Advanced Renewable Tariffs
New Policy Option for Michigan

Paul Gipe, wind-works.org
Renewable Energy Has Come of Age

Noordoost polder, the Netherlands

Paul Gipe, wind-works.org
2007 Wind Capacity
Indiana & Michigan Rank

- Texas
- California
- Illinois
- Ontario
- Pennsylvania
- Wisconsin
- Indiana
- Michigan
- Ohio

Megawatts (Thousands)

Paul Gipe, wind-works.org
Solar Photovoltaic Development

Paul Gipe, wind-works.org
World PV Capacity 2007
~8,000 MW

Germany 53%
Japan 28%
USA 11%
Rest of World 7%

3,963
2,120
806
550
Installed Solar PV Capacity 2007
Indiana & Michigan Rank

- California
- New Jersey
- Arizona
- Illinois
- Indiana
- Michigan

Paul Gipe, wind-works.org
Solar PV Growing Rapidly

- 2007: 8,000 MW Worldwide
- 2,500+ MW/yr
- $20+ Billion
- Major Markets
  - Germany--1,000+ MW/yr
  - Japan--250 MW/yr
  - Spain--350 MW/yr
  - California--120 MW/yr
Renewable Tariffs & Solar Photovoltaics in Germany

MW Total (Thousands)

Year

Renewable Tariffs Launched

100,000 Rooftops

1,000-Rooftops
(2,500 x 3kW)

Paul Gipe, wind-works.org
Solar PV in Germany 2007

- 150,000 New Systems
- €6 Billion
- Total of 450,000 Systems
- ~1,100 MW in 2007!
- Total 4,000 MW
- ~2% Supply in Bavaria
- ~1% Supply in Germany

Paul Gipe, wind-works.org
German Homeowners

- 500 MW on Home rooftops/yr
- 2,000 MW+ Total
- 2 TWh/yr
- ~ €1 Billion/yr Revenue
- Anyone with a Roof Can Do Solar in Germany!

Paul Gipe, wind-works.org
German Farms--Solar PV Crop

- ~700 MW on Barn Rooftops in 2007
- ~1,500 MW Total in 2007 (€9 Billion)
- ~1.5 TWh/yr (€700 Million)
Germany’s Renewable Tariffs
The Results (2007)

- Renewables 14% of Supply
- Renewables 6% of Primary Energy
- 70,000 Employed in Wind Industry
- 40,000 Employed in PV Industry
- 8,000 Employed in Biogas Industry
- 250,000 Employed in Renewables
- €32 (~$50) Billion Turnover

Paul Gipe, wind-works.org
Cost of German EEG
~$50/yr/household

Paul Gipe, wind-works.org
Why the European Success?

• #1 Community Involvement
  Germany & Denmark

• #2 Advanced Renewable Tariffs
  16 EU Countries use Electricity Feed Laws

Paul Gipe, wind-works.org
Stauning, Denmark
Why Community Power?

- Participation = Greater Acceptance
- Distributed = Greater Resiliency
- Clean & Green (Mostly)
- Human Scale
- Enables Local Ownership
- New Cash Crop For Farmers
Advanced Renewable Tariffs
Setting the Stage
What are Our Goals?

• **Primary**
  High Penetration of Renewables Quickly

• **Secondary**
  Equitably Distributed Ownership
  Rural Development
  Distributed Generation
  New Industry & Jobs

Paul Gipe, wind-works.org
Wieringemeer polder, the Netherlands
Do We Want Renewables?

• Peak Oil, Peak Gas

• Climate Catastrophe
  Europe, 2003: 52,000 Dead

• Public Support High
  at Level Not Seen in 20 Years

• Desire for New Jobs
If Yes, Then What Works Best?

• Who Gets Contracts (PPAs)
  Elite Few or All Who Want Them?

• What Mechanism To Use
  RECs/ROCs/Green Tags
  Subsidies (PTC, WPPI)
  Advanced Renewable Tariffs

Paul Gipe, wind-works.org
If We Use a Market Model, Then

• You Get What You Pay For
• If You Want It You Must Pay For It
• Difference Between Cost & Price
  Margin Determines Rate of Growth
• Premium Prices Deliver
  More Generation More Quickly and More Jobs

Paul Gipe, wind-works.org, Goderich, Ontario
### Political Price-Political Quantity

#### Market Mechanisms

<table>
<thead>
<tr>
<th></th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed-in Tariffs</td>
<td>Political</td>
<td>Market</td>
</tr>
<tr>
<td>Quota/RPS/Tendering</td>
<td>Market</td>
<td>Political</td>
</tr>
</tbody>
</table>

Both are Market Mechanisms

Paul Gipe, wind-works.org
Aggressive Targets Require Aggressive Measures

German Renewable Energy Targets

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2020</th>
<th>2030</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>12.5%</td>
<td>27.5%</td>
<td>45%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Ferndale, Ontario
Advanced Renewable Tariffs

• Deliver More Capacity---
  --More Quickly
  --More Equitably
  --By More People
  by Enabling Participation

Paul Gipe, wind-works.org
Advanced Renewable Tariffs

• **What Are They?**
  Payment for Generation (Feed-in Tariffs)
  Political Price, Not Political Quota

• **How Do They Work?**
  Price Differentiation
  Paying for Solar, Paying for Wind

• **Where?**
  Germany, France, Spain . . .
  . . . 18 EU countries

Paul Gipe, wind-works.org
Renewable Tariff Design

- Simple, Comprehensible, & Transparent
- Priority Access & Purchase
- Prices Sufficient for Development
- Lengths Sufficient for Profitability
- Fair But Not Undue Profit
- Price Differentiation

Paul Gipe, wind-works.org

Altamont Pass, California
How Can Utilities Profit from Renewable Tariffs?

- Don’t Lose Customers from Net Metering
- Gain New Generation
- Rate of Return on Transactions?
  Service Fee?
- Tax Benefits on Transactions?
  Washington State
- eg. 1990s Conservation Programs

Paul Gipe, wind-works.org
Indiana & Michigan

• More Like Germany than Texas
  Population Density
  Farm Size
  Settlement Patterns

• Projects More Like Germany than Texas
  Smaller Projects
  Clusters of Turbines

Paul Gipe, wind-works.org
Michigan’s Renewable Energy Sources Act

- Rapid Development
- Reduce Price Volatility
- Reduce Long-Term Prices
  Pay Little More Now
  Avoid Paying More Later
- Reduce CO₂ Gases
- Create New Jobs

Paul Gipe, wind-works.org
Michigan & Germany

- 120 TWh/yr (1/5 that of Germany)
- 1/8 the Population
- 3/4 the Land Area
- 1/5 the Population Density
- Relative to German Land Area
  - 55% Renewable with Same Capacity
  - Same Generation as Coal (66 TWh)
  - Wind Generation (40 TWh)) Same as Nuclear

Paul Gipe, wind-works.org
Michigan & Germany

- ~30,000 Jobs on Population Basis
- Residential Solar Revenue $200 Million/yr
- Farm Solar Revenue $150 Million/yr
- Total Solar PV Investment $4 Billion
- Total Wind Investment $6 Billion

Paul Gipe, wind-works.org
Ontario’s Standard Offer Program

- 20 Year Contracts
- <44kV, <10 MW
- Wind, Solar, Hydro, Biomass
- Inclusive--Open to All
- No Program Cap
Ontario’s Standard Offer Program

• 1,500 MW of Contracts
• Potential Investment of $4 Billion

Since 2006

Paul Gipe, wind-works.org
Montfort, Wisconsin
Renewable Tariffs Are In Play

- British Columbia
- Illinois, Minnesota, & Rhode Island
- California--Feed-in Fever
- US Congress
Renewable Tariffs--New Policy Option for North America

www.wind-works.org

Manawatu Gorge, New Zealand