Developing a Wind Turbine System for Chicago

Inter-Professional Project 307

Summary

- ***Background Information and Site Selection***
- Site Assessment and Turbine Characteristics
- Marketing and Incentives
- Future Work and Group Reflection

Background

- TurbodynamX - wind power in an urban area
- First attempt at constructing turbine in urban setting
- Unique turbine - claims to be more efficient
- Better wind sites exist, but most are too far away from customers

Rendered Image of Turbine at Field Museum

Why the Field Museum?

- High visibility
- Complements the museum's goals to promote alternative energy systems
- Good location to obtain experimental data

Aerial photos of Museum Campus

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Site Assessment

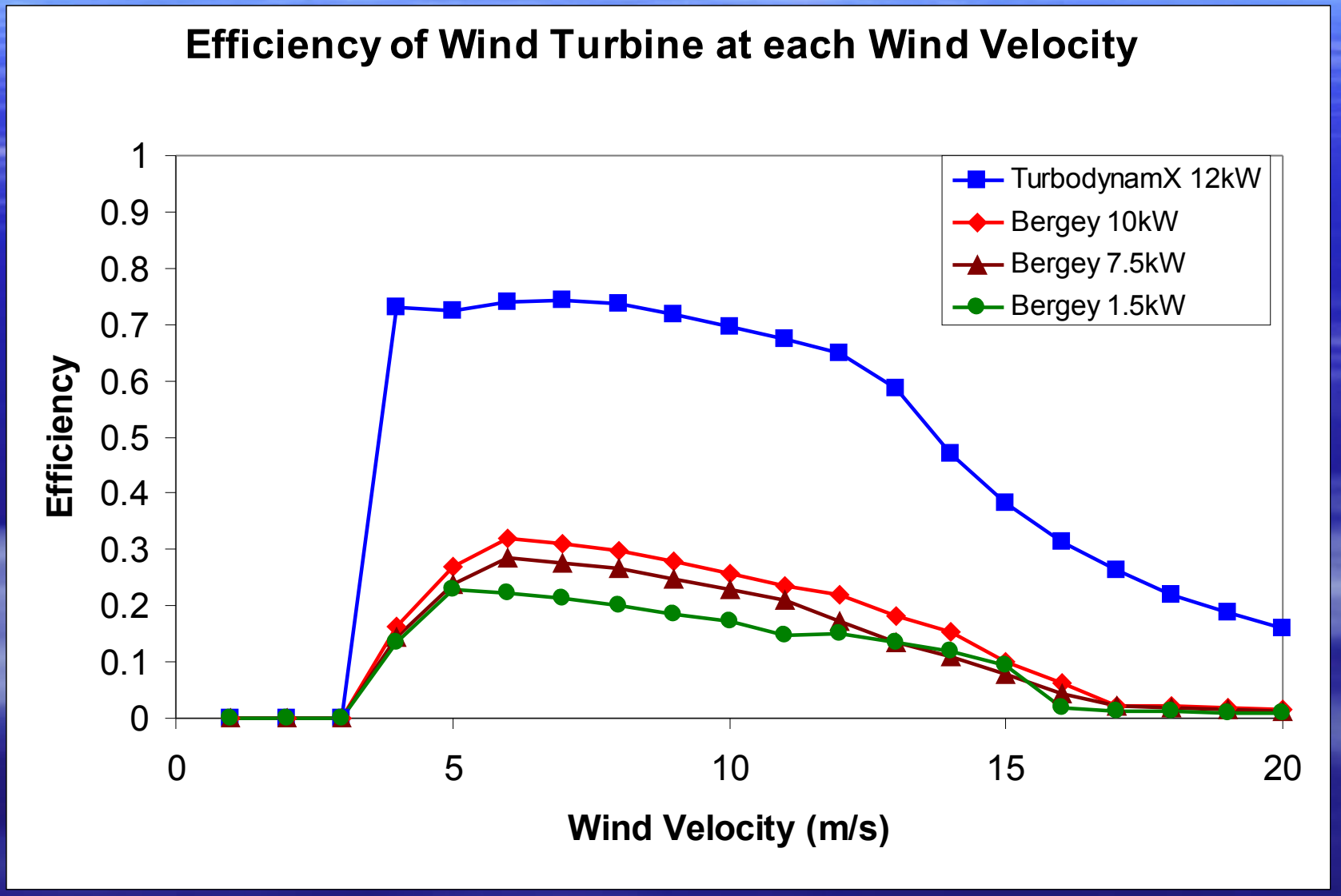
- Annual power production from Meigs Field wind data
- Visual Impact
- Special Zoning
- Environmental Issues
  - Bird kills
  - Noise pollution

Small Wind Turbine Productivity Estimates		
Wind Power Class	Productivity per m^2 of swept area (kWh/year)	Wind Speed at 10m (m/s)
1	< 350	< 4.4
2	350-500	4.4-5.1
3	500-610	5.1-5.8
4	610-690	5.6-6.0
5	690-770	6.0-6.4
6	770-880	6.4-7.0
7	880-1170	7.0-9.4

Turbine Characteristics

- CH CAPHORN 10/POL™ is considerably more efficient than competitors
- Estimated output at Field Museum is 17,000 kWh per year
- System CH CAPHORN™ Fairing design
  - Increased efficiency
  - Reduced bird kill
  - Reduced noise

Efficiency Graph



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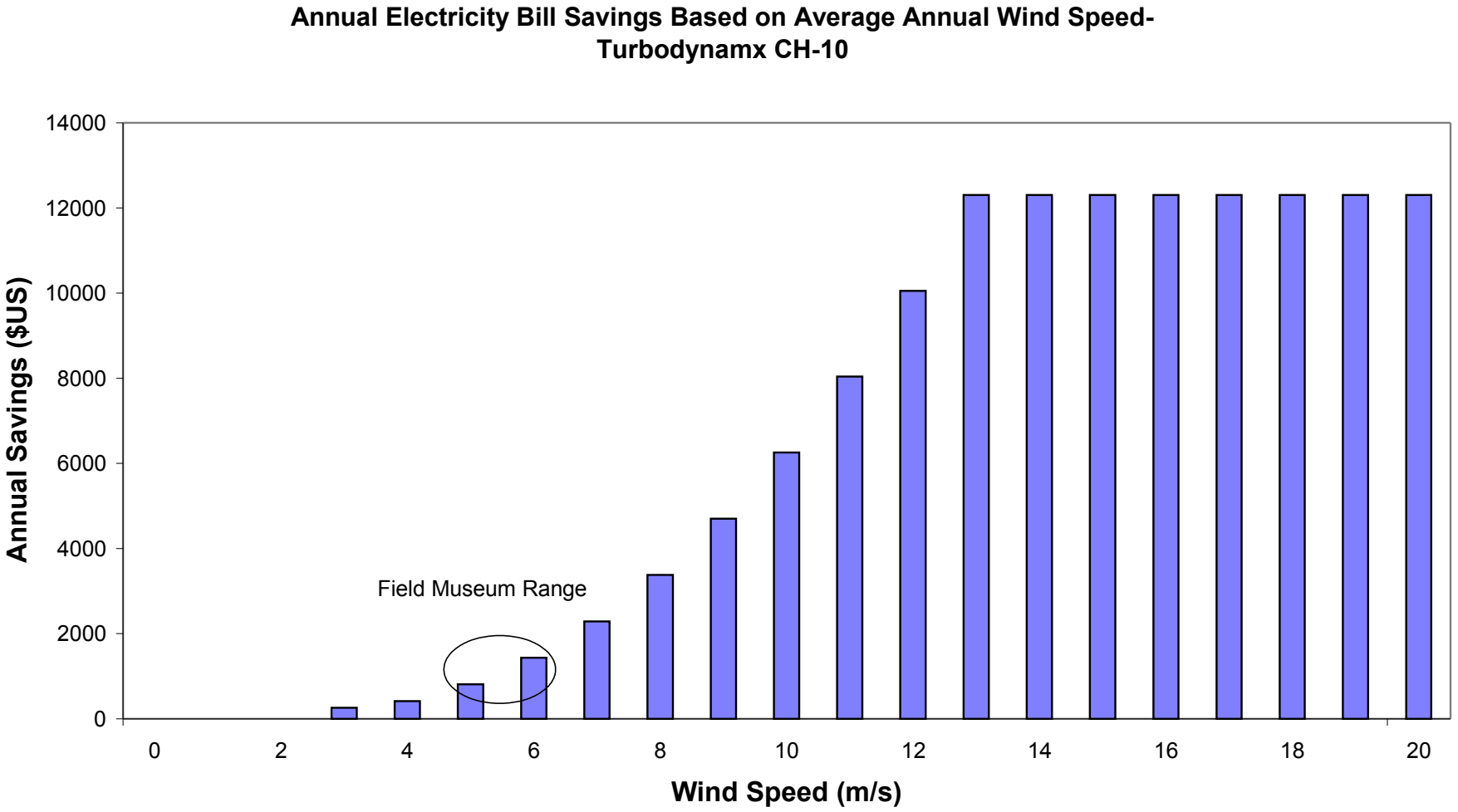
Urban Marketing

- Potential complementary energy source for private consumers

- Green Energy Source
- Cost Savings
  - ~$1,700 per year in electric bill

Cost Savings Curve



Incentives for using Green Energy

- Net metering
- Illinois-sponsored 50% subsidy program
  - CH CAPHORN 10/POL™ turbine meets requirements

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Future Work

- Unveiling of wind turbine at Chicago / Midwest Renewable Energy Workshop on June 24-25
- Install wind monitoring system
- Find avenues for marketing
- Analysis of actual turbine output

Group Reflection

- Separation of group into technical and business sides
- Group meetings
- Team dynamics
- Sponsor Involvement

Acknowledgements

Dr. George Nassos
Dr. Said Al-Hallaj

Chicago Department of Environment
ComEd
Field Museum of National History
Illinois Clean Energy Community Foundation
Illinois Department of Commerce and Community Affairs
TurbodynamX

Thank You

Questions?