City Footprint Project: The experience of La Paz, Quito and Lima

South America

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Quick facts	
Zone	Capital Cities of Ecuador, Peru and Bolivia
Programme started	2012
Topic	Cities Water and Carbon Footprints
Implementing Agencies	Local Governments
webpage	www.huelladeciudades.com

Introduction

The world is going through an unprecedented urbanization movement. In this regard, Latin-America and the Caribbean have the world's highest urbanization rates, with population's increasing from 41 *per cent* in 1950 to 80 *per cent* by 2015[1]. Cities currently occupy only 3 *per cent* of the world's land surface. However, they produce 50 *per cent* of global waste, consume 75 *per cent* of natural resources and account for 60 to 80 *per cent* of global greenhouse gas (GHG) emissions[2]. For this reason, urban centers have an important role to play in the solutions of climate change.

Project Detail

The City Footprint Project is an instrument currently being used by the local governments of Quito, Lima and La Paz, to reduce carbon emissions, improve quality and uses of water and generate climate resilient cities. Specifically, the project seeks to incorporate environmental planning and management instruments into the activities of local governments, as well as the private sector and other actors, giving them access to technical

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and methodological tools that contributes with the identification, selection and development of actions that allow cities to adapt to climate change and mitigate it[3]. The project consists of six stages, as shown in figure 1:

Figure 1: City Footprint Project Stages

The City Footprint Project focuses on two types of footprints that can be measured by individual, organization, economic sector, territory, process or product.

1. Hydraulic footprint[4]: An indicator of freshwater use and pollution, quantified by volume (used or polluted) over a period of time. There are three subtypes:

a. Blue footprint: Volume of surface and ground water (lakes, rivers, aquifers) consumed during the production of goods or services;

b. Green footprint: Volume of rainwater consumed during the production process, particularly relevant to agricultural and forestry products; and

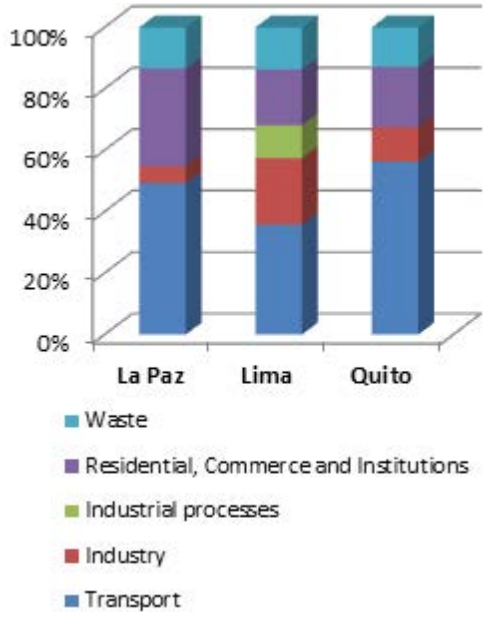
c. Grey footprint: Indicator of freshwater pollution, defined as the volume of water required to dilute pollutants to remain above the agreed water quality standards.

2. Carbon footprint: volume of GHG emitted into the atmosphere over a period of time.

Diagnosis

Stage one analyzes the origin of both hydraulic and carbon footprints. Figure 2 shows the carbon footprint results of the three Latin American cities over a one year period. The main source of GHG emissions is the transport sector (diesel and petrol), averaging around 50 *per cent* across the three cities, followed by the residential, commercial and institutional sector (electricity).

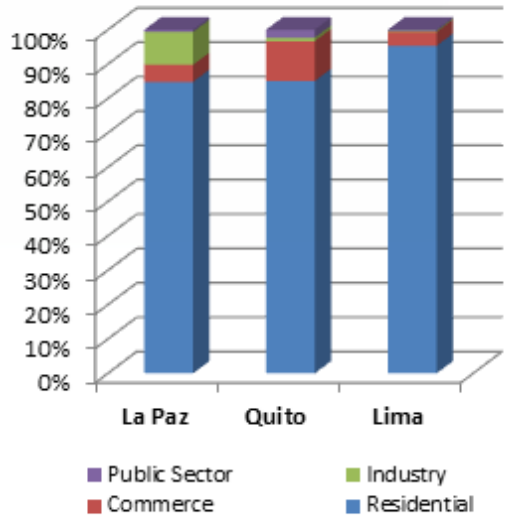
Figure 2: Carbon Footprint by sector



Source: Executive Summary – City Footprints Project. Proyecto Huella de Ciudades (2012)

Figure 3 shows that the residential sector is responsible for approximately 95 *per cent* of the total hydraulic footprint across all three cities, followed by the commercial sector that represents around 5 *per cent* of the total. Regarding the industrial and public sector, it's responsible for less than 1 per cent. Of the three types of hydraulic footprint, the grey footprint accounts for roughly 98 *per cent* of the total. This composition shows that there is an important level of contamination in the water due to a lack of appropriate household effluent treatment.

Figure 3: Cities water footprint by sector

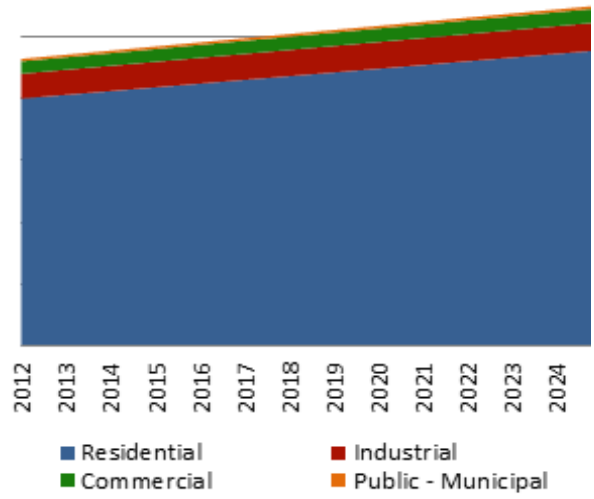


Source: Executive Summary – City Footprints Project. Proyecto Huella de Ciudades (2012)

Business as Usual Projection

The second stage of the project determines footprint projections for a 'business as usual' scenario based on current outputs, if no regulations or changes are implemented. Figure 4 shows the BAU projections for Lima with a 16 *per cent* increase between levels in 2012 and 2015.

Figure 4: Lima's hydric footprint projection



Source: http://ledslac.org/IMG/pdf/20140923_proy_huella_de_ciudades-_valeria_revilla.pdf. Edited by Mauro Magnetto

Reduction Actions

The third stage is to identify projects that can generate a reduction in the hydraulic and carbon footprints of the cities. With respect to the water footprint, actions can include water treatment and reuse of residual waters, implementation of water efficient products for the residential sector (including sinks, showers and toilets), and water use efficiency public awareness campaigns. Carbon footprint reduction activities include efficient transport systems, energy efficiency and clean technology use[5].

Potential of Reduction Actions

Stage four requires evaluation of the potential options for reduction actions, as determined in stage three. This is done by estimating the range of reductions and by determining the cost of implementation for each option.

Figure 5 : Benefit-cost analysis

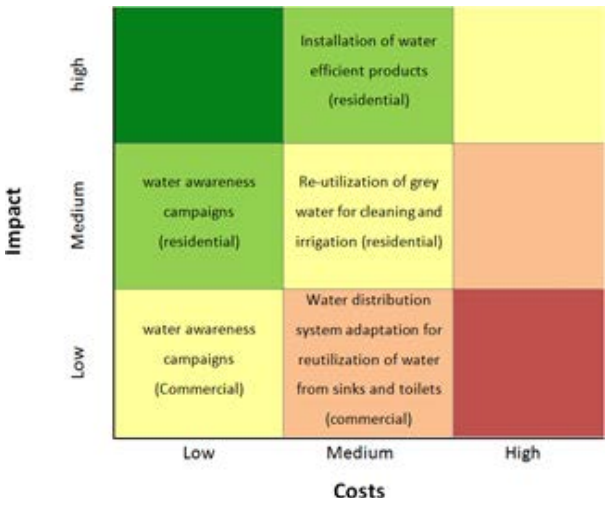


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Figure 5 shows the different action possibilities, where green boxes represent low cost and high impact actions; and red boxes represent high cost and low impact options.

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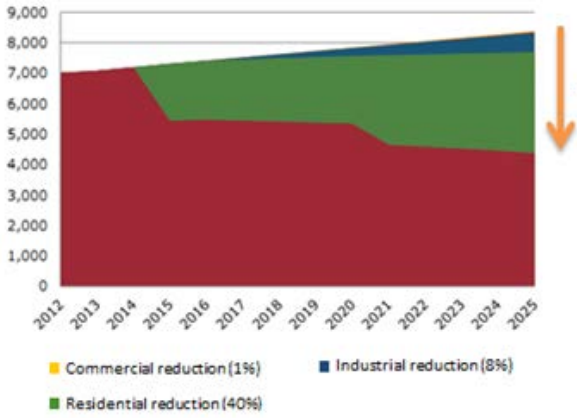
Define goals

By using the optimum scenario for reduction of hydraulic and carbon footprints per sector (as determined in stage four), stage five defines the long term goals. Before defining the goals, however, it is important to outline the responsibilities of different actors, including local, regional and national governments. Once the responsibilities are defined, long term goals can be determined. Figure 6 is an example of an optimum water footprint reduction scenario, per sector.

Figure 6: Water footprint optimum reduction scenario



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Implementation

The City Footprints Project provides local governments with the necessary tools for building capacity to measure their footprints, and monitor and evaluate their footprint reduction performance. Within the implementation processes local governments should focus on at the following key topics:

- Pilot projects: Experimental projects can be used to evaluate the potential for larger scale application, the positive social effects and impacts of footprint reduction.

- Communication: it's highly important that the society firstly understand all the concepts related with the city footprints project, and secondly, get involved. Therefore awareness campaigns are essential. Moreover, apps for cellphones and other instruments such as footprints calculators for schools or for individuals are effective tools to make people participate in the project and produce positive effects on footprint reduction.

- Collaboration: Cities can collaborate with other centers and regions to generate positive synergies (such as knowledge sharing and experience) through cooperation.

Outcomes

The City Footprint Project has a positive environmental impact, helping local governments to acquire the capacities necessary for measuring and managing their GHG emissions and water consumption. In this way, cities can join subnational and national environmental efforts on climate change mitigation and help the country to comply with international commitments. Moreover, local governments are able to build strong action plans that ensure the long term sustainability of the project. A variety of different stakeholders are involved in the project, including citizens, fostering widespread commitment to environmental sustainability. Encouragement of stakeholder participation facilitates collaboration and coordination, and provides the conditions necessary to attract additional funding for further emissions reductions and water management project[5].

The City Footprint Project has great potential as is illustrated in managing the hydraulic and carbon footprints of Lima, Quito and La Paz. This project offers a roadmap for local governments to move towards a sustainable future.

References

The following documents informed the development of this paper:

[1] World Urbanization Prospects: the 2011 Revision. UNDESA. Available at http://esa.un.org/unup/CD-ROM/Urban-Rural-Population.htm

[2] Global Initiative for Resource Efficient Cities, Engine to Sustainability - UNEP. Available at http://www.unep.org/pdf/GI-REC_4pager.pdf 10/10/2014

[3] Excecutive Summary – City Footprint Project. Proyecto Huella de Ciudades (2012).

[4] Hoekstra, A.Y., Chapagain, A.K., Aldaya, M.M. and Mekonnen, M.M. (2011) The water footprint assessment manual: Setting the global standard, Earthscan, London, UK. http://www.waterfootprint.org/?page=files/Glossary. 10/10/2014

[5] Hoekstra, A.Y., Chapagain, A.K., Aldaya, M.M. and Mekonnen, M.M. (2011) The water footprint assessment manual: Setting the global standard, Earthscan, London, UK. http://www.waterfootprint.org/?page=files/Glossary. 10/10/2014

Video Material

LEDS LAC Webinar (2014), 'Proyecto huella de ciudades: hacia un desarrollo urbano bajo en emisiones y resiliente al cambio climático. Experiencias en la Paz, Quito y Lima'. Available at: http://youtu.be/DluRiPREbsg. 10/10/2014

Photographic Source

Steve Johnson (Edited). Retrieved from: https://www.flickr.com/photos/artbystevejohnson/6307672876