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RENEWABLE ENERGY SCREENING TOOLS

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Introduction

- Federal Regulations & RE requirements
- Technologies
- Steps to Renewable Energy Projects
- Tools

Federal Regulations & Renewable Energy

Source of Requirement	Level	Agencies
Energy Policy Act of 2005 Federal Use Goal	3% FY07-09 5% FY10-12 7.5% FY13 and beyond	All
Executive Order 13423	½ of EPAct Federal Goal from "New" Sources	All
DoD National Defense Reauthorization Act of 2007	25% of electricity by 2025	DoD
EISA 2007 SWH Requirement	30% of hot water needs in all new buildings or major renovations if LCC effective	All
Executive Order 13514	GHG inventory and goals	All

Where to begin?

- Efficiency & conservation

  - How much energy is being used?
  - How much does it cost?
  - Where does it go?
    - Which buildings, submeter data

  - What is it used for?
    - Space Heating
    - Ventilation
    - Lighting
    - Hot water: temperature, gallons/day
    - Equipment

  - REDUCE!

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Renewable Energy Screening

- Identify which RE technologies fit site needs
  - •Consider site energy costs, energy needs, site characteristics, RE resources, and available incentives

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Screening Levels

- Level 1: Preliminary Screening
  - Basic check to determine 'go or no-go', simple payback and possible SIR, etc.
  - Uses maps, user-friendly tools (e.g. IMBY, RETScreen)
- Level 2: RE Expert (no site visit)
  - Identify dead-ends and opportunities, develop RFPs, budget and conduct engineering studies
  - Uses calculations by hand or sophisticated analysis software
- Level 3: RE Expert site visit
  - Identifies dead ends and good opportunities, develops RFPs, budget, engineering studies and direct appropriations decisions with likely SIR
  - Calculations by hand and confirmed by 'ground truthing' and integration with actual site, buildings, etc.

Renewable Energy Technologies

Renewable Energy technologies that satisfy EPAct 2005 and EO13423 requirements include:

- Solar ventilation pre-heat systems
- Solar Photovoltaics (PV)
- Solar thermal (SWH or SHW)
- Ground source heat pumps
- Biomass heating and cooling
- Geothermal (heat and electricity)
- Hydrokinetic power
- Ocean resources
- Wind power
- Qualified hydro resources
- Daylighting
- Biomass
- Waste to Energy
- Landfill Gas

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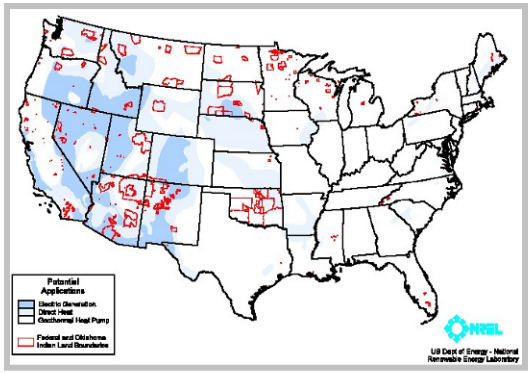
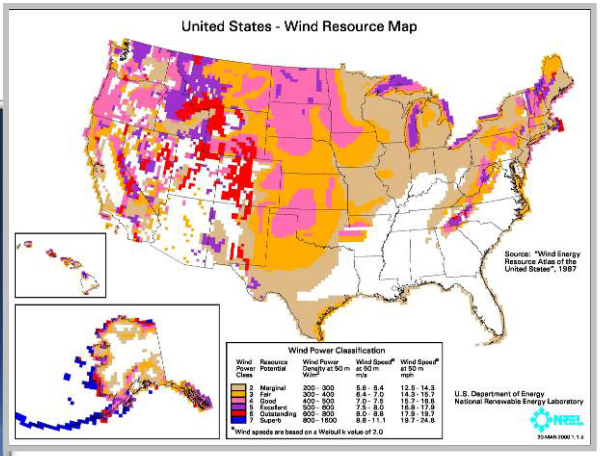
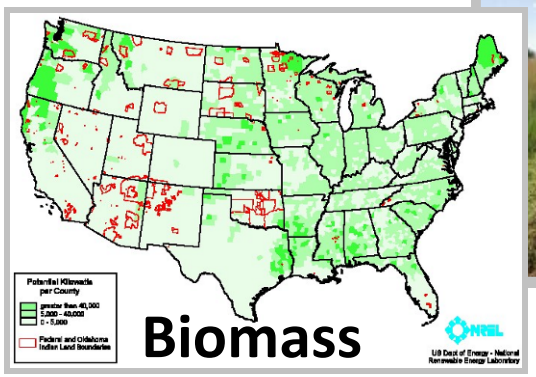
Resource Maps



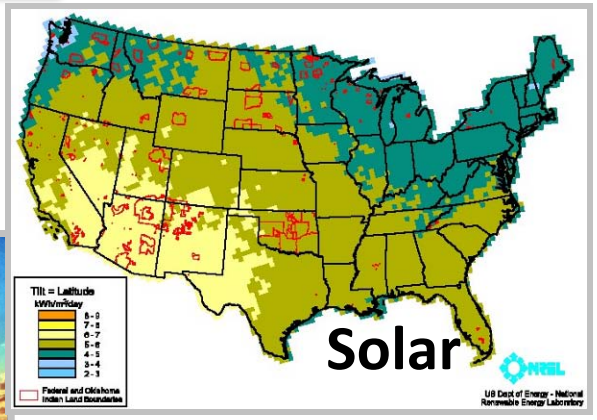
Geothermal



Wind



Biomass



Solar

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Renewable resources maps accessible at:
http://www1.eere.energy.gov/maps_data/renewable_resources.html

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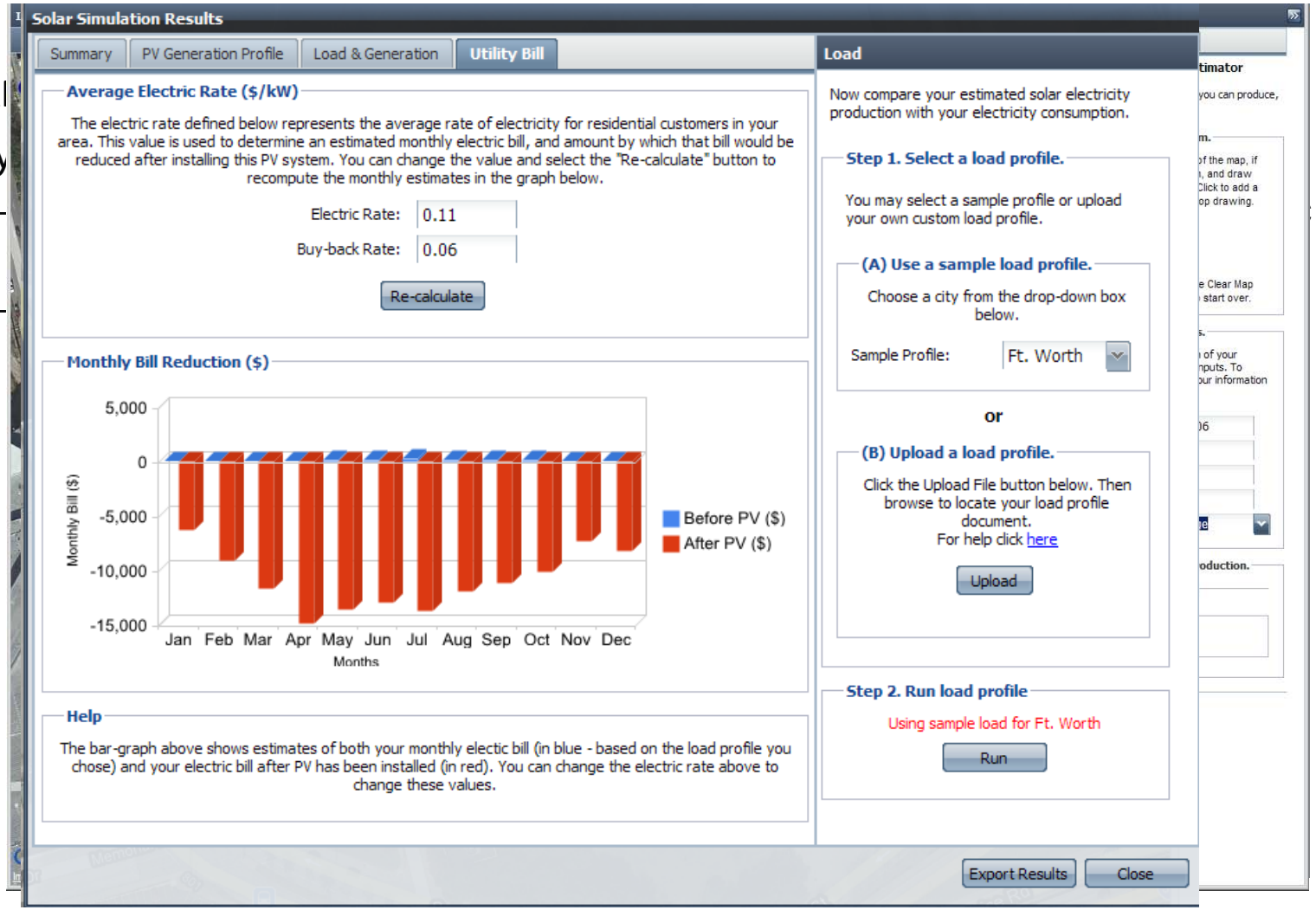
RENEWABLE ENERGY ASSESSMENT TOOLS

Resource	Tool	Where to Find It	Summary
Wind	Wind Energy Project Model	www.retscreen.net	Evaluates energy production, life-cycle costs and GHG emissions reduction for grid-connected and off-grid wind energy systems.
	IMBY	www.nrel.gov/eis/imby	Estimates the electricity production with a wind turbine at a home or business using available space with interactive mapping.
Solar	PV Watts	www.pvwatts.org	Generates performance estimates for grid-connected PV systems.
	PV Project Model	www.retscreen.net	Same as Wind Energy Project Model, but for Solar PV.
	Solar Estimate	www.solar-estimate.org	Estimates the price, savings, and system size of solar energy systems to produce electricity and hot water.
	IMBY	www.nrel.gov/eis/imby	Same as Wind, but for Solar PV.
Biomass	Theoretical Ethanol Yield Calculator	www1.eere.energy.gov/biomass/ethanol_yield_calculator.html	Calculates theoretical yield of ethanol from a feedstock for biomass ethanol production.
Microhydro	Hydropower Resource Assessment	hydropower.id.doe.gov/resourceassessment/software	Evaluation software and resource assessment reports.
ALL	Homer	www.nrel.gov/homer	Design system options for off-grid and grid-connected RE power systems (wind, solar, etc).

IMBY

SOLAR

In My



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RETScreen

RETS

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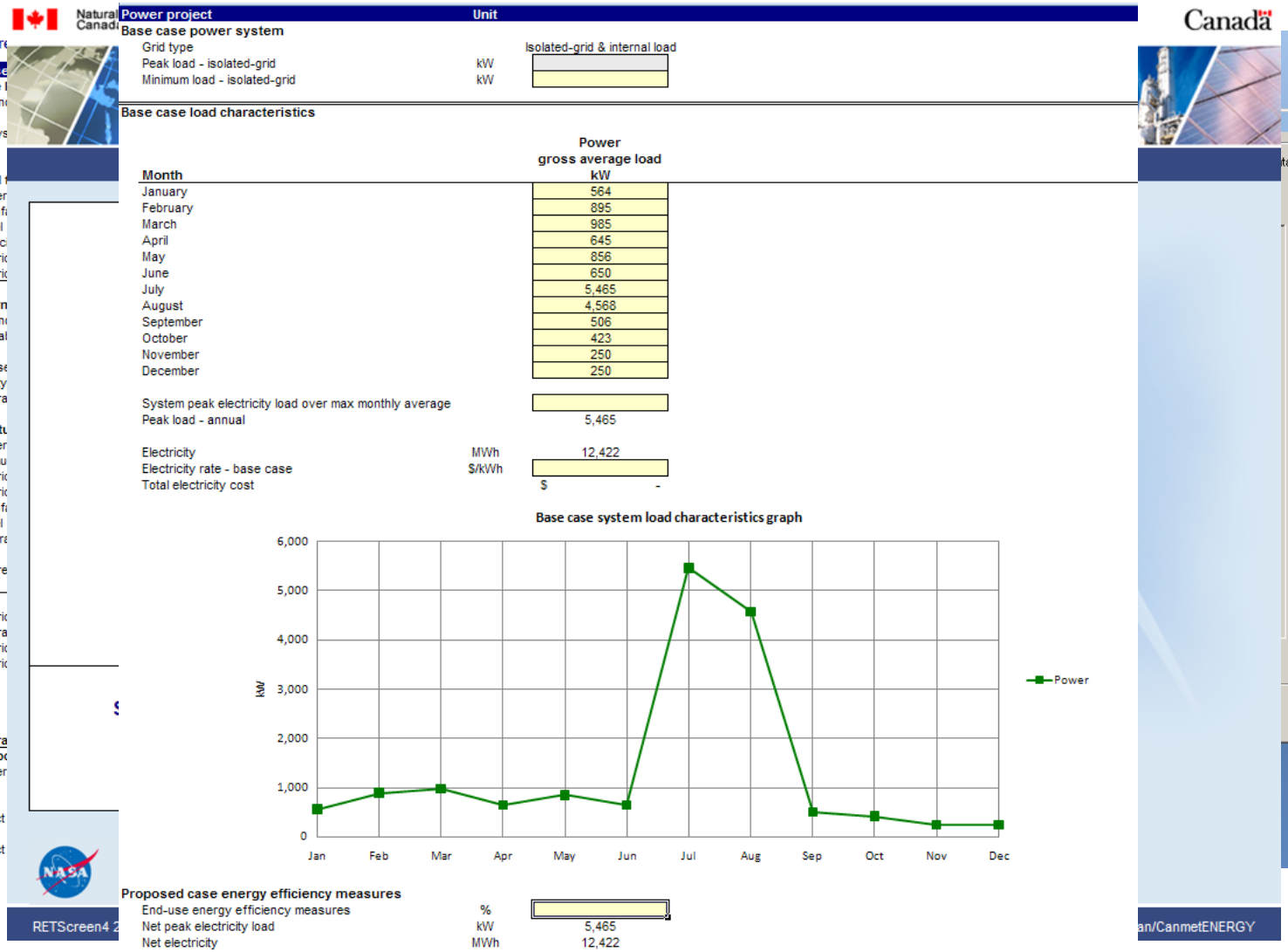

Power project		Unit
Base case power system		
Grid type		Isolated-grid & internal load
Peak load - isolated-grid	kW	
Minimum load - isolated-grid	kW	

Base case load characteristics

Month	Power gross average load kW
January	564
February	895
March	985
April	645
May	856
June	650
July	5,465
August	4,568
September	506
October	423
November	250
December	250

System peak electricity load over max monthly average		
Peak load - annual		5,465
Electricity	MWh	12,422
Electricity rate - base case	$/kWh	
Total electricity cost	$	-

Base case system load characteristics graph

Proposed case energy efficiency measures

End-use energy efficiency measures	%	
Net peak electricity load	kW	5,465
Net electricity	MWh	12,422

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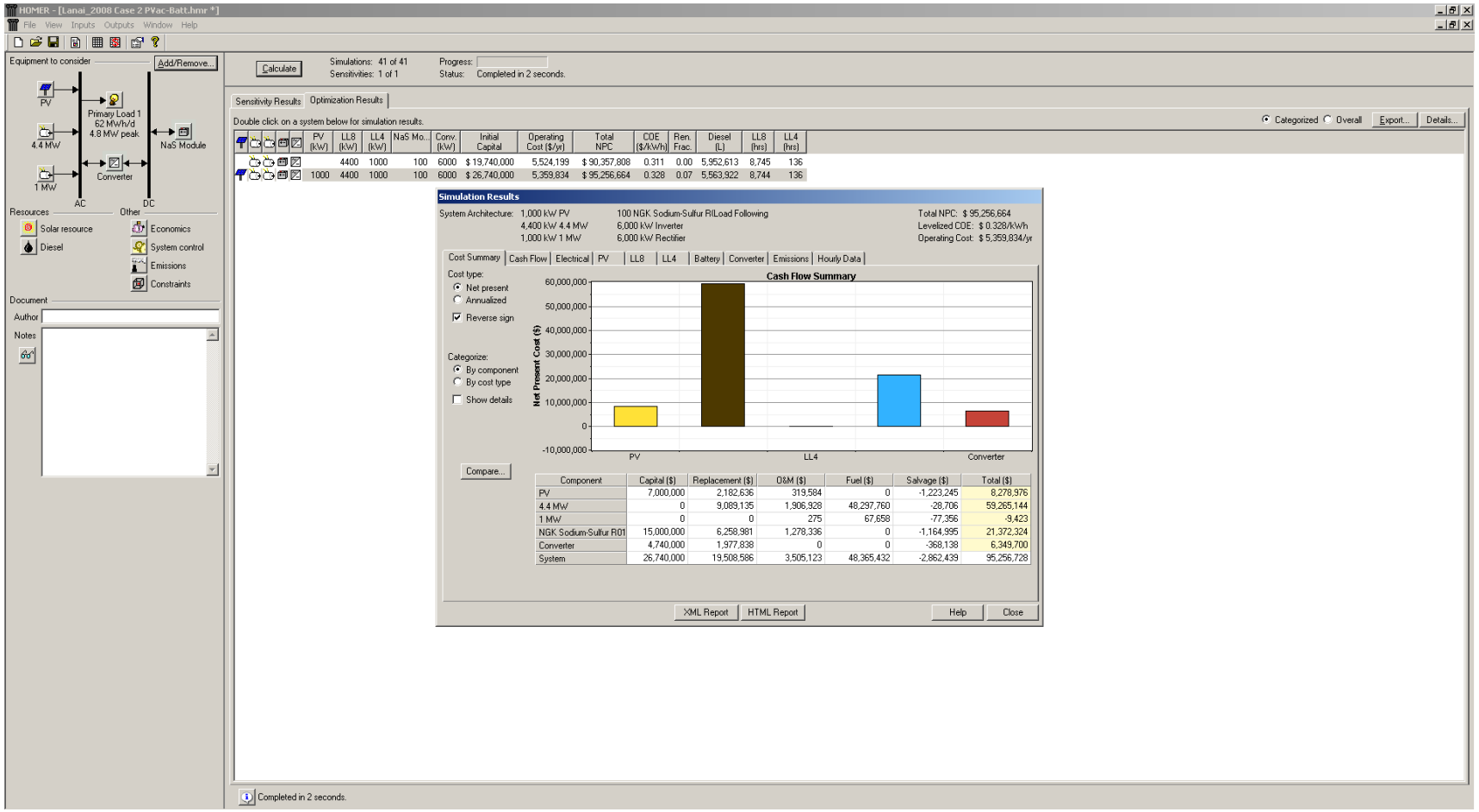
Homer



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Renewable Energy Technologies

Photovoltaics

Wind Power

Solar Water Heating

Solar Vent Air Preheat

Concentrating Solar Heat/Power

Biomass Heat/Power

Daylighting

Ground Source Heat Pump

Landfill Gas

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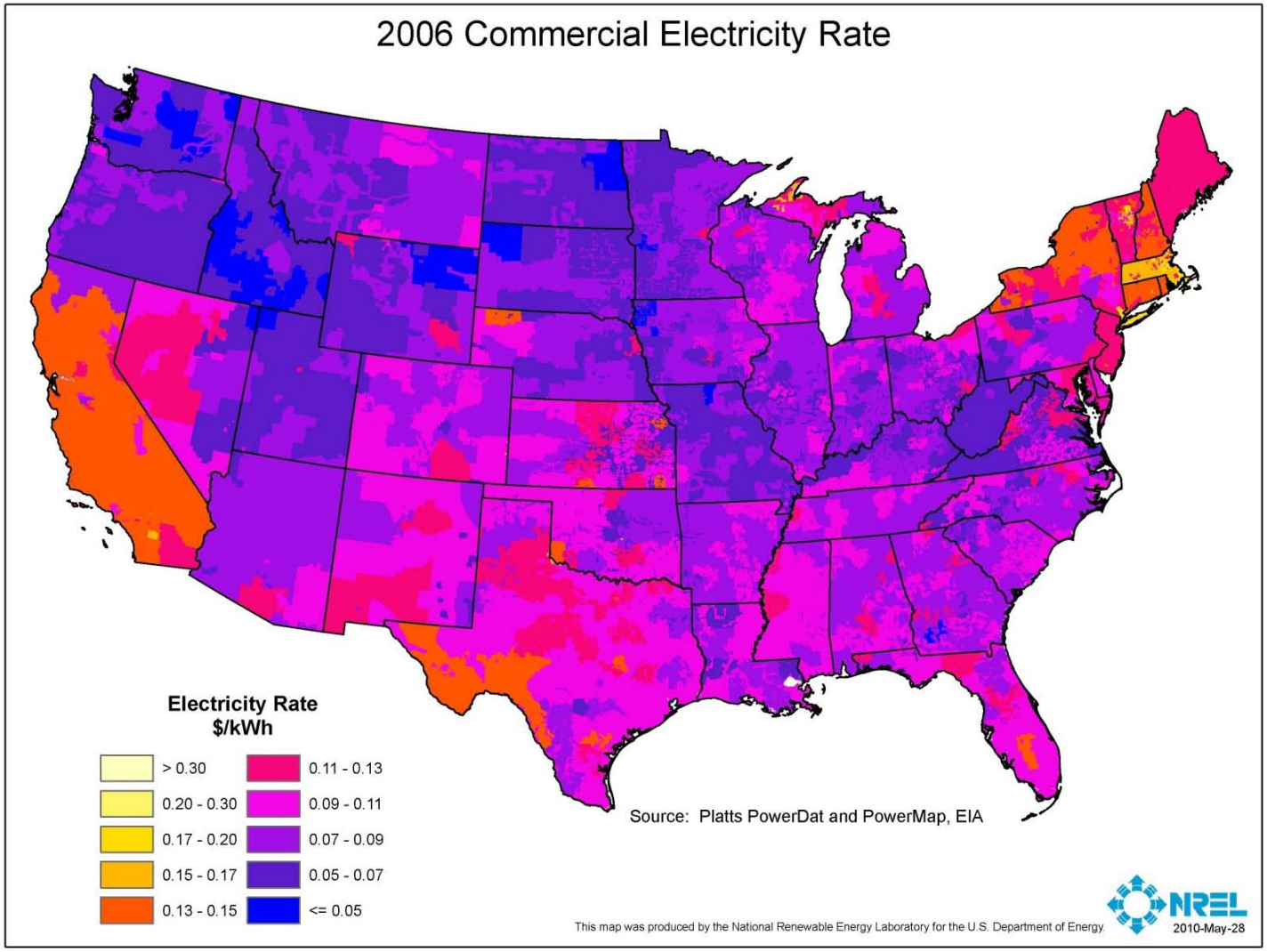
Financing



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Incentives

DSIRE: Database for State Incentives for Renewables and Efficiency

www.dsireusa.org

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Summary

- Federal regulations require the use of renewable energy technologies
- Focus on energy conservation measures BEFORE installing RE technologies
- There are many options for RE technologies: at least one might work at your site
- Free tools and resources are available for Level 1 screening
- Incentives exist which may make it easier for RE project implementation

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Additional Resources

In addition to the tools in this presentation, visit:

National Renewable Energy Laboratory Tools
www.nrel.gov/analysis/analysis_tools.htm

Department of Energy (EERE) RE Calculators
www1.eere.energy.gov/calculators/renewable_energy_systems.html

Federal Energy Management Program (FEMP) home page:
http://www1.eere.energy.gov/femp/

Renewable home page:
http://www1.eere.energy.gov/femp/technologies/renewable_energy.html

RE contacts:
http://www1.eere.energy.gov/femp/technologies/renewable_contacts.html

Database of State Incentives for Renewables and Efficiency:
http://www.dsireusa.org/

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THANK YOU!