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

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Advanced Renewable Tariffs
Getting it Right in California
& The Green Party’s Role
by
Paul Gipe
Renewable Energy Has Come of Age

Noordoostpolder, the Netherlands

Paul Gipe, wind-works.org
Montefalcone, Italy
Freiburg -- Germany’s Solar City
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
World Solar PV Capacity 2009
~20,000 MW

More than 3/4 from Feed-in Tariffs

Paul Gipe, wind-works.org
Hohe Westerwald, Germany

Setting the Stage

Paul Gipe, wind-works.org
North Americans Have Been Dabbling Around the Edges of Renewable Energy Policy

Most Policies Timid Half Measures

Paul Gipe, wind-works.org
Profound Issues Confront North America’s Energy Future

- Climate Change Only One Issue
- Transportation (Liquid) Fuels
  Very Little Public Transit
- Domestic Supplies Declining
Profound Issues Confront North America’s Energy Future

• Our Total Dependence on Oil as a Transportation Fuel Leads to Tragic Consequences--Only Some of Which Make the News.

Paul Gipe, wind-works.org
North American RE Market Growth

- Exciting, Yes
- Significant, Yes
- Not Nearly Enough by Any Standard
North America Needs Massive Reconstruction of its Infrastructure

Renewable Energy Development Can Reindustrialize the North American Economy

Paul Gipe, wind-works.org

Noordoostpolder, the Netherlands
And Create a Rural Revolution Through “Electricity Rebels”*

*Who own their own generation.

Paul Gipe, wind-works.org
Friedrich-Whilhelm-Lübke-Koog, Germany
California Long Ago Lost Leadership Falling Further Behind

- Lost Wind Leadership in Early 1990s
- Lost Solar Leadership in Early 2000s
- Not Meeting Renewable Targets
- Behind Texas!

World’s Largest Solar PV Array in 1980s--Removed in Early 1990s & Sold for Scrap!

Paul Gipe, wind-works.org

Carrizzo Plains, California
Renewable Tariffs
The Philosophical Context

Paul Gipe, wind-works.org
Geothermal: Colline Metallifere, Italy
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
Wieringemeerpolder, the Netherlands
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
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
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
Myths to Dispel

• 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

Paul Gipe, wind-works.org

Husum, Germany
## 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%
California Consumption: ~300 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
Renewable Tariffs & Solar Photovoltaics in Germany

Year

0 1 2 3 4 5 6 7 8

MW Total (Thousands)

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

100,000 Rooftops

Advanced Renewable Tariffs Launched

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

• ~3,800 MW in 2009!
• Total 9,000 MW
  ~9 TWh/yr of Generation
  ~80% on rooftops
• New Target: 3,000 MW/yr!
• ~2% Supply in Bavaria
• ~1+% Supply in Germany

Paul Gipe, wind-works.org
German Renewable Generation

TWh Generated per Year

- ARTs (EEG)
- Feed Law (StrEG)

Year

Advanced Renewable Tariffs Launched

Feed-in Tariff (StrEG)

Paul Gipe, wind-works.org
German Renewables 2009
~93 TWh (16%)

Wind 38
Biomass 30.6
Hydro 19
Solar PV 6.2
Solar PV ~1%

~33% of California’s Current Demand

Source: BMU
Paul Gipe, wind-works.org
Germany’s Renewable Tariffs
The Results (2009)

• 16% of Electricity
• 10% of Primary Energy
• 300,000 Jobs
  Wind: 90,000
  Solar PV: 50,000
  Biogas: 8,000

Paul Gipe, wind-works.org

Hohe Westerwald, Germany
Cost of German EEG (2008)
~$50/yr/household

BMU: EEG Costs <5%, ~€0.01/kWh, 2008.
Paul Gipe, wind-works.org
<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
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>39%</td>
<td>50%</td>
<td>80%</td>
</tr>
</tbody>
</table>
Why the European Success?

• #1 Community Involvement
  Germany & Denmark

• #2 Advanced Renewable Tariffs
  Many 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
- Local Ownership Creates New Cash Crop For Farmers, Homeowners, & First Nations

Paul Gipe, wind-works.org
Lynetten Co-op København

- 7 x 600 kW
- 4 Owned by Co-op
- 3 Owned by Municipal Utility

Paul Gipe, wind-works.org
Middelgrunden Co-op København

• 20 x 2 MW Off-shore
• 1/2 Owned by Co-op
• 1/2 Owned by Utility
• 8,500 Investors
• €570 per Share
• Visible from Christiansborg Palace

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
Community Power is About People and Opportunity

Paul Gipe, wind-works.org
Stromrebellenen (Electricity Rebels)

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

Paul Gipe, wind-works.org

Friedrich-Wilhelm-Lübke-Koog, Germany
Josef Pesch, Fesa

- 45 MW
- 60 million kWh/yr
- Just One of Many
Ursula Sladek, EWS
(Elektrizitätswerke Schönau)

- 31,000 Customers
- Hydro, Solar, & Wind
Heinrich Bartelt, Dardesheim

- 62 MW Wind
- 380 kW Solar PV
- 5% Royalties
  - 1% for Nearby Villages
  - 2% for Landowners with Turbines
  - 2% for Landowners without Turbines

Paul Gipe, wind-works.org
François Pélissier, Erélia

- Le Haut des Ailes, Lorraine
- 32 MW

Objectives
- New Jobs Locally
- New Opportunity Locally

Paul Gipe, wind-works.org
Local People Helping Local People
Hans-Heinrich Andresen

- Manages 16 Wind Farms
- in 16 Villages
- All Locally Owned
  15 Owners in Smallest
  400 Owners in Largest
- Now Planning Their Own Transmission Line!

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
Community Power is also about Faith in Yourself and in Your Community. Yes, You Can Do This. You Don’t Have to be Danish, German, or French.

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
- Lengths Sufficient for Profitability
- Prices Sufficient to Pay for Generation

Fair But Not Undue Profit
Through Price Differentiation

Paul Gipe, wind-works.org
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)

Paul Gipe, wind-works.org
Renewable Tariffs in North America . . Unthinkable?

• Yes--Just 4 years ago
  “You’re Absolutely Nuts!”
  Andy Karsner, DOE, 2006

• Today? No

• Now Possible

• Growing Trend
  in North America
  & Developing World
  China, Mongolia . . . 

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

*"Il n'est rien au monde d'aussi puissant qu'une idée dont l'heure est venue." Victor Hugo
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
Renewable Tariffs . . . Developing Momentum

Paul Gipe, wind-works.org
Grassroots Movement

- Explosion of Interest
- Groups Active
  Across US & Canada
- Public Out in Front
  Demands Aggressive Action
- Tipping Point Reached?

San Gorgonio Pass, California
Paul Gipe, wind-works.org
Renewable Tariffs Are In Play

- Nova Scotia to British Columbia
- Washington State to Florida
- Vermont to California
- US House
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 & Green Economy Act

- Multi-faceted
- Efficiency & Conservation
- Renewable Energy

Procure Through Feed-in Tariffs

Paul Gipe, wind-works.org
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

• Targets Job Creation
  Goal: 50,000 Jobs in 3 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
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
  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 Consumers
  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 Project Status

• 2,500 MW Awarded Contracts
  1,500 MW to Come
• 460 MW Community & Aboriginal
  ~20% of Total
• 120 MW Residential Rooftop PV

Paul Gipe, wind-works.org
Ontario Project Status

- 650 MW PV
  w/ 500 MW of SOC PV ~1,000 MW
- 1,200 MW Onshore Wind
- 300 MW Offshore Wind

Paul Gipe, wind-works.org

Kingston, Ontario
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**
  - California: 20%?
  - 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>
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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
Fuchskaute, Germany
### Grading North American FITs
### Existing FITs

<table>
<thead>
<tr>
<th></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>
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</table>

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

### Proposed FITs

<table>
<thead>
<tr>
<th>Location</th>
<th>Score</th>
<th>Grade</th>
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</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>
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</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>
</tr>
<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
Time for Californians to Take the Road to the Future

Freiburg, Germany

Paul Gipe, wind-works.org
Feed-in Tariffs & Prominent Greens

• Hans-Josef Fell, MdB
  Member of Deutche Bundestag, Die Grünen
  www.hans-josef-fell.de

• Senator Christine Milne
  Deputy Leader of Australia Greens
  http://christine-milne.greensmps.org.au

Paul Gipe, wind-works.org
Feed-in Tariffs & Prominent Greens

Hans-Josef Fell

- Co-Author of Renewable Energy Sources Act (EEG)
  Germany’s System of Feed-in Tariffs
- Today Calls for 100% Renewable Energy in Germany
- Says Germany Can Do 50% by 2020!
Feed-in Tariffs & Prominent Greens
Christine Milne

• Senator Representing Tasmania
• Outspoken Proponent of FITs
• Record Green Vote in August Election
• Milne to Push FITs with More Greens in Senate and Lower House

Paul Gipe, wind-works.org
German Greens & 1991 Feed-in Tariffs

- Bavarian CDU-CSU (Conservatives) Approach Green Member to Draft Bill CDU-CSU is Governing Party
- Green & CDU Draft Bill
- Bill Taken to CDU Caucus
- CDU Party Leaders Sieze Opportunity Submit Bill without Greens Pass Bill Almost Immediately & Take Credit
- Greens Now Seen as Leaders on Issue

Paul Gipe, wind-works.org
What Can California Greens Do?

• Support Only “Robust” Proposals
  Not Support Feed-in Tariffs in Name Only

• Use Organizational Structure
  To Aid Grassroots Movement
  Write Letters to Editor, Op-Eds
  Speak up at Public Forums

• Be Willing to Let Others Take the Glory
  To Build Credibility as a Political Force
  Then Use Success for Further Gains

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

--Ontario Premier Dalton McGuinty
Move From
A Nation of Consumers
to
A Nation of Producers

Paul Gipe, wind-works.org

Lackawanna, New York
No Time for Half-Measures

No Time to Lose

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

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
Renewable Energy

The Revolution Has Begun!

www.wind-works.org

Manawatu Gorge, New Zealand