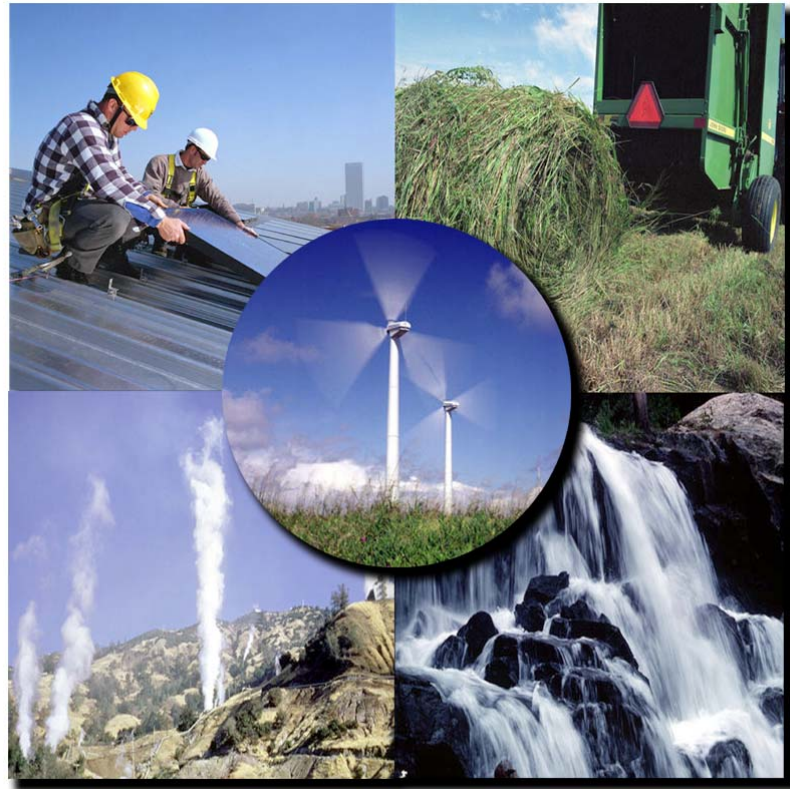




U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program **FEMP** 

Renewable Energy in the Federal Sector





U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program **FEMP** 

Renewable Energy Overview

**Meet the Federal Renewable Energy Goal
Workshop
Seattle, WA**

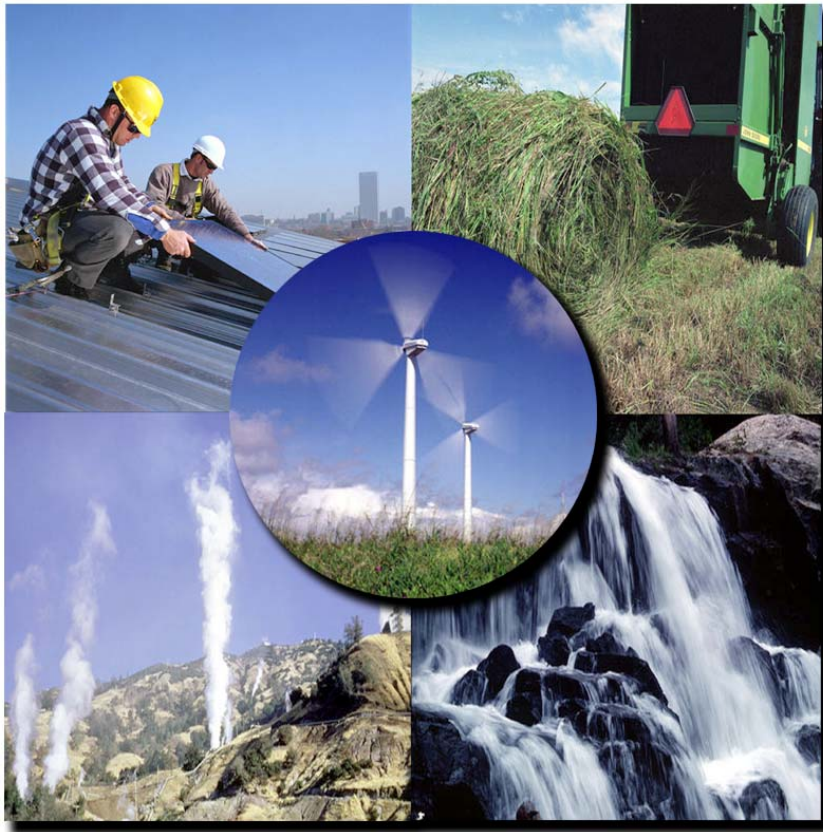
**Anne Sprunt Crawley
April 29, 2004**



U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program **FEMP**

- **Renewable Energy Overview**
- **Federal Requirements**
- **Renewable Energy Basics**
- **Reaching Your Agency Energy Goals**



By using renewable energy, federal agencies can:

- Meet federal renewable energy goals
- Conserve natural resources
- Increase the nation's energy security
- Provide energy security for agency facilities



U.S. Department of Energy
Energy Efficiency and Renewable Energy

federal energy management program

- **Renewable Energy Overview**
- **Federal Requirements**
- **Renewable Energy Basics**
- **Reaching Your Agency Energy Goals**



Executive Order 13123

The Secretary of Energy recommends that the federal government strive to have the equivalent of 2.5% of facilities electricity consumption come from new renewable energy sources by 2005. This is equivalent to 1384 gigawatt-hours (or approximately 500 MW of wind energy capacity). New means in place in 1990 or after.





- Executive Order 13134 – Developing and Promoting Biobased Products and Bioenergy
 - Stimulate creation and early adoption of technologies needed to make biobased products and bioenergy cost competitive
 - Research and demonstration focused



Federal Executive Order Definition of Renewable Energy

- Biomass (RE Research Definition)
- Geothermal
- Solar
- Wind
- Note – this definition is different than others
 - Green E – currently can vary by state
 - Energy Bill – differences for Federal agencies



Executive Order Guidance

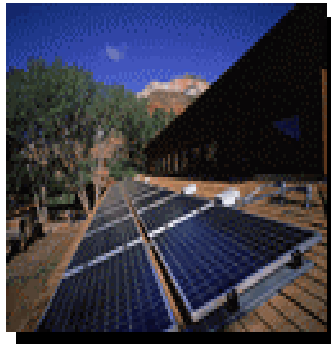
- Guidance on Federal Government Renewable Energy Goal
- Guidance for counting Renewable Energy and Green Energy Purchases toward progress in reaching Greenhouse Gas and Energy Reduction Goals.
 - Renewable Energy Purchases are subtracted from overall energy usage for Energy Reduction Goals
- <http://www.eere.energy.gov/femp/pdfs/eoguidancedoc.pdf>



Resources



Wind



Solar



Biomass



Geothermal



Renewable Technologies that Use Your Renewable Resources



Low energy
design in
buildings

Wind



Biomass

Photovoltaics



Geothermal
energy



Solar hot
water





Goal

1384 GWh — Equivalent of 2.5% of federal facility electricity use by 2005

- Equals about 500 MW of wind (at 31% capacity factor)

June 2000	173 GWh
-----------	---------

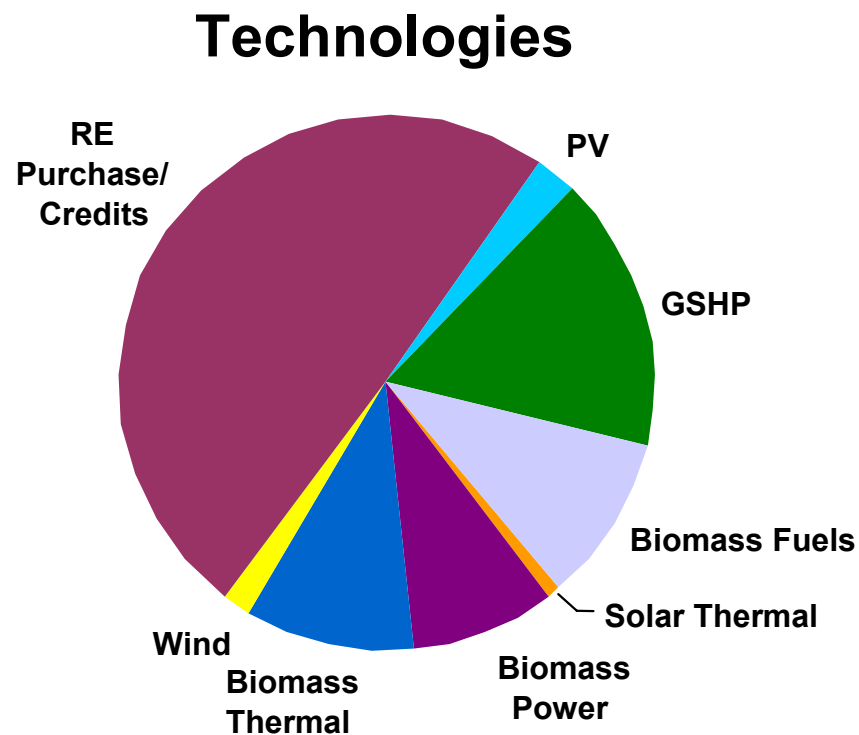
<u>Current (3/31/04):</u>	<u>1067 GWh</u>
---------------------------	-----------------

To go:	317 GWh
--------	---------



Where We Are: Federal Renewable Technologies and Purchases, March 2004

Solar Thermal	9.37	GWh
Biomass Power	92.44	GWh
Biomass Thermal	108.48	GWh
Wind	19.02	GWh
RE Purchase/Credits	527.19	GWh
Photovoltaics (PV)	25.62	GWh
Ground Source Heat Pump	178.54	GWh
Biomass Fuels	106.36	GWh
TOTAL	1067.02	GWh



Data as of 3/31/04



Last Year's Change in Goal Progress

- February 2003 663 GWh
- March 2004 1067 GWh
- Largest category of increase is renewable energy purchases (216 GWh)
- Other large increases in biomass fuels (88 GWh) and geothermal heat pumps (89 GWh) are one time improvements in counting



FY 04 RE Purchases

- Renewable Energy Purchases – 151 GWh of FY04 Contracts
 - 65.7 GWh Fairchild AFB
 - 6.5 GWh DOE West Valley
 - 7.0 GWh EPA Atlanta
 - 4.15 GWh, EPA Athens Regional Laboratory
 - 6.1 GWh EPA Region 2 Office, New York
 - Multiple Agencies, 10 GWh, New York



- Started in 2002 with funds from Congress
- 4 Military Services and 4 DOE National Labs looked at
 - Wind, solar, and Geothermal
- Phase 2 report available soon
- Near term activity will be Renewable Energy purchases



Energy Bill – Federal Renewable Energy Impact

- Federal Purchase Requirement
 - Has bipartisan support
 - Section 203 in HR 6, last year's conference bill
HR 108-375, Senate 2095
 - Specific goals for
 - 2005–2007 - 3%
 - 2008–2010 - 5%
 - 2011 - 7.5%

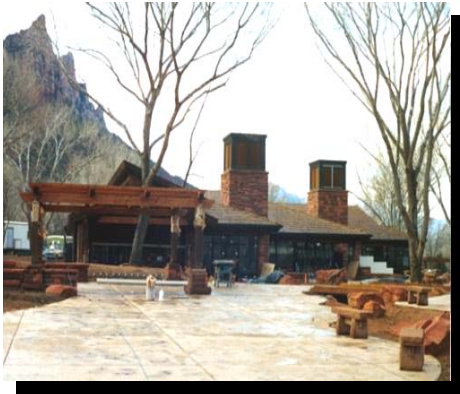


Energy Bill – Federal Renewable Energy Impact

- Different RE Definition
 - Only electricity
 - Includes incremental hydro (large potential opportunity) and Municipal Solid Waste (MSW)
- Currently stalled with the rest of the Energy Bill
- See FEMP Insights for updates
 - <http://www.eere.energy.gov/femp/newsevents/insights108.cfm>



How FEMP can assist your agency to meet the Federal Renewable Energy Goal



On-site Projects

*Low energy design
or on-site power generation*



Renewable Energy Purchases

Green power or green tags



Facilitated Projects

RE energy production on federal lands



Renewable Purchases Approach

- Renewable energy purchases usually include renewable power or renewable energy credits (REC)
- Wind energy is the most common form of renewable energy purchased
- Good option when on-site renewable energy is not possible or cost effective





Facilitated Projects

- Includes projects on federal land where the agency takes action to assist the project in some way
- These projects offer great potential for large scale deployment.
- BLM currently developing a plan to expand development of public lands renewable resources
 - Geothermal
 - Solar
 - Hydro
 - Biomass
 - Wind





Biomass Energy

Resource: Biomass energy is fuel, heat, or electricity produced from organic materials such as plants, agricultural residues, forestry by-products, and municipal or industrial wastes.

Technologies:

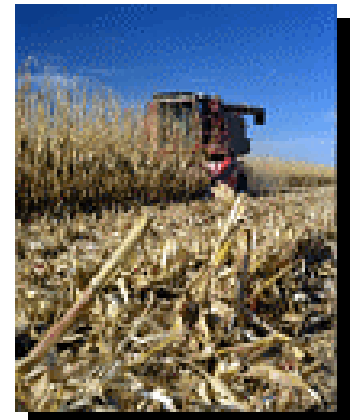
- Conversion (to produce either electricity or heat)
- Gasifiers
- Biofuels (which include ethanol, methanol, bio-oil and biodiesel)



Wood Residues



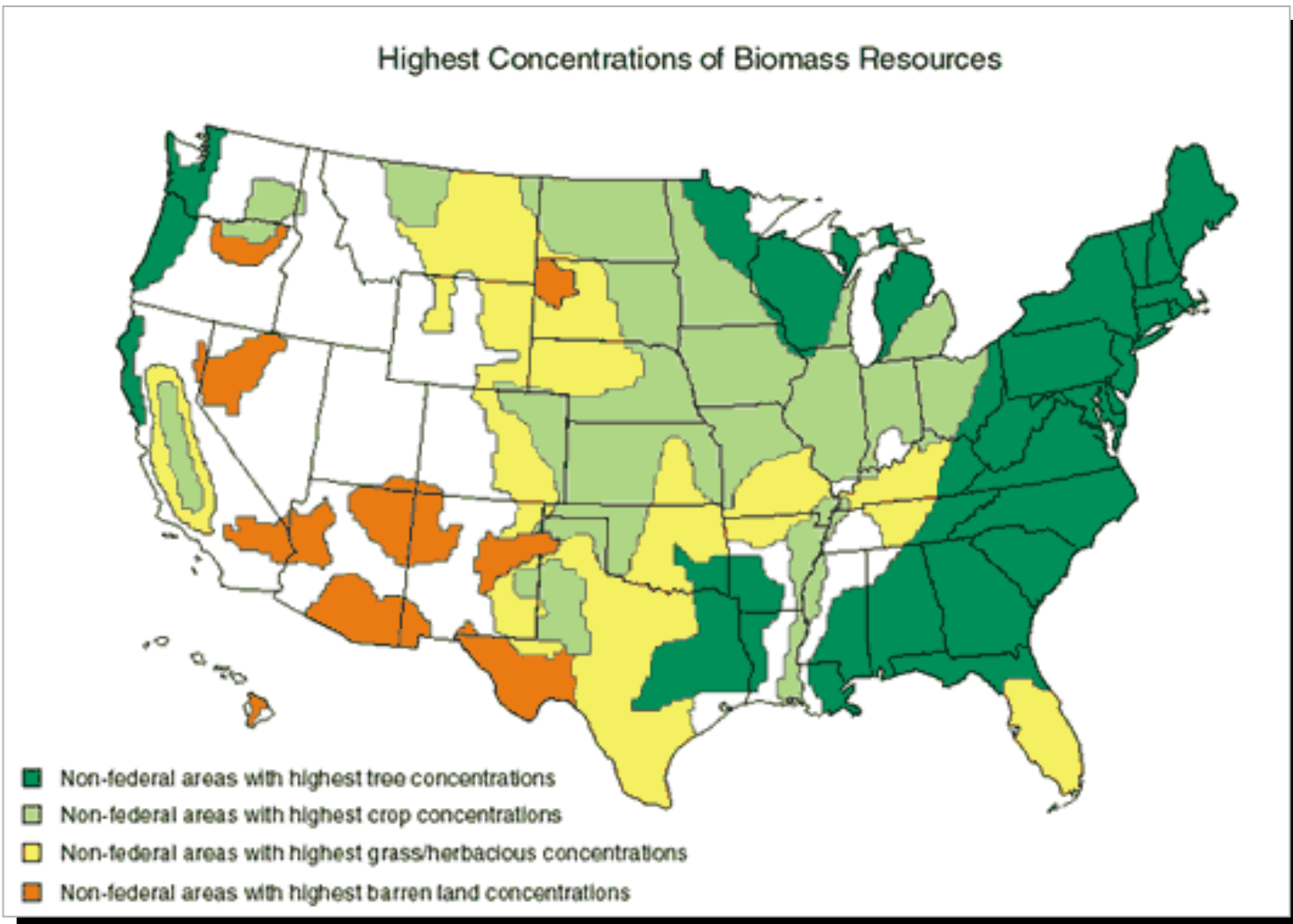
Energy Crops



Agricultural Residues



Biomass Resource in the United States





Biomass Resource on BLM Lands

- NDVI is 0.4 or greater for at least 4 months April to Sept 2000
- Terrain slope less than 12%
- Site within 50 miles of a town of 100 people
- Land Use is BLM compatible

Criteria

1. NDVI is 0.4 or greater for at least 4 months between April and September 2000
2. Maximum slope is $\leq 12\%$
3. Site is within 50 miles of a town with at least 100 people
4. Land use is BLM compatible

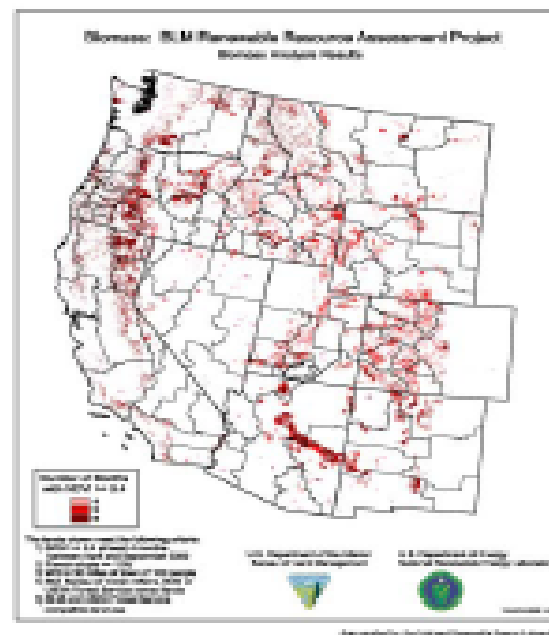
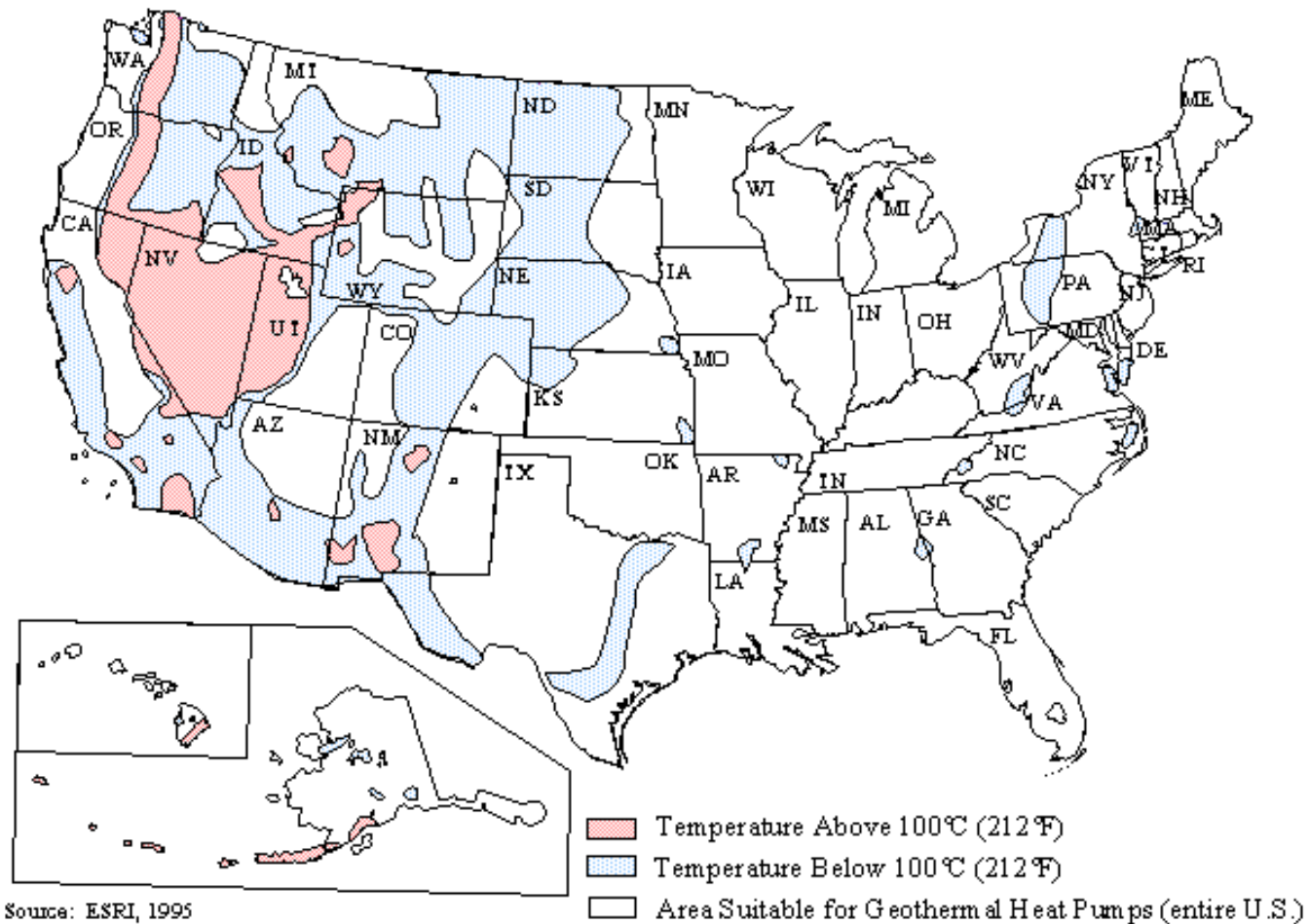


Figure 4: Biomass Analysis Results



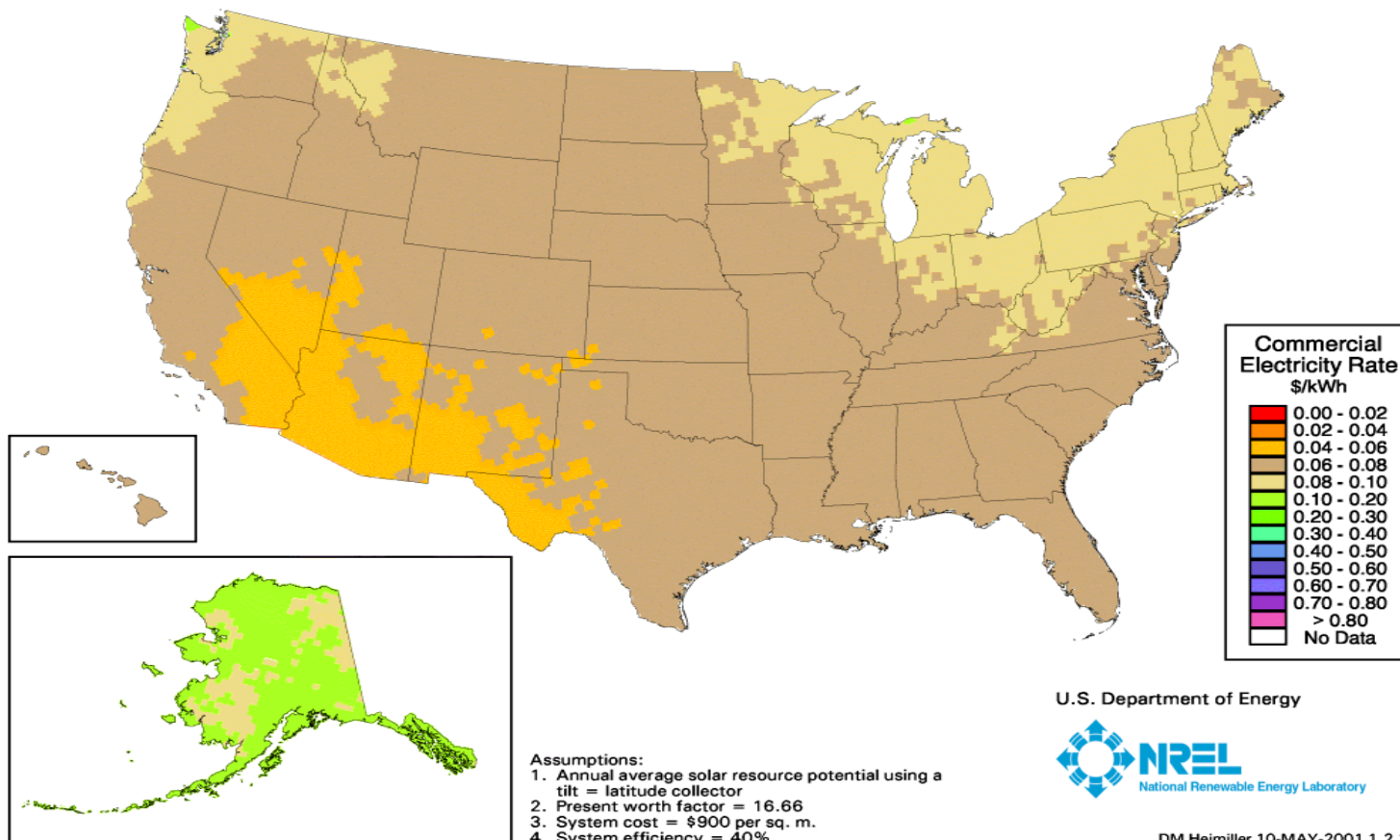
Renewable Energy Basics: Geothermal





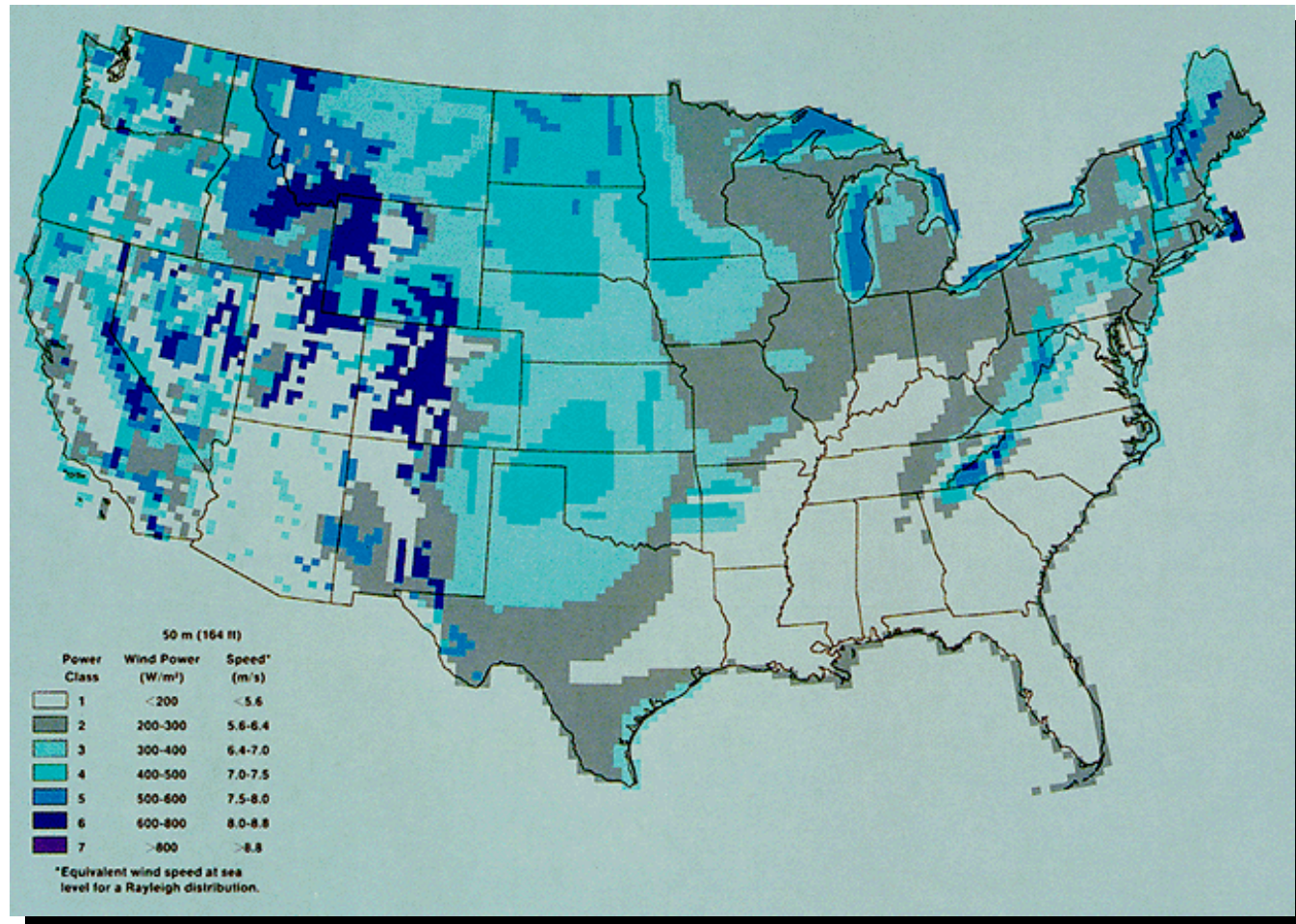
Solar Thermal Energy – Cost-Effective Opportunities

Solar Hot Water: Electricity Rate Corresponding to Savings to Investment Ratio = 1





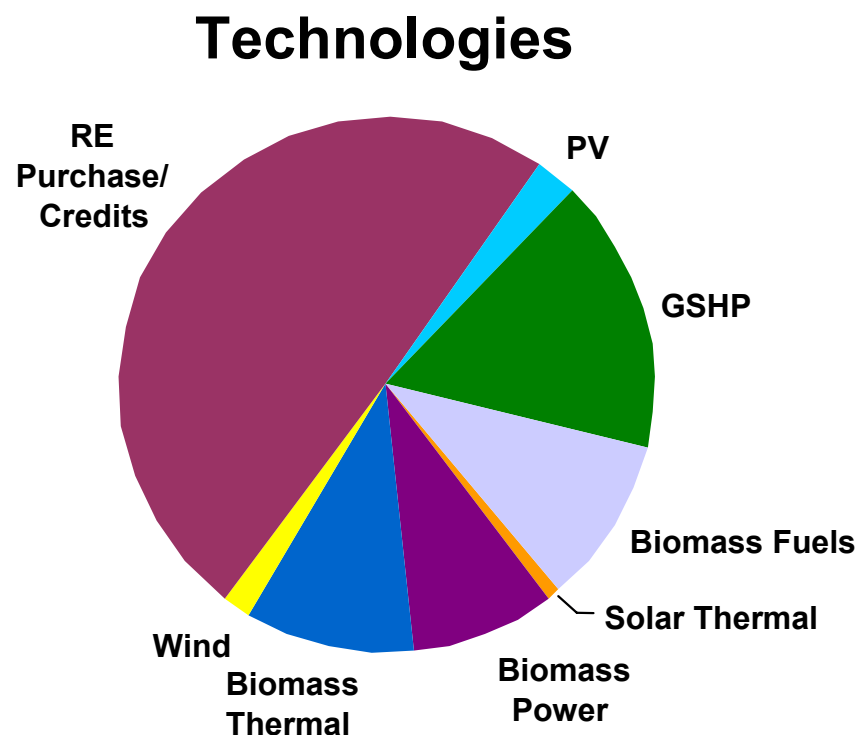
Annual Average Wind Resource Estimates in the Contiguous United States





Where We Are: Federal Renewable Technologies and Purchases, March 2004

Solar Thermal	9.37	GWh
Biomass Power	92.44	GWh
Biomass Thermal	108.48	GWh
Wind	19.02	GWh
RE Purchase/Credits	527.19	GWh
Photovoltaics (PV)	25.62	GWh
Ground Source Heat Pump	178.54	GWh
Biomass Fuels	106.36	GWh
TOTAL	1067.02	GWh



Data as of 3/31/04