

Conventional energy systems struggle to reach isolated, low-density rural populations, whereas, renewable energy systems such as solar and wind power can often provide electricity and hot water where power lines cannot reach.

The policy challenges for off-grid applications are different than grid-connected needs, but are also crucial in creating a receptive investment environment for renewable energy technologies. Since renewables already have significant cost advantages in many off-grid applications, the policy focus is not so much on energy portfolios and financial transfers, but rather in ensuring that utilities continue to make investments in rural areas where populations may be dispersed and sparse. As rural electrification offers lower returns due to its intrinsic characteristics - mainly a widely scattered market - it is generally not attractive to private capital. A first step toward the development of a successful rural electrification strategy is a commitment, at the national level, to furthering the electrification process. Often this means continued financial obligations - subsidies - on the part of the government to reach the nations poorest citizens. Additionally, strategies to break the model of centralized generation combined with grid-extension, and accepting that distributed generation may be less costly and technologically attractive are often successful in rural areas. Policy options in this regard include:



■ **Rural Concessions.** Argentina has designed an innovative rural electrification policy, with the support of the Global Environment Facility (GEF) and the World Bank, which gives exclusive power provision concessions for specified rural areas, combined with a uniform kWh subsidy. Franchise rights for rural concession areas are given to the private sector entities that require the lowest subsidy to provide electric services to rural households and community centers.

■ **Provide Direct Subsidies for Rural Electrification.** The state may provide direct subsidies for investments in rural electrification, where the market conditions are not otherwise attractive for rural cooperatives or private utilities. It is advisable that such subsidies be direct, and targeted at the investment costs for the projects. In Chile, through its National Rural Electrification Project, the State provides subsidies of 60%-70% of the initial investment costs for off-grid rural electrification projects.

■ **Subsidy Repackaging.** Many rural energy needs have traditionally been assisted through subsidies on the conventional fuels being used, including diesel and kerosene. Since renewable costs do not generally require fuel expenditures, but rather in the initial capital investments, it is important to restructure rural energy subsidies so that they can also apply to renewable technologies. This is being practiced in Brazil where the CCC Fund (Conto de Consumo de Combustiveis - Diesel Subsidy Fund) may be utilized to invest in solar, wind, and biomass energy where these technologies are more appropriate.

CONCLUSION

Sustainable energy technologies, including renewables and energy efficiency have the potential to significantly reduce the amount fossil fuels that are consumed for the production of electricity in Latin America and the Caribbean. It is clear that there are many benefits to be accrued by diversifying power generation resources to include these technologies. While the benefits - including power system price stability, infrastructure security, environmental protection, and rural economic development - may be convincing, policy and regulatory reform is required to help level the playing field with regard to conventional fossil fueled systems.

The outlook for clean energy in Latin America and the Caribbean is more promising today than ever before. The fusion of a heightened interest in and appreciation for renewable energy and energy efficiency benefits, combined with increasingly competitive modern technologies has led to a situation in which these systems can provide the most economically sound, long-term investment in the growing power needs of the hemisphere.

For further information please review the webpage for the Office For Sustainable Development and Environment of the General Secretariat of the Organization of American States (OAS/USDE; <http://www.oas.org/usde>).

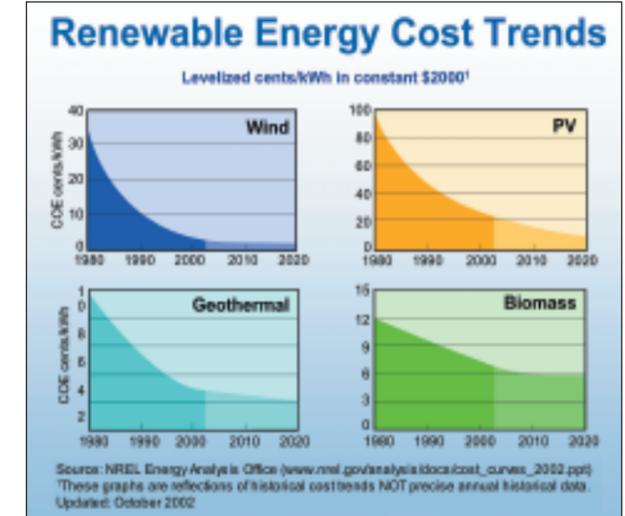
This USDE Policy Brief series provides a forum for discussion on issues pertaining to sustainable development to help transfer good practices and lessons learned from project design and implementation. This is the fifth in a series that includes topics on:

- Water Resources Management
- Transboundary Aquifers
- Biodiversity Conservation
- Trade and Economic Integration
- Natural Hazard Mitigation

Policy Reform for Sustainable Energy in Latin America and the Caribbean

INTRODUCTION

Reliable and affordable energy services are essential to the modern world. Secure access to these services and the stability of their prices are key concerns for policymakers worldwide. For countries that are predominantly dependant on imported fossil fuels for their electricity generation, there are many associated long term risks in this regard, including the potential economic disruptions due to petroleum prices volatility, the vulnerability of fuel shipping and storage systems to terrorism and climate change impacts (i.e. increased strength and propensity of hurricanes), and negative environmental impacts associated with fuel combustion. However, there exist viable alternatives to the current patterns of fossil fuel consumption. Modern renewable energy technologies have seen dramatic decreases in costs, coupled with increased efficiency and reliability over the past two decades. The tables below illustrate the cost reductions that have been achieved since 1980 and offers projections for further reductions through 2020.



Abundant renewable resources, including solar, wind, geothermal, biomass, and hydro may be found throughout Latin America and the Caribbean offering many countries of the region the possibility to utilize domestic natural resources for the production of clean electricity. In fact, renewable energy technologies can help meet the surging growth in electric power



demand - both on and off-grid - throughout the region. Additionally, when coupled with the implementation of energy efficiency improvements significant reductions in fossil fuel use for power generation can be achieved.

BENEFITS OF RENEWABLE ENERGY

Large-scale renewable energy systems, such as wind farms, biomass electricity, hydropower, and geothermal, offer considerable economic, environmental, and energy security benefits that may be considered by policymakers when considering reforms that will diversify the electricity generation portfolio. These benefits include:

- Long-term competitive price stability
- Reduced vulnerability to fuel supply disruptions
- Flexibility to delivery distributed and household energy to peri-urban and rural populations
- Minimal emissions of greenhouse gases - climate change
- Minimal local pollutants - including air and water emissions
- Attracts investment for domestic infrastructure projects
- High tech job creation
- Many systems are modular and can be expanded as demand grows

Despite the technological advancements of sustainable energy technologies and the growing concerns for energy security and the global environment, widespread use of renewable energy systems for power generation and substantial energy efficiency measures in Latin America and the Caribbean is not expected without key changes in energy markets. Utility investment decisions regarding grid-tied power and off-grid energy services are largely driven by rate of return expectations for private power projects. Financial arrangements for electricity utilities favor low upfront costs and continued fuel costs (fossil fuel) over high upfront costs and low fuel costs (renewable energy). The same reticence to high up-front costs is hindering the widespread deployment of energy efficiency technologies.

In addition to the basic structure of the market, other factors may favor conventional fossil fuel power systems including:

- Fuel subsidies offered by many countries
- Fuel storage and delivery infrastructure costs born by the public
- Petroleum exploration tax (and other economic) incentives
- Availability of low cost project finance
- The absence of charges for environmental impacts



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- Widespread knowledge and general familiarity of conventional technologies

However, with minor changes to the electricity market through policy reform, modern renewable energy and energy efficiency technologies can compete with conventional fossil-fueled generation, offering long-term price stability (given their independence from fossil fuel price fluctuations) along with other benefits as important contributors to well diversified and far-reaching energy portfolios. This paper argues that targeted policy reforms will appreciably improve the competitiveness of renewables vis-à-vis conventional fossil fuel powered systems throughout the region. These same policy reforms will considerably improve the efficiency of the system, resulting in lower fuel costs and a more reliable system.



ELECTRICITY MARKET CHALLENGES

A general lack of appropriate policies is the principle bottleneck now impeding the rapid diffusion of renewable energy and energy efficiency technologies in Latin America and the Caribbean. Many of the electric power markets in the hemisphere have moved toward deregulated, market-oriented structures. Over the past three decades, many countries have converted their state-owned monopolies into privatized systems.

In Central and South America, many of these are unbundled (separated generation, transmission, and distribution entities) competitive markets. These competitive markets place great emphasis on short-term

“spot market” prices, and place a premium on existing generation and new generation investments that have very short construction lead times and low initial capital costs. Thus, alternative energy systems, such as renewables are inherently disadvantaged by the structure of the electricity market. In such markets, the state has largely removed itself from the electricity business and private companies compete for market share, such that this model does not tend to encourage aggressive electrification programs in rural areas where profits are hard to generate, leaving many Latin American citizens without access to modern energy services (it is estimated that 14% of the population in Latin America lacks access to electricity).

In contrast, throughout the English-speaking Caribbean the dominant model involves privately held monopolies that control all market segments, including generation, transmission and distribution. In the case of many Caribbean countries, the prospects for a competitive, unbundled private market is not practical given the relatively small power requirements. Yet, the policies governing the private monopolies are no more favorable for renewables than the competitive markets in Latin America. In many cases these monopolies benefit from fixed rates of return based as a percentage of total revenue, so there is little incentive to increase efficiency, reduce costs, or take on new risks.

POLICIES TO ENCOURAGE THE DEVELOPMENT AND USE OF GRID-TIED RENEWABLE ENERGY SYSTEMS AND ENERGY EFFICIENCY TECHNOLOGIES

When policymakers set out to alter energy market conditions, a first step involves articulating clear goals and objectives for the sector. A national plan may outline the general direction and identify the areas of the market where policy initiatives should focus. With the support of the Renewable Energy in the Americas (REIA) initiative in the General Secretariat of the Organization of American States (GS/OAS), the

BOX 1. SAINT LUCIA ADOPTS SUSTAINABLE ENERGY PLAN

St Lucia is looking to become a Sustainable Energy Demonstration Country within the coming decade. With this objective in mind, Cabinet has endorsed a Sustainable Energy Plan, which outlines a management strategy that seeks to promote energy conservation and efficiency. It was prepared by the Sustainable Development Unit of the Ministry of Planning. The plan seeks to ensure the existence of adequate energy supplies to sustain economic development, while meeting current and projected power demand; provide for stable and reliable electricity supplies for all customers; enhance the security of energy supply and use for all sectors of the economy; and protect the local and global environment by maximizing the use of renewable energy and energy efficiency alternatives where viable, thereby enabling St Lucia to become a Sustainable Energy Demonstration Country by 2008-2012 in accordance with its announcement made at the Fifth Meeting of the Conference of Parties of the United Nations Framework Convention on Climate Change.

According to Judith Ephraim, Professional Cadet with the Sustainable Development Unit of the Ministry of Planning, energy sustainability entails a change in attitude and behavioral patterns at every level of St Lucian society and major shifts in public policy.

She explained: “Energy sustainability will satisfy the growing demand for energy and bring about other economic and environmental benefits. Exploitation of our indigenous sources of energy will provide insulation from volatile oil price fluctuations and reduce the amount of foreign exchange being spent on fuel imports.”

“Effective management of the energy sector will ultimately result in a reduction in local energy costs, a change that will be welcomed by all St. Lucians,” Ephraim added.

Government sees substantial environmental and economic benefits for St Lucia resulting from sustainable energy development, especially if it involves an environment-friendly indigenous fuel source.

PRESS RELEASE: Saint Lucia Government Information Service

BOX 2. BRAZIL: PROINFA - ALTERNATIVE ELECTRICITY SOURCES PROGRAM

In April 2002, the Brazilian government passed Law 10.438 (or Proinfa). Proinfa is an energy program designed to stimulate development of biomass cogeneration, wind, and small hydro generators by guaranteeing power sale contracts to the first 3300 MW of projects which use these technologies, by December 30, 2006. Under the program, Eletrobrás will buy electricity produced from the different renewable resources under contracts up to 15 years. In July 2003, the Brazilian Ministry of Energy and Mines published preliminary prices for power to be purchased through the Proinfa program.

Government of Saint Lucia prepared and subsequently adopted a National Sustainable Energy Plan (SEP) in 2001. This SEP now serves as the guiding force behind multiple efforts that are transforming the energy portfolio in Saint Lucia [See Text Box 1].

Having established its goals and objectives, decision makers can identify the specific impediments to grid-tied renewable energy development or the implementation of energy efficiency technologies in their country, and set out to design policy tools that seek to overcome these. An obvious first step involves the reduction or removal of incentives for fossil fueled systems. Further, regulatory reforms should be considered to ensure that renewable energy project could feed into the power grids. Further, policy makers may elect to adopt targeted measures that address specific barriers to renewable energy and promote investments in such systems. Several approaches have been implemented throughout the region and the world, which are summarized below:

- **Renewable Portfolio Standard.** This system requires a minimum percentage of renewables to be part of the overall energy supply portfolio. It can be applied to all large suppliers with diverse portfolios, or can be set for the nation (or State) as a whole, and combined with some type of tradable credit system or systems benefit charge (see below) which ensures that all power providers

BOX 3. GUATEMALA: RENEWABLE ENERGY LAW

On October 30, 2003, the Parliament of the Republic of Guatemala approved a law, which creates incentives for power generation from renewable energy systems. The law was prepared by the Ministry of Energy and Mines (MEM) and provides economic and fiscal incentives such as exemption of duty taxes on imports of equipment necessary to build power generation projects using renewable resources, as well as various degrees of tax exemptions for companies and individuals implementing such projects, including a ten-year income tax exemption. This new law is expected to “level the playing field” for renewable energy power projects that are competing with developers of fossil fuel-based projects that receive other financial incentives.

share the cost of supporting the renewables portfolio. The recently approved PROINFA Program in Brazil is similar to a portfolio standard in that the law requires/guarantees that the government owned utility - Eletrobras - will purchase a minimum amount of renewables-based electricity by a certain date [See Text Box 2].

- **Systems Benefit Charges.** This system is basically a tax collected from all power services, which goes into a fund to support renewable energy and energy efficiency developments. The U.K has had a variation of this with its competitively bid “Non-Fossil Fuel Obligation” program. The government imposes a levy on all retail electricity sales to help finance renewable energy projects.
- **Exemptions from Taxes.** In an effort to stimulate investments in renewable energy projects, countries may elect to reduce or eliminate certain taxes. Tax exemptions may include income taxes, depreciations allowances, and import taxes. Based on input from private power developers, and with the assistance of the REIA program of the GS/OAS, Guatemala approved a comprehensive Renewable Energy Incentives Law in 2003 [See Text Box 3].
- **Exemptions from systems charges.** This approach allows renewable providers to be exempt from many of the systems charges that conventional power generators must pay. These can include considering renewables as load-reduction technologies, and exempting them from general kWh surcharges.
- **Renewable Energy Resource Laws.** Using natural renewable resources to generate electricity requires specific legislation that governs their use. For example, experience has shown that tapping geothermal resources for power generation is more successful when governed by a geothermal resources law, than under generic minerals or water acts. Geothermal resource laws such as those in Peru, Guatemala, El Salvador and Nicaragua address matters such as drilling rights, resource concessions, and environmental protection that is unique to the industry. The same can be demonstrated for hydropower, wind, and biomass. The GS/OAS is currently working with the governments of Dominica, Saint Kitts and Nevis and Saint Lucia to prepare geothermal resource development laws for each country.

Countries need long-term energy solutions, and in order to obtain these they may elect to design policies that create a market, which is receptive to the needs of long-term investments such as renewable technologies. Several approaches have been presented here, and there are many other options available. For a comprehensive discussion on the development of Renewable Energy Policies, see the Renewable Energy Policy Manual, on the REIA website at: http://www.oas.org/reia/english/Documents/RE_policy_manual.htm.

POLICIES FOR OFF-GRID RENEWABLE ENERGY

There are many factors that can contribute to growth and quality of life improvements in rural areas, but electrification is certainly a key component. Reliable electricity can contribute to improvements in key sectors including

- health care (vaccine refrigeration, lighting, water heating)
- education (TV/VCR and computers, lighting, tape players)
- economic opportunities (small business development, agricultural applications)
- municipal water (water treatment, water pumping)
- residential (lighting, TV, small appliances, computers)