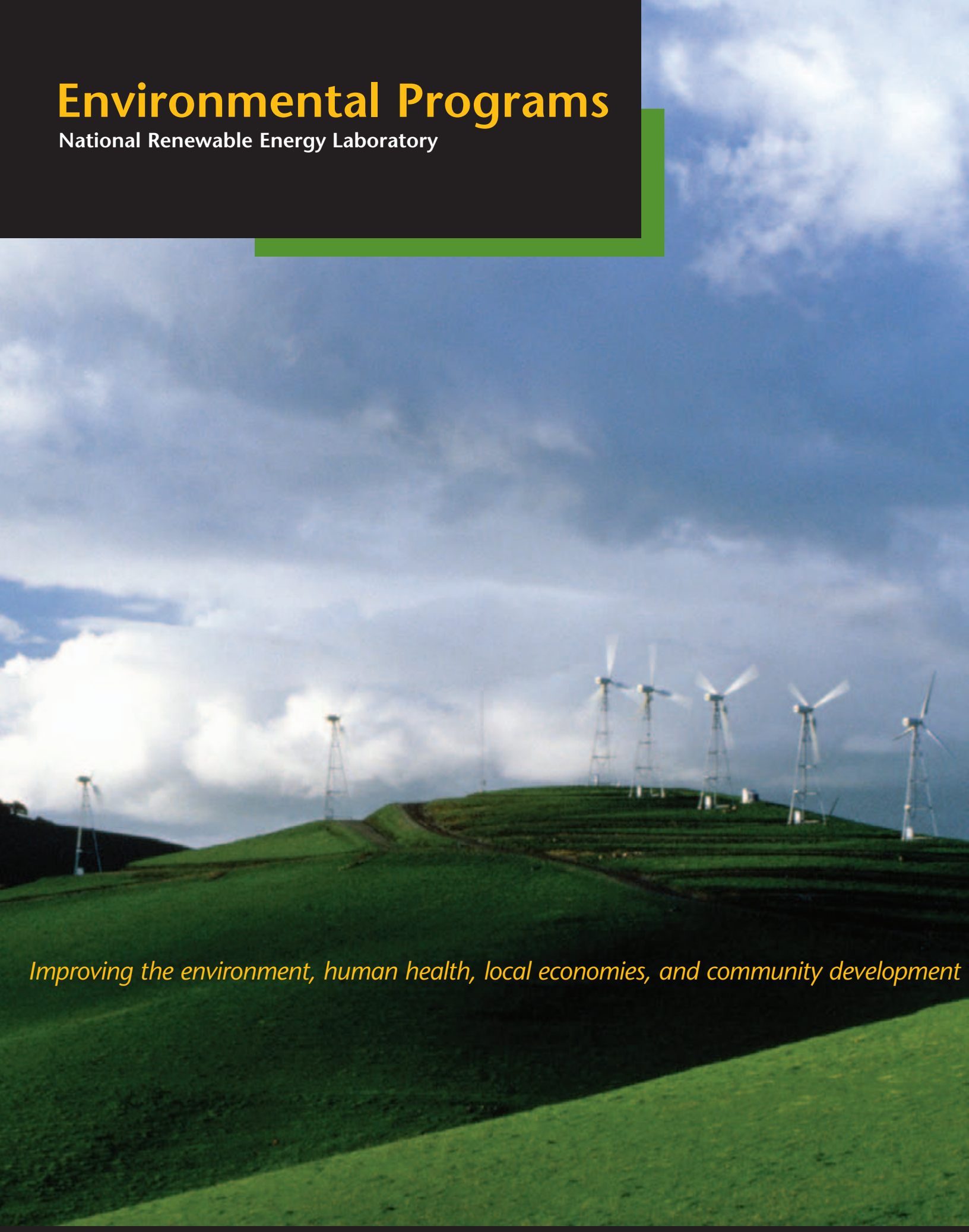
Environmental Programs

National Renewable Energy Laboratory



Improving the environment, human health, local economies, and community development

International Programs

Programs in Chile and Korea indicate that integrated clean energy and air pollution strategies could save thousands of lives, and significantly reduce hospital visits in the next two decades, while also reducing emissions of greenhouse gases. In economic terms these health benefits represent a savings of $0.24-1.9 billion in Chile and $59-179 million in Korea.

The above renewable power system, supplied in collaboration with NREL to the rural community of Villa Las Araucarias in southern Chile, helps keep the environment clean while supplying power to an off-grid, remote location.

Climate Change Technology Transfer

The Technology Cooperation Agreement Pilot Project (TCAPP) provides a model for technology transfer under the United Nations Framework Convention on Climate Change. In partnership with the Agency for International Development (USAID), the Environmental Protection Agency (EPA), and the Department of Energy (DOE), NREL operates the program in seven countries – Brazil, China, Egypt, Kazakhstan, Korea, Mexico and the Philippines. The program accelerates private investment in clean energy technologies in developing countries through collaboration among developing and developed country governments, the private sector, and donor communities. NREL also works in collaboration with the Climate Technology Initiative (supported by 23 developed countries and the International Energy Agency) on a related multilateral technology transfer program – the Cooperative Technology Implementation Program.
Visit www.nrel.gov/tcapp for more information.

Improving Environmental Quality and Human Health

The EPA initiated the Integrated Environmental Strategies Program in 1998 to assist developing countries with an integrated approach to address public health as well as local and global environmental problems. NREL currently works with Argentina, Brazil, Chile, China, Mexico, Korea and South Africa to quantify the human health, air pollution, and economic development benefits of clean energy technologies and policies and to develop local environmental strategies that make full use of renewable energy and energy efficiency technologies.
Visit www.nrel.gov/icap for more information.

Reducing Greenhouse Gas Emissions through Market Friendly Activities

With its technology and market expertise, NREL promotes the development of market-based energy projects that reduce greenhouse gas emissions and provide economic development benefits. NREL works with DOE, USAID, EPA, the Climate Trust, the World Bank, developing country governments, and private sector partners on inter-country cooperative efforts to develop projects for greenhouse gas reduction and to promote economic development and energy security. These efforts include building technical capacity with host country governments and project developers, identifying project opportunities and establishing straightforward methodologies for assessing the sustainable development benefits associated with these activities, and creating project pipelines to facilitate project activities and reduce transaction costs.

NREL has collaborated with partners in ten Southern African countries to develop market-based energy efficiency and renewable energy projects that reduce greenhouse gas emissions and support key development objectives. In Ipolokeng, South Africa, PV panels transform sunlight to electricity on the roof of a school building.

Climate Change Action Plans for Developing Countries

NREL helps developing countries design and evaluate the economic benefits of climate change action plans. NREL is presently working with the Mexican, Philippines, and Zambian governments to define the mitigation potential and costs of alternative energy technologies and policies.

Renewable Energy for Economic Development

NREL helps energy planners in developing countries increase access to clean, reliable, renewable energy through regulatory assistance, resource assessment, and economic analysis of alternative supply technologies including new institutional and financial approaches.

Together with NREL, the County Studies Program team in Mexico is developing an implementation strategy for solar water heating technologies for commercial and residential applications. This technology was selected from Mexico's Climate Change Action Plan based on the potential for mitigation of greenhouse gas emissions and cost-effectiveness. The above rooftop solar pool heater system reduces water heating costs at a hotel complex in Mexico City.

Domestic Climate Change Programs

■ Climate Change Analysis

NREL conducts analyses of future energy scenarios and the potential role that clean energy technologies might play to reduce greenhouse gas emissions under different energy technology, market, or policy assumptions. NREL was a coordinating laboratory in the 2000 inter-laboratory study, Scenarios for a Clean Energy Future. The study examined solutions to reduce inefficiencies, oil dependence, air pollution, and greenhouse gas emissions in the United States.

■ Carbon Offset Programs

A market for carbon dioxide, and other greenhouse gases, is beginning to take shape as the private sector recognizes that market-based mechanisms can provide an economically sound approach to tackling environmental challenges. NREL is working closely with various organizations, both in the private and public sector, to explore how energy efficiency and renewable energy technologies can play a vital role in these greenhouse gas offset programs.

Air Pollution Activities

■ Indoor Air Quality Research and Development

NREL conducts research and development, including work on photocatalysts, to help purify indoor air and maintain human health.

■ Federal Facility Energy and Emissions Management Pilot Project

The U.S. government is the largest energy user in the world and has made substantial reductions in energy use through the Federal Energy Management Program (FEMP), which employs an innovative approach to access private financing through energy service companies and utilities. NREL is assisting FEMP and the EPA with a pilot project to further reduce energy use and emissions of air pollutants and greenhouse gases at federal facilities.
Visit http://www.nrel.gov/femp/ for more information.

■ NO_X Allowances for Energy Efficiency and Renewable Energy Technologies in State Implementation Plans

NREL provides technical expertise on approaches for controlling nitrogen oxide (NO_X) emissions from stationary sources in the eastern United States. NREL collaborates with the National Association of State Energy Officials to identify opportunities to assist states in using energy efficiency and renewable energy technologies to mitigate NO_X emissions.

■ Integrated State Environmental and Energy Plans

NREL assists state and local governments in strategizing for greater integration of environmental and energy plans. NREL calls upon a host of technologies and policies for clean energy to tailor cost-effective approaches to meet energy and environmental goals of state and local governments.
Visit *http://www.nrel.gov/business/state.html* for more information.

■ Air Pollution Analysis

NREL analyzes the options and implications of air quality policies and regulations for renewable energy markets, specifically with respect to acid rain, ozone, regional haze, fine particulates, and greenhouse gas emissions. NREL also conducts various assessments of air pollution issues and the role of energy efficiency and renewable energy technologies in addressing air pollution. Models are used to estimate the costs of different levels of emissions reduction.

Through its collaboration with the Technology Cooperation Agreement Pilot Project (TCAPP), the Philippines Department of Energy has enacted policies and developed pilot projects that have promoted the environment for renewable energy market development. This photovoltaic maintenance team poses in front of a rural electrification project in Visayas, Philippines.

Green Power

NREL's green power program activity analyzes the implications of customer choice on the market demand for renewable energy in both regulated and evolving competitive electricity markets. Analyses include the market potential for green power, the status of domestic green power marketing activities, the role of customer aggregation in green power market development, and successful utility green pricing strategies. NREL maintains the Green Power Network *http://www.eren.doe.gov/greenpower/home.shtml* for DOE.

Life Cycle Assessment

NREL uses life cycle assessment (LCA) to provide direction, focus, and support to the development and commercialization of various research projects being supported by DOE. LCA is an analytic method for identifying and evaluating the environmental impacts of emissions and resource depletion associated with a specific process.
Contact Margaret Mann at margaret_mann@nrel.gov for more information.

The National Renewable Energy Laboratory's (NREL) mission is to develop renewable energy and energy efficiency technologies and practices, advance related science and engineering, and transfer knowledge and innovations to address our energy and environmental goals. NREL conducts research and development on a broad portfolio of technologies. Each of these technologies has significant environmental benefits. In addition, NREL assists governments, businesses, and communities throughout the world in applying clean energy technologies to address their environmental and energy needs. NREL implements environmental programs in close collaboration with partners in U.S. federal, state and local agencies, developing countries, the business community, international organizations, environmental organizations, and other technical institutions.

Major NREL environmental programs and initiatives include:

- Design of ***integrated energy and environmental strategies*** in collaboration with other countries and state and local governments
- Partnerships with U.S. federal, state, and local agencies with ***implementation of air pollution programs and climate change programs***
- Implementation of ***green power programs***, including the online Green Power Network
- Analysis of the ***environmental and economic impacts and benefits*** of energy efficiency and renewable energy technologies
- Implementation of a model program for climate change ***technology transfer*** between developed and developing countries
- Development of ***greenhouse gas emission reduction projects*** as joint efforts between U.S. and developing country partners
- Assistance with preparation of ***climate change action plans*** of developing countries
- Development of ***life cycle assessments*** for fuel production and power generation systems

Improving the environment, human health, local economies, and community development

NREL Technology Areas

- Advanced Transportation Technologies
- Biofuels
- Biopower
- Buildings
- Distributed Energy Resources
- Energy Analysis, Applications, and Information
- Geothermal
- Hydrogen
- Industrial Processes
- Materials Science
- Photovoltaics
- Resource Assessment
- Wind

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