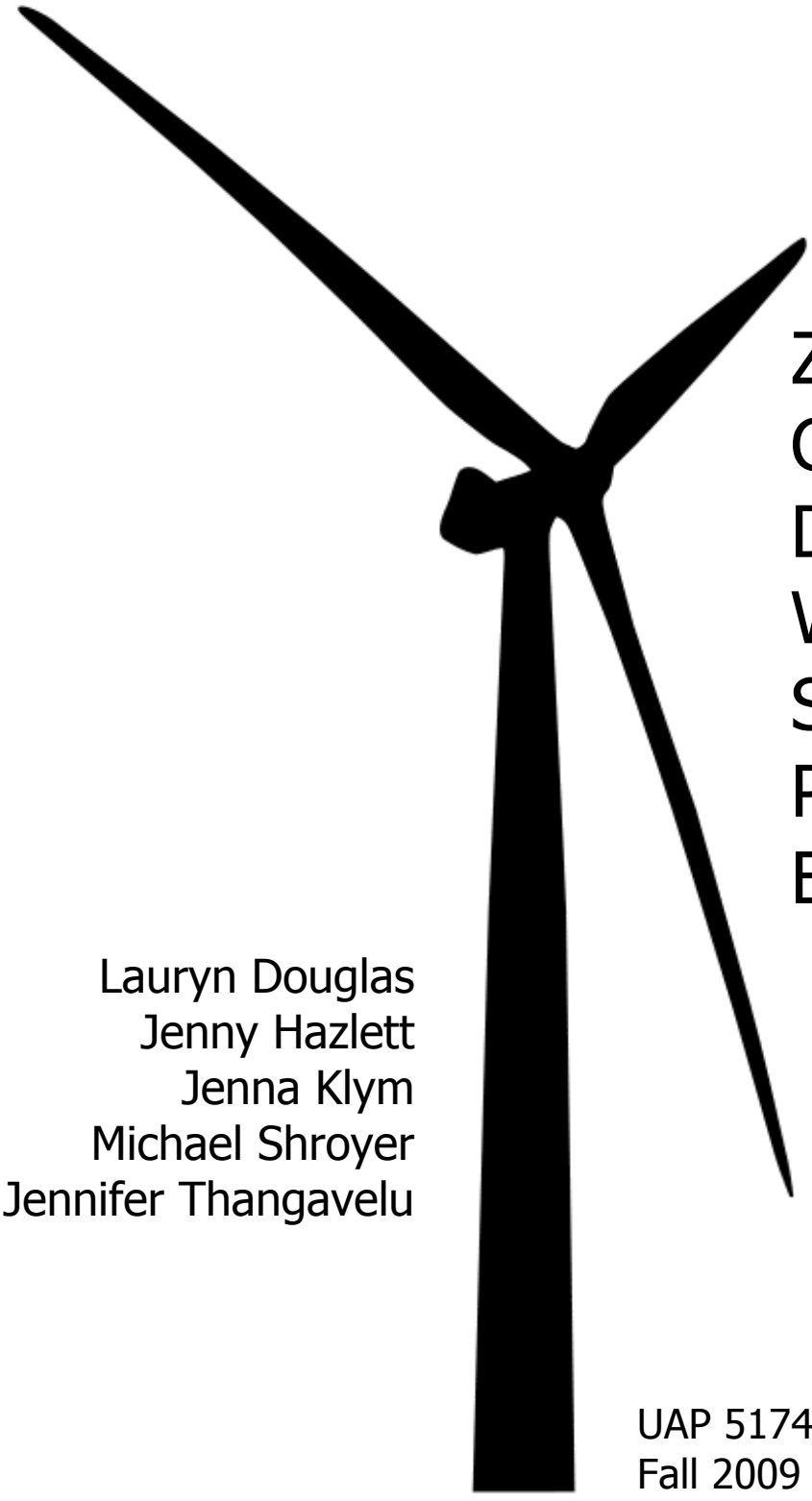

ZONING CHANGES FOR DISTRIBUTED WIND AND SOLAR ENERGY PRODUCTION IN BLACKSBURG

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Introduction

The goal of this report is to evaluate what specific changes could be made to the Blacksburg zoning ordinance to support distributed wind and solar energy production. Zoning is a powerful tool that local governments use to control the built environment and implement the comprehensive plan. Zoning ordinances regulate the permitted uses of land, lot sizes, density, building heights, parking, and many other requirements. By removing existing impediments in the zoning code that prevents citizens from implementing small-scale wind and solar, a town can significantly reduce its greenhouse gas emissions.

The report is broken down into four major parts. First, a brief review what other local governments in Virginia and the U.S. have done to implement wind and solar power. Then, an evaluation of the regional suitability of both wind and solar power to help shift Blacksburg away from its dependence on coal to renewable energy. Next, we review the town's major energy sources, greenhouse gas emissions, and political will to shift to renewable energy. Finally, an examination of how zoning can help Blacksburg encourage distributed wind and solar energy.

What Are Other Local Governments Doing?

In April 2008, Rock Port, Missouri reached new heights and became the first city in the United States to be 100% powered by wind. The Loess Wind Farm project was built entirely on agriculture land within the Atchinson county, and all of the electricity is created through four, Suzlon S-64,1.25 MegaWatt (MW) wind turbines. These four turbines generate a total of 16 gigawatt hours (16 million kilowatt hours) of electricity annually. Rock Port has historically consumed only 13 gigawatt hours annually by residents and businesses for its town of 1,400 people (Wind Capitol Group, 2009).

Extra electricity when available is purchased by the local power company, the Missouri

Public Utility Alliance, and will use it to supply power when wind is not available. The excess power generated is not stored, but rather fed into the high voltage transmission lines, which feed power to the city intermittently (Lozanova, 2008). Rock Port is also a member of the Missouri Joint Municipal Electric Utility Commission, a state created agency that is authorized to act as an electricity wholesaler to supply power for 56 municipal utilities throughout Missouri, and the extra power can be sold here as well.

Loess Hills was able to benefit financially during construction because it was built at the same time and shared a contractor with the nearby Cow Branch Wind Farm. Rock Port utility customers also benefited from a reduction in electrical transmission charges previously paid to bring power to the city (Wind Capitol Group, 2009).

Unique to rural areas, experts predict these farms will bring in more $1.1 million annually in county real estate taxes, paid by the Wind Capitol Group. The landowners themselves can also benefit, making between $3,000 and $5,000 dollars for leasing the land used for the turbines (ScienceDaily, 2009).

Another mid-western state, Texas, has led the US in wind capacity since 2006. In October, 2009, E.ON Climate and Renewables completed the world's largest wind farm, just outside of Roscoe, Texas. Its turbines boast a capacity of 781.5 megawatts (MW), surpassing the 735.5 MW Horse Hollow wind farm. Roscoe farm took over $1 billion in investment, and required a great deal of cooperation between local landowners (O'Grady, 2009).

Wind farms have been helping to revive the economy in sparse areas of Texas, and current plans are in place to double the states wind capacity in the next few years. The Roscoe farm spans four Texas counties and covers nearly 100,000 acres. Its 627 turbines are manufactured by Mitsubishi, GE and Siemens. E.ON's next major project is the world's largest off shore farm, located off the coast of England (O'Grady, 2009).

Rockingham County, VA has incorporated small wind energy systems into their zoning ordinance (Article VII, Division 6B, Section 17-146). Their zoning ordinance has defined a small wind energy system as: "a wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics that has a maximum power of at most 50kW, which will be used primarily to reduce on-site consumption of utility power" (Rockinham, 2004). The requirements set forth in the zoning ordinance govern the siting of small wind energy systems in accordance with Virginia Code. The ordinance also covers some basic design principles for small wind energy systems, such as: "Small wind energy towers shall maintain a galvanized steel finish…"; "Small wind energy systems shall not be artificially lighted unless required by the Federal Aviation Administration (FAA) or appropriate authority"; and "No tower should have any sign, writing, or picture that may be construed as advertising" (Rockingham, 2004). The ordinance also goes on to require a minimum lot size of 1 acre for small wind energy systems, as well as height restrictions and setback requirements for wind turbines. Permits for small wind energy systems are available through the special use permitting process outlined in Rockingham County's zoning ordinance.

Cape Charles, VA is another locality that is looking into the feasibility of small scale wind power. They do not currently address wind power in their zoning ordinance, but according to the minutes of a planning commission meeting in May of 2009, a sample zoning ordinance is being worked on. Several years ago Cape Charles approved a proposal from ProVento to build wind turbines in the STIP park, but the project never came to fruition. Cape Charles is currently discussing the possibility of constructing one large wind turbine to power the Water and Wastewater Treatment Plants and the streetlights in Town.

Is Wind Power Feasible in Blacksburg?

At 30m the southwestern part of the state is the only region that can benefit from wind energy. As turbines become taller and taller more problems arise in terms of towns and residents not wanting what they deem to be unsightly turbines in "their back yard." Because Southwest Virginia can utilize the shorter 30m turbines, this part of the state would be on the forefront of implementing wind power in Virginia and would serve as an example for the rest of the state. Wind power is beneficial for a number of reasons. The U.S. Department of Energy recently issued *Small Wind Electric Systems: A Virginia Consumer's Guide*. The publication relays the pros and cons of small scale wind energy use. Though it promotes the use of wind energy, it suggests that a hybrid system of wind combined with solar power is best for areas with wind speeds of at least nine miles per hour (4.0 m/s) (Small Wind, 19). Hybrid systems are very useful for remote areas where the cost of running power lines to remote areas could be very costly. Because much of the area surrounding Blacksburg is undeveloped, this may be an excellent alternative to connecting to the utility grid which could cost anywhere from $15,000 to $50,000 (Small Wind, 20). Wind is strongest in the winter and sun is strongest in the summer, therefore the two systems partnered together would create the most cost effective energy source. The Virginia Consumer's Guide suggests wind use if the location is fitted in the following ways: the property has a good wind source, the property sits on at least one acre of land, the zoning code allows wind turbines, the property owners electric bill is at least $150 per month, the property does not have easy access to utility lines, and the property owner is "comfortable with long term investments" (Small Wind, 3). Most people in the outlying Blacksburg area would fit into these categories with two exceptions. First, many people may not be comfortable with the high costs of implementing a wind energy system. Secondly, the Blacksburg zoning code does not address the permission of wind turbines. Although the

Virginia Association of Zoning Officials website states that legislation has been updated to address the penalties of installing renewable energy systems, it is up to the locality to address specific plans for allowing or not allowing the systems to be installed ("Legislative News" 8-9). The data from the guide states that most zoning codes limit wind turbine heights to 35 feet (Small Wind, 3). In addition to the height restrictions limiting the turbines from reaching extreme heights, wind turbines do not produce a significant amount of noise. The noise generated from a wind turbine may reach 52 to 55 decibels which is about as loud as an electric toothbrush or an air conditioner (Small Wind, 3).

Costs associated with wind turbines are rather high. The average residential energy use was 14000 kilowatt-hours in 2002 (Small Wind, 4). To reach energy production of this level a five to 15 kilowatt wind turbine would be needed. A small wind energy system cost from $3000 to $5000 for every kilowatt generated (Small Wind, 11). Those preparing to invest in wind energy should be aware that payment may take anywhere from 15 years to a lifetime. Even though they are costly, wind turbines create a clean source of renewable energy. With renewable energy on the forefront energy technology, many people are willing to buy clean energy for their homes or businesses. Not only do wind turbines create a clean source of renewable energy but they can also create revenue incentives for the owner. There are two ways to create revenue from small wind turbines. First, net metering allows customers to be credited for any excess electricity they generate. This is helpful as wind power increases in the winter months and therefore can displace the costs of high air conditioning costs in the summer. Secondly, small wind turbine owners can also use Renewable Energy Certificates or RECs. Through this contract the local electric utility facilitates the buying and selling of renewable clean energy. By selling excess energy the small wind turbine owner can increase their revenues by up to 20 percent (Small Wind, 18).

Currently, small wind turbines in Southwest Virginia are few and far between. However, Dominion Virginia Power in partner with BP Wind Energy has proposed wind farms for this part of the state in Wise County as well as Tazewell County. The plan is to be an investment of over $600 million and will generate 250 megawatts of power. Implementing wind power on the small and large scale may seem like a foreign concept; however, we must remember that "[wind] power is still in its infancy….You're going to see a lot more of this nationwide" according to Jim Madden, a BP business developer (McCown, 2). Specifically for this region, wind power could become a good alternative industry to the coal industry that has taken over this part of the state. However, developers of the plan must consider the effects of placing hundreds of 150 ton wind turbines on land where mining has occurred underneath. Conversely, the project could bring a tax revenue of more than $1.7 million a year (McCown, 3). In addition, the 12 month building period would create 100 to 150 jobs and upon completion would create ten permanent operational jobs (McCown, 3). Wind energy installation in Southwest Virginia presents both problems and advantages. Implementing a small wind turbine system can cost money that most people cannot afford to spend even if they want clean energy. On the other hand, there are incentives for installing wind turbines such as Renewable Energy Certificates. If Southwest Virginians see the results of the proposed wind energy farms for Wise and Tazewell counties, the movement toward renewable clean energy may move forward.

What is Blacksburg Doing Right Now?

Blacksburg has made environmental sustainability, specifically through reducing its greenhouse gas emissions, one of its top priorities. Most recently, the Mayor of Blacksburg, Ron Rordam, has signed onto the "cool cities" movement as well as the U.S. Mayors Climate Protection Agreement. As a result, Blacksburg has received numerous grants to become more

sustainable and reduce total greenhouse gas emissions for the town. The U.S. Mayors Climate Protection Agreement includes commitments such as striving to beat the Kyoto Protocol targets in their own communities (this includes a reduction in green house gas emissions by 7% by 2012) and to urge Congress to pass bipartisanship greenhouse gas reduction legislation (Mayor's Task Force, 2009). In 2007, the Town of Blacksburg joined ICLEI Local governments for Sustainability and committed to the Cities for Climate Protection (Mayor's Task, 2009). Susan Garrison, the head of the Mayors Climate Task Force on Energy and Sustainability, mentioned that the town ordinance will need to be reviewed in order to ensure that the code allows for the potential grants the town will receive to reduce its green house gas emissions (personal communication, November 9, 2009).

A complete inventory of greenhouse gas emissions in the town of Blacksburg was conducted in 2007. Blacksburg uses around 10.36 trillion Btu in both end use and primary energy sources annually (Blacksburg energy and greenhouse gas emissions inventory, 2008). Out of this 10.36 trillion Btu, electricity makes up the largest energy source constituting around 66% of the town's total greenhouse gas emissions). Furthermore, 88.3% of the electricity that Blacksburg receives from the grid is from coal (Blacksburg energy and greenhouse gas emissions inventory, 2008). Virginia Tech is the largest energy-consuming sector, next is transportation, then residential, and lastly industrial and commercial. It is important to note that with the exception of non-electric vehicle transportation, theoretically, all the consuming sectors above (energy, residential, industrial, and commercial) have the capacity to consume alternative sources of energy derived from wind and solar power. If Blacksburg wishes to reduce its green house gas emissions and become more sustainable, it needs to utilize renewable energy resources, such as solar and wind power.

Blacksburg recently approved a year-long pilot project to install a wind turbine and

photovoltaic panel on top of the YMCA building on North Main Street. The goal of Blacksburg Wind Power, a group comprised of various members of the community as well as Virginia Tech Professors that received the grant, is to provide an example of independent, renewable, clean, distributed energy production. Blacksburg Wind Power received a $10,000 Community Action Grant from Virginia Tech's Office of the Vice President for Research on April 1, 2009 to install a residential/small-business scale wind turbine at the YMCA Center at 1000 North Main Street in Blacksburg, Virginia, less than 0.5 miles from the Virginia Tech campus (Blacksburg Wind Power, 2009). The grid-interactive system will include the 300W vertical axis wind turbine from Urban Green Energy coupled with comparably scaled solar panels donated by Solar Connexion. Installation is expected in December of 2009 (Blacksburg Wind Power, 2009).

This pilot project is an example of the proactive steps the town is taking to evaluate the feasibility of implementing a small-scale wind turbine that can be installed on top of a building. Although it is only meant for educational purposes, Blacksburg views the project as a chance to inform both the public and planning commission on the zoning amendment process for broader application of alternative energy production in Blacksburg. In addition, Virginia Wind Energy Collaborative views this opportunity to investigate the feasibility of a small-scale wind-based net-metered system, uncover potential non-technical barriers of acceptance, educate the public on the process of installing wind energy systems, and to work with citizens and the town regarding renewable energy zoning and regulations. The zoning commission passed Resolution 9-E-09, which is a proposed zoning ordinance amendment regarding small wind turbines and solar panels. The resolution acknowledges that Blacksburg is committed to creating a more sustainable future and investing in renewable energy is part of the comprehensive plan. The proposed amendment would permit, under suitable conditions, the generation of wind and solar energy in the Town. Specifically, the Planning Commission is requested to consider a text

amendment to the zoning ordinance that includes definition and use types, district standards, and use and design standards.

The pilot project is a great example of how wind energy can be produced on a small-scale, inexpensive way that can be aesthetically pleasing and non-intrusive. The Virginia Wind Energy Collaborative estimates that investing in 1,000 megawatts of wind energy in the state could result in $1.2 billion economic benefits, a reduction of 3.0 million tons of CO2, and savings of 1.6 billion gallons of water (Blacksburg Wind Power, 2009).

Why Zoning for Distributed Wind and Solar Energy?

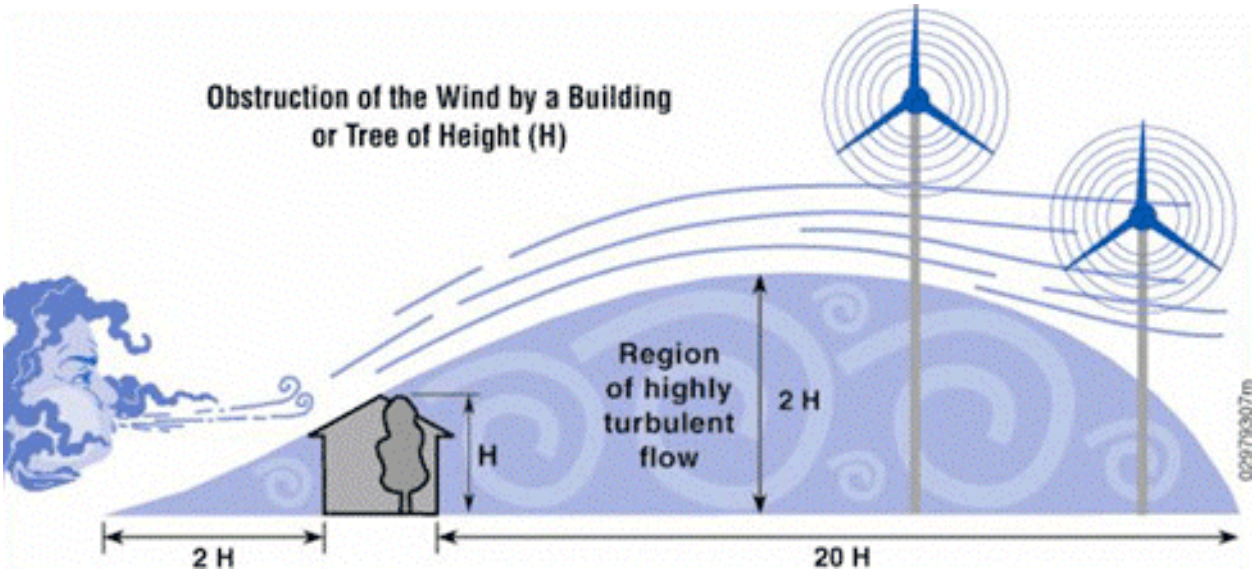
Large-scale solar and wind energy are unavailable at this time to Blacksburg, and the town's major electricity suppliers have no definite plans for switching to renewable sources. But even if such a centralized supply were available, the fact remains that a great deal of energy is lost in transmission along inefficient power lines from distant plants, lessening the benefit of large-scale renewable energy (Bronin, 1223). Thus, if Blacksburg is serious about encouraging a switch to wind and solar, its only option in the short run and perhaps best option in the long run is to achieve it through distributed, small-scale generation.

As with any new land use, permitting distributed energy technology throughout the town's districts introduces several potential public concerns, including: structural dimensions, aesthetics, safety, and functionality. Zoning, as an exercise of a state's police power through the local government to protect public health, safety, and welfare, can to some extent address all these concerns.

Special Considerations for Wind and Solar Zoning

Wind

Figure 1 (source: Hydra Ltd.)



As shown in Figure 1, surrounding structures including trees and buildings affect wind flow patterns, which in turn affects the efficiency with which a turbine functions. According to the American Wind Energy Association, "A tall tower is the single most important factor in the economic viability of a small wind system" (AWEA, 6). Thus zoning site standards become critical factors in wind turbine placement and performance.

Solar

The ability of a solar energy system to function properly depends on its access to sunlight—a challenge in urban areas where structures can block sunlight on neighboring properties. Thirty-four states and a few municipalities grant protection for solar easements and solar rights. Thirteen states authorize localities to zone for solar access, which includes restricting building height and mandating large lot sizes through the concepts of "solar envelope" and "solar fence" (Bronin, 1243). This type of zoning is difficult to impose after development has already occurred according to non-solar codes. Virginia is not among the states that authorize its

localities to adopt this type of highly restrictive zoning.

Prerequisites for Zoning Changes

Before Blacksburg can consider zoning changes, it is necessary first to determine whether 1) Virginia provides relevant statutory enabling authority; and 2) the town's comprehensive plan supports the action.

Enabling Authority

Of the three broad judicial interpretations of local government authority, Dillon's Rule is widely viewed as the most restrictive: a locality has only those powers specifically provided for by state enabling statute. Virginia is a Dillon's Rule state. But as Richardson *et al* assert, local government authority in reality is more flexible than any categorization suggests, and local government officials often use Dillon's Rule status as an excuse for inaction (2003).

One team member found that an official with the Blacksburg Planning Commission questioned whether sufficient statutory enabling authority exists for distributed wind energy. To settle the issue, even if it likely posed no real obstacle, the team searched Title 15.2 of the Code of Virginia ("Counties, Cities and Towns") and found no explicit language authorizing localities to allow the activity of concern. However, it did find the following under "Chapter 9 – General Powers of Local Governments":

> § 15.2-958.3. Financing clean energy programs.
>
> A. Any locality may, by ordinance, authorize contracts to provide loans for the initial acquisition and installation of clean energy improvements with free and willing property owners of both existing properties and new construction. Such an ordinance shall include but not be limited to the following:
>
> 1. The kinds of distributed generation renewable energy sources or energy efficiency improvements for which loans may be offered;

While this section describes a type of loan program for energy improvements, its logic implies enabling authority for the technology itself: why would the state authorize a loan program for distributed energy generation if the technology it concerns is impermissible? "Wind turbine" is not specifically mentioned in the authorizing language, but it clearly gives localities latitude to specify the types of alternative energy generation in their ordinances—types that naturally would include wind turbines, which are a popular distributed energy technology.

Support in the Comprehensive Plan

A locality's zoning ordinance is a tool for implementing its comprehensive plan. Therefore, before deciding on any zoning changes it was necessary that the team consult Blacksburg's comprehensive plan to verify sufficient support for its proposals. In *Blacksburg 2046*, the section "The Built Environment" is divided into several chapters, including "Utility Services." The "Objectives and Action Strategies" for "Utilities—Electrical Services" includes the following:

> B. Support programs to increase energy efficiency within the region, such as the use of solar, wind, and other decentralized technologies.

This language provides clear support for zoning changes to encourage distributed wind and solar energy generation.

Zoning Barriers to Distributed Wind and Solar

Advocates of small-scale solar and wind energy recommend identifying elements in a locality's zoning code that pose barriers to installation of wind and solar technologies. Such barriers typically include maximum height restrictions that would impede optimal wind energy generation and aesthetic design standards that effectively prohibit both solar panels and wind turbines.

The team identified the following potential barriers in Blacksburg's code:

Potential Barrier	Zoning District [i]	Standard	Energy Technology Affected
Maximum height restriction (14 of 18 relevant zoning districts)	• Rural Residential 1 • Rural Residential 2	35 ft	Most likely wind turbines, particularly land-sited (non roof-top)
	• Low-Density Residential	30 ft, or 40 with additional setback	
	• Transitional Residential • Old Town Residential • Low Density Multi-Unit Residential • Medium-Density Multi-Unit Residential	35 ft, or 45 with additional setback	
	• Downtown Commercial • Planned Commercial • Planned Industrial	60 ft	
	• Office	45 ft, or 60 with additional setback	
	• Industrial	60 ft, or 70 with additional setback	
	• University and College	75 ft	
	• Mixed-Use Development	60 ft, with conditions	
Aesthetic standard (four of five districts zoned for commercial activity)	• Downtown Commercial • General Commercial • Planned Commercial • Mixed Use Development	"All roof-top equipment shall be screened in building materials that match the structure or which are visually compatible with the structure."	Solar panels and roof-top wind turbines

i See Appendix A for Blacksburg zoning map

Approaching Zoning Changes for Wind and Solar Energy

Zoning changes to accommodate and encourage targeted uses must be approached carefully to avoid unintended consequences. Consider the following:

- Simply raising or eliminating height restrictions in zoning districts would apply to all structures, not just wind turbines. This could result in undesirable development (e.g., buildings with four floors instead of two), and also pose problems for many types of wind technology which function most effectively in areas where the turbines themselves are the

tallest structures and rise sufficiently above any turbulence caused by surrounding buildings and trees.

- Just adding "wind turbine" to the list of structures exempt from height restrictions fails to take into account a turbine's unique properties. Ten of Blacksburg's zoning districts include the following exemptions: church spires, belfries, cupolas, monuments, water towers, chimneys, flues, flagpoles, television antennae, and radio aerials. Each of these structures is essentially immobile, while a wind turbine has moving parts that can cause greater public concern.
- Eliminating the ordinance's language regarding rooftop equipment screening in commercial districts would benefit wind and solar technology, but could result in unnecessary eyesores from other, unrelated rooftop equipment.
- At the other end of the spectrum, requiring a conditional use permit for every wind installation would pose significant financial costs to the local government and onerous delays to the applicant due to the associated public hearing requirement.

Zoning Recommendations to Support Distributed Wind and Solar Energy Generation

Taking into consideration the above caveats, the team recommends the following changes to Ordinance No. 1137, Blacksburg Zoning Ordinance:

- Adopt the basic model zoning ordinance for small-scale wind crafted by the American Wind Energy Association (AWEA) (see Appendix B for full text of model ordinance), and incorporate its provisions: 1) in the Site Development Standards and Conditional Uses for each applicable District under Article III, District Standards, and 2) in Division 7, Miscellaneous Uses under Article IV, Use and Design Standards. Highlights:

  - A wind turbine system meeting the ordinance's site and design criteria is a *permitted use* in all zoning districts (i.e., a use allowed by default, requiring only a permit for installation, to be granted within 30 days of application).
  - A wind turbine system that does not meet the ordinance's design criteria is a *conditional use*, requiring a conditional use permit.
    - For conditional use permits, ensure "that the burden of proof that a wind system indeed poses a public health or safety problem is on the municipality, and not on the applicant to disprove," to avoid the perception that adopting the technology is excessively burdensome (Sagrillo, n.d.).
- Under Article III, District Standards, modify the language in the Site Development Standards of Divisions 14, 15, 16, and 28 to exempt all solar and wind energy systems from rooftop equipment enclosure regulations.

Zoning Is Just One Tool

Achieving a shift away from coal and toward renewable energy sources like wind and solar in Blacksburg will require more than just the changes recommended in this report. Below is a list of additional recommendations for the town, related to zoning and beyond zoning:

- Reduce or waive permit fees
- Fast-track renewable energy permit review periods
- Offer density bonuses for development that reduces energy consumption or produces energy on-site
- Provide property tax exemptions for renewable energy equipment, as many cities and counties in Virginia already do
- Educate the public about their wind and solar options (the YMCA pilot project is a good

start)

- Encourage the lifting of private covenants that effectively prohibit solar and wind technology for aesthetic reasons

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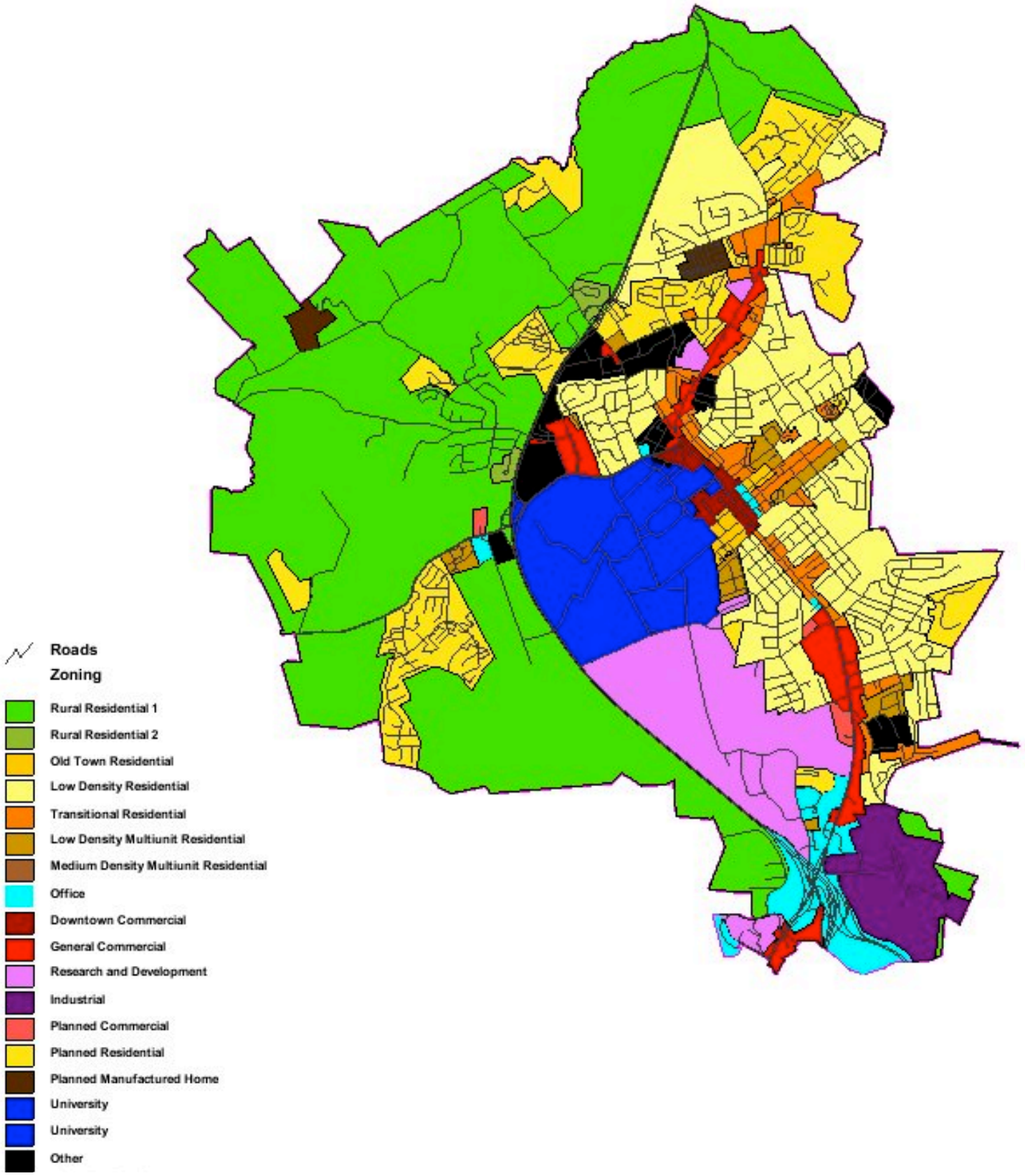
APPENDIX A: Town of Blacksburg, VA, Zoning Map



APPENDIX B: **AWEA Model Zoning Ordinance** [Modified for Blacksburg, VA]

Use Regulation for Small Wind Energy Conversion Systems

Section 1: Purpose
It is the purpose of this regulation to allow the safe, effective and efficient use of small wind energy systems installed to reduce the on-site consumption of utility supplied electricity.

Section 2: Findings
The Town of Blacksburg finds that wind energy is an abundant, renewable, and nonpolluting energy resource and that its conversion to electricity will reduce our dependence on nonrenewable energy resources and decrease the air and water pollution that results from the use of conventional energy sources. Distributed small wind energy systems will also enhance the reliability and power quality of the power grid, reduce peak power demands, and help diversify the State's energy supply portfolio. Small wind systems also make the electricity supply market more competitive by promoting customer choice.

The State of Virginia has enacted a number of laws and programs to encourage the use of small-scale renewable energy systems including rebates, net metering, property tax exemptions, and solar easements. However, many existing zoning ordinances contain restrictions, which while not intended to discourage the installation of small wind turbines, that can substantially increase the time and costs required to obtain necessary construction permits.

Therefore, we find that it is necessary to standardize and streamline the proper issuance of building permits for small wind energy systems so that this clean, renewable energy resource can be utilized in a cost-effective and timely manner.

Section 3: Definitions

Small Wind Energy System: A wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics, which has a rated capacity of not more than 100 kilowatts (kW) and which is intended to primarily reduce on-site consumption of utility power.

Tower Height: The height above grade of the fixed portion of the tower, excluding the wind turbine itself.

Total Extended Height: The height above grade to a blade tip at its highest point of travel.

Section 4: Permitted Use
Small wind energy systems shall be a permitted use in all zoning districts where structures of any sort are allowed; subject to the requirements of Section 5 below. Small wind energy systems not meeting the performance standards of Section 5 may be allowed by conditional use permit.

Section 5: Use Standards for Small Wind Electric Conversion System
5.01. Setback: The base of the tower shall be set back from all property lines, public right-of-ways, and public utility lines a distance equal to the total extended height. Turbines shall be allowed closer to a property line than its total extended height if the abutting property owner(s) grants written permission and the installation poses no interference with public utility lines or public road and rail right-of-ways.
5.02. Tower Height: So long as the total extended height meets sound and set-back requirements, there shall be no specific height limitation, except as imposed by Federal Aviation Administration regulations as stated in 5.07.
5.03. Sound: Sound produced by the turbine under normal operating conditions, as measured at the property line, shall not exceed the definition of nuisance noise. Sound levels, however, may be exceeded during short-term events out of anyone's control such as utility outages and/or severe wind storms.
5.04. Wind Turbine Equipment: Small wind turbines must have been approved under the state public

benefits program or any other small wind certification program recognized by the American Wind Energy Association.

5.05. Requirement for Engineered Drawings: Building permit applications for small wind energy systems shall be accompanied by standard drawings of the wind turbine structure and stamped engineered drawings of the tower, base, footings, and/or foundation as provided by the manufacturer. Wet stamps shall not be required.

5.06. Soil Studies: For standard soil conditions (not including gravel, sand, or muck), foundations developed by the wind turbine manufacturer shall be acceptable for turbine installations of 20kW or less and will not require project-specific soils studies or an engineer's wet stamp.

5.07. Compliance with FAA Regulations: No WEC shall be constructed, altered, or maintained so as to project above any of the imaginary airspace surfaces described in FAR Part 77 of the FAA guidance on airspace protection.

5.08. Compliance with National Electric Code: Building permit applications for small wind energy systems shall be accompanied by a line drawing of the electrical components, as supplied by the manufacturer, in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code.

5.09. Utility Notification: No small wind energy system shall be installed until evidence has been given that the utility company has been informed of the customer's intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

5.10 Insurance: Additional insurance beyond homeowners' coverage shall not be required.

5.11. Abandonment: If a wind turbine is inoperable for six consecutive months the owner shall be notified that they must, within six months of receiving the notice, restore their system to operating condition. If the owner(s) fails to restore their system to operating condition within the six-month time frame, then the owner shall be required, at his expense, to remove the wind turbine from the tower for safety reasons. The tower then would be subject to the Public Nuisance provisions of the zoning code.

5.12. Signage: All signs, other than the manufacturer's or installer's identification, appropriate warning signs, or owner identification on a wind generator, tower, building, or other structure associated with a small wind energy system visible from any public road shall be prohibited.

5.13. Lighting: No illumination of the turbine or tower shall be allowed unless required by the FAA.

5.14. Access: Any climbing foot pegs or rungs below 12 feet of a freestanding tower shall be removed to prevent unauthorized climbing. For lattice or guyed towers, sheets of metal or wood may be fastened to the bottom tower section such that it cannot readily be climbed.