

January 28, 2013

The Carroll County Board of Supervisors held a meeting on, January 28, 2013 in the Board Meeting Room of the Carroll County Governmental Center.

Present were:           David V. Hutchins  
                              W.S. "Sam" Dickson  
                              Dr. Tom Littrell  
                              Joshua A. Hendrick  
                              Phil D. McCraw  
                              Ralph "Bob" Martin  
                              Gary Larrowe, County Administrator  
                              Nikki Shank, Assistant Administrator

Mr. Hutchins called the meeting to order at 7:01 p.m.

Mr. Dickson led in invocation and pledge.

Mr. Hutchins told that this is not a public hearing and he wants to be sure that everyone understands that. He told that there will be one when an ordinance is developed. He told that the purpose of this workshop is to exchange information and obtain information and no decisions will be made tonight. He told that we will allow discussion but it will be in an orderly manner and asked everyone to respect others opinions and thoughts.

Dr. John Miles with JMU told that he will be sharing general information that is relevant and he would be happy to come in person to give more details on specific topics. He proceeded to go over the power point that is below.



**An Introduction to Wind Power  
and Associated Issues**

28<sup>th</sup> January 2013

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Virginia Center for Wind Energy  
James Madison University



## Outline

1. What's Driving the Interest in Wind Power?
2. Advantages & Disadvantages of Wind
3. Wind Resources and Wind Power
4. Wind Turbines, Sizes, and Terminology
5. Key Considerations
6. Financing and Costs
7. Next Steps for Communities

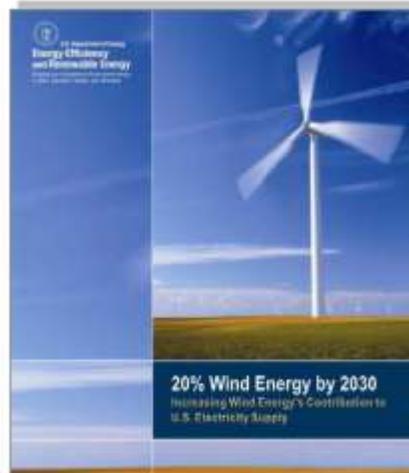
### 1. What's Driving the Interest in Wind Power?

- National and state electricity needs as demand continues to grow
- Environmental concerns with fossil, nuclear
- CO<sub>2</sub> and climate change
- Cost competitiveness with coal and natural gas
- State and national policies and goals
- Virginia has attractive wind resources

## 20% Wind Energy by 2030

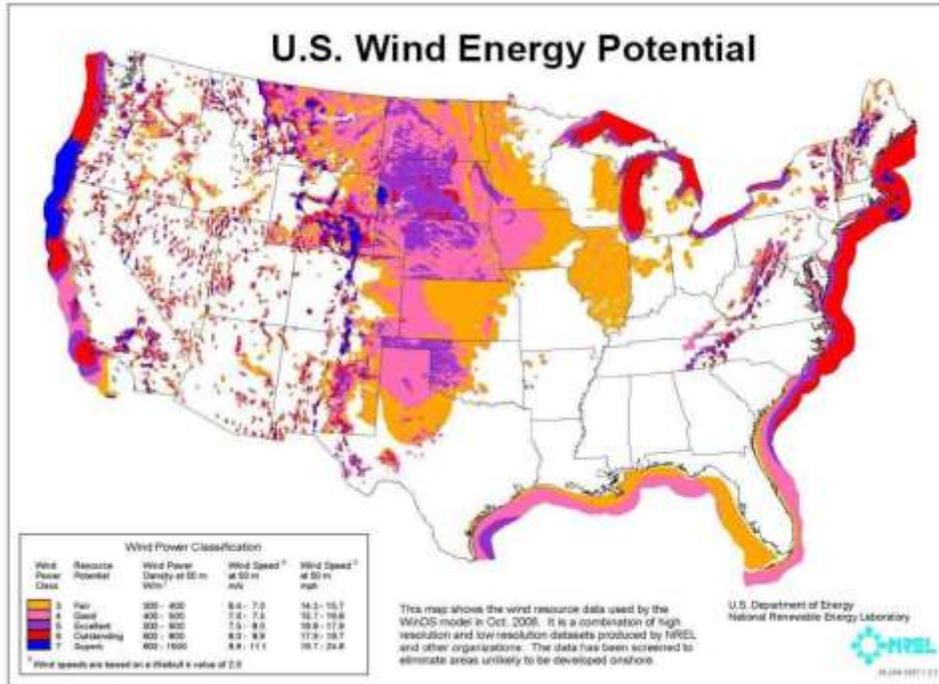
**20% Wind Energy by 2030**  
Hallmark report released in May clarifies pathway to major contribution from wind energy in the U.S.  
<http://www.20percentwind.org/>

- Technology Improvement
- Ramping up Domestic Manufacturing
- Transmission and Integration
- Wind Power Market and Application Development
- **Addressing Siting and Environmental Challenges**

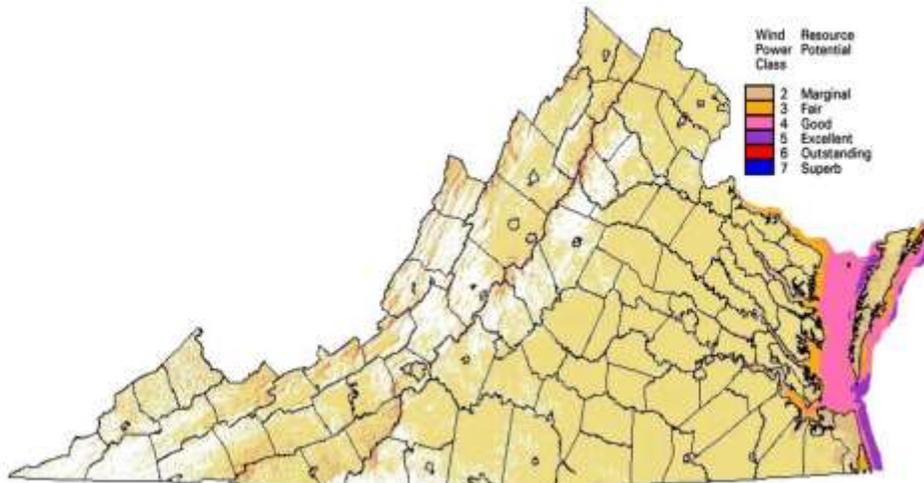


## 2. Advantages & Disadvantages of Wind Power

- No emissions
- Stable & predictable electricity costs
- Installs quickly
- Does not require water
- Can be dismantled at end of life comparatively easily
- Intermittent (but reliable)
- Good wind resources are not everywhere
- Site-specific environmental impacts must be very carefully assessed

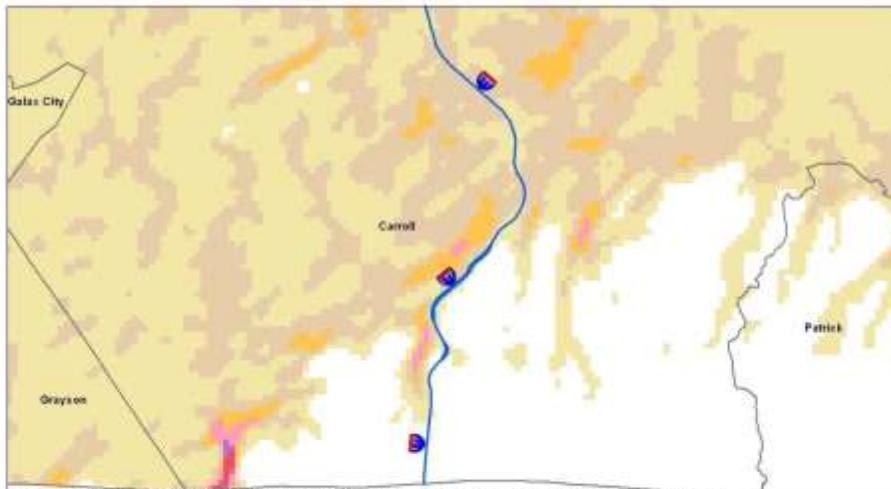
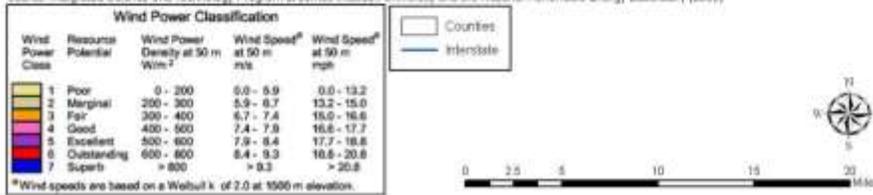


## 3. Wind Resources in Virginia

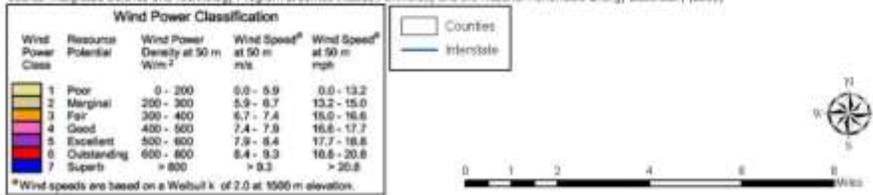




Source: Integrated Science and Technology Program at James Madison University and the National Renewable Energy Laboratory (2004)



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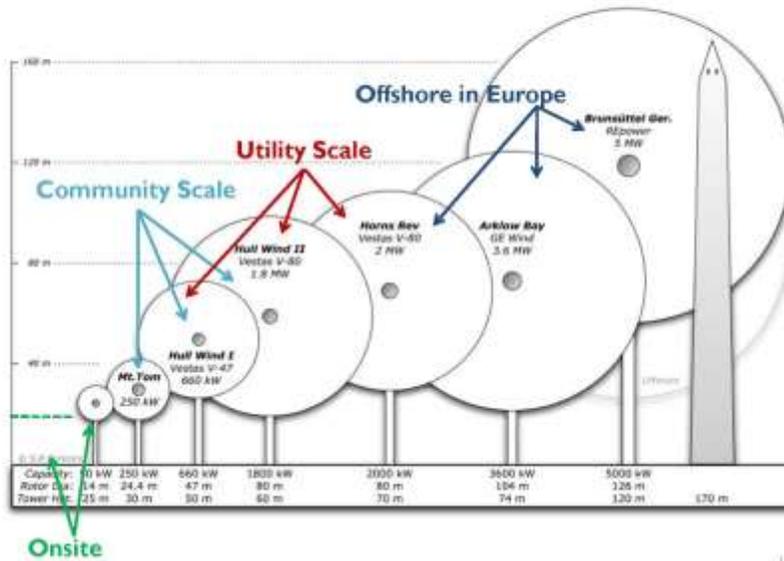


## 4. Wind Turbine Size & Terminology

Category	Nameplate Capacity	Description
Onsite	≤ 10 kW (residential)	These systems are small, either stand-alone or net metered, and would probably involve only 1 turbine.
	≤ 500 kW (commercial)	
Community	≤ 10 MW	Community-scale projects are typically either net metered or connected to the local distribution network, but could be connected to transmission. These projects are typically owned by and serve the community. They would probably involve less than 5 turbines. In the Midwest, there are community wind systems that are also "utility scale" using our definition.
Utility	< 50 MW	Industrial-scale wind power projects are most often developed by a company that either will own or sell the project for the purpose of realizing a return on their investment.
	≥ 50 MW	An industrial-scale wind power project equal to or greater than 50 MW nameplate capacity is subject to the full approval process by the Commonwealth's State Corporation Commission.

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## 4. Wind Turbine Size



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## 4. Onsite Systems

- Class 1: 1-kW, 6-kW, 10-kW
- Class 2: 3.7-kW, 10-kW, ~20-kW



A 1-kW Bergey in Floyd, VA  
Height: ~ 45 ft



A 20-kW Westwind in Ireland  
Height: ~ 60 ft

## 4. Onsite Systems

- Larger than 20-kW typically requires at least Class 3 or higher wind

A 100-kW Northwind in MA  
Height: ~ 120 ft



A 50-kW Atlantic Orient in VT  
Height: ~ 80-90 ft



## 4. Community Wind



A 660-kW community system in Hull, MA, less than 10 miles from Boston.

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## 4. Utility Scale Wind



Bear Creek Wind Power Project near Wilkes-Barre, PA, as seen from the PA Turnpike. These are 2.0 MW Gamesa Turbines.

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## 4. Turbine Size and Wind Class: Putting It All Together

- Basic prerequisites for community and commercial wind energy development:
  - Availability of a good wind resource
  - Topography
  - Price/cost of electricity

Wind Class	Potential for Wind Development
<b>Class 1 or 2</b>	<ul style="list-style-type: none"><li>• Marginal for onsite</li><li>• Unsuitable to marginal for community-scale</li><li>• Unsuitable for utility-scale</li></ul>
<b>Class 3</b>	<ul style="list-style-type: none"><li>• Appropriate for onsite</li><li>• Marginal to appropriate for community-scale</li><li>• Generally unsuitable for utility-scale</li></ul>
<b>Class 4</b>	<ul style="list-style-type: none"><li>• Appropriate for onsite or community-scale</li><li>• Marginal for utility-scale</li></ul>
<b>Class 5+</b>	<ul style="list-style-type: none"><li>• Appropriate for all scales</li></ul>

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## 4. Turbine Size and Wind Class: Putting It All Together

- Setbacks/fall zones/spacing varies from 1/2 to 1 acre per turbine for onsite, and 1-4 acres per turbine for community
- For utility, varies from 2 acres per megawatt nameplate capacity (if in series) to 25 acres (if arrayed 2-dimensionally)
- A linear mile of ridgeline holds 6-12 turbines depending on size of the turbine

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## 5. Considerations During Construction

- Roads
- Forest clearing
- Slopes
- Surface streams

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## 5. Safety & Nuisance Considerations

- Safety setbacks
- Ice throws
- Sound
- Shadow flicker
- Electromagnetic interference
- Height and turbine capacity factor

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## 5. Key Environmental & Other Considerations

- Wildlife
- Designated wilderness
- Sensitive habitats
- Forest fragmentation
- Scenic views
- Cultural and historic resources
- Recreation

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## 6. Financing Options: Community Wind Models

- Onsite vs. wholesale contracts
- Community “Owned”
  - Municipal ownership
  - Community cooperative (citizens own shares)
  - Local investor/owner
- Investor Owned
  - Utility
  - Independent power producer
  - Private individual outside of community
  - Minnesota “flip” model
  - Opportunities for community revenue sharing

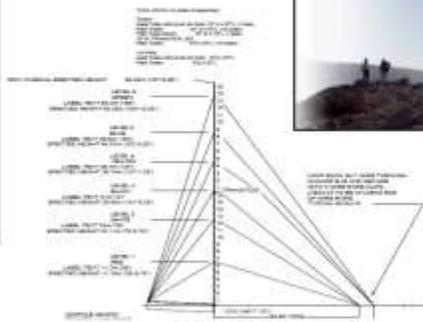
## 6. Other Financing Dimensions

- Depends on ownership mode
- Grants
- County tax revenue for utility scale
  - Equipment
  - Property tax and land use
  - Other?
  - Revenue benefits depends on contracts with county
    - West Virginia (Mountaineer) benefits through school funding

## 7. Next Steps for Communities

- Determine goals for wind power
- Evaluate wind resource
  - strongly recommend measuring for at least a year if Class 3 wind or higher, or think it is better than Class 1 or 2
  - permit applications for MET towers are indicators that developers are interested and are prospecting
  - for small turbines (< 10 kW) a measurement program may not be prudent, but expectations should be reasonable

## 7. Meteorological (MET) Towers



Virginia State-Based Anemometer Loan Program

<http://sbalp.cisat.jmu.edu/>

## 7. Meteorological (MET) Towers





## Sources of Images

- Segen Microgeneration, 20-kw Westwind turbine in Ireland, <http://www.segen.co.uk/eng/wind/westwind.htm>
- Sustainable Energy Developments, Inc., 100-kw Westwind in Massachusetts, <http://www.sed-net.com/>
- US DOE, Dynapower 50-KW Atlantic Orient turbine in Vermont, [http://www.windpoweringamerica.gov/ne\\_project\\_detail.asp?id=23](http://www.windpoweringamerica.gov/ne_project_detail.asp?id=23)
- Panoramio, Bear Creek Wind Power Project, <http://static.panoramio.com/photos/original/1740520.jpg>

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Dr. Miles asked if there are any questions.

Mr. Martin asked if the companies are just looking at Carroll County because of the tax credits.

Dr. Miles told that every power generating source gets federal subsidies. He told that there is a production tax credit that is specific for wind and solar and when it was introduced the wind technology was not there yet. He told that some did not want the tax credits anymore and it puts them at a competitive disadvantage but until all other tax credit go away they are entitled to the same. He told that the notion is resources in Carroll County are very good but they are available in limited quantity. He told that if they are knocking on your door, there is a resource that is working of at least analysis if not construction. He told that the tax credits are only one small issue among dozens of issues.

Mr. Martin told that on the Pennsylvania Turnpike you mentioned that the windmills are within 2 to 3 miles of the turnpike and Carroll County's would be adjacent to I-77 and he is concerned that it will be right on I-77 and he guesses that will be determined later.

Dr. Miles told that personally he is not privy to the precise piece of land but if they are in the vicinity of an interstate they will have to deal with transportation officials on both the state and federal levels and they will have to take in to account right of ways and set backs would be factored in.

Mr. Martin asked if there would have to be distribution lines into AEP.

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Dr. Miles replied absolutely. He told that the second most important factor after availability is to determine if there is a distribution connection.

Mr. Martin told that he has monitored energy for the school system and the county is now bringing in Natural Gas which will probably connect to some of the schools while the other schools are on coal fire heat and he does not see how wind mills are going to compete with those because he knows the usage. He told that from the kilowatt usage you might power the exit signs but not the entire school.

Dr. Miles told that it depends on the size of project and the size of the machines. He asked if there was a specific question.

Mr. Martin told that he is rambling but his question is you are talking about such a small production of energy and we already have 765,000 volt lines in the county and excuse his French but it is like peeing in the ocean to cause a flood from what you are suggesting on these wind mills. He told that the whole concept bothers him and he can give facts and numbers on all of the schools and he doesn't see where wind mills can even power the schools. He told that it is such a small production of kilowatt hours that you are talking about he just doesn't see where it is going to amount to a whole lot in Carroll County.

Dr. Miles told that it depends on the type, size and ownership of the project. He told that if a developer comes in and they get permission to build a certain number, about 5 windmills can power 3200 homes. He asked how many homes there are in the County.

Mr. Martin asked what the cost would be and that bothers him more than anything.

Dr. Miles told that the most traditional model is the developer comes in and everyone is happy, they install the turbines, pay the landowner, and start paying tax revenues. He told that the county would not own the power so there is no electricity transmission with the county. He told the alternative structure would be where the county is involved in the development and business structure. He told the Massachutes project is one example. He told that you cannot build a new coal power plant for the same cost as you can for wind. He told a round number is \$0.05 to \$0.07 cents per kilowatt hour so it is highly competitive with traditional generation.

Mr. Martin asked if he means when it is producing electricity.

Dr. Miles told that when the economic bottling is done you are factoring in the intermittency so it assumes that the wind is only going to be operating at a certain level a certain amount of time. He told that you never assume the wind is always blowing and if you are a power company and there is a need for a peaking for power in the summer time when everyone turns their air on you could use a gas turbine. He told that the capacity might only be 5% because you are only turning it on a total of 15 days out of the year.

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Mr. Martin told that you speak of economic benefits and asked what kind of benefits would Carroll County receive as far as benefits.

Dr. Miles told that it is hard to do because he does not have another example here in the State to point to. He told that Robin could speak to that more because he was involved in a conversation in detail. He told that some of the communities that are comparable in size to yours that he is aware of in West Virginia, they had significant revenues where they could upgrade schools so we are talking real money. He told that it would be hard to give a real number but he thinks it would be in the six digits he thinks.

Ms. Erica Largen told that when you are talking about the community scale wind turbines, how many jobs do these particular turbines provide and are those job normally taken by people in our community.

Dr. Miles asked if she is talking about a community style rather than a traditional utility scale.

Ms. Largen replied yes or what is feasible for here.

Dr. Miles told that there would be a burst with construction where there would be local impacts but once the project goes operational it would just be a handful of positions and he doesn't think jobs are where the benefits are going to be. He told that 10 turbines would be equivalent to a half dozen jobs and there would be the possibility to train others. He told that Carroll does not have the resources for a large project; he thinks it will be the tax revenue and the opportunity to provide clean energy.

Mr. Hutchins told that this has been very informative and told that he has picked a bad day to hold the meeting in Wytheville because it is Legislative Day in Richmond but they will try to have someone there. He asked if Mr. Martin and Mr. Hendrick could attend.

Mr. Hendrick told that he has sent his form in.

Mr. Hutchins thanked Dr. Miles for the information.

Dr. Miles told that it has been his pleasure and if he can be of more service just let him know.

Mr. Hutchins told that he was asked to have another speaker and he has some information on Mr. Karr that he would like to share. He told that Mr. Karr is a member of the Roanoke County Board of Zoning Appeals for the last 24 years, is a registered interested party in the Department of Environmental Quality and was instrumental in the model wind ordinance and a local outreach group, the author of the 10 year Master Plan for Radford University, a professional advocate for alternative energy research and the architect for the Draper Trail head and the New River State Park.

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Mr. Karr told that he would like to share some of his research. He told that he is a professional architect for over 35 years and he took an interest in alternative energy that we can use. He told that if we could store energy, particularly with wind we might be able to do something but we don't have the capacity or the technology to store significant amounts of energy. He told that three years ago he became real interested because he didn't want it in his back yard. He told that he lives on Poor Mountain and his neighbor asked him about it and he told him that if it will help pay taxes it might be worth it but later the representative of the company started coming he thought that he should look into it. He told that he cannot say that he is unbiased and he anyone that has committed themselves to study is unbiased because that is the purpose is to come to a conclusion. He shared a PowerPoint that he prepared containing the research that he has completed.

Mr. Hutchins asked if there are any questions.

Ms. Largen asked at what point are renewable energy sources like wind turbines going to be worth it economically to offset, not to take over our current coal and oil to provide electricity if not heat.

Mr. Karr told that he thinks we have been able to do that for the past 20 years or more on a local level when we are not using 11 – 20 % of the energy produced on the transmission line. He told that we are using all that we produce.

Ms. Largen told that she also understands that when you have a coal fired power plant that the efficiency is about 15 % and asked if the wind is greater.

Mr. Karr told that the loss is occurring over the transmission. He told that the real advantage is the net metering.

Mr. Perry asked if it is true that studies are generally commissioned hoping that the outcome will benefit them, case in point, drug companies do studies all the time where they find out 10 or 20 years later that they are unfounded.

Mr. Karr replied yes sir and you are touching a button.

Mr. Perry told that his second comment is directed at Mr. Martin who spoke of using wood pellets which is a good idea, but you have to have electricity to operate the stove.

A citizen from the audience asked about the map that was shown for the site in West Virginia, how soon after construction was the pictures taken.

Mr. Karr told that some were actually during construction.

The citizen told that the exposed soil was severe. He told that he studied forestry at Virginia Tech and usually one year after the clear cut had been done the sites are normally able to revegetate. He asked if the construction projects would have to abide by the best management practices of Virginia.

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Mr. Largen asked what keeps them from fighting a fire, if it is a forest fire they would just use traditional means and is curious what is stopping someone from fighting the fire.

Mr. Karr told that it is a downward slope and when you fight fires, particularly in the mountains it is more advantageous to attack it by air. He told that they have had a couple of small fires on Poor Mountain and that is how they attacked them.

Mr. Largen asked why they can't use a helicopter.

Mr. Karr told that it would be dangerous and they don't like flying around wind turbines. He told that you can't place the water if you can't get low enough.

A citizen from the audience told that he is a big supporter of alternative energy and they have had solar panels for 30 years. He told that Mr. Martin said that the wind was very little here. He told that he is talking about a river, the wind may be little but it is flowing into a big river of energy supply and we need to figure out ways to cut back and save.

Mr. Karr asked what we can do to help personal conservation.

The citizen told that right now we are talking about windmill power.

Mr. Karr told that he is not anti alternative energy.

Mr. Brian Dixon told that he means this with all due respect, have you ever been to Stoots Mountain.

Mr. Karr replied yes.

Mr. Dixon asked if he saw any trees.

Mr. Karr told that he has not been on top of Stoots Mountain.

Mr. Dixon told that there are no trees because he has clear cut the whole place because he owns the majority of the land. He told that we are not in Floyd County and you are talking about totally different wind power. He told that the wind company that he is dealing with is not the same so he doesn't understand what gives him the right to come to Carroll County and tell us what is going on. He told that he doesn't come to Floyd County and tell you not to build a barn.

Mr. Karr told that he doesn't live in Floyd County either.

Mr. Dixon told that they have been studying this for 2 years. He told that he has brought a tractor trailer down it because he has hauled logs out for three years.

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Ms. Peery told that what you are talking about doing in limiting what a private landowner can do with their land, if you plan to do that you need a comprehensive zoning plan. She told that she doesn't know if she is for or against or if Carroll County is a viable site. She told that she does not like residential development stripping off our scenic ridgeline. She told that our scenic views have never been of any importance to any of this Board. She told that she takes that back for Mr. Hendrick. She told that we let Snow Realty chop off sides of the mountain to build cabins and we don't care if it ends up in Cana. She told that you cannot just pick and choose what you want to zone out. She told that her time on earth is limited and so is yours and it is time for this County to start thinking forward and progressive. She told that if the young people think it is viable we should not be holding them back. She told that she feels sure that when the railroads came in, the power system came in many years ago people were skeptical and it came through and proved them wrong so who is to say that wind energy will not do the same. She told that Carroll County has to be more progressive in our thinking because we have no choice. She told that we were talking about minimal jobs and told that Amerilink brought one job. She told that if wind energy is viable in Carroll County you will not stop it.

Mr. Hutchins told that we are getting away from an education session and getting into an opinion scenario.

Mr. Karr told that he sent an email about SB1341. He told that every locality needs to make their position known.

Mr. Roger Jennings told that he requests that we study the health issue on this and distributed some information on that.

Ms. Donna Peery told that she has faith in the Board and somewhere there has got to be people who are smart enough to look at this from all angles and if Carroll is a viable place for wind then we should benefit from it. She told that she feels sure that the people who are smart enough to tell us all the pros and cons are out there and we should look for them.

Mr. Tom Peery told that on SB1431, the State government is kind of like the Federal government, they slip things in when no one is looking and pass them. He read the summary of the Senate bill. He told that it sounds like no matter what you decide if this bill passes the State will supersede anything you do. He told that the board shouldn't be hasty on the decisions it makes because if you hamstring the private enterprise like the gentleman who owns the land on Stoots Mountain and do what is called spot zoning and this passes then you have restricted and free enterprise in this County.

Mr. Emory Beardon told that we need to let free enterprise rule and if he can put a windmill on his land and make money, why should you oppose. He told that he is not worried about how many schools it will power or if it is efficient or not and he doesn't see that it is the Board's place. He told that if he wants to invest in it and be more

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economical then he is watching his money. He told that zoning is wrong and he thinks it is something that you need to back off from.

Mr. Tom Largen told that they have talked about a lot of things tonight, most of them were far left or far right and we didn't talk about what he thought we were going to talk about. He told that what he thinks is in question here is we already have an ordinance in effect which is no ordinance. He told that if the county citizens wanted zoning we would have it and they don't want it. He told that he thinks that it is wrong when most of your constituents don't want it but you are planning on passing an ordinance that is zoning. He told that if you want zoning lets do it but not pick an issue and regulate it. He told that we are talking about wind turbines but we are calling it ridge lines and it doesn't cut it.

Mr. Hutchins thanked everyone for being here. He told that we have heard a lot and we have already read a lot of material. He reminded everyone that some of the board is going to Richmond and there will be three or four of them together some of the time.

### **ADJOURNMENT**

Upon motion by Mr. McCraw, seconded by Mr. Dickson and passing, the Board adjourned.

#### VOTES

Mr. Hendrick	Yes
Mr. McCraw	Yes
Mr. Hutchins	Yes
Mr. Dickson	Yes
Dr. Littrell	Yes
Mr. Martin	Yes

(Order)

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Chairman

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Clerk

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