

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

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What Do These Countries Have in Common?

- Mongolia
- South Africa
- Bulgaria
- Bosnia
- Iran
- Germany
- Spain
- Ireland
- China
- Slovenia
- Thailand
- Croatia
- Serbia
- France
- Portugal
- Uganda

Partial List of Countries with Feed-in Tariffs

Paul Gipe, wind-works.org

Carleton College V82, Northfield, Minnesota

Feed-in Tariffs--FITs (Advanced Renewable Tariffs) by Paul Gipe



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

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European Renewable Policy

- **20/27 States Use FITs**
- **3/27 States Use FITs for PV Alone**
- **In EU 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

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 . . .

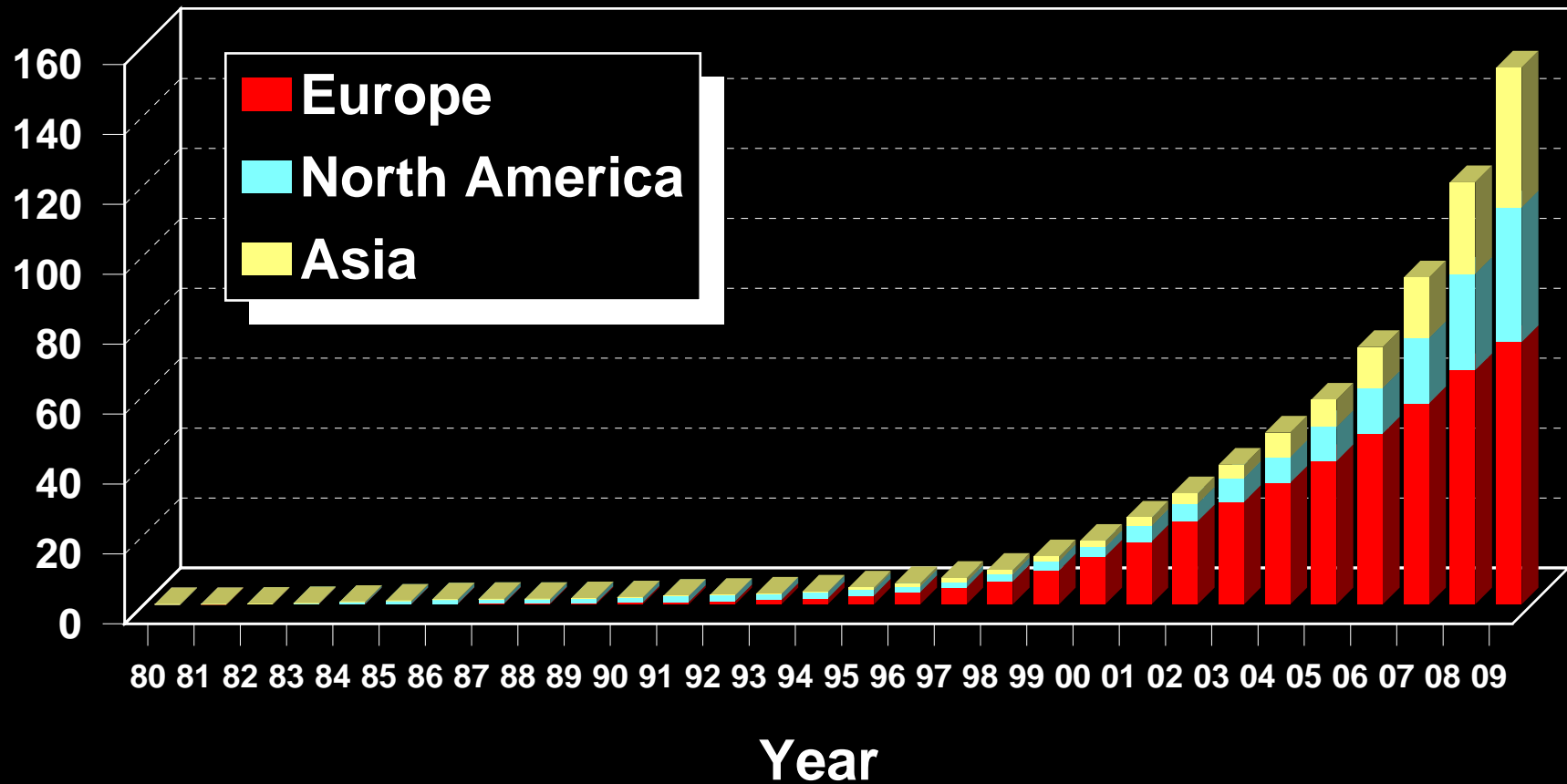
. . . 20 EU countries

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2009 World Wind Capacity

Megawatts (Thousands)



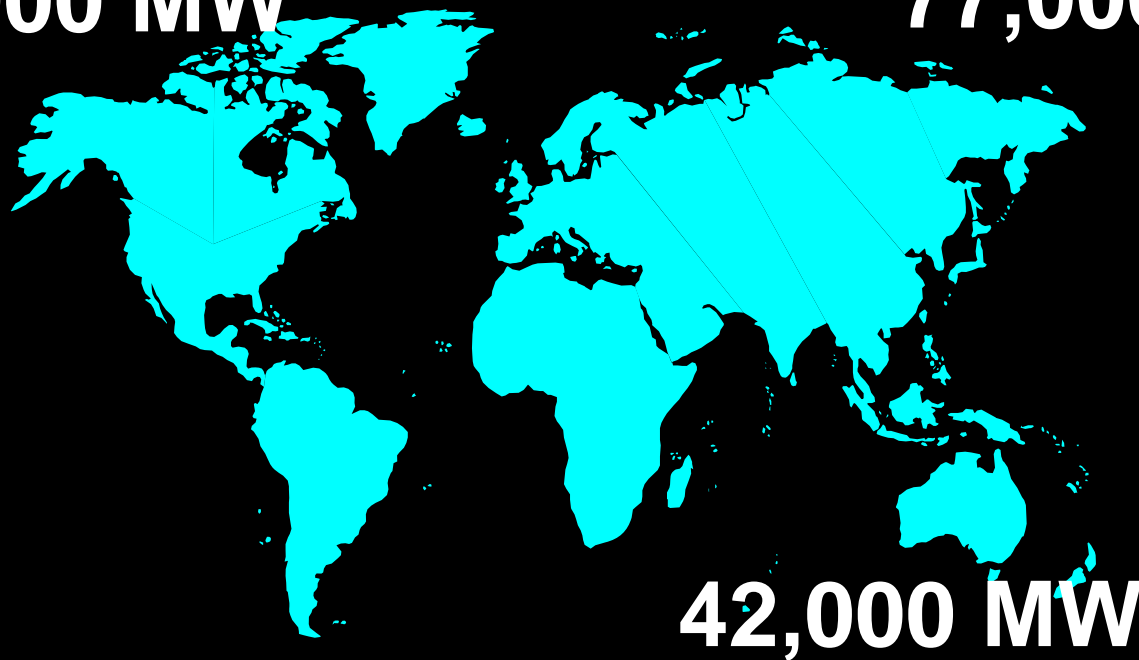
More than 1/2 From Feed-in Tariffs

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2009 World Wind Capacity

38,000 MW

77,000 MW



42,000 MW

2010 Solar PV Capacity

- 35,000 MW Worldwide
- 15,000+ MW/yr
- \$50+ Billion
- Major Markets

Germany--8,000 MW*

Italy--1,500 MW/yr*

Japan--500 MW

USA--800 MW/yr

California--250 MW/yr

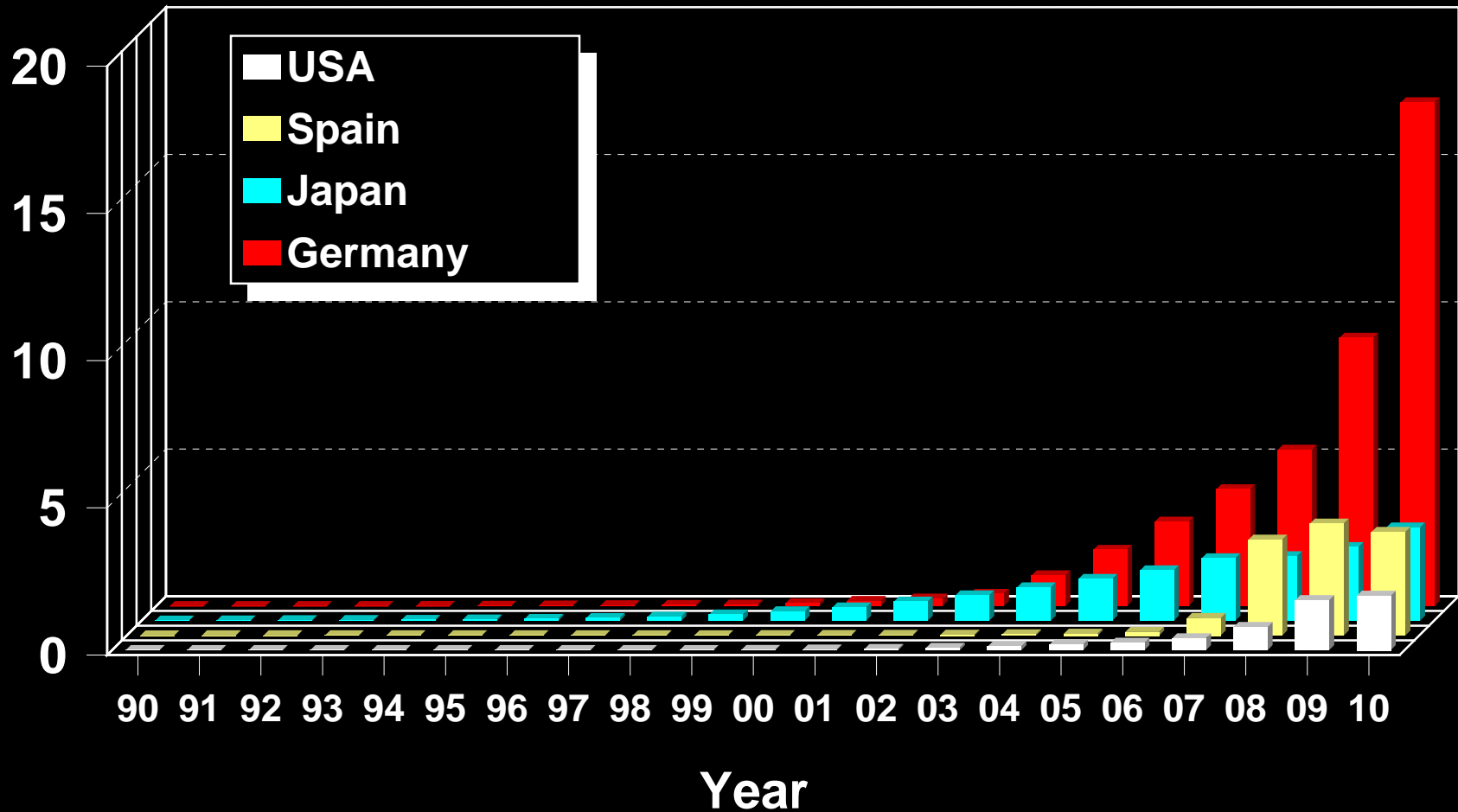
*Feed-in Tariff Market

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Rancho Seco, California

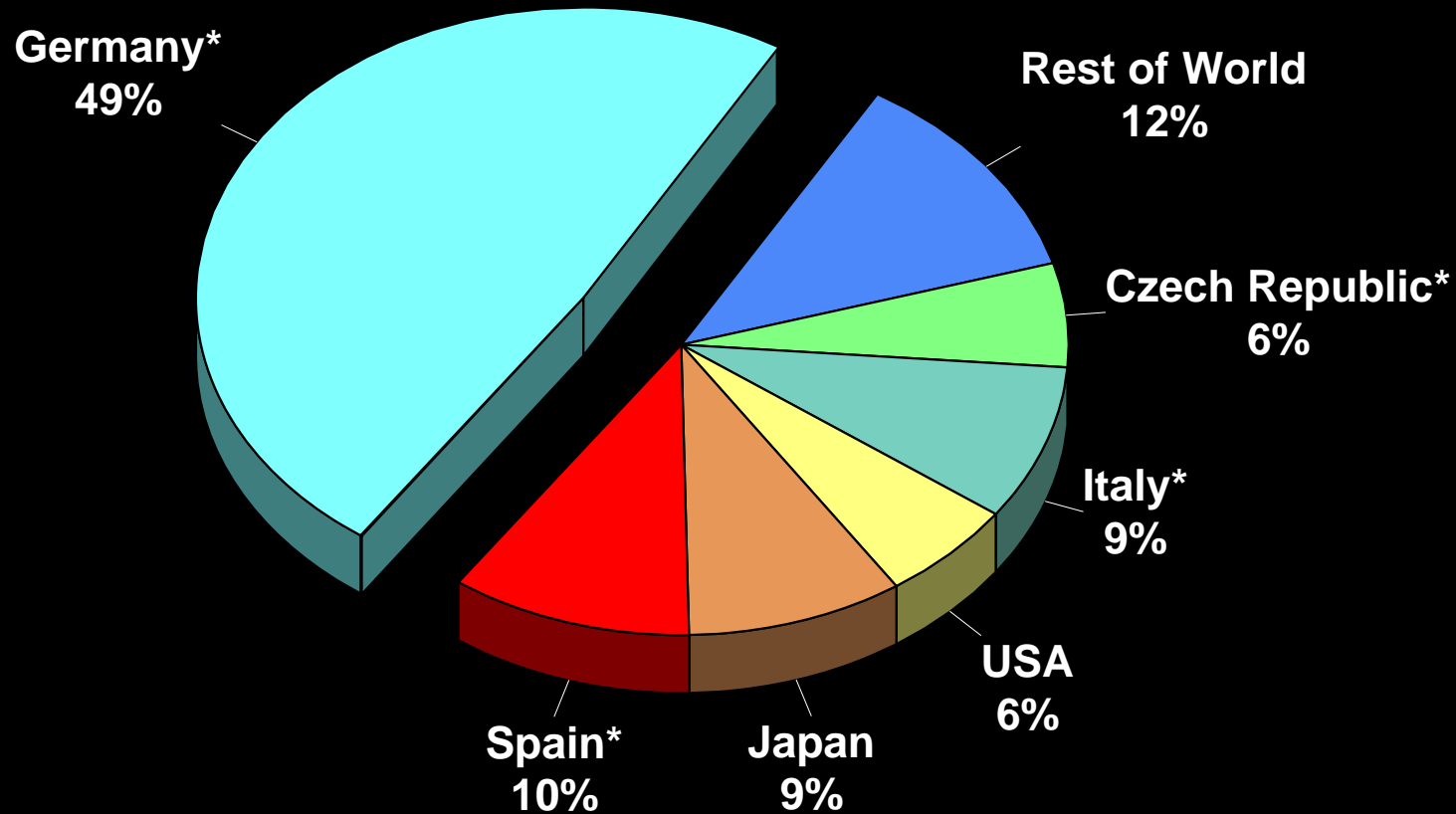
Solar Photovoltaics Development

Total Installed MW (Thousands)



World Solar PV Capacity 2010

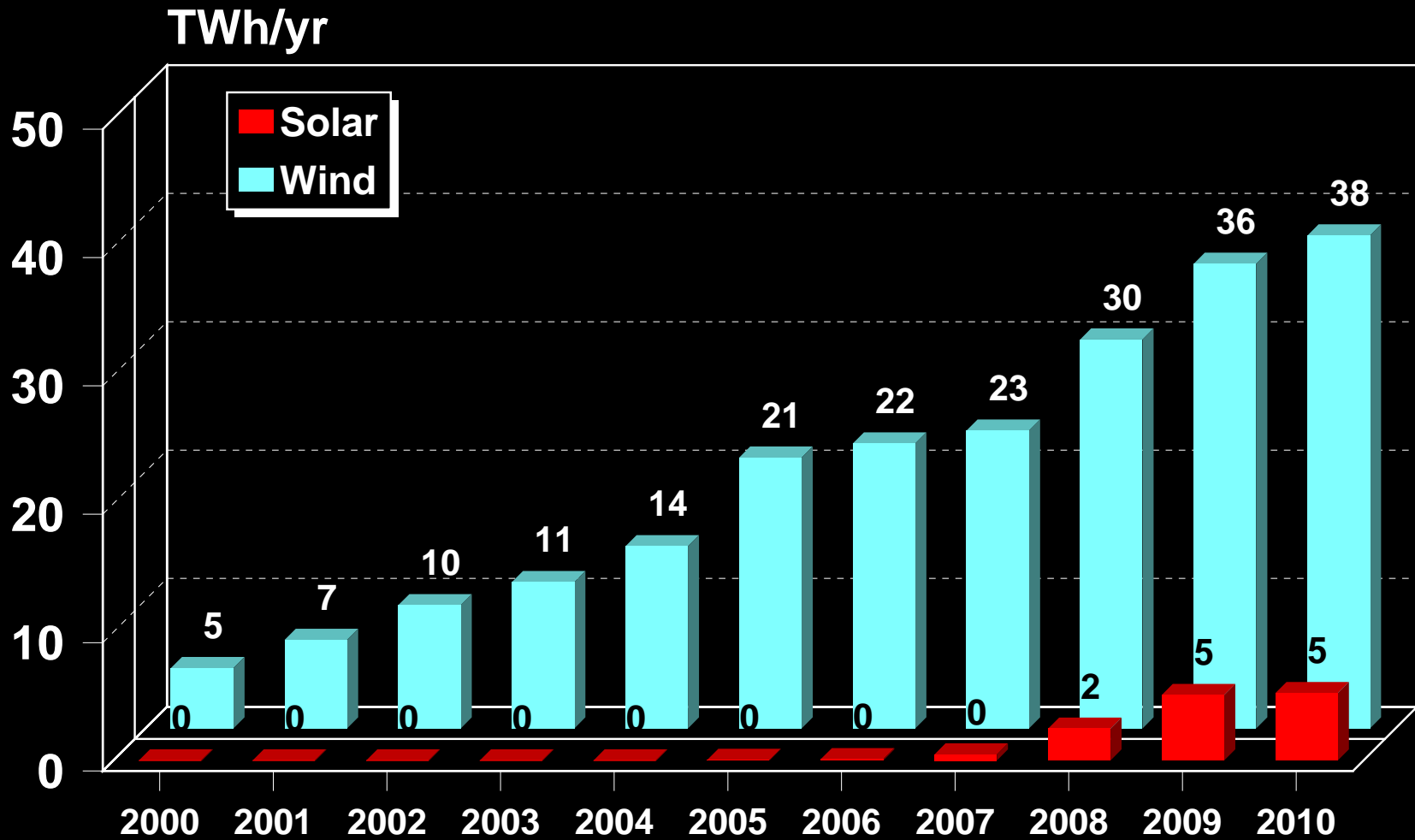
~35,000 MW



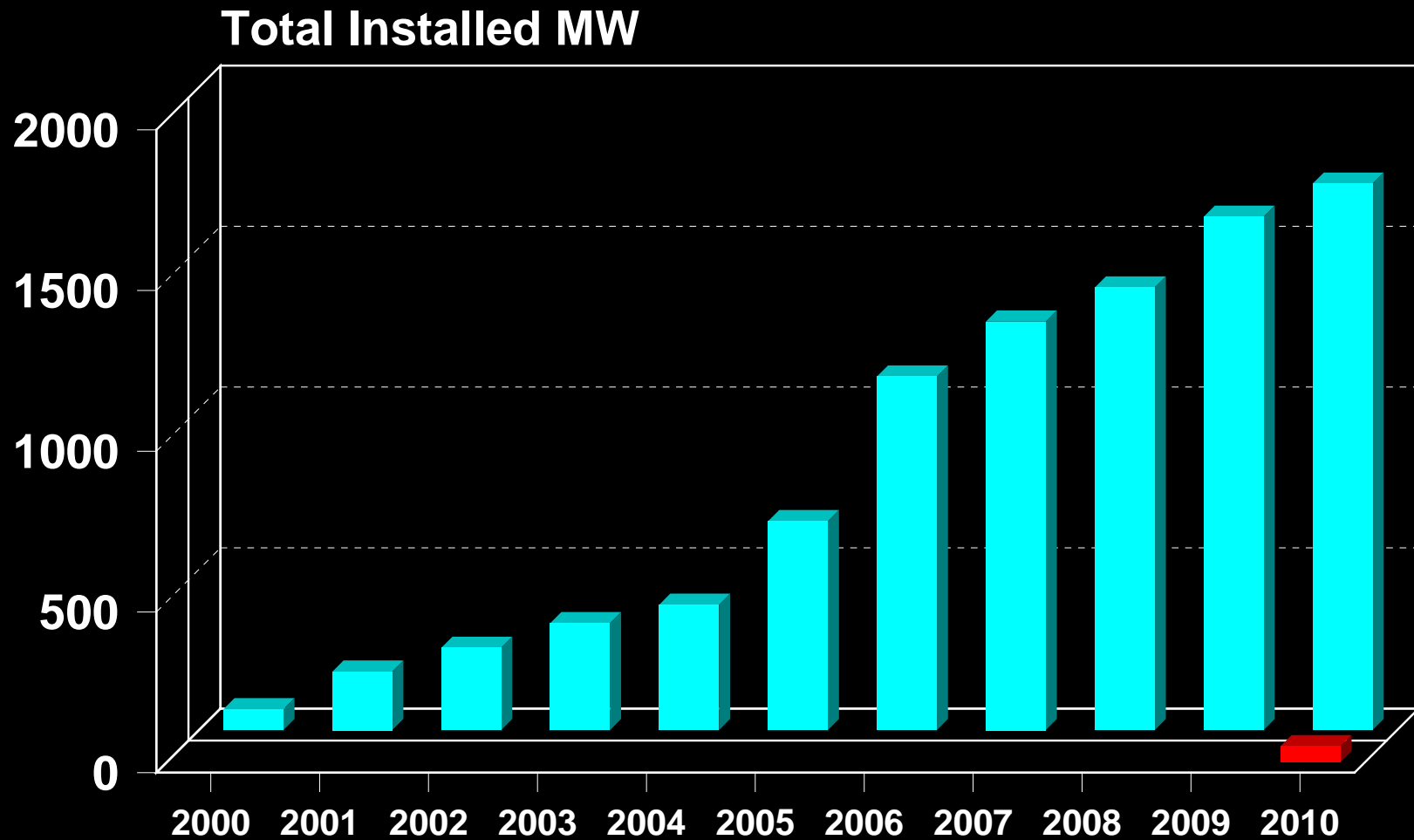
More than 3/4 from Feed-in Tariffs

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Spanish Wind & Solar Generation



German Biogas Development

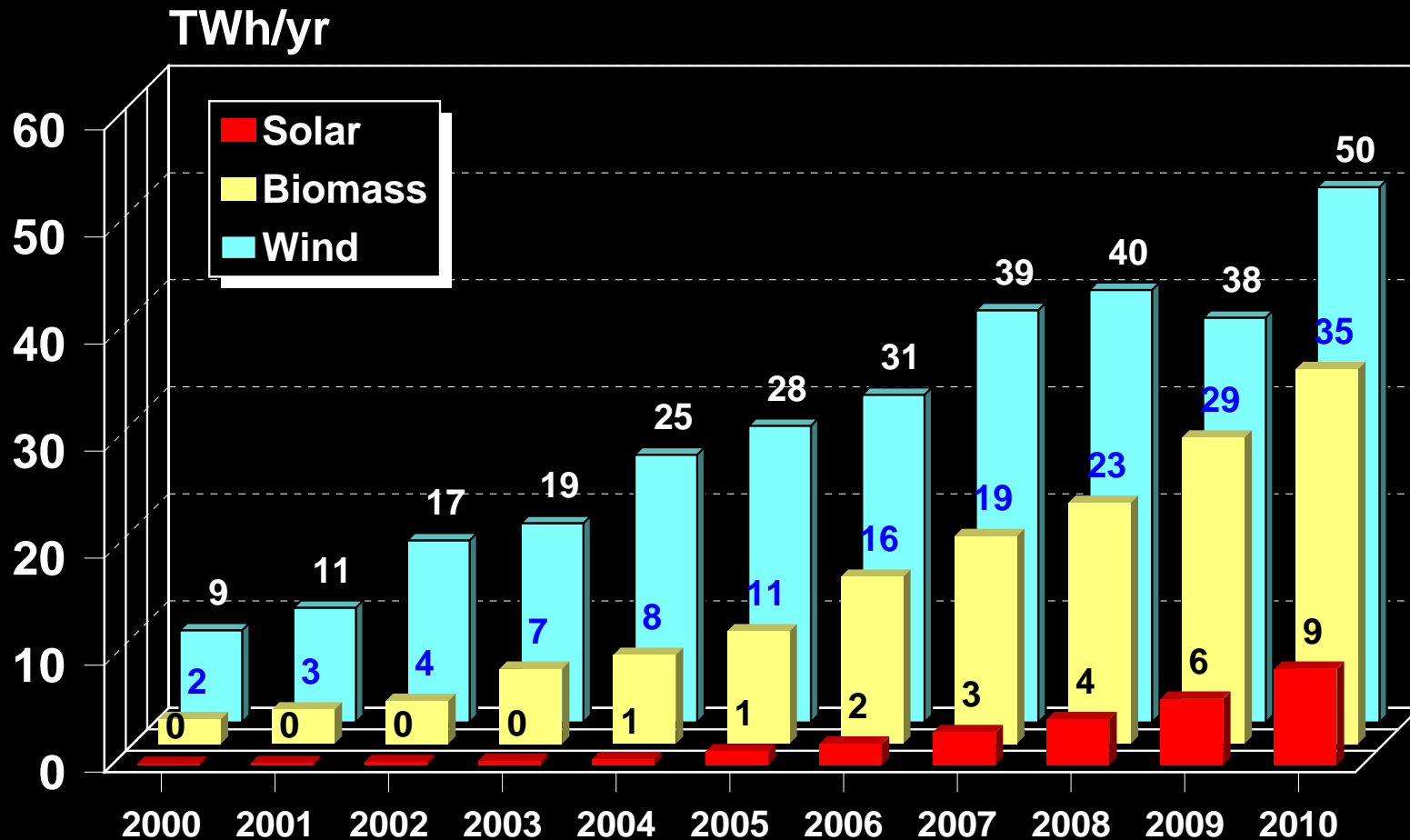


USA 2009: ~150 plants, 50 MW.

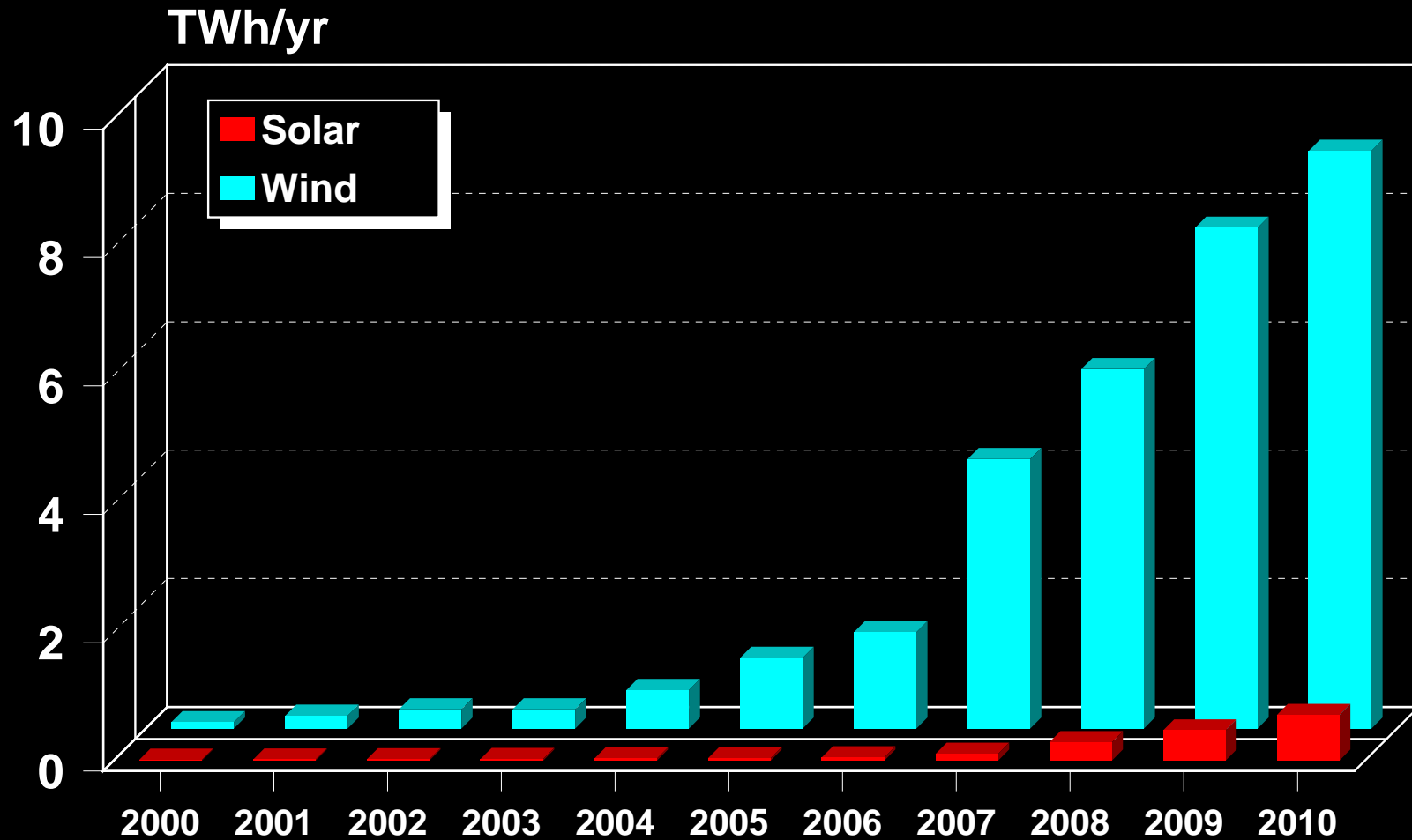
German Biogas Association from Heinrich Böll Stiftung: ~5,000 plants, ~8TWh/yr.

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German Wind, Solar, & Biomass Generation



French Wind & Solar Generation



European Projected Development 2010 with Feed-in Tariffs

	Wind	Solar PV
Germany	2,500	8,000
Spain	2,500	50-100
France	1,000	400
Italy	Quota	1,500

European 2011 Feed-in Tariffs

	Wind	Solar PV
Germany	Stable	2011 Cuts in Two Steps: 2,500-3,500 Growth Corridor
Spain	New Limits on Full Load Hours	Cuts Made 2010
France	Stable	Raised Tariffs, New Differentiated Tariffs, 3-month Suspension
Italy	Quota (RPS)	2011 Cuts: New Target; 3,000 MW 2011-13

FIT Programs in Development

Finland

Great Britain

Malaysia

Philippines

Nova Scotia

Vietnam

Botswana

Wind & Biomass

Renewable Heat

All Resources

All Resources

ComFIT, no Solar PV

Wind

?

Europe Dominates 2010 PV Market

- Germany + Italy + Czech Republic
- = 11,000 MW
- ~1/3 of Global Market



Paul Gipe, wind-works.org

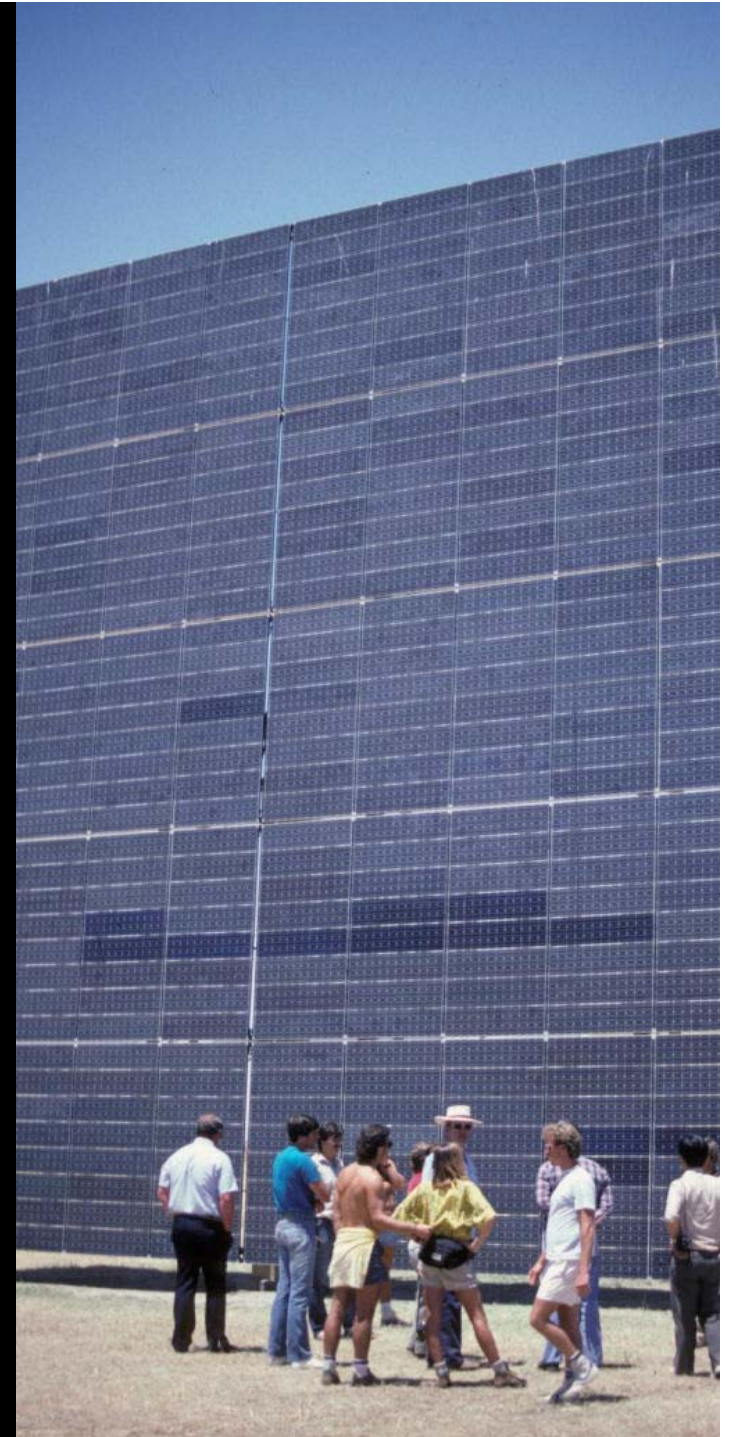
Friedrich-Whilhelm-Lübke-Koog, Germany

Solar PV in Germany

- **~8,000 MW in 2010!**
- **Total 17,000 MW**
- **~17 TWh/yr of Generation**
- **New Target: 3,500 MW/yr!**
- **~2% Supply in 2010**
- **2020: 50-70,000 MW**
10%-12% of Supply

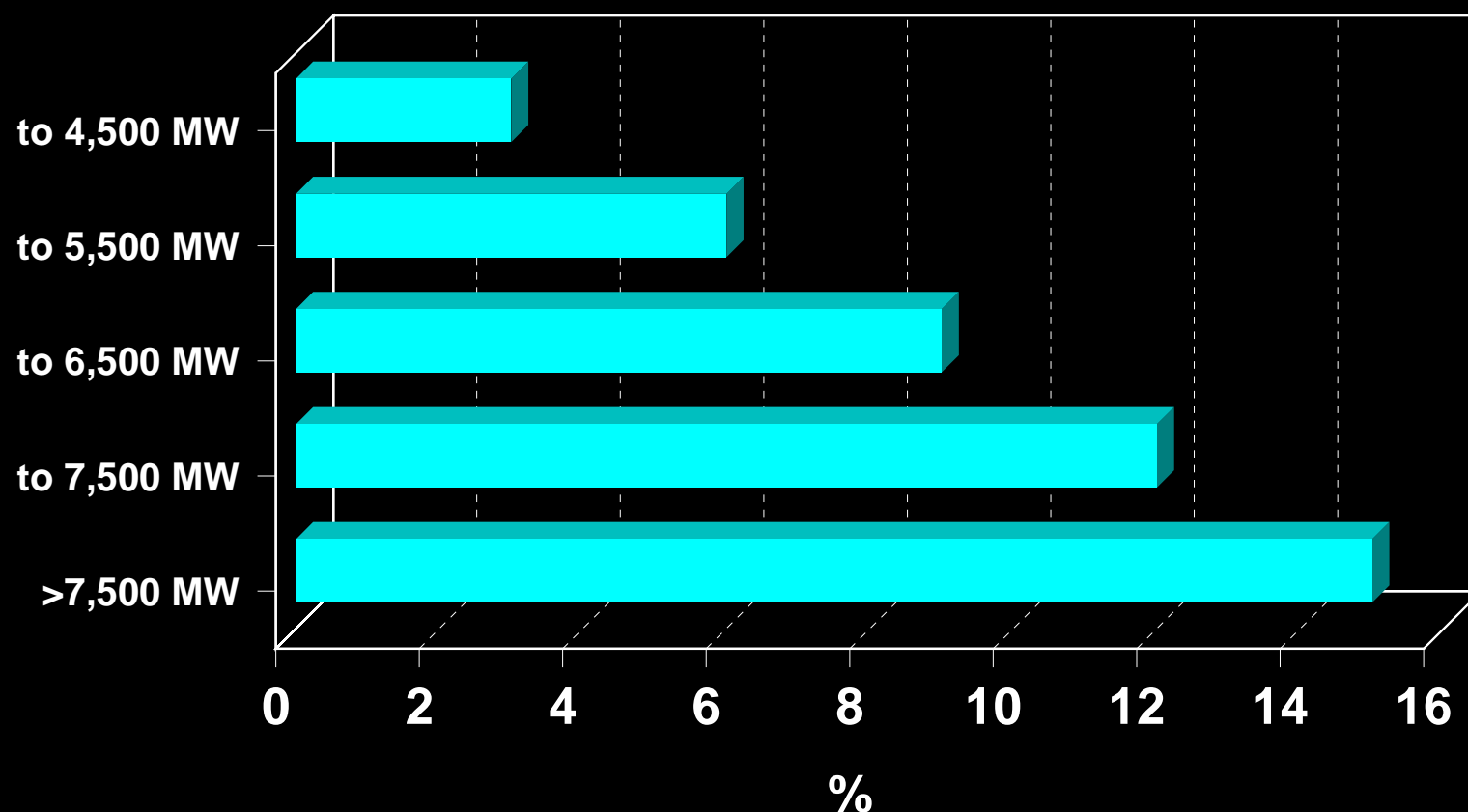
USA: Total of 2,050 MW in 2010.

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German PV Degression Corridors 2011

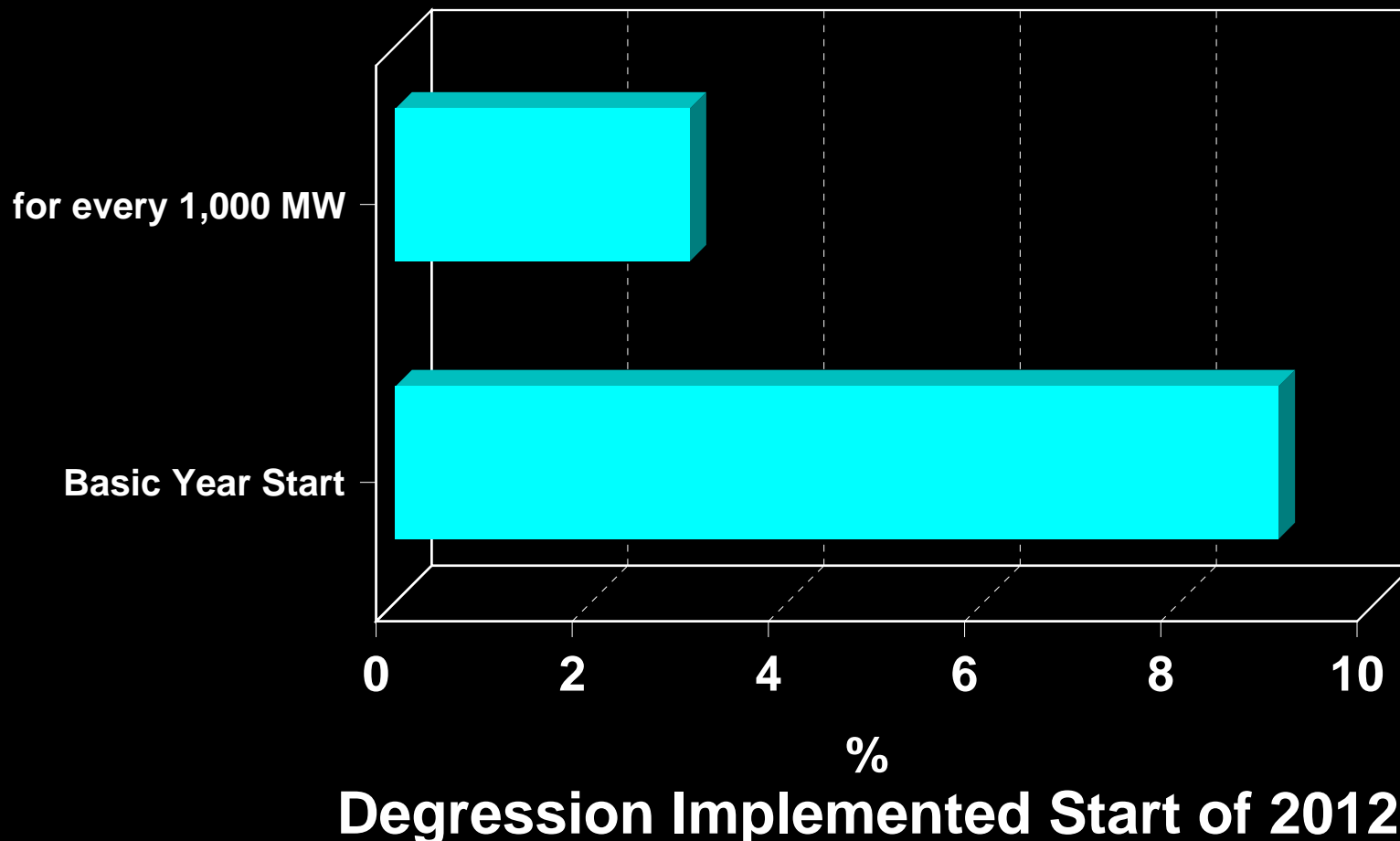
Target Growth 3,500 MW



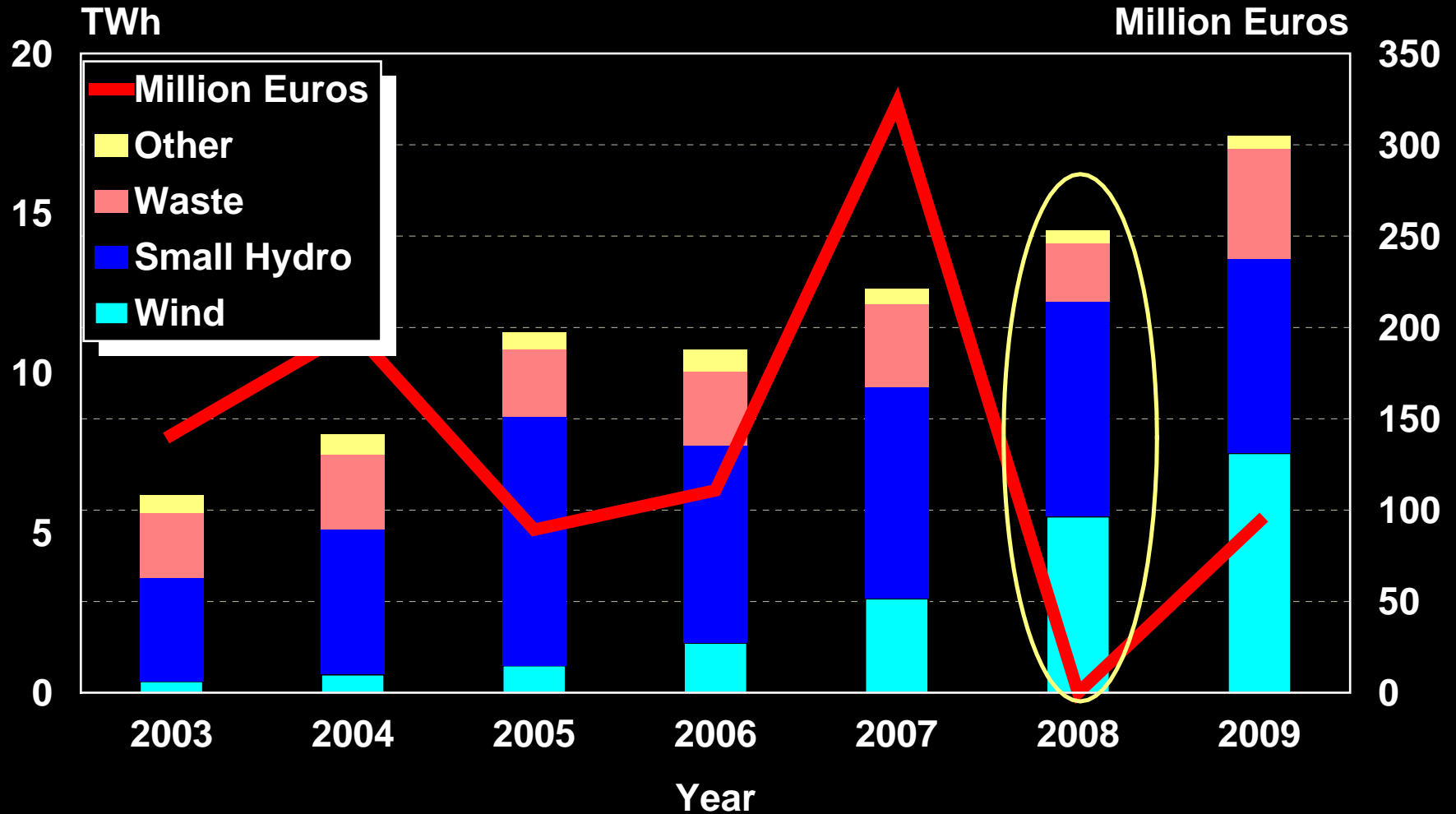
Degression Implemented Mid-Year 2011
This is on top of the 9% at start of the year.

German PV Degression Corridors 2012

Target Growth 3,500 MW



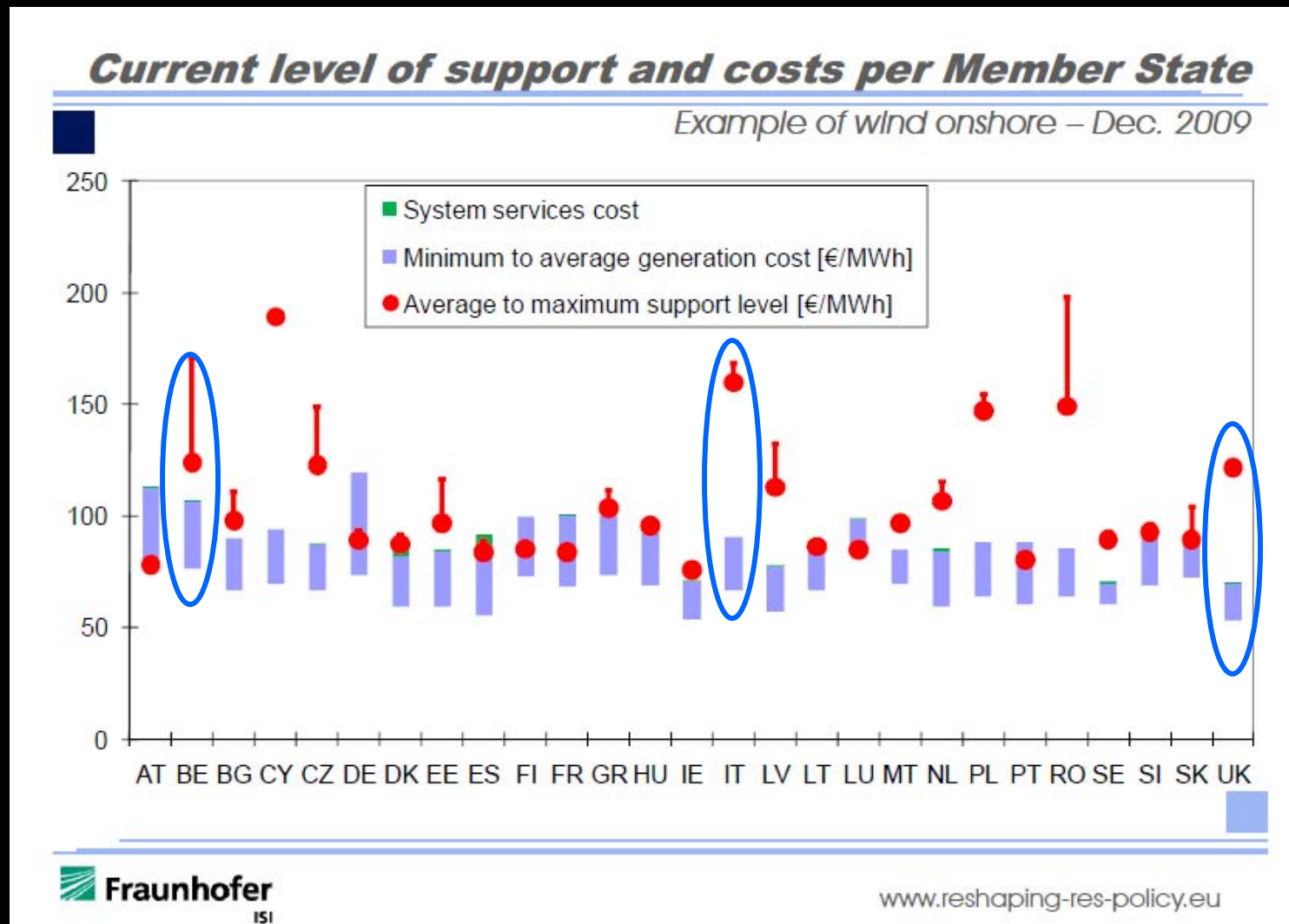
Over Cost of French Renewable Tariffs



Source: www.cre.fr

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RECs (RPS) Markets Most Costly



Wind in EU: RPS More Costly Than Needed

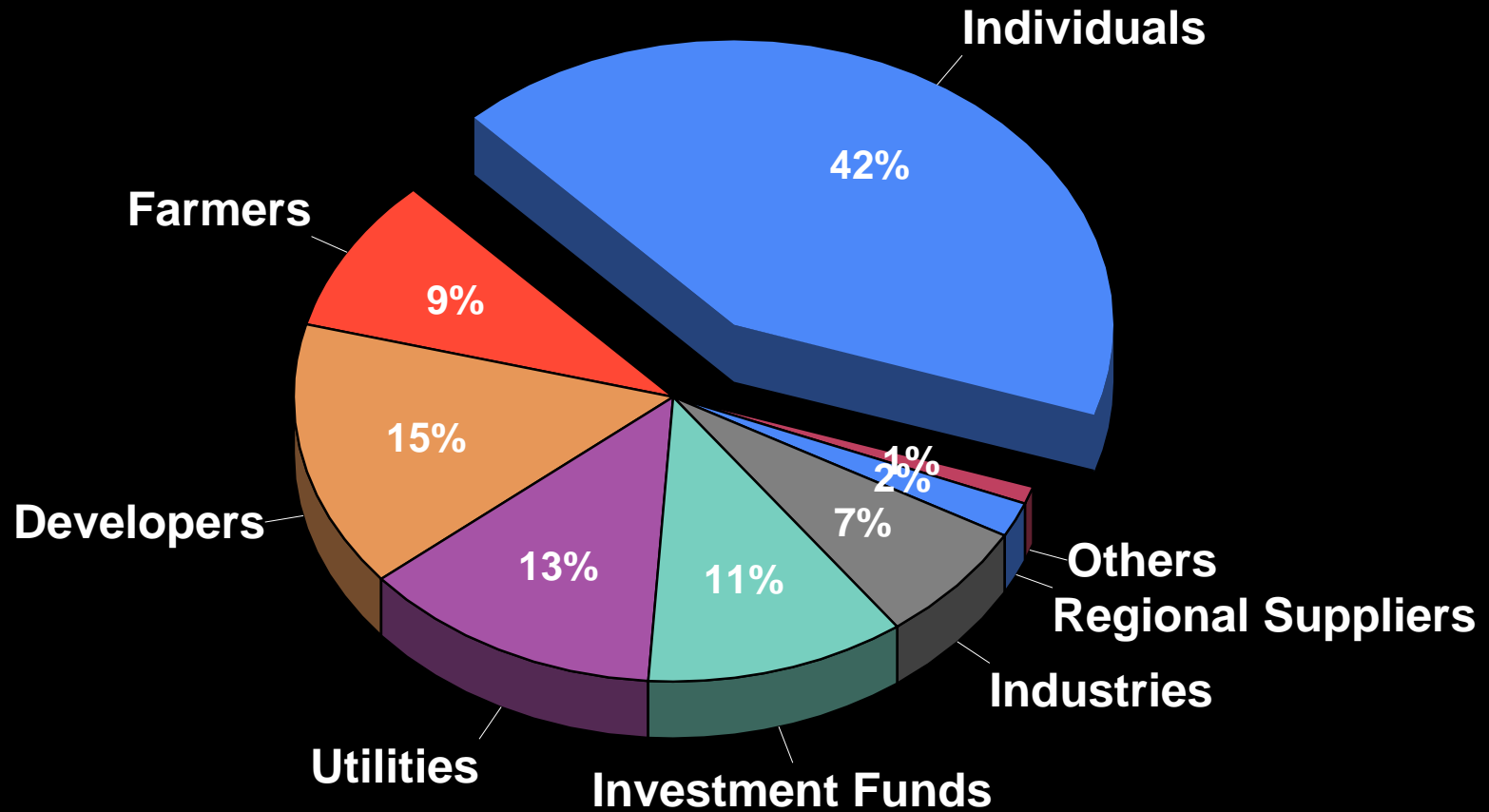
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Stromrebellen (Electricity Rebels)

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



Ownership of Renewables in Germany 2009



www.unendlich-viel-energie.de

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Ownership of Renewables in Germany 2009

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



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

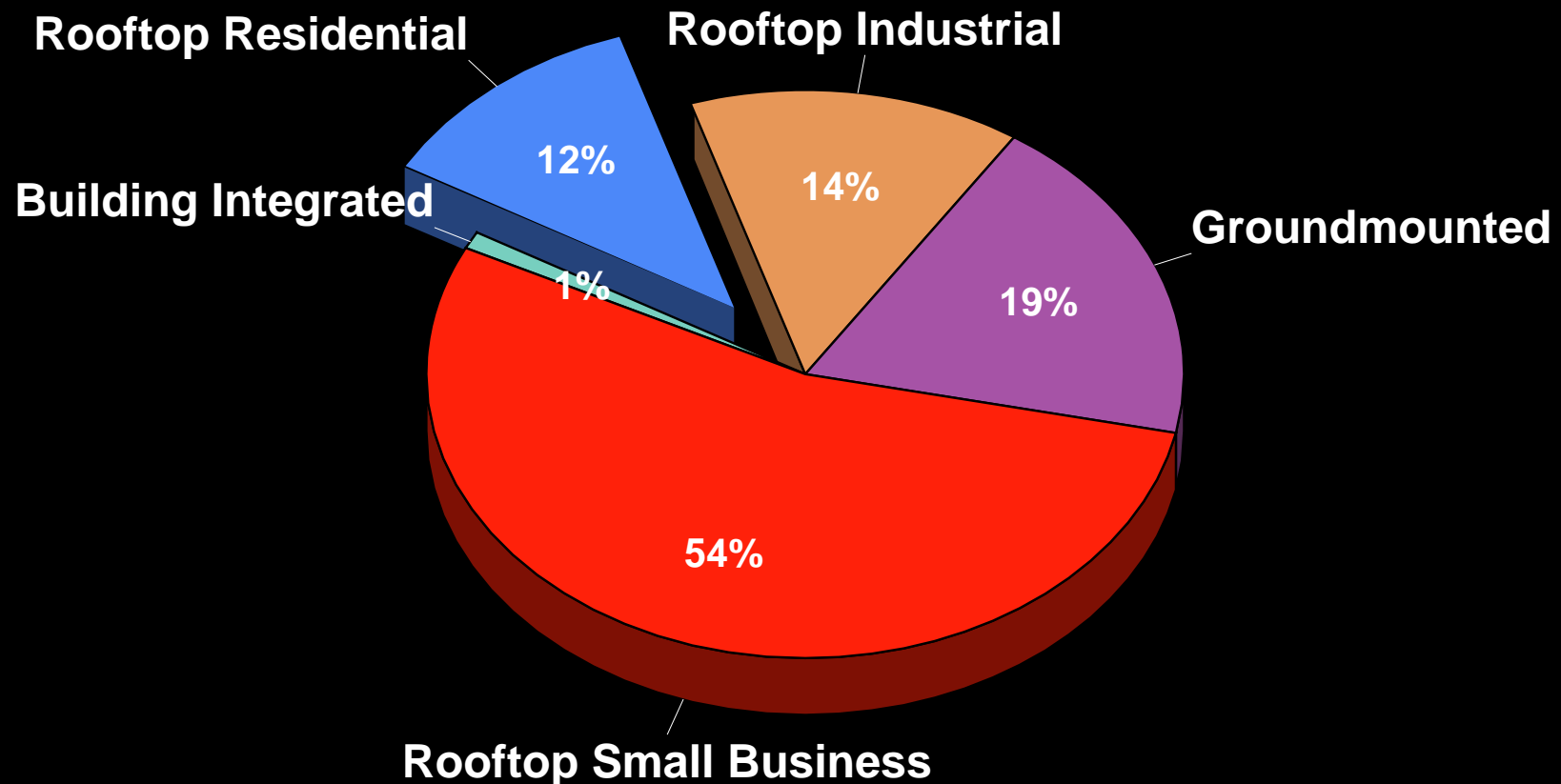
The Farmers of Nordfriesland

- **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
Geronimo
~Tehachapi Pass
€100 million (\$150 million)/yr



2009 Solar PV Market in Germany

80% Rooftop (Distributed Generation)



Bundesverband Solarwirtschaft (BSW)

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Ontario Moved First

First Modern System of Advanced Renewable Tariffs in North America



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Montfort, Wisconsin

Ontario “Gets It”

- Closing Coal Plants
 - Delaying Nuclear Build
 - Putting Renewables First
- Groundbreaking in North America



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Goderich, Ontario

2010 North American PV Market

Ontario Moves into Second

Rank		MW 2010
1	California	250
2	Ontario	168
3	New Jersey	125
4	Colorado	44

Clear Sky Partners: ~800 MW/yr

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2010 North American PV Market

Ontario Moves into Third

Rank		Total Installed MW 2010
1	California	1000
2	New Jersey	250
3	Ontario	215
4	Colorado	100

Clear Sky Partners: ~700 MW in 2011; ~3,000 MW by 2015!

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



Renewable Energy

The Revolution Has Begun!

www.wind-works.org

Manawatu Gorge, New Zealand

