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, An Environmental Trust, APROMA, ASES, AusWEA, AWEA, David Blittersdorf, Jan & David Blittersdorf Foundation, BWEA, BWE, CanWEA, Canadian Co-operative Assoc., CAW, CEERT, Deutsche Bank, DGW, DSF, EECA, ES&T, GEO, GPI Atlantic, IREQ, KWEEA, MADE, Microsoft, ManSEA, MSU, NRCan, NRG Systems, NASA, NREL, NZWEA, ORWWG, OSEA, Pembina, PG&E, SeaWest, SEI, TREC, USDOE, WAWWG, WE Energies, the Folkecenter, the Izaak Walton League, the Minnesota Project, the Sierra Club, World Future Council, and Zond Systems, and written for magazines in the USA, Canada, France, Denmark, and Germany.
Ontario’s Feed-in Tariffs: Setting the Standard in North America by Paul Gipe
What Do These Countries Have in Common?

- Mongolia
- South Africa
- Bulgaria
- Bosnia
- Switzerland
- Germany
- Spain
- Ireland
- China
- Slovenia
- Thailand
- Croatia
- Great Britain
- France
- Portugal
- Uganda

Partial List of Countries with Feed-in Tariffs
Paul Gipe, wind-works.org
RFPs & Bidding Fails to Deliver Renewable Energy Equitably

• Fails to Bring on Renewables at the Pace & Price Bid
  Typically 50% of Contracted Capacity
  Britain’s NFFO & France’s Eole Failed
  Lumpy Development--No Manufacturing

• Limits Participation
  Undemocratic & Exclusionary

• Europe Has Moved to FITs

Paul Gipe, wind-works.org
Feed-in Tariffs Deliver Results

- >50% of Wind Worldwide
- >75% of Solar PV Worldwide
- >90% of Farm Biogas Worldwide

Ydby, Denmark
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 . . .
  . . . 20 EU countries

Paul Gipe, wind-works.org
European Renewable Policy

- 20/27 States Use FITs
- 3/27 States Use FITs for PV
- Since 1997
  - 85% of all Wind from FITs
  - ~100% of all Solar PV from FITs
  - ~70% of all Biogas from FITs
- FITs Most Cost-Effective Policy
- FITs Principal Way to Meet Targets

Fraunhofer Institute: www.reshaping-res-policy.eu

Paul Gipe, wind-works.org  Wörstadt, Germany
Over Cost of French Renewable Tariffs

Source: www.cre.fr
Paul Gipe, wind-works.org
FIT Markets Least Costly Policy

Wind in EU: RPS More Costly Than Needed
Paul Gipe, wind-works.org
Ontario “Gets It”

• Closing Coal Plants
• Putting Renewables First
  Groundbreaking in North America
• Delaying Nuclear Build
  Wise Move in Hindsight
Nuclear Not Cheap--Not Reliable

- **New Build: High Electricity Costs**
  
  CEC Study: Near the Cost of Solar PV in Germany

- **Risk Insurance: Effectively Uninsurable**
  
  $0.20/kWh to $3.40/kWh!
  Minimum: As Much as Electricity Cost

- **Reliability: Work Great**
  
  When They Work, but . . .

Paul Gipe, wind-works.org

Rancho Seco, California
CEC Estimated Cost of New Generation in 2018

California Energy Commission: CEC-200-2009-07SF
Merchant: Merchant Plant; IOU: Investor Owned Utility; POU: Publicly Owned Utility
Paul Gipe, wind-works.org
Fukushima 1 Nuclear Power Plant

Source: Wikipedia.org

Paul Gipe, wind-works.org
Fukushima 1 and European Wind

Paul Gipe, wind-works.org
Ontario Moved First

First Modern System of Advanced Renewable Tariffs in North America

Paul Gipe, wind-works.org

Montfort, Wisconsin
Ontario’s Green Energy Act
The Most Progressive Renewable Energy Policy in North America in Two–Three Decades

Paul Gipe, wind-works.org
Goderich, Ontario
Making the Grade: What ‘s Needed

• Open to All for All
  Homeowners, Farmers, Business & Industry, Communities, Native Americans
  Regardless of Tax Status
  Tariffs with & without Tax Credits

Paul Gipe, wind-works.org
Solar Park Rodenäs
# Making the Grade: What’s Needed

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Best Practice</th>
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<tbody>
<tr>
<td>Program Caps</td>
<td>None or &gt;20%</td>
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<tr>
<td>Project Size Caps</td>
<td>None or 20 MW</td>
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<tr>
<td>Contract Term</td>
<td>&gt;20 years</td>
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<tr>
<td>Multiple Technologies</td>
<td>Wind, Solar PV, Solar DHW, Geothermal, CSP</td>
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<td>Cost-Based Tariffs</td>
<td>For All Classes</td>
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<tr>
<td>Technology Differentiation</td>
<td>Tariffs for Each Class</td>
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<tr>
<td>Technology Banding</td>
<td>By Application &amp; Size</td>
</tr>
<tr>
<td>Resource Differentiation</td>
<td>Wind &amp; Solar PV</td>
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</tbody>
</table>

Paul Gipe, wind-works.org

Middelgrunden, Denmark
Grading North American FITs
The Gold Standard

<table>
<thead>
<tr>
<th>Country</th>
<th>Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Germany</td>
<td>90</td>
<td>A</td>
</tr>
<tr>
<td>France</td>
<td>90</td>
<td>A</td>
</tr>
<tr>
<td>Spain (Fixed Tariff)</td>
<td>80</td>
<td>A-</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
<table>
<thead>
<tr>
<th></th>
<th>Score</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>Ontario (2009)</td>
<td>84</td>
<td>A-</td>
</tr>
<tr>
<td>Vermont</td>
<td>54</td>
<td>D</td>
</tr>
<tr>
<td>Maine</td>
<td>43</td>
<td>F</td>
</tr>
<tr>
<td>Wisconsin IOUs</td>
<td>36</td>
<td>F</td>
</tr>
<tr>
<td>California</td>
<td>28</td>
<td>F</td>
</tr>
<tr>
<td>Oregon</td>
<td>16</td>
<td>F</td>
</tr>
</tbody>
</table>
Ontario’s Feed-in Tariffs

• First Aboriginal Bonus in NA
  First NA Policy for First Nations
• First Differentiated Solar PV Tariffs
  6 Tranches or Classes
• Most Differentiated Biogas Tariffs
  5 Tranches or Classes
• Best Wind, Solar, & Biogas Tariffs in NA
  Competitive Internationally

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

• No Subsidies or Grants
• Costs Borne by Ratepayers
  Not Taxpayers--More Egalitarian
• Community Wind Bonus
  Farmers Qualify ($0.01 CAD/kWh)
• Aboriginal Bonus ($0.015/kWh)

Paul Gipe, wind-works.org
Ontario Program Status

- 3,500 MW Awarded Contracts
  1,500 MW to Come with Line Completion
- 400 MW Community & Aboriginal
  ~15% of Total
  Largest in North America

Paul Gipe, wind-works.org
Ontario Program Status

- ~1,000 MW Solar PV with 500 MW of SOC PV ~1,500 MW Contracted
- ~2,000 MW Onshore Wind
- $9 Billion in Likely Private Investment
## 2010 North American PV Market

### Ontario Moves into Second

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>MW 2010</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>California</td>
<td>250</td>
</tr>
<tr>
<td>2</td>
<td>Ontario</td>
<td>168</td>
</tr>
<tr>
<td>3</td>
<td>New Jersey</td>
<td>125</td>
</tr>
<tr>
<td>4</td>
<td>Colorado</td>
<td>44</td>
</tr>
</tbody>
</table>

**ClearSky Advisors: ~800 MW/yr**

Paul Gipe, wind-works.org
Ontario’s FIT Program
World Class
“Made in Canada”
Ontario Feed-in Tariff Revisions
Making the Best Better

• Differentiated Wind Tariffs
  Long Recommended--Time Now to Act

• Radical Revision of Solar PV Tariffs
  Breaking the Grip of California & New Jersey on Solar Prices

• Add Renewable Heat Tariffs

• Expand Tariffs for Storage

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

• For Different Technologies
• For Different Applications
• For Different Sizes
• For Different Resource Intensities
  For Wind (Germany, France, & China!)
  For Solar (France, Oregon)

Paul Gipe, wind-works.org
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
French Wind Tariffs
Resource Productivity Method

• Fair Profits at Medium Wind Sites
• Not “Undue” Profits at Windy Sites
• Proven Method to Limit Costs
French Wind Tariffs by Specific Yield

Paul Gipe, wind-works.org

Chateau de Lastours, France
Ontario’s Maturing PV Market

• North American Solar PV Prices
  Determined by US Subsidy Programs
  Federal & State Programs
  California & New Jersey
  Among Highest in World
  40% Higher than in Germany!

• Breaking Free
  Setting the Pace & the Price
  Reforming Solar PV in North America
Ontario Solar PV Tariff Revision
Setting the Bar in North America

Paul Gipe, wind-works.org

-43%
-39%
-35%
-35%
-20%

Current
Germany
DC Bonus

Paul Gipe, wind-works.org
Feed-in Tariffs for Renewable Heat

- Germany, France, Spain, Switzerland with CHP
- Ontario, Slovenia without CHP
- Great Britain Scheduled July, 2011

Vorupør Kraftvarmeværk, Denmark

Paul Gipe, wind-works.org
<table>
<thead>
<tr>
<th></th>
<th>Years</th>
<th>€/kWh</th>
<th>CAD/kWh</th>
<th>USD/kWh</th>
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</thead>
<tbody>
<tr>
<td>&lt;20 kW</td>
<td>20</td>
<td>0.211</td>
<td>0.288</td>
<td>0.288</td>
</tr>
<tr>
<td>&lt;100 kW</td>
<td>20</td>
<td>0.199</td>
<td>0.272</td>
<td>0.272</td>
</tr>
</tbody>
</table>

Proposed for July 2011.

Paul Gipe, wind-works.org
Extend Peak Performance Bonus

- Currently “Firm Power” Bonus
  Biomass, Biogas, Landfill Gas, Hydro
- Extend to Wind & Solar
  To Encourage Innovation in Storage
  Make Firm Power From Variable Sources

Paul Gipe, wind-works.org
Rockenhausen, Germany
Electricity Rebels--the Rallying Cry

“Wind is a Local Resource. It is Our Resource. And We Want to Make Money from it.”--Wolfgang Paulsen (Stromrebelle)
Stromrebellen (Electricity Rebels)

- Democratizing Generation
- Creating Local Investment
- Creating Local Jobs
- Creating Opportunity--and Hope
- Denmark, Germany, and France, Minnesota, Ontario and . . . ?

Paul Gipe, wind-works.org

Friedrich-Wilhelm-Lübke-Koog, Germany
Ownership of Renewables in Germany

• 51% Farmers & Individuals
• Own 22,000 MW!
  Wind, Solar, & Biogas
• Total Wind in USA only 35,000 MW
  Owned by Utilities, Subsidiaries, & Developers

Schneebergerhof, Germany

Paul Gipe, wind-works.org
Local Entrepreneurs Building Local Projects

- 2.6 MW Locally Owned Solar Plant
- Locally Developed, Locally Built, Locally Owned

Nico Petersen, Solar Park Rodenäs

Paul Gipe, wind-works.org
The Farmers of Nordfriesland

• 0.5% of California
  2,000 km²
• 560 MW of Wind
  Community-Owned
  <1% of Land Area
• 1.3 TWh/yr
  More than Altamont, More than San Gorogonio
  ~Tehachapi Pass
  €100 million ($150 million)/yr
“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.

Paul Gipe, wind-works.org
Time for North Americans to Take the Road to the Future

Freiburg, Germany

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

No Time to Lose

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

Hinesburg, Vermont

Paul Gipe, wind-works.org
A Lot More Renewable Energy Technology for Life*

*from N.F.S. Grundtvig, Danish Theologian

Paul Gipe, wind-works.org
Renewables . . .

When You Look Closely . . .

. . . Worth Every Cent

Paul Gipe, wind-works.org
Renewable Energy

The Revolution Has Begun!

www.wind-works.org

Manawatu Gorge, New Zealand