Introduction

The Roundtable on Sustainable Mobility was established in February 2010 as an activity of the Earth Institute at Columbia University. The mission of the Roundtable is to accelerate the implementation of global sustainable mobility. To that end, four meetings were held in 2010 that brought together experts from automobile manufacturing, information and communications systems, and energy systems, as well as representatives from universities, federal agencies, nonprofits, and consulting firms.

Roundtable Meetings in 2010

Each of the four meetings focused on a topic integral to promoting sustainable mobility. The first meeting, held on April 27th, focused on a new “DNA” for automobiles based on the convergence of electric and connected vehicles, and on urbanization trends. For over a century, cars and trucks have been driven mechanically, powered by combustion engines, energized with oil, and operated as stand-alone machines. The new “DNA” entails vehicles that are driven electrically, powered by electric motors, energized with hydrogen and electricity from diverse sources, and operated interdependently.

The second meeting, held on June 21st, focused on the “Mobility Internet,” the growing system of technologies, services, and apps that allows:

- consumers to be connected to information and communications systems while traveling;
vehicles to be connected virtually to other vehicles, other road users, and roadside infrastructure; and

- municipalities to collect data, collect fees, and optimize transportation variables.

Advances in vehicle-based technologies (sensors, radar, transponders) as well as wireless technologies (mobile telephones, dedicated short-range communications, cellular, satellite) are enabling increased vehicle connectivity and autonomous driving. In addition, rapid growth in commercial services exploiting the “Mobility Internet” is making it easier for consumers to park cars, hail cabs, and plan travel, and for local governments to increase traffic safety, reduce congestion, and optimize public transportation systems.

On October 15th, the third meeting of the Roundtable focused on potential global demonstration sites for implementing sustainable mobility solutions. Two sites were examined in depth. The first was Babcock Ranch, Florida, a sustainable eco-city that will eventually be home to 50,000 residents. Babcock Ranch is committed to being a first mover in sustainable mobility and is partnering with Florida Power & Light to build the nation’s largest solar array to electrically power the city and its transportation system. The second demonstration site discussed was Chongming Island, in Shanghai, China. Chongming Island is Shanghai’s “living laboratory” for sustainable development and is planned as a showcase for innovative solutions to the world’s sustainability challenges and opportunities, including sustainable personal mobility. Ideally, the Earth Institute would establish additional demonstration projects throughout the world, not only in greenfield developments, but also in brownfield urban centers and in rapidly expanding cities.

The fourth and final meeting was held on December 14th with a focus on next steps. Results of a participant survey indicated demonstration sites are a top priority to accelerate the implementation of sustainable mobility technologies. In order for electric vehicles and information/communications technologies to be integrated and tested with real consumers,
dedicated environments must be established. Stakeholder companies are seeking opportunities to partner with other organizations in such demonstration projects.

Lessons Learned
The most important lessons learned from the Roundtable can be summarized as follows:

**Sustainable personal mobility is within our grasp.** The technologies that underlie lightweight electric vehicles that are connected and can be driven autonomously exist today. Such vehicles can be charged by smart electric grids connected to renewable energy sources, promising a world with zero emissions from personal mobility.

**It will result from an integrated “system of systems.”** In order for sustainable personal mobility to become a reality, numerous technical systems must be integrated, including vehicle engineering, information and communications systems, and energy systems. Standards must be developed in all areas. In addition, economic, political, and behavioral systems must be integrated. Issues of privacy and liability must be addressed.

**No one company or government appears capable of developing and deploying this system alone.** Within the private sector, no company appears to have the expertise in all of the necessary areas to implement a sustainable mobility solution on their own. Within transportation in general, the interaction between product and infrastructure is such that neither the private sector nor the public sector can move forward alone. This is the case not only because of the physical requirements of the system, but also due to the financial requirements. Innovative public/private funding partnerships must be developed.

**Therefore, collaboration and real world learning are key to a sustainable mobility future.** Companies must form business partnerships with other organizations possessing complimentary technology, knowledge, and expertise. These business partnerships must
find opportunities for real world learning with real consumers so that products and systems can be tested and refined.

*To move forward, a collaborative design, development, and implementation program is needed.* This program should consist of the *right combination of companies* working in “living laboratories” with real consumers. Government support, strong program management, and adequate dedicated resources are key to success.

*The best role for the Earth Institute/Columbia University is to be a “catalyst” for this program, and ensure a dual track of “doing” and “thinking.”* The strength of universities lies in their academic credibility and neutrality. The Earth Institute is well positioned to bring together stakeholders and serve as a catalyst to the development of the “doing” part of the program. The Earth Institute’s academic credibility can translate knowledge gained into policy recommendations that further enable progress. In addition, the Earth Institute can implement an educational program to ensure that the “thinking” is captured and disseminated to other urban centers around the globe striving towards sustainable mobility.

**Next Steps: Moving Forward**

On March 31st, 2011, the Roundtable on Sustainable Mobility will host a site visit to Babcock Ranch, Florida. Babcock Ranch shares the Earth Institute’s vision of connected, autonomous driving that will reduce energy consumption, reduce greenhouse gas emissions, eliminate traffic accidents, reduce traffic congestion, and empower consumers via the “Mobility Internet.” The purpose of the site visit will be to convene the right combination of company leaders constituting the future commercial eco-system for sustainable mobility, and converge on a synergistic business model that works for each individual company as well as for the program as a whole.