

ENERGY AND POVERTY IN LATIN AMERICA AND THE CARIBBEAN

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Executive Summary

The countries of Latin America and the Caribbean (LAC) are developing domestic initiatives to promote the achievement of the Millennium Development Goals (MDG), taking energy as an essential ingredient that has a direct effect in the living conditions of all populations, especially those situated in rural and urban-marginal areas.

However, according to estimates of the Economic Commission for Latin America and the Caribbean (2005), 40.6% of the Latin American population lives under conditions of poverty, while 16.8% are in extreme poverty. These percentages mean that 213 million persons in poverty and 88 million in extreme poverty, which is why the efforts being made by these countries demand the support not only of the international community and its governments, but strategies that will contribute more effectively to reaching the desired outcomes.

Accordingly, we attribute special importance to the role that energy can play in seeking to achieve these goals, through implementation of domestic programs to develop sustainable energy systems, along with enhancements in governance and the promotion of energy trade among countries.

With this in mind, this paper puts forward a proposal to increase the contribution of energy to sustainable development and poverty reduction by introducing and putting into practice such concepts as community participation in strategy design, market awareness-building among communities, exchange of information and know-how, taking advantage of the carbon market (CDM), implementing funding measures towards a new development model, and monitoring / accompanying projects.

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1. Latin America, the Caribbean and the Millennium Development Goals

According to the United Nations' 2007 assessment of progress made under the Millennium Development Goals (MDGs) in Latin America and the Caribbean, the region needs to accelerate its extreme poverty alleviation, or it may not meet the goals set for 2015. It should also lower its unemployment rates, enhance its health care for the public, and increase its environmental sustainability.

According to estimates of the Economic Commission for Latin America and the Caribbean (2005), 40.6% of the Latin American population lives under conditions of poverty, while 16.8% are in extreme poverty. These percentages mean 213 million persons in poverty and 88 million in extreme poverty.

As Figure 1 shows, over the past 30 years most countries have made progress in terms of increasing their per capita income. This group of countries includes Argentina, Barbados, Brazil, Chile, Costa Rica, Cuba, Grenada, Mexico, Panama, Dominican Republic, and Uruguay, with Chile in the limelight. There is a second group of countries that have seen growth but at a lower rate, including Colombia, Ecuador, El Salvador, Guatemala, Paraguay, and Peru. A third group of countries has shown no significant growth for this indicator, such as Bolivia, Guyana, Haiti, Honduras, and Jamaica. Finally, one can form a fourth group with a few countries that have recorded decreases in their levels of income, such as Nicaragua, Suriname and Venezuela, the latter having seen the most dramatic drop.

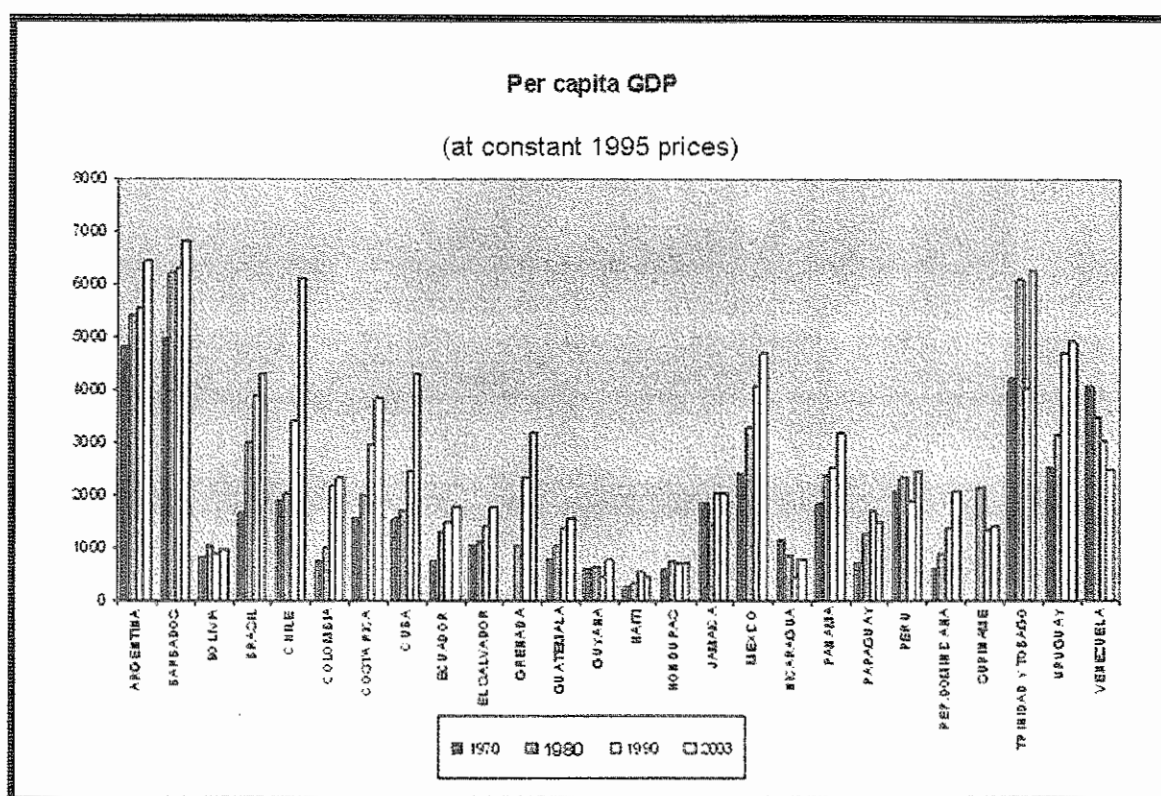


Figure 1. Per capita income in Latin America and the Caribbean

Source: SIEE/ECLAC

Considering the population living on less than two dollars per day as an indicator for analyzing poverty levels in these countries, Figure 2 shows that progress made under this heading was not encouraging. Thus, although some countries made headway in sustainably lowering this percentage, others made small progress and some returned to the situation as it was in the 1970s.

In this regard, three groups of countries are seen: one showing over 50% of the population living on less than two dollars per day, such as Nicaragua, Haiti and El Salvador followed by Bolivia and Honduras with a slightly lower percentage; A second group including Ecuador, Grenada, Guatemala, Mexico, Paraguay, Peru, Suriname, and Venezuela records 25 to 35% of the population; and a third group consists of Argentina, Barbados, Brazil, Chile, Colombia, Costa Rica, Guyana, Jamaica, Panama, Dominican Republic, Trinidad & Tobago, and Uruguay, with less than 20% of the population.

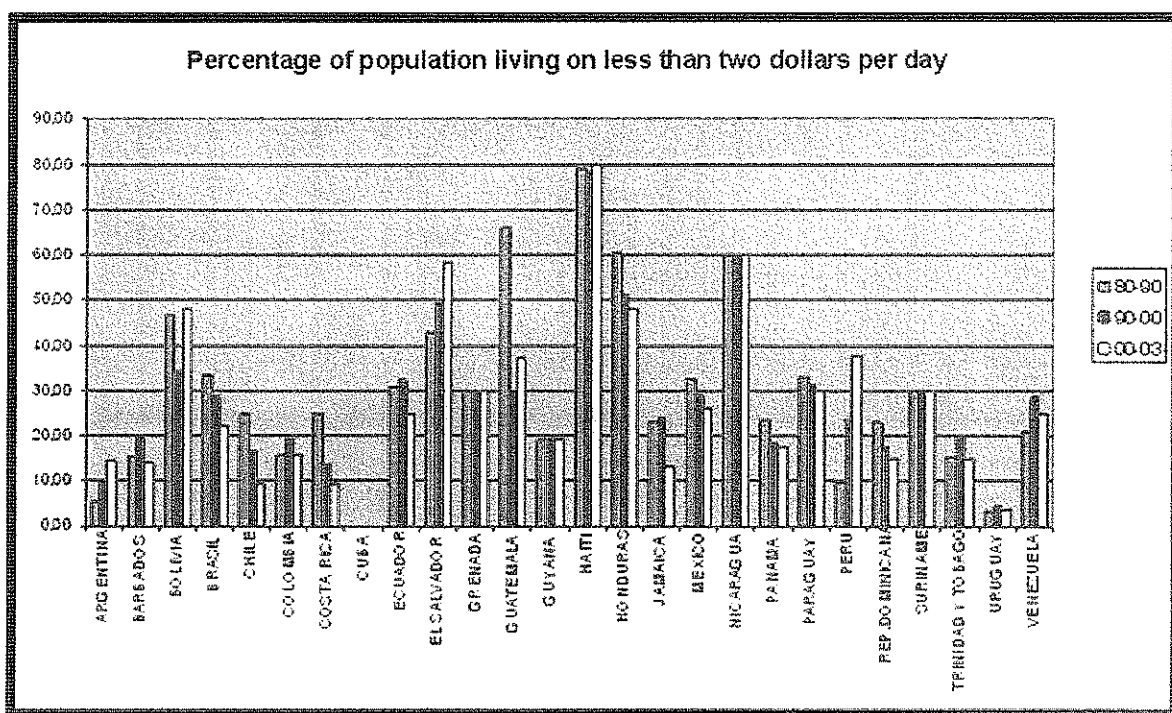


Figure 2. Poverty in the region

Source: World Bank social statistics

With this diagnostic, these countries have been developing domestic initiatives to promote the achievement of these goals, taking energy as an essential ingredient that has a direct effect on enhancing the people's living conditions, especially populations in rural and urban-marginal areas.

Most of the countries in the region have ongoing projects aimed to expand their power utilities and to provide modern energy sources for project implementation. Nevertheless, the efforts being made by Latin American and Caribbean countries require support from international cooperation agencies, being initiatives that demand a broad economic base that goes beyond the funds available to local governments, which are solely responsible for supplying energy to their populations.

As seen in Figure 3, progress in increasing energy access in the region has been considerable, particularly after the structural reforms (during the 90s and over the past five years), when most countries put specific provisions in their power sector laws to supply economic resources for expanding power utility coverages. Only 3 countries in the region (Haiti, Nicaragua and Suriname) are the ones remaining below the mean coverage (60%) for the world's developing countries.

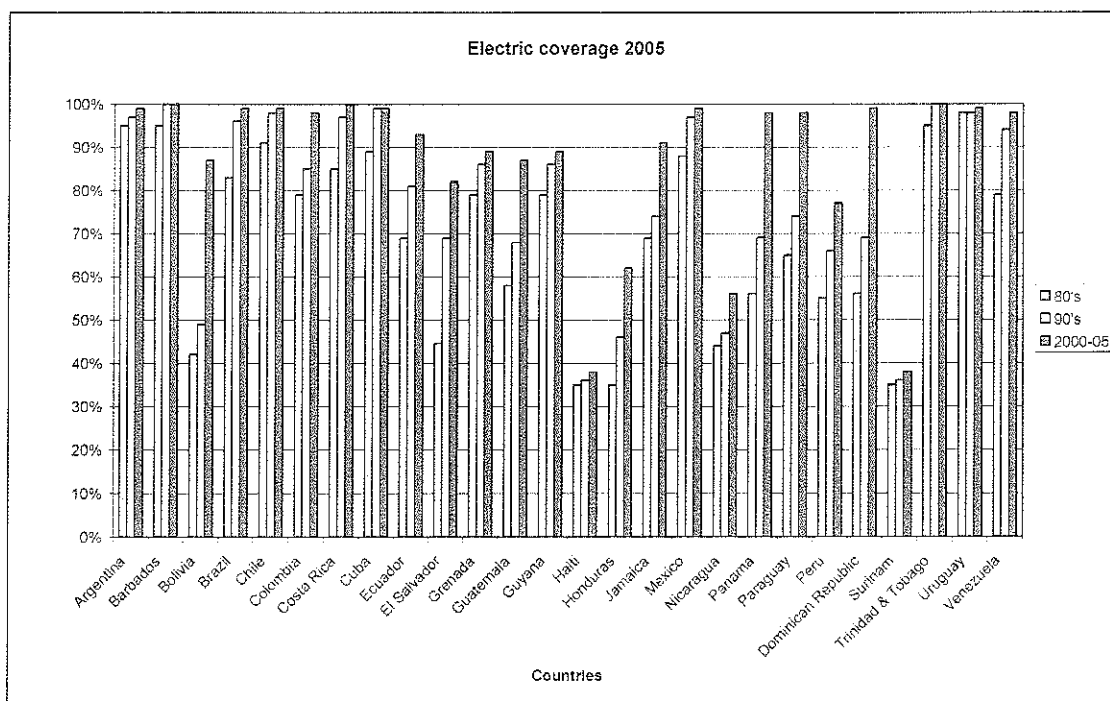


Figure 3. Evolution of domestic electric power coverage

However, the outlook is less optimistic for the rural areas of the region, which is where the greatest poverty is usually concentrated. The countries with the largest urban / rural differentials are Bolivia (50%), Brazil (25%), Colombia (30%), El Salvador (30%), Panama (40%), Peru (50%), and Dominican Republic (18%) (see figure 4).

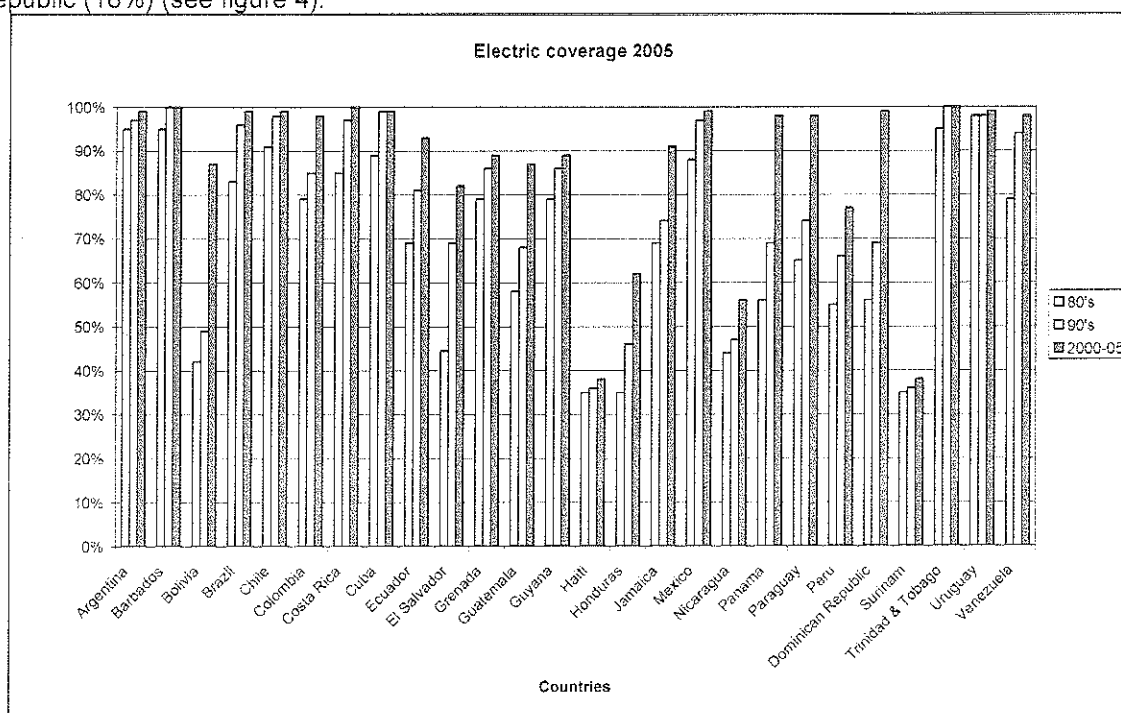


Figure 4. Urban / rural electric power coverage

Finally, firewood is primary energy source that is widely used in the region's rural areas, where farmers depend on this resource for cooking and craft production, with a 5.8% share of the regional consumption. This situation is heightened in Central America, where firewood has a 35.9% share of all energy consumption. Some countries in the region are even having supply problems due to deterioration of forest masses, as is the case in Haiti, El Salvador, Dominican Republic, and Nicaragua. Nevertheless, we should point out that the use of firewood for cooking is not the factor responsible for deforestation in these countries.

In countries with the highest firewood use for energy, the role women play in collection and use is fundamental, making them the most heavily affected in terms of the time spent and health problems inherent in cooking. This reality highlights the need to enhance the efficiency of using this energy source and expanding the penetration of modern energy products in rural sectors of the region.

2. Energy Sector Governance in the Region

During the nineties, all countries of Latin America and the Caribbean introduced structural reforms in their energy sectors, opening them up to private investments. In most countries of the region, the State retained policymaking and regulatory functions, while the private sector became responsible for investments and operations in the industry.

Under this arrangement, the private sector demands an environment of lower investment risks through a clear regulatory framework with stable legal security. In some cases this has not been achieved, the result being a limit on the new investments needed.

On the other hand, the new structure reduced the State's presence to the point of leaving it without the tools required to fulfil its responsibility for domestic energy supply, under the notion that the market would resolve all contingencies.

Presently, most countries of the region have opted for setting up a freely competitive energy market, but a dearth of investments is leaving several countries with supply deficits, thus putting their energy security at risk.

Therefore, it is necessary to balance private sector and State functions, having energy planning as a State tool for defining energy policies to guarantee the country's energy supply.

3. Integration as a tool for expanding energy services

Latin America and the Caribbean (LAC) have abundant energy resources that are used for domestic supply and for export. However, distribution is not uniform among countries and sub-regions. Energy resources per sub-region are summarized in Figure 5.

It is important to point out that in the Southern Cone countries, reserve / production ratios average around 10 to 20 years for oil, 20 to 40 years for natural gas, and over 50 years for coal.

In the case of the Andean Region countries, the ratio is 10 to 30 years for oil, except in Venezuela, and over 50 years for both natural gas and coal.

In the Caribbean, the supply forecast is an average of 5 to 15 years for oil and over 20 years for gas, excluding Trinidad & Tobago. In Mexico's case, the ratio is over 50 years for oil and 20 years for natural gas.

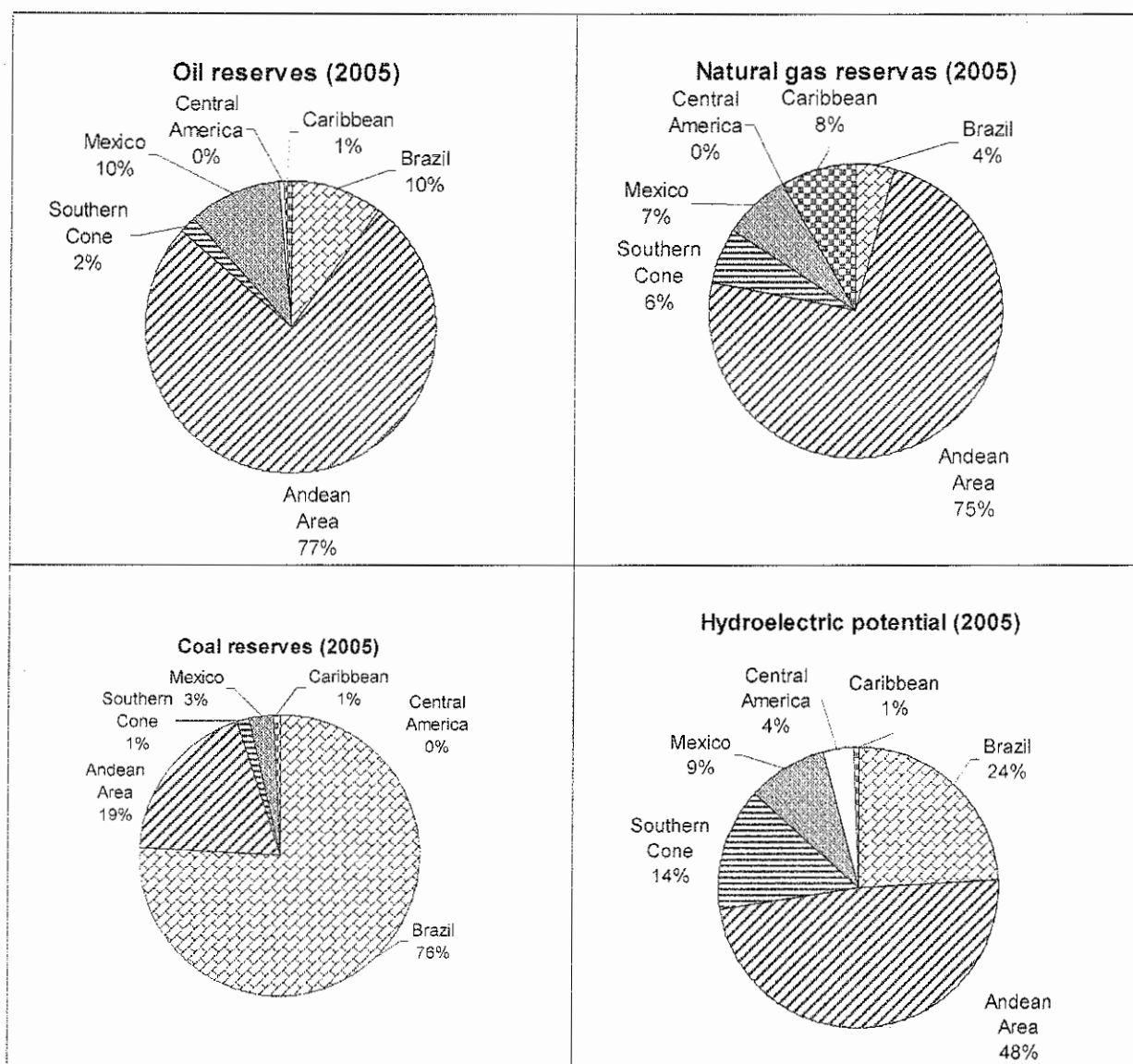


Figure 5. Energy Resources

Source: SIEE / OLADE

In the case of energy sources for generation, the most sensitive sector in terms of supply, most of the region's countries have a high concentration of hydropower sources for generation. Fifteen of all the countries are over 40% dependent on this source of energy. This group includes Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Haiti, Honduras, Jamaica, Panama, Paraguay, Peru, Uruguay, and Venezuela. In a second group are those whose concentration (over 40%) is in natural gas. This group includes Argentina, Barbados, Chile, and Trinidad & Tobago.

As for coal use, Guatemala and the Dominican Republic are over 40% dependent on this energy source.

With regard to dependency on other sources for generation, countries such as Costa Rica, El Salvador and Nicaragua depend on geothermal energy by over 40%.

On the other hand, it is interesting to see the changes in the energy mix over the past 10 years in countries like Chile, which went from depending on hydropower and coal to natural gas. Also in the case of Costa Rica, El Salvador and Nicaragua, a percentage of geothermal energy was replaced by hydropower. In the case of Cuba, domestic oil production grew. Finally, cases that are of interest to comment on are: a) Mexico, which has a diverse energy matrix in terms of sources for generation, with an average share of 30% for each source; b) Costa Rica, which uses a high percentage of renewables for generation (about 90%); and c) Brazil, where renewables account for 45% of the energy matrix and 89% of all power generation.

Despite the fact that the region has major fossil fuel producers, price variations for these energy sources have severe repercussions on most countries' economies. It is necessary to adopt mechanisms to alleviate that pressure and attend to the growing domestic demand.

One of these mechanisms is to promote the trade of energy surpluses that some countries of each sub-region have. The region already has experience in this through the use of bi-national hydroelectric plants, the gas pipelines in MERCOSUR, and the electric interconnections in Central America and the Andean Community.

Although Latin American energy integration has seen much progress, there are still many opportunities to take, both in the power sector and the natural gas industry. With regard to electric integration, the region has used only about 21% of its hydroelectric potential, and for renewable energy sources, the utilized potential is barely 4.2 %. To integrate electrically, Latin America needs to implement at least 17 projects, requiring an investment of around 1,250 million dollars to save 1,000 million dollars per year, which in 15 years would mean 15 billion dollars. As for gas integration, a high integration scenario would mean a savings of 90 billion by year 2018.

The benefits are clear, but more political understanding is needed to hasten and deepen the process, as well as the essential private capital contributions.

4. Poverty Reduction through Access to Energy

For the poorest communities of LAC, access to quality modern energy means multiple opportunities to overcome poverty, such as freeing women, both adults and youth, from the weight of gathering biomass and carrying water to their homes. In addition, improved stoves with chimneys prevent polluting the indoors of their dwellings, thus reducing disease for all inhabitants. The region has several initiatives with this orientation, also including lighting with modern energy to facilitate studying at night, increasing production activities, and improving communications. In this regard, aside from covering basic needs, the possibility of increasing productive applications has meant enhanced living conditions by using machinery for farm work and for processing produce, bringing better prices on the market.

On the other hand, part of the royalties and taxes on oil and natural gas production that are received by certain oil & gas-producing countries has served to attend to the most urgent needs of the less favoured sectors of the population, enabling energy to contribute to an even broader social milieu than through its direct effects, thus helping to achieve the Millennium Development Goals.

The strategies for rural energy plans are usually designed by the national entities in charge of the sector. Most do not take into account the needs or realities of potential users (traditional "up-down" planning). In remote areas, inhabited by populations with scarce economic resources, the need for power utilities are not a priority as they have problems obtaining basic services and developing productive resources, due to a lack of funding.

Since extending existing networks to disperse rural areas either is not possible or requires enormous investments, some opt for setting up isolated systems, usually around diesel generators or using renewable resources such as hydropower, biomass, wind, or solar energy. In this regard, most countries of LAC have implemented rural electrification projects using renewable energy sources, with subsidies for equipment or through donations.

Rural electrification utilizes various procedures to finance new works, including: Making it mandatory as a part of distribution licenses, subsidy for investments, subsidies on tariffs, crossed subsidies, subsidies on renewable energy sources, and donating renewable energy equipment, among others.

Despite efforts to broaden power utility coverage regionally, a few factors remain that limit further development, particularly the following:

- Insufficient financial resources: Most communities yet to be energized are located in hard-to-reach or dispersed areas, so electric services come mostly from renewable systems at high costs for the purchasing power of those communities.

- Lack of awareness among authorities and the people: There is a lack of knowledge about the advantages of renewable energy with regard to environmental protection and non-dependence on conventional fuels, which are hard to transport and costly.
- Lack of local technical support: There has been no promotion of training for technical personnel, nor availability of spare parts for technologies used.
- Dependency on a welfare approach: There is a general awareness among poor communities, particularly in remote areas, that the State is obliged to supply electricity free of charge.
- Imposition of decisions: In general, rural electrification projects are designed around a specific technology without consulting the population.
- Limited women's participation: In remote areas, women are responsible for household activities and supplying energy and water, making it essential to involve them in supply decisions.

In the light of this situation, it is deemed appropriate for the expansion of people's access to modern energy systems to contemplate an integrated development model that seeks to enhance their overall living conditions.

This new model as proposed should be structured around the following components:

a) Community participation in strategy design:

Rural populations should actively participate in designing their energy supply programs, so that their situation will be the basis for decision making. Projects to be developed should be chosen by the population taking their priorities into account, not coming in with projects and technologies that are alien to their interests, but placing energy at the service of production projects that contribute to development and support the establishment of basic service infrastructure.

b) Market awareness-building:

The people should value the services they receive, due both to their own contributions and the new production opportunities offered by modern energy, which enables them to generate income and pay gladly for the service.

Thus, a business environment should be created in communities without economic resources, using State and international cooperation resources as "seed capital" which should help communities meet the priority needs they themselves establish through the participatory mechanisms used through applying the concept of participation.

This capital would be delivered to a legal entity formed by the population, which we will call the Community or Rural Enterprise, to administer and finance the selected projects to generate income for the population. This Community Enterprise should have a business vision to manage the projects and the capital, and receive sufficient technical training to assume responsibility for technical operation and equipment maintenance.

Under this arrangement, the systems or project components will not be delivered free of charge to each beneficiary, but each one should commit to paying a periodic quota to be set in accordance with their ability to pay, taking into account the new income deriving from the projects to be executed, as payment for the service. These payments should be allocated to replace invested capital, pay operation and maintenance costs, and a percentage to cover overhead.

Under this modality, the purpose of the Community Enterprise would be to recover the capital in order to expand their projects or develop new initiatives in the future.

A second modality, to be defined by the people, consists of paying a "tariff" to cover operation and maintenance costs, plus a percentage for project overhead. In this case, the Community Enterprise will only use the seed capital to execute the projects that are agreed upon, and it will end following project implementation.

This system requires that governments have the political will and that communities take ownership of the projects and accept to face a new challenge using energy as their main tool. However, it requires sustained support of the sector involved in these projects, in order to change the welfare approach to participatory community management based on assuming responsibility for the

community enterprise and conceiving projects as business units in which the population manages its own company.

c) Information exchange:

Another important activity is to achieve a level understanding among communities and project developers through an exchange of knowledge and culture aimed to handle the basic concepts of rural development, energy supply systems, natural resources used to generate energy, women's participation in community decision-making, and the rights and obligations of project beneficiaries. Participatory workshops, group decision-making approaches, awareness of idiosyncrasies – both community and individual–, are among the factors that will help maintain active community cooperation.

The ability to hold a discussion in which the primary actor is a community member, as a goal of reaching a level understanding, is key to this process. The technical team limits its role to facilitating knowledge, moderating discussions, guiding the topics, but not being a part of the discussions nor taking positions or suggesting alternatives. Its role is to induce the decision-making process.

d) Financing required for the new development model:

Most of the programs and projects that are ongoing in the region require specific funds to finance them.

Various experiences developed in the region have shown that appropriate cooperation consists of setting up funding mechanisms that use an entity made up of community representatives that is in charge of administrative seed capital management to finance energy systems.

For example, OLADE has been working with support from the Canadian Cooperation on a regional project, with precisely this focus, being implemented in Bolivia, Guatemala, Guyana, and Paraguay, where poor, remote communities are helped to enhance their living conditions through energy supply for production activities (generating income for the community) and basic infrastructure (education, telecommunications and health). The program is attending to some 250 families in 4 communities and has projects focused on power generation, photovoltaic systems for training centres, household production and lighting, improved wood stoves, and support to process farm produce.

There are various modalities for community enterprise administration, primarily financial management and integrated project management. The first model (financial management) contemplates setting up "revolving funds" and micro-financing bank arrangements, and is only applied in rural sectors with a certain level of purchasing power.

The second model (integrated project management), applicable in poor sectors with limited economic capacity, helps develop community income-generation projects with a percentage allocated to paying for the service. Under this arrangement, the "seed capital" contribution is vital as the driver to implement both production projects and basic infrastructure projects (health, education, water supply, communications). The Community or Rural Enterprise has its initial capital guaranteed and depends on its management to maintain it and make it grow through repayment by the community (of both capital and operating costs) using its new income.

e) Taking advantage of the carbon market:

The Kyoto Protocol established a device to promote green-house gas reductions called the Clean Development Mechanism (CDM), which is binding for industrial countries and makes it possible to implement clean energy projects in developing countries.

This process facilitates trade in emissions avoided through the use of reduced-emissions power generation, renewable energy and energy efficiency.

Latin America and the Caribbean have been participating actively in this market, and by April 2007, 246 renewable energy projects had been approved. This is almost half of all project approved world-wide and avoids emission of 238.6 million tons of de CO₂, thus protecting the global environment (Figure 6).

Renewable energy projects in Latin America and the Caribbean: 251

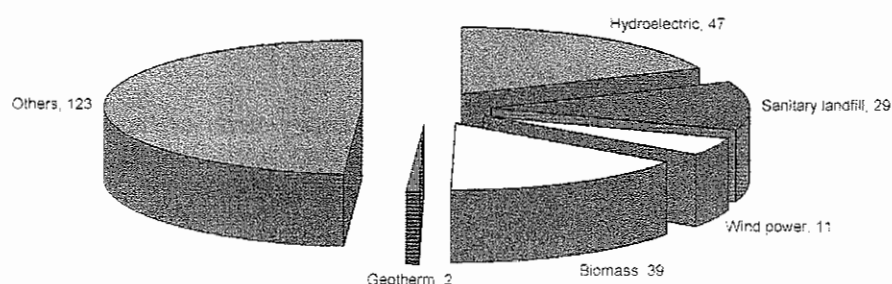


Figure 6. CDM projects for renewable energy

Source: CD4CDM, April 2007

Although much progress has been made in the use of this mechanism, there is a great potential for the region's energy sector to benefit from this market and grow its energy supplies from renewable sources.

f) Follow-up and accompaniment:

In order to ensure that communities take adequate ownership of the project, its technical operation and maintenance, it is necessary to supply sufficient technical support until community enterprises are able to handle this themselves.

The use of these concepts not only makes it possible to overcome the hurdles described above, but also contributes to program sustainability in remote communities, which has not been achieved in several trials carried out in the region.

5. Conclusions

According to estimates of the Economic Commission for Latin America and the Caribbean (2005), 40.6% of the Latin American population lives under conditions of poverty, while 16.8% are in extreme poverty. These percentages mean 213 million persons in poverty and 88 million in extreme poverty.

Likewise, according to the United Nations' 2007 assessment of progress made under the Millennium Development Goals (MDGs) in Latin America and the Caribbean, the region needs to accelerate its extreme poverty alleviation, or it may not meet the goals set for 2015.

With this diagnostic, these countries have been developing domestic initiatives to promote the achievement of these goals, taking energy as an essential ingredient that has a direct effect on enhancing the people's living conditions, especially populations in rural and urban-marginal areas.

Most of the countries in the region have ongoing projects aimed to expand their power services and to provide modern energy sources for project implementation. Nevertheless, the efforts being made by Latin American and Caribbean countries require support from international cooperation agencies, being initiatives that demand a broad economic base that goes beyond the funds available to local governments, which are solely responsible for supplying energy to their populations and developing sustainable energy systems to foster a significant energy contribution to poverty reduction.

Developing sustainable energy systems includes several aspects in order to achieve social, economic and environmental impacts, all at the same time.

As stated above, in order to achieve greater poverty-reduction impacts through energy, we propose introducing and putting into practice such concepts as community participation in designing rural electrification strategies, market awareness-building among communities, exchange of information and know-how, taking advantage of the carbon market (CDM), implementing funding measures for the new development model, and carrying out project follow-up and accompaniment.

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