electricity, generating greenhouse gases (GHGs).

Although line drying cannot solve all our energy needs, it is an efficient way of solving a part of the problem. The time it takes to receive a return on investment in solar energy for households is probably five to seven years, even in the California desert. Investing in a clothesline is paid back in months. According to some research, the carbon emissions associated with residences could be reduced by 3.3 percent by line drying half the year. The proportion of environmental harm associated with dryers will grow as other energy conservation measures take effect because there are few efficiencies to be achieved in heating air.

Both clotheslines and turbines raise aesthetic issues, but the legal analysis in these cases would differ. The analysis of objections to wind turbines could depend on view rights or nuisance, but these claims are not strong, especially as applied to the argument that claims of unsightliness might be heard in a discretionary permitting process. Enforcement of objections to clotheslines is based on restrictive covenants or rules

governing the power of homeowners associations.

One could argue that changed circumstances justify eliminating restrictive covenants. There are, however, some doctrinal obstacles to this approach. Ordinarily, the changed circumstances would be changes in the area. Changed circumstances could not be used to address apartment communities, which very frequently have similar restrictions, and would be of limited use in addressing homeowners' associations' rules. Because doctrinal arguments will not be conclusive as to siting decisions for wind turbine power plants or clotheslines, it is worth thinking about what weight aesthetic objections should have.

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In the example of clotheslines, the source of aesthetic offense no doubt stems from people's associations with them. Many people associate clotheslines with tenements and poverty or with being too old-fashioned or rural for modern communities and therefore think them ugly. Ironically, the very efficiency of sun drying laundry makes people perceive it as undesirable. The apparent ugliness of clotheslines is a judgment that need not be accepted as permanent. People once mostly wanted a lot of things that they mostly do not want anymore, like segregation and tail fins on cars. If people in wealthy areas dried laundry on lines, it would no longer be stigmatized. Just as a Toyota Prius is perceived as a fashionable and environmentally friendly car, not as a poor person's small car, so too could line drying be rebranded as high status. If this change were achieved, the ability to prohibit clotheslines would no longer be desired.

Social attitudes to clotheslines have the characteristics of a "tipping point." These attitudes are apparently stable, but can be changed into an opposite attitude that is also stable. The attitudes towards drying laundry on lines are based on historical associations, not on innate characteristics of lines or some fundamental inconsistency. Because the social benefits from line-drying clothes are so great, courts faced with prohibitions on them could readily decide that they are unreasonable and unenforceable.

Wind turbines present a more complex set of environ-

mental and aesthetics issues. The residences on which clothes are being dried are obviously the product of drastic human reshaping of the land, so there is no question about intruding into nature; by contrast, wind turbines could be placed in a variety of environments. To start with extreme examples, it would be unacceptable and unlawful to place large wind turbines in natural parks or designated wilderness areas. On the other hand, relatively few people appear to object to wind turbines in the California desert on aesthetic grounds. (Some turbines do, however, raise serious issues in other respects, such their impact on raptor survival.) How should the cases in the middle be handled? In many respects, wind turbines are a bit like clotheslines. Although they do not have the negative associations, part of our dislike for them may simply be that they do not fit our expectations.

Our expectations, though, are not necessarily fixed or accurate. Wind turbines off Cape Cod are no more artificial than boats or ships and are less obtrusive than many boats. Even with respect to turbines located on land, the bucolic landscapes of open farms that we imagine as natural are actually quite artificial. Without constant grazing or farming, they would revert to forest. Limiting turbines may be appropriate as part of a general decision to limit development. For example, in some places, such as the Adirondack Park in New York, decisions have been made to limit development. Perhaps other areas should preserve farming as a living museum free of wind turbines. Banning wind farms more broadly on aesthetic grounds is unlikely to produce much benefit. Consistent with the idea that our expectations are changeable, people in areas where wind turbines had been controversial often find them acceptable. Thus, if an area is potentially open to development, perhaps any harm to someone else's vistas should be insufficient to stop a wind farm.

Anti-Environmental Behavior and the Limits of Property Law Remedies

Looking out over a downtown or apartment complex will reveal numerous examples where small changes would both save money and reduce GHG emissions. Dark roofs increase heat absorption. In most climates, this requires cooling that discharges hot air, in turn burdening neighboring landowners, and generating GHGs because most electricity in this country comes from burning coal. Incandescent lamps consume excess electricity and generate heat that must be removed, again by generating GHGs and pushing hot air at one's neighbors.

Nuisance law suggests that this conduct, because unreasonable, might violate a neighbor's rights. Nuisance law, like common-law theories generally, requires showing that unreasonable conduct harmed a plaintiff's use and enjoyment of her land. In this case, the effect on neighbors is small but material. A residential block that adopted light-colored roofs in place of the existing dark ones could be one degree Celsius cooler than unchanged neighborhoods. That might, depending on circumstances, save 5 to 10 percent on cooling costs. See Cool Roofs, Lawrence Berkeley National Laboratory, Environmental Energy

Technologies Division, Heat Island Group, <http://eedd.lbl.gov/HeatIsland/CoolRoofs/>. The cumulative cooling effect and energy savings across a region might be significant.

Although nuisance law provides a doctrinal way of addressing such interference, using nuisance law to enforce relatively small claims would be intolerably expensive. Should property law be changed to make these sorts of injuries easier to enforce through tort law? I suggest not. The enormous costs of litigation would make these rights difficult to enforce. Awarding attorney fees to successful plaintiffs would make the rights easier to enforce, but at the cost of a potential for strike suits or actions brought by spiteful neighbors.

However, the impacts on neighbors from activities that generate GHGs provide a basis for using property taxes to achieve similar results. The criticism of property taxes as a wealth tax is well developed and needs little elaboration here. When property wealth was an excellent approximation of overall wealth, a property tax functioned reasonably well as a wealth tax. Now that property is no longer a major component of wealth, that assumption is unrealistic. Although real property still has advantages for tax purposes—it is harder to conceal than financial assets, for example—the poor fit of real property ownership to ability to pay allows us to reinvent the property tax as a means to address other concerns.

A further disadvantage of the property tax as it is now constituted is that it provides a disincentive to engage in activities that fight global warming and increase property values. Consider the person who installs, probably with some government subsidies, a photovoltaic solar roof. By providing electricity and reduced heat absorption and lowering associated cooling costs, the roof affects a double saving in GHGs. Unfortunately, this benefit increases the value of the house, triggering an increase in the property tax. It is ironic that one arm of government is subsidizing this addition and another arm of government is taxing it. An easy fix to the property tax would be simply to exclude from the base of the property tax the value of changes that make property more energy efficient.

Reconceiving the property tax as a general tool for addressing global warming would be a more ambitious project, but not without precedent. Proposals for a “carbon tax” on GHG emissions replace an income tax with taxes based on harm to the environment. Modifying the property tax in this way would replace another incomplete tax on wealth with one providing appropriate incentives. Some property taxes are already based on the detriment that a property causes the community. In many places, property taxes include a charge for storm water management that is based on the permeability of the ground. Property owners with land that retains water—land essentially in its natural state—pay little tax. Those with large amounts of ground covered with asphalt or roofs or other impermeable material pay tax at a rate more than eight times that of owners of open land. The system is not meant to punish those who have impermeable land, but rather to make owners of such land pay for the developments that they necessitate.

Increasingly accurate recognition of the benefits of preserving natural systems provides us with a more accurate basis for assessing the harm associated with different land uses.

Taxing based on contribution to global warming would be a part of that. One could start out at a simple level, by having modest fees based on the albedo of a roof, reducing taxes for places preserved as green space, or by establishing sales taxes on incandescent lamps. Of course, at a conceptual level, there is no need to tie a tax system to nuisance law. However, the identification of inefficient activities as a nuisance is an important step in justifying regulation of those activities and avoiding inadvertent regulatory takings of private property.

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Property law as we recognize it today has been around for hundreds of years, and many of its principles may provide useful guidance. When we are challenged by new problems, such as the harnessing of environmentally friendly resources, old precedents may be relevant. In retrospect, though, it should not be surprising that decisions that wrestled with the prudent use of scarce resources should be relevant. In this context, common-law property principles may be useful in developing answers to non-common-law regulatory issues, such as licensing solar and wind turbines and the treatment of in-stream hydroelectric power.

In the harnessing of environmentally friendly resources, an approach based on the common-law of property has some advantages. First, being based on rules common to most states, it is more likely to lead the states to similar solutions than statutory or regulatory initiatives. Second, because the courts must apply common-law rules as cases arise, deferring a decision is not an option.

Of course, a common-law regime cannot satisfactorily resolve all problems, even if common-law property rules satisfactorily describe people’s rights and obligations. The litigation costs are simply too great. Although the task of devising alternatives may be daunting, there is so much inefficiency in how we now consume energy that almost any effort is bound to be a substantial improvement over current practice. This article is a preliminary effort at rethinking property law in the context of climate change and calling attention to some old but relevant precedents in order to provide ideas for courts, legislators, and administrators and a basis for further work. 🌳