

## **Workshop on Human-Carbon Interactions in Urban Systems**

### *Concept Note*

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### **Rationale**

Urban areas alone account for between 60 and 80 percent of global energy consumption and carbon emissions (GEA, 2012). The majority of scientific research on the urban carbon cycle has focused on quantification of flux at the whole-city level or subsets of the urban landscape (e.g., individual economic sectors) but with little process or mechanistic linkages to economic, behavioural or political drivers. Furthermore, little research has linked an understanding of the urban carbon cycle with land use and land use change surrounding urban areas or land use, form, and structure within urban areas. There is much knowledge and research on socioeconomic activity within urban areas, but this work has either not focused on carbon, or has not “connected” with the explicit space/time needs required by research in carbon cycle science where linkage to space/time explicit atmospheric measurements and land transformation is essential.

The US Carbon Cycle Science Plan has included considerable emphasis on the human dimensions of the carbon cycle and 3 of the 6 key goals within the Plan refer to aspects of human-carbon interactions. For example the Plan seeks to “understand and quantify the socioeconomic drivers of carbon emissions” (Goal 2); “determine the likelihood of success and the potential for side effects of carbon management pathways that might be undertaken to achieve a low-carbon future” (Goal 5); and “address decision maker needs for current and future carbon cycle information; and provide data and projections that are relevant, credible, and legitimate for their decisions” (Goal 6).

The accomplishment of these goals will require new research aimed at a better understanding of how humans interact with the carbon cycle and a new research community focused on human-carbon interactions. However, to date, there has not been a focused effort within the US carbon cycle science community to bridge the gap between the natural and social sciences and begin the necessary knowledge integration and community socialization. The complexity of human-carbon interactions is often approached from a macroeconomic viewpoint, reduced to a few variables, such as population size, GDP and technological change. Or, it is tackled from the bottom-up in isolated research communities with their internal conventions, norms, and languages that raise barriers to integration and synthesis with other approaches and perspectives. Yet, it is increasingly clear that scientific and policy communities need to better understand the processes and mechanistic drivers and feedbacks between carbon exchange and human activity/management from the bottom-up as well as the top-down and to find a common intellectual framework that draws from and incorporates the different research communities that have relevant thinking and outcomes. Indeed this information is essential to meet the needs of the three human-related goals outlined above. As a dominant and complex anthropogenic system, urban areas and their linkages to surrounding land use and land use change, provide an opportunity for carbon science to begin building the necessary research community to bridge the natural and social sciences through focus on a rich but tractable domain.

### **Goals**

To begin the process of bridging the gap between the natural and social sciences on human-carbon interactions, we propose a workshop to examine the state of the science and gaps in knowledge on the social and physical factors that affect carbon dynamics in urban systems and decisionmaking feedbacks. We focus on urban systems and their surrounding land transformation as a rich subset of the broader human-carbon interactions in an effort to simplify this first attempt at building and socializing an interdisciplinary research community.

By bringing together the natural and social sciences we seek: to better understand the interactions between humans and the carbon cycle; to assess research within the existing related fields; and to identify interdisciplinary and trans-disciplinary areas requiring new or improved research to meet the goals of the US Carbon Cycle Science Plan.

### **Questions for background papers:**

Given the current state of knowledge in your field on the interaction of the carbon cycle and humans in urban systems, what do you see as the greatest gaps in understanding or research emphasis?

Where would research be focused to close those gaps? What interdisciplinary and trans-disciplinary areas require new or improved research to meet the goals of the US Carbon Cycle Science Plan relating to human-carbon interactions?

In practical terms, what useable information can the research community provide to stakeholders (practitioners, planners, policymakers) in urban systems to enable better carbon cycle policy or action/choices (e.g., low-carbon pathways, transit transportation systems)?

### **Format**

The workshop will be sufficiently small in size to encourage discussion among all the participants but large enough to allow for several breakout groups. Therefore, approximately 15-20 researchers from fields such as physical sciences, engineering, sociology, economics, ecology, geography, and planning have been invited to examine how humans and decision-making in urban systems affect carbon outcomes.

Participants are asked to draft a 1 page background paper presenting an overview of the current state of research as well as indicating research gaps in their area of expertise as it relates to carbon-human interactions at the city level. These papers will be submitted by August 15<sup>th</sup> and will serve as a basis for the working group discussions during the workshop. All papers will be made available online to all participants prior to the workshop to allow for pre-meeting discussion, collaboration and question forming. The organizers will use this material to define the working groups for the meeting.

Through this pre-meeting preparation and participation, the workshop can begin where regular conferences usually end: with discussions, debate and collaborative thinking.

A couple of weeks before beginning of the workshop, each working group will decide on its program for their meeting breakouts. During the three day workshop, each group prepares a group report documenting its discussion during the breakout sessions. At the middle and end of the workshop, the results are brought together in plenary sessions and presented.

### **Outcome**

A foundational paper that will serve as a basis for a truly integrated call or program on Human-Carbon Interactions in Urban Systems

### **Working groups**

By September 15<sup>th</sup> we will suggest working groups based on the review of the 1-page background papers that we get.