



**Green Industry**  
for Global Recovery  
and Growth

**GENERAL CONFERENCE** Thirteenth Session  
9 December 2009, Vienna International Centre

## **Round Table**

**REGIONAL PROGRAMME FOR  
LATIN AMERICA AND THE CARIBBEAN**

**Promoting renewable energy  
industry in Latin America and  
the Caribbean:  
enhancing local manufacturing  
capacity – challenges and  
opportunities**

## **Background Paper**



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

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## **I. Introduction**

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The Copenhagen Climate Conference, scheduled to be held between 7 and 18 December 2009, is expected to boost the renewable energy technologies (RET) industry to unprecedented dimensions. Further stringent regulations and multi-billion investments could foster the introduction and development of more economic and efficient technologies. Accordingly, the RET industry promises to become one of the major drivers of the economy and employment generation in the current millennium.

Developed countries and large corporations are already intensively investing in research and development and engaged in establishing a regulatory framework for the introduction of RET. Only a few developing countries have been able to seize emerging opportunities. In Asia, China and India, with a consequent policy and adequate investments, have become key players in the industry and, by 2020, China could be on its way to becoming the largest global player in wind technologies. As regards, Latin America and the Caribbean (LAC), the region has, thus far, been unable to develop a competitive RET industry and, if the necessary policies and measures are not introduced in the medium term, the region risks becoming a mere consumer of technologies and follower of industrial trends. This will mean that jobs, wealth and value-added will remain outside the borders of the region.

The main objectives of the UNIDO LAC Round Table 2009 are to set the stage for discussions to review the challenges faced by the region, and evaluate the measures and

recommendations to reverse the current trend. This issue paper highlights some of the key topics to be assessed.

## **II. The Tailwind for Renewable Energy Technologies**

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The UNIDO LAC Round Table 2009 is being held on the eve of the Copenhagen Climate Conference, which is not only one of the largest, but also the most important international gathering on climate change ever witnessed.

At that Conference, policy makers, business communities and civil society from some 196 countries will be debating and it is hoped that they will reach an agreement on measures to reduce the impact of the current development activities on climate change and steer future industrial development and growth along a sustainable and climate-friendly path.

The world today seems to have realized the challenges and consequences of the fossil fuel-based development and has already been taking measures to encourage the development of renewable energy and low carbon-based industry.

In September 2009, at the meeting of the G-20 in Pittsburgh, world leaders agreed on a proposal made by the United States “to end fossil fuel subsidies in order to switch to greener energy sources in the medium term”.

The Corporate Leaders Group on Climate Change (CLG) - an organization headed by Prince Charles that includes 500 top-tier international companies - is demanding "immediate and deep" emissions control commitments from December's United Nations Conference of Parties (COP-15) in Copenhagen.

Publicly-traded corporate titans, such as Coca-Cola, Royal Dutch Shell, British Petroleum, British Airways and General Electric, have signed a memorandum, referred to as the Copenhagen Communiqué that links actions on emissions with the health of the global economy. This Communiqué bears the signatures of executives of global retailers, for example, Tesco, of the United Kingdom of Great Britain and Northern Ireland, which can spearhead efforts to reduce packaging materials, encourage reuse of shopping bags and make distribution networks more efficient.

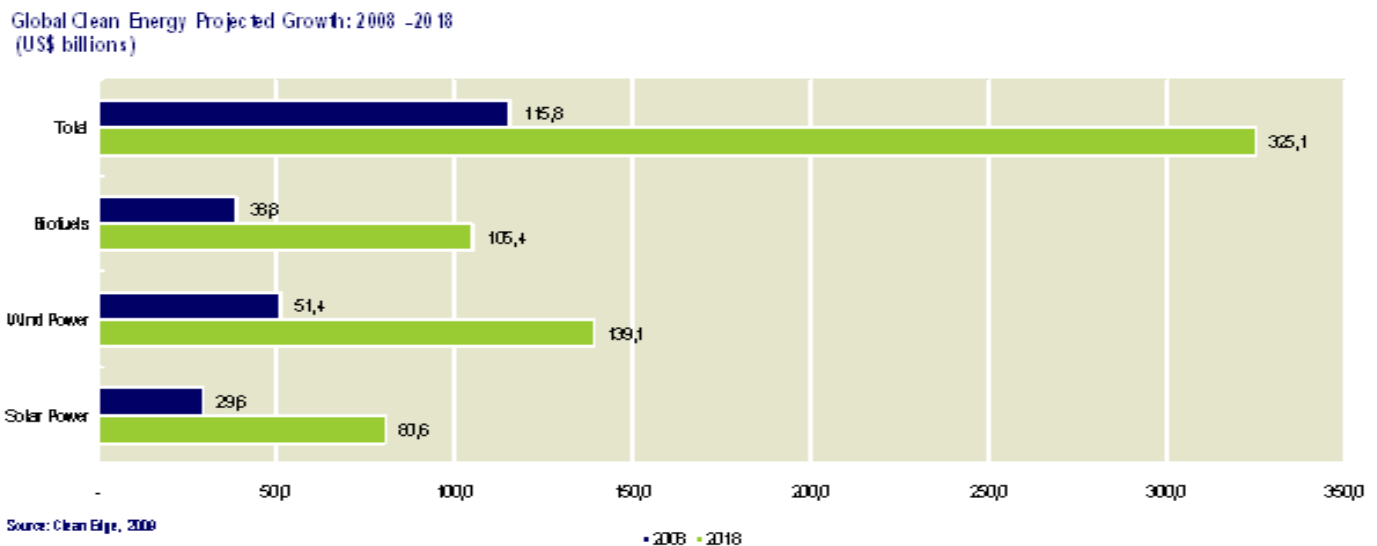
With a United States market capitalization of over \$56 billion, the insurance giant, Allianz, of Germany, is concerned about the heightened underestimated risk posed by rising sea water level and worsening weather events. As lower emissions could mean lower future payouts and higher margins for Allianz, they appear to be in agreement with Prince Charles and the CLG 500.

Due to the declining North Sea production base, oil companies, such as Royal Dutch Shell and British Petroleum, are being forced to switch to wind, solar and other renewable energy sources. British Petroleum has nearly 100 wind energy projects in the United States alone, adding up to 20 gigawatts (GW) of potential output.

On 16 September 2009, investors representing \$13 trillion in assets at the International Investor Forum on Climate Change in New York, issued a joint statement calling for action on climate change. If this trend continues, vast sums can be diverted away from high-risk polluters and companies that do not subscribe to the programme.

Keeping the above in mind, it seems that those attending the Round Table—and the world at large—can expect to witness an unprecedented tailwind for progress in climate change and RET.

**Figure 1. Expected global clean energy projects growth 2008 - 2018**



Source: <http://www.greenchipstocks.com/archives/solar-energy>

### III. The Global Challenges and the Emergence of Asia

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The emerging markets in Asia need to develop a substantial infrastructure. Some claim that this infrastructure is too massive and invasive. Over the past year, energy production from wind has grown faster than coal, nuclear, and even natural gas. The challenge is how to leverage the current communication systems—the essential architecture of the infrastructure that already exists. Another issue arising from this development is how the developing world is preparing itself to actively participate and fully benefit from micro- and micro-economic impacts resulting from the newly emerging industries and investments.

The Asian continent, headed by China and India (figures 2 and 3), has, for instance, already succeeded in utilizing the benefits of the emerging wind energy industry, and is actively pursuing technology transfer programmes, promoting investments and enhancing local manufacturing capacity for the emerging demand for RET in domestic and international markets.

**Figure 2. Development of the wind energy industry in China**

TOTAL INSTALLED CAPACITY									
year	2000	2001	2002	2003	2004	2005	2006	2007	2008
MW	346	402	469	567	764	1,260	2,599	5,910	12,210

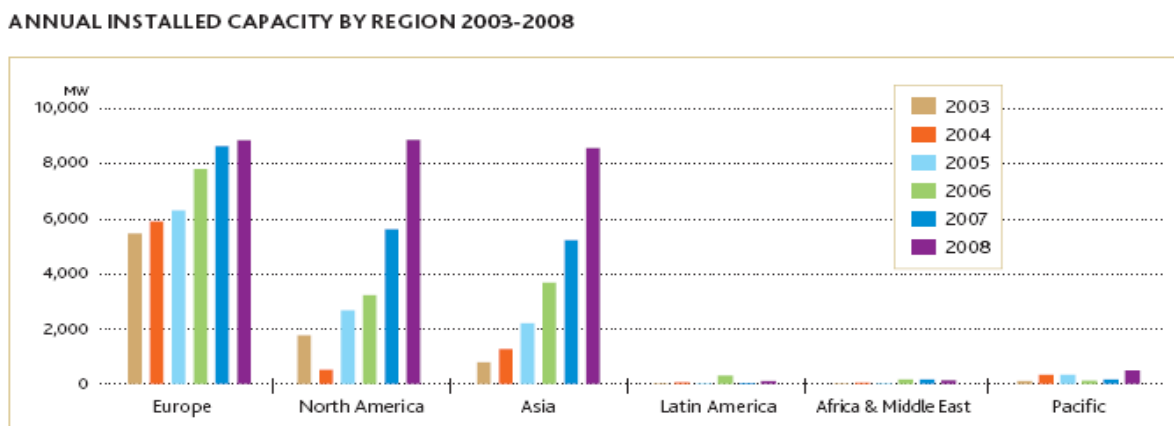
**Figure 3. Development of the wind energy industry in India**

TOTAL INSTALLED CAPACITY									
year	2000	2001	2002	2003	2004	2005	2006	2007	2008
MW	220	1,456	1,702	2,125	3,000	4,430	6,270	7,845	9,645

Source: GWEC – Global Wind 2008 Report, Renewable Energy House, Brussels

In 2008, the Asian region became a key international player in the manufacture and introduction of wind technologies and has overtaken Europe in yearly megawatts (MW) installed. Between 2004 and 2008, the yearly introduction of windmills increased from 1,001 MW (2004) to 8,400 MW (2008), with China and India accounting for 6,300 MW and 1,800 MW respectively.

**Figure 4. Annual installed capacity, by region**



*Source: GWEC – Global Wind 2008 Report, Renewable Energy House, Brussels*

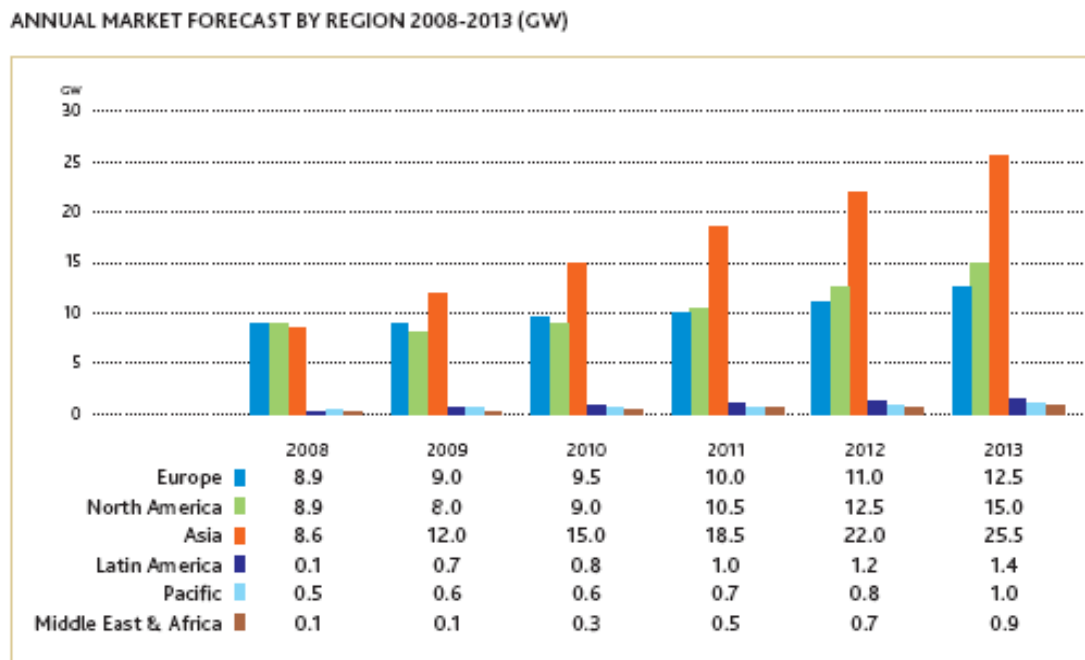
The countries of LAC, however, have only made diffident efforts in the promotion of wind energy and RET, in general, and have failed to reveal similar achievements. In 2008, many Latin American markets were still stagnating. Overall installed capacity (667 MW) in the region accounts for only 0,5 per cent of the global capacity. In the same year, Brazil and Uruguay were the only two countries that installed major wind farms. This slow wind deployment is especially dangerous for the economic and social prospects of the region as people in many LAC countries are already experiencing power shortages and sometimes do



not have any access to modern energy services. In a few countries, such as Argentina, Brazil, Chile, Costa Rica and Mexico, a number of projects are under way—shedding some light on the horizon vis-à-vis the forecast for 2009.

In the field of wind energy, China plans to establish the largest wind turbine cluster in the world. The 10 GW turbine cluster planned for the area around the city of Jiuquan is part of Beijing's \$14.6 billion infusion into wind energy throughout 2010, thus doubling its wind capacity, nationwide. By 2020, China will have 100 GW of its own installed wind capacity in place and connected. This will compare closely with the world's current capacity of 121 GW.

**Figure 5. Annual market forecast, by region**

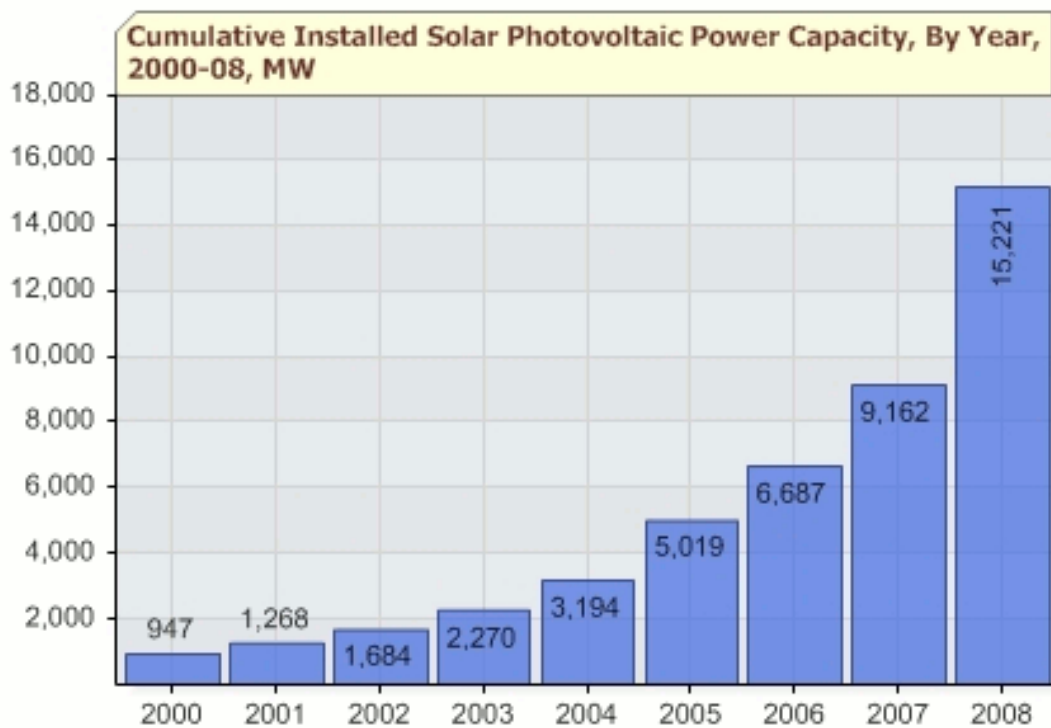


**Figure 5. Annual market forecast by region**

*Source: GWEC – Global Wind 2008 Report, Renewable Energy House, Brussels*

A similar fast-growing scenario has been experienced in world **solar photovoltaic (PV)** production. The global solar industry has grown over 1,500 per cent over the past nine years—from an installed capacity of 947 MW in 2000 to 15,221 MW at the end of 2008.

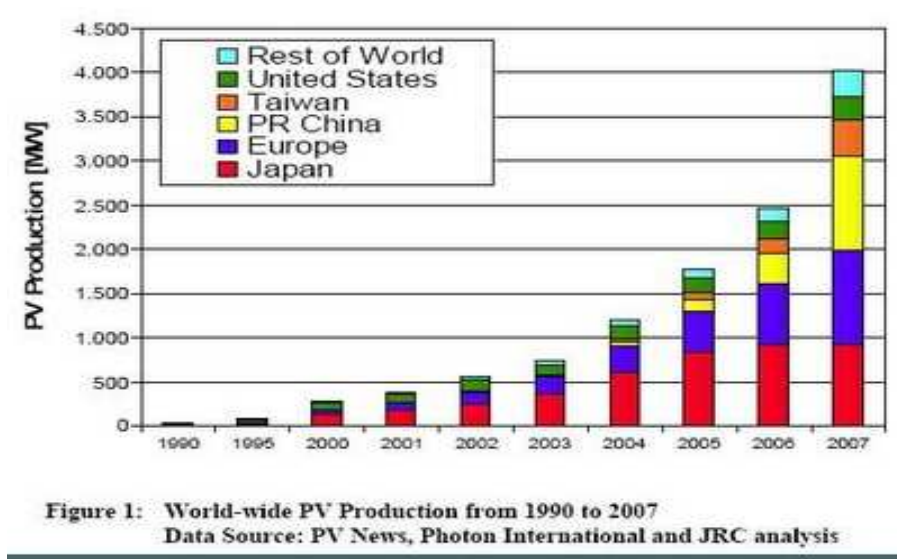
**Figure 6. Growth of world cumulative capacity of PV from 2000 to 2008**



Source: <http://mokkikunta.blogspot.com/2008/12/photovoltaics-status-report-2008-60.html>

Chinese manufacturers raised their global share from less than 1 per cent in 2004 to 20 per cent in 2006 and to 35 per cent in 2007. Japanese producers, for their part, continued to lose ground, accounting for only 26 per cent of global production over the same period.

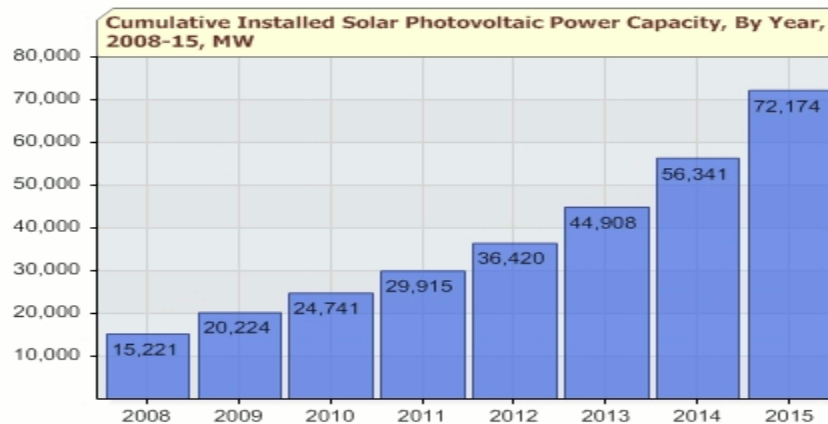
Figure 7. Worldwide PV production from 1990 to 2007



Source: <http://mokkikunta.blogspot.com/2008/12/photovoltaics-status-report-2008-60.html>

Under a conservative growth scenario, the **solar energy industry** is expected to grow by a further 33 per cent by the end of 2009, and by 2015, its growth is expected to reach a phenomenal level—over 374 per cent the 2008 level.

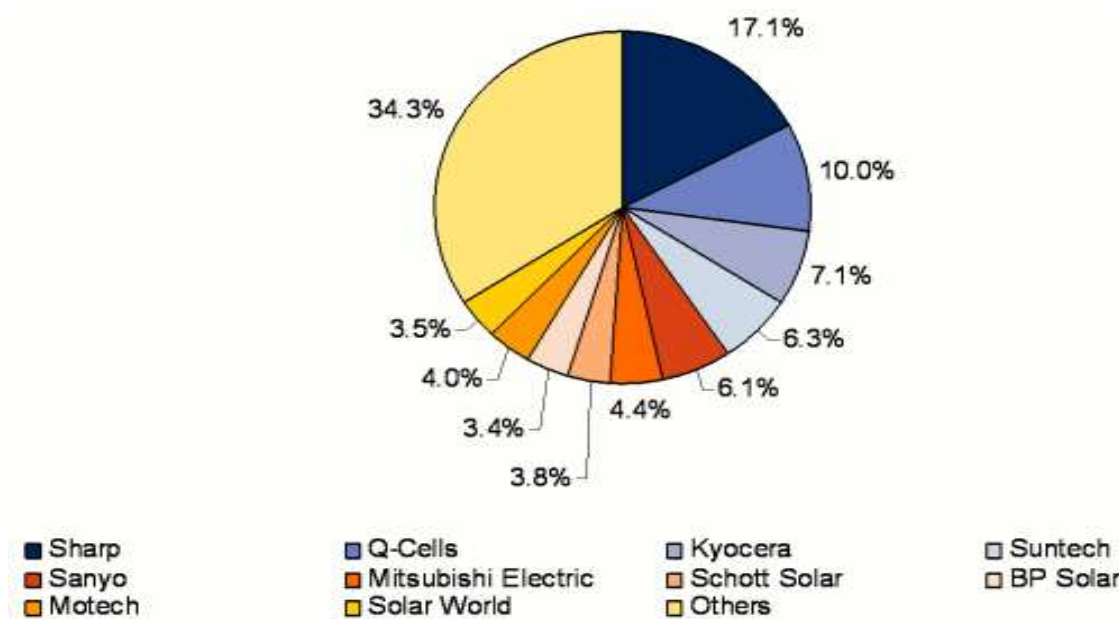
Figure 8. Worldwide PV production growth until 2015



Source: European Commission Joint Research Centre (2008) *Planning and Installing Photovoltaic system*, Earthscan, London, United Kingdom

The key players in the PV industry have already been preparing themselves for **solar industry growth**. Companies in China, Japan and the United States have already positioned themselves and are investing huge amounts in new facilities and development. Figure 9 illustrates the top solar cell producers, by market share, in 2007-2008:

**Figure 9. Market share of top solar cell producers (2008)**



*Source: European Commission Joint Research Centre (2008) Planning and Installing Photovoltaic system, Earthscan, London, United Kingdom*

According to current plans, by 2020, China is expected to have a solar power capacity of 1.8 million KWh.

Unfortunately, not a single country nor company in the LAC region appears in the international scenario. The five countries expected to lead the way in the next five years, along with their estimated cell-production annual growth rate (CAGR), are: France (46.4 per cent); United States (39.3 per cent); China (35.3 per cent); India (34.6 per cent) and Japan (24 per cent).

#### **IV. Emerging Challenges for Latin America and the Caribbean Region**

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The Latin American region is endowed with abundant renewable energy resources, albeit grossly underutilized to date. The main reasons for this are the lack of proper elements for large-scale and sustainable deployment of technologies necessary to tap these resources.

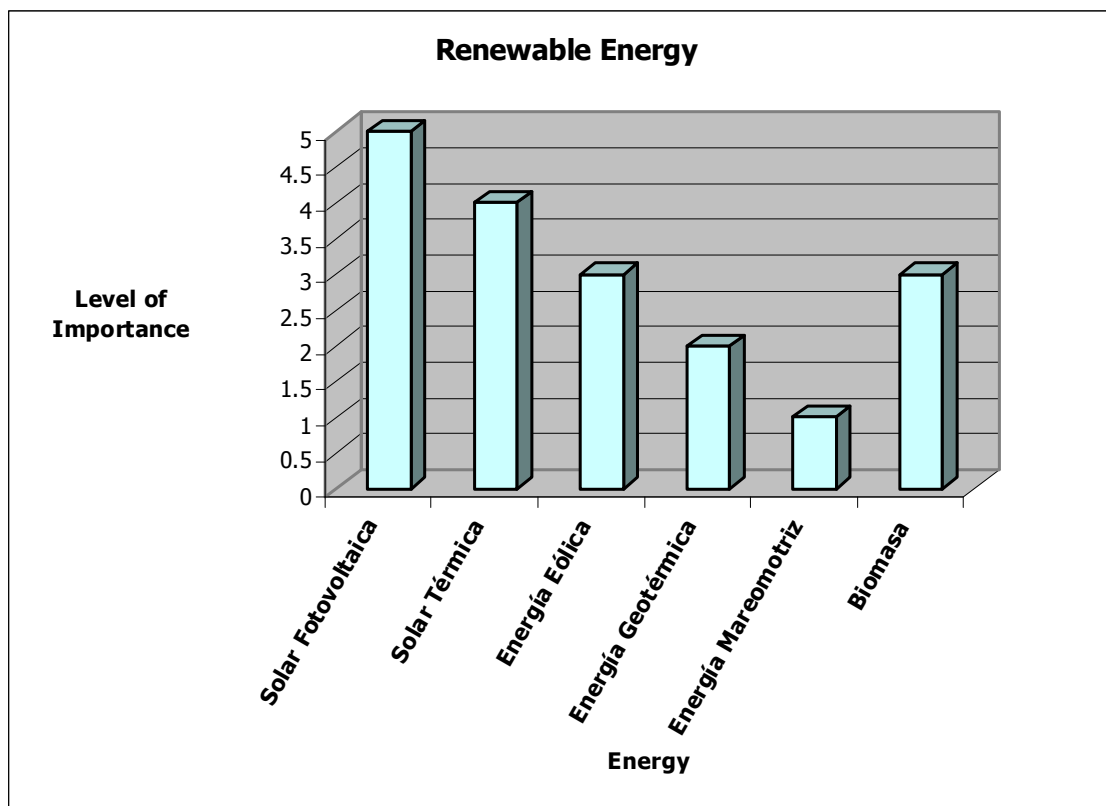
Few countries in the region are actively working to develop policies, institutional settings, financing schemes, industrial infrastructure, human resources and other necessary elements, to facilitate the introduction of renewable energy as part of their energy supply options. Joint activities between two or more countries to achieve this objective are even more difficult to find. Legal, regulatory, institutional and financing schemes to foster and facilitate the use of renewable energy for electricity generation are at different stages of development. Even though common denominators exist among different countries in the region, no integration of renewable energy policies can be observed.

The largest efforts in this respect are being induced by international organizations or bilateral aid agencies through a number of programmes, aimed at identifying and removing the barriers that impede the use of renewable in the region. Results to date have, however, been modest.

In a survey conducted by the UNIDO Regional Programme for LAC, between May and August 2008, ten countries/institutions in the region were consulted, among others, on the

status of RET development in the region. Based on the results, RET were categorized in accordance with their importance to the national economy.

**Figure 10. Ranking the importance of RET in LAC countries**



*Source: UNIDO Regional Latin America and the Caribbean Programme Survey on Renewable Energy in 10 countries of LAC, 2009, Vienna, Austria*

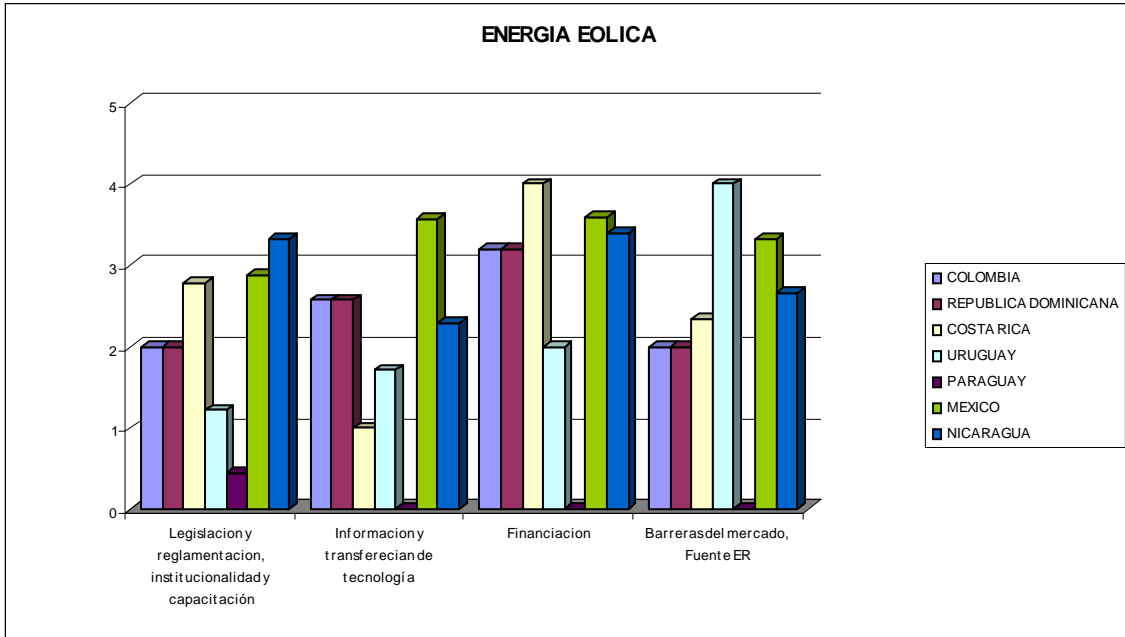
During the survey, further efforts were made to identify the potential constraints and limitations in LAC for the development and introduction of RET. The full-fledged results of the survey will be made available as a background document to the Round Table.

The survey explored, among other issues:

1. Level of local RET production
2. Barriers in terms of legislative framework, domestic infrastructure, technology absorption and transfer, financing and market opportunities
3. Measures to be implemented to enhance the application and introduction of RET, including the need for:
  - developing and promoting of investment projects
  - strengthening national environment policies
  - promoting public policies and regulatory framework
  - implementing measures to combat green house effects
  - introducing financial incentives, financial consultancy services and credit access
  - promoting technology transfer programmes
  - promoting cooperation and networks
  - developing national programmes of energy efficiency

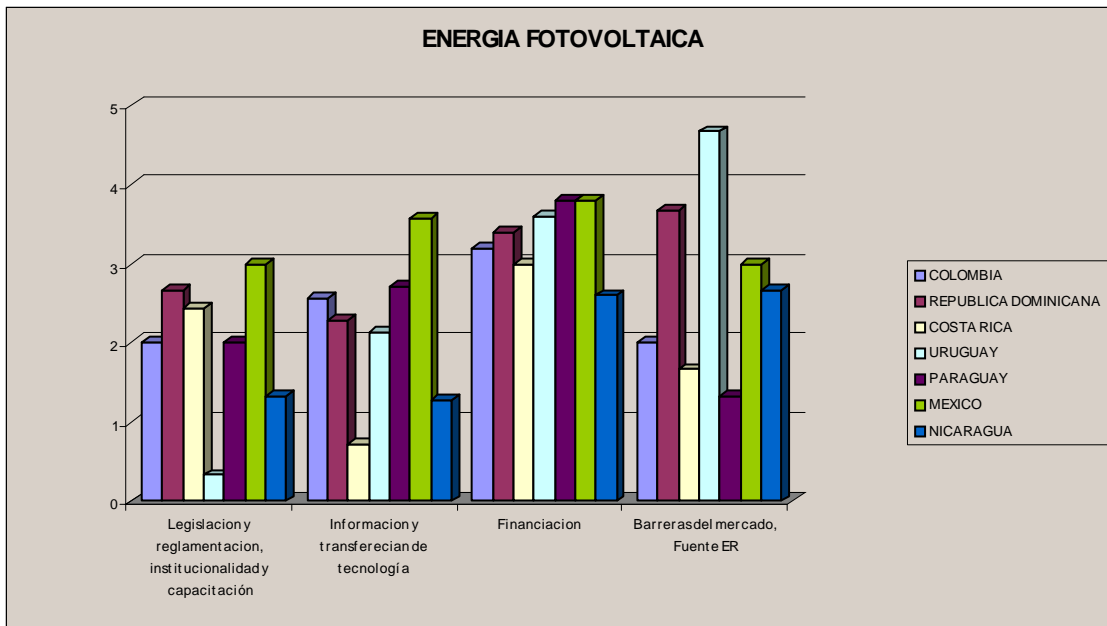
The **barriers and constraints** for the introduction of RET were studied by type of technology and country. It was found that in the three most widespread RET, namely, PV, wind energy and biomass, barriers to financial and market opportunities were perceived as the most important. An extract of the ranks are provided in figures 11 to 13.

**Figure 11. Ranking of barriers faced by LAC countries in the PV sector**



Source: UNIDO Regional Latin America and the Caribbean Programme Survey on Renewable Energy in 10 countries of LAC, 2009, Vienna, Austria

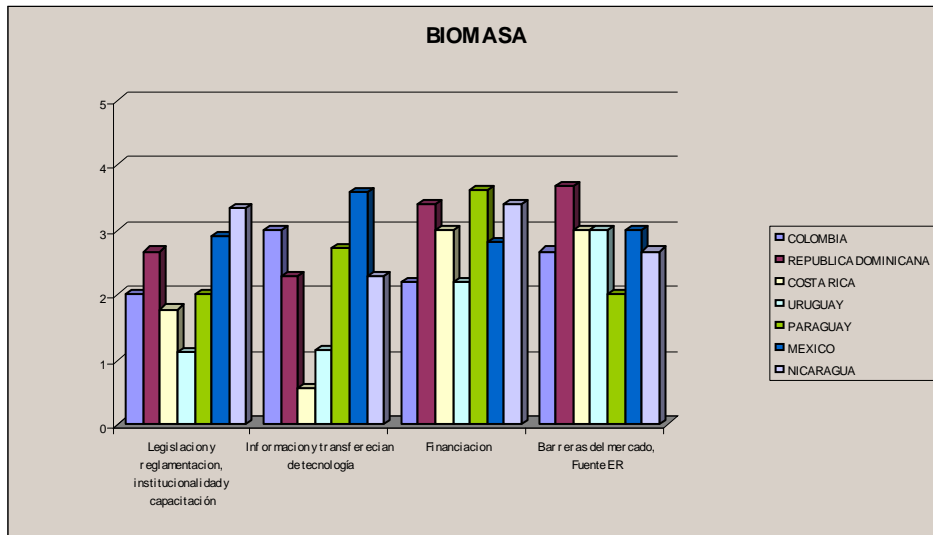
**Figure 12. Ranking of barriers faced by LAC countries in the wind energy sector**



Source: UNIDO Regional Latin America and the Caribbean Programme Survey on Renewable Energy in 10 countries of LAC, 2009, Vienna, Austria



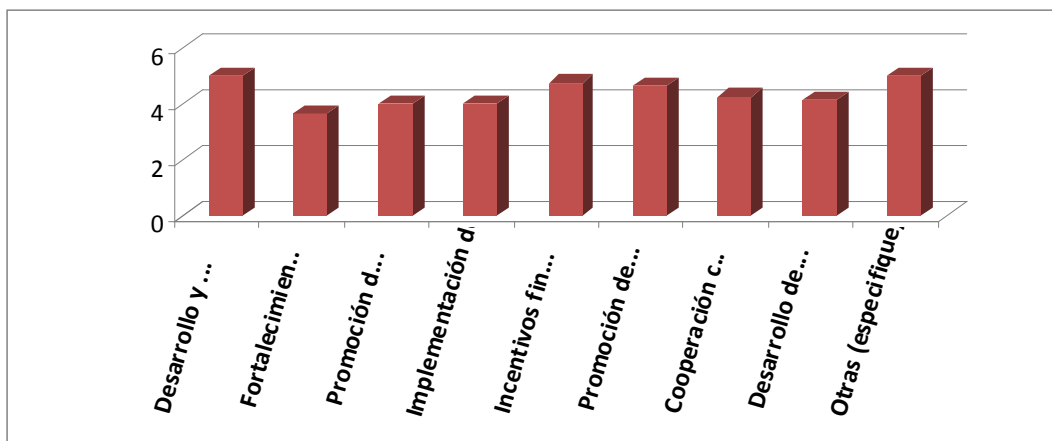
**Figure 13. Ranking of barriers faced by LAC countries in the biomass sector**



Source: UNIDO Regional Latin America and the Caribbean Programme Survey on Renewable Energy in 10 countries of LAC, 2009, Vienna, Austria

The measures to be implemented to improve the position of RET in the region and to promote the regional and domestic manufacturing capacity of the sector were ranked by participants of countries that participated in the survey. The development and promotion of RET projects followed by the promotion of technology transfers programmes resulted as top priority measures to be promoted.

**Figure 14. Ranking of suggested measures to be introduced to enhance the RET industry in LAC**



Source: UNIDO Regional Latin America and the Caribbean Programme Survey on Renewable Energy in 10 countries of LAC, 2009, Vienna, Austria

## V. Summary of issues to be addressed by the Round Table

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The main objectives of the LAC Round Table are to review the challenges that hinder the development of the renewable energy technology manufacturing industry, the replacement of fossil fuels in industrial processes in LAC, and to identify actions needed to overcome these obstacles. In particular, the Round Table should help to explore the following issues:

***Issue 1    How can the regulatory framework be promoted for the development of the renewable energy industry in Latin America?***

Legal, regulatory, institutional and financing schemes to foster and facilitate the use of renewable energy for electricity generation are at different stages of development. Even though common denominators exist among different countries in the region, no integration of renewable energy policies can be observed. The point here is to address the type of mechanism that can be introduced to ensure that the region is able to adopt adequate policies to promote the development of the renewable energy industry.

***Issue 2    How should governments support and stimulate investment into the development of the renewable energy industry across LAC?***

The Asian continent, headed by China and India, has, for instance, already succeeded in utilizing the benefits of the emerging wind energy industry, and is actively pursuing technology transfer programmes, promoting investments and enhancing local manufacturing capacity for the emerging demand of RET by domestic and international markets. Between 2005 and 2008, China and India managed to overtake Europe and United States in the

development of RET. In the field of PV, their influence as global players is growing. The Round Table should deliberate on the right mix of policies, investment promotion incentives and regional activities that LAC should introduce to replicate the development of the Asian region.

***Issue 3      Which should be the financial drivers for RETs?***

Asia and Europe rely on the right mix of public incentives, regional pressure and promotion of private investment in the development of renewable energy. There is a new set of instruments that could be introduced at regional and country levels to promote the nascent renewable energy industry. More importantly the inflow of investment should be encouraged as LAC has been unable to mobilize investment in the RET industry. To this end, the Round Table should briefly review the right mix of instruments to be introduced to promote domestic and international investment in the RET industry. It should also discuss whether these instruments need to be introduced at country, regional, or sub-regional levels.

***Issue 4      How can the emerging technology gap be reduced?***

Asia, Europe and the United States are investing and introducing policies that promote research and development, and are also encouraging technology transfer programmes. Large multinationals are innovating technologically and acquiring patents in this field. The LAC region has, so far, only played a passive observatory role in the technology race of RET and, at best, is becoming a valuable capital goods consumer. There is an urgent need to reverse

this trend and enhance the region's potential to absorb, develop and manufacture RET. The capacity of the region to absorb and develop RET will be enhanced with the creation of regional competence centres that would help to increase awareness and assist local capacities to take advantage of the employment potential that will emerge from the RET industry.

***Issue 5        Where are the biggest opportunities for the sector in the next five years?***

The LAC region is endowed with abundant renewable energy resources, albeit grossly underutilized to date. The main reason for this situation is the lack of proper elements for large-scale and sustainable deployment of the technologies necessary to tap into these resources. The competition for developing RET could increase in the future. Wind energy and PV could become mature industries in the near future, thereby enhancing entry barriers and competition. The LAC region should set priorities and select the right strategy to establish the RET industry. The mobilization of all stakeholders needs to be secured. How this can be attained and in which fields, still need to be identified.

***Issue 6        How should the regional strategy evolve in the next five years in this regard?***

The limited resources of LAC call for prioritization of actions to be taken. The Round Table should reflect on the priorities, in terms of technological and financial resources to be set up, as well as the type of cooperative schemes that would be necessary to leverage the limited resources available in the region.

*Issue 7      What should be the role of UNIDO?*

A closer look will be taken here to find out how UNIDO can support the LAC region in its efforts to set up a competitive RET industry. Specifically, the role of the Organization in promoting supply chains, encouraging technology absorption mechanisms, setting up regional cooperative structures and technology sharing programmes will need to be reviewed, and what can be done to encourage partnerships and private sector ventures to enhance the private sector participation in the development of the RET will have to be discussed. Participants of the Round Table would be expected to provide an insight on the future role of UNIDO in supporting these regional endeavours.

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