*Journal of Sustainability Science and Management*
*Volume 16 Number 8, December 2021: 205-217*
*eISSN: 2672-7226*


# PERMISSIONLESS INNOVATION AND LAND-USE REGULATION: HOW ZONING CAN FRUSTRATE SUSTAINABILITY AN EXAMPLE FROM THE UNITED STATES

RYAN M. YONK[1]* AND JOSH T SMITH[2]

[1]*400d Barry Hall, 811 2nd Ave N Fargo Nd, 58108.* [2]*Old Main Hill, Logan, Utah 84323*

**Corresponding author: ryanyonk@ndsu.edu*
*Submitted final draft: 11 November 2020* *Accepted: 2 March 2021* http://doi.org/10.46754/jssm.2021.12.014

**Abstract:** Land-use regulations are created for a variety of purposes ranging from safety to protecting the historical significance or appearance of an area, and are primarily based on a precautionary approach. As is true of all regulations, land-use regulation also introduces costs and can stymie technological advancements that are not considered in the regulatory process. We explore how land-use regulations can discourage innovation in sustainability practices. We find that land-use regulations when applied proactively based on a precautionary principle can negatively impact innovation in sustainability practices. We suggest instead that a policy of permission-less innovation, with land-use management focused on mitigating negative externalities once those externalities are known instead of a reliance on a precautionary principle can yield both harm mitigation, and innovation.

Keywords: Zoning, permissionless innovation, sustainability, land-use.

## Introduction

Land-use regulation is a broad term for urban planning that attempts to foresee and prevent land-use conflicts among individuals. It exists in several forms, with zoning being the most common. Zoning regulates what land uses are allowed in particular areas and prohibits other uses in those same areas. In the United States, land-use regulations and zoning exist at almost every level of government. An emerging use for land-use regulations is aimed at advancing sustainability goals, however, in some cases land-use regulations have made innovation more difficult.

We begin with a necessary assertion given our conclusion and call for a change in policy approach. We are not opposed to all land-use regulation and zoning. We view land-use regulation and zoning as having the potential to create positive outcomes for communities and individuals, although that result is not guaranteed. Good regulation fosters growth and improvement by providing institutions for individuals and corporations to work within while providing avenues for redress when harms are done. Unfortunately, because of the dynamic nature of the world and the static nature of regulation and the planning associated with it, land-use regulations can sometimes frustrate the implementation and use of new clean energy sources and less resource-intensive living.

Unlike areas of regulation where regulatory requirements change more often, and cost-benefit analyses are more common, land-use regulations have the potential to continue in force even when they no longer serve their intended purpose. They can persist even when unintended consequences become apparent. We view one possible answer to this problem in the permissionless innovation literature that argues, contra the precautionary principle, that experimentation should be allowed by default. Problems should not be dealt with via precautionary bans, limits, or plans but rather as they arise. Current land-use regulation is most often explicitly based on a precautionary approach that attempts to forecast what problems could arise. This approach too often fails to anticipate innovations including those in sustainability that emerge, and due to the static nature of the regulatory land-use approach can present serious impediments to the adoption of those innovations, as an unintended consequence.

We explore the theory behind both the precautionary principle and permissionless innovation and suggest that permissionless innovation might be a better policy approach to land-use regulation and may approach sustainability goals more effectively. We share two examples centered on tiny homes and distributed renewable energy systems to show how land-use regulations (often paired with NIMBYism (not-in-my-backyard)) can become an impediment to sustainability innovations.

This is not to say that all concerns raised by local residents are without merit, and there have been a number of examinations of how substantive local concerns have at times been rejected as simple NIMBYism. Further some authors have argued that those most invested in a particular action are likely to "cry Nimby" whenever objections are raised to their desired outcome (Wolinski 1994, Van der Host, 2007). We readily acknowledge that these problems are real and point to mitigation mechanisms that address these harms as they occur rather than preventing action due to fear that those actions might create harms. Thus, our view of NIMBY type arguments is that rather than being used to proscribe action they should be addressed as harms occur or become apparent.

We find that land-use regulation and planning have the potential to stymie the development of new means of moving society towards sustainability, especially when coupled with the NIMBY orientation, rather than negative externality mitigation. Ultimately, we propose that sustainability measures would benefit from land-use management based on the principles of permissionless innovation rather than the precautionary principle that is currently the most common guide for policymakers. Permissionless innovation and related literature presents another means of resolving the reality of negative externalities with foreclosing of the development of new approaches and technologies that have the potential to provide environmental gains.

## Literature Review

### *Land-use Literature Review: History and Purpose of Zoning and Land-Use Regulation*

Land-use regulation is a broad term for urban planning that attempts to foresee and prevent land-use conflicts among individuals. It exists in several forms, but zoning is the most common type. The federal government issues recommendations and manages federal lands, but states, counties, and cities often all promulgate their own zoning codes. Non-governmental parties even exercise private governance in their own right through homeowners' associations (HOA) which employ land-use regulations or similar rules about how buildings within the association must be built (Sullivan, 2011).

To some degree land-use and zoning requirements are the same throughout the United States. Despite the fractured nature of how zoning is created and enforced, there are many broad similarities between zoning and land-use regulations. They share a similar approach based on the ex-ante prevention of harm. This is largely because of two acts, referred to as the Standard Acts, which were drafted by the federal government and many states chose to adopt them with minor revisions. The first Standards Act was issued by the U.S. Department of Commerce in 1924, substantially revised in 1926, and called "A Standard Zoning Enabling Act" (SZEA). (USDC 1926) Most states followed SZEA closely rather than invent their own rules from whole cloth (Sullivan, 2011). In 1928, "A Standard City Planning Enabling Act" (SCPEA), which detailed the planning process for cities. (American Planning Association, 2016) Further similarities exist in newer codes with a wide coalition of advocacy, trade, and other groups creating model ordinances that states and other land-use authorities consult when writing their own codes. In 2003, for example, the American Planning Association produced model codes aimed at promoting the U.S. Environmental Protection Agency's (EPA) Smart Growth Principles (American Planning Association, 2016).

The similarities should not be over emphasized. A paper published by the National Renewable Energy Laboratory (NREL) estimated there could be as many as 25,000 local zoning jurisdictions in the United States (Green & Sagrilo, 2008). Because of the overarching similarities, these jurisdictions do not necessarily represent 25,000 unique zoning codes setting 25,000 standards to be met, but it does mean that land-use rules in one jurisdiction will differ from one another, and investigation is necessary to ensure compliance with the differences in land-use regulations is necessary as one moves between jurisdictions.

The costs of these differences have been well documented both by Industry groups and as well as government researchers. Both have expressed worry that complying with each jurisdiction's land-use requirements may be prohibitively expensive and may represent a significant impediment to the development of what are often viewed and environmentally friendly innovations. For example, a report published by NREL and prepared by the American Wind Energy Association (AWEA) refers to a 2001 study which found the cost of pursuing the necessary ordinances for distributed wind energy generation in the 534 zoning jurisdictions of California could cost $20 million and require as many as 200 person-years of effort. The Researchers for NREL conclude their discussion of these costs saying, "[These costs are] not a realistic cost for the wind industry to bear for the entire nation, much less for just one state" (AWEA, 2002).

### *Understanding Zoning*

Zoning and land-use regulations exist for a variety of purposes, ranging from safety to protecting the historical significance or appearance of an area. Zoning most often arises as a response to actual or potential conflicting uses of private property by individuals. One of the most common examples that illustrates the purpose is of zoning is that of a factory desiring to build in a residential area, and zoning and other land-use regulations are necessary to prevent the potential harms' residents could experience from pollution or such annoyances as the noises of operation. By sectioning areas for particular uses, the goal is to prevent the emergence of conflicts between citizens and businesses (Juergensmeyer & Roberts, 2003).

The complexity and content of zoning restrictions often varies with the needs of the area. For example, because of its dense population, New York City developed zoning regulations for air rights, which govern the ability to build above a piece of ground, based on common law ideas that property rights extend "up to Heaven and down to Hell". Air rights are also often used to restrict or regulate the height of new buildings to preserve historic views and notable buildings. Because of the obvious value of air rights, there is an active market for air rights in large cities. Developers can sometimes purchase air rights from the owners of historic buildings in order to be able to build more stories than they would otherwise be allotted by the zoning restrictions (Marcus, 1984).

Other land-use restrictions are made for environmental purposes. For example, zoning and the land-use regulations associated with it, are often used to encourage sustainable developments and to decrease the environmental impact of developments. Cities will sometimes require government buildings be certified as environmentally friendly. Many federal government buildings are required to comply with Leadership in Energy and Environmental Design (LEED) and the U.S. General Services Administration (GSA) issues occasional guidance documents on compliance with LEED as it pertains to federal requirements from executive orders and other directives (U.S. General Services Administration).

Our short recitation of the purposes of zoning and land-use regulation is clearly not exhaustive, but rather is illustrative of the types of outcomes zoning desires. There is a wide literature that explores the success that zoning has had in achieving sustainability goals (Jepson & Haines, 2014). Too often, however, the question of what might the indirect or

unintended consequences of regulatory action have been ignored and unconsidered.

A central criticism of regulation in general, and one that is particularly important for land-use regulations is that the world is a dynamic place and in their very nature regulations are static. Most often regulation and especially land-use regulation dictates the methods or the technology that must be used rather than the desired outcome. As a result, the development of new and better systems for dealing with the problems that regulation was meant to solve, are delayed (Wiener, 2004).

Despite the relative dearth of examinations of the negative effects of zoning, there has been some criticism focused on the unintended consequences that can occur. A particularly interesting area of research examines zoning's regressive effects and the burdens it places on the poor (York *et al.,* 2014). For example, compliance costs for zoning drive up the costs of housing simply as a part of doing business. But other components of zoning rules like minimum lot sizes and parking requirements also increase the costs by necessarily requiring larger homes or parking lots regardless of other competing desires.

Sanford Ikeda and Emily Hamilton surveyed this literature in a 2015 paper on land-use regulations and affordable housing. They conclude simply that "... density restrictions, parking requirements, and smart growth regulations all tend to increase the cost of housing by restricting the supply of new housing and by raising construction costs." The argument is a straightforward application of economic supply and demand to housing (Ikeda & Hamilton, 2015).

Edward L. Glaeser, Joseph Gyourko, and Raven Saks (2005), explore how housing prices in Manhattan, and other areas, have risen despite a plethora of reasons to think that housing is a highly competitive industry. They find that because land-use and other regulations make the development of housing more difficult, those restrictions limit the supply and maintain the high prices for housing. Housing prices, according to their estimates, are twice what it would cost to build more housing (Glaeser *et al.,* 2005).

Other research on the origins of zoning and land-use regulations argues that, even well-intentioned, land-use controls can end up serving political ends. There are two general elements to this critique of land-use regulation. The first argues that restrictions serve as useful policy levers that interest groups opposed to a particular development or building project can employ to prevent or slow its development. The intersection of land-use regulation and NIMBYism is often cited in critiques of these regulations. In fact, the literature documents how once a group exists within a certain scheme of land-use regulations, it is often in their rational interest to maintain those as a means of ensuring their homes or other properties are not impacted by land-use changes, and they have a clear incentive to employ a preventative approach given their preference for the status quo (Fischel, 2001). Further there is evidence that already developed areas benefit from regulation because of rising housing prices but harm undeveloped areas who pay higher development prices (Hiber & Robert-Nicoud, 2013).

The second vein in this critique points to the fundamental nature of politics and argues, "even if there were no social rationale for land-use control, politicians would find it in their interest to invent controls" (Denzau & Weingast, 1982). Regulations essentially create a market for rents and allow politicians to dispense those rents in return for support and ultimately to ensure their reelection. Research in this vein points out that though regulators follow the law there are often avenues for influence from political groups and players. Land-use regulation is best understood more richly as not merely a question of legal issues, but as "a political act that requires a nuanced understanding of the institutions and the players" (Yonk & Simmons, 2014).

While we view both of these critiques as valid, and potentially important reasons to be skeptical of the efficacy of zoning and land-use regulation generally, we are more interested

how static regulation impacts innovation and the unseen costs of what is unintentionally foreclosed by adopting the precautionary approach, rent distribution, and the general desire to prevent rather than mitigate negative externalities.

### *Permissionless Innovation and the Precautionary Principle*

Permissionless innovation stems from a developing strand of research heavily focused on technology policy and explaining the rapid evolution and changes in technology. Adam Thierer's book on the subject includes a subtitle emphasizing technology and the definition of permissionless innovation focuses on technology,

> ...the notion that experimentation with new technologies and business models should generally be permitted by default. Unless a compelling case can be made that a new invention will bring serious harm to society, innovation should be allowed to continue unabated and problems, if any develop, can be addressed later (Thierer, 2016).

Scholars of permissionless innovation argue that the freedom to experiment and the lack of controls in technology policy is a powerful explanation for its growth. The Framework for Global Electronic Commerce released during President Clinton's administration, for example, explicitly lays out ideals of self-regulation and self-direction as its goal for Internet commerce (White House, 1997). Discussing the Framework's role in the digital economy, Thierer concludes by calling it "proof positive that policy attitudes toward change and progress matter deeply and can have a profound influence on an economy's innovative potential" (Thierer, 2016).

Discussions of permissionless innovation must be contrasted with the precautionary principle, which developed in its earliest form in Germany's environmental policy (Jordan & O'Riordan, 2004). There is a vibrant scholarly debate over the particulars of the definition of the principle, but it is generally considered to mean policymakers should act before there is scientific certainty to protect individuals and particularly so in environmental areas (Jordan & O'Riordan, 2004). The precautionary principle is commonly referred to in debates about genetically modified organisms (GMOs) (Lynch & Vogel, 2001), chemical regulation (Gomez *et al.,* 2020) and other regulatory areas where harm is possible. This debate is fostered at least in part because this is an area where the United States and Europe have taken different regulatory approaches.

The fundamental distinction is where the burden of proof lies in justifying regulatory action, and when that action should occur. Under the precautionary principle the default position is that innovators must prove they will not harm others while permissionless innovation holds that the innovators' ability to implement her new ideas should be maintained by default until others show they will be hurt by the changes (Thierer, 2016). It is in this core difference that we ultimately find the origin of our suggestion for a revised policy approach.

## Methods

We first begin by developing and expanding the theory of permissionless innovation to land-use regulations and then consider some relevant and important objections to our theory. Finally, we use two examples focused on tiny homes and distributed renewable energy deployment to illustrate the difference in approach. These examples serve not as a traditional hypothesis test of the impact but rather as a place to begin a consideration of the possible impacts of land-use regulation on innovations in sustainability. We seek to make no claims about the relative value to overall sustainability that would come from widespread use of the innovations we use as examples. Indeed, understanding their value in the longer term would be a valuable and important scholarly undertaking, albeit one that is largely not possible given the current policy environment.

Similar questions about how regulation affects the implementation of technologies and innovations have been investigated using similar methodologies, when actual projects are attempted. For example, Hansen, Simmons, and Yonk (2016) detail the "regulatory noose," their term for how regulation deters development and implementation of new technology, by exploring how micro-hydro projects have been affected by regulation, and the resulting costs (Hansen, Simmons & Yonk, 2016).

## Theory

### *Early Echoes of Permissionless Innovation*

In many ways, the theory at the root of our exploration is an extension and combination of two often cited scholars of land-use regulation, Jane Jacobs and Richard F. Babcock. Both authors focused on different areas of land-use restrictions and zoning, but they share important similarities. Babcock's work emphasized both the value and importance of planning and land-use regulation, but it also focused explicitly on how the decisions were actually made, who was making the decisions, and what pressures and interest groups play a part in planning process and how the resulting rules were impacted by the groups involved (Babcock, 1966).

Babcock's writings and research discuss the players in the game of zoning (Babcock, 1966). He documents numerous cases of zoning and in many ways, how the rules of the game, namely land-use regulations, determine outcomes. With Charles L. Siemon, Babcock examining how groups leverage those rules and work within them to both represent and advance their interests (Babcock, 1966).

From Babcock and the economic school of public choice theory, we take a critical look at more than simply the well-established potential value of land-use regulation and, the rich interplay of the incentive's individual regulators face and how those incentives may impact the final decision.

Jane Jacobs criticized fundamental tenets of planning and the land-use regulation it required, and her career is notable in part for her continual opposition to those entrenched in the discipline (Ikeda, 2016). She saw cities as vibrant and fluctuating a result of the interactions of everyone in the city. Jacobs argued that,

> There is no logic that can be superimposed on the city; people make it, and it is to them, not buildings, that we must fit our plans… The remarkable intricacy and liveliness of downtown can never be created by the abstract logic of a few men (Jacobs, 1958).

Jacobs's theory of the growth and changes of cities is often compared to ideas of spontaneous orders in economics. She believed cities and communities were not something that could be created and planned, but rather that communities emerge when local interests are best represented.

It was not, for Jacobs, that planning or the land-use regulation it required was inherently bad, but the lack of local input meant that the end goal of better outcomes was often unachieved. She emphasized the importance of local control over more isolated regulation by distant bureaucrats. The people who live in the city, since they created the city, according to Jacobs, should drive efforts to change it in an evolutionary and individualized way (Jacobs, 1961).

Our read of Jacobs suggests that attempts to plan and regulate the development and growth of a city would stifle those who lived in it from being able to develop organically, their own solutions to problems they encountered. Her examples illustrate how cities receive their life and character from the individuals that live in them, and that cities were not empty vessels that planners and regulators could simply place people in and have a successful city. Instead, cities must develop according to the particular needs of the people living in it not by outright direction and forethought by experts, but rather through an undirected, organic evolution. Profoundly, she

saw that solutions are often best found through organic processes rather than those of design by a distant regulator (Jacobs 1958). Jacob's city was not a city devoid of regulation but was one where the local knowledge and need drove the individual adoption of regulatory rules.

### *The Land-Use Manager's Problem*

Permissionless innovation as applied to land-use means operating by principle instead of regulation. The key insight from the permissionless innovation literature so far has been in elucidating how regulations are static controls in a dynamic world.

Much can be gained from trusting long-established common law principles and the creative nature of individuals to find solutions. Those familiar with the amount of planning and debate that goes into establishing land-use restrictions are likely to think it is foolish to go without those efforts. There are, however, many cases of prosperity without planning. It is difficult to overestimate the value of proper institutions for individuals to operate within in these situations, and the application of regulation as a way to mitigate real rather than supposed harms.

Consider the process by which most land-use regulation is created. When a problem is identified by constituents of a land-use commission or legislature, one of the first responses is to pass a law to address the issue as a way to help and protect those constituents. The implications do not, however, stop there. That law may be inadequate for handling the problem or even create a different and potentially worse difficulty. The grand sum of this process is not obvious, but as McClaughlin and Williams note, bureaucracies and regulatory agencies each build on the past work of those who came before while rarely clearing old rules and regulations (2014). This means regulations are made in response to a certain time and situation but must go on to be enforced in unforeseen and fundamentally unknowable circumstances and to new groups of people.

Much like technologies are sometimes locked-in because of increasing returns to using the same technology, regulations are similarly locked-in. Arthur detailed the pattern of technological lock-in, which has since been applied to regulation by some scholars (Arthur, 1989). Once people know how to use a piece of technology, Arthur argues, there will be greater gains from using that technology. We believe the same general rationale holds for regulations. Certain land-use restrictions and zoning ordinances may create entrenched interests that are willing to work to maintain the benefits they receive from the current system (Olson, 1971).

Not only are regulations often locked-in by this process, but those who directly engage with the land-use regulations often lobby to maintain the rules as they currently exist. The economic theory of regulation, as advanced by Stigler (1971) and formalized by Peltzman (1976), explain regulation by pointing to how industries will attempt to capture regulation as a way to guarantee economic rents. Paired with Olson's (1971) insights on the logic of collective action, wherein informed minorities often concentrate benefits of policies in their own hands while dispersing their costs amongst everyone, there are powerful reasons to believe that regulation is not as altruistic as our original hypothetical assumes. Instead, regulation may best be thought of as demanded by special interests and supplied by regulators and politicians.

Regulators thus face a two-fold problem. First, they write regulations that are static and yet serve a dynamic world. Second, they must discern between self-serving special interests and real community needs.

### *Stasis in a Dynamic World: Permissionless Innovation and Land-Use Decisions*

Traditional land-use regulation does not appear to have a completely satisfactory solution to the first problem. The most straightforward means of addressing it is to write general regulations that assume situations will change. Another option would be to regularly clear out the regulations and trim outdated materials. Ideally

these solutions could maintain the dynamism necessary to keep up with the evolving world.

There may be natural defenses for the second problem in land-use regulation. As noted, there are an estimated 25,000 jurisdictions with zoning authority which indicates that they are likely to be close to those they regulate and affect. It may be that land-use regulations are not unduly pushed or impacted by special interests because of how close the people are to planning commissions.

Unfortunately, the history and empirical work on land-use regulations show these solutions are likely inadequate. In regard to the second problem, Glaeser *et al.* (2005) demonstrates land-use regulations artificially boosting housing prices. Density restrictions, parking requirements, and other land-use regulations make it difficult to build new housing and therefore raise prices (Ikeda & Hamilton, 2015). Economic theory also clearly predicts that existing groups will attempt to protect their interests by preventing new developments (Fischel, 2001).

Even more fundamental is the problem of politics inherent in these questions. Denzau *et al*. (1982) clarifies the economic logic of the political, even if there were no social rationale for land-use restrictions, politicians are likely to find convenient ways to justify controls, so they can sell economic rents (Fischel, 2001). Babcock's insights on the way planning happens and the means players use to exert influence and guarantee their interests also cast doubt on the adequacy of these solutions (Babcock, 1985).

Applying permissionless innovation to land-use restrictions offers a potential new answer to the land-use regulator's problem. Instead of attempting to foresee every potentiality, regulator's would establish general rules akin to common law. Rather than regulating by code and standard, land-use can be managed by principles and tests as they are throughout common law. In fact, many common law standards are applicable to the risks that permissionless innovation may entail and present another and more dynamic solution than current methods provide.

Organic solutions to problems will develop and may serve the needs of the community better than city planners are able to, as past experience indicates. There are cities with little to no zoning, like Houston, Texas. These cities function and Houston is one of the largest cities in the United States (Zhu, 2010). There are many private agreements and some legal codes, but Houston only recently began developing general city land-use regulations through a city plan, and their experiment remains ongoing (Jacobs, 2014).

### *Examples from Sustainability Innovators*

#### *Tiny Homes*

Encouraged by cultural currents pushing for minimalism and sustainable living, tiny homes have emerged as a potential innovation to meet these demands. Tiny homes generally range from 100 square-feet to 300 square-feet but depending on the design include most of the features of a normal house. They use space saving furniture, design, and efficient appliances to fit into the small homes. Many homes are built by their occupants from recovered or recycled materials and even when they are not, standard prices range from $10,000 to $35,000.00 (American Tiny House Association https://americantinyhouseassociation.org)

Advocates argue they are a more climate-friendly way of living because they require fewer resources. Further research is certainly merited by these claims as it is not necessarily true that smaller homes equate to environmental benefits. Despite this uncertainty, tiny homes are an interesting attempt at a solution to climate change, and one that without the opportunity for deployment in real world settings are likely to remain just that, a possible solution.

One of the primary problems that Tiny House advocates face is the unprepared nature of most zoning jurisdictions, indeed in many cases zoning regulations have not considered Tiny Houses or have outright banned them by implementing square footage requirements in a desire to encourage conformity. Spur, Texas

is unique in that the city council is taking an active role in attempting to make the area "tiny house friendly." But their attempt has required substantial changes to their zoning and land-use regulations (Krasselt, 2014). Other areas are simply ill-equipped to deal with tiny homes, and acknowledge that their municipal codes will need revision to allow Tiny Homes in their jurisdiction (Harris, 2016).

Current explorations of Tiny Homes have focused on the central problem that their advocates say they face, their legality and place within zoning codes. These advocates, and much of the literature argue that standards for height, setback, lot size, and even minimum floor space, represent serious impediments to their continued development and deployment (Vail, 2016). Despite this plethora of zoning and land-use code regulations that act as impediments, the advocates of Tiny Houses generally point to minimum square footage requirements as being the regulatory requirement that most restricts their use (Mitchell, 2012). These issues illustrate how precautionary regulation locks in current rules, and unintentionally precludes potential innovations from entering the marketplace.

### *Distributed Renewable Energy Generation*

Just as with the tiny house movements, pushes for more renewable energy generation are buoyed by climate science and concerns about the use of fossil fuels. Zoning and land-use regulations are also often related to environmental goals of reducing energy consumption and being more environmentally conscious. Zoning has, however, often frustrated environmental goals.

Small-scale or distributed renewable energy generation is often used to supplement energy consumption at home or for a business (Salkin, 2012). Scholars in this area identify outdated statues and municipal codes, deeds, and even restrictive housing association agreements as the source of many of these problems (Salkin, 2012).

Often these static land-use regulations that limit what activities can occur are based on the potential rather than actual problems that merge. One person in a neighborhood may be interested in equipping her home with a wind turbine in order to power her home with clean energy. Other people in the same neighborhood may worry about the noise the turbine could generate (Upton, 2010). Their worry about the potential impact then trumps the attempt at sustainability without compelling evidence that the harm has or will actually occur.

One especially egregious example is detailed by the Distributed Wind Energy Association (DWEA). Tower heights for wind power is limited to around 35 feet by most zoning ordinances. When these ordinances were implemented the rule made sense because of limitations in firefighting technology (DWEA, 2016). Today, however, the rule persists even if the reason does not and this rule has been used by neighbors concerned about potential impacts to forestall installation of effective wind towers.

We do not doubt that in some cases there will be nuisances created by these innovations, and we are sympathetic with those that would bear the costs of those nuisances, and would vehemently argue that those nuisances should be allowed as torts under the common law, a reality that is currently forestalled if projects meet zoning regulations and yet still cause harms.

## Discussion

### *Criticisms of Permissionless Innovation*

Several relevant and important objections to our sketch of applying permissionless innovation to land-use restrictions and planning are clear. Our proposal creates ambiguity, is more reactive than proactive, and could still be susceptible to special interest influence.

Ambiguity is the flipside of innovation. Allowing experimentation appears to open several avenues for people to be harmed. This fear is important, but it misunderstands permissionless innovation and takes a shortsighted view of innovators. Our first response is that this objection elides that people are currently being harmed by the land-use restrictions. If changes to the zoning

ordinances could relieve some of that, then those opportunities must be considered as well. There is no reason to privilege those not being harmed currently over those who are already being harmed.

Another response to worries about ambiguity is that permissionless innovation's wait-and-see approach is not merely reactive. Common law principles, like nuisance law, already provide robust protections that people know in advance. Innovators will know the risks and anyone who suffers harms can seek redress through Coasian negotiation or by resorting to the court system. Responsibility and legal culpability have the potential to both prevent and mitigate harm, which are the goals of the current system. The ambiguity is also valuable because it incentivizes companies to continually be evaluating the means they use to improve the environment instead of just checking a box or jumping through hoops they are legally required to complete in order to comply with regulatory statutes.

Critics of implementing the principles of permissionless innovation in zoning and land-use regulation may argue that this is merely shifting a romanticized view of regulators to a romantic view of local politics and community groups (Buchanan, 1999). We are sympathetic to this concern, however, Jacobs's ideas on community-based movements may hold the basis to solving the problem of special interest influence. It is also possible for an interest group to fund a movement to achieve its ends even locally. Politics often makes strange bedfellows, as the regulatory theory of Baptists and bootleggers clearly illustrates, and there is no reason for local politics to be exempt (Yandle, 1983). Concerns about special interests shaping rules and regulations is a serious criticism that deserves further research. There are reasons to think that interest group influence will be better mitigated under permissionless innovation than it is in the current system, however. First, community movements will be numerous, and it would likely be prohibitively expensive for any interest group to try to influence every such movement. Second, any regulation interest groups do manage to push through will be subject to change and revision in a way that is currently not an option for reformers.

## Conclusion

The general consensus in land-use management is a desire to manage how property is used in order to prevent harm to others. This goal is laudable, but the current precautionary approach has tended to emphasize precaution and regulation over innovation and harm mitigation. As a result, regulations that freeze certain practices in place have made it more difficult to innovate in sustainability practices, and often outright prevented them.

This reality can be illustrated by viewing the current regulatory system through a lens where the status quo of no action rules. Land-use regulation particularly in the form of zoning locks the status quo in place. This regulation has tended to add more specific regulations that address particular situations that disrupt the status quo rather than to establish principles by which to identify harm, prevent it, and when it does occur allow for those harmed to be compensated.

While this strategy of harm prevention is appealing, it prevents actions that disrupt the status quo merely on the basis that some harm is possible. As a result, an unintended consequence is the foreclosure of innovation. We highlight how this foreclosure negatively impacts sustainability innovations and how land-use regulators have unintendedly prevented as a result of this attempt to prevent harm.

Our analysis of the developed theory of permissionless innovation and the literature that surrounds it suggests that applying this approach to land-use management decisions has the potential to provide both for harm mitigation or compensation, and innovation and experimentation that drives the development of new sustainability practices.

Fundamentally, permissionless innovation has the potential to foster innovation in a way

that current systems do not. It is impossible to know what will work unless it is tested, and current land-use regulations restrict the ability to experiment. Permissionless innovation may constitute an institutional innovation worthy of consideration and further investigation**.**

**Acknowledgements**

The authors extend their gratitude to reviewers for critical comments on the manuscript and the university for the research opportunity.

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