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, KWEA, 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.

Paul Gipe, wind-works.org
Advanced Renewable Tariffs for La Plata REA & Durango Area by Paul Gipe
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
Hohe Westerwald, Germany

Setting the Stage

Paul Gipe, wind-works.org
Do We Really Want Renewables?

San Gorgonio Pass, California

Paul Gipe, wind-works.org
If Yes, Then What Works Best?

- Who Gets Contracts
  Elite Few or All Who Want Them?
- How To Pay For Them
  RECs/ROCs/Green Tags
  Subsidies (PTC, ITC)
  Advanced Renewable Tariffs
  --Differentiated Feed-in Tariffs

Paul Gipe, wind-works.org
Dunkerque, France
Market Mechanism Status

- **Quotas (RPS & Tendering)**
  Timid Targets Seldom Met

- **Renewable Tariffs**
  Once Only Non-Anglophone Countries
  Now Ontario, Great Britain, Vermont
  Meeting Aggressive Targets

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
2009 World Wind Capacity

38,000 MW

77,000 MW

42,000 MW

Paul Gipe, wind-works.org
2009 Solar PV Capacity

• 20,000 MW Worldwide
• 7,000+ MW/yr
• $20+ Billion
• Major Markets
  Germany--3,800 MW*
  Italy--700 MW/yr*
  Japan--500 MW
  USA--450 MW/yr
  California--200 MW/yr

*Feed-in Tariff Market
Paul Gipe, wind-works.org

Rancho Seco, California
Myths to Dispelle

• Renewables are Free or Cheap
  But They Are Affordable & They Are Worth It
• Renewables Can’t Be Added Quickly
  or Can’t Make a Difference
• Feed-in Tariffs Not Market-Based
• Feed-in Tariffs are Costly
### Renewables Can Be Added Quickly

<table>
<thead>
<tr>
<th></th>
<th>Wind 5 yrs</th>
<th>Wind 10 yrs</th>
<th>Solar 5 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>15 TWh/yr</td>
<td>35 TWh/yr</td>
<td>5 TWh/yr</td>
</tr>
<tr>
<td>Spain</td>
<td>15 TWh/yr</td>
<td>28 TWh/yr</td>
<td>5 TWh/yr</td>
</tr>
</tbody>
</table>

Germany Renewables: 10 Years--5% to 15%
Spain: 10 Years--0% to 10%
Colorado: ~61 TWh/yr

Paul Gipe, wind-works.org
### High Penetration Quickly is Possible

<table>
<thead>
<tr>
<th>Country</th>
<th>Percent Wind</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>1.2%</td>
</tr>
<tr>
<td>California</td>
<td>1.5-2.3</td>
</tr>
<tr>
<td>Germany</td>
<td>6.5%</td>
</tr>
<tr>
<td>Spain</td>
<td>14.3%</td>
</tr>
<tr>
<td>Portugal</td>
<td>15.3%</td>
</tr>
<tr>
<td>Denmark</td>
<td>21%</td>
</tr>
</tbody>
</table>

2009: Multiple Sources  
Paul Gipe, wind-works.org
## Political Price-Political Quantity

**Market Mechanisms**

<table>
<thead>
<tr>
<th></th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Law</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
Ernst & Young
Germany and Britain
Cost of Renewables (2006)

• Germany: 4x more energy generated
• Germany: @ 1/5 less relative cost of GB Renewable Obligation Certificates

Manawatu Gorge, NZ
Paul Gipe, wind-works.org
<table>
<thead>
<tr>
<th></th>
<th>USD/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quotas &amp; TGC</td>
<td>0.13-0.17</td>
</tr>
<tr>
<td>Feed-in Tariffs</td>
<td>0.09-0.011</td>
</tr>
</tbody>
</table>

FITs: $0.04-$0.06/kWh less costly.

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

Source: www.cre.fr
Paul Gipe, wind-works.org

Year
TWh

Million Euros

Wind
Small Hydro
Other
Waste

Source: www.cre.fr
Paul Gipe, wind-works.org
Cost of German EEG (2008)

~$50/yr/household

BMU: EEG Costs <5%, ~€0.01/kWh, 2008.

Paul Gipe, wind-works.org
# European Projected Development 2010 with Feed-in Tariffs

<table>
<thead>
<tr>
<th>Country</th>
<th>Wind (MW)</th>
<th>Solar PV (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>2,500</td>
<td>6,000</td>
</tr>
<tr>
<td>Spain</td>
<td>2,500</td>
<td>50-100</td>
</tr>
<tr>
<td>France</td>
<td>1,000</td>
<td>200</td>
</tr>
<tr>
<td>Italy</td>
<td>Quota</td>
<td>1,500</td>
</tr>
</tbody>
</table>

USA: Wind, 10,000 MW?; PV, 450 MW

Paul Gipe, wind-works.org
## European 2010 Feed-in Tariffs

<table>
<thead>
<tr>
<th>Country</th>
<th>Wind</th>
<th>Solar PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Stable</td>
<td>2010 Cuts in Two Steps: New 3,000 MW Target</td>
</tr>
<tr>
<td>Spain</td>
<td>Possible Cuts</td>
<td>Further Cuts</td>
</tr>
<tr>
<td>France</td>
<td>Stable</td>
<td>Raised Tariffs: New Resource Differntiated Tariffs</td>
</tr>
<tr>
<td>Italy</td>
<td>Quota</td>
<td>2011 Cuts: New Target; 3,000 MW 2011-13</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
# FIT Programs in Development

<table>
<thead>
<tr>
<th>Country</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>Wind &amp; Biomass</td>
</tr>
<tr>
<td>Great Britain</td>
<td>Renewable Heat</td>
</tr>
<tr>
<td>Malaysia</td>
<td>All Resources</td>
</tr>
<tr>
<td>Philippines</td>
<td>All Resources</td>
</tr>
<tr>
<td>Japan</td>
<td>All Resources</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>ComFIT, no Solar PV</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
Renewable Tariff Design

- Simple, Comprehensible, & Transparent
- Priority Access & Purchase
- Lengths Sufficient for Profitability
- Prices Sufficient to Pay for Generation

Fair But Not Undue Profit
Through Price Differentiation

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

• Fair Profits at Medium Wind Sites
• Not “Undue” Profits at Windy Sites
• Profitability Index Method (Chabot)

Not Discounted Cash Flow Model

Paul Gipe, wind-works.org
Igny, Lorraine, France
French Wind Tariffs by Specific Yield

Specific Yield (kWh/m²/yr)

$CAD/kWh

Base
Medium
High

Chateau de Lastours, France

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

- Nova Scotia to British Columbia
- Washington State to Florida
- Vermont to California
- US House (Inslee)
Gainesville, Florida
A Made in America Success

• Gainesville Regional Utility (Muni)
  100,000 Inhabitants
• Utility Progressive Leader in State
• Solar PV Only
  4 MW/year Soft Program Cap
  1 MW/year Groundmounted Cap
  32 MW Program Target
  5%/year Degression
  20-Year Contracts

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

• Project Size Limits
  Roofmounted: 300 kW
  Groundmounted: 1,000 kW

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

• 2011 Three Classes
  Rooftop <10 kW: $0.32/kWh
  Rooftop <25 kW: $0.29/kWh
  Groundmounted >25 kW: $0.24

• Expedited Permitting (Rooftop Only)
• 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
  2 MW Installed (April 2010)
  vs 300 kW from Previous Program
  $5 Million in Private Investment

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

- Streamlined Review for Small Systems
  Similar to Ontario’s MicroFIT
- Application Fee ($500-$1,200)
- Capacity Reservation Deposit
  Anti-Gaming Provision for Larger Systems
  <10 kW Exempt
  $30/kW Refundable Upon Completion
  Forfeited if Not Completed on Time

Paul Gipe, wind-works.org
Vermont a Beacon in USA

• The First State to Act in USA
  Not California!

• Multiple Resources
  Wind (Large & Small), Solar PV, Landfill & Biogas, Hydro, Biomass

• Tariffs Based on Cost of Generation

Hinesberg, Vermont

Paul Gipe, wind-works.org
Vermont a Beacon in USA

- **Program Cap**: 50 MW
  - ~1% of 5 TWh per year of Demand
  - 200 MW in Applications (170 MW Solar PV)
- **Project Size Cap**: 2.2 MW
- **Contract Term**: ~20 years
  - Landfill Gas: 15 years
  - Solar PV: 25 years

Paul Gipe, wind-works.org
## Vermont Renewable Tariffs

<table>
<thead>
<tr>
<th>Source</th>
<th>CAD/kWh</th>
<th>USD/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind: Small</td>
<td>0.205</td>
<td>0.20</td>
</tr>
<tr>
<td>Wind: Large</td>
<td>0.128</td>
<td>0.13</td>
</tr>
<tr>
<td>Solar PV</td>
<td>0.308</td>
<td>0.30</td>
</tr>
<tr>
<td>Biomass</td>
<td>0.128</td>
<td>0.13</td>
</tr>
<tr>
<td>Landfill Gas</td>
<td>0.123</td>
<td>0.12</td>
</tr>
<tr>
<td>Farm Biogas</td>
<td>0.164</td>
<td>0.16</td>
</tr>
<tr>
<td>Hydro</td>
<td>0.128</td>
<td>0.13</td>
</tr>
</tbody>
</table>
Vermont: What They Got Wrong

- Prices Too Low without State Subsidy
  State Subsidy Exhausted
- Insufficient Differentiation
  Only One Tranche for Solar PV!
- No Anti-Gaming Provisions
  Many Squatters and Speculators Hogging Queue
  Fed Gold Rush of Applications
- Poor Field Results
  No Wind, Hydro, or Biogas
  Limited Solar PV Likely to be Built

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 “Gets It”

- Closing Coal Plants
- Delaying Nuclear Build
- Putting Renewables First

Groundbreaking in North America

Paul Gipe, wind-works.org  Goderich, Ontario
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
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 & Job Creation
  50,000 Jobs in Three Years

Paul Gipe, wind-works.org
Ontario’s 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!)

Sarnia, Ontario

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

• First Offshore Wind Tariffs in NA
• 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
  Individual Farmers Qualify
  $0.01 CAD/kWh Bonus
  $0.145 CAD/kWh (€0.10/kWh)

Paul Gipe, wind-works.org
Ontario Wind Tariffs 2010

<table>
<thead>
<tr>
<th></th>
<th>$CAD/kWh</th>
<th>$USD/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onshore</td>
<td>0.135</td>
<td>0.13</td>
</tr>
<tr>
<td>Offshore</td>
<td>0.19</td>
<td>0.184</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
Ontario Hydro Tariffs 2009
Term: 40 Years

Hydro <10 MW
- $CAD/kWh: 0.131
- $USD/kWh: 0.113

Hydro <50 MW
- $CAD/kWh: 0.122
- $USD/kWh: 0.105

Paul Gipe, wind-works.org
Ontario Program Status

• 19,000 MicroFIT Applications
  ~190 MW Potential
  6,000 Contracts Offered (~60 MW)
  800 Systems on Line in 1 year

• 8,000 MW of FIT Applications
  Requires Substantial Deposit

• $9 Billion in Likely Private Investment

Paul Gipe, wind-works.org
Ontario Program Status

- 2,500 MW Awarded Contracts
  1,500 MW to Come with Line Completion
- 460 MW Community & Aboriginal
  ~20% of Total
Ontario Program Status

• 650 MW Solar PV
  with 500 MW of SOC PV ~1,000 MW Contracted
• 1,200 MW Onshore Wind
• 300 MW Offshore Wind
Ontario Tariff Status

• **MicroFIT Revision August 2010**
  Split into Two Tranches
  Rooftop PV & Ground

• **2011 Program Review**

Toronto, Ontario
Paul Gipe, wind-works.org
North American Solar PV Market
Ontario Moves into Top Three

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>MW 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>California</td>
<td>212</td>
</tr>
<tr>
<td>2</td>
<td>New Jersey</td>
<td>57</td>
</tr>
<tr>
<td>3</td>
<td>Ontario</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>Florida</td>
<td>36</td>
</tr>
<tr>
<td>5</td>
<td>Colorado</td>
<td>23</td>
</tr>
</tbody>
</table>

Ontario 2010: ~100-200 MW
Paul Gipe, wind-works.org
## North American Solar PV Market
### Ontario to Move into Top Three

<table>
<thead>
<tr>
<th>Rank</th>
<th>Total Installed MW 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>California</td>
</tr>
<tr>
<td>2</td>
<td>New Jersey</td>
</tr>
<tr>
<td>3</td>
<td>Colorado</td>
</tr>
<tr>
<td>4</td>
<td>Ontario</td>
</tr>
<tr>
<td>5</td>
<td>Arizona</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
Ontario Success Due To

• Push for Renewable Policy
  Not a Solar PV or a Wind Policy

• Push for Conservation & Efficiency
  Reduces Program Costs to Ratepayers
  (Danes Pay Less for Electricity Than Ontarians)

• Collaborative Strategy
  Green Energy Act Alliance: Green NGOs, Ag, & Labor
  Trade Groups: CanSIA, CanWEA, OWA

• Public Consultation

Paul Gipe, wind-works.org
Challenges in North America

- Piecemeal Policy Approach
  Too Slow
  RPS for Wind, Subsidies for Solar
- "Cheap Energy Contract"
  Cheap Today--Expensive Tomorrow

Paul Gipe, wind-works.org
Challenges in North America

- Low Program Caps
  - Vermont: 1%-3%
  - LABC-Los Angeles: 3%
  - Oregon: 25 MW! (Why Bother?)
- Solar Only or Wind Only
- Timidity & Lack of Vision
  - Do We Want Renewables or Don’t We?

Paul Gipe, wind-works.org

Friedrich-Whilhelm-Lübke-Koog, Germany
Grading North American FITs
10 Criteria

- Program Caps
- Project Size Caps
- Contract Term
- Technologies Included
- Tariffs Based on Cost of Generation
- Tariffs Differentiated by Technology
- Tariffs Differentiated within Technology
- Wind Tariffs Differentiated by Resource
- Inflation Indexing
- Bonus Payments or Adders

Paul Gipe, wind-works.org
## Grading North American FITs

### The Gold Standard

<table>
<thead>
<tr>
<th></th>
<th>Score</th>
<th>Grade</th>
</tr>
</thead>
<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
# Grading North American FITs

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Germany</th>
<th>France</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Caps</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Project Size Caps</td>
<td>10</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Contract Term</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Multiple Technologies</td>
<td>10</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Cost-Based Tariffs</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Technology Differentiation</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Technology Banding</td>
<td>20</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Resource Differentiation</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Inflation Indexing</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Bonus or Adders</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
# Grading North American FITs

## Existing FITs

<table>
<thead>
<tr>
<th>State</th>
<th>Score</th>
<th>Grade</th>
</tr>
</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>

Paul Gipe, wind-works.org
## Grading North American FITs
### Ontario & Vermont

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Ontario</th>
<th>Vermont</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Caps</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Project Size Caps</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Contract Term</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Multiple Technologies</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Cost-Based Tariffs</td>
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<td>10</td>
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<tr>
<td>Technology Differentiation</td>
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<td>10</td>
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<tr>
<td>Technology Banding</td>
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<td>12</td>
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<tr>
<td>Resource Differentiation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Inflation Indexing</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Bonus or Adders</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Paul Gipe, wind-works.org
# Grading North American FITs

## Proposed FITs

<table>
<thead>
<tr>
<th>State/Provision</th>
<th>Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>82</td>
<td>A-</td>
</tr>
<tr>
<td>Indiana HB1190</td>
<td>82</td>
<td>A-</td>
</tr>
<tr>
<td>California AB 1106</td>
<td>54</td>
<td>D</td>
</tr>
</tbody>
</table>

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

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

Paul Gipe, wind-works.org

Middelgrunden, Denmark
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
La Plata FITs Key Considerations

• Local Choice--Local Projects?
• Must be Carefully Designed
• Must be Cost Based
  Plus a Reasonable Profit
• Must Include Multiple Resources
• Outside Consultation Needed
  See Ontario’s FIT Documents for Detail Needed

Paul Gipe, wind-works.org
La Plata FITs: Local Choice

• **Determine Objectives & Goals**
  - Locally-Owned Projects--Who Gets Contracts
  - Pilot Program or Full Program
  - Resources to Include--More than Just Solar
  - Local Economic Activity

• **Goals Determine Program Design**
La Plata FITs: Careful Design

• Program Size
• Technologies & Number of Tranches
  FITs & MicroFITs
• Application Process
  How To Insure Local Ownership
  How To Avoid Speculators and Squatters
• Measures to Gauge Progress
  MW, kWh, or Systems Installed?
  % Local Ownership?

Paul Gipe, wind-works.org
La Plata FITs: Cost Based

- Tariffs Based on Cost of Generation
  Not Avoided Cost or Wholesale Rate
- Tariffs With & Without Tax Credits
  For an Equitable Program
- Use Real Not Imaginary Numbers

Recent California Analysis (Chabot PIM)
- Wind: $0.07 to $0.14/kWh
- Small Wind: $0.20 to $0.50/kWh
- Solar PV: $0.30 to $0.70/kWh

Paul Gipe, wind-works.org
La Plata FITs: Multiple Resources

- Mix Required to Minimize Cost
  Wind & Hydro Offsets Cost of Solar PV
- Landfill Gas & Biogas?
  Provides Multiple Clean Air Benefits
- Solar DHW?
  Renewable Heat Tariffs Coming in Britain

Paul Gipe, wind-works.org
La Plata FITs: Outside Consultants

• Outside Consultation Needed
  See Ontario’s FIT Documents for Detail Needed

• Meister Consultants (Wilson Rickerson)
  www.mc-group.com
  Firm with Most FIT Design Experience in USA

• E3 Analytics (Toby Couture)
  www.e3analytics.ca
  Consultant to NREL
How to Use Feed Law Web Pages

Welcome to Wind-Works
An on-line archive of articles and commentary on wind and solar energy, community power, Feed-in Tariffs, and Advanced Renewable Tariffs.

Join the Alliance for Renewable Energy and support a grass roots movement that's bringing feed laws and feed-in tariffs back home to North America.

Sign Up, if you would like to be added to my email distribution list on feed-in tariff developments worldwide.—Paul Gipe

July 30, 2010

What's New on Feed-in Tariffs

- Deutsche Bank: FiTs Adjust while Delivering Scale in 2010--Feed-in tariffs (FiTs) continue to be the driving force behind many renewable energy deployments globally, and are an effective policy tool for catalyzing the large investment flows needed to achieve 2020 emissions reduction targets and clean energy mandates.

- Colorado Towns explore renewable options--Already, 75 percent of the electricity distributed by the municipal utility department in Aspen comes from

Paul Gipe, wind-works.org
How to Use Feed Law Web Pages


- Primers on Feed-in Tariffs and Advanced Renewable Tariffs
- Renewable Tariffs by Country
- Renewable Tariff Design
- Model Advanced Renewable Tariff Legislation
- Renewable Tariffs (General Articles)
- Tables of Feed-In Tariffs Worldwide
- Feed-in Tariffs: The Economic Case
- Reviews of Books on Feed-in Tariffs
- Links to More on Feed-in Tariffs
- North American Experts on Feed-in Tariffs

Paul Gipe, wind-works.org
How to Use Feed Law Web Pages

Renewable Tariffs and Standard Offer Contracts in the USA

Since the fall of 2007 several states have introduced bills into their state legislatures that, if enacted, would create Renewable Energy Sources Acts like those in Europe.

In addition, a bill as been introduced at the federal level in the House.

A number of states have have introduced programs patterned after Renewable Feed Laws in Europe. However, there are significant differences between true Renewable Tariffs and many of the Production-Based Incentive programs in the USA. For a brief discussion see Performance-Based Incentives or Renewable Tariffs for Photovoltaics in the USA.

- USA
- Model Advanced Renewable Tariff Legislation
- Arkansas
- California
- Colorado
- Florida
- Hawaii
- Illinois
- Indiana
- Maine
- Maryland
- Michigan
- Minnesota
# How to Use Feed Law Web Pages

Paul Gipe, wind-works.org

## Renewable Tariffs in Slovenia

<table>
<thead>
<tr>
<th>Years</th>
<th>€/kWh</th>
<th>CAD/kWh</th>
<th>USD/kWh</th>
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</thead>
<tbody>
<tr>
<td>15</td>
<td>0.095</td>
<td>0.120</td>
<td>0.117</td>
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### Solar PV

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<tr>
<th>On Buildings</th>
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<tbody>
<tr>
<td>&lt;50 kW</td>
<td>0.415, 0.524, 0.511</td>
</tr>
<tr>
<td>&gt;50 kW&lt;1,000 kW</td>
<td>0.380, 0.480, 0.468</td>
</tr>
<tr>
<td>&gt;1 MW&lt;10 MW</td>
<td>0.315, 0.398, 0.388</td>
</tr>
<tr>
<td>&gt;10 MW&lt;125 MW</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### Building Integrated

| <50 kW | 0.478, 0.603, 0.588 |
| >50 kW<1,000 kW | 0.437, 0.551, 0.537 |
| >1 MW<10 MW | 0.363, 0.457, 0.448 |
| >10 MW<125 MW | n/a |
| Ground-mounted | n/a |

### Geothermal

<table>
<thead>
<tr>
<th>Slovenia</th>
<th>South Africa</th>
<th>South Korea</th>
<th>Spain RD 436 2004</th>
<th>Spain RD 6 2009 PV</th>
<th>Spain RD 661 2007</th>
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<tbody>
<tr>
<td>15</td>
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---

<table>
<thead>
<tr>
<th>Year</th>
<th>&lt;50 kW</th>
<th>&gt;50 kW&lt;1,000 kW</th>
<th>&gt;1 MW&lt;10 MW</th>
<th>&gt;10 MW&lt;125 MW</th>
<th>Ground-mounted</th>
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<tbody>
<tr>
<td>2010</td>
<td>0.105</td>
<td>0.133</td>
<td>0.130</td>
<td>0.130</td>
<td>n/a</td>
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</tbody>
</table>
Time for 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
Renewables . . .
When You Look Closely . . .
. . . Worth Every Cent

Paul Gipe, wind-works.org