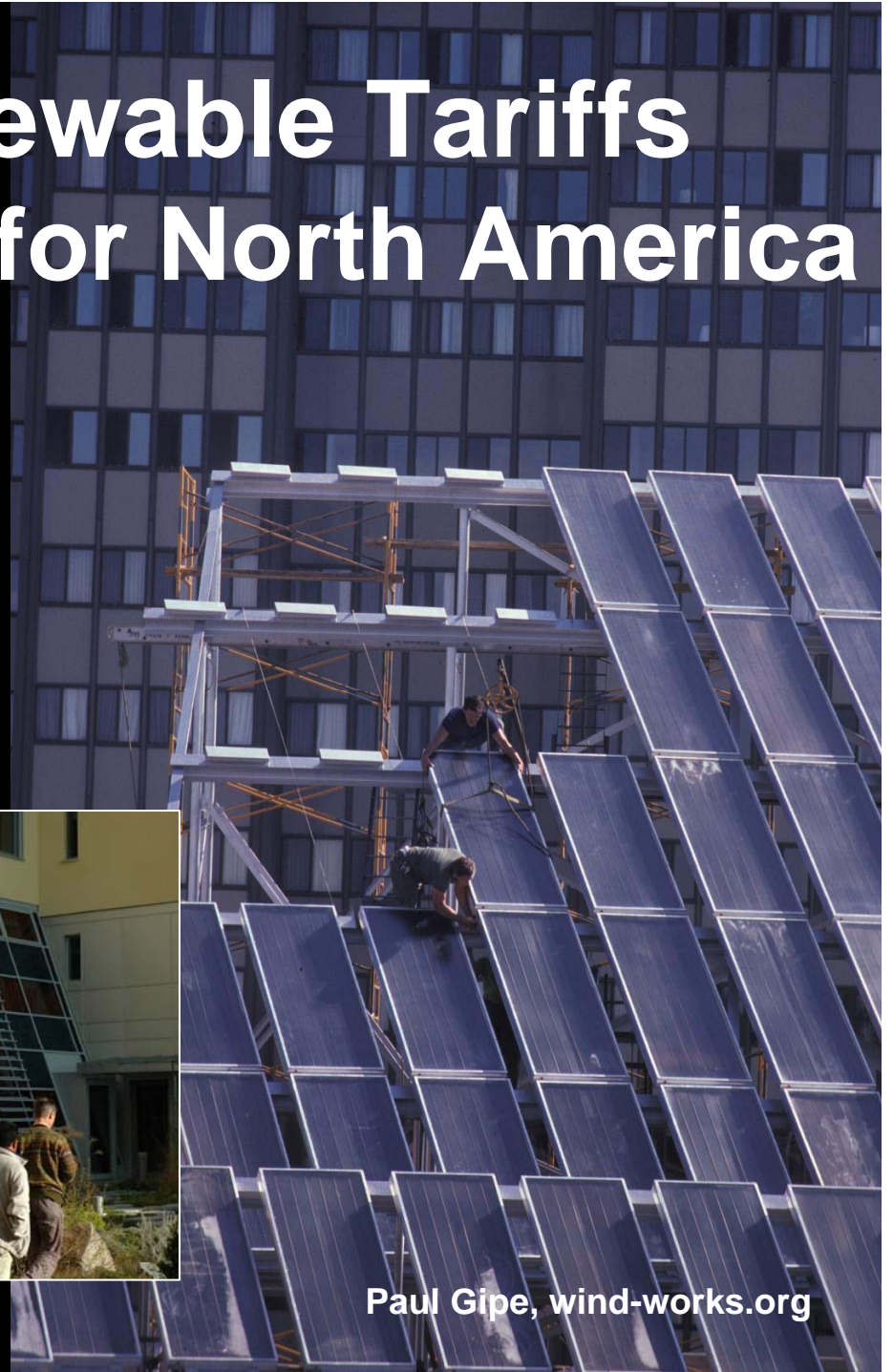


Disclaimer: The views expressed are those of Paul Gipe and are not necessarily those of the sponsor.

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 New Policy Option for North America



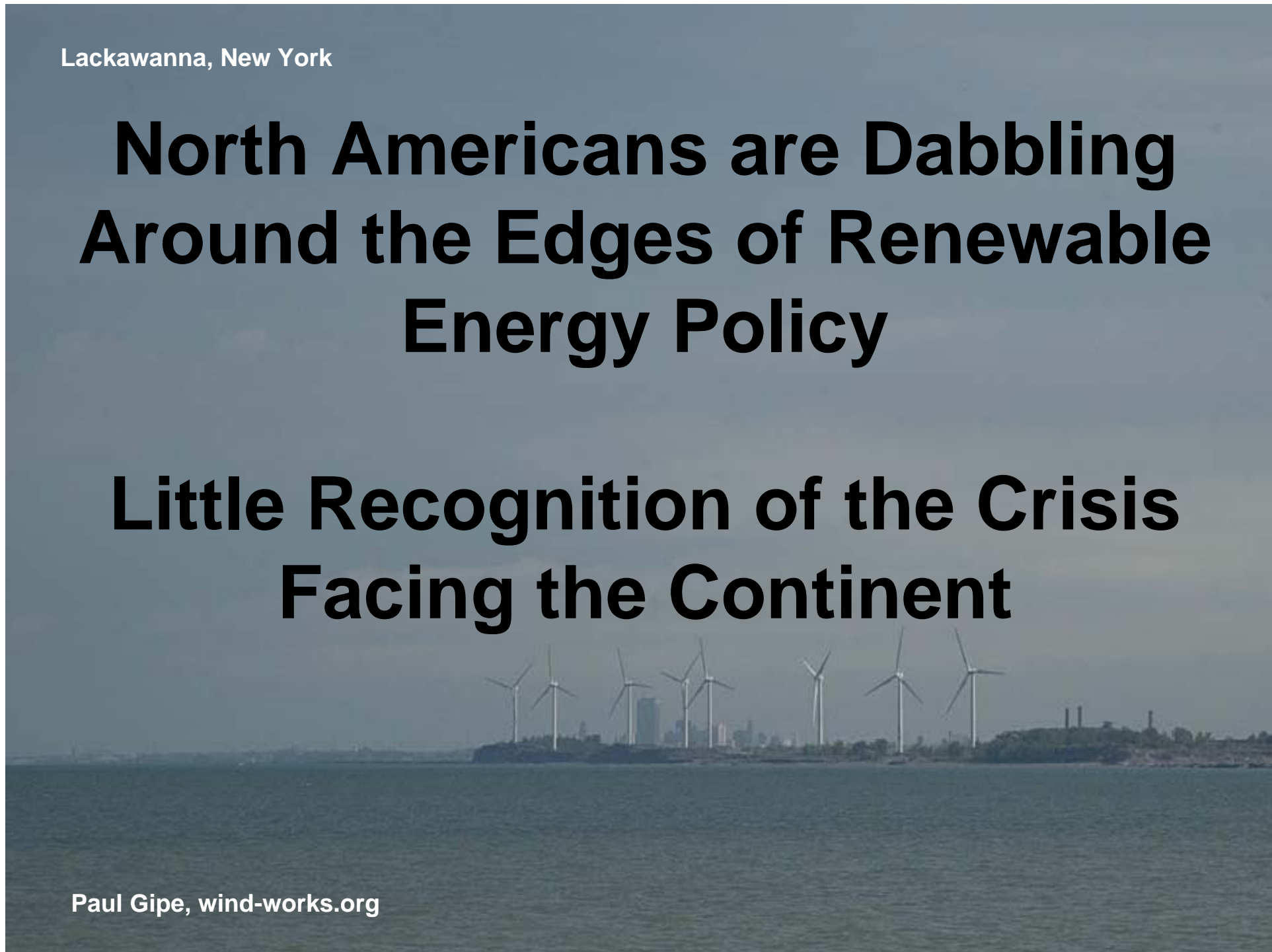
Paul Gipe, wind-works.org

Lackawanna, New York

North Americans are Dabbling Around the Edges of Renewable Energy Policy

Little Recognition of the Crisis Facing the Continent

Paul Gipe, wind-works.org



Complacency is Not a Policy

Inaction is Not an Option



Paul Gipe, wind-works.org

Skibsted Fjord, Denmark

Myths to Dispel

- Renewables are Free
- Renewables are Cheap
- Renewables Can't Be Added Quickly
- Renewables Can't Make a Difference
- Net Metering Works

Paul Gipe, wind-works.org

Husum, Germany

North American Market Growth

- Exciting, Yes
- Significant, Yes
- Not Nearly Enough
by Any Standard

Paul Gipe, wind-works.org

Buffalo Ridge, Minnesota



Scale Needed: Electricity Only

- USA ~4,000 TWh/yr
- w/ 50% Cut ~2,000 TWh/yr
- @ 50% ~1,000 TWh/yr
- Avg Yield ~2 TWh/1000 MW
- = 500,000 MW of Wind
- Today: ~10,000 MW

Scale Needed: Passenger Vehicles

- 5,000 B km/yr
- 1/3 kWh/km for EV
- ~1,500 TWh/yr for EVs
- @ 50% EVs
- @ 2 TWh/1,000 MW
- ~400,000 MW

Scale Needed: USA Only

- 25%-50% Electricity Supply
- 50% Passenger Vehicle EV
- ~1,000,000 MW
- ~100 X Today!

Paul Gipe, wind-works.org

Buffalo Ridge, Minnesota

Is Storage Necessary?

- **No--Helpful, Yes**
- **Transmission--Yes**
- **Grid Management--Yes**
Smart Grid?
- **Single-Cycle Gas Plants--Yes**



High Penetration is Possible

Percent Wind

Denmark, January 2007

36%

Spain, 16 February, 2006

20%

Can It Be Done Here?

- 300,000 Heavy Trucks/yr
- ~1/2 MW/Truck
- ~150,000 MW/yr Equivalent
- Yes, It Can Be Done
- But Not At Current Pace

The USA is Capable of Huge National Undertakings

- **TVA, BPA, WPA**
- **Civil Rights**
- **Anti-Smoking**
- **War**

Swords into Wind Turbines

- **Direct Cost of Iraq War ~\$600 B**
- **Direct Purchase Opportunity Cost**
~15% Penetration, or
- **Tariff Payment Opportunity Cost**
~19% Penetration

<http://www.wind-works.org/articles/costofiraqwarandwind.html>

Paul Gipe, wind-works.org



Germany's Renewable Tariffs

The Results (2006)

- New Renewables 10% of Supply
- Renewables 5.3% of Primary Energy
- Wind 6.5% of Supply
- 70,000 Employed in Wind Industry
- 40,000 Employed in PV Industry
- 214,000 Employed in Renewables
- €22 (~\$30) Billion Turnover

Why the European Success?

- **#1 Community Involvement**
Germany & Denmark
- **#2 Advanced Renewable Tariffs**
16 EU Countries use Electricity Feed Laws

Public Acceptance Critical to Wind

- **Acceptance Necessary**
- **As Wind Grows**
 - Entrenched Players More Threatened
- **Organized Opposition**
 - Coal & Nuclear Industry
 - Far Right

Building Acceptance

- **Must Share Opportunity**
- **Public Must Participate**
- **Or Wind Will Never Reach its Potential**

Paul Gipe, wind-works.org

Schauinsland, Germany

Why Community Wind?

- **Participation = Greater Acceptance**
- **Distributed = Greater Resiliency**
- **Clean & Green (Mostly)**
- **Human Scale**
- **Enables Local Ownership**
- **New Cash Crop For Farmers**



Increasing Acceptance #1

“Your Own Pigs Don’t Stink”



Paul Gipe, wind-works.org

Jutland, Denmark

Co-Op & Farmer-Owned Wind

	Farmer	Co-op	Corporate
The Netherlands	60%	5%	35%
Germany	40%	10%	50%
Denmark	65%	25%	10%
Spain	0%	0%	100%

Source: Dave Toke, University of Birmingham, 2005.

Community Power

- **Greater Acceptance**
- **More Power More Quickly**
- **More People Involved Locally**
- **More Money Locally**
- **More Jobs Locally**

Paul Gipe, wind-works.org

WWEA Kingston, Ontario

Theme: Community Power

- **June 24-26, 2008**
- **First North American WWEA Conference**
- **International Participation**
- **David Suzuki, Hermann Scheer, . . .**

http://www.wwindea.org/home/index.php?option=com_content&task=view&id=194&Itemid=68

Paul Gipe, wind-works.org

Advanced Renewable Tariffs

- **Deliver More Capacity--**
 - More Quickly
 - More Equitably
- **By Enabling Participation**



Advanced Renewable Tariffs

- **What Are They?**

Feed-in Tariffs or Minimum Price Systems

Political Price, Not Political Quota

- **How Do They Work?**

Price Differentiation

- **Where?**

**Germany, France,
Spain . . .**



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
- High or “Premium” Prices Deliver
More Generation More Quickly and More Jobs

Market Mechanism Status

- **Quotas (RPS & Tendering)**

Typically Anglophone Countries
Timid Targets Seldom Met

- **Prices (Renewable Tariffs)**

Typically Non-Anglophone Countries
Aggressive Targets

Political Price-Political Quantity Market Market Mechanisms

	Price	Quantity
Feed-in Tariffs	Political	Market
Quota/RPS/Tenders	Market	Political

Both are Market Mechanisms

Aggressive Targets Require Aggressive Measures

Ferndale, Ontario

German Renewable Energy Targets

	2010	2020	2030
Electricity	12.5%	27%	45%



Renewable Tariffs: Trend Growing in North America



Paul Gipe, wind-works.org

Husum, Germany

Advanced Renewable Tariffs North American Endorsements

- David Suzuki Foundation
- Pembina Institute
- Liberal Party of Ontario
- NDP of Canada
- Greenpeace (USA & Canada)
- Bill McKibben, Denis Hayes,
Anne Ehrlich . . . and many more

Renewable Tariff Design

- **Simple, Comprehensible**
- **Transparent**
- **Priority Access & Purchase**
- **Prices Sufficient for Development**
- **Lengths Sufficient for Profitability**
- **Fair But Not Undue Profit**
- **Price Differentiation**
By Technology, Application, or Intensity

Wind's Cost -- $f_{(x)}$ of Resource

- High Wind = Low Cost
- Low Wind = High Cost
- We Need It All

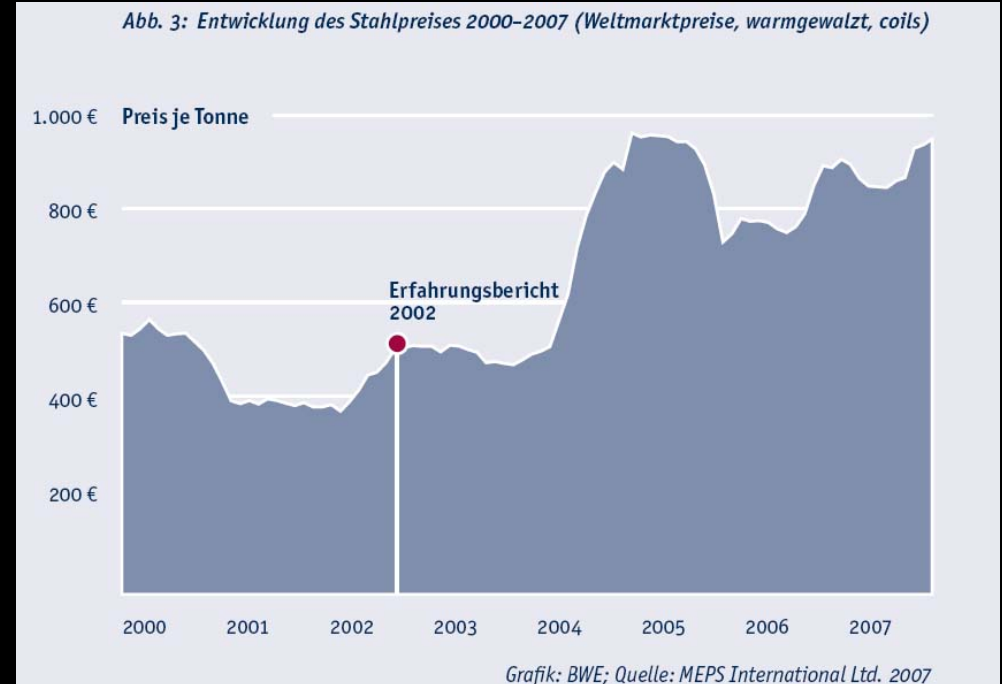
Paul Gipe, wind-works.org

Manawatu Gorge, New Zealand



Wind's Cost -- $f_{(x)}$ of Materials

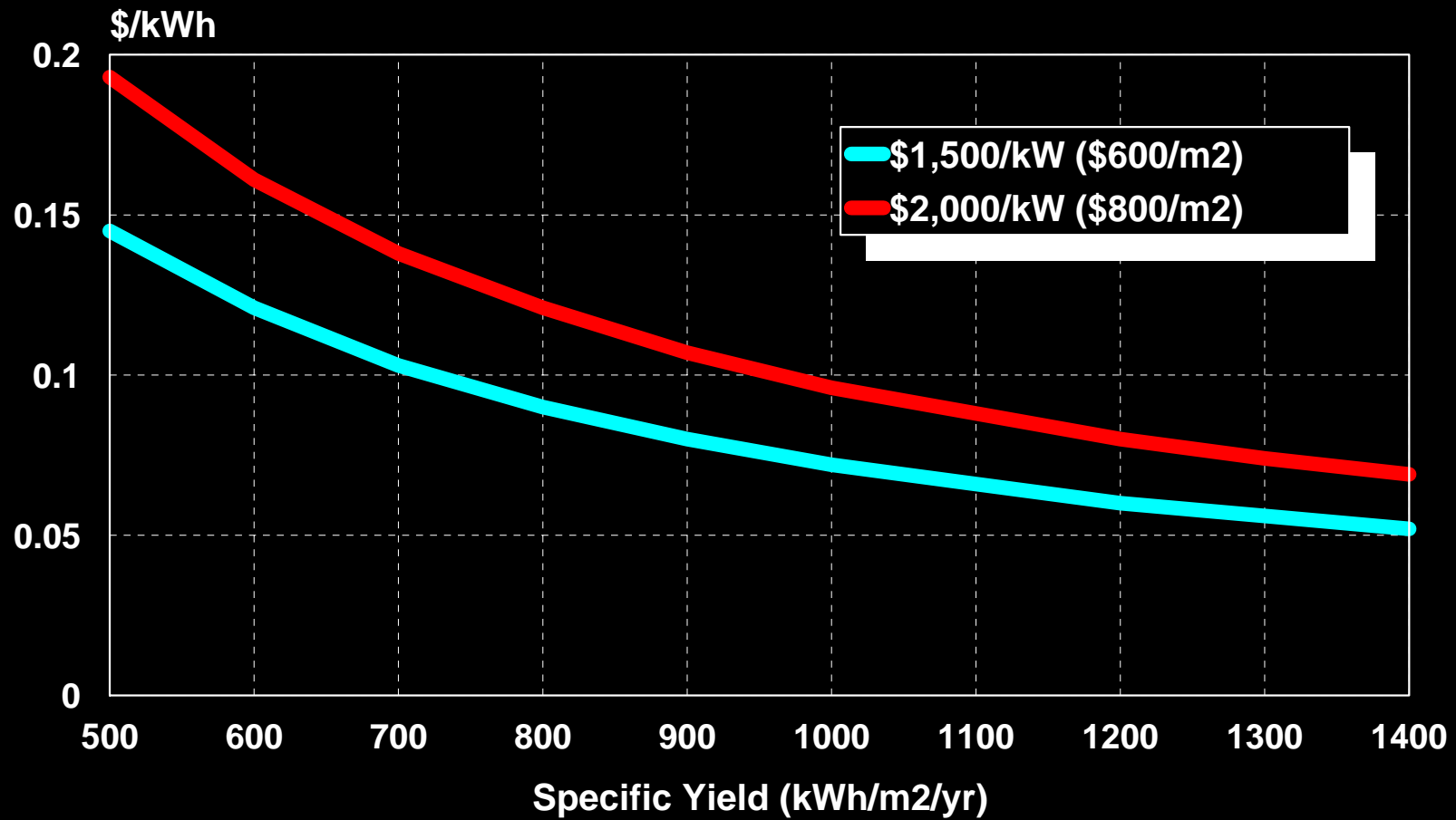
- Steel Prices ~2X
- Copper Prices ~4X



http://www.wind-energie.de/fileadmin/dokumente/Positionspapiere/BWE_EEG-Position_07-09-06.pdf

Paul Gipe, wind-works.org

Cost of Wind Energy 2008

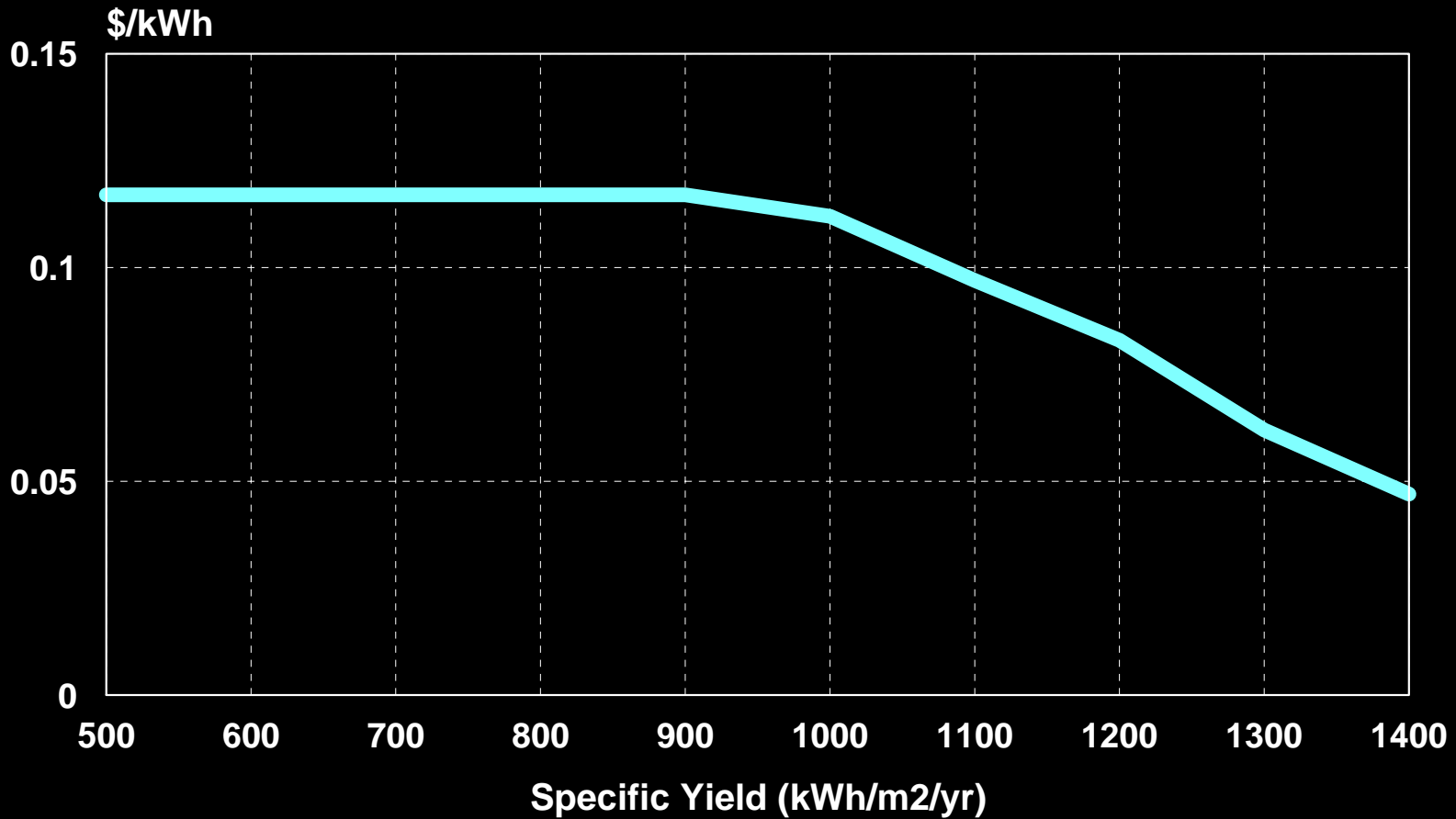


Note:

500 kWh/m²/yr ~ 5 m/s

1400 kWh/m²/yr ~ 8 m/s

French Wind Tariffs



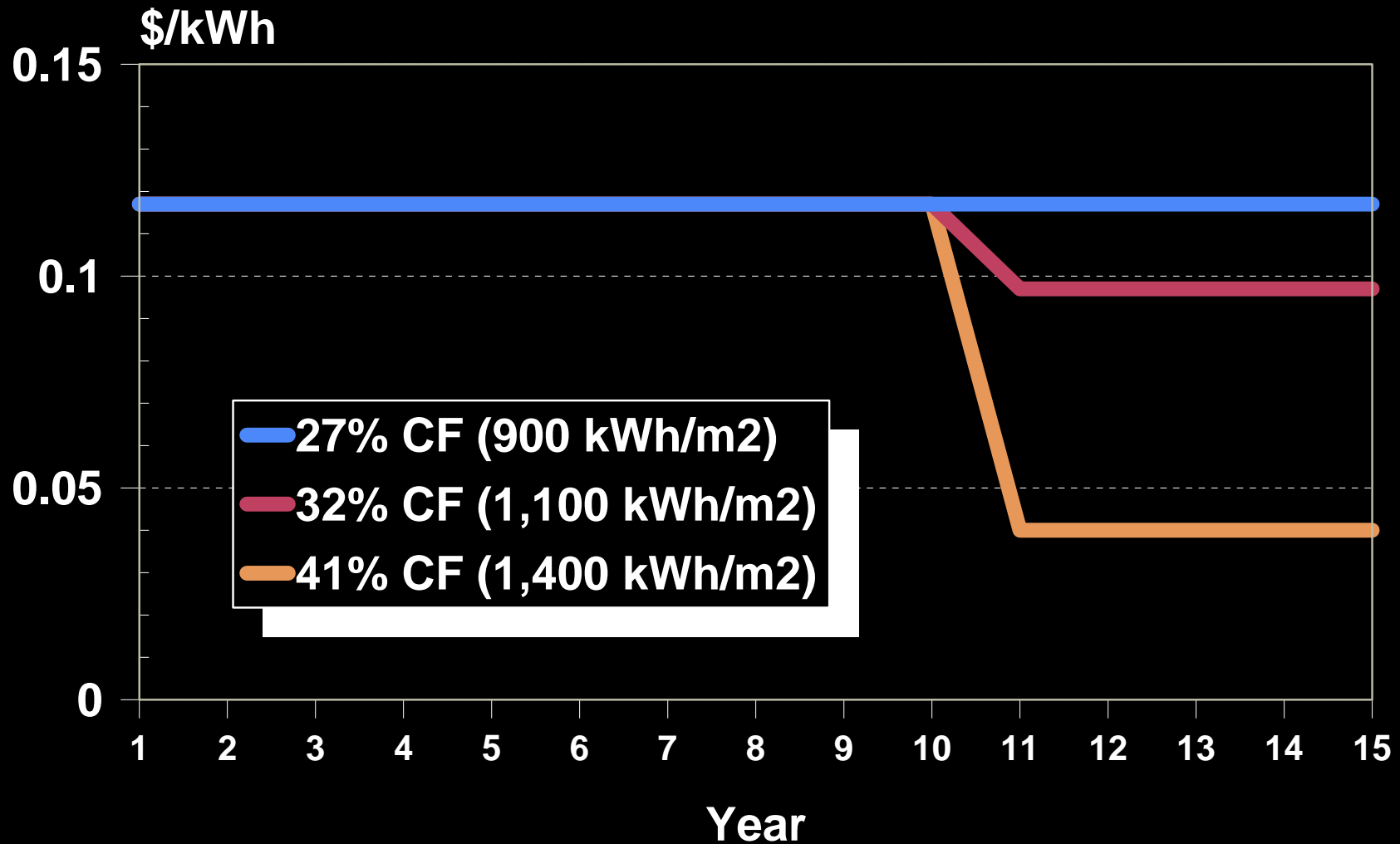
Note:

500 kWh/m²/yr ~ 5 m/s

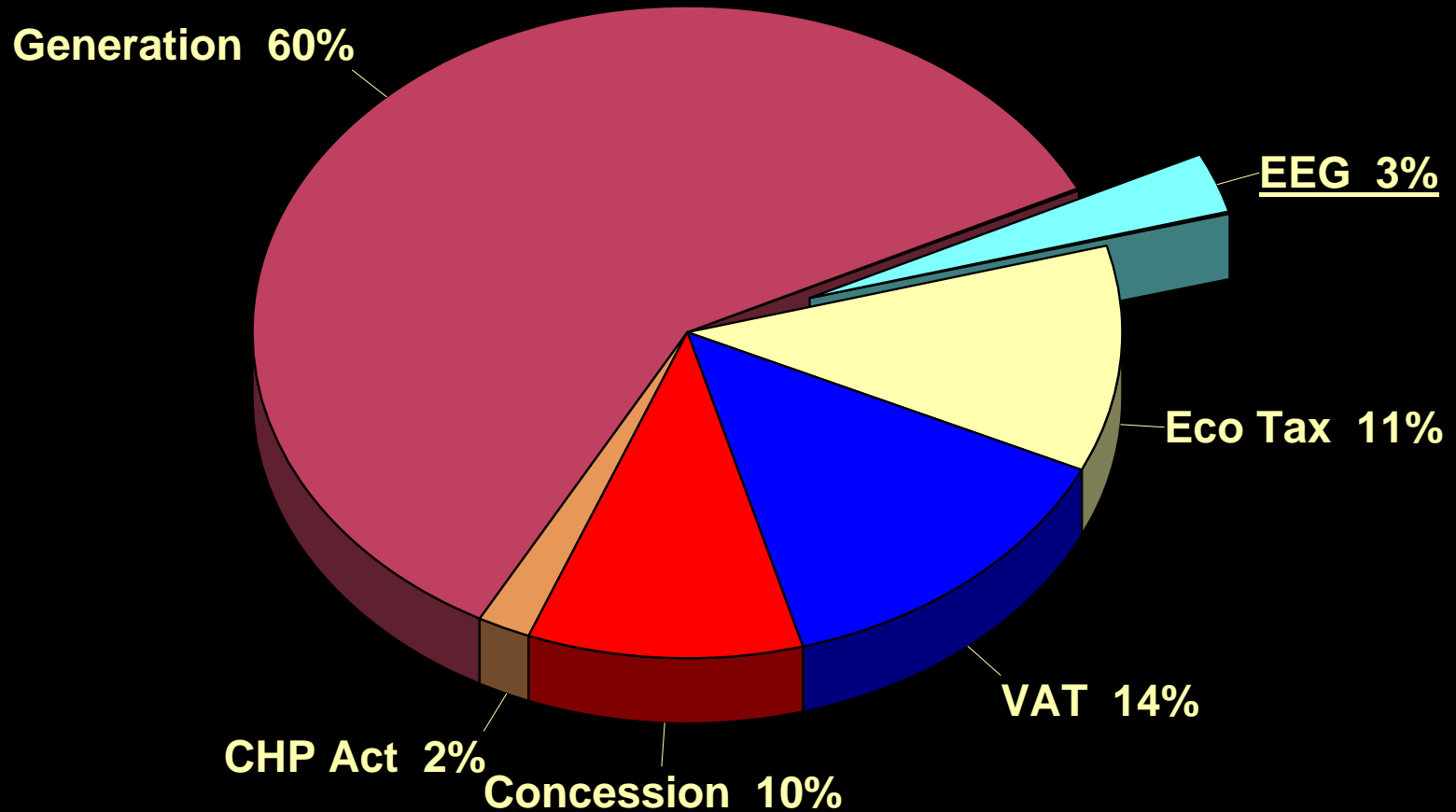
1400 kWh/m²/yr ~ 8 m/s

Paul Gipe, wind-works.org

French Wind Tariffs 2006



Cost of German EEG



Wind--Not in Isolation

- Part of a Complete Package
- All Renewables--All the Time



Move From Nation of Consumers to Nation of Producers

Paul Gipe, wind-works.org

Lackawanna, New York



From Consumer Culture to Culture of Conservation

--Ontario Premier Dalton McGuinty

Paul Gipe, wind-works.org

Montfort, Wisconsin

We Need More Wind . . .

Matane, Quebec



Paul Gipe, wind-works.org

Hinesburg, Vermont

... And More Solar



Paul Gipe, wind-works.org

Gaspé Peninsula, Quebec

No Time for Half-Measures

No Time to Lose

Paul Gipe, wind-works.org



Renewable Tariffs-- New Policy Option for North America

www.wind-works.org

Manawatu Gorge, New Zealand

