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Community Wind Development

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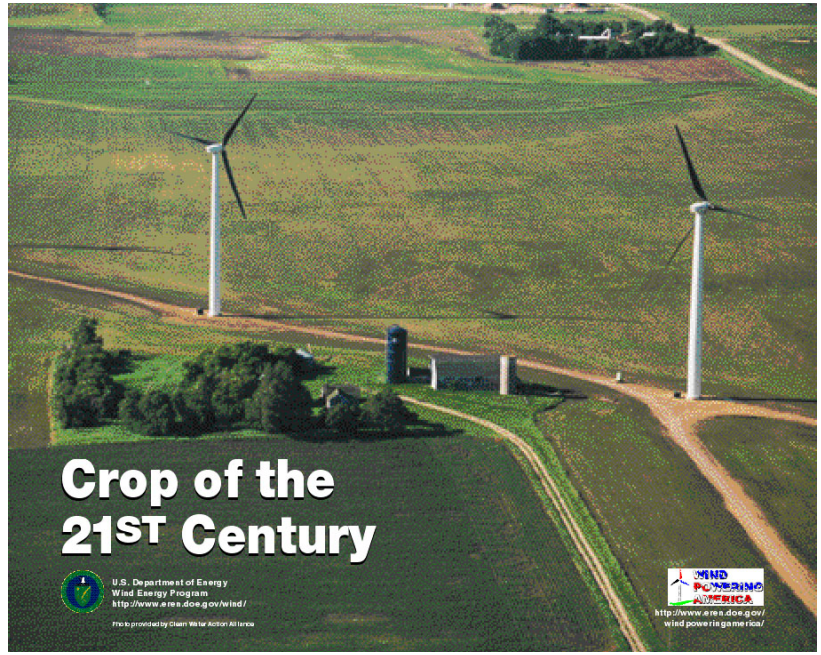
Topics I Will Cover

- What is a Community Wind Project?
- Key Issues
- Economic Feasibility
- Case Study



What Is a Community Wind Project?

- Tom Wind's Definition: A Wind generation project owned by farmers, businesses, schools, governments, or locally owned utilities in the area where the wind power is used
- Majority of ownership benefits stay in the local community
- Typically a single turbine or a small cluster
- Often connected to the local distribution system

Single 900 kW Wind Turbine Owned By Waverly Light & Power Connected to 13.8 kV Distribution Line

Key Issues

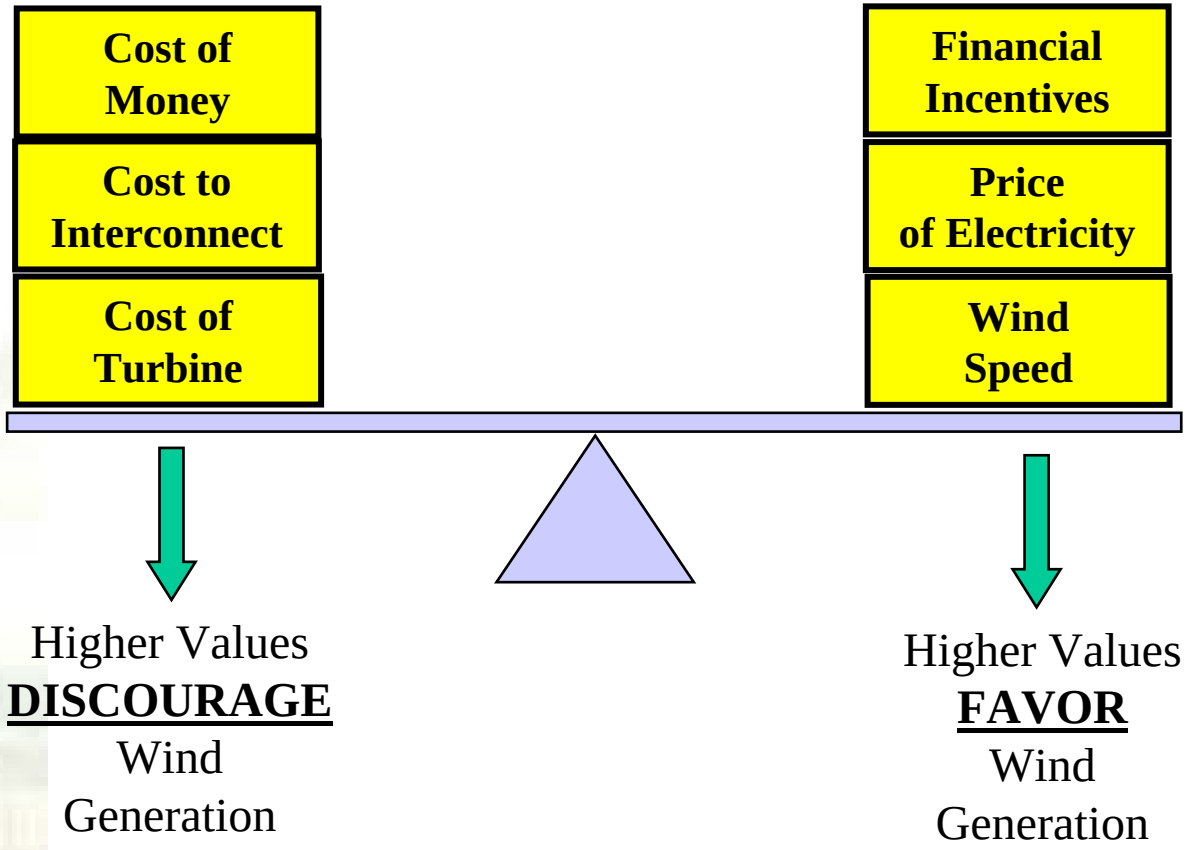
Photo by GE Wind - Storm Lake, Iowa

Overview of key issues

- Siting
- Interconnection
- Operation
- Turbine procurement
- Financing
- Operation & Maintenance
- Overall economics

600 kW Turbine at School in Forest City, Iowa

The Overall Economics of Wind Generation is Determined by a Balance of Factors

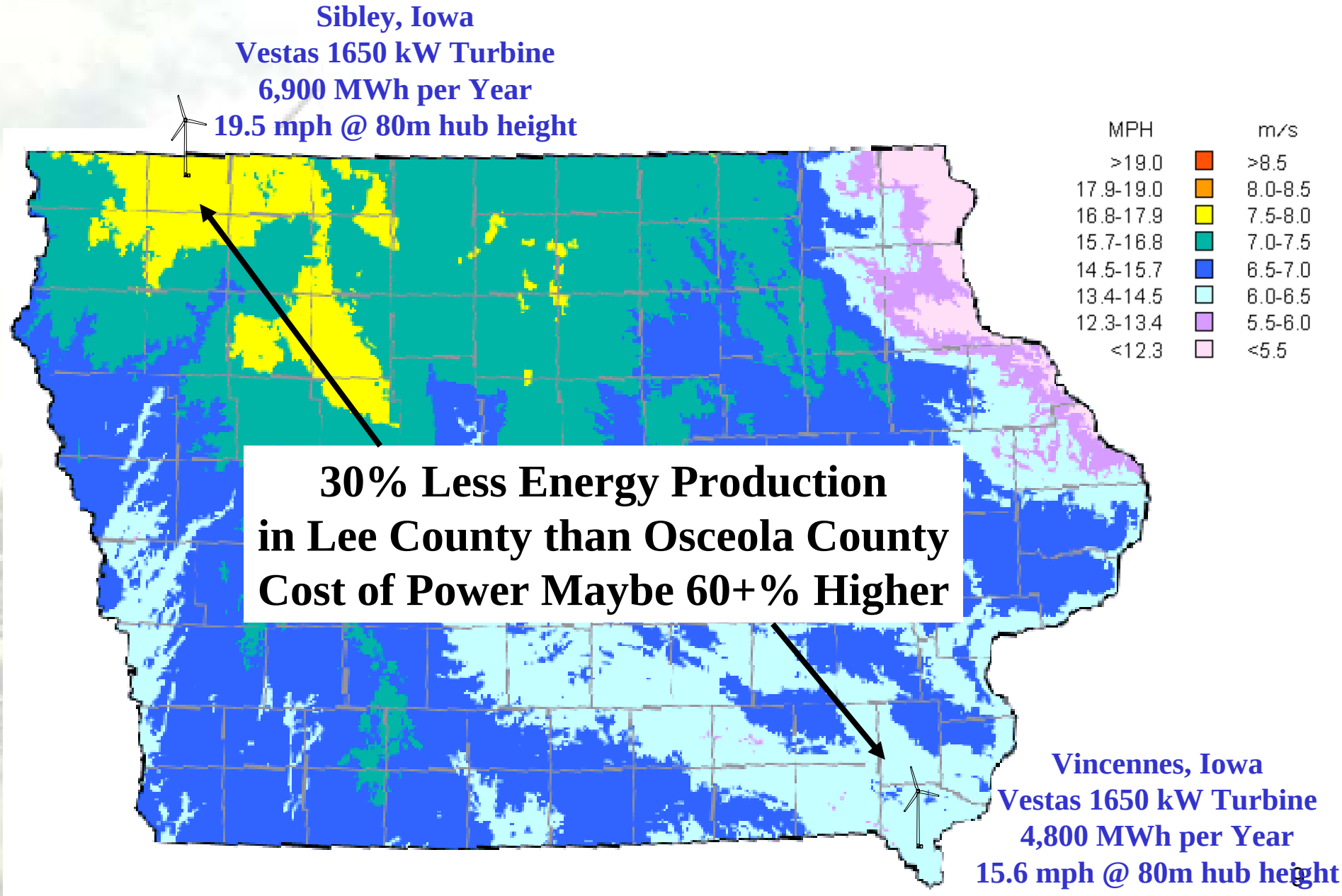


Costs and Challenges
Photo by GE Wind - Storm Lake, Iowa

Costs and Challenges

- Your best site from a logistical perspective may not have the best wind speed in the area, because wind speed makes a big difference (see next slide)
- Wholesale PPA rate or power bill savings
  - Added value of green tags
- Financial incentives
  - Generally, some type of incentive is required to make a “small” project competitive with larger wind generation projects, such as state production tax credits or payments, grants, or zero interest loans
- Financing costs
  - For-Profit project can use federal tax benefits, such as the PTC and accelerated depreciation
    - Debt term is often 10 years
  - Non-Profit project can use zero interest CREB financing
    - Debt term can be 15+ years

Small Differences in Wind Speed Make a Big Difference!



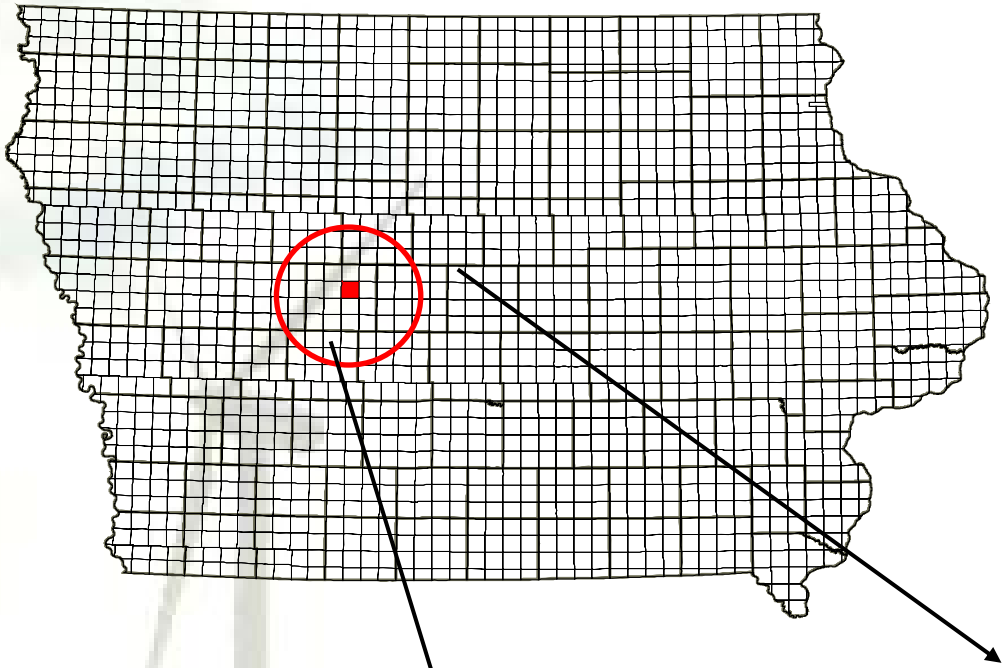
Costs and Challenges
(Continued)

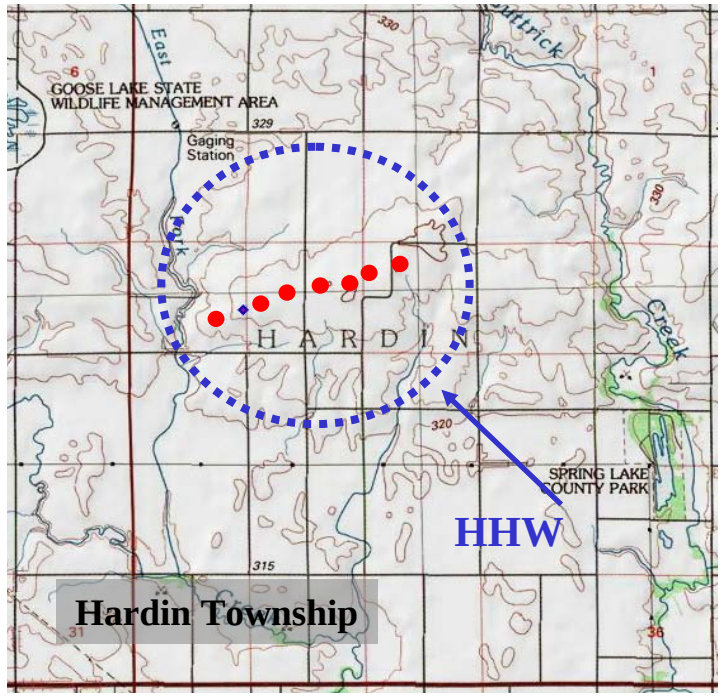
- Wind turbine sizes
  - Larger wind turbines provide lower cost wind power
    - Less capital cost per kW
    - Operating and Maintenance costs are less per kW
    - Higher hub heights provides higher wind speeds
    - Newer technologies increase efficiency
  - Refurbished wind turbines
    - Can lower capital costs
    - Usually less efficient
    - May have higher maintenance costs
    - Difficult to find “larger” units, since they are newer units still being used
- Wind turbine prices
  - Turbine prices are higher now due to limited supply and growing demand, prices <u>may</u> drop a little in 2008.

Costs and Challenges
(Continued)

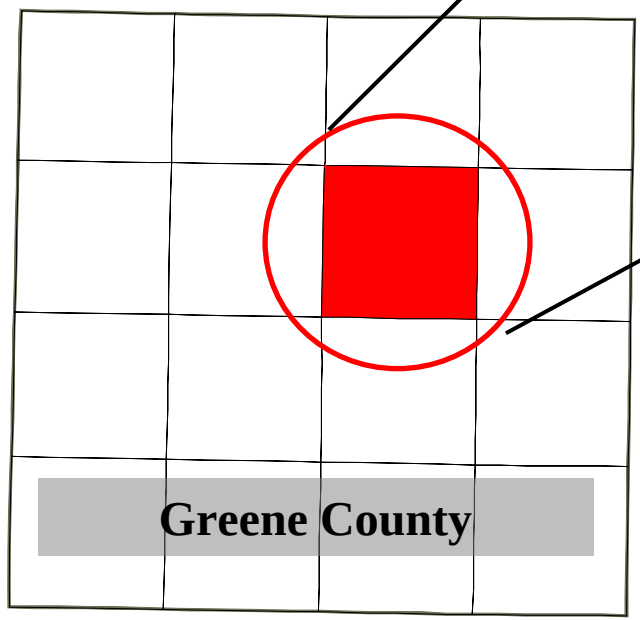
- Interconnection cost
  - A project with only one or two large turbines can save money by connected to the existing distribution system
    - Point of Interconnection has to be relatively close to the distribution substation to avoid voltage flicker and voltage level problems
      - Distance of 0-4 miles, depending primarily on upon substation transformer size, conductor size
- Operation and Maintenance
  - Wind turbine manufacturer will be responsible for maintenance during the 2 to 5 year warranty period
  - How close are the manufacturer's service facilities?
  - Are there third party maintenance providers nearby?
  - The cost of long-term Repair and Replacement is uncertain and can be very significant.

Case Study
Photo by GE Wind - Storm Lake, Iowa





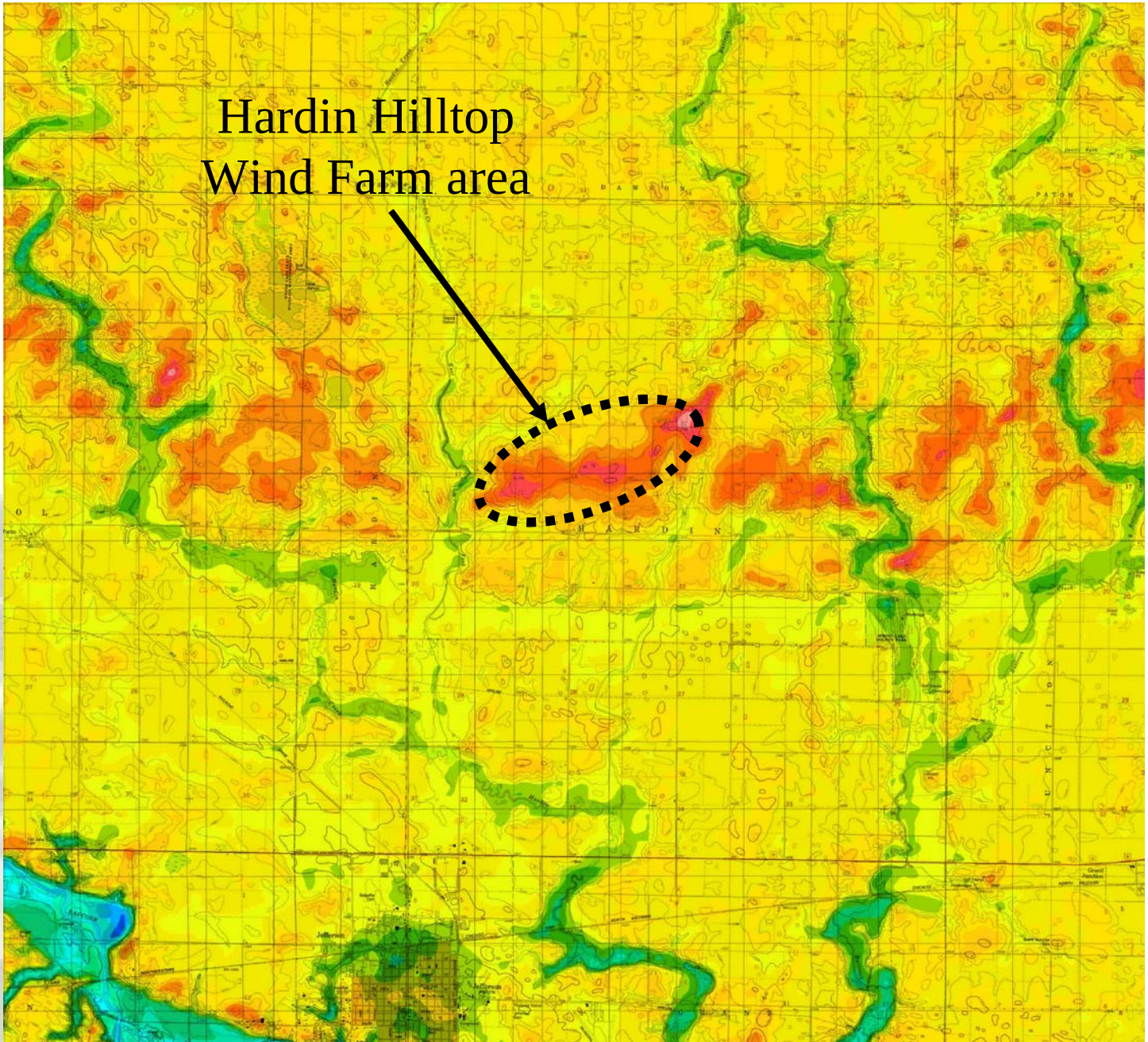
Farmer-Owned Wind Farm Proposed in Greene County, Iowa



One Financing Option for Large Wind Turbines is LLC Flip Model

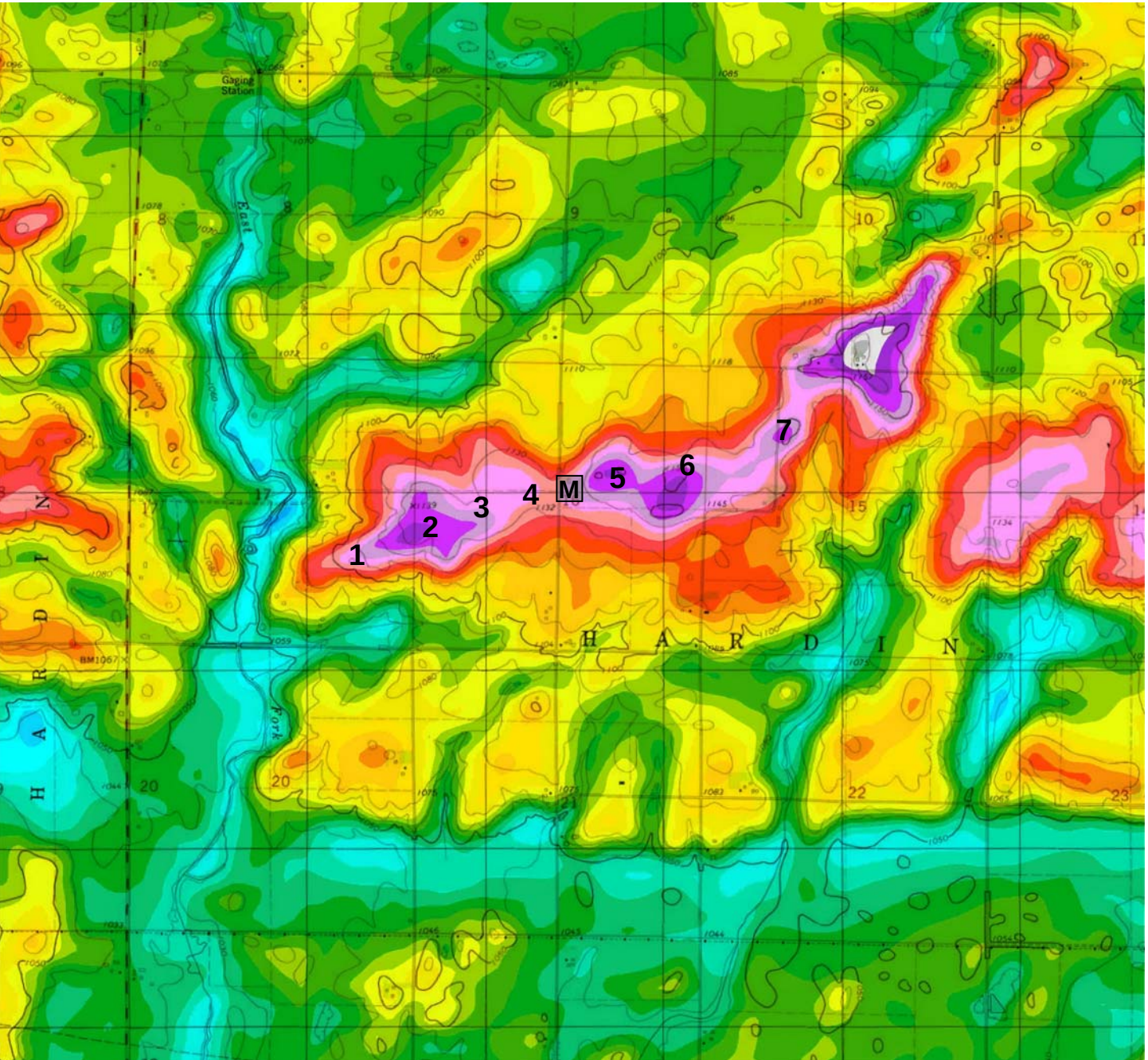
- Ownership structure based on Minnesota LLC Flip model
  - Outside Investor for utilizing income tax benefits ("Tax Investor") becomes a partner in your LLC and pays 35-40% of the wind turbine project cost depending upon how windy the site is
  - Ownership flips after 10 years from Tax Investor to local owner when the tax benefits lapse
- May use USDA grants
  - Limited to $500,000, but all applicants don't receive funding
  - Reduces Production Tax Credit and depreciation basis for Tax Investor
- There may be other financial incentives depending upon the state
- Local owners will have modest down payment
- Balance of cost can be borrowed from a local bank.

Selecting the Area with the Best Wind Speeds



Mean Annual
Wind Speed
In Meters per Second
at 50 Meters

Selecting Specific Sites



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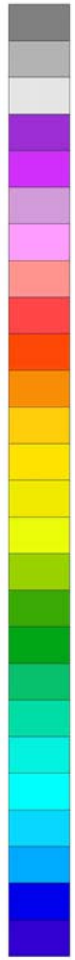
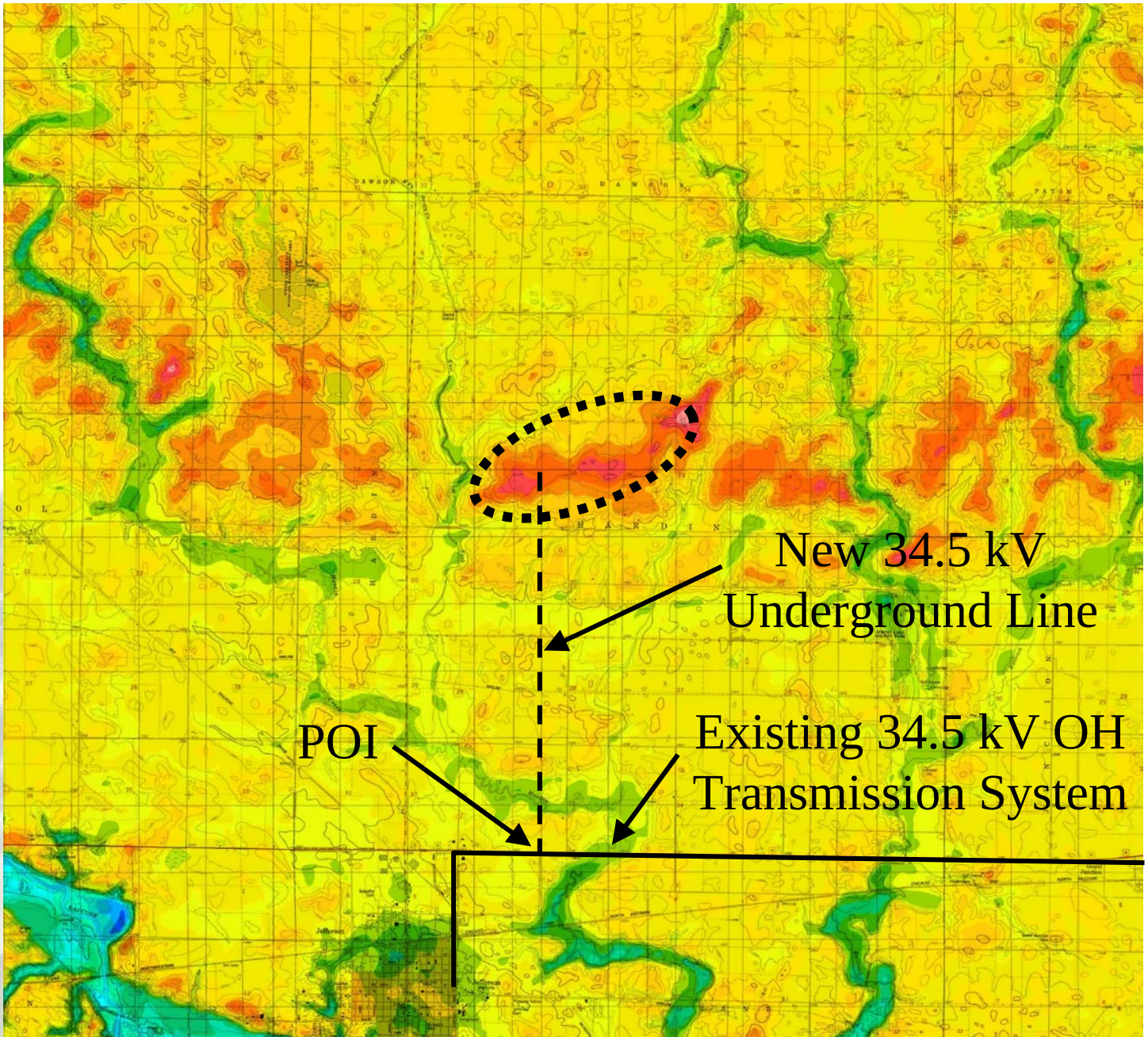


0.02
Mps per
Color
Change

1 Wind Turbine #1

M Met Tower

Interconnecting the Project to the Grid



The main interconnection issues for this project are the power factor and operating voltage levels at the Point of Interconnection

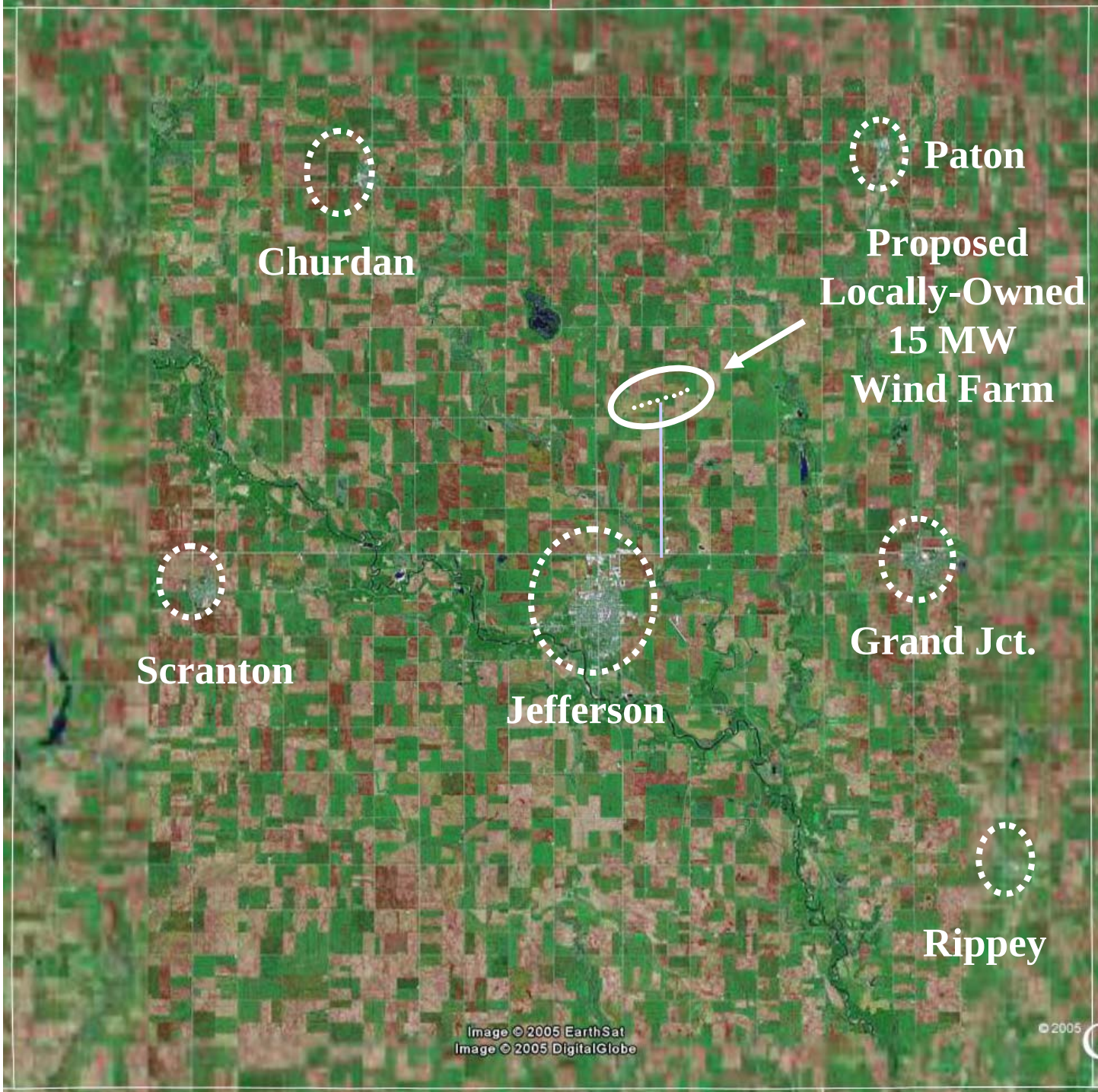
Power Purchase Agreement

- All power will be sold to the local investor-owned utility serving in the area
  - Fifteen year term contract
  - Power sold at utility's long term avoided cost (about 3 ¢ per kWh) as required by PURPA
  - Green tags are separately valued and sold
- Wind power will be integrated in with the utility's other power supply resources

The Major Challenge for This Project: --- Wind turbine procurement ---

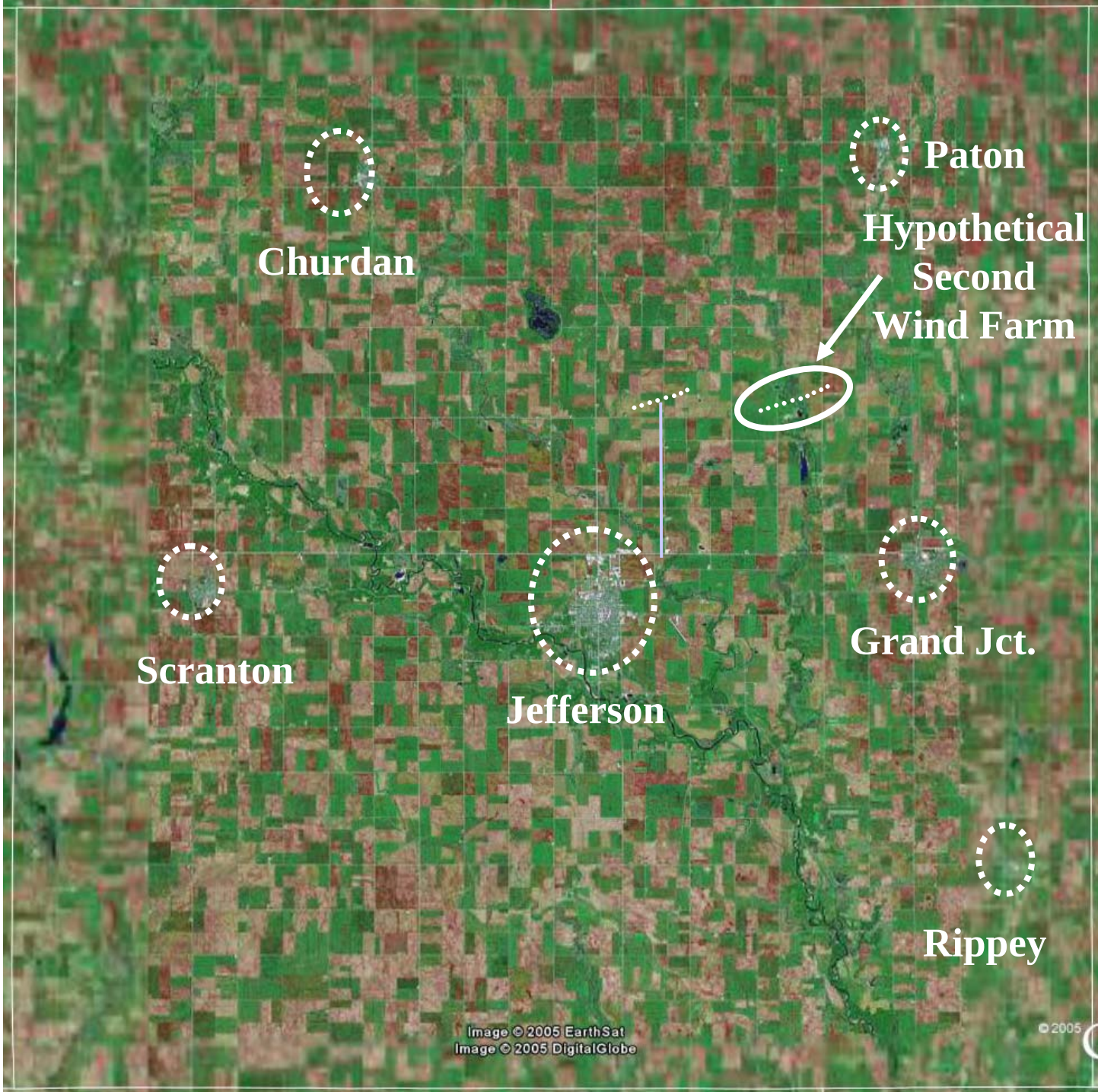
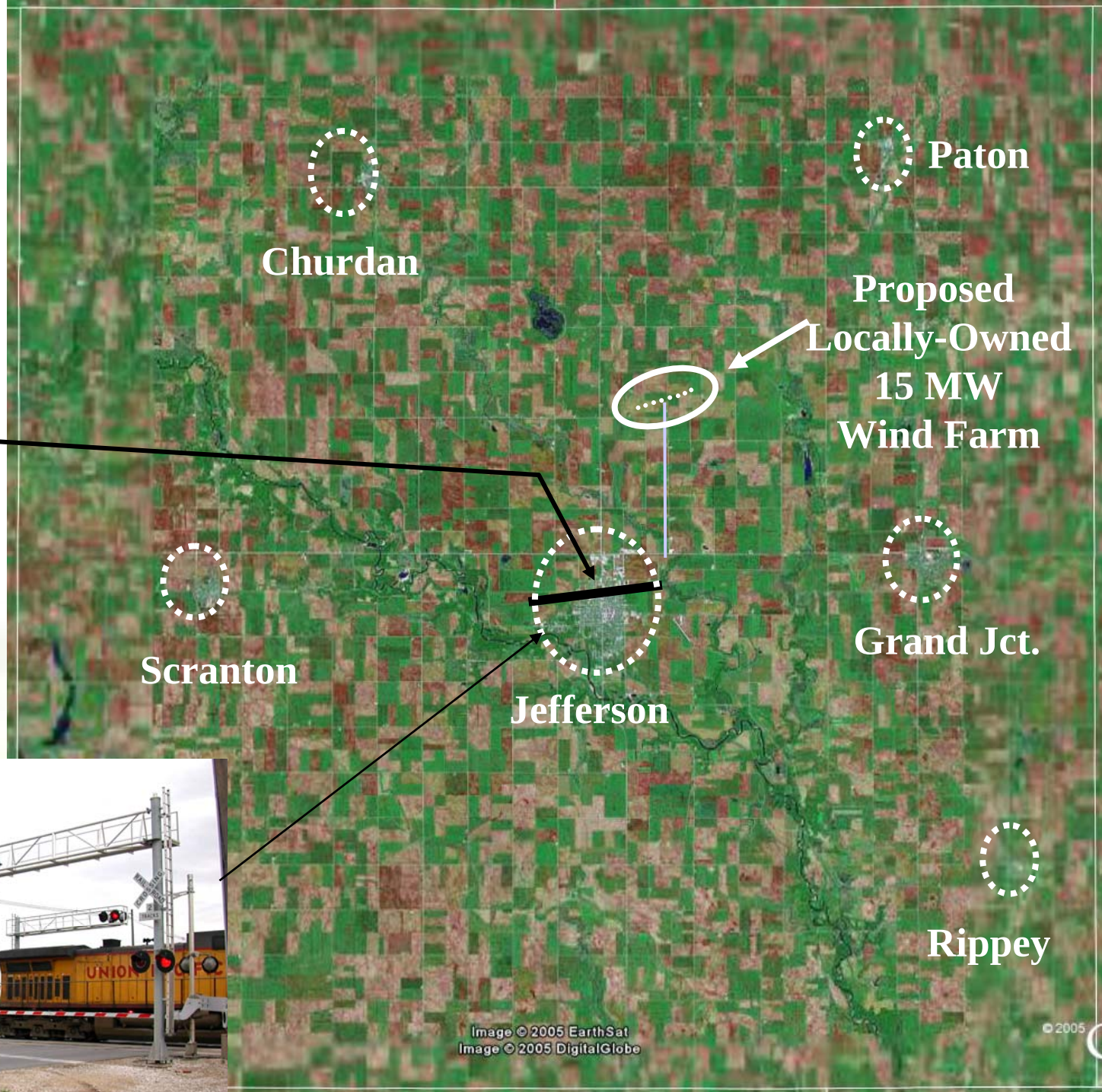
- It is a Seller's Market!
- Most major manufacturers have no wind turbines available for 2006 or 2007
  - Large wind farm developers have purchased most wind turbines
  - Earliest delivery may be in 2007 or 2008
  - Two years ago, delivery time was 20-25 weeks
- Manufacturers favor larger orders rather than smaller orders since they make more money
  - In some cases, no manufacturers may even bid on supplying a single wind turbine
- To get a turbine in the near future you may have to work through a larger developer

- The proposed wind farm would generate about 47,000 megawatt-hours per year
- Jefferson uses about that same amount of energy per year
- The Proposed Wind Farm Will Be a Significant Supplier of Electricity to the County



- The whole county uses about 100,000 MWH per year

- Along with a second hypothetical wind farm about the same size, the two wind farms would generate enough energy on average to provide all of the county's electricity needs.



- The 15 MW Locally-Owned Wind Farm Will Save the Equivalent of Enough Coal To Fill a Train 3 Miles Long <u>Every Year</u>