Urbanisation, megacities, and energy poverty in Latin America

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According to the United Nations, in 2007, for the first time, the world's population living in urban settlements exceeded that living in rural areas. More than three billion people live in the cities of the world, and five hundred million people live in megacities (of more than ten million inhabitants) or in cities with more than five million inhabitants.

Future population growth will be mainly urban, reaching 60 per cent in 2030, and 70 per cent in 2050, almost twice today's level. By then, the world's population will reach nine billion people, and 98 per cent of population growth will take place in the developing and emerging countries.

This urban transformation will affect the most populated poor regions in a significant way, causing new social stratifications and intensifying the transformation of the world's ecosystem. The rapidly growing use of energy based on fossil fuel and the extensive use of natural resources will imply environmental degradation, making supply of food and water for human consumption more complex.

These demographic and urbanisation phenomena challenge the capacity to produce public goods and services and pose a threat to a healthy environment for the population, an essential condition for sustainable development.

Urbanisation is a complex process that entails a series of material and psychological profits and losses, and gives privileges to certain groups and disadvantages to others.

The World Energy Council (WEC), concerned with the problems related to the Four A's' main goals (Accesibility, Availability, Acceptability and Accountability), recently completed a global study to develop a concept for a secure energy supply and distribution system for large cities based on modern developing technologies, including transportation, in order to ensure a sustainable future. Some of the conclusions of the report *Energy for Megacities* are that according to the map of energy access, based on final energy availability and share of non-commercial energy, as shown in Figure 1, most of the population in the Latin American region belongs to the 'poor' or 'less poor' strata. In particular, the megacities have the potential to increase their per-capita energy consumption from 15-25 GJ/person to 25-75 GJ/person.

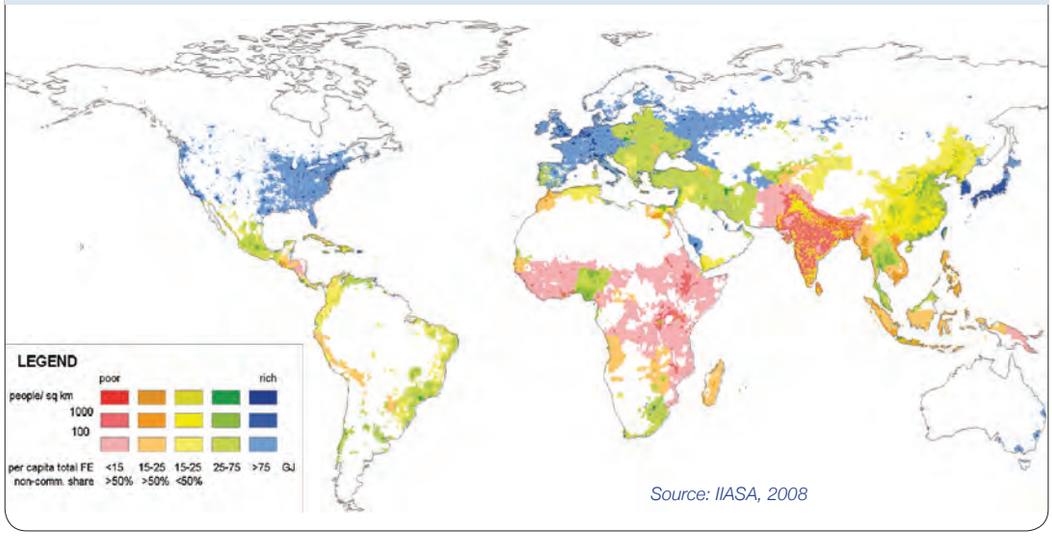
The UN Habitat Study in 2008 estimated that the energy infrastructure investment for halving the slum population of almost 1 billion people is about US$700 billion.

Urbanisation in Latin America

In 2007 Latin America had 570 million inhabitants, of which 77 per cent lived in urban areas. In 2009, the poor population was close to 189 million (34 per cent of the population) and indigenous inhabitants up to 76 million (13.7 per cent of the population), while 40 per cent of the population lived in unsuitable housing. In 2030, the Latin American and Caribbean (LAC) region is expected to have more than 600 million people living in cities (84 per cent of the population), exceeding the urbanisation level of the developed countries.

The LAC region will

Figure 1: Energy Access by Country



Source: IIASA, 2008

Billions of people:
Abject poverty: 1.3
Poor: 0.6
Less poor: 1.4
3.3
Middle class: 1.4
Rich: 1.2
2.8

São Paulo, Brazil: one of Latin America's four megacities

become the most urbanised in the world. However, this urbanisation will be extremely different from that of the developed countries because, besides being fast and lacking of planning, it will entail deep economic, social, and environmental problems.

According to the most widely accepted definition of a megacity, currently there are 19 of them in the world, and by 2025 the number is expected to increase to 27, out of which 11 are capitals of their respective countries. Asia has eleven megacities; North America, two; Africa and Europe, one each; and Latin America has four: Mexico City Metropolitan Area, Greater Buenos Aires, and the Metropolitan areas of São Paulo and Rio de Janeiro (see Table 1).

Those cities and others such as Bogotá, Santiago, Lima and Caracas, present problems related to the environment, exclusion and poverty, in a context of rapid urbanisation processes that deserve attention. These cities have been populated without any public space and with overcrowding.

Urban poverty and social inequality are processes clearly identifiable in most of the large Latin American cities. There is a proven high correlation between available commercial energy and poverty. The supply of modern, reliable, and reasonably costly energy services for the economic sectors and for household use is essential to increase production, productivity, income and quality of life of the population. This is why public policies focused on increasing energy access must be urgently encouraged in developing countries.

WEC study: Latin American Energy Poverty – Mitigation alternatives. April 2006 report

In this pioneer work, three case studies were carried out in major cities of three South American countries: Greater Buenos Aires in Argentina; Rio de Janeiro in Brazil; and Caracas in Venezuela.

Thanks to the variety of subject matter and approaches in the three case studies, the report provides guidelines for the discussion of strategies necessary to handle the problem of energy poverty in urban areas, not only in the Latin American region but all around the world. The general conclusions of the three studies highlight the cooperative solutions by means of which governments and companies work together in actions that represent benefits for the companies and also for the consumers.

Regarding social and economical issues, the report concluded that the subject of energy should not be studied in isolation. Energy policy decisions must take into account the specific social and economic reality of the population and focus particularly on the causes of poverty and not only its effects. The design of subsidy-oriented social policy must be guaranteed in the long term and not distort market performance. It also should integrate with other social programmes, particularly those that encourage education and employment. Any benefits should not be seen as a right but as a privilege, subject to a specific circumstance.

Another important issue that relating to energy efficiency. It is well known that access to energy and efficiency in consumption are two sides of the same coin. Good habits and a consumption culture linked to efficient equipment

Table 1: Megacities in Latin America

Mega city	Population (millions of inhabitants)
Mexico City, Mexico	19.0
São Paulo, Brazil	18.8
Buenos Aires, Argentina	12.8
Rio de Janeiro, Brazil	11.7

guarantees better and more economic access to commercial energy. Table 2 shows problems related to poverty and energy access from the authorities', companies' and users' point of view.

Table 2: Obstacles to Energy Access

Problems from the point of view of the authorities and the companies	Problems from the point of view of poor users
• Precarious employment situation, irregular income, unemployment, lack of opportunities and education • Illegal land tenure • Vandalism • Organised crime and violence • Favourable environment for bossism and political clientelism • Clandestine connections • Lack of governability • Urban planning, lack of safety and illegality problems • Energy theft • Losses due to energy not billed • Adulteration of subsidy programmes (political management of the subsidies, subsidies seized by organised crime, etc) • Frequent delayed payments	• Lack of training and education • Culture of 'political clientelism' and perception of injustice • Personal and family lack of safety • Precarious land tenure • Lack of legal access to energy • Supply interruptions • Prices and tariffs unsuitable to make the service sustainable • Lack of access to efficient equipment • Excessive consumption in relation to performance • Low quality service • Feeling of exclusion and marginality due to the lack of attention to their problems, translated into resentment and an environment favourable for social violence.

The case of Colombia

Colombia, with an estimated population of 45 million people in 2009, is the third most populated country in Latin America, after Brazil and Mexico.

It has undergone a fast urbanisation process from the second half of the 20th century. During this period, Colombia changed from being a country whose largest population was congregated in rural areas to having more than 75 per cent of its inhabitants living in urban groups. Its average population density is of about 41 inhabitants per km^2, but it is distributed throughout the country in an irregular way, with more density in the Andean region.

In this context, the study *Urban Poverty and Energy in Colombia* commissioned by the WEC Colombian Member Committee for publication in 2011, makes a proposal to be carried out in the five largest cities of the country. They are characterised by a rapid population growth and receiving a displaced population that currently exceeds 3 million people.

Most large cities, at all development levels, have to expand their energy supply systems, especially electricity to meet growing demand; subject to more prohibitive environmental regulations for investment decision making.

In that sense, the distributed power generation from non-conventional sources, efficient energy use and smart grids for distribution networks will be necessary practices and technologies to be promoted by the energy policies and power utilities in order to assure the Four A's.

Enel-Endesa's commitment to Latin America

The international energy group Enel-Endesa has the major challenge of ensuring full coverage of electricity services, complying with the highest quality standards and adequate tariff schemes for consumers in large cities in five major Latin American countries; Buenos Aires in Argentina, Rio de Janeiro in Brazil, Lima in Peru, Santiago in Chile and Bogotá in Colombia.

Experience shows that the solution of energy problems in the large cities of Latin America requires close collaboration between national and local authorities, industry, opinion-builders, research institutions and other stakeholders. Introduction and enforcement of high environmental standards is a critical success factor, but above all, significant investment is needed in the expansion and upgrading of the entire electricity system, including appropriate 'smart' technologies for efficient management of the grid. A strong commitment to Corporate Social Responsibility on behalf of participating companies will secure public support and contribute to successful implementation of such initiatives. ❑