Renewable Energy Committee

Chairperson: Andrew Lewandowski
Committee Members:
Alan Coates
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Greg Hoffmann
Cory Neeley
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Renewable Energy Committee

Established September 2016

- One year temporary committee
- Can/Should Waterloo be a Net Zero community?

Introduction

- Origins of the Committee
- Meaning of 100% Renewable/Net Zero
- Waterloo/UW-Madison Feasibility Study
  - Renewable Technology Infrastructure
  - Geography
  - Costs of Implementation

Introduction

- Waterloo Next Steps
  - Committee to Determine Details of Infrastructure Plans
    - Technology
    - Location
    - Cost
  - Committee to Negotiate a Purchase Power Agreement
  - Committee for Solicitation of Donations
    - Reducing cost of purchase
    - Obtaining third party donations

Questions?

Origins of the Committee

City Identity:

- "Waterloo's viability relies on the health of its natural systems. The quality of the water we drink and the air we breathe as well as the integrity of the soil, natural areas, and wildlife populations provide the essential foundation for economic, social, and personal health. In Waterloo, environmental health also helps to define the community's sense of place. The City is defined, linked, and bounded by natural features like the wetlands, the Maunesha River, natural and wildlife areas, and wooded drumlins. Paying attention to how growth and development affects these resources, and how these resources are an asset to community growth, will contribute significantly to the achievement of Waterloo's future vision."

Origins of the Committee

City Industries:

- Briess Malts, Est. 1876

Green with Briess Initiative

- Improved Efficiency and Conservation
- Waste Stream Recycling
- Refrigeration Conversion
- Water Conservation

Origins of the Committee

City Industries:

- McKay Nursery, Est. 1897
  - Land Stewards
  - Lubrication oil reuse
  - Steel filter recycling
  - Roof-top Rain Gardens

Origins of the Committee

City Industries:

- Sheehy Mail Contractors, Est. 1952
  - Compressed Natural Gas
  - Increased truck efficiency

Origins of the Committee

City Industries:

- Trek Bicycles, Est. 1976
  - Pillar of the green transportation industry
  - Renewable energy credits

Origins of the Committee

City Industries:

- Ab E Discovery
  - Biotech company created to reduce antibiotic use in livestock

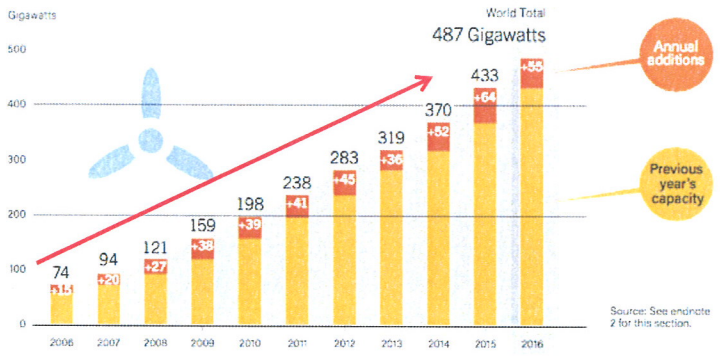
Is renewable energy a fad?

Origins of the Committee

- Direction of the World
  - Trending toward renewables

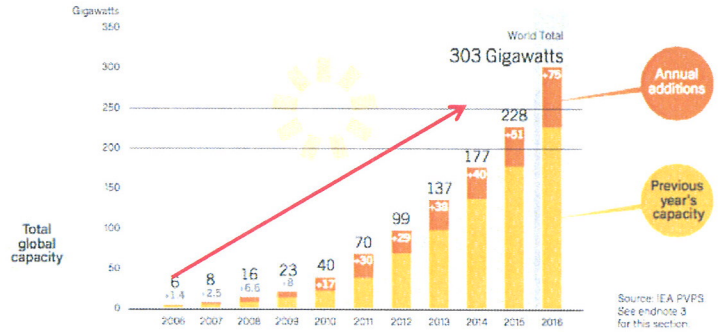
WIND POWER

Figure 26. Wind Power Global Capacity and Annual Additions, 2006-2016



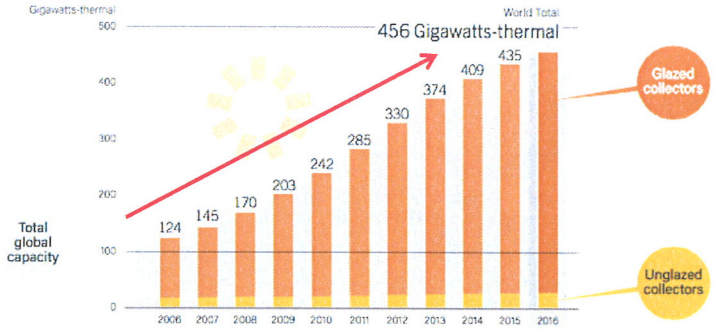
SOLAR PV

Figure 15. Solar PV Global Capacity and Annual Additions, 2006-2016

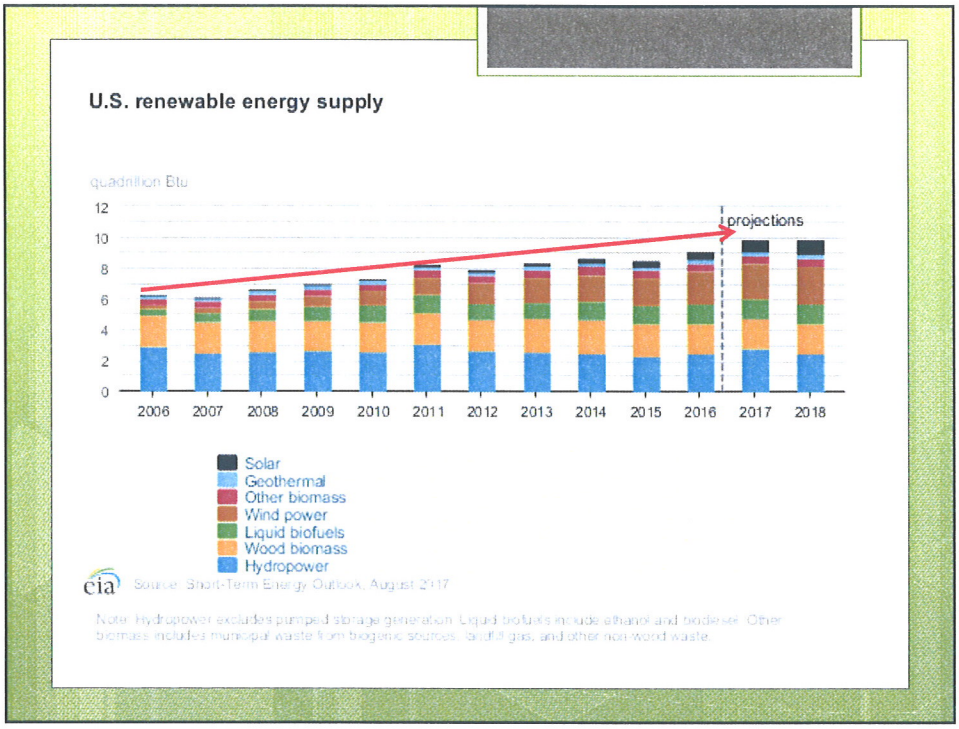


SOLAR THERMAL HEATING AND COOLING

Figure 22. Solar Water Heating Collectors Global Capacity, 2006-2016



Source: IEA SHC. See endnote 2 for this section.



Origins of the Committee

- Direction of U.S. Cities
  - 150 Mayors dedicated to 100% renewables by 2035
  - Three cities at 100% renewable electric
    - Aspen, CO
    - Burlington, VT
    - Greensburg, KS

Origins of the Committee

- Direction of U.S. Cities
  - Madison, WI
    - Common Council Vote
      - $250,000 allocated to plan by 1/18/2018

Origins of the Committee

- Direction of U.S. Cities
  - Abita Springs, LA
    - 100% renewable electric by 12/31/2030

Origins of the Committee

- Direction of U.S. Cities
  - How partisan is this?
  - Madison, WI – 70% voted for Hilary Clinton
  - Abita Springs, LA – 75% voted for Donald Trump

Origins of the Committee

- City Mission supports renewable energy
- City Industry supports renewable energy
- Global, National, and City-wide trends toward renewables

Questions?

100% Renewable Energy

- 100% Energy Production – off the grid
- 100% Energy Production – on the grid
- Buy Renewable Energy Credits
- Combination of the above

Waterloo Feasibility

100% Energy Production – on the grid

- Making Waterloo a "utility generator."

To become 100% renewable (electricity):

- Minimum production ~34,400,000 kWh/year
- Consume 40,000,000 kWh/year
- Current WPPI renewables = 14%

Waterloo Feasibility

- Partnered with UW – Madison School of Engineering
  - Undergraduate Capstone course

UW Feasibility Analysis

- Best Renewable Technology options
  - Solar
  - Wind

UW Feasibility Analysis

- Geography:
  - Wind
    - North of town (McKay Nursery partnership)
    - Each turbine – about 6.8 million kWh/year
  - Solar
    - Northwest corner of the city
    - Up to 43.7 acres of unused land
    - Could generate about 36 million kWh/year

UW Feasibility Analysis

- Total cost of installation and maintenance
  - Wind Turbines
    - ~$8.2 million/turbine
  - Solar Garden
    - ~$52 million
  - Sell-back guidelines

Questions?

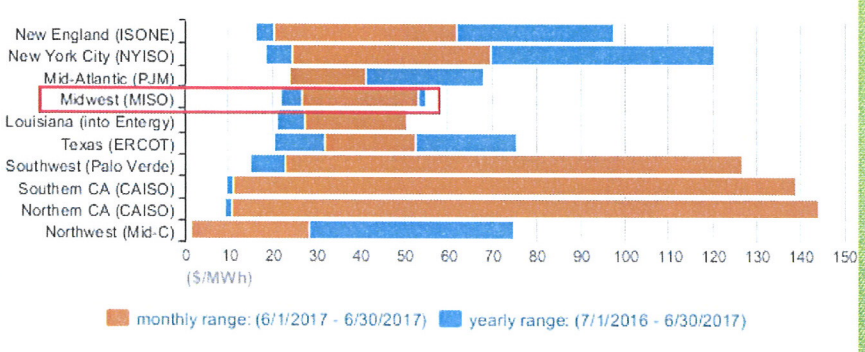
Next Steps

- Committee to determine details of renewables
- Committee to Negotiate a Purchase Power Agreement
- Committee for Solicitation of Donations

Next Steps

- Infrastructure Committee
  - Secure Grants
    - Meteorological tower
  - Bids from renewable energy industry
    - Partner with WPPI
  - Evaluate legalities of infrastructure
    - Statutes that dictate use

Monthly and annual range of wholesale electricity prices for selected regional trading hubs, June 2017



eia Source: U.S Energy Information Administration based on SNL Energy

Return on Investment

- $0.023/kWh – $0.054/kWh
  - Current WPPI wholesale rate ~ $0.04/kWh
- 40,000,000 kWh/year
- $920,000 - $2,160,000 / year
- Negotiate over a 20 year period
  - $18.4 million – $43.2 million

Next Steps

Committee for Reducing Capitol Costs

- Donations from technology suppliers
- Philanthropic donations
  - Foundations
  - Celebrities
  - Media outlets
  - Sports teams
- Grants

Conclusions

- Goal of 100% renewable energy fits with Waterloo's future
- Waterloo is situated to use Wind and Solar to meet its energy needs
- ROI: $18-43 million over 20 years if capital costs are controlled
- Next steps: establish committees for infrastructure bids, PPA, and donation solicitation

Thank You