



AMERICAN  
**SOLAR**  
ENERGY SOCIETY

# Update on ASES Green Jobs Reports

## Jobs impacts of ***TACKLING CLIMATE CHANGE***

For CRES Monthly Meeting - November 18, 2010

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LEADING THE RENEWABLE ENERGY REVOLUTION



## Background on Green Jobs Reports

- This the fourth study the American Solar Energy Society has produced on the green economy - including three state specific studies for Ohio, New York and Colorado
- Our 2007 work focused on TOTAL number of green jobs:
  - More than 9 million employed
  - \$1.045 Trillion of industry revenue
  - More than \$100 billion in corporate profit
  - More than \$150 billion in federal, state and local tax revenue



## Estimating Net Jobs from Tackling Climate Change

- This work is based on our 2007 landmark work: *Tackling Climate Change in the U.S.: Potential Carbon Emissions Reductions from Energy Efficiency and Renewable Energy by 2030*.
- Study goal to focus on the NET jobs realized if we transition to the low-carbon economy -- realizing that some jobs in high-carbon industries will be lost.
- All of our studies underscore that energy efficiency is the largest source of jobs. However it declines in the later years to economy-wide improvements in efficiency



## Estimating Net Jobs from Tackling Climate Change

Occupational data from all four studies demonstrate:

- Broad variety of jobs
- Distributed throughout the U.S. economy
- Higher than average pay
- Cannot easily be outsourced



# Occupations that benefit most

(in order of increased numbers)

- Construction
- State and local government
- Farms
- Professional, scientific and technical services



# Types of Employment

## Standard Jobs:

- Accountants
- Engineers
- Truck Driver
- Computer Analyst
- Mechanics
- Clerks



## Challenge of Leadership

- The roadmap has been presented
- If we fail to take up the road, we will lose ground to other nations in the global marketplace for who will export the low carbon energy technology
- Vast majority of Americans want a transition to the low carbon economy



## SUMMARY

- The promise of Tackling Climate Change is substantial reductions of carbon emissions
- Broad deployment of Energy Efficiency and Renewable Energy is more than a source of electricity, fuel or energy savings it is a source of huge numbers of American jobs



## Conclusion

This report is timely because it addresses two of the most pressing challenges U.S. policymakers face—rebuilding an economy battered by recession and mitigating climate change. A key strategy for rebuilding the economy is creating jobs, and a key strategy for mitigating climate change is reducing U.S. carbon emissions. The ASES/MISI study demonstrates that aggressive deployment of RE&EE helps solve both these challenges.



# LOOKING FORWARD

## Renewable Energy Industry Forecasts from RE Trade Associations

Solar Energy Industry Association

National Hydropower Association

Geothermal Energy Association

American Wind Energy Association



# National Hydropower Association

## CURRENT STATUS

- 96,000 Megawatts of annual generation
  - 67% of all U.S. Domestic Renewable Generation
  - 7% of total U.S. Electric Generation





# National Hydropower Association

## HYDRO CAN DOUBLE!!

- Another 96,000 Megawatts of generation  
BY
  - Make existing Hydropower more efficient
    - Modernizing Turbines and adding New Capacity to exiting hydroelectric facilities
    - Converting Non-Powered Dams (less than 3% of U.S. 80,000 dams generate electricity
    - Develop conduit (in-pipe) technologies



# National Hydropower Association

**HYDRO CAN DOUBLE - continued**

Another 96,000 Megawatts of generation

- Pumped Storage Projects (Utilizing Wind and Solar power too)
- Hydrokinetic Technologies
  - ❖ In-stream Generation - harnessing the power of moving currents
  - ❖ Ocean and Tidal Power -natural movements of waves and tides



# National Hydropower Association

## HYDRO CAN DOUBLE

- Another 96,000 Megawatts of generation
  - Hydropower Improvement Act of 2010
    - Supporting 25 x '25
- Would lead to 1.4 million cumulative jobs over the next 15 years!





# Geothermal Energy Association

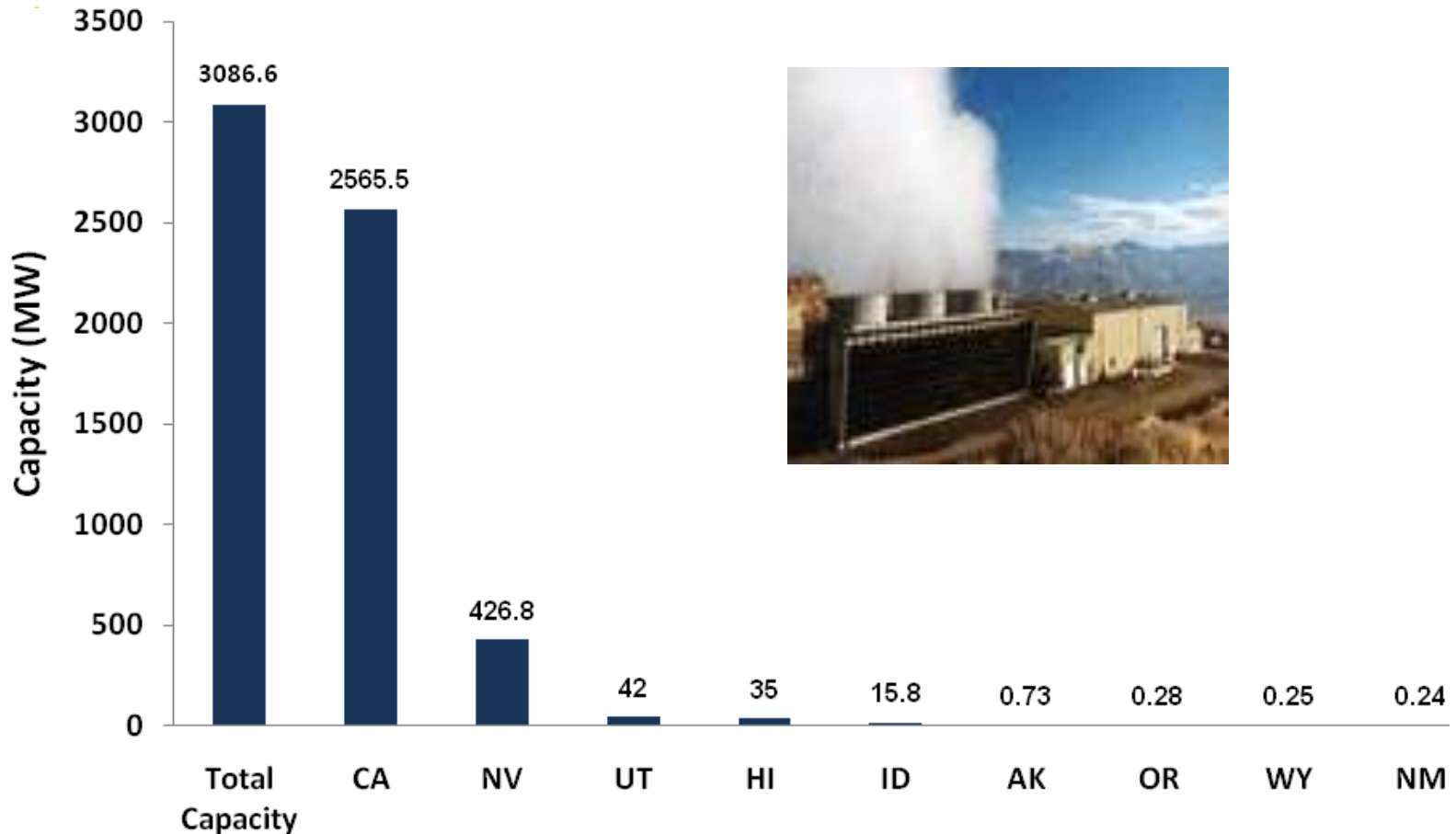


- Current status:  
3086.6 Megawatts of capacity



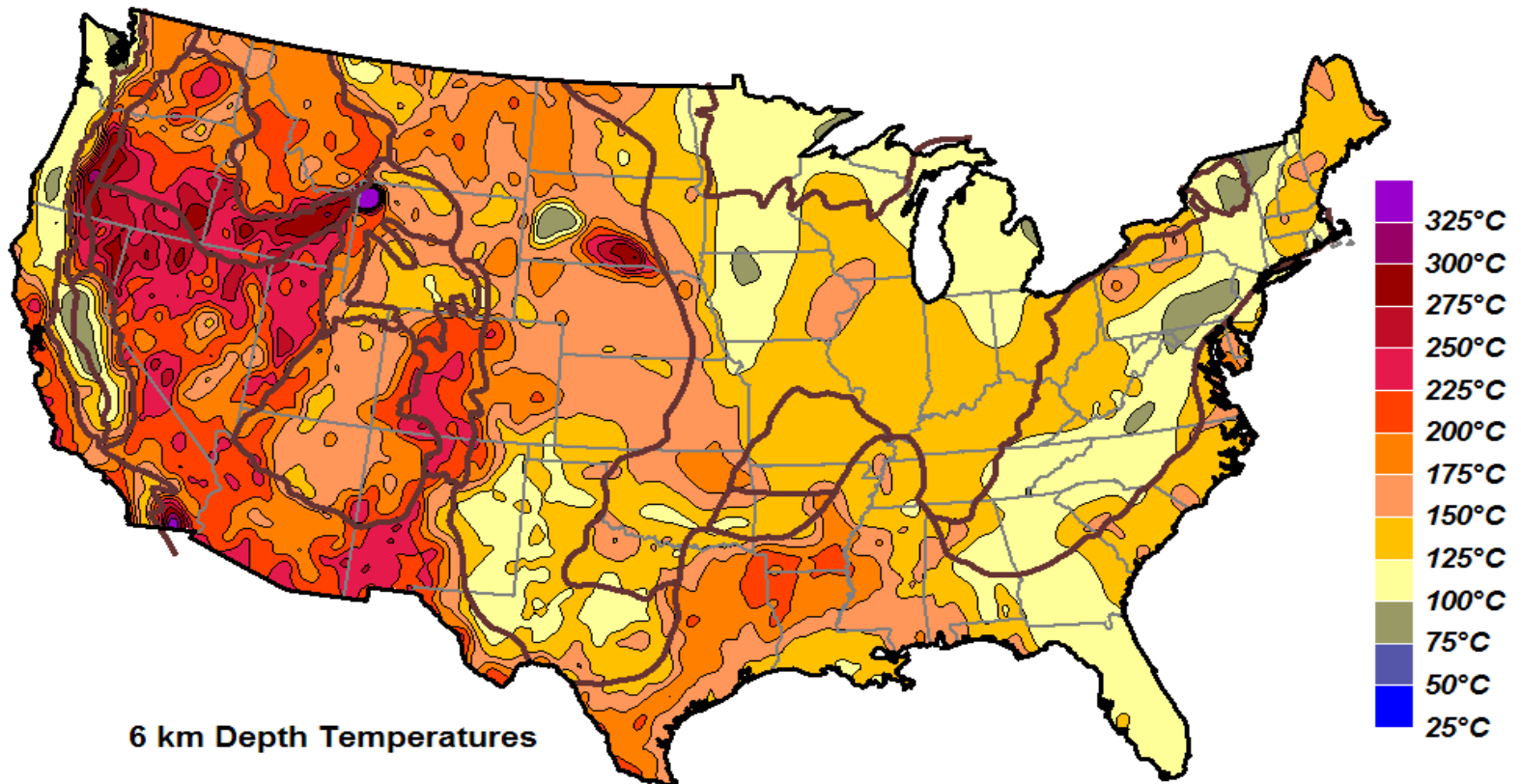


# Geothermal Power On-Line Today





## The Heat of the Earth is an Enormous Resource: Estimated Temperatures at 6 Kilometers Depth



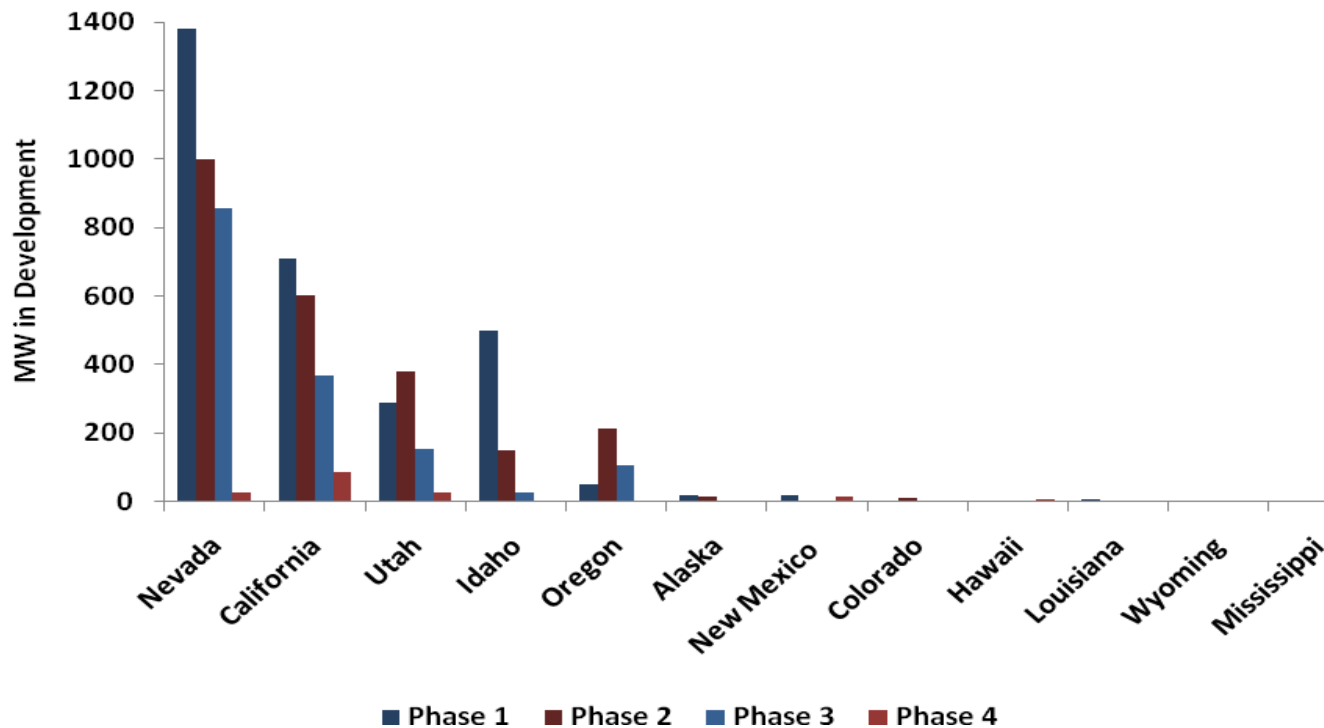


# New Projects Under Development: April 2010

- **188 Projects in 15 States**
- **5254.21 – 7875.16 MW**



# Developing Geothermal Projects by State and Phase





## Untapped US Geothermal Power Potential

- in Western US Only (conventional, hydrothermal systems)\*

- **Identified Geothermal Systems:** 3,675 MWe (95% probability) to 16,457 MWe (5% probability)
- **Undiscovered Geothermal Systems:** 7,917 MWe (95% probability) to 73,286 MWe (5% probability)
- **11,592MW – 89,743MW of Hydrothermal Power in 13 Western States remains to be developed!**

\*USGS: Assessment of Moderate-and High-Temperature Geothermal Resources of the United States, Sept. 2008



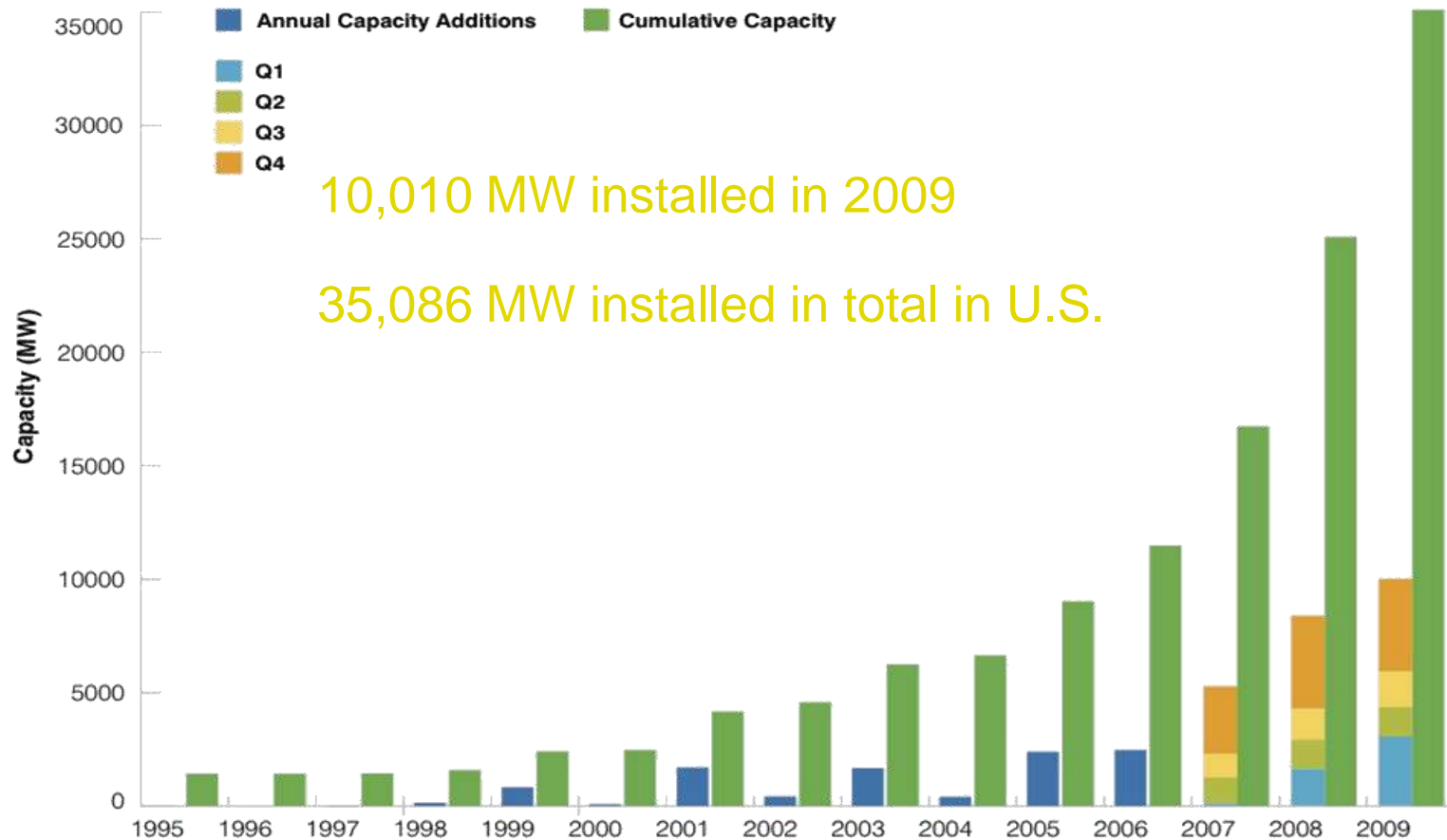
# American Wind Energy Association

Target of 20% U.S. electric generation  
from Wind Power by 2020



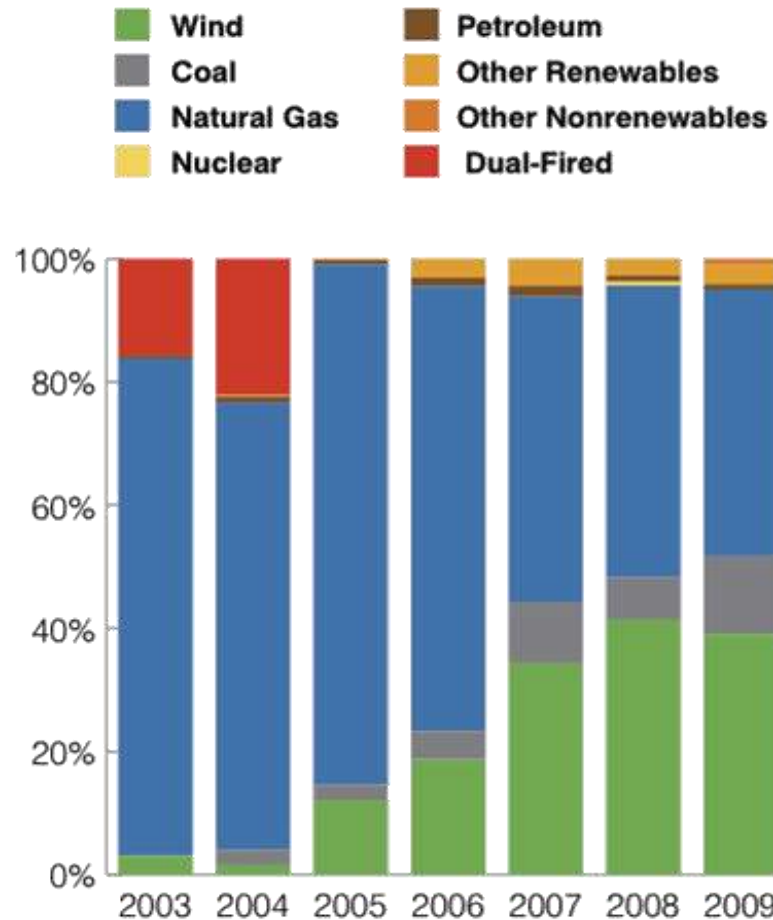


# U.S. Wind Capacity Growth



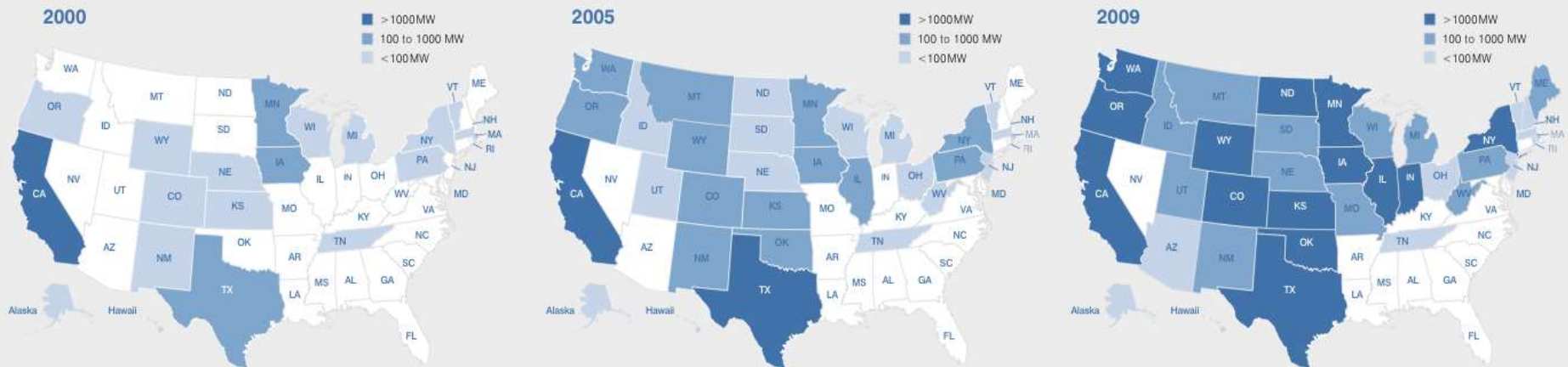


# 2009 Wind Provided 39% of New Capacity



Source: AWEA, SEIA, SNL, Lawrence Berkeley Laboratory

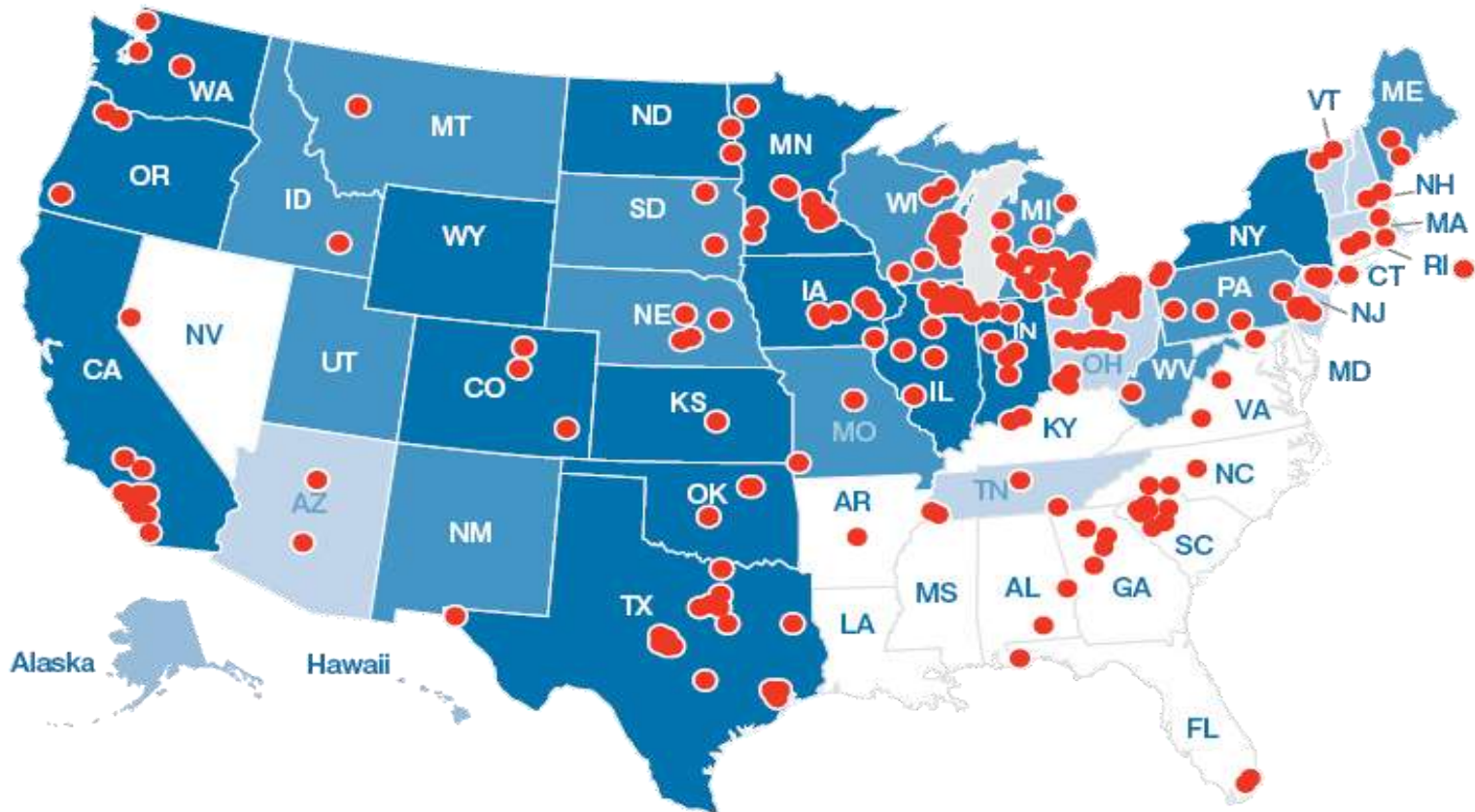
# Change in Capacity Additions Over Time



- California had virtually the only wind power installed in the late 1990s
- 36 states now have utility-scale wind power
- 14 states now have over 1,000 MW of installed wind capacity



# All Online Wind Manufacturing Facilities



Over 200 facilities across the U.S. supply to the wind industry, and this figure does not capture the many additional facilities at the sub-supplier level.



# American Solar Energy Society

## Solar energy deployment today

**Thanks to Larry Sherwood** Rankings presented can be found in “Can Incentives Sustain the Solar Boom” article by Larry Sherwood in the July/August 2010 *SOLAR TODAY* magazine and were based on preliminary numbers and therefore differ slightly.



## Top 10 States for Grid-tied Photovoltaic Installations in 2009

2008 rank in parentheses\*

State	Capacity (megawatts-dc)
1. California (1)	212.1
2. New Jersey (2)	57.3
3. Florida (16)	35.9
4. Colorado (3)	23.3
5. Arizona (8)	21.1
6. New York (7)	12.1
7. Hawaii (5)	11.5
8. Massachusetts (11)	9.5
9. Connecticut (6)	8.7
10. North Carolina (10)	7.4
All Others	34.2



\* Rankings published in “Can Incentives Sustain the Solar Boom” article by Larry Sherwood in the July/August 2010 *SOLAR TODAY* were based on preliminary numbers and therefore differ slightly.



In 2009 annual grid-connected PV installations grew by 40% - to cumulative installed U.S. grid-connected capacity to 1.24 Gigawatts DC

Top 10 States for Cumulative Grid-Connected Installations

State	PV Capacity per person (Watts-dc/person)
1. California	20.8
2. Hawaii	17.0
3. New Jersey	14.6
4. Nevada	13.8
5. Colorado	11.4
6. Arizona	7.0
7. Connecticut	5.6
8. Oregon	3.7
9. Vermont	2.7
10. Massachusetts	2.7
National Average	4.2



PV System at Aspen Mountain Ski Resort

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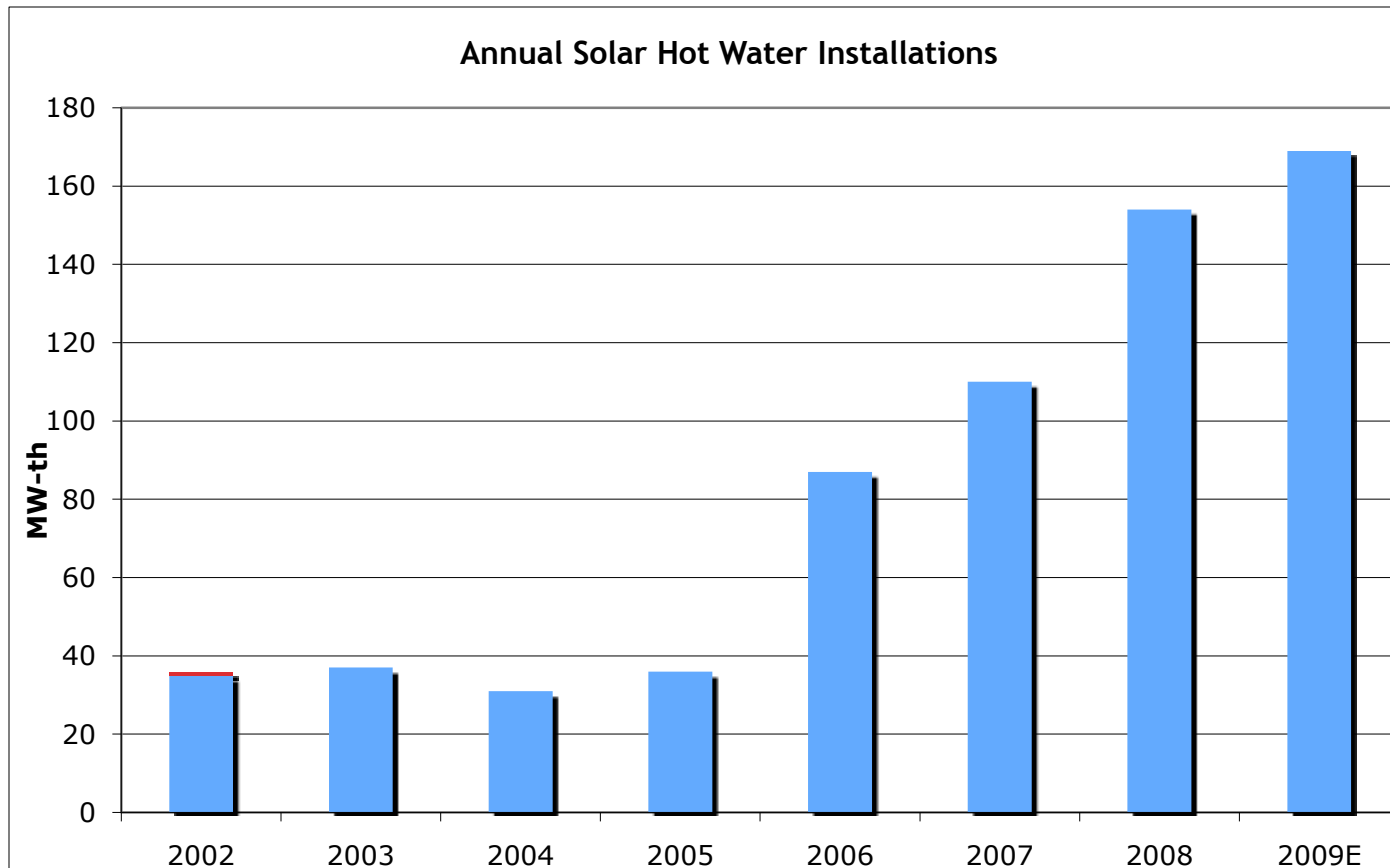
## Top 5 States for Solar Hot Water Installations in 2008

State	Capacity (megawatts-th)
1. Hawaii	42.4
2. California	19.8
3. Puerto Rico	17.1
4. Florida	15.6
5. Arizona	5.0
All Others	55.0

- Based on data supplied by the Energy Information Administration.
- Installations include installations for space heating, but do not include installations for pool heating.

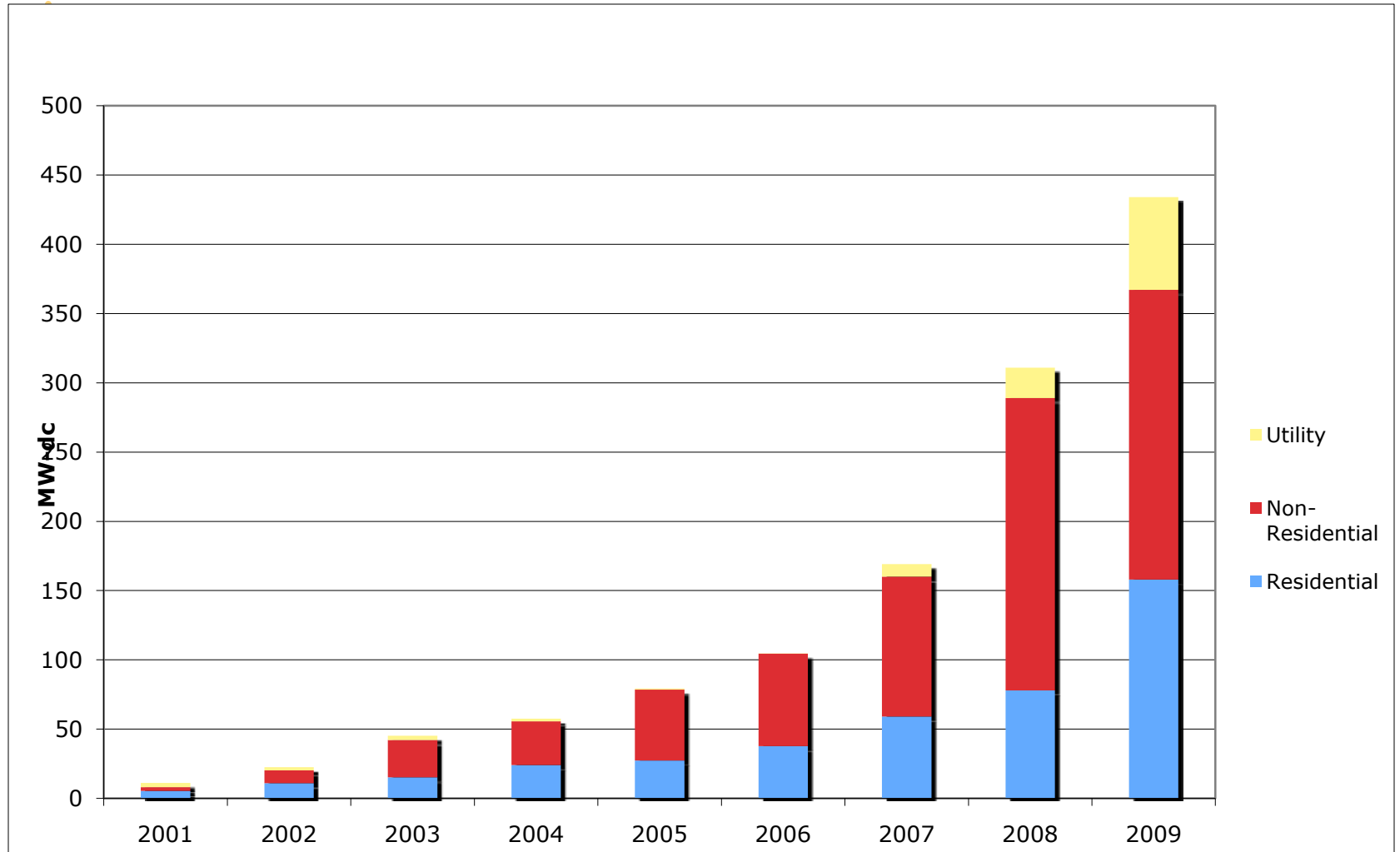


**Solar Hot Water is eligible for Federal Incentives.  
2009 growth was 9%  
(40% in 2008 & 26% in 2007)**





## Annual Grid Connected PV Installations By Sector





## MOVING FORWARD - PV

- Anticipate grid-connected PV growth in 2010 of 50-100 percent.
  - Federal stimulus spending
  - Grant alternative to commercial ITC
  - Long-term extension of Federal ITC
  - Improvement in capital markets



Pentagon's Ground Mounted 30 kW PV System  
Showing 4 Acres of PV Modules



## MOVING FORWARD

- SEIA has a goal of 10 Gigawatts of deployment per year starting in 2015!
- How do we get to the promise of renewable energy?
  - To become a vibrant economy again
  - To improve public health
  - To ensure US competitiveness
  - To put America to work
  - To Preserve the environment
  - For National Security



## MOVING FORWARD

### The Campaign for a SOLAR NATION

- ‘Solar’ a surrogate for all Renewable Energy Technologies and Energy Efficiency measures
- GOAL – 1 Million SOLAR CITIZENS by 2014
  - Energy Literacy
  - Advocacy
  - Empowerment



## The Campaign for a SOLAR NATION

### ASES Campaign Research Data:

- ❖ 80% think local gov't don't do enough to promote solar energy
- ❖ 49% want gov't to invest more into RD for solar
- ❖ 39% would support Solar if had to choose one energy source
- ❖ 47% interested in owning/renting a green home



# The Campaign for a SOLAR NATION

We Will:

- ✓ Combat misinformation from the Fossil Fuel Industry
- ✓ Raise \$25 million in donations and at least a million Solar Citizens
- ✓ Focus on Solar Energy's immediate potential to improve the environment, increase energy independence, create jobs and make America more competitive



## The Campaign for a SOLAR NATION

The Campaign is a BOLD call to action, for ASES, for our Chapters and for solar advocates everywhere.

It will become known as the **RISE-UP** Campaign

THE SUN RISE UP EVERYDAY; IT'S TIME FOR US  
TO **RISE UP**, TOO!



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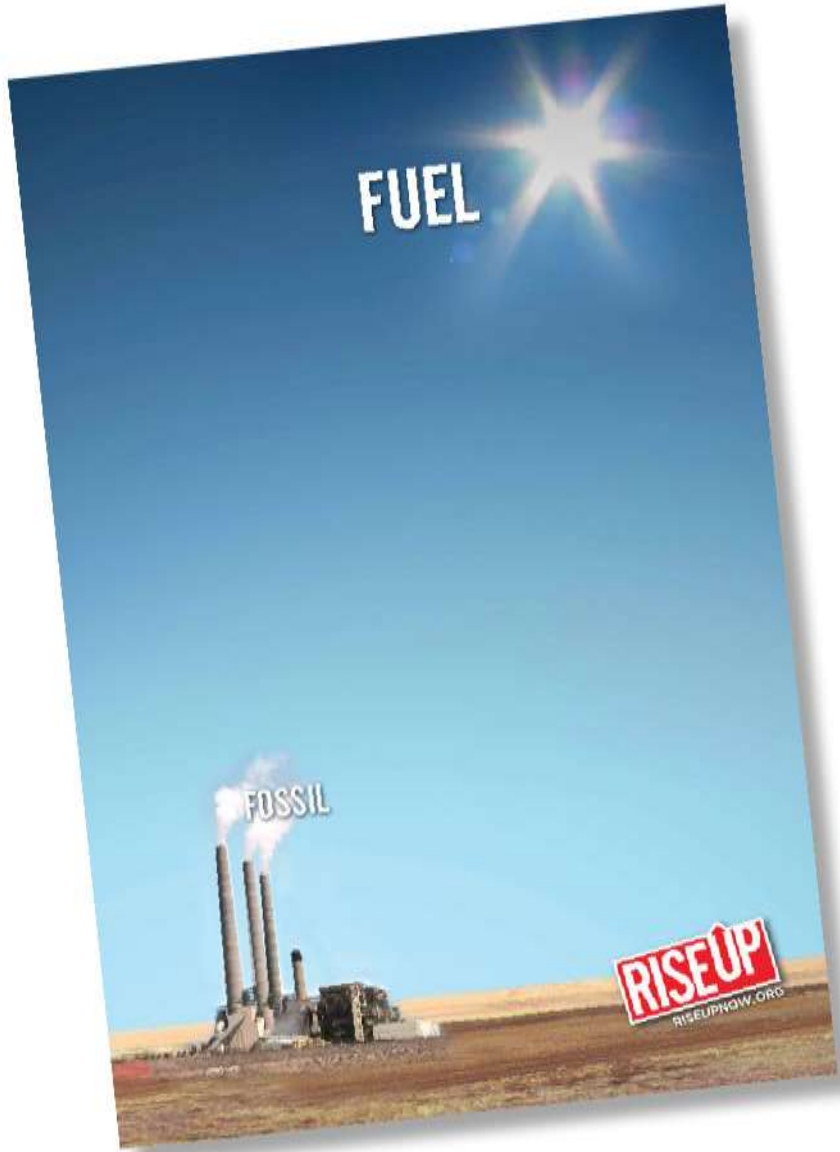
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FUEL

FOSSIL

**RISEUP**  
RISEUPNOW.ORG





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THANK YOU!

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LEADING THE RENEWABLE ENERGY REVOLUTION