Sustainable Resources for Sustainable Cities Symposium - A discussion document – Louise Guibrunet UCL ISR Doctoral Researcher

What do we mean by sustainable cities?

The Sustainable Resources for Sustainable Cities Symposium was held over two days in November 2013. It was organised by the UCL Institute for Sustainable Resources (ISR) and UCL Grand Challenges, as a space to discuss the opportunities for a sustainable resource use within cities. The programme and full list of participants are available in Appendix A.

This document summarizes the main topics and challenges that have been addressed during the symposium. The first one of these is what is meant by the concept of "sustainable city". The term is widely used in academia as well as in the private and the public sector, yet the underlying assumptions around it often differ, as well as the relative importance attributed to each of the pillars of sustainability (environmental, social, economic and governmental). However, the participants all touched on similar issues, albeit with a different emphasis.

Firstly, the over-arching consensus is that a sustainable city is a liveable one. That means that cities need to provide for the basic needs and well-being of their population. In particular, the participants highlighted access to shelter, food, water, energy, and mobility as key urban rights. Yet access to these services and resources is not universally achieved, especially in developing countries where urbanization is fast, unplanned, and in many cases informal. The fast growth of the urban population and the lack of financial resources mean that not all the population can access these basic services. Human health is also a cause for concern, especially due to the lack of clean water and drainage, poor waste disposal, and bad air quality. The loss of biodiversity is another worrying factor within the urban context, as it has been shown that urban biodiversity increases humans' exposure to micro-organisms, which in turn increases their resistance to inflammatory diseases (such as hay fever or arthritis). Unlike the services and infrastructures that are man-made, biodiversity is a natural feature of a city, and has to be protected rather than planned for. This raises the question of how to preserve ecosystem services in an urban context.

Cities are currently not sustainable because of their high environmental impact. Urban areas concentrate human activities in a dense environment, which as a result concentrates air, water and land pollution. Climate change is a prime example of this phenomenon: participants identified that cities account for half of the world's population, and yet as much as 75% of greenhouse gases (GHG) emissions worldwide. This means that countries' GHG emissions reductions targets will only be achieved if the problem of urban pollution is tackled, which makes energy efficiency measures and urban transport planning especially key in the global fight against climate change.

Interestingly, many studies only take into account the local environmental impacts cities have. For instance, pollution is measured as the pollution that is emitted within the city's boundaries or its immediate region. Rather, the symposium's participants argued that the concept of a sustainable city goes beyond its physical borders. Evaluating urban sustainability should entail accounting for

all environmental impacts, including those that occur on the other side of the globe. This is an idea that makes impact assessment more complex, as it would need to consider the whole life cycle of energy, materials and products imported to the city for transformation and consumption. However complex, the integration of the city's impact as a consumer of imported goods and resources seems essential to the concept of sustainable cities.

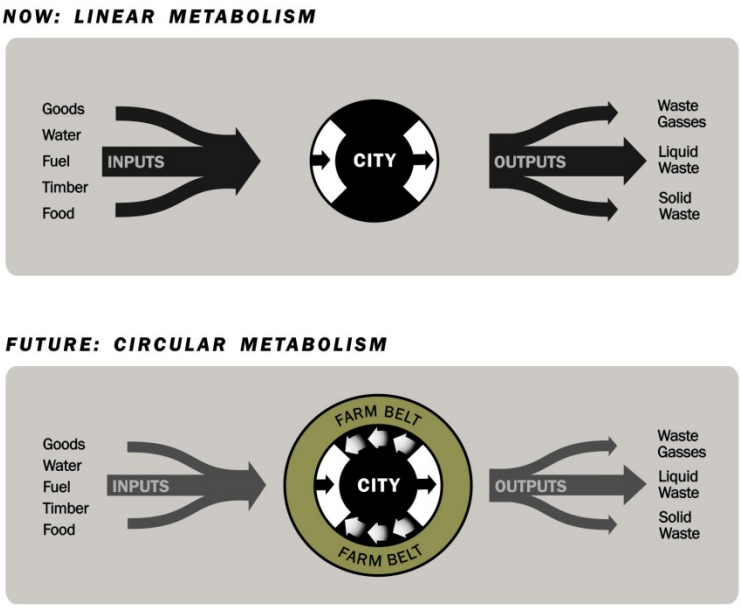
A related problem is the scarcity and depletion of natural resources. This is an especially relevant topic as this phenomenon is argued to be worsened by climate change. In the symposium, the example of London was presented, where the summer rainfall is expected to decrease in the future, causing water shortages for the population. The high and increasing demand for resources within cities poses the question of whether cities can become productive landscapes, and supply water, energy or food from inside their territory. One example that was presented in the symposium is the possibility to generate biofuel from algae at a small scale and even possibly within the urban domestic environment.

Besides disrupting the resource flow within cities, climate change will also increase the frequency and intensity of natural disasters. The impacts of floods, landslides, hurricanes or storms are dire in urban areas which are densely populated, which is why it is essential to plan for cities that can resist to such events, and more generally to plan for resilient cities (resilience being the capacity to withstand a shock, recover quickly and adapt to new conditions). Various participants argued that cities and its sub-systems (such as energy systems) cannot be sustainable unless they are resilient. City resilience will be achieved through rethinking its morphology. This process has to be innovative and creative (for instance, urban design that attempts to mimick ants organisational systems), although the fix will not solely be a technological one. One key aspect of resilience is learning about and building on the existing cultural and economic bases of a society; which means that community involvement and the respect of populations' lifestyles is essential.

So what defines a sustainable city? Learning from all the participants' emphases, a sustainable city is a city with a minimal environmental impact, that draws little or no resources from its region or the rest of the world. It is a productive city, which has resilient energy systems and food production. It is a city with a low metabolism, meaning that it bears little dependance on imported resources. It is also a city where people can survive, live and thrive. This means that everyone has enough to eat, enough drinking water to be in health, and a shelter on a safe piece of land.

Innovations for sustainable cities

There was a strong consensus in the symposium that technological innovations are needed to improve resource productivity within cities. Herbert Girardet, keynote speaker, advocates a "Factor five" increase in resource efficiency that will be achieved through the use of renewable energy, recycling materials and reducing the throughpout of resources in productive processes.



The concept is that of a circular metabolism (see image[1]). Currrently, cities' metabolism is linear, which means that most of the resources are imported to the city and the waste is exported. Increasing resource efficiency requires transitioning to a circular metabolism, where resources are extracted, transformed, recycled and reused as much as possible within the city. Both imports and exports are reduced.

There are successful examples of circularity in the use of resources, and in particular in industrial processes. Kalundborg's eco-industrial park in Denmark is one of them, where "industrial symbiosis" is carried out: Within the industrial park, one actor's waste is another actor's resource. On a smaller scale, one of the symposium's presentations discussed the possibility to use sludge as a fertilizer for agricultural purposes. Other participants talked about the possibility to design "productive city landscapes" generating energy and food.

However, it was also argued that a broader understanding of consumption patterns is needed in order to reduce energy and resource use. Resource demand is not only amplified by demographics (population growth) and urbanization, but also by lifestyles choices. In particular, the rise of the middle class in developing countries means that consumption patterns are evolving: more people want to consume more. These societal evolutions have to be understood and accounted for in studies of resource demand.

Governing the sustainable city

During the second day of the symposium panellists discussed the challenges for implementing urban change.

Governance was identified as they key issue. The sustainable city needs strong institutions that have the capacity to build an integral and long-term vision for the city. The lack of a coherent vision hinders the possibility for a holistic approach to planning, essential to urban sustainability.

Participants highlighted that urban policy making is too often sectorial and short-sighted, as well as suffering from the effects of corruption and decisions made out of personal interests. Successful planning has to overcome these challenges by creating a common vision, a long-term objective or

[1] Credits: Herbert Girardet

roadmap to sustainability. Participants pointed out that successful case studies included cities where a strong mayor led urban change. In New York, London, Curitiba or Bogota to name a few, the image of the mayor helped shape the vision for sustainability and helped bring about long term change.

Cross-sectorial vision is essential. Policies proposed by the different governing bodies need to take into account impacts beyond their own sector. One prime example is transport planning, where decisions affect not only transport infrastructure but also human health, economic growth, air quality, housing price or climate change, among others. Governments need to have the technical and financial capability to plan ahead, to be innovative, creative and make full use of the range of policy alternatives available, be them fiscal, regulatory or educational.

Another key aspect of successful urban governance is community involvement. Innovative policies such as participatory budgeting and planning were cited as essential approaches for urban sustainability. This is because citizens are the critical actors of sustainability. They need to be engaged and feel that they have a sense of belonging and control over their community, which is why participants argued that governments should thrive to foster public participation in urban policy making. Another perspective that was discussed during the symposium is that citizens are not passive actors that need to be engaged and included in the decision-making process. On the contrary, they are the actors currently acting for sustainability through grassroots movements. In this perspective, governments need not try to promote public engagement, rather, they should learn from the grassroots organizations' successes.

Finally, and perhaps bringing together the topic of governance, the issue of measuring and quantifying urban sustainability was tackled. Participants argued that it is essential to create tools that measure a city's progress away from or toward sustainability, and that enable the evaluation and comparison of policy alternatives. It was highlighted that quantitative data diplayed in a format that is comprehensive and easy to use is essential to inform policy-makers but also to allow for governments' accountability towards citizens. This has to be done despite the uncertainty of the data at the city scale, which has been deplored by many participants.

Closing thoughts: Towards solutions for sustainable cities

The study of sustainable cities is revolutionary in the sense that it applies the concept of "sustainability" to a territory, when traditionally it has been applied to processes (such as a "sustainable development", "sustainable growth" or "sustainable production"). Here, the object of study has physical boundaries and covers a range of processes that take place within those (population growth and provision of services, industrial production among others).

This affects how we think about sustainability and what it means to "sustain" a city. Is the objective to sustain current urban consumption patterns and lifestyles ? Or is it to challenge these consumption patterns in order to sustain a healthy and safe life for the world's population?

The symposium opened the door for these debates. What is clear is that the complexity of the topic at hand begs for further research to be undertaken, but also for space for debate and discussion between the key urban actors. This is why researchers need to keep on engaging with each other across academic fields, but also with the private sector, the government as well as grassroots movements and citizens. This diversity of actors, perspectives and experience is the key to finding solutions towards creating sustainable cities.

Appendix A

5 November 2013: Urban Metabolism, Feeding the city

Introductory Remarks
Professor Raimund Bleischwitz, BHP Billiton Chair in Sustainable Global Resources, UCL ISR
Dr Ian Scott, Principal Facilitator, UCL Grand Challenges programme

Session 1: Urban Challenges Chaired by **Andres Sevtsuk**, Assistant Professor in Architecture and Sustainable Design, Singapore University of Technology & Design
Dr Emma Terama, Research Associate, UCL Department of Science, Technology, Engineering and Public Policy (STEaPP) 'Is sustainable consumption challenged in the global urban transition?'
Dr Catalina Spataru, Senior Research Associate, UCL 'Common Road to 2050 - Energy Scenarios'
Dr Emily Morris, Research Associate, UCL Institute of the Americas 'Urban mobility: Havana's urgent challenge'
Alison Fairbrass, Engineering Doctorate Student, Centre for Urban Sustainability and Resilience, UCL 'Developing accessible methods for urban biodiversity monitoring'
Professor Graham Rook, Professor of Medical Microbiology (Emeritus) Centre for Clinical Microbiology, Department of Infection, & the National Institute for Health Research (NIHR) and UCL Hospitals Biomedical Research Centre, UCL 'Can urban greenspace and biodiversity reverse the worrying increases in chronic inflammatory disorders?'

Session 2: Resource Supply Chaired by **Professor Raimund Bleischwitz**, UCL ISR
Marco Poletto, Director ecoLogicStudio & BIO_UD Research Cluster Director, The Bartlett, UCL 'Bio Urban Design Lab -'Cities as productive landscapes''
Emily King, Senior Consultant, Environmental Resources Management (ERM) 'Sustainability Profiling'
Teresa Camarero-Esparza, PhD student, UCL Institute for Sustainable Resources & CEGE UCL 'Integrative Sludge Management: A focus on waste production and resource recovery'
Evgenii S. Matrosov, PhD Researcher, UCL 'Should we update England's water supply planning process?'
Dr Paul Hellier, Department of Mechanical Engineering, UCL 'Algal Bio-fuels for Sustainable Transport'

Session 3: Resource Consumption Chaired by **Tadj Oreszczyn**, Director of the UCL Energy Institute, Director of the RCUK Centre for Energy Epidemiology (CEE) & Professor of Energy and Environment
Sabien Windels, Project officer at Interreg IV B project called "ZECOS", KAHO Sint-Lieven (University College Ghent: industrial engineering) 'Fuel poverty and financing methods for energy efficiency measures'
Professor Peter Jones, Professor of Transport and sustainable development, UCL, 'Developing an interactive tool to explore household resource use and how this might be reduced.'
Oliver Wilton, Senior Teaching Fellow, The Bartlett School of Architecture & Dr Jake Hacker, Visiting Professor in Building Engineering Physics, UCL Energy Institute 'Phase Change Material Thermal Stores'
Shoshanna Saxe, PhD Student, University of Cambridge 'A methodology for accessing the net GHG impact of new metro rail'
Dr. Susan E. Lee, Research Fellow, University of Birmingham 'A City Design Framework to Elucidate Urban Challenges: Energy Flows of Birmingham'

Mapping UCL research on sustainable cities and sustainable resources
Charlotte Johnson, Research Associate, UCL ISR

Keynote Address Chaired by **Dr Robert Biel**, Senior Lecturer, Development Planning Unit, UCL
Professor Herbert Girardet, Co-Founder, World Future Council 'Urban Metabolism'

6 November 2013 : Research into action

Introductory Remarks

Professor Raimund Bleischwitz, BHP Billiton Chair in Sustainable Global Resources, UCL ISR

Panel discussion: Cities in Transition

Moderated by **Dr Michele Acuto**, Senior Lecturer in Global Networks & Diplomacy, Department of Science, Technology, Engineering and Public Policy (STEaPP); UCL

Panellists:
Dr Vanesa Castan Broto, Lecturer, Development Planning Unit, UCL
Rt Hon Charles Clarke, Honorary Professor of Economic Policy and Migration, University College London
Professor Herbert Girardet, Co-Founder, World Future Council & Visiting Professor, University of the West of England
Dr Yacob Mulugetta, Reader, Centre for Environmental Strategy, University of Surrey
Professor Tadj Oreszczyn, Director of the UCL Energy Institute, Director of the RCUK Centre for Energy Epidemiology (CEE) & Professor of Energy and Environment
Dr Inge Paulini, Secretary General, German Advisory Council on Global Change
Dr Lily Song, Provost (Postdoctoral) Fellow, University College London