


Planning for the Wind

Michigan Townships Association


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Building Place

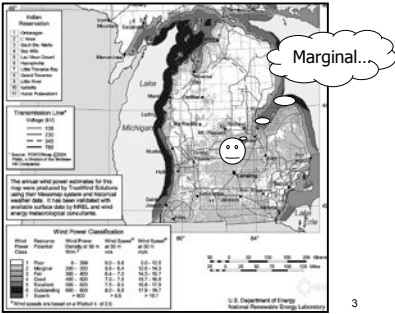
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The Way Things Were in the Wind



Building Place Notebook 2

Michigan Wind Potential



Marginal...

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Why are we talking about alternative and renewable energy?

- Higher utility costs
- Growth in **Michigan-based** wind turbine and solar energy manufacturing
- **Cost of renewable energy production is coming down**
- Federal and state government **incentives (and mandates)**

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Electric Bills May Jump



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"Clean, Renewable, and Efficient Energy Act"

- P.A. 295 of 2008
- establishes a system of renewable energy credits and permits "net metering"
- **10%** of an electric provider's energy must come from renewable sources by 2015
- Electric and natural gas providers must create and file energy optimization plans
- Creates **Wind Energy Resource Zone Board**

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Tax Credits for Small Wind Turbines

- New Federal investment tax credit
 - Home, Farm, or Business use
- Owners of small wind systems
 - 100 kilowatts (kW) of capacity or less
 - Potential credit = 30% of total installed cost
 - Available through 12/31/2016

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The Way Things Are Today...


Monday, March 23, 2009

DTE sees 280 wind turbines in Thumb's Huron County

BAD AXE – The skyline in Michigan's rural Thumb could look a bit like historic Holland a few years down the road. DTE Energy officials said Huron County will have 280 wind turbines in the county by 2012. The Huron County wind turbines will generate 1,200 megawatts of power, or 10 percent of the county's total power. The Detroit-based utility is investing \$1.5 billion in the project. DTE Energy's general manager of DTE Energy Renewable Resources said the company's goal is to have about 3 percent of its power from renewable energy sources by 2012.


"We're going to be running hard to get this done," he said. He quoted him as telling the county board March 17.

State law requires DTE to buy at least half of the remaining 9 percent of total power that has to come from renewable energy sources from a third party.



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Alternatives to the Propeller



- ~30' high
- Omni-directional
- Relatively inexpensive
- ~1/2 acre site

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The Way Things are Going...

Muskegon wind turbine technology turns heads in Vegas

Posted by Dave Alexander | The Muskegon Chronicle March 15, 2009 07:49AM

RELATED STORY


- [Nation Shows its love its own wind turbine](#)

The WindTronics 760 produces power at the turbine blade ends instead of at the hub of the unit where traditional turbines power a gear box. A new residential "wind turbine in a box" was introduced at a Las Vegas Ace Hardware show last week in the city.



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Planning for our Energy Future



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Planning for our Energy Future

- Update local master plans to address energy issues
- Evaluate local potential for "renewable" energy:
 - solar
 - wind
 - geo-thermal
 - methane (landfill gas)
 - etc.

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Planning for our Energy Future

- **Renewable energy production as an economic development tool**
 - Diversify farming income
 - Municipal income source
 - **Visibility/Advertising** - Wind turbine systems placed to draw attention (and visitors)

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Planning for our Energy Future

- **Consider energy conservation in land development/re-development**
 - Maximize solar energy potential in building and site design
 - Cluster of homes on smaller lots
 - Promote mixed-use development
 - Create walkable neighborhoods
 - Improve bicycle and public transit connectivity


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Planning for our Energy Future

- **Sustainable Zoning or Place Zoning**
 - Google "sustainable zoning"
 - Rocky Mountain Land Use Institute
 - www.buildingplace.net/place-zoning
- **Promote LEED certification**
 - Leadership in Energy and Environmental Design
 - U.S. Green Building Council
 - New Buildings
 - Building Renovations
 - Neighborhoods (new)

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Regulating Small Wind Turbines



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Ordinance Preparation

- Wind turbine standards should be in the **Zoning Ordinance**
- Preferred - all standards in **one self-contained section** or article
 - Similar to cell tower regulations
- Purpose of ordinance is to **allow for reasonable use** and **minimize off-site impacts**

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Ordinance Preparation

- **Prior to preparing a wind turbine ordinance:**
 - Invite an wind energy industry expert from the to make a public presentation
 - Consider individual site visit(s) to existing wind turbines
 - Review recent wind energy articles from the Michigan Planner, Planning & Zoning News, and other publications

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Ordinance Preparation

- Use tables to organize information:

Type of Wind Energy Conversion System (WESC)	Required Approval		Applicable WESC Standards in Section 50.33
	Special Use Approval	Certificate of Zoning Compliance	
Agricultural WESC installation or alteration, up to a maximum height of 75 feet		•	Subsections B, C, D, E
Agricultural WESC installation or alteration, exceeding 75 feet in height	•		Subsections B, C, D, E
Private WESC installation or alteration	•		Subsections B, C, D, F

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Checklist of Issues to Consider

- Height/fall zone/setback
- Noise & shadow flicker impacts
- Visibility/aesthetics
- Types of permitted units
- Permitted locations
- Preferred approval process
- End of life/abandonment/removal

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Height, Fall Zone, & Setback

- **Towers** should be set back from all property lines and buildings a minimum distance equal to:
 - 100% - 150% of overall height
 - Measure to tip of blade
- Require tower design to minimize potential fall zone
- May allow temporary anemometer “test” tower with reduced setbacks

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Height, Fall Zone, & Setback

- **Tower Height:**
 - Require minimum ground clearance for blades
 - Need to get above trees and structures by at least 25 - 35 feet
 - Set maximum height for “by right” towers
 - Allow for taller towers with special use approval

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Height, Fall Zone, & Setback

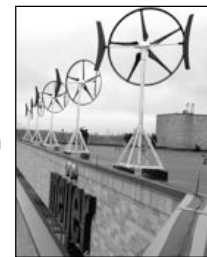
- **Setbacks are intended to:**
 - Maximize safety
 - Provide space to contain a catastrophic tower or blade failure
 - Provide area for ice-fall or debris-fall
 - Protects property rights of adjacent landowners
 - Reduce visual impacts with distance

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Height, Fall Zone, & Setback

- **Building-Mounted Units:**
 - Limit turbine height above the building height
 - Require setback from building wall to minimize visibility
 - Require fall zone for unit within roof area



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Height Issues That May Come Up

- **Icing (Ice Throw):**
 - Under certain conditions, ice may build up on turbine blades
 - Causes blades to slow or stop
 - Ice then sloughs or falls to the ground within area = diameter of blades
- **Lightning:**
 - Wind turbines do not attract lightning
 - Pose no threat to neighboring properties
 - Release of pent-up static electricity that moves from turbulent atmosphere to ground

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Noise Impacts

- **Noise impacts may extend well beyond property line**
- **Topography and weather conditions may cause noise to:**
 - “Skip” over some areas, or
 - Concentrate or amplify in other locations
- **Small wind turbines with narrow, fast-moving blades create more “white noise” and less whine or pulsating sound**

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Noise Impact Example



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Noise Impact Example

- **The wind turbine industry says:**
 - “The blades...make a ‘whooshing’ sound and mechanical parts or unusual wind currents can produce a steady ‘hum’ or ‘whine.’
 - However, **ambient noise is usually louder than any noise produced by wind turbines** (which) are significantly quieter than older models.”

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Noise Impact Example

- **A neighbor says:**
 - “(W)e now live with the daily presence of turbine noise, 24/7. ... **The noise is as constant as the wind.** ...
 - “It can be a low rumbling, whooshing, grinding **background noise that one can just hear** above the sound of the trees or
 - it can **build to an in-your-face noise, (a) pulsating sound** that echoes in your head, keeps you awake at night, and beats on your house like a drum.”

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Noise Impacts

- **Require blade and turbine noise data** with application
- **Set standard for maximum permitted noise levels at the property line**
 - Typical: Maximum of **45 dB(A) - 55 dB(A)**
 - **Rustling leaves = 10 dB(A)**
 - **Rural evening = 20 dB(A)**
 - **Quiet rural area = 40 dB(A)**
 - **Ordinary conversation = 60 dB(A)**

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Shadow Flicker

- A “flickering” shadow is created by rotating blades
- Require **sun angle data** and **daytime path** of the wind turbine’s shadow
 - **Summer** and **especially winter paths**
- Concern for those with **photosensitive epilepsy** or similar conditions
- Not a significant issue for smaller turbines with narrow blades and higher rotation speed

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Visual Character & Aesthetics

- Some find wind turbines to be **graceful visual amenity**
- Others find units to be an **unwelcome visual intrusion**
- **Require monopole tower**
 - **Non-reflective color (white, gray, black)**
 - **No guy wires**
 - **Minimum FAA lighting**
 - **No signage**
 - **Strict maintenance plan**

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Types of “Small” Wind Energy Systems

- **Agricultural wind turbines**
 - Windmills for pumping, etc. (historical)
 - Isolated site power generation
 - Additional source of income
- **Private or residential wind turbines**
 - Rooftop
 - Freestanding
- **Non-residential wind turbines**
 - Demonstration project
 - Commercial “attention-getting” installation

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Permitted Locations and Approval Processes

- **Agricultural Wind Turbines:**
 - Allow limited number per acre or parcel “by right”
 - building/zoning/electrical permits
 - Set maximum height for “by right” turbine towers
 - Allow additional or taller agricultural wind turbines with special use approval

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Permitted Locations and Approval Processes

- **Private or Residential Wind Turbines:**
 - Require special use approval so neighbors are aware of proposal
 - Maximum of one per parcel
 - Rear yard only
 - Allow only in “rural” residential district(s)?
 - Building-mounted units likely require substantial structural upgrades

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Permitted Locations and Approval Processes

- **Non-Residential Wind Turbines:**
 - Require special use approval
 - Beware that project may be intended as “attention-getter”
 - Think of dealership flags and whirly-gigs!



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End of Life, Abandonment, & Removal

- Require information about **anticipated lifespan** with application
- **Maintenance plan**
- **Removal agreement**
 - Remove within 90 days of abandonment or ceasing operation
 - Removal bond for non-residential units

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Additional Requirements

- **Detailed site plan**
- **Documentation of compliance:**
 - Construction and electrical codes
 - Setbacks and fall zone
 - Noise limitations
 - Lighting and signage limitations
- **Proof of liability insurance**
- **Method of climb prevention**

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Final Notes

- **Wind turbines are a fast-changing technology**
 - Any ordinance will likely need to be updated in one to two years
- **Assistance from qualified professionals key to success**
 - Planning consultant
 - Attorney
 - Wind energy expert

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Thank You

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