NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Technology Assessment

Strategic Energy Analysis Center (SEAC) 2012 Highlights

NREL analysis, data, and tools inform policy and investment decisions as energy-efficient and renewable energy technologies advance from concept to commercial application. These selected products indicate the breadth of our work and depth of our capabilities.

2011 Renewable Energy Data Book

Author: Rachel Gelman

The 2011 Renewable Energy Data Book provides facts and figures on energy in general, renewable electricity in the United States, and global renewable energy development and investments. Rich graphics and depth and breadth of data make the Data Book series among the most popular items on NREL.gov.

http://www.nrel.gov/docs/fy13osti/54909.pdf

Freshwater Use in U.S. Power Plants: Electricity's Thirst for a Precious Resource

Authors: Kristen Averyt, Jeremy Fisher, Annette Huber-Lee, Aurana Lewis, Jordan Macknick, Nadia Madden, John Rogers, Stacy Tellinghuisen

In this report of the Energy and Water in a Warming World Initiative, the authors present the first systematic assessment of both power plants effects on water resources across the United States and the quality of information available to help public- and private-sector decision-makers make water-smart energy choices.

http://www.ucsusa.org/assets/documents/clean_energy/ew3/ew3-freshwater-use-by-us-power-plants.pdf

§1603 Treasury Grant Analysis

Authors: Daniel Steinberg, Gian Porro, Marshall Goldberg

The Preliminary Analysis of the Jobs and Economic Impacts of Renewable Energy Projects Supported by the §1603 Treasury Grant Program report estimates the direct and indirect jobs and economic impacts of projects supported by the §1603 Treasury grant program. The analysis employs the Jobs and Economic Development Impacts (JEDI) models to estimate the gross jobs, earnings, and economic output supported by the construction and operation of the large wind (greater than 1 MW) and solar photovoltaic (PV) projects funded by the §1603 grant program.

http://www.nrel.gov/docs/fy12osti/52739.pdf

Transparent Cost Database on OpenEI

Leads: Austin Brown, Ryan McKeel

The Transparent Cost Database provides users access to published historical and projected cost estimates for electricity generation, biofuels, and vehicle technologies. These technology cost and performance estimates can be used to benchmark company costs, model energy scenarios, and inform research and development decisions. All data are visualized and downloadable.

http://en.openei.org/wiki/Transparent_Cost_Database

Renewable Electricity Futures Study

Authors: Trieu Mai, Ryan Wiser, Debra Sandor, Gregory Brinkman, Garvin Heath, Paul Denholm, Donna J. Hostick, Naim Darghouth, Adam Schlosser, Ken Strzepek

The Renewable Electricity Futures Study (RE Futures) is an initial investigation exploring the implications and challenges of very high renewable electricity generation levels in 2050. RE Futures was a collaboration with more than 110 contributors from 35 organizations including national laboratories, industry, universities, and non-governmental organizations. Using models with unprecedented geographic and time resolution for the continental United States to assess whether the U.S. power system can supply electricity to meet customer demand on an hourly basis with high levels of renewable electricity, RE Futures provides initial answers to important questions about the integration of high penetrations of renewable electricity technologies from a national perspective, focusing on key technical implications.

http://www.nrel.gov/analysis/re_futures/

Geothermal Regulatory Roadmap

Leads: Kate Young, Kermit Witherbee, Jon Weers

The Geothermal Regulatory Roadmap team has been working with federal, state, and local agencies to develop a working guide for agency, industry, and policymaker use in an effort to understand processes and timelines and identify potential areas of concern. The roadmapping initiative covers the eight western states, including CA, NV, HI, AK, ID, UT, OR, and MT. The roadmap is being developed at the federal and state levels, allowing for future expansion to the local (county) level. Additional states are being added.

http://en.openei.org/wiki/GRR

Navajo Generating Station and Air Visibility Regulations: Alternatives and Impacts

Authors: David J. Hurlbut, Scott Haase, Gregory Brinkman, Kip Funk, Rachel Gelman, Eric Lantz, Christina Larney, David Peterson, Christopher Worley

The U.S. Environmental Protection Agency (EPA) announced in 2009 its intent to issue rules for controlling emissions from the Navajo Generating Station that could affect visibility at the Grand Canyon and at several other national parks and wilderness areas. The final rule will conform to what EPA determines is the best available retrofit technology for the control of haze-causing air pollutants, especially nitrogen oxides. This study aims to assist both the Interior Department and the EPA by providing an objective assessment of issues relating to the power sector.

http://www.nrel.gov/docs/fy12osti/53024.pdf

NREL is a national laboratory of the U.S. Department of Energy,
Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

Biomass Resource Allocation among Competing End Uses

Authors: Emily Newes, Brian Bush, Daniel Inman, Yolanda Lin, Trieu Mai, Andrew Martinez, David Mulcahy, Walter Short, Travis Simpkins, Caroline Uriarte, Corey Peck

The Biomass Scenario Model (BSM), a system dynamics model, facilitates understanding of policies and their potential effects on the U.S. biofuels industry. However, BSM does not currently have the capability to account for allocation of biomass resources among the various end uses. This report provides a more holistic understanding of the dynamics surrounding the allocation of biomass among competing uses.

http://www.nrel.gov/docs/fy12osti/54217.pdf

NREL Utility Rate Database on OpenEI

Leads: Sean Ong, Ryan McKeel

OpenEI, a powerful, collaborative platform, has added utility rates. The new utility-rate database shows average consumption rates and allows users to access detailed rates including time-of-use rates, demand charges, and tiered rate structures for most utilities in the United States. Illinois State University is working to populate the database.

http://www.openei.org/

http://en.openei.org/wiki/Gateway:Utilities

International Experiences and Frameworks to Support Country-Driven Low-Emissions Development

Authors: Ron Benioff, Jaquelin Cochran, Sadie Cox

NREL supports several multilateral initiatives designed to increase use of renewable energy and energy efficiency to support economic development while addressing such global challenges as climate change and energy security. Our portfolio includes several projects in the field of low emission development strategies (LEDS). LEDS allow countries to advance sustainable development, promote private-sector growth, and reduce greenhouse gas emissions.

http://www.nrel.gov/docs/fy12osti/52860.pdf

http://en.openei.org/wiki/Gateway:Low_Emission_Development_Strategies

Past and Future Cost of Wind Energy

Authors: Eric Lantz, Maureen Hand, Ryan Wiser

To better understand the potential for wind technology cost reductions, this report provides a review of historical costs, evaluates near-term market trends, and summarizes the range of projected costs. It also notes potential sources of future cost reductions. The majority of studies indicate continued cost reductions on the order of 20%-30% through 2030.

http://www.nrel.gov/docs/fy12osti/54526.pdf

Interactions, Complementarities and Tensions at the Nexus of Natural Gas and Renewable Energy

Authors: April Lee, Owen Zinaman, Jeffrey Logan, Morgan Bazilian, Douglas Arent, Robin L. Newmark

Natural gas and renewable energy technologies enjoy many complementarities spanning economic, technical, environmental, and political considerations. These complementarities arise from their similarities—which include improved environmental performance compared to coal and oil and their ability to contribute to a robust U.S. economy—but it is from their dissimilarities that the biggest opportunities for mutually beneficial collaboration can be found.

http://dx.doi.org/10.1016/j.tej.2012.10.021

Cost-effectiveness and Economic Incidence of a Clean Energy Standard

Authors: Bryan K. Mignone, Thomas Alfstad, Aaron Bergman, Kenneth Dubin, Richard Duke, Paul Friley, Andrew Martinez, Matthew Mowers, Karen Palmer, Anthony Paul, Sharon Showalter, Daniel Steinberg, Matt Woerman, Frances Wood

A Clean Energy Standard (CES) is a flexible, market-based policy instrument that could be adopted to reduce greenhouse gas emissions from the U.S. electricity system over time. This paper uses several well-known energy system and electricity models to analyze the cost-effectiveness and economic incidence of three different design options for a CES that would each lead to approximately 80% clean electricity by 2035.

http://dx.doi.org/10.5547/2160-5890.1.3.5

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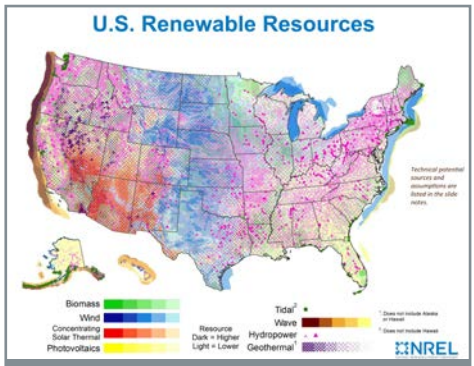

U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis

Authors: Anthony Lopez, Billy Roberts, Donna Heimiller, Nate Blair, Gian Porro

This report presents the state-level results of a spatial analysis effort calculating energy technical potential, reported in square kilometers of available land, megawatts of capacity, and gigawatt-hours of generation, for six different renewable technologies. For this analysis, the system specific power density (or equivalent), efficiency (capacity factor), and land-use constraints were identified for each technology using independent research, published research, and professional contacts.

http://www.nrel.gov/docs/fy12osti/51946.pdf

http://www.nrel.gov/gis/re_potential.html

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