

Green Jobs at SolarWorld



www.solarworld.de

Agenda



- Solar market and the demand for electricity (US and world-wide)
- Company history and why Oregon for our expansion
- Green job specifics and Oregon's help
- The future – Employment and Training
- Wind

Clean energy from sand & sun!



“By 2050, worldwide demands will be twice as high as they are now, even though there are still more than 2 Billion people without access to electricity and as a result with unequal opportunity for development.”

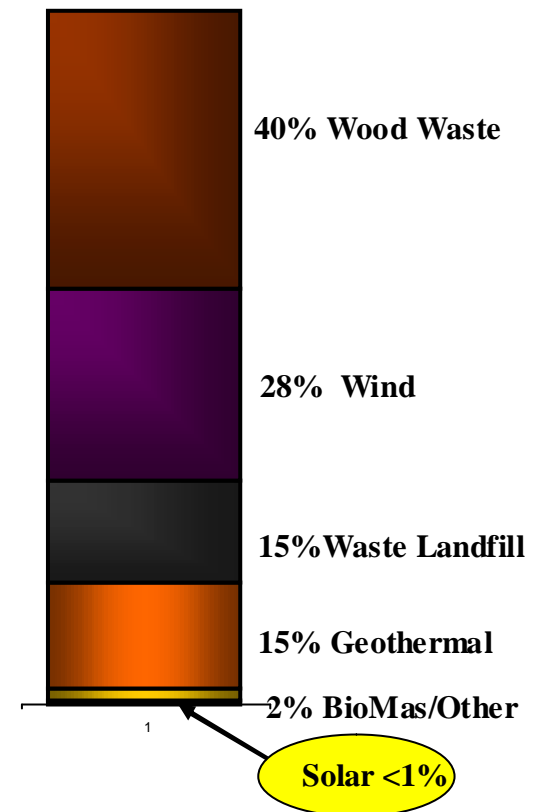
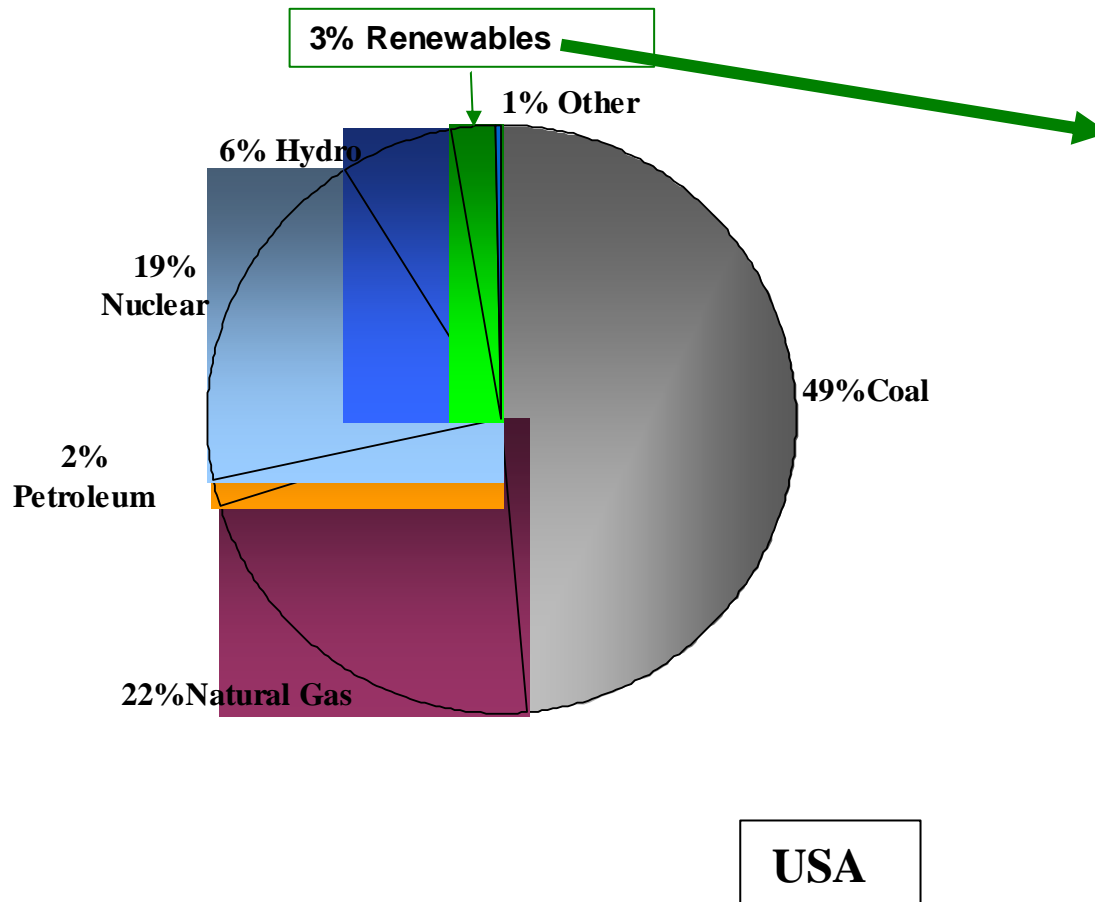
- Frank H. Asbeck

USA Electrical Sources



Electrical Generation in U.S. 2007

US Renewables 2006

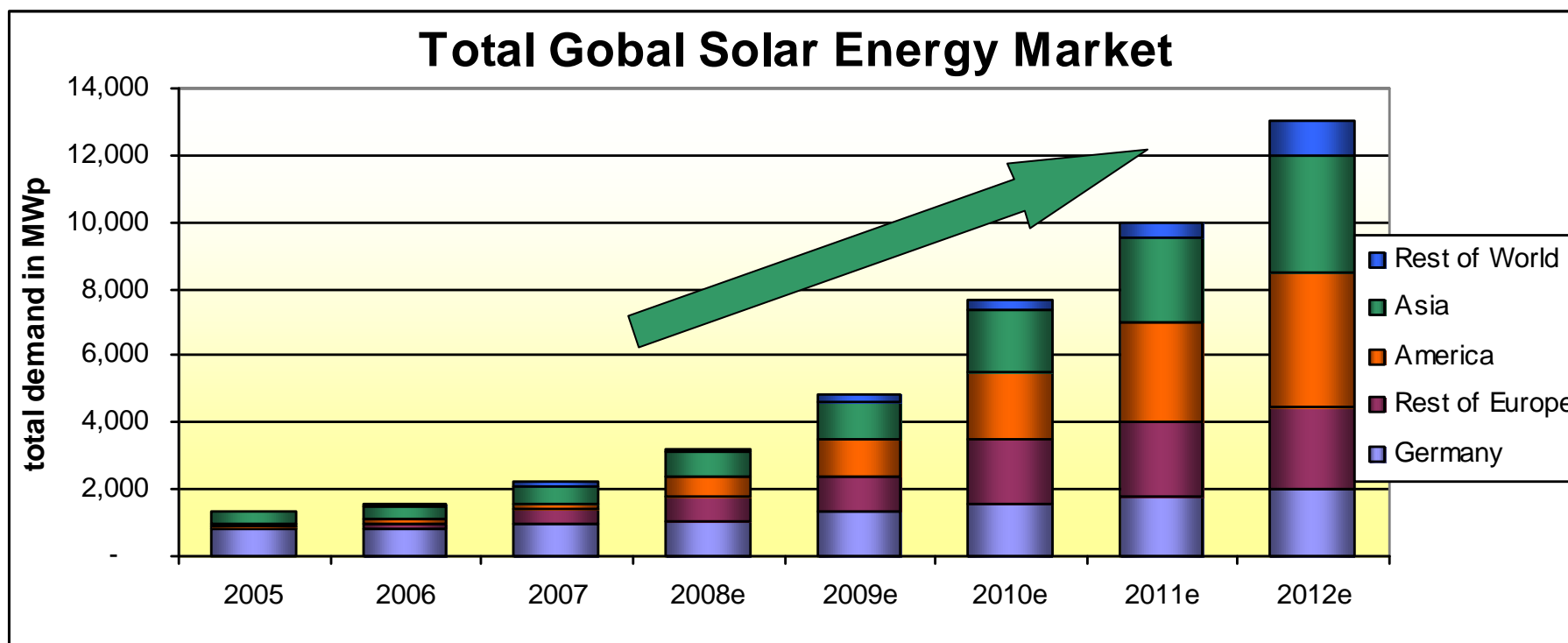


* Source: Energy Information Administration

Market Development - Solar PV



<i>in MWp</i>	2005	2006	2007	2008e	2009e	2010e	2011e	2012e
Germany	835	785	1,000	1,055	1,330	1,600	1,800	2,000
Rest of Europe	57	180	400	746	1,053	1,900	2,200	2,500
America	107	166	200	601	1,131	2,000	3,000	4,000
Asia	311	390	500	700	1,118	1,850	2,500	3,500
Rest of World	33	48	100	119	190	300	500	1,000
Total	1,343	1,569	2,200	3,221	4,822	7,650	10,000	13,000

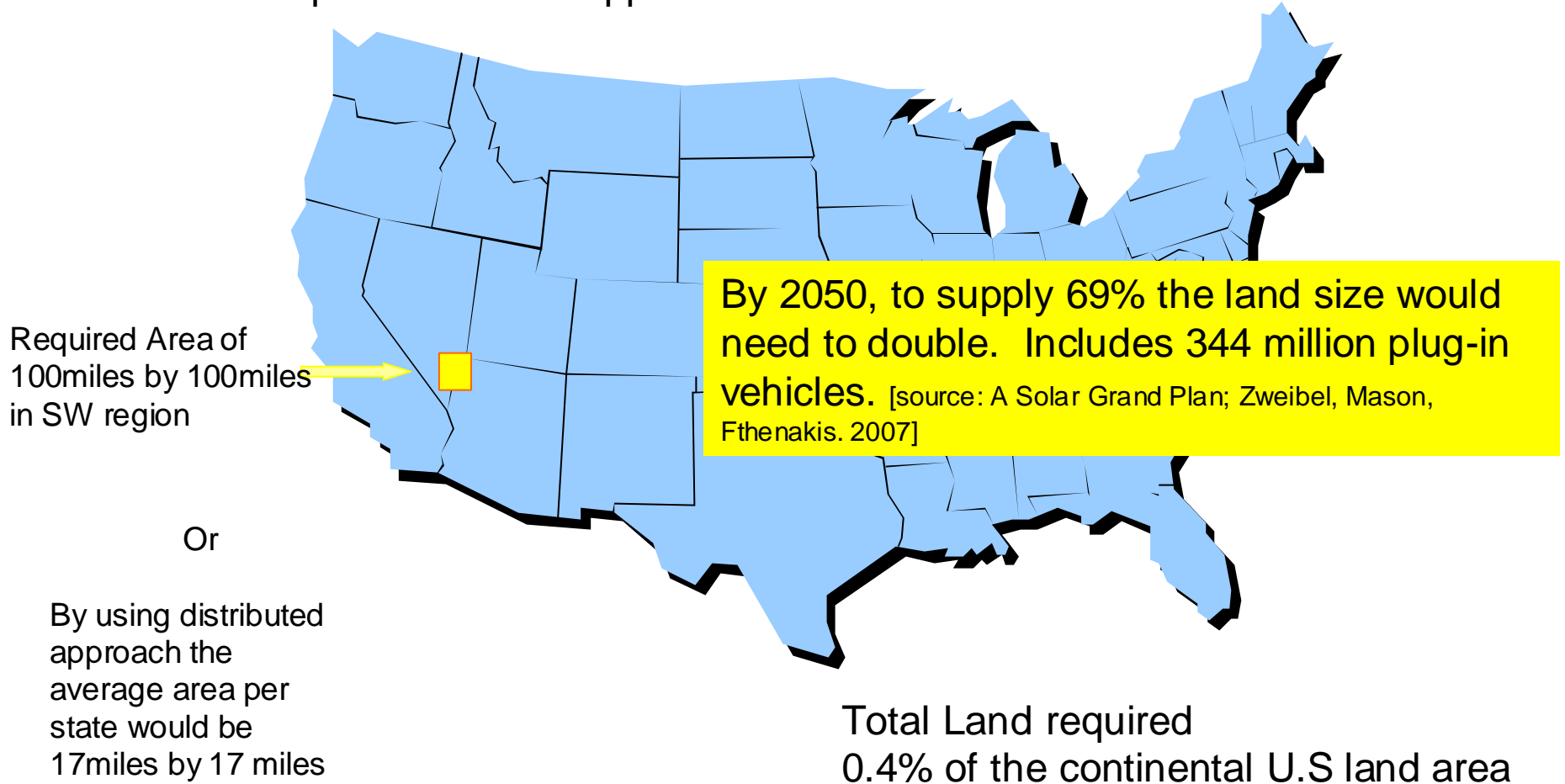




Some data from Greenpeace and the European Photovoltaic Association . . .

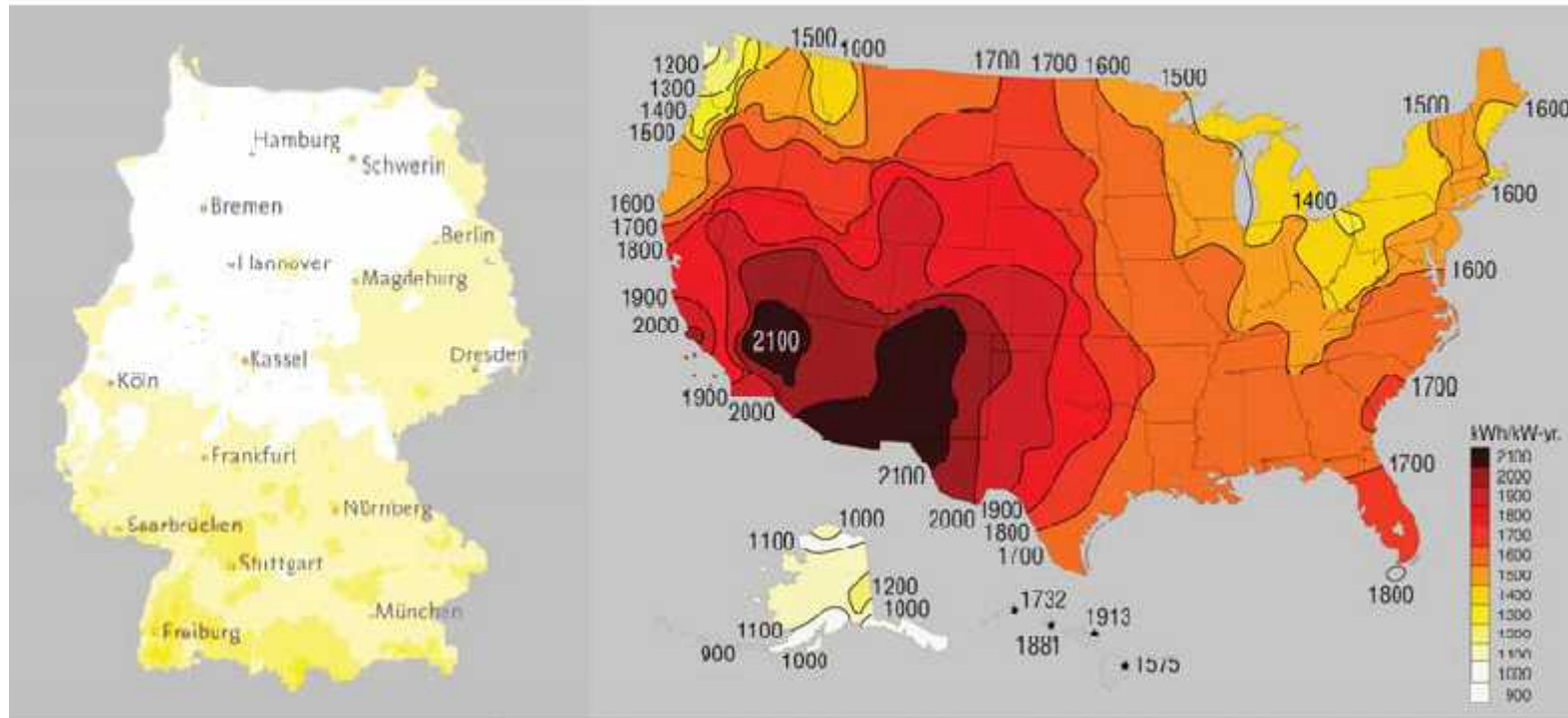
- Worldwide by 2020 solar could provide electricity to 1 billion people and provide 2 million jobs.
- Most of the jobs come in five major areas
 - Installation 1,019,000
 - Production 245,000
 - Research 32,000
 - Supply 92,000
 - Wholesale 73,000
- In 2008 Germany had 57,000 solar related jobs (more than nuclear energy)

PV Power plant sized to support all the U.S. ANNUAL electrical demand



Source: National Renewable Energy Laboratory

Solar Resources: Germany vs. United States (in kWh of solar electricity produced per kW of solar capacity)



U.S. has vast solar resource.
Germany has eclipsed the U.S.

Recent USA Projects



- 0 5,000 Sunmodules, Orange County Convention Center in Orlando, Fla. – the second largest in USA.
- 0 1 MW system is the Southeast’s largest roof-mounted installation.
- 0 The center draws 1.4 million visitors a year.

- 0 6,720 Sunmodules, central bus maintenance facility, Los Angeles County Metro Transport Authority.
- 0 1.2 MW system is largest solar-panel installation in L.A.; and, at any transit facility worldwide.



Sunkits™ Residential Project - Oregon



- 160 new construction homes to be outfitted with *SolarWorld Sunkits™*
- New housing development “Edgewater – on the Tualatin River” by Legend Homes
- Earth Advantage certified homes – the Northwest’s premiere green building program.



Oregon Projects Update: Eco Trust & Columbia Sportswear



EcoTrust Building

Portland, OR

30 kW Solar

Installed Jan 30th, 2009



Columbia Sportswear

Beaverton, OR

100 kW Solar

Installed Dec 2008



Oregon Solar Highway (I-5 / I-205 Interchange)



Solar Project: 104 kW PV system –
594 SolarWorld 175w Modules

ODOT plans to create the largest
Solar Highway in the World

Displacing **100%** of their electrical
usage with **45 MW of Solar**

Top photo: ***Governor Kulongoski
& ODOT's Allison Hamilton with
SolarWorld Module***



Solar market drivers 2009

- Expected growth of U.S. market before current crisis: 50%
- Expected growth of U.S. market with current crisis: 30%
- Main markets: California, New Jersey
- New in 2009: huge utility projects of 20-30 MW range
- Policies: Feed-in tariff in Gainesville, Fla. (more political than economic influence, due to 4 MW cap)



Welcome to the land of opportunity

SolarWorld congratulates the mayor and commissioners of the city of Gainesville and the Gainesville Regional Utility on being the first in the nation to successfully implement a "feed-in" tariff for renewable energy generated by local citizens.

Gainesville residents can now install a solar PV system on their homes and receive \$0.22 per kWh - that's up to \$1,800 per year for a typical 5 kW system.

It's just the Gainesville that is making America a true leader in renewable energy.

MADE IN USA

SolarWorld. And EveryDay is a SunDay


www.solarworldusa.com

BUILD A SOLARWORLD

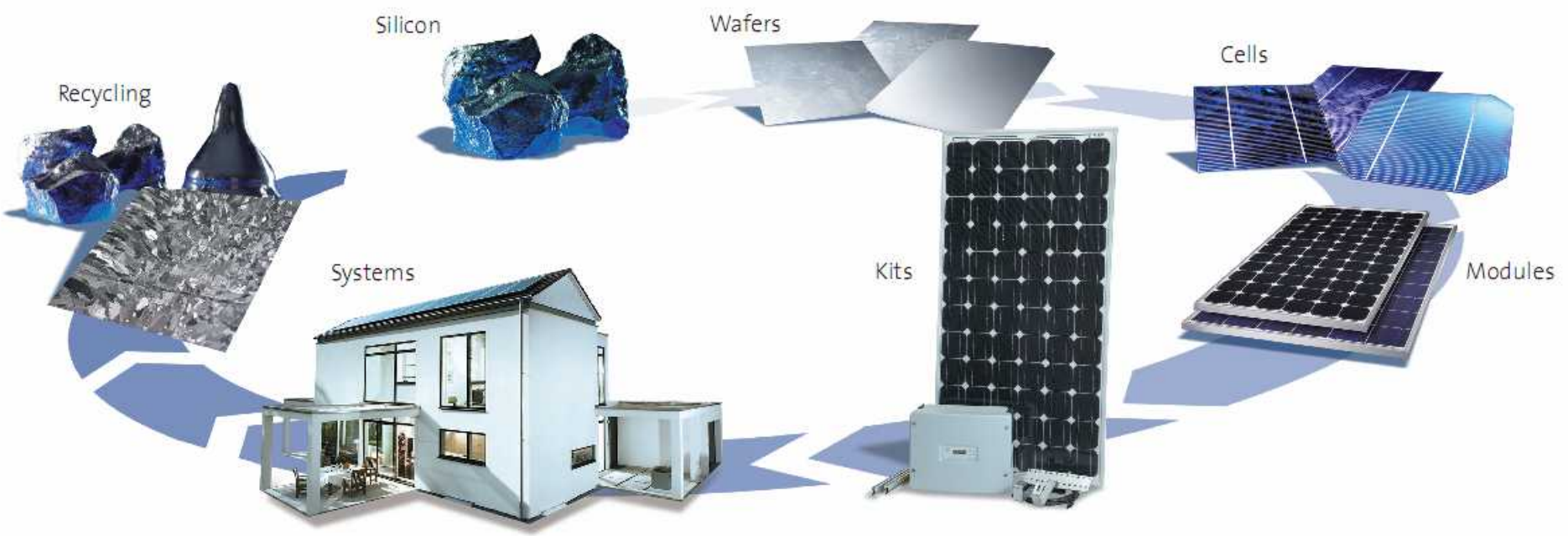
Our vision

The objective of SolarWorld AG is the worldwide establishment of a reliable, environmentally friendly and safe energy supply.

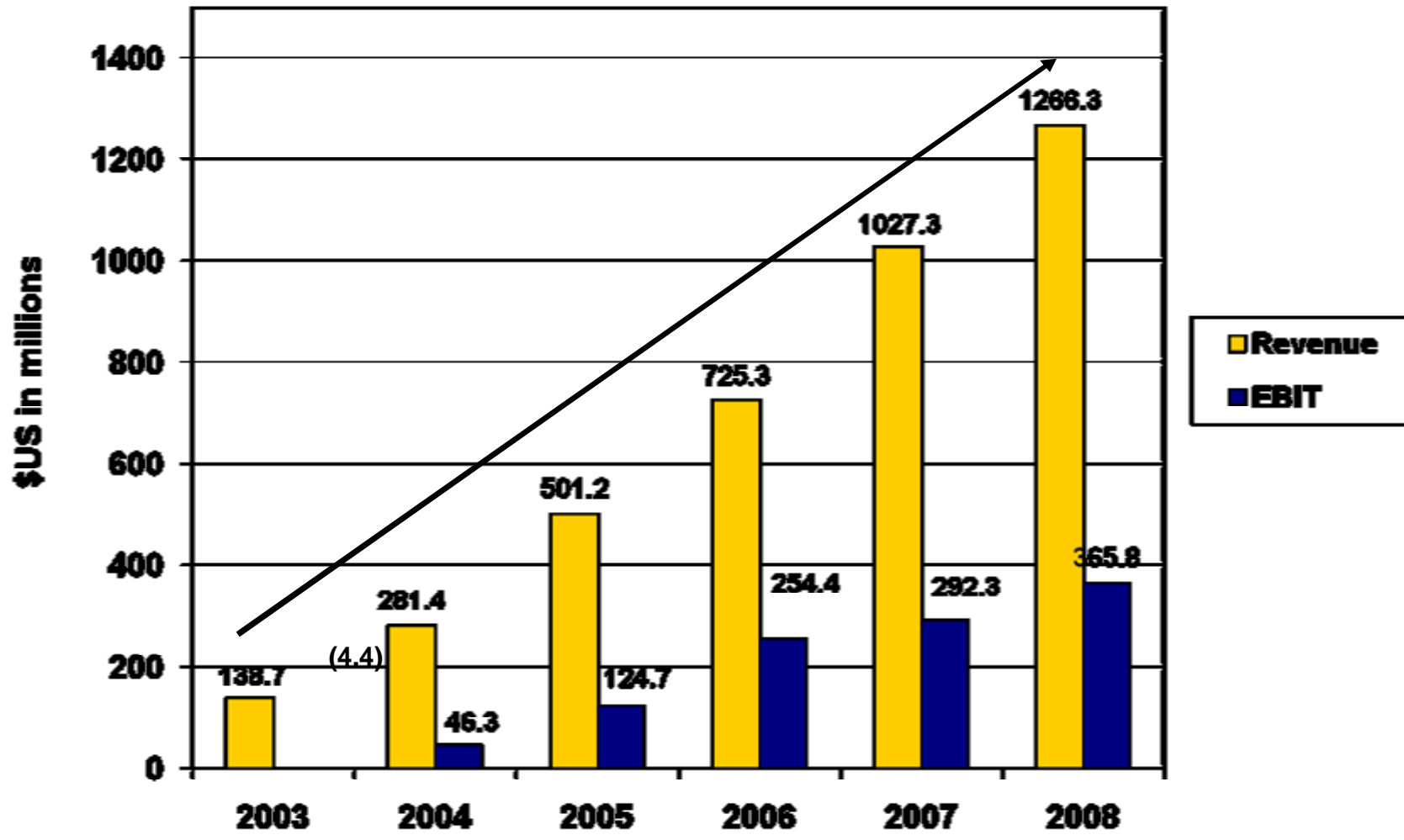
Solar energy is the key to resource and climate protection; it contributes to the avoidance of military conflicts through growing independence from fossil resources.

We are working on making solar power generation competitive in all markets as quickly as possible and at making the decentralized use of solar energy possible for all people, thus gaining an opportunity for sustainable development.

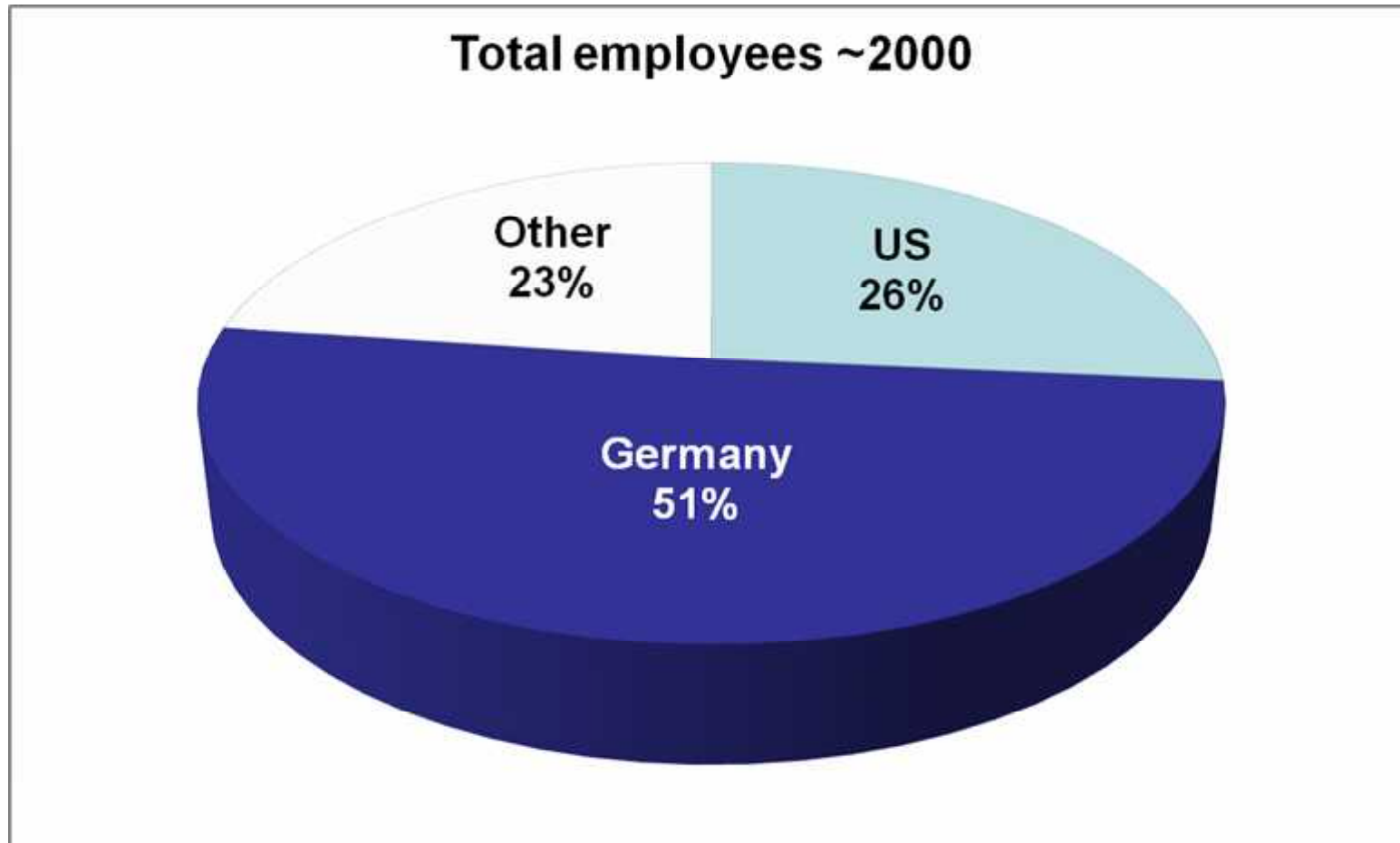
Fully integrated solar value chain



Continued Company Growth: 2008 Results



Global Employee Distribution*



* Employee numbers are approximate.

SolarWorld in the USA



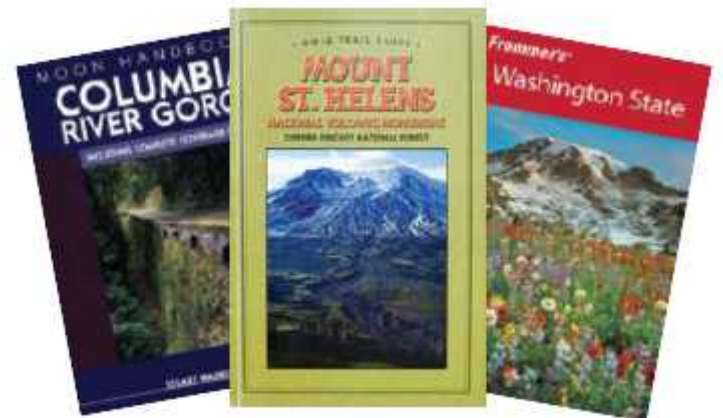
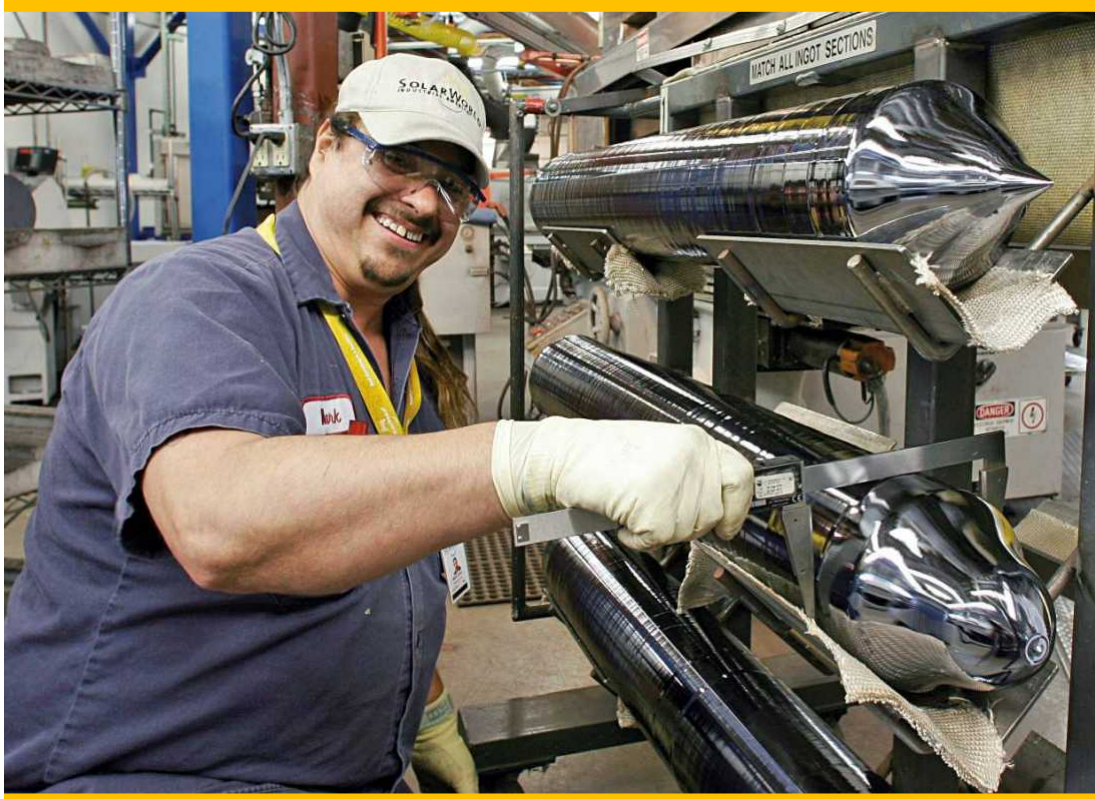
- SolarWorld has been in the U.S. since the early days of the PV industry, under several well-known and respected company names:
 - ARCO Solar (Atlantic Richfield) 1977 – 1989
 - Siemens Solar 1990 – 2001
 - Shell Solar (Royal Dutch Shell/ Shell Oil) 2001 – 2006
- SolarWorld AG, our parent-company, has been doing business in Germany since 1998 - and purchased Shell Solar in 2006, merging both firms world-wide.



SolarWorld's new America's headquarters



Vancouver, WA – Sustainability thru recycling



Camarillo, CA – Modules for a growing world!



Oregon - Factors



Oregon's Silicon Forest offers an experienced network...

- State of Oregon
- City of Hillsboro
- Low cost hydro power
- College/University system
- Solid technology workforce
- Construction trades

- Ideal site for SolarWorld's continued USA expansion (BETC's & EZ)
- State-of-the-Art production, with integration of crystal, wafer and cell production under one roof



“Green job” creation



Crystal Growing

- cz process technology manager
- cz process engineer
- entry level process engineer
- equipment engineering maintenance manager
- cz equipment engineer
- cz production operators
- cz maintenance technician
- cz training designer/instructor
- cz production supervisor

Solar Cell

- characterization
- production
- production technicians/operators
- maintenance technicians
- maintenance and equipment engineer - optical
- maintenance and equipment engineer - robotic
- equipment technician – automation

Solar Wafer

- production/shift supervisors
- production technician/operators

Creating 1,000 new economy jobs



Emphasis on quality of life and growth opportunity...



- Vacation - 4 Weeks
- 100% education reimbursement (for approved degree programs).
- Market-leading health benefits.
- Company matching on 401(k).
- Solar2U employee Sunkits® program.



What makes someone “fit” the ‘green collar’ job?



- Works for a higher purpose – genuinely enthusiastic about saving the environment.
- Puts team goals and achievement ahead of personal achievement.
- Intellectually free & flexible – critical thinkers who like to solve problems.
- Proactive – takes initiative and focuses to achieve objectives. Wants to solve this problem for future generations now!
- Respect and tolerance for others and other points of view.



SolarWorld USA Workforce Job Types



Job Type	Percentage
Administrative Support	5%
Senior Management Through First Level Management	11%
Engineers/Accountants/Scientists/Sales	24%
Production Operators & Maintenance Technicians	60%



Solar Photovoltaic Manufacturing Technology - Certificate of Completion.

- This 13 credit program qualifies graduates to work in the solar industry as entry-level production operators after only one term.
- PCC Career Services focuses on displaced workers to help them learn valuable skills for the green economy.
- SolarWorld has hired 12 operators from the first two COC graduates.

Microelectronics Technology: Solar Photovoltaic Manufacturing Technology – AAS Degree Program

- This 95 credit program prepares students for a career in Solar Manufacturing.
- Targeted positions are:
 - **Upper-level production operator/ technician roles**
 - **Maintenance Technicians**



Sciences – The ‘solar world’ is going to be more competitive and will require breakthroughs to reduce costs.

- Physics of silicon – what are the limits of the devices and how can they be manufactured. Cost reduction targets to reach grid parity before 2015.
- Chemistry – enhance the output of the cells.

Statistics – manufacturing control is based on upper and lower limits of process specifications

- Have to be able to ‘do the math’ and understand the math.

Shop – use of tools and machines

- Turning a wrench, sawing, grinding – these are essential skills. Gives us an appreciation of how things are made and where goods come from. America would be well served if “shop” was required before graduation from high school.

General Comments on Wind Industry



Wind resources in the area or along the supply chain

- Wind resources are well known and mapped
- Transmission of power (local use or 'shipped' out of area)

Jobs

- Manufacturing
- Construction
- Maintenance
- Wind turbine performance analysts (based on wind resources)
- General business and administration

Training

- Community colleges in the remote areas have been great resources and partners

Thank You

