Disclaimer: The views expressed are those of Paul Gipe and are not necessarily those of the sponsor.

Disclosure: Paul Gipe has worked with Aerovironment, ANZSES, APROMA, ASES, AusWEA, AWEA, BWEA, BWE, CanWEA, CAW, CEERT, DGW, DSF, EECA, ES&T, GEO, GPI Atlantic, IREQ, KWEA, MADE, Microsoft, ManSEA, MSU, NRCan, NRG Systems, NASA, NREL, NZWEA, ORWWG, OSEA, PG&E, SeaWest, SEI, TREC, USDOE, WAWWG, WE Energies, the Folkecenter, the Izaak Walton League, the Minnesota Project, the Sierra Club, and Zond Systems, and written for magazines in the USA, Canada, France, Denmark, and Germany.
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

Altamont Pass, California
Paul Gipe, wind-works.org
# Renewable Tariffs Contract Length

<table>
<thead>
<tr>
<th>Country</th>
<th>Wind</th>
<th>Solar</th>
<th>Hydro</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Germany</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Ontario</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Portugal</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Spain (2007)*</td>
<td>&gt;15</td>
<td>&gt;25</td>
<td>&gt;25</td>
<td>&gt;20</td>
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</tbody>
</table>

Longer Contracts Reduce Initial Price.

Paul Gipe, wind-works.org
Renewable Tariffs Inflation Adjustment

<table>
<thead>
<tr>
<th>Country</th>
<th>Inflation Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>0%</td>
</tr>
<tr>
<td>Ontario RFP</td>
<td>15%</td>
</tr>
<tr>
<td>Ontario SOC</td>
<td>20%</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>26%</td>
</tr>
<tr>
<td>France</td>
<td>60%</td>
</tr>
<tr>
<td>Spain</td>
<td>50-75</td>
</tr>
<tr>
<td>Greece</td>
<td>100%</td>
</tr>
<tr>
<td>Ireland</td>
<td>100%</td>
</tr>
</tbody>
</table>

Higher Inflation Adjustment Reduces Initial Price.

Paul Gipe, wind-works.org
Renewable Tariff Design
Price Differentiation

• For Different Technologies
• For Different Applications
• For Different Sizes
• For Different Regions
• For Different Resource Intensities
German Solar PV Tariffs 2009

- Freestanding
- <30 kW rooftop
- <100 kW rooftop
- >100 kW rooftop
- >1000 kW rooftop

$/kWh

Paul Gipe, wind-works.org
Solar PV Tariffs Worldwide

Italy
South Korea
France
Germany
Czech Republic
Spain
Austria
Ontario
Washington State*
California*
South Australia*

*$Limited duration with net-metering.

Paul Gipe, wind-works.org
Prices Paid for Wind Energy in Europe

Feed Law-Germany

Feed Law-France

Feed Law-Spain

0 0.02 0.04 0.06 0.08 0.1 0.12 0.14

$USD/kWh

2009

Paul Gipe, wind-works.org
Prices Paid for Offshore Wind Energy in Europe

Paul Gipe, wind-works.org

Germany

France
Differentiated Tariffs for Wind

- **Distributed Benefits**
  - Only Accrue From Distributed Generation
  - Differentiated Tariffs = Distributed Wind

- **Reduces Pressure on Windiest Sites**
  - Profitability Still Higher at Windy Sites

- **Reduces NIMBYism**
  - By Enabling Greater Participation

Paul Gipe, wind-works.org

San Gorgonio Pass, California
Differentiated Tariffs for Wind

• Increases Program Flexibility
  Lessens Pressure to Get Prices Right the First Time

• Reduces Development Risk
  Determining Final Price After 5 Years of Operation

• Spreads Opportunity to All
  Not Just to Elite Few

• Provides Fair Profits at Modest Wind Sites

• Limits "Excessive Profits" at Windy Sites

Paul Gipe, wind-works.org
French Wind Tariffs Pre-2006
Average Price vs Initial Price

Year

Euro Cents/kWh

23% CF
30% CF
41% CF

Paul Gipe, wind-works.org
# ARTs Feature Comparison

<table>
<thead>
<tr>
<th>Feature</th>
<th>Germany</th>
<th>France</th>
<th>Spain</th>
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</thead>
<tbody>
<tr>
<td>ARTs</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cost-Based Tariffs</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Program Limits</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Term</td>
<td>20</td>
<td>15-20</td>
<td>25+</td>
</tr>
<tr>
<td>Inflation</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Solar Tiers</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Wind Offshore</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Wind Tiered Tariffs</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Wind Tiers</td>
<td>Continuous</td>
<td>Continuous</td>
<td>n/a</td>
</tr>
<tr>
<td>Community Power</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

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>30%</td>
<td>45%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
German Renewable Generation

TWh Generated per Year

- ARTs (EEG)
- Feed Law (StrEG)

Year

0 25 50 75 100

Advanced Renewable Tariffs Launched
Feed-in Tariff (StrEG)

Paul Gipe, wind-works.org
German Renewables 2008
~95 TWh

- Wind: 40.3
- Hydro: 21.8
- Biomass: 28.7
- Solar PV: 4.3

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

- 2008: 13,000 MW Worldwide
- 5,000+ MW/yr
- $20+ Billion
- Major Markets
  - Germany--1,500+ MW/yr
  - Spain--500+ MW/yr (2,600 MW in 2008)
  - Japan--250 MW/yr
  - California--150 MW/yr

Paul Gipe, wind-works.org

Rancho Seco, California
World Solar PV Capacity 2008
~13,000 MW

- Germany: 41%
- Spain: 25%
- Japan: 17%
- USA: 9%
- Rest of World: 8%
Solar PV in Germany 2008

- 150,000 New Systems
- €6 Billion
- Total of 600,000 Systems
- ~1,500 MW in 2008!
- Total 5,000 MW
- ~2%Supply in Bavaria
- ~1%Supply in Germany

Paul Gipe, wind-works.org
German Homeowners

- ~800 MW on Home Rooftops/yr
- ~3,000 MW+ Total
- ~2.5 TWh/yr
- ~€2 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 2008
- ~2,000 MW Total in 2008 (€9 Billion)
- ~2 TWh/yr (€1 Billion)
Germany’s Renewable Tariffs
The Results (2008)

- Renewables 15.3% of Supply
- Renewables 9.6% of Primary Energy
- 70,000 Employed in Wind Industry
- 50,000 Employed in PV Industry
- 8,000 Employed in Biogas Industry
- 280,000 Employed in Renewables
- €32 (~$50) Billion Turnover

Paul Gipe, wind-works.org
Adding Renewables Quickly

• Germany
  Renewables: 10 Years--5% to 15%
  Wind: 5 Years--15 TWh/yr
  Wind: 10 Years--35 TWh/yr
  Solar PV: 5 Years--5,000 MW; 5 TWh/yr

• Spain
  Wind: 5 Years--15 TWh/yr
  Wind: 10 Years--15,000 MW 28 TWh/yr
  Solar PV: 1 Year--2,600 MW; 4 TWh/yr

Paul Gipe, wind-works.org
Grassroots Movement Has Begun

- Explosion of Interest
- Groups Active Across Canada
- Local Groups Now Active Across US
  Most Within the Past 12 Months!
- Public Out in Front
  Demands Aggressive Action
- Tipping Point Reached?

Paul Gipe, wind-works.org
“Change” in the Air?

• Obama Elected
  Was Once Unthinkable

• CEC Recommends Feed-in Tariffs
  California May Move Quickly in 2009

• California Cities Now Considering
  Palm Desert, . . . Los Angeles?

• Gainesville, Florida Municipal Utility
  First True Solar PV Tariff in USA (March)

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

• British Columbia, New Brunswick
• Michigan, Illinois, Indiana!
• Minnesota & Rhode Island
• California--Feed-in Fever
• US House & US Senate
Market Mechanisms Status

• Renewable Tariffs Developing Momentum

Paul Gipe, wind-works.org

Montjoyer, France
Renewable Tariffs in North America . . Unthinkable?

• Yes--Just 4 years ago
• Today? No
• Now Possible
• Growing Trend
  in both USA & Canada

Paul Gipe, wind-works.org
Gaspé, Quebec
The Mood Has Changed

- Ontario Moved First
Ontario’s Standard Offer Program

The Most Progressive Renewable Energy Policy in North America in Two Decades

Paul Gipe, wind-works.org

Goderich, Ontario
Why?

• All Renewables
  First in North America

• Open To All Players
  First in North America

• Differentiated Tariffs
  Two (Solar & Everything Else)
  First in North America

• Simplified Contracts

Paul Gipe, wind-works.org
The “Ontario Model”

- Adapted European Models to Ontario
  Examined German, French, Spanish Systems

- Focused on Wind & Solar
  Hydro & Biomass Placeholders

- OSEA Criteria
  Enabling Community Ownership
  (Farmers, Homeowners, First Nations, Small Businesses)

- Adapted French Wind Tariffs

Paul Gipe, wind-works.org
Why German & French System?

• Enables Community Participation
  More People Can Benefit

• Broader Geographic Distribution
  More People Can Benefit

Paul Gipe, wind-works.org
# Co-Op & Farmer-Owned Wind

<table>
<thead>
<tr>
<th>Country</th>
<th>Farmer</th>
<th>Co-op</th>
<th>Corporate</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Netherlands</td>
<td>60%</td>
<td>5%</td>
<td>35%</td>
</tr>
<tr>
<td>Germany</td>
<td>10%</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td>Denmark</td>
<td>64%</td>
<td>24%</td>
<td>12%</td>
</tr>
<tr>
<td>Great Britain</td>
<td>1%</td>
<td>1%</td>
<td>98%</td>
</tr>
<tr>
<td>Spain</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Dave Toke, University of Birmingham, 2005, 2008

Paul Gipe, wind-works.org
Gainesville, Florida
A Made in America Success

- Gainesville Regional Utility (Muni)
  100,000 Inhabitants
- Utility Progressive Leader in State
- 4 MW/year Soft Program Cap
- 1 MW/year Ground-Mounted Cap
- 5%/year Degression

Paul Gipe, wind-works.org
Gainesville, Florida
A Made in America Success

- Two Classes
  - Rooftop: $0.32/kWh
  - Ground-Mounted: $0.26
- Expedited Permitting (Rooftop Only)
- 20-year Contracts
- Modest Meter/Monthly Fee

Paul Gipe, wind-works.org
Gainesville, Florida
A Made in America Success

• Overwhelming Success
  2009 & 2010 Reservations Exceeded
  8 MW Contracted
  vs 300 kW from Previous Program

• 3-4 Months to Execute Project
  Failure to Execute Opens Up Queue
Ontario “Gets It”

First Modern System of Advanced Renewable Tariffs in North America

Paul Gipe, wind-works.org
Ontario’s Green Energy & Green Economy Act

• Multi-faceted (Affects 5 Acts)
• Efficiency & Conservation
• Renewable Energy
  Consistent Enforcement of Siting Guidelines
  Procure Through Feed-in Tariffs
• Hearings Underway Soon
• Passage Expected in Late May

Paul Gipe, wind-works.org
Ontario’s Green Energy Act

• Changes Public Policy on Electricity
  Includes Industrial & Environmental Policy
• Gives Renewables Priority
  In Utility Procurement & System Design
• Targets Industrial Development
• Targets Job Creation
  Goal: 50,000 Jobs in 3 Years
  Nano Solar “Interested”
  Everbrite 1/2 Billion Plant: 1,200 jobs

Paul Gipe, wind-works.org
Ontario Power Authority’s Proposed Feed-in Tariffs

- Differentiated by Size & Technology
- Differentiated by Application
- Tariffs Based on Cost of Generation
  Plus Reasonable Profit
- No Program Cap (Bring It On!)
- No Project Size Cap
  Exception: Groundmounted Solar PV < 10 MW

Paul Gipe, wind-works.org
Ontario Power Authority’s Proposed Feed-in Tariffs

- Stakeholder Engagement Underway
- Detailed Rules Proposed Based on Experience with RESOP
- Addition of Renewables Determines Grid Upgrades & Expansion
- Rules in Place ~June 2009

Paul Gipe, wind-works.org
Ontario Solar PV Tariffs 2009

Paul Gipe, wind-works.org
Ontario Wind Tariffs 2009

- **Onshore**
  - $CAD/kWh: 0.135
  - $USD/kWh: 0.105

- **Offshore**
  - $CAD/kWh: 0.19
  - $USD/kWh: 0.148

- **Community <10 MW**
  - $CAD/kWh: 0.112
  - $USD/kWh: 0.144

Paul Gipe, wind-works.org
Ontario Hydro Tariffs 2009

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

- 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
Midwest Wind Tariffs 2009

Does Not Include Federal Production Tax Credit.

Paul Gipe, wind-works.org
### Midwest Solar PV Tariffs

<table>
<thead>
<tr>
<th>Project Size</th>
<th>$/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30 kW</td>
<td>0.50</td>
</tr>
<tr>
<td>&gt;30 kW&lt;100 kW</td>
<td>0.45</td>
</tr>
<tr>
<td>&gt;100 kW&lt;1,000 kW</td>
<td>0.40</td>
</tr>
<tr>
<td>&gt;1,000 kW</td>
<td>0.35</td>
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Includes Federal Investment Tax Credit.
Strategy--Operating in Parallel

- Run Alongside Existing Programs
  With RPS & Solar Subsidies (ITC)
- Don’t Disrupt Existing Markets
  We Need All RE As Quick As Possible
- Build Track Record
- Use Renewable Tariffs
  for Meeting RPS Targets

Paul Gipe, wind-works.org
Move From
A Culture of Consumption
to
A Culture of Conservation

--Ontario Premier Dalton McGuinty

Paul Gipe, wind-works.org
Montfort, Wisconsin
Feed-in Tariffs

“Turn farms, homes, and businesses into entrepreneurs”

--Terry Tamminen, Former Chief Policy Advisor to Governor Arnold Schwarzenegger

Paul Gipe, wind-works.org

Goderich, Ontario
Move From
A Nation of Consumers
to
A Nation of Producers

Paul Gipe, wind-works.org
Lackawanna, New York
“Nothing is as powerful as an idea whose time has come.”
-- Victor Hugo

*Loose translation of “On résiste à l'invasion des armées; on ne résiste pas à l'invasion des idées.
California Lt. Governor Garamendi

“We know what works. Seems to me we use what works.”*


Geothermal Plant, Mammoth Hot Springs, California

Paul Gipe, wind-works.org
No Time for Half-Measures

No Time to Lose

Paul Gipe, wind-works.org
We Need A Lot More Wind . . .

Paul Gipe, wind-works.org
And A Lot More Solar
A Challenge
Worthy of Great Nations

Paul Gipe, wind-works.org

Vestas V110, Denmark
Renewable Tariffs--New Policy Option for North America

www.wind-works.org

Manawatu Gorge, New Zealand