WHY DESIGN NOW?

National Design Triennial

Smithsonian
Cooper-Hewitt, National Design Museum

WHY DESIGN NOW?

National Design Triennial

Ellen Lupton

Cara McCarty

Matilda McQuaid

Cynthia Smith

with contributions by Andrea Lipps

Smithsonian
Cooper-Hewitt, National Design Museum
New York

WHY DESIGN NOW?
NATIONAL DESIGN TRIENNIAL
Ellen Lupton, Cara McCarty, Matilda McQuaid, and Cynthia Smith, with contributions by Andrea Lipps

Published by
Cooper-Hewitt, National Design Museum
Smithsonian Institution
2 East 91st Street
New York, NY 10128, USA
www.cooperhewitt.org

Published on the occasion of the exhibition
Why Design Now? National Design Triennial
at Cooper-Hewitt, National Design Museum,
Smithsonian Institution,
May 14, 2010–January 9, 2011.

Why Design Now? National Design Triennial
is sponsored by

Generous support is provided by Agnes Bourne, the Norwegian Consulate General in New York, the Esme Usdan Exhibition Endowment Fund, the Ministry of Culture Denmark, and public funds from the New York State Council on the Arts, a State agency.

Additional funding is provided by Dr. Leonard Polonsky and Dr. Georgette Bennett, The Consulate General of Switzerland in New York, and the Office of Cultural Affairs, Consulate General of Israel in New York.

This publication is made possible in part by The Andrew W. Mellon Foundation.

Museum Editor: Chul R. Kim,
Director of Publications

Design: Michael Bierut and Yve Ludwig,
Pentagram, New York

Printed in China by Toppan Printing Company.

Distributed to the trade worldwide by
Distributed Art Publishers
155 Sixth Avenue, 2nd floor
New York, NY 10013, USA
www.artbook.com

First edition: May 2010
ISBN: 978-0-910503-87-7

Library of Congress Cataloging-in-Publication Data

National Design Triennial (4th : 2010 :
New York, N.Y.)
Why Design Now? : National Design Triennial /
Cara McCarty ... [et al.] ; with contributions by
Andrea Lipps.
p. cm.
Includes index.
"Published on the occasion of the exhibition Why Design Now? National Design Triennial at Cooper-Hewitt, National Design Museum, Smithsonian Institution, May 14, 2010–January 9, 2011."
ISBN 978-0-910503-87-7 (alk. paper)
1. Design--History--21st century--Exhibitions.
2. Industrial design--History--21st century--Exhibitions. 3. Sustainable design--Exhibitions.
I. McCarty, Cara. II. Cooper-Hewitt Museum.
III. Title.

NK1397.N38 2009
745.409'05110747471--dc22

2010004050

Title page: Jardin Botanico-Orquideorama (Orchid Botanical Garden), Medellín, Colombia. Alejandro Bernal, Felipe Mesa, Camilo Restrepo, and J. Paul Restrepo, Plan B Architects; additional team members: Jorge Buitrago, Lina Gil, Carolina Gutierrez, Catalina Patiño, Viviana Peña. Colombia, 2004–7

Mobility

Cara McCarty

The history of human settlement has always involved the overcoming of distance, for the movement of human beings or for the goods they have needed for their well-being. Today, mechanized transportation has resulted in massive, interconnected modes of movement by land, air, and water, allowing us to travel farther in less time than ever before and creating unimagined social and economic benefits. Half the planet now congregates in cities, many of vast population size and spatial spread. But the specifics of how, where, when, and why we travel also result in significant negative impacts that undermine the benefits. The key components of personal transportation are the mode, the number of trips and miles traveled, the efficiency, fuel type, and route selection. There are several major shifts currently underway, and designers are taking on the task of redefining mobility—its future patterns and components—to effect positive changes on our world.

Transportation in America relies on a seemingly endless supply of inexpensive fossil fuels. Among the eighteen economies surveyed by the International Energy Agency, the United States uses the most energy per passenger mile,[1] and transportation is the fastest growing producer of carbon emissions in the country.[2] As one expert put it, “It’s not that we are almost

NYC Hoop Rack. Ian Mahaffy, Ian Mahaffy Industrial Design, and Maarten de Greeve, Maarten de Greeve Industrial Design. Client: New York City Department of Transportation. Designed Denmark, manufactured United States, 2008–9. Galvanized cast ductile iron

out of oil . . . we are running out of air to put the CO_2."[3] The many amenities of the low-density American city were achieved through the availability of cars—inexpensive, individual transportation to and from work as well as for pleasure. Communal transportation within cities, especially by rail, generally requires higher aggregations of people within walking distance than the seven minutes that an American suburbanite will walk. Regional high-speed rail transportation between cities, however, is being implemented or upgraded in many parts of the world. Among the forefront of very-high-speed trains is France's recently designed AGV (*automotrice à grande vitesse,* or "high-speed self-propelled train"), which consumes less energy, uses lightweight, recyclable materials, and employs more advanced technology to travel more safely and economically up to 225 miles per hour (fig. 1).

fig. 1

Major efforts are now underway to produce emission-free vehicles through hybrid gas-and-battery or battery-electric technology alone. According to one theory, the United States could replace all of its cars and trucks with electric vehicles powered by wind turbines whose footprint would take up less than three square kilometers.[4] Because most American driving trips do not exceed forty miles, and a vehicle battery can travel for at least that distance on a single charge, recharging could be done easily from a standard home outlet or while vehicle owners are shopping or working, helping to reduce commuter gas consumption by 94%.[5] We have become accustomed today to plugging things in to recharge them, which might help facilitate the acceptance of electric vehicles. Hybrids and other plug-in vehicles could recharge at a broad network of charging stations connected to the energy grid and installed in public and private lots, like the ChargePoint™ Networked Charging Station proposed by Coulomb Technologies (fig. 2). And short trips could be made on foot or bicycle if sidewalk infrastructure were made safer and more pleasant; in small, on-demand electric vehicles like CityCar, designed at MIT (fig. 3); or on portable bicycles like the IF Mode folding bicycle (fig. 4).

fig. 2


fig. 3


fig. 4

In dense metropolitan areas, increasing the cost of using roads has become a new disincentive for using cars, especially if the driver is alone. In London, congestion pricing imposed on vehicles entering the city center has reduced traffic by 15%, the time drivers spend in gridlock by 30%, greenhouse emissions by 16%, and, just as important, allowed buses more clear road space than before.[6] Today's digital technology substitutes body movement with virtual methods of communication, offering options for reducing travel. Telepresence technology, tele-banking, and purchasing goods on the Internet are changing how meetings are conducted and reducing shopping trips. In addition, rapid-production digital manufacturing processes will reduce waste and the need for long-distance shipping. But there is still much to be learned about the replacement of face-to-face communication with virtual alternatives to travel and methods of contact.

The examples of cities like London and Singapore, which combine road management with sustainable mass transport systems, underscore the importance of seeing transportation as a system of interconnected components that can be accessed easily and conveniently. Mesh networking uses the capabilities of current wireless communication technology to create a "smart," integrated transportation infrastructure: enabling vehicles to communicate with one another or to a central network, employing sensory devices that monitor and regulate traffic by recording location, speed, direction, and time, and having vehicles interact with toll gates and traffic lights.[7]

The need for more sustainable cities requires the next generation of urban transportation to be expansive and multi-purpose. Imagine seamless transfers from automobiles—owned, short-rented, or shared—to trains or buses, bikes or rickshaws, or to walking, all scheduled and combined into a single door-to-door travel experience, with the help of electronic multi-modal journey and integrated fare payment on cell phones or at kiosks, as well as through ubiquitous transfer points.[8] Barriers to such an experience—separated hubs, complex multi-level transfers, carrying shopping goods over distances, the psychological and physical non-accommodation of small children, the elderly, travelers with disabilities—could be eliminated or alleviated through accessible design combined with aesthetic sensibility.

Human welfare depends not only on the mobility of people. In the current system of food transportation around the globe, it takes ten calories of heat for every calorie of food put on a dining-room table.[9] Moving freight by truck poses major issues of truck design and fuel use due to vehicle weight and aerodynamic drag; at fifty-five miles per hour, half of an average car's energy is used to push air out of the way. Recently, Wal-Mart, the world's largest retailer, worked with the Rocky Mountain Institute to determine how it could double by 2015 the fuel efficiency of its fleet, which currently averages about six miles per gallon. This dramatic increase is being achieved by improving the vehicles' aerodynamics and by installing low-rolling-resistant tires.[10] For short trips, designing lightweight commercial and government electric-vehicle fleets is an obvious energy-saving opportunity, as exemplified by IDEA, Bright Automotive's aerodynamic, full-size, plug-in hybrid electric van (fig. 5).


fig. 5

Container ships are a less familiar but major mode of long-distance goods distribution that presents significant health, pollution, and efficiency challenges. According to one authority, a giant container ship emits almost the same amount of cancer and asthma-causing chemicals as fifty million automobiles; fifteen ships may now produce as much pollution as all of the world's cars combined.[11] Yet oceangoing ship pollution remains one of the least regulated parts of the global transportation system. Policies are being implemented to reduce particulate emissions from ships, and companies are becoming more creative about eliminating empty backhauls. The concept cargo carrier, the *E/S Orcelle*, for example, is not fueled by oil, relying instead on multiple alternative energy generators: fuel cells, solar, wind, and wave power (fig. 6).

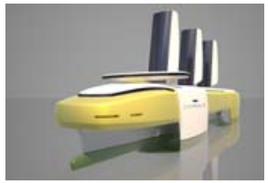


fig. 6

The role for designers in rethinking our mega-mobile world is tremendous. Nearly every section of today's newspapers contains articles describing new mobility initiatives prompted by environmental concerns and the shift to alternative fuels. Some are micro-technological innovations that are easier to achieve than major changes in people's behavior or in the intrinsic form of cities. Already, the growing demand for more livable cities is inspiring citizens to push for more walkable and bikable communities. And the transformation from independent single-system vehicles to a vast and efficient inter-related mobility network presents enormous opportunities, both in the developed and developing worlds, for designing rural and urban infrastructure coupled with new forms of mobility by land, sea, and air.

1 "Energy Inefficient" editorial, in *The New York Times* (January 19, 2009): A24.
2 Jacob Gordon, "Don't Kill Your Car," in *GOOD* magazine (spring 2009): 82–88.
3 Nathan Lewis, The Art Center Summit 2009: Expanding the Vision of Sustainable Mobility, Pasadena, CA, February 17, 2009.
4 Mark Z. Jacobson, "Review of Solutions to Global Warming, Air Pollution, and Energy Security," briefing to Senator Jeff Bingaman, Chairman, Senate Energy and Natural Resources Committee, October 8, 2008. In *Energy & Environmental Science* (January 2009): 148–73.
5 Ben Jervey, "Batteries Not Included," in *GOOD* magazine (spring 2009): 70–71.
6 Elizabeth Quill, "Unclogging Urban Arteries," in *Science* (February 8, 2008): 750–51.
7 Both IT infrastructure and hardware design are currently being developed and applied in cities around the world through Cisco Systems' Connected Urban Development (CUD) initiative, in partnership with the Clinton Initiative (Sue Zielinski, email correspondence, August 17, 2009).
8 This type of "open-source transportation," applied through New Mobility Hub Network systems, is being piloted in partnership with various cities around the world by the University of Michigan's SMART program, with the support of Ford Motor Company and other business and government leaders (Sue Zielinski, email correspondence, August 17, 2009).
9 Budd Steinhilber, "A Look Back . . . and Forward?" in *Innovation* (spring 2008): 55–57.
10 RMI MOVE (Mobility + Vehicle Efficiency), "Wal-Mart's Truck Fleet." © 2009 Rocky Mountain Institute. http://move.rmi.org/markets-in-motion/case-studies/trucking/wal-mart-s-truck-fleet.html, last accessed February 1, 2010.
11 John Vidal, "Health Risks of Shipping Pollution Have Been Underestimated," in *The Guardian* (April 9, 2009). http://www.guardian.co.uk/environment/2009/apr/09/shipping-pollution, last accessed February 1, 2010.

The author wishes to thank Julian Beinart, Robin Chase, and Sue Zielinski.

1

AGV (*Automotrice à Grande Vitesse*) [High-speed Self-propelled Train]

Trains are among the most sustainable forms of transportation, and currently there is great international interest in replacing air and automobile regional travel with fast trains. The AGV, designed in France by Alstom Transport's Design and Styling Studio, is at the forefront of high-speed, energy-efficient trains being produced for fast and reliable medium-distance service between major cities. In 2011, the new, privately owned Italian train company Italo will introduce the AGV and provide rail service between Naples and Turin. The 350-mile trip will last about three hours, and the train will travel at speeds of up to 225 miles per hour.

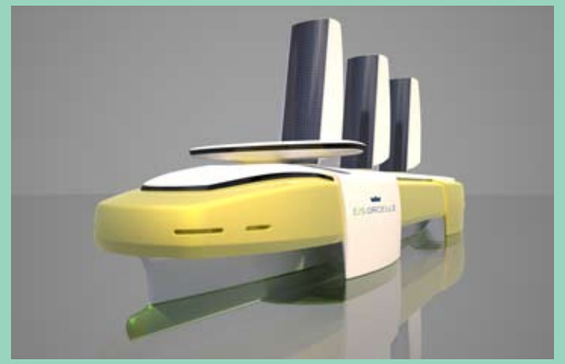
The AGV's design differs from those of conventional trains in a number of respects. Ninety-eight percent of the train is built from recyclable materials, such as aluminum, steel, copper, and glass. Its low weight and efficient traction systems make for a 15% reduction in energy use compared to current trains. The AGV is the first train powered by compact and energy-efficient permanent-magnet synchronous motors, which create electricity and minimize energy loss. It also produces its own electricity from a regenerative braking system: while the train is slowing down, up to eight megawatts of unused electricity is returned to the train's power network. The train's architecture offers both energy savings and improved safety: by locating the bogie between, rather than under, cars, there is no accordion effect in case of derailment.

1 Italo high-speed service on AGV (*automotrice à grande vitesse*), model. NTV and Alstom Transport Design and Styling Studio. Italy, 2009. Resin

2

2 ChargePoint® bollard. Peter H. Muller, Interform. Manufactured by Coulomb Technologies Inc. United States, 2009. Aluminum, molded plastic, power measuring system, modem, ground-fault protection circuitry

3 *E/S Orcelle* cargo carrier, concept. No Picnic AB. Client: Wallenius Wilhelmsen Logistics. Sweden/Norway, 2005, to be completed 2025. Computer rendering



3

4

4 IDEA plug-in hybrid electric fleet vehicle. David Busch, Bright Automotive Inc. Assisted by Rollin Nothwehr and Art Center College of Design interns Michael Churchill, Noah Hammersten, Nikita Kalinin, and Nathan Wills. Manufactured by Bright Automotive, Inc. United States, 2009; expected production 2013. Computer rendering

ChargePoint® Networked Charging Station

One of the challenges of plug-in and electric vehicles is recharging the battery. The finite driving range of electric car batteries means that replenishing points need to be readily available. California-based Coulomb Technologies has developed the ChargePoint Network, a system of smart charging stations that provides curb-side charging for plug-in electric and hybrid vehicles. Since the majority of daily car trips are less than forty miles, drivers do not have to worry about "range anxiety," as their cars can be conveniently recharged in parking spaces at home or at work, or while the owner is shopping. And by linking Coulomb's stations to smart energy grids, the flow of electricity can be managed.

The first charging stations have been installed in San Jose, San Francisco, Houston, Detroit, and Chicago; and the ChargePoint Network has been deployed in Amsterdam, as part of the city's two-year trial project with plans to fuel ten thousand electric cars by 2015. Electric power distributed by these charging stations is obtained from utility grids, some of which, as in Chicago, Florida, and San Diego, is partly supplied by solar panels. The ChargePoint Network communicates via Wi-Fi with the charging stations in order to provide driver authentication, owner management, and utility real-time control. A home-based ChargePoint system can supply cheaper electricity rates and a safer, more secure, and faster service than standard wall outlets. The charging stations can be mounted on walls, streetlight poles, or as stand-alone bollards.

E/S Orcelle Cargo Carrier

Shipping and air travel have been challenging to regulate in terms of new environmental standards. A dramatic step forward is the *E/S Orcelle* (E/S stands for environmentally sound; *orcelle* is French for an endangered type of dolphin), a sustainable vessel proposed by the Swedish/Norwegian transportation company Wallenius Wilhelmsen Logistics. The concept is based on zero emissions and the premise that by 2025 ships will be propelled without oil. The *E/S Orcelle* would have an optimum cargo capacity of up to 50% more space than today's modern car carriers and could transport ten thousand cars. This increase is achieved by the vessel's five-hull shape along with its use of lightweight materials and energy from renewable sources.

The carrier would be made of aluminum and thermoplastic composite materials, which offer greater high-tensile strength, less maintenance, and are more recyclable than the traditionally used carbon steels. The stability provided by the boat's hull and fin design, combined with the new propulsion systems, eliminates the need for the vessel to take on and release ballast water, which often contains invasive species that cause environmental damage. The *E/S Orcelle*'s primary energy sources can be obtained at sea—dorsal fin sails contain photovoltaic cells that capture solar energy and self-adjust to harness wind energy; and twelve underwater fins capture wave energy, which can be transformed into hydrogen, electricity, or mechanical energy.

IDEA Plug-in Hybrid Electric Fleet Vehicle

Reducing wind resistance and vehicle weight are the two keys to improving battery performance and reducing costs in electric vehicles. A recent start-up, Bright Automotive, took these objectives to task with the IDEA, its concept plug-in hybrid electric van designed for light-duty commercial and government fleets. The all-wheel-drive IDEA demonstrates breakthrough vehicle efficiency by operating in all-electric mode for the first forty miles and then switching to a hybrid mode achieving forty miles per gallon. For commercial customers with an eighty-mile daily urban route, the IDEA uses about one gallon of gasoline. By lowering the vehicle's weight, using low-rolling resistant tires, and maximizing its aerodynamic potential, Bright Automotive expects each vehicle to reduce fuel consumption by 1,500 gallons per year and carbon-dioxide emissions by up to sixteen tons per year over competing vehicles. This light truck is constructed of aluminum and sustainable materials, and is manufactured using environmentally friendly methods. Designed as a multipurpose utility van, the vehicle incorporates a 70/30 easy-access split rear door, wide side cargo door, integrated bulkhead, interactive touch-screen computer, and patent-pending passenger seat that converts to a mobile office.

5

5–6 IF Mode folding bicycle. Mark Sanders, MAS Design, and Ryan Carroll and Michael Lin, Studio Design by Pacific Cycles. Manufactured by Pacific Cycles. Designed United Kingdom and Taiwan 2008, manufactured Taiwan 2009. Aluminum, leather, rubber

6

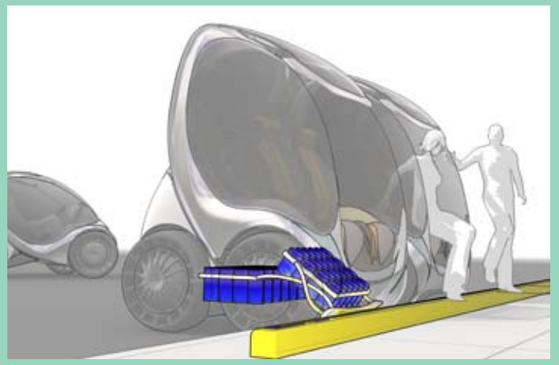
IF Mode Folding Bicycle

The IF Mode is a full-size folding bicycle designed to make urban bicycling a more appealing transportation option. Folding bicycles have typically been heavy to carry, difficult to collapse, and look disproportionate with their small wheels. By contrast, British designer Mark Sanders and Ryan Michael Carroll and Michael Lin of Pacific Cycles, based in Taiwan, conceived of the IF Mode as portable luggage with a handle to push it around. The bicycle is made of lightweight materials with simple, elegantly designed components. It successfully eliminates oily chains, complex tubes, hidden dirt traps, and much of the clutter of conventional bicycles. Unlike most folding bikes, it has full-size wheels and should be seen as a "personal transporter," offering a new image to people who previously thought of bikes as only for enthusiasts or for recreation. According to Sanders, "Instead of looking at the bike and thinking of how to fold it, it began with the folded shape and thinking of how to turn it into a bike." Furthermore, as mobility systems become increasingly interconnected, portable designs like these will facilitate transfers between different modes of transportation. Like laptops, they might eventually become a standard piece of one's luggage.

7

MIT CityCar

As designers contemplate future urban transportation systems, the notions of shared use and mobility on-demand appear as viable alternatives to private car ownership. MIT CityCar is a new vehicle type that combines the two. Conceived by the Smart Cities group of MIT's Media Lab, the stackable, two-passenger electric CityCar will be available at closely spaced intervals in urban areas where users swipe a card and take the first fully charged vehicle at any charging station. Vehicles being returned are stacked and electrically recharged. The critical component of the car is an omni-directional robot wheel that contains an electric motor, suspension, steering, and braking. There are no mechanical linkages connecting the robot wheel to the driver's controls, and elimination of the traditional engine and drive train enables the mechanical systems to be modularized, allowing for flexibility in the design of the body and interior. When folded and parked, CityCar is only five feet long, and three to four cars can fit into a traditional parking space. It is designed for start-and-stop urban traffic, and the wheel robots allow the car to spin on the spot. A sophisticated electronic information and management system is envisaged to control the supply and demand of cars in its network of sites. Although the CityCar must still operate on congested urban streets, the vehicle provides a non-polluting, noise-free, energy-efficient, and convenient alternative to current modes of short-distance travel.



8

7–8 MIT CityCar. William J. Mitchell, Ryan Chin, William Lark, Jr., Raul-David Poblano, Peter Schmitt, and Philip Angus Liang, Smart Cities, MIT Media Laboratory, with Mitchell Joachim and Franco Vairani, MIT Department of Architecture, and Andres Sevtsuk, MIT Department of Urban Studies & Planning. United States, 2003–present. Computer renderings

9

10

NYC Hoop Rack

One simple way to encourage increased bike use in urban areas is to provide bicycle lanes and parking in both commercial and residential locations. A study has shown that a lack of secure bike parking is the main reason why people do not cycle to work. In 2008, New York City's Department of Transportation, in partnership with Cooper-Hewitt and with the support of Transportation Alternatives and Google, organized an international competition for a sidewalk bike rack. The winner was the NYC Hoop Rack, created by two designers in Denmark, Ian Mahaffy and Maarten de Greeve. This elegant, no-fuss, minimal design will become the new standard bicycle rack on the city's sidewalks. Over the next three years, five thousand racks are expected to be installed citywide. The Hoop Rack, a thirty-four-inch circle made of cast metal and bisected by a horizontal bar, can withstand the harsh environment of city streets and is destined to become an iconic member of the urban streetscape.

9–10 NYC Hoop Rack. Ian Mahaffy, Ian Mahaffy Industrial Design, and Maarten de Greeve, Maarten de Greeve Industrial Design. Client: New York City Department of Transportation. Designed Denmark, manufactured United States, 2008–9. Galvanized cast ductile iron. Computer rendering

11

12

13

11–13 *Samarth* bicycle trailer. Radhika Bhalla. Designed United States, deployed India, 2008. Locally sourced bamboo, rattan, iron, jute, coconut fiber, wheels

Samarth Bicycle Trailer

Throughout the developing world, the lack of transportation in rural villages severely restricts many people's ability to access proper healthcare, attend school, receive information, or sell their crops or crafts at markets. The Samarth is a do-it-yourself bicycle trailer that uses local materials and techniques to empower rural Indian women through increasing their mobility. (*Samarth* is the Hindi word for "empower.") Created by Radhika Bhalla, a young Indian designer, the cart responds to the demands of women whose daily routine is spent traveling long distances to transport people and collect water, firewood, or crops. The cart, which can be pushed or pulled or attached to a bicycle, has three configurations: closed like a box, it can carry pots of water or hens or anything that needs to be secured; upright, it can seat two children; and fully opened like a bed, it can carry longer hauls like firewood or crops. The cart requires a structural material like wood or iron for the frame, as well as a soft material, such as jute or coconut fiber, that can be woven, colored, and personalized. Bhalla estimates that the Samarth can provide a woman with five extra hours a day to increase her income by producing handicrafts, take her children to school or to the doctor, or engage in other activities.