Summaries of thematic areas

Air Quality Monitoring in Cities

Context:

- The Problem(s)
- Global GE Perspective

Air quality is usually measured through concentration levels of small and fine particulate matter (PM_{10} and $PM_{2.5}$). PM_{10} and $PM_{2.5}$ include pollutants such as sulfate, nitrates and black carbon, which penetrate deep into the lungs and into the cardiovascular system, posing great risks to human health. As urban air quality declines, the risk of stroke, heart disease, lung cancer, and chronic and acute respiratory diseases, including asthma, increases for the people who live in them. Ambient air pollution is the greatest environmental risk to health - causing more than 3 million premature deaths worldwide each year.

More than 80% of people living in urban areas that monitor air pollution are exposed to air quality levels that exceed the World Health Organization (WHO) limits. While all regions of the world are affected, populations in low-income cities are the most impacted. 98% of cities in low- and middle income countries with more than 100 000 inhabitants do not meet WHO air quality guidelines. According to the latest urban air quality database, from 2008-2013 global urban air pollution levels increased by 8%, despite improvements in some regions.

Most sources of urban outdoor air pollution are well beyond the control of individuals and demand action by cities, as well as national and international policymakers to promote cleaner transport, more efficient energy production and waste management. Reducing industrial smokestack emissions, increasing use of renewable power sources, like solar and wind, and prioritizing rapid transit, walking and cycling networks in cities are among the suite of available and affordable strategies. Air quality monitoring in cities can be a tool to determine whether the actions being taken are being effective and benefitting citizens' health and quality of life through improving the air they breathe.

Situation in Latin America and the Caribbean

- Leading countries in LAC

Polluted air is a major health hazard in developing countries. According to a 2013 report published by the Clean Air Institute (CAI), over 100 million people in Latin America breathe polluted air. The authors looked at levels of particulate matter (PM10 and PM2.5), ozone (O3), nitrous oxide (NO2), and sulphur dioxide (SO2) in the region. They compared the levels of those compounds with the World Health Organization (WHO)'s Air Quality Guidelines, and found that:

- Most of the countries measured for PM10 and PM 2.5 in 2011, all exceeded the WHO's recommended level.
- Ozone measurements in 2011 in Santiago (Chile), Mexico City and Quito exceeded the WHO's recommended level.
- Of the 13 countries that measured for NO2, 7 exceeded the WHO's recommended level

According to CAI, Monterrey, Guadalajara, Mexico City, Cochabamba (Bolivia), Santiago (Chile), Lima (Perú), Bogotá y Medellín (Colombia), Montevideo (Uruguay) y San Salvador (El Salvador) are the 10 cities with the most polluted air in LAC. In all of them, the levels of pollution are above WHO levels.

Encouragingly, the researchers also found that many countries have some standards in place to limit these emissions:

- Approximately half of the countries included in the study have PM2.5 standards.
- All of the countries that have any standards in place (16) have PM10 standards.
- 13 of the countries have Ozone (8 hour) standards.
- All 16 countries have SO2 (24 hour) standards.
- 15 of the 16 countries have (annual) NO2 standards. *

Chile is mentioned as a leading country in this area, for having regulation on the emissions of NO2, SO2 and PM2.5 from vehicles, and by requiring the use of cleaner, ultra-low sulfur diesel fuel nationwide. Mexico is also moving forward towards vehicle efficiency and fuel quality standards that will make Mexico's new vehicles comparable to those sold in the U.S. and Europe. Costa Rica is also advancing in this area, with programs to promote more efficient vehicle technologies, restrict the import of old vehicles, improving fuel quality, etc., all contemplated in the country's National Energy Plan. In terms of energy, renewables are taking off throughout the region – Brazil, Chile and Mexico tend to get the most attention for it, but other countries are also making progress, such as Peru, Panama and Costa Rica.

At the regional level, there is an effort from the Forum of Ministers of Environment for LAC in developing a Regional Action Plan on Atmospheric Pollution for Latin America and the Caribbean. This forum will seek to coordinate action at the regional level and seek support from UN entities such as UNEP and WHO in strengthening capacities in the region, developing studies and prioritizing action. The plan includes 1-technical assistance, training and capacity strengthening, 2-policy dialogue, cooperation and coordination, 3-assessment methodologies of policies, plans and projects, 4-research, 5-awareness raising and 6-regional plan monitoring and evaluation.

Links to QI:

- Relevant standards (ISO)
- QI service gaps

There is an ISO technical committee related to Air Quality (ISO/TC 146/SC 4) which is responsible for standards such as ISO 4225 and 4226 (General aspects and measurement of Air Quality), ISO 7186-1 and 2 (Air Quality Exchange of Data), and other standards related to measurement and assessment of air quality (ISO 8756, 9169, 9359, 11222, 117771, 13752, 14956 and 20988). Apart from standards regarding air quality directly, there are other areas where standards can help for improving air quality, such as those assessing fuel quality, combustion efficiency. Standards supporting the development of renewable energies and more efficient technologies are also important in contributing towards improved air quality.

As mentioned before, in order to improve air quality and in order to meet air quality standards, efforts in this sector must go beyond standards. Policy regulations and technical regulations must also ensure that standards are enforced, that the appropriate technology shifts are being promoted to reduce the burning of fossil fuels and that the measurement equipment used to determine pollution levels is calibrated.

(Preliminary) Conclusions

There is still work to do in mainstreaming air quality monitoring in LAC. There are still countries where there is no data available to analyse trends and determine whether they comply with international recommended levels, or whether their air quality is improving or diminishing. In this area, there is opportunity in developing technologies or monitoring methods that are low cost and low tech, since technical capacities and funds are usually the biggest limitations in developing countries.

On the other hand, the greatest opportunities for QI to impact air quality in cities (beyond monitoring) are related to development of cleaner technologies and renewable energies to reduce the use of fossil fuels, working together with policy makers in order to promote or demand their adoption in LAC countries. As several LAC countries are already advancing in some of these actions, there is an opportunity to match and support these projects with air quality monitoring to assess whether they are also having effect in this area.

A recommendation for taking action would be to work closely with the stakeholders developing the Regional Action Plan on Atmospheric Pollution for Latin America and the Caribbean, in order to introduce QI components and services into it.

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Air pollution levels rising in many of the world's poorest cities

http://www.who.int/mediacentre/news/releases/2016/air-pollution-rising/en/

Quality Infrastructure services to solve the e-waste problem

Context:

- The Problem(s)
- Global GE Perspective

Electronic waste or e-waste describes discarded electrical and electronic equipment (EEE). In the technical debate it is called *waste electrical and electronic equipment* (WEEE). Used electronics which are destined for reuse, resale, salvage, recycling or disposal are also considered e-waste.

Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution. Electronic scrap components, such as CPUs, contain potentially harmful components such as lead, cadmium, beryllium, or brominated flame retardants. Recycling and disposal of e-waste may involve significant risk to the environment, to workers and communities in developing countries and great care must be taken to avoid unsafe exposure in recycling operations and leaking of materials such as heavy metals from landfills and incinerator ashes.

E-Waste is also from the perspective of *resource (in-)efficiency* a major problem. For an appropriate reuse, it is necessary to identify different components and materials, give guidelines for the appropriate handling; better even to include principle recycling already in the product design phase.

Situation in Latin America and the Caribbean

- Leading countries in LAC

In recent years, the fast technological development, the strong increase in sales and the continuous digitalization of society have caused an accelerated rise of waste electrical and electronic equipment (WEEE). Due to the increasing economic and social development, these tendencies have been particularly pronounced in Latin America. While the industry in many developed countries is already paying a great deal of attention to the recycling and disposal of WEEE, this topic has just barely started to become important in many Latin American countries.[1]

The participation of the informal sector in the handling of WEEE is typical in Latin America, even though there are also formal companies with several years of experience that have undergone a continuous learning process. Many more are starting or are interested in starting operations. Due to the low availability or complete absence of specific standards and technical regulations for the appropriate handling of WEEE in several Latin American countries, there are companies that strive for an inexpensive recycling without considering the negative impacts that their practices may have on the health of their employees and the environment.

Even though WEEE is regarded as an important source of secondary resources that should be taken advantage of, it should not be overlooked that some of its components and materials exhibit hazardous properties, and, therefore, have to be handled with appropriate procedures. The companies that are handling WEEE are currently facing the challenge of finding more adequate methods for the processing and recovery of materials in a world where new types of equipment and technology are continuously appearing in the market. Therefore, there is a strong need for the establishment of guidelines and requirements concerning the appropriate handling of WEEE.

[1] Quote SRI

At the country level, countries like Colombia and Peru are working currently on standards for e-waste recycling. There is also work in Costa Rica on Greening the IT Industry which includes the management of E-waste [2] and Argentina has reported local initiatives in e-waste collection and recycling. Nevertheless, the regional landscape lacks a more systematic inventory and the feedback of QI and other partner organizations.

Promotors and key stakeholders

There are two global initiatives/ projects:

The broadest initiative is called “Solving the e-Waste Problem” (STEP), http://www.step-initiative.org and is coordinated by the UN from Bonn/ Germany

A stronger industrial focus is the Sustainable Recycling Industries (SRI) project, which supports capacity building for sustainable recycling in developing countries: The program is funded by the Swiss State Secretariat of Economic Affairs (SECO) and is implemented by the Institute for Materials Science & Technology (Empa), the World Resources Forum (WRF) and ecoinvent, sustainable-recycling.org

The latter is connected with the global “Resource Efficient Cleaner Production network” (RECPnet) with its Latin American sub-network “Red Latinoamericana de Producción Más Limpia”, http://produccionmaslimpia-la.net/miembros-red. The Centers in Colombia and Peru are pioneering with support of the SRI project solving the e-waste project. The network is supported by UNIDO.

There is still a need to contact key stakeholder groups, especially private industry organizations (including traders of recycled e-waste), regional organizations and national authorities for environment and health.

Links to QI:

- Relevant standards (ISO)
- QI service gaps

There are several QI services needed to contribute to solving the e-waste problem in Latin America and the Caribbean. Some examples are:

1. There are standards needed for all different phases of the recycling process from collection, to transport and storage, to treatment. The comparison of different technical and environmental standards for the treatment of WEEE (e.g. Swiss (Swico/SENS), two European (WEEELabex and Cenelec) as well as two North American (R2 and e-Stewards)) recently conducted by SRI is a good point of departure.
2. To implement e-waste recycling standards there will be a need for an increased capability and capacity of testing services. The specific tests still need to be identified.
3. These testing services will require metrological traceability and accreditation.
4. The certification of professionals who are working in the WEEE recycling industry is an additional service needed.

[2] https://www.apc.org/es/system/files/Costa%20RicaFinalReport_June2011.pdf.

(Preliminary) Conclusions	- Solving the e-waste problem is a key topic in the green economy agenda, because it refers to environmental (contamination, Hazardous waste), social (health of workers in the recycling industry) and resource efficiency issues (re-use potential of scarce resources). - In LAC there are already stakeholders working in the area of standardization, which makes it easy to bring additional QI expertise and services in - As the standardization of the e-waste problem is a relatively new field, we expect a high potential for innovation
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Hazardous Waste Management

Context:

- The Problem(s)
- Global GE Perspective

Hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. It is generated from many sources, ranging from industrial manufacturing process wastes to batteries and may come in many forms, including liquids, solids gases, and sludges. Examples of hazardous waste include: asbestos, chemicals, brake fluid or print toner, batteries, solvents, pesticides, oils (except edible ones), e.g. car oil, equipment containing ozone depleting substances, e.g. fridges, hazardous waste containers.

Adequate management of hazardous waste is challenging due to special measures needed to be taken during different stages of its life cycle including: generation, transportation, storage, recycling, treatment, and disposal

The perils surrounding this type of waste result in it being heavily regulated. There are several international conventions that regulate hazardous waste management. One of the most relevant conventions is the Basel Convention (1992), which regulates the transboundary movement of this type of waste and its disposal. Ratifying countries commit to:

- Minimise the generation of hazardous waste;
- Ensure adequate disposal facilities are available;
- Control and reduce international movements of hazardous waste;
- Ensure environmentally sound management of wastes; and
- Prevent and punish illegal traffic.

The convention seeks that appropriate knowledge of the type of waste to be handled, and understanding of the health and safety implications of managing it, is present when exporting and importing hazardous waste, especially when it is imported into developing countries.

There are also conventions regulating specific types of hazardous waste, such as the Stockholm Convention on Persistent Organic Pollutants, 2001 (POPs) and the Minamata Convention, regulating mercury.

Situation in Latin America and the Caribbean

- Leading countries in LAC

Work on hazardous waste has been going on in different LAC countries for over a decade[3]. In terms of the Basel Convention, a lot of it is done through Basel Convention Regional Centres (BCRCs). The primary mechanism for assisting in the implementation of the Basel Convention and its obligations is a series of Basel Convention Regional Centres for Training and Technology Transfer (BCRC). Established across the world under Article 14 of the Convention, these Centres are meant to provide for the effective implementation of the Convention at the national to regional levels.

In Latin America, these Centres are located in Argentina (for South America), El Salvador (for Central America and México), in Trinidad and Tobago (for the Caribbean) and in Uruguay (for LAC).

[3] http://www.basel.int/default.aspx?tabid=2346

Some relevant examples of leadership for hazardous waste management in LAC are:

- Costa Rica has implemented regulation and a national system for managing hazardous waste[4] .
- Colombia[5] has developed guidelines regarding hazardous waste.
- Mexico is implementing a program with the US, which includes goals to reduce and prevent land contamination through strengthened waste management[6].

Links to QI:

- Relevant standards (ISO)
- QI service gaps

There are a series of standards regarding hazardous waste, which ISO categorizes as special waste (which include radioactive waste, hospital waste, carcasses, and other hazardous waste). Several of them can be consulted here.

One particular link for QI that has been detected through this project is the management of hazardous waste generated in laboratories. In QI labs, waste could be chemical, biological and even radioactive. This waste should be adequately managed according to its properties and characteristics. Adequate management of each of these types of waste will also depend on each country's regulation and waste management infrastructure/facilities.

In ISO 17025, there is no mention about waste management whatsoever. In 15189 there is a requirement for a safe disposal of samples, that "shall be carried out in accordance with local regulations or recommendations for waste management". In terms of standardization, there is an opportunity for incorporating a requirement for adequate waste management in ISO 17025 to start homogenizing QI laboratories' practices regarding waste management. There should be a requirement to ensure the traceability of hazardous waste after its disposal, and for disposal procedures to comply with local regulation at the least.

There is also an opportunity at the regional level to identify a baseline scenario of hazardous waste management in QI laboratories[7], and if necessary, to develop skills, knowledge, strategies and protocols/procedures/guidelines for the adequate management of each type of waste. These types of guidelines are common in other countries (see some examples in the bibliography) and might already be present in many of the QI labs in the region, however this must be verified in order to determine the actions that should be taken in order to improve the situation (if necessary).

[4] http://sigrep.minae.go.cr/pag/principal.php

[5] http://www.minambiente.gov.co/images/AsuntosambientalesySectorialyUrbana/pdf/sustancias_qu%C3%ADmicas_y_residuos_peligrosos/gestion_integral_respel_bases_conceptuales.pdf

[6] https://www.epa.gov/border2020/goals-and-objectives#goal3

[7] It could look something similar to this one carried out in Brazil: http://cdn.intechopen.com/pdfs-wm/16297.pdf

(Preliminary) Conclusions	There is still the need to strengthen capacity and knowledge regarding hazardous waste, especially in developing countries such as LAC countries, where activities such as mining and industry are still relevant economic activities. International conventions and frameworks pose opportunities for collaboration and knowledge sharing between countries and at the regional level. Hazardous waste management in labs is seen as a good starting point in bringing together QI and green economy goals.
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Life Cycle Assessment

Context:

- The Problem(s)
- Global GE Perspective

In order to determine whether a product is sustainable, its entire lifecycle should be considered. Why? Because environmental impacts can happen and be distributed throughout a product's entire lifecycle (from the extraction of natural resources to the final disposal). For instance, a production process might be very sustainable (organic, energy efficient, etc), but the resources needed to make the product might come from very far away (implying emissions related to their transportation), or their extraction process might be highly detrimental to the environment or surrounding communities (e.g some types of mining).

Life Cycle Assessment (LCA) is a tool for the systematic evaluation of the environmental aspects of a product or service system through all stages of its life cycle. LCA provides an adequate instrument for environmental decision support. The stages involved in the process include:

- compiling an inventory of relevant inputs and outputs,
- evaluating the potential environmental impacts associated with those inputs and outputs,
- interpreting the results of the inventory and impact phases in relation to the objectives of the study.

LCA also allows for comparison between products that are assessed in the same way, which can make decision making easier for consumers seeking more sustainable products. For producers, LCA can allow for clearer identification on where specific impacts are happening, therefore decisions can be made in order to reduce them, also leading to resource efficiency.

Situation in Latin America and the Caribbean

- Leading countries in LAC

LCA is relatively new in LAC (most organizations are just over a decade old), especially due to the high levels of technical competence, resources and sometimes even technology and software needed to develop an assessment for a product. However, there are several countries that have been advancing in the subject.

There is an Ibero-American LCA Network, where countries like Argentina, Costa Rica, Brazil, Chile, Colombia, Cuba and Peru participate in the Executive Committee. There is also an Association for Life Cycle Assessment in Latin America (ALCALA) located in Costa Rica.

This Association originated in 2003, where in an LCA conference in USA, the Costa Rican delegate proposed to do an international LCA conference in Latin America for the first time. This resulted in a process of unifying LCA experts in the region, implementing the 2005 International Conference on LCA (CILCA) in Costa Rica, and launching ALCALA.

The association has developed a series of projects and events, several of them jointly with the Ibero-American LCA Network.

LCA in LAC has mostly been studied and is present in countries such as Brazil, Chile, Costa Rica, Colombia, Peru and México[8]. There is a Brazilian

[8] An interesting case study of private companies using LCA in the region can be found here:

LCA Association created in 2002, which originated from the Brazilian Technical Standards Association (ABNT). In México, there is a Mexican LCA Network within UNAM's Engineering Institute, where a very relevant entity in LCA is the Center for LCA and Sustainable Design (CADIS). Perú also has its LCA Network, however it is not clear who comprises it. Leadership on LCA in countries like Costa Rica, Colombia and Chile has been shown especially from the private sector, but there are no national networks or organizations promoting LCA as in the other countries mentioned previously.

Links to QI:

- Relevant standards (ISO)
- QI service gaps

The International Organisation for Standardisation (ISO) has standardised LCA within the ISO 14040 and ISO 14070 series standards. Technical Committee ISO/TC 207/SC 5 is in charge of developing these standards, which range from principles and frameworks for LCA, to guidance on how to apply LCA, and the competence needed for LCA reviewers. LCA data is also used in eco-labels (also known as Environmental Product Declarations - EPDs), which are also standardised under the ISO 14020 series which can be used in product certification.

One of the challenges for Environmental Product Declarations is the development of Product Category Rules (PCRs), which describe the requirements that a product must comply with in order to be able to receive a certain declaration. PCRs must be developed for each product or family of products and are key elements in order to be able to compare the declarations of different products. If PCRs are different, even if the product is the same, comparing between declarations will not be possible. Here it will be important for each country to establish what products are the most relevant for developing PCRs: for instance, Costa Rica has started with several cleaning products because of these products' relevance in Public Procurement and how useful it would be to have labeling to categorize them.

(Preliminary) Conclusions

There is potential in spreading knowledge and sharing experiences about LCA in the LAC region. The existence of ALCALA and the Ibero-American network is seen as an opportunity, where they can be used as platforms in order to develop pilot projects. There is potential in involving Caribbean countries, which seem absent in LCA development in the region.

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Sustainable public procurement

Context:

- The Problem(s)
- Global GE Perspective

Sustainable Procurement is a process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organisation, but also to society and the economy, whilst minimising damage to the environment.[9]

Sustainable Procurement seeks to achieve the appropriate balance between the three pillars of sustainable development i.e. economic, social and environmental.

- Economic factors include the costs of products and services over their entire life cycle, such as: acquisition, maintenance, operations and end-of-life management costs (including waste disposal) in line with good financial management;
- Social factors include social justice and equity; safety and security; human rights and employment conditions;
- Environmental factors include emissions to air, land and water, climate change, biodiversity, natural resource use and water scarcity over the whole product life cycle.

Sustainable public procurement (SPP) refers to the spending of government organizations which usually represents between 10 and 30 percent of national GDP. SPP can be used as a key instrument in the transformation to sustainable consumption and production.

Situation in Latin America and the Caribbean

- Leading countries in LAC

SPP can be a powerful lever for development and growth. It aligns with many of the economic and social priorities of Latin American and Caribbean (LAC) countries. National development plans increasingly reflect an appreciation for environmental, social and economic sustainability. Environmental agencies are better staffed and prepared than in the past, and environmental education at all levels continues to improve. LAC governments are encouraging the mitigation of environmental and social risks in the private sector, but the public sector must also lead by example. SPP provides governments with a valuable tool to demonstrate their commitment to sustainable development.

Green goods and services are already being scaled up across the LAC private sector. Public procurers should support green entrepreneurship, using their market power to encourage companies to adopt sustainable technologies and processes.

[9] Definition adopted by the Task Force on Sustainable Public Procurement led by Switzerland (membership includes Switzerland, USA, UK, Norway, Philippines, Argentina, Ghana, Mexico, China, Czech Republic, State of Sao Paulo (Brazil), UNEP, IISD, International Labor Organization (ILO), European Commission (DG-Environment) and International Council for Local Environmental Initiatives (ICLEI) and adopted in the context of the Marrakech Process on Sustainable Production and consumption led by UNEP and UN DESA.

SPP relates to multiple areas of government expenditure, e.g.

- Products: air conditioning, information and telecommunication technologies, vehicles, indoor lighting, office supplies, fuel, furniture, apparel, paper, cleaning products, etc.
- Services: Management and consultancy services, IT consultancy services, software, servers and data centres, electricity, courier and postal, mobility, waste management, food beverage and catering, landscaping, maintenance services, etc.
- Infrastructure: roads, water treatment facilities, airports, ports, railroads and stations, buildings, sewage plants, schools, prisons, power plants, etc.

Promotors and key stakeholders

The Inter-American Network on Government Procurement (INGP), is an initiative of the American countries constituted as a regional technical cooperation mechanism, composed by governmental institutions in the 32 countries of Latin America and the Caribbean.

The INGP is represented by the national directors of government procurement; as well as by institutions that provide institutional and financial support such as the Organization of American States (OAS), which acts as Technical Secretariat of the Network, the Inter-American Development Bank (IDB) and the International Development Research Centre (IDRC).

UNEP is also supporting SPP in LAC and creates the link with the promotion of a Green Economy.

In the area of standardization of sustainable procurement, the work of the ISO Committee ISO/ PC 277 is relevant. It is elaborating a procurement standard with strong participation of LAC countries for public and private organizations ISO/ DIS 20400.2

Links to QI:

- Relevant standards (ISO)
- QI service gaps

The new ISO standard 20400 “Sustainable procurement – Guidance” will provide guidelines for government organizations to integrate sustainability into their procurement processes. It has just reached a second Draft International Standard (DIS) stage, meaning interested parties can once more submit feedback on the draft before final publication in 2017.

QI bodies can support SPP especially by integration of environmental and social performance into technical specifications. Here is also the need to relate the use of private sustainability labels to formal standards. ISO assigns eco-labels in three categories: ISO 14024 on life cycle impact of a product or service, ISO 14021 is used by manufactures to inform consumers about the environmental characteristics of a particular component, product or process; ISO 14025 contains information on a product’s lifecycle impact on the environment.

Finally, QI bodies should also practice sustainable procurement within their organizations and lead by example.

(Preliminary) Conclusions	Latin America and the Caribbean have shown significant progress in the area of SPP. The responsible entities for procurement recognize the importance of standards and eco-labels, but the collaboration between the procurement offices and QI bodies is still missing. A closer collaboration could support SPP giving technical guidance for the environmental and social requirements in the procurement processes, or in knowledge about relevant standards and certifications related to the sustainability of different products and services. Given that the variety of products, services and infrastructure is very wide, there will be a need to select a specific area to start the collaboration. Other of the pre-selected thematic areas could be worked within the project also under the SPP perspective.
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Sustainable social housing (SSH)

Context:

- The Problem(s)
- Global GE Perspective

It is often believed that sustainability concepts can only be applied to high-standard, expensive buildings. This viewpoint ignores the huge importance of affordable housing and its potential to contribute to more sustainable buildings and communities.

Sustainable social housing (SSH) refers to the building and maintenance of affordable housing which follows sustainability principles. The concepts highlight the social dimension of Green Building. SSH could be seen as a comprehensive process accounting for environmental, social, cultural, economic and institutional considerations (UN- Habitat).

According to the Intergovernmental Panel on Climate Change (IPCC), the housing sector has the most potential for CO2-reduction and resource efficiency without extra cost in the near future (UN-Habitat, 2012a). Unmet or suppressed demand and the rebound effect however, can offset these savings.

Situation in Latin America and the Caribbean

- Leading countries in LAC

In Latin America, buildings consume 21% of treated water and 42% of electricity, while producing 25% of CO2 emissions and 65% of waste. Green buildings are defined as structures that are environmentally responsible and resource-efficient over their full lifecycles. By transitioning to green buildings, the sector could reduce energy consumption by up to 50%, water use by 40%, carbon dioxide (CO2) emissions by 39%, and solid waste by 70%. They also reduce operating costs, improve workplace productivity, and use sustainable materials. Amidst mounting concerns related to climate change and the demand for energy and water, it is imperative that policymakers and companies alike continue to improve efficiency in the real estate sector, using market mechanisms, certification schemes, and building codes. (ELLA, 2013).

Brazil was a pioneer of SSH in Latin America. The main green housing initiatives for social housing in Brazil are water heating, thermal comfort projects, labelling, solar energy and the selection of low-energy materials. Unfortunately, however, financial institutions are reluctant to fund energy efficiency projects.

Currently, other LAC countries are starting to reform their building codes to make them compatible with sustainability goals.

In Mexico the lack of standards to regulate the quality and efficiency of the new eco-technology products has been a barrier for SSH. In order to overcome this, the Institute for the National Workers' Housing Fund (INFONAVIT) has worked in partnership with regulators and suppliers to establish appropriate quality standards that achieve the necessary savings but which are still affordable.

In Argentina the National Institute of Industrial Technologies (INTI) has developed a labelling program for sustainable buildings.

Promotors and key stake-holders	The United Nations Human Settlements Programme (UN-Habitat) and the United Nation Environmental Program (UNEP) are the leading UN Organizations to promote SSH worldwide and also in the LAC region. Both are part of the Global Network for Sustainable Housing (GNSH). The GNSH has been created to contribute to the development of sustainable and affordable housing solutions in developing and transitional countries, with a specific focus on improving the social, cultural, economic and environmental sustainability of slum upgrading, reconstruction, large scale affordable housing and social housing programmes. A pioneering project was the Sustainable Social Housing Initiative (SUSHI) which was developed by the United Nations Environment Programme (UNEP) to increase the use of sustainable building solutions in social housing programs in developing countries. From 2009 to 2011, the SUSHI approach and guidelines were tested e.g. in Sao Paulo/ Brazil. SUSHI has provided guidelines and case studies for developers to integrate sustainable solutions in the design, construction and operation of social housing units. NGOs like Habitat for Humanity and Practical Action are also supporting SSH in the LAC region. Innovation in SSH is driven by architects like the Chilean Alejandro Aravena with his concept of “incremental housing”.
Links to QI: - Relevant standards (ISO) - QI service gaps	QI bodies have a long experience in testing and certifying building materials. This competence can be amplified to the analysis of the environmental footprint of building materials and also include unconventional or traditional building materials (i.e. bamboo or mud, “green cement”). By testing and certifying sustainable building materials, QI can support the dissemination of more environmental friendly building practice. QI could support also the development of Green Building Standards for affordable housing. These standards could be used as requirements for public financial support. QI can also support the accreditation of professionals for SSH.
(Preliminary) Conclusions	SSH has a high potential to support the transformation to la low-carbon and resource-efficient economy. The competence of National QI could be used to technically back up innovation and the transformation to an environmentally friendly and socially inclusive housing building practice. QI can support the development of building codes, standards and regulations which are aligned to international standards. This could support the use of sustainable technologies, materials and methods. SSH also has the capacity to directly or indirectly tackle the larger problems in cities such as solid waste management, storm water management, water supply, sanitation, and mosquito control.

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