



**Asia-Pacific
Economic Cooperation**

**Workshop on
Transportation Energy Efficiency Improvement
Potential in APEC Economies**

**Workshop Report
Washington, D.C.
10 May, 2010**

APEC Energy Working Group

July 2010

Produced by
Alliance to Save Energy
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Acknowledgements

This workshop was made possible by the support of the United States government through the U.S. Department of State, and by the guidance and advice of the U.S. Department of Energy, the U.S. Department of Transportation, and the American Public Transportation Association. The Alliance to Save Energy gratefully acknowledges these key partners, each of whom dedicated valuable time and resources to help make the workshop a success.

The Workshop on Transportation Energy Efficiency Improvement Potential in APEC Economies is a self-funded, United States project of the Asia-Pacific Economic Cooperation Energy Working Group, Expert Group on Energy Efficiency and Conservation. The U.S. Department of Energy thanks the governments of Australia, New Zealand, and Singapore for co-sponsoring this project.

Lastly, the Alliance to Save Energy and its partners would like to thank the workshop speakers who shared valuable insights and lessons from across the APEC region and the participants who contributed to the day's dynamic and substantive dialogue.

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Introduction & Overview

At the Seventh Energy Ministers Meeting (EMM-7) in Gyeongju, Korea in 2005, energy ministers agreed that an effective response to growing oil import dependency in the Asia-Pacific Economic Cooperation (APEC) region requires a mix of demand- and supply-side measures, including measures to raise the fuel efficiency of transport. Energy ministers noted that “continued growth in oil demand can be reduced through energy efficiency and conservation measures, particularly in the transport sector. This may include adopting fuel efficiency standards, promoting the development and uptake of more fuel-efficient vehicles and supporting a shift to less oil-dependent modes of freight transport.”

Pursuant to the ministers’ interest, a [Survey of Transport Efficiency Policies \(EWG 03 2007A\)](#) and a [Workshop on Policies to Promote Fuel-Efficient Transport in APEC \(EWG 02 2008A\)](#) held in Singapore were undertaken by the APEC Energy Working Group (EWG) to review the range of policies that exist to enhance the efficiency and reduce the oil use of freight and passenger transport in APEC economies. These include both policies for improving the fuel efficiency of road transport, which accounts for the great majority of oil use in the region, and policies for improving the efficiency of the overall transport system including road, rail, sea and air.

In the *Survey*, examples of fuel efficiency policies for road transport include incentives for the purchase of fuel-efficient vehicles; fuel-efficiency standards and labeling for vehicles and tires; efficient vehicle selection and operation for government fleets, fuel taxes, support for development and demonstration of technologies to improve vehicle fuel economy, public information campaigns to promote carpooling, traffic system management, and road pricing. Examples of fuel efficiency policies for the broader transportation system include incentives for switching freight shipments from highways to less energy-intensive modes such as rail and sea, programs to enhance the availability and convenience of public transit, transit system energy efficiency (routing, driver training, bus-priority lanes and signal control), flexible work schedules and locations; and “smart growth” planning processes that promote greater density, mixed-use development, and use of non-motorized transport in the design of towns and cities.

Building off the momentum of the previous two projects, on May 10, 2010 in Washington, D.C., the Alliance to Save Energy, the U.S. Department of Energy (DOE), the U.S. Department of Transportation (DOT), and the America Public Transportation Association (APTA) held the [Workshop on Transportation Energy Efficiency Improvement Potential in APEC Economies](#). At this workshop, expert speakers and participants discussed potential energy savings from various transport energy efficiency policy options and shared experiences and challenges from across the APEC region. The workshop panels included energy efficiency for new vehicles, freight efficiency, reducing road congestion, and strategies like mode-shifting and transit-oriented development that can promote livable communities.

The objective of the second workshop was to continue identifying challenges, best practices, and lessons learned across the diverse APEC economies, share those experiences, and inform future APEC energy and transportation projects.

Event Program

Time	Topic & Speakers
7:30- 8:00	Registration
8:00-8:15	Welcoming Remarks <ul style="list-style-type: none"> • Jeffrey Skeer, International Relations Specialist, Office of European and Asian Affairs, U.S. Department of Energy • William Millar, President, American Public Transportation Association
8:15- 8:30	Opening Keynote Polly Trottenberg, Assistant Secretary for Transportation Policy, U.S. Department of Transportation
8:30- 9:30	<u>Energy Efficiency in New Vehicles</u> In this session, panelists will discuss the imperative of reducing energy intensity and greenhouse gas emissions from new vehicles and the impacts and challenges of fuel economy and emissions standards. Presentations will offer unique perspectives from the private sector and from Mexico, where the federal government is developing new vehicle standards. Moderator: Drew Kodjak, Executive Director, International Council on Clean Transportation <ul style="list-style-type: none"> • Keith Cole, Director of Advanced Technology Vehicle Strategies & Legislative Affairs, General Motors • Rodolfo Lacy, Program Coordinator, Mario Molina Center for Strategic Studies on Energy and Environment, Mexico
9:30- 10:45	<u>Freight Efficiency</u> This panel explores challenges and opportunities in the freight sector, including policies that encourage shifts to more fuel-efficient modes of freight. Presentations will cover comprehensive freight policy in Japan, the impact of public-private collaboration on road freight, and the benefits and challenges of ocean freight and shipping. Moderator: Patrick Sherry, Intermodal Transportation Institute, University of Denver, United States <ul style="list-style-type: none"> • James Corbett, Ph.D, Professor, College of Earth, Ocean and Environment, University of Delaware, United States • Tadashi Kaneko, Senior Representative, Japan International Transport Institute • Sarah Froman, Office of Transportation and Air Quality, U.S. Environmental Protection Agency
10:45-11:00	Refreshment Break

Time	Topic & Speakers
11:00-12:00	<p data-bbox="337 260 662 289"><u>Reducing Road Congestion</u></p> <p data-bbox="337 302 1471 478">Heavy road congestion poses a serious problem for many urban centers in developed and developing economies. Speakers on this panel explore planning, design and operations strategies that can improve the efficiency of existing transportation systems and fleets. Presentations will focus on practical key lessons and best practices from leading cities and home in on the ongoing challenges and innovations of improving road congestion in Jakarta.</p> <p data-bbox="337 516 1334 546">Moderator: Dario Hidalgo, Ph.D, Senior Transport Engineer, EMBARQ, United States</p> <ul data-bbox="386 554 1471 688" style="list-style-type: none"> <li data-bbox="386 554 1471 617">• Michael Replogle, Global Director and Founder, Institute for Transportation and Development Policy, United States <li data-bbox="386 625 1471 688">• Heru Sutomo, Ph.D, Centre for Transportation and Logistics Studies, Gadjah Mada University, Indonesia
12:00-12:30	<p data-bbox="337 722 708 751">Break for Boxed Lunch Pick-up</p>
12:30- 1:45	<p data-bbox="337 774 727 804"><u>Promoting Livable Communities</u></p> <p data-bbox="337 816 1471 993">Sprawling, car-dependent, and low-density patterns of development exacerbate and accelerate the problems of high energy consumption and increased greenhouse gas emissions from the transportation sector. In this session, panelists will discuss new and innovative strategies emerging from the local and city level that are reshaping development and transportation patterns.</p> <p data-bbox="337 1031 1399 1060">Moderator: Deputy Assistant Secretary Beth Osborne, U.S. Department of Transportation</p> <ul data-bbox="386 1068 1429 1178" style="list-style-type: none"> <li data-bbox="386 1068 1429 1098">• Jamie Leather, Principal Transport Specialist, Asian Development Bank <li data-bbox="386 1106 1429 1136">• Rachel MacCleery, Managing Director, Infrastructure, the Urban Land Institute, USA <li data-bbox="386 1144 1429 1178">• Paul Minett, Managing Director, Trip Convergence Ltd., New Zealand
1:45- 2:30	<p data-bbox="337 1194 584 1224">Concluding Remarks</p>

Welcoming Remarks

Jeff Skeer, Coordinator for APEC Activities, U.S. Department of Energy
Welcome & Background on APEC

The Asia Pacific Economic Cooperation, or APEC, as many of you may know, accounts for about half the world's economic output, energy use, carbon emissions, and trade. APEC energy ministers and APEC's Energy Working Group are very concerned about ensuring the region's energy security and reducing the region's impact on the environment. In late 2005, APEC energy ministers met in Korea to consider how best to cope with rising oil prices and oil import dependency in the region as a whole. They concluded that we need to follow a three-pronged approach, including not only enhanced investment in exploration and development (which itself faces certain technical challenges, as recent events in the Gulf of Mexico attest) but also accelerated introduction of alternative transport fuels and much more energy-efficient transport.

So the APEC Energy Working Group commissioned a survey of policies to promote fuel-efficient transport in APEC economies. Some such policies relate mainly to more efficient vehicle transport. These include regulations to raise the minimum or average fuel efficiency of new cars and trucks, labels and incentives to encourage the purchase of fuel-efficient vehicles, use of large municipal and federal government vehicle fleets to provide “demand-pull” to boost the scale and reduce the cost of fuel-efficient vehicles, mandatory vehicle inspection programs to boost operational efficiency, and public awareness campaigns about the value of fuel-efficient vehicles and driving practices for household budgets, energy security, the global environment and the business bottom line.

Other policies relate to transport systems. These include policies to limit road congestion, to encourage transit oriented development, to promote a shift in freight transport to more efficient transport modes like rail and barge (which use far less energy per tonne-kilometer than do trucks), and to spread the application of bus rapid transit systems (along the rapidly expanding Curitiba model of dedicated bus lanes, bus stations and payment prior to boarding) which have been adopted in a growing number of APEC cities.

To gather additional examples of such policies, we have sponsored expert workshops. The first of these took place in March of last year in Singapore. This is the second, to facilitate participation by interested experts on the other side of the Pacific. For the current event, we are focusing especially on energy-efficient vehicles and freight, bus rapid transit and transit oriented development. We hope this will lead to a growing compendium of examples and practices in a broad range of APEC economies from which other economies can learn and draw inspiration as they design their own efforts to boost the fuel-efficiency of transport.

Finally, we intend to explore some particular policy approaches in greater depth in terms of estimating the potential energy savings and emissions reductions. We just got funding to do this for intermodal freight, and we hope to do this also for bus rapid transit and transit oriented development. The potential energy savings and emissions reductions are substantial, and policymakers need to be aware of this opportunity.

It is in this constructive vein that we embark upon our discussion today. We are eager to hear about the latest policies for boosting the fuel-efficiency of transport, the obstacles encountered in implementing these policies, some practical approaches to addressing these obstacles, and the potential benefits of fuel-efficient transport measures for energy security and the global environment.

In this endeavor, we have received financial support from the State Department, intellectual support from the Departments of Energy and Transportation, and logistical and planning support from the Alliance to Save Energy. A vital partner behind the scenes – and also in the discussion today – is the American Public Transportation Association.

Which is why I'm so pleased to introduce the president of APTA, Bill Millar. Bill has been promoting public transportation at APTA since 1996, and worked even longer before that to improve public transit in Pittsburgh. He started his career as the county transportation planner in Lancaster, PA, about the time I was a senior in high school there. And we both take metrorail to work – in spite of the growing congestion on our beloved system.

William Millar, President, American Public Transportation Association Opening Remarks

Welcome.

Thanks for that introduction, Jeff.

Excited to be here and to hear our speakers today—because energy efficiency and environmental sustainability, the subjects of our session, are two areas where transportation policy, technology and operational innovations, and a focus on livability in transportation and land-use planning all have some amazing benefits.

Our speakers will discuss what is being done and what more can be done to reduce the energy intensiveness of the transportation sector and the benefits of reducing greenhouse gas emissions that can accrue by reducing energy consumption.

My own involvement, of course, centers on what public transportation use does in these arenas.

Last year saw the publication of a groundbreaking report on this very topic, called *Moving Cooler*. A conclusion that clearly can be drawn from the report was that there is no one solution to energy efficiency and greenhouse gas reduction. Many different approaches combined are more effective than any one answer alone.

In fact, the report demonstrated that expanding public transportation, together with combining travel activity, more efficient land use development, and operational efficiencies can reduce greenhouse gases by 24 percent.

And so I'm pleased to be here with distinguished experts representing several important aspects of any future solution to these challenges: making new passenger vehicles more fuel-efficient and less polluting; making freight transportation more efficient; reducing traffic congestion; and giving people more transportation options by ensuring that transportation and community planning foster livability, giving people a choice to be less car-dependent.

And now it is my great honor to introduce our keynote speaker.

Keynote Address

Polly Trottenberg, Assistant Secretary, United States Department of Transportation

Thanks Bill. And I want to thank APEC, APTA and the Alliance to Save Energy for inviting me to speak today.

I am proud that one of the top goals of the Obama Administration and the U.S. Department of Transportation is to improve efficiency and reduce carbon emissions from the transportation sector. For many of us who joined this Administration, we view combating global warming as one of our most important missions.

This is certainly true at USDOT. In the U.S., the transportation sector accounts for nearly a third of all carbon emissions and over 70 percent of our oil consumption. There is almost no other highly developed country that is as oil-dependent as we are and we know we must transition to a less carbon-intensive transportation system.

But we have inherited a surface transportation program, governance structure, and financing mechanism that were designed chiefly to build the Interstate Highway System. Our transportation system can no longer keep up with the social, economic and environmental challenges our country faces and requires transformational change, which is hard to achieve in the U.S. political system.

But our system does afford many incremental opportunities to try new programs and experiment with different approaches at the local, state and federal level.

At U.S. DOT, we are working with the authorities and funds we currently have at our disposal to provide more efficient and sustainable travel options for all Americans.

We have worked together with the Environmental Protection Agency to set new joint fuel economy and tailpipe emission standards for passenger cars and light trucks that will reduce U.S. carbon dioxide emissions by almost a *billion metric tons*.

In the U.S., almost all intercity travel is done by car or plane, in part because we have invested a pittance in passenger rail since the creation of Amtrak in 1971, while spending hundreds of billions on highway and airport development over the last 60 years.

But the American Recovery and Reinvestment Act provided U.S. DOT with \$8 billion to invest in high-speed and passenger rail through a competitive grant process. We received dozens of applications worth over \$57 billion, and the Federal Rail Administration has awarded \$8 billion to the most promising passenger rail projects all across the U.S. And now FRA is gearing up to award another \$2.5 billion by the end of this year.

The Recovery Act also granted U.S. DOT \$1.5 billion for a multi-modal discretionary grant program, which we dubbed “TIGER.”

We made environmental sustainability one of the key outcomes we looked at in evaluating the 1,400-plus TIGER applications we received worth \$60 billion. We ultimately funded [51 projects](#), many of which reduced carbon emissions in the movement of both passengers and freight. And we will be awarding another \$550 million by the end of the year for more TIGER projects.

We put \$100 million into discretionary grants for public transit agencies to reduce energy consumption and greenhouse gas emissions.

And we have made \$280 million available for urban circulator projects such as streetcars, buses, and bus facilities.

To promote livable communities, DOT has formed an interagency partnership with the Department of Housing and Urban Development and EPA. We are working to supply Americans with affordable, convenient transportation, affordable housing and access to employment centers and other destinations. This will enhance environmental sustainability, economic opportunities, and the quality of the life for all Americans.

And we have written new policies to encourage accommodating less energy-intensive modes like biking and walking.

Our own research shows us that the strategies we are pursuing can have a big impact. Two weeks ago, we released the landmark report, “[Transportation’s Role in Reducing Greenhouse Gas Emissions](#).” The report’s results showed that implementing our livability initiatives, including improved public transit availability, coordinated land use strategies, and greater opportunities for walking and biking, could reduce carbon emissions up to 17 percent by 2030.

In short, at USDOT we’ve accomplished quite a lot with the resources we’ve been given, but we hope to do much more. However, we face some daunting fiscal and political challenges.

As many of you know, in the U.S., we typically authorize our surface transportation programs – highways and transit – every six years, paid for by an 18.4 cents per gallon federal gas tax.

Our current authorization ran out at the end of September 2009 and our highway trust fund that pays for our surface transportation programs went broke in 2008. We have been covering the program with numerous temporary extensions and infusions of cash from our general fund.

Although the surface transportation reauthorization offers our country an opportunity to reform our national transportation policy to focus on performance, livability and environmental sustainability, at present, there is no political consensus about how to pay for a new bill or as to how much reform we can achieve.

The current shortfall in the Highway Trust Fund – estimates are that we need an additional \$100-\$150 billion for the next six-year bill -- and the growing national deficit will make transportation legislation especially hard to pass in the coming months.

We are also overdue to pass comprehensive energy and climate legislation, but that bill too is facing many political challenges. Passing climate legislation would drive the development of low carbon fuels, incentivize increased vehicle fuel efficiency, and along with better transportation planning and investment, improve system efficiency and reduce carbon-intensive travel activity.

But it has proved a tough sell in these difficult economic times and the most recent bill – authored by Senators Kerry, Graham and Lieberman – grew especially controversial when opponents likened its “linked fee” for petroleum to raising the gas tax.

But at U.S. DOT we are currently drafting our principles for a transformational reauthorization bill and have found growing grassroots political support for our efforts.

Livability and environmental sustainability are concepts that have gained tremendous momentum in recent years in light of the changing demographics of the U.S.

Our population is aging, the proportion of households without children is growing, and our increasingly knowledge-based economy seeks urban clustering and fewer suburban office park facilities. There is also a growing demand for more transportation choices and for locating housing and job opportunities near public transportation.

So we will continue our efforts to craft a surface transportation proposal that will reduce carbon emissions and foster livable communities and transportation choices for all Americans.

U.S. DOT is grateful to be a part of this important APEC workshop and I look forward to your questions.

[See the U.S. DOT's Recovery Act activities online.](#)

Energy Efficiency in New Vehicles

Moderator: Drew Kodjak, Executive Director, International Council on Clean Transportation (ICCT)

Session Highlights:

- It is imperative to reduce energy intensity and greenhouse gas emissions from new vehicles - if auto manufacturers want to stay competitive, they'll need to push the envelope on fuel efficiency.
- Worldwide – about $\frac{3}{4}$ of the world's auto market is in the midst of a transition to a 20% GHG reduction.
- Weight-based standards actually disincent investment in lighter vehicles and smaller engines, which generate the largest efficiency gains. Size-based or attribute-based standards may be a better alternative.
- Although many advanced vehicle technologies are very expensive, manufacturers are investing in response to government regulation.
- Mexico's first vehicle regulations, currently under development, are part of an integrated national climate strategy.
- Mexico's vehicle regulations will not only strive to limit tailpipe emissions, they also aim to be active drivers in the vehicle market and promote consumer behavior change towards smaller cars.

Drew Kodjak, Executive Director, ICCT

International Experience with Greenhouse Gas and Fuel Economy Standards

[See Presentation Online](#)

- The mission of International Council on Clean Transportation (ICCT) is to dramatically improve the environmental performance and efficiency of cars, trucks, buses, and transportation systems.
- Graph in presentation shows fleet average fuel economy data for the EU, Japan, South Korea, China, Canada, the United States, and Australia through 2008, the nearest targets enacted or proposed thereafter by region.

- Worldwide – about $\frac{3}{4}$ of the world's auto market is in the midst of a transition to a 20% GHG reduction.
- If auto manufacturers want to stay competitive, they'll need to push the envelope on fuel efficiency.
- The same is true for aviation, and commercial trucks. The entire transportation system is transforming itself. It is an important time for the industry.
- Lighter vehicles are far and away more energy efficient than heavier ones. The main difference between Europe, Japan, and US is the size of engines and the weight of vehicle. There is a 1,000 pound difference between the average weight of vehicles in the U.S. versus those in Japan and engine size is double in the U.S.
- We need to design standards that minimize the weight of vehicle. Weight-based standards actually disincent investment in lighter vehicles and smaller engines, which as noted, generate the largest efficiency gains.

Keith Cole, Director of Legislative Affairs, General Motors

Beyond Efficiency: Energy Diversity at the New GM

[See Presentation Online](#)

- The proportion of fuel costs to income has historically decreased over time, but since 2000 that declining trend has reversed.
- It's been a tough 2 yrs at GM – tough for the industry and GM in particular. The markets are starting to turn around; GM is starting to pay off its government loans and will probably do an IPO sometime this year.
- GM sells more vehicles overseas than in the U.S. – China is their best market currently. Developing countries account for more sales than U.S. or Europe. As developing countries become wealthier, the demand for personal mobility is overwhelming.
- Only 12% of the world owns a vehicle today, and this number is expected to rise.
- As a business necessity, the demand is not sustainable if autos are fueled by petroleum, and we need alternative solutions.
- HISTORY:
 - U.S. fuel economy standards have been slowly increasing, but new standards show a significant increase to 35 MPG.
 - Price of gasoline: During 1990's gas prices were low and people wanted SUVs. Improved vehicle efficiency makes the cost of driving less costly and has masked the true costs of personal mobility and driving.
- When gas prices increase, people drive less and purchase smaller cars rather than trucks and SUVs.

- Vehicle sizes overseas are much smaller than in the U.S. Chinese standards are higher than the U.S., and cars are smaller. This means the U.S. vehicle market has to employ more advanced technologies to meet efficiency & performance standards.
- The Energy Independence and Security Act of 2007 mandates CAFÉ standards through 2016. A McKinsey report shows that the cost of vehicle improvements to achieve the technologies to get reach 2016 targets and beyond will cost auto manufacturers over \$100/ton for GHG abatement requirements. But because of regulation, regardless of the cost, we need to find ways to meet the standards.
- The internal combustion engine is here to stay but more vehicle electrification and hydrogen fuel cell technology will improve the internal combustion engine. New autos will use more expensive computer technology. GM feels that flex fuel vehicles are a cheaper way to meet standards.
- Energy density of fossil fuel alternatives simply cannot provide the same levels of performance as traditional fuels and internal combustion. Despite decades of R&D and investment, batteries are still ~100 times less power dense than liquid fuels, making it hard to build large cars or cars with long ranges that aren't powered by liquid fuels.
- It is important to have a larger energy portfolio in car technology and fuels. GM's strategy is to diversify its portfolio over time by improving technology and increasing its market share of ethanol vehicles and biofuels; improve technology and increase market share of HEVs, PHEVs, and EVs; improve batteries and energy storage—still a long way behind liquid fuels in terms of efficiency. We will continue to need liquid fuels for a long time, so we should make them as efficient as possible.
- Other things GM is investing in its portfolio:
 1. Flexfuels;
 - a. GM thinks this is the fastest way to reduce GHGs.
 - b. Corn ethanol is probably not going away, but its market isn't growing much.
 - c. Other types of biofuels and waste heat recovery technologies are growing.
 2. Hybrid technology- can attain 25% increase in fuel economy but is expensive.
 3. Electric vehicles such as the Chevy VOLT - a pure electric vehicle that can go up to 300 miles on the battery. The technology is not cheap, but electricity is.
 - a. VOLT is equipped with a "range extension device" which can boost its range to 300 miles and help overcome consumers' "range anxiety."
 4. Fuel cells are part of the future: DOE has downplayed them recently but globally the auto industry is heading in this direction, with a goal that in 2015 they will be available. Germany is building 1,000 fueling stations for them now.
 - a. Market penetration in the U.S. is low since we are not equipped with the fueling infrastructure, but fuel cells are making a lot of headway in global markets.
 5. En-Vs for Personal Urban Mobility: Like a 2-passenger segway, that can connect in chains and move in dedicated lanes (possibly BRT lanes), and powered by electricity.

Rodolfo Lacy, Program Coordinator, Mario Molina Center, Mexico
Mexican Fuel Economy and Greenhouse Gas Standards in a Comprehensive Climate Change Regulation

[See Presentation Online](#)

- Mexico does not currently have a fuel efficiency standard but is required to establish joint fuel economy and GHG standards in 2010 as part of Mexico's Climate Change Program.
- In addition to traditional NO_x, SO_x, and VOCs, the Mexican standard is also trying to include CFCs from vehicle air conditioners, indirect CO₂ and black carbon. In terms of global warming, black carbon is even more potent than methane, and should be regulated.
 - There is no model for Mexico to follow that includes black carbon. To establish standards, the government is requesting data from manufacturers on particulate matter and black carbon annually for next 3 yrs. After this, maximum emission limits may be considered.
 - Mexico is including a supplemental test to measure indirect CO₂ emissions when the A/C is on. For CFCs, air conditioning systems must be hermetically sealed during the vehicle's lifetime.
- In Mexico, the average useful life of autos is longer than in the U.S. –ranging about 20-25 years. They import cars from Brazil, Europe, U.S.
- Mexico manufactures 1.5 million cars. They export 81% of what's produced: 70% goes to the US, some also go to Europe. Since they're selling overseas, they must meet the foreign efficiency standards as required by these countries.
- At the same time, because Mexico doesn't have efficiency standards, they are importing a lot of old, dirty *chocolates*, or used vehicles. In 2006-2007 Mexico's fleet grew by more used vehicles than new – these old cars are inefficient. Despite stricter border enforcement, many illegal vehicles are still making their way into Mexico.
- Mexico intends to use new standards to shift the market towards smaller cars and push behavior change. Mexico does not want to follow the U.S. model in this instance (market shift to larger cars and SUVs).
- For Mexico's "20 in 15" Proposal, in regards to fuel efficiency standards, they have four groups of vehicles (size-based rather than weight-based) in the rulemaking proposal each with their own vehicle efficiency goals. The program is modeled after Japan's Top Runner approach.
- More than 50% of the market is controlled by the Asian and European markets, which have stricter standards than in the U.S. Mexican manufacturers would like to follow the

examples set by Japanese or European manufacturers. Lacy noted that while hybrids cost more, the hybrid purchase makes sense.

- Carbon leakage in APEC Economies: Most manufacturers calculate average useful life to be around 10 years, but in actuality many vehicles or parts of vehicles are exported to other economies where they can be used for another 10 years. Particularly for cars who fail inspections, many of those are exported to economies without standards and inspections or with lower levels of government oversight. This poses a problem in trying to mitigate global climate change through vehicle regulations.

Question & Answer

Q: Mexico intends to use their vehicle standards program not just to drive technology and fuel economy but also to transform consumer behavior in their choice of vehicles (to smaller ones). However, in the U.S., big cars equate to big profit; small cars equate to small profits. How can we get around that economic incentive to manufacture larger vehicles? How can industry balance profits with needed changes in car size and economy, and how can we mobilize politically to accomplish that?

Keith Cole: In this industry, the best engineers and designers traditionally wanted to design trucks, because that's where the profits and prestige were. We constructed a market on big cars when gas was cheap. However, in a world of higher energy prices, industry can make more money in smaller cars due to increased demand—this is proven in Europe's case. Also in the past, by averaging fuel economy standards the way CAFÉ does, efficiency in smaller cars could offset inefficiency in larger cars and manufacturers could game the system. Now, in countries adopting attribute- or size-based standards, those opportunities disappear.

Rodolfo Lacy: Mexico's objective is to shape the market, and they can do so partly by choosing what types of vehicles to import and also with good marketing to consumers. In the Mexican market, size is less important than prestige – only 20% of people have cars. Gas prices are not as important. Lately the mini-cooper has been popular. They want to bring more efficient cars from a global market into Mexico. If they promote hybrid vehicles it will work – marketing is key. The different advantages of small vehicles can be promoted. For instance, in Mexico, the streets are very small so a mini cooper is easier to park.

Q: Europe is targeting a standard of 60 MPG – substantially higher than US. How far and fast can Asian economies move to a higher standard? Can standards be adopted for size versus weight-based standards?

Drew Kodjak: Adopting a size (or “footprint-based” standard) rather than a weight-based standard is a forthcoming trend. New regulations will most likely lead the way. Three billion people around world follow Europe's example and they tend to be the leader in this regard. In Canada

we'll probably also follow their lead. In the meantime, low-cost measures like downsizing engines and turbo charging can make significant gains.

Keith Cole: Manufacturers are spending about \$100/ton for new GHG reducing technology for vehicles. If we could get people to buy smaller cars, and if status and style played into that it might help, but consumers demand functionality. Europeans don't demand pickup trucks like in the U.S. which makes it more challenging in the U.S. He doesn't know how they'll achieve a 60MPG standard without electric vehicles. If there were a carbon price, the business case in investing in these technologies would become better. Lastly, our regulatory system in the U.S. isn't well set-up to allow for diesel which could move us a long way to higher efficiency, especially in trucks.

Q: How much more can we improve?

Keith Cole: It's a mixed bag – higher fuel taxes drive people to buy more fuel efficient cars. Different APEC countries are choosing different paths. For example, South Korea is pushing for fuel cells; China – electric battery vehicles. GM believes that the technologies will need to be different in different parts of world and the costs associated are about the same, and they're expensive.

Q: Will China get to 60 MPG?

Keith Cole: They have political concerns, and 60 MPG would be very expensive. Most likely, they will not go in this direction.

Q: Regarding carbon leakage, from a carbon perspective what matters is the total profile. Is there a future where auto manufacturers are given incentives or made to be responsible for more? Technology can only get us so far; operation and use of the vehicle over its lifetime need to be addressed too. Where is the locus of responsibility for the lifecycle of the vehicle? What opportunity is there for manufacturers to be accountable for that?

Keith Cole: You can assign responsibility to any element of society. The question is – where does it make sense (most efficient) to assign responsibility? As a manufacturer, we can't control how much people drive. Gas taxes, or CO2 charges on fuels are more efficient and assign responsibility to the customer – that is, the more they drive the more they pay. For example, pay as you drive car insurance – pay for how many miles you drive rather than pay a flat fee annually. This would incent people to drive less.

Freight Efficiency

Moderator: Patrick Sherry, Intermodal Transportation Institute, University of Denver

Session Highlights:

- The movement of goods is among the fastest-growing sources of transportation emissions.
- Fast and reliable movement of goods is crucial for sustaining economic growth and development—this needs to be balanced with energy and environmental impacts in the movement of goods.
- Not enough data or research has been done to understand the full potential and challenges for intermodal freight. The GIFT model is one tool to begin to help decision-makers explore different scenarios.
- Japan has successfully decreased emissions in transport sector via technology innovation, regulations and standards, incentives, system optimization, and behavior change. Freight emissions peaked in FY1996 and have been decreasing ever since.
- United States Environmental Protection Agency's (EPA) "SmartWay" is a market-based partnership which now has 2,600 partners.
- Other countries are using SmartWay as a best practice model for establishing public-private partnership freight programs in their own countries.

James Corbett, Ph.D, Professor, College of Earth, Ocean and Environment, University of Delaware

Improving the Energy Efficiency and Environmental Performance of Goods Movement: A Multi-Modal Perspective

[See Presentation Online](#)

- The movement of goods is among the fastest and strongest growing sources of transportation emissions.
- There are energy and environmental attributes associated with the movement of goods from multiple modes of transportation.

- Corbett referenced the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC). One proposal to mitigate GHG emissions is to shift modes of transportation to less polluting sources where possible.
- Historically, high levels of service equated to smaller and faster packages with truck and air providing the fastest delivery times, and slower modes of transportation such as rail and water have been considered to be of a lower quality of service. However, this paradigm creates direct tension when with energy and carbon constraints. In order to avoid trade-offs, we need to pursue 3 things simultaneously: (1) Reduce cost; (2) Conserve energy & environmental resources; (3) Protect environment and health
- The amount of freight moved is strongly correlated with the economic growth of a country. Decoupling these is especially difficult during a time of economic recovery.
- Corbett introduced the Geospatial Intermodal Freight Transportation (GIFT) Model (being developed by RIT and University of Delaware)
 - Uses emissions calculator to calculate emissions on particular segments and a transfer emissions model to calculate impacts from intermodal transfers
 - Operates like google maps – it assigns a route from point A to point B. Decision-makers can compare different routes by different modes, and the CO2 implications of those choices.
 - Model allows decision-makers to explore impacts of different scenarios, factoring in time and speed of delivery, mode & infrastructure, and cost. They're testing the model to make improvements.
- So far overall effects are promising but limited, and more research is needed to determine the opportunities and implications of modal shifts.
- Their program is holding a series of stakeholder roundtables to identify gaps and further refine the tool.

Tadashi Kaneko, Senior Representative, Japan International Transport Institute

Policy for Energy-Efficient Freight Transportation in Japan

[See Presentation Online](#)

- In Japan, twenty percent of CO2 emissions is from transport sector; 90% from vehicles. CO2 emissions in transportation peaked in 2001, while freight vehicle emissions peaked in 1996.
- Japan's policy for GHG reduction integrates several elements:
- Improve fuel efficiency & operational efficiency
 - Regulation is based on the Top-Runner Standard
 - Vehicle Green Tax System promotes fuel-efficient vehicles, hybrids, and clean-diesel. The system includes 3 taxes: (1) The annual vehicle tax; (2) The annual vehicle tonnage tax; (3) The Vehicle Acquisitions Tax.

- Owners of fuel efficient vehicles can get a tax incentive of 50%, 75% or 100% tax reduction.
- A subsidy is available which is intended to help introduce low-emission buses and trucks – unfortunately with the economic downturn, demand has been slow, so the government added subsidies for replacing old and less-clean vehicles. Buyers can earn up to \$18,000 for replacing a large old vehicle with a new smaller one.
- Japanese people like regulations, but “Hojo-kin” is key – it means the government provides subsidies and incentives to drive demand for lower emission vehicles.
- Government-supported programs are running pilots for new low-emission heavy duty trucks. Pilot routes evaluate the vehicle’s quality, durability, operational cost, convenience, etc.
- Operational efficiency-
 - Using integrated handling, operational management techniques, air-conditioning retrofits, and ICT applications, fleets are greatly improving their operational efficiency.
 - Eco-friendly driving management systems: A small box installed in a truck records driving behavior (such as quick accelerating and idling). Data is transmitted to central computer and drivers then attend a seminar to learn to drive more efficiently. This approach improves driver efficiency by as much as 20%.
- Increase cargo volume per delivery.
 - Freight volume has increased but trucking distance has decreased which has improved overall efficiency.
 - Reduce volume and distance of transportation. Modal shift from trucks to domestic shipping and rail has reduced some emissions, but mode shifting progress has been slow.
- Third Party Logistics: The total transportation process from factory to shelf is being optimized by the government’s incentives that add a distribution center in the supply chain. Benefits include unification of orders and inquiries and more responsive communications through an integrated data system.
 - The system is supported by government assistance in standardizing contracts, establishing guidelines, and creating a tax and incentive structure for cargo distribution (Comprehensive Distribution Efficiency Law of 2005).
- The Green Distribution Partnership was established 2005 by shippers, think-tanks, and other carriers. There are now 3,100 members. This is based on U.S. EPA’s SmartWay Program.
 - Fosters cooperation between shippers and carriers on methodologies for emissions calculations and to share best practices.

- Government grants are available, and companies can also be recognized through an awards program.
- Case Study: Modal shift with “milk run” scheme--Increase cargo volume and shift longer legs of trucking to rail or shipping . Reserve trucks for “milk runs,” or the shorter legs between factories, rail heads/ports, distribution centers, and final destinations.
- Case Study: New tools—Using a new “soft-tank container,” an ordinary container can become a tank trailer. This allows trucks to be fully loaded on both to and return trips rather than only on to trips.

**Sarah Froman, Office of Transportation and Air Quality, U.S. EPA
Promoting Freight Efficiency Through the SmartWay Program**

[See Presentation Online](#)

- Sarah Froman reported that many countries are working to develop freight sustainability initiatives globally. The “SmartWay” Carrier-shipper partnership program includes technology and finance programs.
- SmartWay is a market-based partnership formed between EPA and freight transport industry to conserve fuel and reduce emissions. Now 2,600 partners are involved, encompassing 30% of VMT in freight trucks and all class 1 rail freight.
 - When shippers join, they commit to shipping at least 50% with partner carriers and look at ways to improve efficiency and reduce emissions in their logistics operations. In return, they receive better data and recognition
 - When carriers join, they commit to emissions reduction goals and to integrate fuel-saving technologies and strategies into their fleets. In return, they get preferred status and technical assistance.
- GHG inventory and management tool track partners progress. EPA helps partners understand the financial benefits they’ll receive if they invest in better trucking technologies.
- Up to present, program participation was driven by carriers’ desire to learn and improve fuel efficiency. Slowly, now there is also market pressure from the demand side as brand recognition increases and awareness of carbon disclosure increases.
- SmartWay Technology Program certifies tractors and trailers if they are 10-20% more efficient. Verified technologies include idle reduction, aerodynamic equipment, and low rolling resistance tires.
- Smartway Finance Program is aimed at accelerating deployment of energy-efficient technologies and practices, with a strong focus on smaller fleets with lack of access to capital.

- Uses revolving loans to give grants to smaller fleets organizations at lower interest rates and with more flexible terms.
- SmartWay Finance Center is an online portal similar to Lending Tree where truckers can find complete information on loans.
- Globalization and multinational corporations means new challenges and opportunities for optimizing global supply chains.
 - SmartWay is developing new tools to encompass more freight modes in more places to improve data collection and analysis globally.
- Other countries are using SmartWay as a best practice and model for establishing freight programs in their own countries.
 - Canada, Mexico, France, Australia have implemented similar programs
 - EU feasibility pilot led by France.
 - World Bank using SmartWay as a template for the pilot Green Freight Partnership project in Guangdong, China.

Question & Answer

Q: What are some recommendations or projections of end results of the GIFT model?

A: James Corbett: They have noticed 2 patterns:

1. There are clear corridors of goods flow. Some of these corridors are viable and competitive for mode-shifting, but we don't yet know why they aren't being chosen.
2. Nodes matter more than segments, especially in terms of managing congestion and peaks. The efficiency, performance, and attractiveness of an integrated route is greatly dependent on delay times at nodes. Taking these into account can uncover some interesting performance comparisons. For instance, when comparing routes, when mandatory rest times for truckers are factored in, rail may attain performance parity even when accounting for wait times at rail heads.

Q: Can the GIFT model modal impacts under a cap & trade scenario?

A: James Corbett: GIFT can use its formula to adjust for prices. Clearly, comprehensive regulation can motivate industry and provide systematic incentives. Regardless, GIFT can map available routes that can allow the industry to plan and adapt. Currently, the program is convening a series of round tables with industry stakeholders to continue to refine the model.

Q: What is the implication of GIFT for developing economies? What lessons can they take away?

A: James Corbett: As developing economies start consuming more internally (and not just exporting goods), they have the opportunity to build their intermodal infrastructure and networks in a more rational way that is geared towards the entire system, rather than favoring any one mode

(such as what happened in the U.S. with highways). Developing economies have the opportunity to learn from others and foresee what they might need down the road.

Reducing Road Congestion

Moderator: Dario Hidalgo, Ph.D, Senior Transport Engineer, EMBARQ, United States

Session Highlights:

- Urbanization in developing economies is increasing rapidly and straining transportation and other infrastructure.
- Developing economies can choose either a capital-intensive / car-centric solution or choose a solution that limits private motorization and gives priority to non-motorized and public transport.
- While the number of autos per 1,000 people correlates to economic development, greater use of automobile doesn't mean greater economic productivity.
- Better road and transportation system operations and management can reduce congestion, increase productivity, improve air quality, and reduce emissions.
- A growing number of cities are limiting road space and expanding walking and biking space. Bogota is a great success story, and the Guangzhou BRT is modeled on it. Guangzhou's BRT is the largest in Asia. Its success may have lessons for other rapidly urbanizing areas.
- The case of Jakarta, Indonesia, highlights challenges to implementation. Particularly, fragmented planning authority is hindering Jakarta from fully implementing an integrated transportation strategy. Even so, Jakarta still has ambitious and innovative plans in the works.

Dario Hidalgo, Ph.D, Senior Transport Engineer, EMBARQ

Reducing Road Congestion: Workshop on Transportation Efficiency Improvement Potential in APEC Economies

[See Presentation Online](#)

- Urbanization in developing economies is increasing rapidly and putting a lot of strain on transportation and other infrastructure.

- Developing economies can choose either a capital-intensive and car-centric solution or choose a solution that limits private motorization and gives priority to non motorized and public transport. The first solution has historically led to increasing and intractable congestion on the roads. Even if vehicles are cleaner, congestion still remains a problem in the first paradigm.
- U.S. has 800 vehicles per 1,000 people – this is not sustainable and developing countries have the opportunity to develop smarter. Greater auto use doesn't mean greater economic productivity. We need more creative solutions than cars.
- Compact cities with mixed use development are better. NYC is shifting to this by removing roads for vehicle traffic and improving transportation systems, and allowing higher density living within the city. In Mexico, the main opportunities for improvement are not in fuel efficiency but in improved public transportation.
- For example, Bogota, Columbia in 1998 was congested with buses, and now they've made a change to a bust rapid transit system, and more biking. As such, the city of Bogota has been able to keep public transportation at stable levels over time. There are economic disincentives to car use.
- Another example is Istanbul's bus rapid transit corridor - it is one of the most heavily traveled BRT lines in the world.
- Countries with the same GDP have different rates of car ownership. This implies that there are other ways to grow that are not entirely car-dependent.
- With integrated and comprehensive policies, transformation like that in Bogota is possible, but our officials and politicians will need to be bold and brave.

Michael Replogle, Global Director and Founder, ITDP

Transportation Networks: From Best Practice to Vision

[See Presentation Online](#)

- Leading cities around the world provide lessons for how to achieve low-carbon, high efficiency transportation networks.
- How street space is allocated, priced and managed tells people how to travel. This is missed often in planning.
- A growing number of cities are limiting road space and expanding walking and biking space.
- To boost transportation operational efficiency, (1) AVOID, (2) SHIFT, (3) IMPROVE.
- Optimize traffic signals to avoid stop-and-go congestion. Steady flow traffic can create efficiencies at all speeds, especially at lower speeds. To draw a comparison with the electric grid, high congestion during peak hours is like brownouts 2 times a day on the roads.

- We could cut GHG by ¼ or more by 2050 with the largest net negative cost per ton with smart transportation, smart growth, transport pricing measures. (Cited the *Moving Cooler* study and the recent report released by the U.S. DOT as a resource.)
- Unmanaged vehicle lanes can lose ½ their capacity when it's needed most. Congested lanes move at 20 MPH whereas managed move at 60 MPH.
- For example, after 30 years of road pricing, Singapore has tripled its mode share of public transit. Singapore now has 70 charging points for tolls, and prices are adjusted periodically.
- Polling shows that public opinion changes pre and post congestion improvements – that is, once people see it, they appreciate it more.
- Bus rapid transit (BRT) has high cost-effectiveness, is quick to deploy, but requires political support to allocate road space and for enforcement. It cuts CO2 and energy use; switches use to lower carbon fuel; increases use of energy efficient buses.
- Bogota is a great success story, and the Guangzhou BRT is modeled on it. Guangzhou's BRT is the largest in Asia and its ridership puts it in the same class as the largest transit systems in the world (including subways and light rail systems).
 - Stations are located away from major intersection so it doesn't impede traffic, and there are turning restrictions across 60% of intersections.
 - Direct service design reduces the need for feeder buses and forced transfers.
 - Bike lanes are built into the BRT corridor and bike parking and sharing is available near BRT stations.
 - The system has modern off board fare collection systems (like subway stations), reducing time spent on buses collecting fares.
 - Modern control systems allow operators to prevent bus bunching, and displays in stations provide passengers with real-time information.
 - Stations are integrated with the metro (currently under construction).

Heru Sutomo, Ph.D, Gadjah Mada University, Indonesia

Jakarta Urban Transport Policy: Racing with Fast Motorization

[See Presentation Online](#)

- Voted as the 3rd most polluted city in the world, Jakarta is struggling to balance between economic development and its urban transport policy. The recovery from the late 1998 economic crisis and the sound economic state surviving from the world recession has induced a fast rate of motorization the city can hardly cope with. Even the success of its BRT established in 2003 could not significantly improve the worsening congestion.
- Motorcycle use is the fastest growing mode of transport, and safety issues are emerging.

- Without drastic intervention, total vehicles in area will be equal to the total road area, itself, by 2014.
- The government's three pronged approach to solving the problem includes: (1) Mass Transit development, (2) Traffic management, (3) Expanded road infrastructure.
- Jakarta is trying to expand and improve the Jabotabek Railway, while implementing complementary measures such as TOD, developing feeder and integrated ticketing systems, and establishing an airport link. However, at present, Jakarta's rail system comprises only 3% of passenger mode share.
- Jakarta BRT opened its first corridor in 2004 and has since expanded to 10 corridors. However, this aggressive expansion has resulted in a trade-off in quality and systematic planning. For instance, there has been no emphasis on feeder lines so penetration and adoption of BRT by riders has been lower than the potential.
 - BRT and the subway (MRT) are not well integrated since the 2 systems are under different jurisdictions.
- Traffic Demand Management initiatives includes the 3-in-1 (est. 1992). This program requires all vehicles in the central business district to have 3+ passengers.
 - Enforcement has been challenging. The regulation has had the adverse effect of creating "jockeys" who charge drivers money to be their extra passengers.
- A road pricing system is currently awaiting Parliament approval.
- The city lacks a comprehensive parking policy which could also generate revenues for the city.
- The city is challenged by the a growing number of motorcycles and congestion.
- The environmental improvements after 5 years has been rather low.
- Challenges: It is difficult to make integrated solutions happen in rapidly growing cities, especially when planning authority is fragmented across jurisdictional lines. Even so, they have ambitious plans for Jakarta.
- Sutomo recommends this website for additional information: www.pustral-ugm.org

Question & Answer

Q: There is often a gap between theory and practice. How are Jakarta's plans progressing, and how are they addressing institutional and financial barriers?

A: Heru Sutomo responded that BRT systems are planned and operated by provisional government funding. There is a special planning entity, TransJakarta, that encompasses all the local provisional governments in the greater Jakarta area. However, this body only has authority over the BRT systems. How to integrate BRT with MRT (which is federally funded) still remains a major obstacle.

Dario Hidalgo added that there are some good examples (Bogota, Guangzhou, Ahmedabad) of cities who have managed to overcome that problem.

Q: These presentations have been focused mostly on urban-centered solutions. Are there thoughts about how to apply these to less urban areas and how that can help build political support?

A: Michael Replogle: Rural areas around the world have poor access to transportation, which limits their economic opportunities. Low-income segments of the population, in particular, are disproportionately affected. Furthermore, one proposal to reduce driving in America is a VMT tax which is politically very complex. Still, there are some investments and policy shifts that can alleviate the impact on low-income while investing in a more sustainable way of development.

Right now, subsidies for transportation in the U.S. are higher than those for education or health.

Dario Hidalgo: America might serve as a cautionary tale for others since there is such a high cost of conversion from dispersed development to high-density development.

Q: Can Heru describe the 3 in 1 phenomenon in more detail?

A: Heru Sutomo: Jakarta's HOV policy comprises the following. In downtown Jakarta, there are 2 main corridors where all cars in all lanes must have at least 3 passengers or face a penalty. However, this is undermined by "jockeys" who charge drivers a fee for them to ride in their cars to make up the quota. If Jakarta used an electronic road pricing system instead of the current policy, it might minimize opportunism by jockeys and recover those costs as public revenues.

Q: What is the trade off in quality in terms of aggressive expansion of the BRT system in Jakarta?

A: Heru Sutomo: There are restrictions on the HOV lanes, but no restrictions on surrounding roads. Also, there is a lack of feeder systems. Furthermore, many corridors operate CNG buses but there is a lack of CNG fuel, putting many buses out of commission waiting for fuel and causing overcrowding on remaining buses. Overall, the aggressive expansion has come at a cost of less thorough planning and execution for the entire system.

Promoting Livable Communities

Moderator: Deputy Assistant Secretary Beth Osborne, U.S. Department of Transportation

Beth Osborne was sick that day and unable to attend. Joe Traini, Senior International Transportation Specialist at the U.S. Department of Transportation Office of International Transportation & Trade filled in as moderator for this panel.

Session Highlights:

- Land use matters because we're growing quickly. Every decade, between now and 2050, the U.S. will add more than 30 million people. If compact development makes up more than 60%, it could make a significant difference in energy and climate.
- Sprawling, car-dependent, and low-density patterns of development exacerbate and accelerate the problems of high energy consumption and increased greenhouse gas emissions from the transportation sector.
- The institutional structure that governs transportation systems is important. There needs to be one authority responsible for transportation and planning or very well-coordinated bodies at minimum.
- Asian Development Bank (ADB) lends \$3.5 billion per year to governments to improve transportation systems, and 70% has been used to grow transportation infrastructure. One guiding question for ADB and APEC to consider might be: How can we replicate some successful strategies and examples in Asia elsewhere?
- Improved energy efficiency can result in co-benefits such as reduced congestion, improved fuel security, reduced emissions, and improved local air quality. ADB and other institutions are taking a broader strategy with an emphasis on co-benefits.
- Work-related trips account for only about 20% of trips taken, so land use in terms of compact development and mixed use can greatly shape the transportation choices people make.
- In 1980 20% of people carpooled, today 12% carpool. However, there are some encouraging and innovative ridesharing solutions emerging that may help dramatically increase occupancy in private vehicles, reduce congestion on the roads, and improve livability.

James Leather, Principal Transport Specialist, Asian Development Bank (ADB) Promoting Livable Communities in Asia and the Pacific

[See Presentation Online](#)

- A “medium-sized” city in Asia is one with a population of a half million to 4 million people.
- One guiding question might be: How can we replicate some successful strategies and examples in Asia elsewhere?
- The transportation profile is dynamic and still changing rapidly in Asia, presenting both opportunities and challenges.
- Improved energy efficiency can also result in other co-benefits such as reduced congestion, improved fuel security, reduced emissions, and improved local air quality. ADB and other institutions are taking a broader strategy with an emphasis on co-benefits.
- ADB’s overall strategy is: Avoid – Shift – Improve. First, avoid and reduce the need to travel. Second, shift to more efficient modes. Third, improve existing vehicles & fuels. Developed and developing countries have different needs for avoiding, shifting, and improving.
- In most Asian cities 30-40% are using non-motorized transportation and public transport; 70% mode-share. How do we stop the transition to motorized vehicles?
- One trend in Asia is the growth of electric 2-wheelers and electric buses. These can help in low-demand areas or areas with little fueling infrastructure (rural) or for high-frequency or short trips (anywhere).
 - The largest electric bus fleet is in China and has about 600 small buses, each with about 15 seats.
- ADB lends \$3.5 billion per year to governments to improve transportation systems, and 70% has been used to grow transportation infrastructure.
 - **China:** In China, a \$1 billion loan is exploring efficiencies in rail freight: improving signaling; double stacking; double tracking; mode shifting; etc. Additionally, ADB is funding 16 bus rapid transit systems in China now.
 - **Mekong Region:** ADB is supporting projects to integrate freight networks and infrastructure (rail, ports, roads) and projects to shorten shipping distances by shifting some freight to coastal shipping.
 - **Kathmandu, Nepal:** ADB is supporting a project to complete a missing section of a road which is critical to removing vehicles from the city center.
 - **Philippines:** Projects include one to link BRT to existing bus systems and turn them into feeder systems. Another project is investigating opportunities to improve efficiencies in Jeepnies.
- The institutional structure that governs transportation systems is important. There needs to be one authority responsible for transportation and planning or very well-coordinated bodies at minimum. For example, in London, Singapore, and Seoul, one agency is responsible for transportation within the city boundaries. All these cities have done well.

- In terms of financing, in general, the major revenue-generating thing is vehicle sales, while mass transit is a public good. In order to finance urban transportation system improvements, ideally the revenues from vehicle sales can be used to partially subsidize the costs of providing public goods and services.
 - In Singapore, there's a range of disincentives used to restrict individual vehicle use. There are taxes and charges applied at the time of purchase, and higher prices for on-street parking the city, and road congestion pricing increases the price of private vehicle ownership over the lifetime of the vehicle. For instance, if your car costs \$20,000, the total cost is actually closer to \$60K when you consider parking fees and other fees. Restriction measures are necessary. This has reduced congestion on the roads and encouraged residents to utilize mass transit, and the taxes and fees generate revenue for transit systems.
- Ultimately, regulations need to be comprehensive in scale and take into account social equity and road safety questions. We must take a broader view and factor in the health, social and environmental costs to driving.

Rachel MacCleery, Managing Director for Infrastructure, Urban Land Institute
Livable Communities, Transportation, and Climate Change: What Metros Can Do to Make a Difference

[See Presentation Online](#)

- As the intersection between infrastructure (water, roads, energy and housing) and transportation, land use is often an overlooked tool.
- Population will continue to grow, and the challenge will be how to decouple GHG emissions from that.
- Land use matters because we're growing -every decade - between now and 2050, the U.S. will add more than 30 million people. If compact development makes up more than 60%, it could make a significant difference.
- Compact development can take many forms and there are different options depending on the locality (can fit into existing urban areas, suburban or exurban areas).
- Work or work-related trips are only about 20% of trips taken, so land use in terms of compact development and mixed use can greatly shape the transportation choices people make. If more choices are closer together, this may increase public transit and non-motorized mode shares.
 - Compact development can reduce both VMT and GHG emissions.
- Demand for metro living is growing, but there are institutional, regulatory, and financial barriers. These include fragmented planning authority and zoning obstacles.

- However, twenty states are taking a leadership role in that they have adopted GHG reduction targets; and over 1,000 cities have signed the Mayors' climate pledge.
- Some examples of successful land use developments include:
 - Urban intensification and infill projects in Seattle and Washington, DC.
 - Suburban retrofits and mall makeovers: Belmar (old Villa Italia Mall) in Denver, CO has tripled density onsite without adding any traffic lights. Other similar projects include Dadeland in Miami, FL and Tysons Corner in Fairfax, VA.
 - Daybreak, Salt Lake City, Utah – 4,000 acres; 24,000 new residences all built to ENERGY STAR standards.
 - A whole host of streetcar and urban rail investments are also on the books.
- Policy reforms are needed – for example, requiring developers to provide maximum parking space ratios rather than minimum parking space requirements; or flexible, innovative parking strategies, share-car, zoning reforms.
- Looking at Asia, what are some lessons and strategies that can be applied there? In a region with strong population growth, growing demand for vehicles, rapid urbanization, and loss of farmland—what do “sprawl,” “compact,” and “livable” mean in an Asian context? How is that different from American understanding of those terms?
- In the end, compact development/livable communities offer a win-win and have many benefits, but they are hard to do. We need supportive market demand, policy, regulation, and infrastructure to succeed.

Paul Minett, Managing Director, Trip Convergence, Ltd, New Zealand

The Need for a (Road) Space Program For This Decade

[See Presentation Online](#)

- Energy consumption is increasing in the U.S.
- Livability without a car – the ability to walk, bike, and take mass transit needs to become the typical mantra. Good signage, consistency and familiarity are important in training the public to use mass transportation. But what if we can't get to that point fast enough? Then increasing ride-sharing with existing vehicle fleets may make sense and be less polluting than nearly empty buses.
- As we build infrastructure to support more transit and plan policies and programs to encourage modal shift and behavior change, we can still improve occupancy and efficiency in existing vehicles.
- Single occupant vehicles typically make up about 110.9 million vehicles on U.S. roads. Assuming these are vehicles that could hold 4 people, there are 300 million empty seats, and 2.8 billion gallons of gasoline are wasted each year by congested traffic. There are already

15.7 M ride-sharers today in the U.S. using vanpools, carpools (workplace based), family-pools. New migrants more likely to share rides.

- In 1980 20% of people carpooled, today 12% carpool.
- Barriers to more ridesharing include: inconvenience of finding rideshare partners, time wasted collecting riders, and our inability to imagine a solution to the first two issues.
 - How can we make ridesharing an easy choice and how can we make assembling full cars easier today?
- Casual carpooling has been happening since the 1970s:
 - For example, in San Francisco, there are 3,000 carpools of 3-person vehicles daily
 - In Washington, D.C., “Slug lines” carry 3,250 3-person carpools daily.—The biggest stop is the Pentagon parking lot, and the slug lines basically work as a feeder system for the metro there.
 - Casual carpooling works because there’s a common meeting place and there’s no barriers to assembling cars—much easier and faster than a trip-by-trip pre-arrangement.
- Technology can facilitate and help operationalize and expand casual carpooling.
 - Online databases can host a pool of pre-screened members and match riders and drivers.
 - The use of smart phone/mobile internet devices are helping people connect.
- At this point, there needs to be a lot more research and study to explore how effective this can be, where can it be replicated, and how it can be scaled as one part of the solution to transportation constraints and climate challenges.

Question & Answer

Q: What can APEC as an open forum do to collaborate and coordinate with efforts here?

Paul Minett: APEC can support the Ridesharing Institute and help fund research.

Q: How do you address mismatches and other problems in carpooling schemes? How do you match supply and demand?

Paul Minett: Pre-screening participants helps. Guaranteeing a ride home is important – that is, if your ride doesn’t show up, we find a way to get participants home. Mysteriously, with the slug lines and casual carpooling, by 9:30 in the morning, everyone is gone – the process balances itself. We plan to improve the process by providing information via the Internet so that people know the best time to go to a pickup location.

Q: What are some examples of institutional or government structures that have effectively combined governance, land use & transportation effectively to get around institutional hurdles and fragmented authority?

Jamie Leather: Having a government office with jurisdiction over such transportation issues is important. For example, London had a government body, Transport for London, looking over transportation issues but then Thatcher dismantled it, and transportation suffered. Later, when Transport for London was revived, the system rebounded. This was an interesting case study of the impacts of having a central planning authority, not having it, and then having it again. It demonstrates that when a body is in place, it helps tremendously. Seoul also has a good oversight body and champion in the Ex-Minister of Seoul. Seoul also has a strong complementary marketing & information program.

Jeff Skeer: Hong Kong would be another good example.

Q: It sounds like there are parallels between ridesharing and freight. For instance, you could view the Pentagon slug line stop as a distribution center. Both have similar challenges of how to bundle people or cargo in the most efficient manner. Is there infrastructure or investment conditions from the ridesharing side that could inform thinking on efficient freight operations?

Paul Minett: When it comes to ridesharing, it's not simply an information question (knowing where packages and cargo are and where they're going), but it's also a logistics problem. Also, people are much more dynamic than packages—they can change their minds, add new legs onto a trip, etc. Cargo on the other hand can't think. At the same time, there may be some interesting things to explore in tandem.

Q: It seems as if there is a common theme: systematic underpricing of driving costs and lack of information feeding into system networks prevent disaggregate players from bundling into more efficient packets. How can advances in ICT and changing business models transform the way transportation works, particularly with how to move away from individual vehicles?

Rachel MacCleery: There are innovations happening in transit and compact land use in Asia, but it's on a smaller, one-by-one basis. There's an opportunity to encourage more of this at the federal level, to incentivize new approaches and help communities think across jurisdictions to regions and to create meaningful, rich, walkable places. To a certain extent, federal policy has lagged behind. HUD Sustainability grants are prompting people to work together.

Q: From the *Growing Cooler* report, what can we do to accelerate the trend towards more TOD?

Rachel MacCleery: The report examines a number of scenarios based on different assumptions. You can see the report for what those specific assumptions are.

Q: What is the progress and outlook for "Eco-Cities" in Asia? What are some challenges and prospects related to transportation?

Jamie Leather: Transportation is a difficult area to try to achieve zero emissions or zero energy, and it's unclear how successful that can be. However, these demonstration cities probably can help

us uncover some key lessons and strategies. Maybe one thing to add value APEC can do is to highlight those lessons and case studies for others, so that new developments and new urban areas don't have to start from scratch.

Concluding Remarks

Jeff Skeer, Coordinator for APEC Activities, U.S. Department of Energy

We've heard from speakers today about the state of energy efficiency in vehicles, with the main themes being:

Vehicle miles:

- Fuel cost as a percentage of disposable income -it's much lower now than it was in the 1990s, and it's a challenge to get people to buy fuel-efficient cars.
- Vehicle fuel standards: how much further can APEC economies go with fuel standards in terms of the turnover in stock, and how rapidly can we move to higher standards?
- Hybrids are important and can raise fuel economy by 30%, though cost per ton of CO₂ reduction is high, >\$100 per ton.
- Electric vehicles have lower operating costs than gasoline vehicles at 102 cents per mile vs. 7-13 cents.
- We need to have a greater range of distance by further battery developments (energy per unit weight has not improved much – it's hard to apply the technology to larger vehicles).
- Internal combustion will continue to have a substantial share of the vehicle market for many years, so continued efforts to boost their efficiency are important.
- Regulatory design issues are important: size-based fuel economy standards are more effective than weight-based standards.
- There are good prospects for moving towards size-based or footprint-based fuel efficiency standards in the APEC region. EU is moving this way, as are APEC North American economies (Canada, Mexico, United States), so a number of APEC economies in Asia may well follow.

Freight transportation:

- Freight transport is the fastest-growing energy subsector in transportation, so it demands our attention.

Fuel efficiency of freight vehicles can be improved by several means:

- Energy efficiency standards (such as top-runner or best in class);
- Voluntary certification schemes for trucks with a suite of fuel-saving features (such as full truck loads, efficient tire systems, reduced truck idling, intermodal links with rail and ships);

- Voluntary partnerships with shippers (businesses) and carriers (transport firms);
- Fuel savings and carbon calculators for shippers and carriers to use;
- Tax incentives for vehicles that meet or beat energy efficiency standards;
- Loans for fuel-efficient trucks, simplified loan applications, revolving funds for low-cost fuel efficiency loans, and web portals to match potential lenders with qualified trucking fleets;
- Promotion of eco-friendly driving styles by truckers;
- Improvement of traffic flow to reduce truck idling;
- Increasing cargo volume per unit of delivery through rails and ships (through improved rail infrastructure and service, new freight train technology, public recognition of the energy and environmental value of freight trains, use of efficient cargo ships);
- Reducing volume and distance of transportation through better geographic matching of buyers and sellers (with “third party logistics” to optimize the whole distribution network between shippers, wholesale businesses, and retail consumers – promoted through tax reductions on warehouse facilities, streamlined zoning approvals for transport hubs, and low-interest loans), use of “public” cargo trucks instead of in-house trucks, and better road networks;
- Japan is a successful case where freight volume increased but trucking distance decreased along with fuel use and associated carbon emissions;
- Mode shifting or intermodal freight; rail and ships are less carbon intensive than roads or air travel. Emissions calculators have been developed to help carriers make decisions.
- Intermodal mapping helps people visualize this; there are issues with the kind of cargo and whether a load can practically be shifted to rail without spoiling a product; for example, whether the infrastructure and availability are aligned and whether mode shifting is practical in a given case.

Questions for future analysis of mode shifting potential for freight in APEC:

- What fraction of commodities, by value, in each APEC economy, are sufficiently non-perishable that they are suited to rail and ships (which are often slower modes of transport than trucks)?
- For what portion of trips are intermodal shifts allowed by existing infrastructure, and how can the portion be increased through proper infrastructure development strategies?
- For what portion of freight shipments are intermodal transfers potentially cost-effective, and how much might this share increase with the appearance of a carbon value in the market?

Reducing Road Congestion:

Several ways have been cited to reduce road congestions, many of which can reduce greenhouse gas emissions and energy use at a negative cost and substantially raise vehicle throughput on roads:

- Avoid unnecessary travel via road pricing, parking control, and smooth park-and-ride arrangements;
- Shift travel to more efficient modes like buses, walking, and bicycles via road network development with ATCS (automatic traffic control systems), segregation of different transport modes (buses, cars, motorcycles, bicycles), and pedestrianization.
- Improve efficiency of road networks by optimizing traffic speed and flow. Develop urban mass transit with a mix of BRT, light rail, and heavy rail. Such a strategy can produce dramatic reductions in congestion and accidents as well as pollution (NOX, SOX, lead, carbon monoxide, hydrocarbons and particulates).
 - Successful examples include Orange County, CA, in the U.S.; Singapore (where public transport share rose from 40% to 67% as incomes rose ten-fold); and Stockholm, Sweden, and Germany in Europe;
 - Particularly noteworthy successes are in places where bus rapid transit systems have been put in place – Guangzhou (Canton) China: serving 25,000 passengers per hour in each direction; many other cities in China (Chongqing, Xiamen, Beijing, Jinan, Hangzhou, Dalian); Seoul, Korea; Brisbane, Australia; Jakarta, Indonesia; and Los Angeles, CA, in the U.S.

BRT services can be improved through:

- Dedicated rights of way and off-board fare collection; bigger doors and at-level boarding; stations being located far from intersections to avoid congestion there; safe pedestrian environments to and from bus stops; weather protection for travelers; system information for patrons at stations; bike lanes within right of way; operational controls to prevent bus bunching; integration of light rail and metro stations; feed-in and drop-off allowed outside BRT corridor to improve convenience and raise ridership);
- Urban mass transit development (light, heavy rail);
- Parking control, smooth park and ride arrangements.

Livable Communities:

Compact development has many benefits, and the results have been shown to be excellent.

- Unnecessary travel is avoided through integrated land use planning and traffic management;
- Investment is shifted to non-motorized and public transport;
- Public transport systems are improved and made more attractive;
- Congestion, energy use and carbon emissions are reduced;
- Infrastructure costs and land requirements are reduced;
- Communities become more healthy, convenient and livable.

But how and to what extent can APEC economies accelerate transit-oriented development:

- In view of the slow natural turnover of residential and commercial building stocks?
- In view of inertia in zoning regulations that have often favored just the opposite through minimum plot sizes and lack of a clear urban growth boundary in most cities?

Some proposed approaches:

- Urban infill and redevelopment where infrastructure already exists and could readily support denser development without greater congestion;
- Development of streetcar networks and metrorail systems;
- Informal carpooling hubs with matching databases and prescreening to boost ridership;
- Walkable communities and pedestrian zones that will attract a market of professionals who prefer an urban lifestyle for the convenience and cultural opportunities.

The institutional structure of transportation planning is very important to the success of transit oriented development like those pursued in APEC cities such as Hong Kong, Seoul and Singapore. To succeed, transportation planning should happen at the level of the entire metropolitan area and include existing infrastructure in metro areas and improve land use planning.

Jeff Skeer will use the results of this workshop at upcoming APEC EWG and ministerial meetings to inform future funding proposals for energy and transportation projects.

Speaker Bios

Welcoming Remarks

Jeffrey Skeer, U.S. Department of Energy

For the past six years, Jeff Skeer has worked in the Office of European and Asian Affairs, Office of Policy and International Affairs at the U.S. Department of Energy (DOE). He is DOE's delegate to the Energy Working Group of the Asia-Pacific Economic Cooperation (APEC) and also chairs the APEC Biofuels Task Force. Jeff is actively involved in technology and policy cooperation with Europe through the US-EU Energy Council that was launched at ministerial level in November 2009, working with DOE programs and laboratories and the European Commission's Directorate General for Research in developing action plans for biofuels, hydrogen and fuel cells, solar energy, and carbon capture and storage, energy efficient buildings, smart grids, fission, fusion and advanced materials.

Jeff has led studies at the Asia Pacific Energy Research Centre (APERC) in Tokyo and served as a U.S. delegate to the Standing Group on Long-Term Cooperation of the International Energy Agency (IEA). He began his career at the DOE's Office of Electricity Policy in 1980. He holds a Bachelors degree in Public Administration from the Woodrow Wilson School of Public and International Affairs at Princeton University (1978) and a Masters in Public Policy from the Kennedy School of Government at Harvard (1980).

William Millar, American Public Transportation Association

William Millar has served as president of the American Public Transportation Association (APTA) since 1996 and has sought to expand APTA's reach and effectiveness, guiding it to legislative victories and dramatically increasing federal investment in public transportation. Prior to APTA, Bill served 19 years at the Port Authority of Allegheny County, the principal transit operator serving Pittsburgh, PA. As its executive director from 1983-1996, he oversaw the development and operation of bus, busway, light rail, paratransit and inclined plane service. He is the founder of Pittsburgh's award-winning ACCESS paratransit service.

Bill began his career as the county transportation planner in Lancaster, PA and has also worked for the Pennsylvania DOT. Additionally, Bill has been a member of the executive committee of the Transportation Research Board for many years and served as its chair in 1992. He also serves on advisory committees of several university transportation research institutes. Bill has a B.A. from Northwestern University and an M.A. from the University of Iowa majoring in urban transportation planning and policy analysis.

Opening Keynote

Assistant Secretary Polly Trottenberg, U.S. Department of Transportation

Ms. Trottenberg is currently the Assistant Secretary for Transportation Policy at the U.S. Department of Transportation. She was previously the Executive Director of Building America's Future, a new non-profit organization dedicated to bringing about a new era of U.S. investment in infrastructure that enhances our nation's prosperity and quality of life. BAF was created by Pennsylvania Governor Edward G. Rendell, California Governor Arnold Schwarzenegger and New York Mayor Michael R. Bloomberg.

Ms. Trottenberg also worked in the United States Senate for 12 years, most recently as Deputy Chief of Staff and Legislative Director for California Senator Barbara Boxer, Chairman of the Senate Environment and Public Works Committee. Ms. Trottenberg also served as Legislative Director for New York Senator Charles Schumer and as Legislative Assistant to New York Senator Daniel Patrick Moynihan. She has worked extensively on transportation, public works, energy and environmental issues during her congressional career.

Before starting her career on Capitol Hill, Ms. Trottenberg worked at the Port Authority of New York and New Jersey, the Massachusetts State Senate, and the Massachusetts Port Authority. Ms. Trottenberg received her undergraduate degree from Barnard College and her Master's in Public Policy from the Kennedy School of Government.

Energy Efficiency in New Vehicles

Drew Kodjak, International Council on Clean Transportation

Drew Kodjak is Executive Director of the International Council on Clean Transportation, a group of government environmental regulators and international experts from around the world who participate as individuals with a common purpose of improving the environmental performance and efficiency of vehicles and fuels. Prior to joining the ICCT in 2005, Mr. Kodjak served as Program Director for the DC-based National Commission on Energy Policy (NCEP), a bipartisan 16-member Commission of energy experts that released a highly influential report, *Ending the Energy Stalemate*, in December 2004. Before the NCEP, Mr. Kodjak spent several years as an Attorney-Advisor to the U.S. Environmental Protection Agency's Office of Transportation and Air Quality in Ann Arbor, MI. During his tenure with the EPA, Mr. Kodjak was awarded the EPA Gold Medal for his work on the heavy-duty diesel rule. Mr. Kodjak is a member of Bar Associations in Minnesota, New Jersey, and the District of Columbia Court of Appeals.

Keith Cole, General Motors

Mr. Keith Cole is Director of Advanced Technology Vehicle Strategies and Legislative Affairs for General Motors. He focuses on GM's advanced vehicle technologies and their impact on environmental policies. From 1997 until 2002, he was a partner at the law firms of Beveridge & Diamond, and then Swidler Berlin, specialized in energy, environment and natural resource matters. Before that, he worked for Congress for seven years, as counsel to the House Energy and Commerce Committee, specializing in environmental legislation, and two years with the Senate Small Business

Committee. Prior to his legal career, he worked as a geophysical engineer for Schlumberger Technical Services in Abu Dhabi, Kuwait, Egypt, and the Sudan.

Mr. Cole serves on the Board of the Wolf Trap Foundation for the Performing Arts, and has served on the advisory board of the NFIB Legal Foundation, and the Board of Directors of the Access Fund, a national organization dedicated to preserving access to rock climbing areas. He has a Bachelor's degree in Mechanical Engineering and Materials Science from Duke University, and a Law degree from the University of Virginia.

Rodolfo Lacy, Mario Molina Center for Strategic Studies on Energy and Environment, Mexico

Rodolfo Lacy is an environmental engineer who graduated in 1981 from the Metropolitan Autonomous University in Mexico City. He coordinated and edited the first State of the Environment Report in Mexico and is author of the book *Air Quality in the Valley of Mexico*. In 1994 he was awarded a fellowship from the Rockefeller Foundation in the program "Leadership for the Environment and Sustainable Development –LEAD." He is the founding President of the Environmental Engineers Association of Mexico, the former Executive Director of Environment Pollution Prevention and Control in the Mexico City Government, and the former Head of Advisors to the Minister of the Environment and Natural Resources in Mexico.

Freight Efficiency

Patrick Sherry, Intermodal Transportation Institute, University of Denver, United States

Dr. Patrick Sherry is an Associate Professor and Training Director for the Counseling Psychology Program at the University of Denver. Since 2003 he has also served as the Director of the National Center for Intermodal Transportation and a member of the Board of Directors of the Intermodal Transportation Institute at the University of Denver and was instrumental in obtaining over \$2.4 million dollars in funding for transportation-related research. In addition to scientific research, he has consulted extensively with Fortune 500 transportation companies throughout the US and Canada in the areas of safety, human resources, and leadership training. He has conducted extensive research in the area of human factors related to the hours of service for the transportation industry. He developed and validated an assessment battery for selecting and hiring managers in a large rail transportation company and is currently working on a documentary film and a book describing state-of-the-art intermodal transportation solutions in the Western United States.

Tadashi Kaneko, Japan International Transport Institute

Mr. Tadashi Kaneko is a Senior Representative of the Japan International Transport Institute's (JITI) Washington, DC office. He leads research projects on US-Japan international transportation issues including high-speed rail, the civil aviation industry, and environmental measures in the transportation sector. Since joining the Transportation Ministry in 1991, Mr. Kaneko has been engaged mainly in policy coordination covering all modes of transportation, including accessibility improvement of public transportation as well as environmental affairs in the transportation sector. From 2003 to 2005, he was Deputy Director of the Environment Division of the Ministry of Land,

Infrastructure, Transport and Tourism (MLIT), during which time he was dedicated to the creation of the Government of Japan's Kyoto Protocol Target Achievement Plan. Mr. Kaneko has also been engaged in railway issues such as privatization/settlement of national railways and urban railway network planning. Just before joining JITI in April 2008, he was Director for Policy Planning and Coordination of the Urban Railway Division of MLIT. Mr. Kaneko received a Master of Arts in Law and Diplomacy from The Fletcher School of Law and Diplomacy, Tufts University, MA, USA, and a Bachelor of Law from the University of Tokyo, Japan.

Sarah Froman, SmartWay, U.S. Environmental Protection Agency

Sarah Meginness Froman is a policy advisor in the Office of Transportation and Air Quality at the U.S. Environmental Protection Agency (EPA) where she specializes in greenhouse gas (GHG) accounting and management in the transportation sector. Prior to this position, she served as a Presidential Management Fellow at EPA, where she helped states identify measures to reduce air pollution from mobile sources, developed guidance on corporate GHG accounting and reporting standards as part of the Climate Leaders program, and worked with a state-level environmental agency in Melbourne, Australia to assist companies with comprehensive GHG management strategies. She has previously worked on GHG management strategies at the International Council for Local Environmental Initiatives, the City of Boston, and the International Energy Agency. Sarah holds a Master's degree from the Woodrow Wilson School of Public and International Affairs at Princeton University.

James Corbett, Ph.D, University of Delaware, United States

James J. Corbett, P.E., Ph.D. conducts technology-policy research related to transportation, including groundbreaking research on air emissions from maritime transport and the energy and environmental impacts of freight transportation, and assessments of technological and policy strategies for improving goods movement. Dr. Corbett is a Professor in the College of Earth, Ocean and Environment, with joint appointment in Civil and Environmental Engineering in the College of Engineering at the University of Delaware. He is a principal partner in Energy and Environmental Research Associates, L.L.C. (EERA), engaged in energy, environmental, and economic analysis for clients internationally. Dr. Corbett received his Ph.D. in Engineering and Public Policy (EPP) from Carnegie Mellon University, where he also earned M.S. degrees in the departments of EPP and Mechanical Engineering. He is a graduate of the California Maritime Academy and he worked as a licensed officer in the U.S. Merchant Marine, a Naval Reserve Engineering Duty Officer, and a consultant for industry and government in industrial operations, energy and environmental performance. Among more than 120 publications related to shipping and multimodal transportation, Dr. Corbett coauthored the 2000 IMO Study on Greenhouse Gases from Ships, the Second IMO Greenhouse Gas Study 2009, and wrote the Marine Transportation and Energy Use chapter in the 2004 Encyclopedia of Energy.

Reducing Road Congestion

Dario Hidalgo, Ph.D, Senior Transport Engineer, EMBARQ, United States

Dr. Hidalgo manages the EMBARQ Network's international team of transport engineers and environmental scientists. He has more than 20 years of experience as a transport expert, consultant,

and government official. He was Deputy General Manager of TRANSMILENIO S.A., Bogotá's renowned Bus Rapid Transit system. As a consultant for international agencies and local governments, Dr. Hidalgo has taken part in projects in India, Argentina, Mexico, Peru, Chile, Colombia, Ghana and Thailand. He has also taught training courses on Bus Rapid Transit in China, México, India, South Africa, Thailand and Colombia. He has also been a graduate-level lecturer in urban planning and is the author of more than 30 articles, including an extensive review of Bus Rapid Transit in developing countries. He holds a Ph.D. in Transportation Planning from Ohio State University. Originally from Bogota, Colombia, he lives with his family in Washington, DC.

Michael Replogle, Institute for Transportation and Development Policy, United States

Michael Replogle is Global Policy Director and Founder of the Institute for Transportation and Development Policy. As a consultant to the Asian Development Bank and UN Environment Program, Michael is developing transportation carbon footprint analysis methods. He is an advisor to the US Department of Transportation and the Singapore Land Transport Authority on transportation statistics, intelligent transportation systems, and sustainable transportation and is an emeritus member of the Transportation Research Board Committee on Transportation in Developing Countries. He has recently advised governments including New York, Mexico City, Beijing, and Jakarta regarding travel demand management, congestion pricing, and bus rapid transit.

As transportation director for the Environmental Defense Fund from 1992 to 2009, he has been a frequent witness before the US Congress and state legislatures on transportation and environmental planning and policy. From 1983 to 1992 he was responsible for comprehensive planning, travel forecasting, and growth management for Montgomery County, Maryland, and helped shape metropolitan Washington, DC's transportation plans. He holds M.S.E. and undergraduate honors degrees in Civil and Urban Engineering and Sociology, from the University of Pennsylvania.

Heru Sutomo, Ph.D, Gadjah Mada University, Indonesia

Dr. Heru Sutomo is the director of the Centre for Transportation and Logistics Studies at Gadjah Mada University and has served in that post since the Centre was established in 2001. Additionally, Dr. Sutomo founded and became the first director of the Master Course in Transport System and Engineering at Gadjah Mada (1996-1999), and then he founded and became the first director of the Transportation Studies Unit at the Centre for Tourism Studies (1999-2001). He has participated in public transport reform in Indonesia, including the development of the BRT (Bus Rapid Transit) in Jakarta, and is still advising Trans Jakarta to further develop and improve the system. He is active in promoting low carbon, including non-motorized, transport. Projects include Becak (pedicab) revitalization, developing the Green Bike movement on five campuses in Jakarta, and promoting pedestrianization in city centres (Jogja and Surabaya). Dr. Sutomo received his first degree in Civil Engineering at Gadjah Mada University in 1984 and received his M.Sc.(eng) in Transport Planning and Engineering and Ph.D in traffic modeling at Leeds University, Institute for Transport Studies in 1988 and 1992, respectively.

Promoting Livable Communities

Beth Osborne, Deputy Assistant Secretary, U.S. Department of Transportation

Beth Osborne is Deputy Assistant Secretary for Transportation Policy at USDOT where she is currently working on the surface transportation reauthorization, the Secretary's livability initiative, and safety and environment issues. Beth comes to USDOT from the office of U.S. Senator Tom Carper (DE), where she was the legislative assistant for transportation, trade and labor policy. Previously, Beth worked as the legislative director for environmental policy at the Southern Governors' Association and as policy director for Smart Growth America. She began her career in Washington, DC, in the House of Representatives working as a legislative assistant for US Representative Ron Klink (PA-04) and as legislative director for Rep. Brian Baird (WA-03). Beth grew up in New Orleans and graduated with a B.A. and J.D. from Louisiana State University. She is married with one daughter and resides in Washington, DC.

Jamie Leather, Principal Transport Specialist, Asian Development Bank

Jamie Leather is a Principal Transport Specialist in the Infrastructure Division, Regional and Sustainable Development Department of the Asian Development Bank. Mr. Leather has over 20 years of experience in transport planning, 15 years of which were spent in Asia. Mr. Leather is a committee member of ADB's Transport Community of Practice and also Lead of Urban Transport in the Urban Community of Practice. Mr. Leather obtained his master of science in transport planning and engineering from the Institute of Transport Studies, Leeds University (UK) and a bachelor of arts in human geography also from Leeds University.

Rachel MacCleery, Managing Director for Infrastructure, Urban Land Institute, USA

An urban planner and transportation expert, Rachel MacCleery is Managing Director for infrastructure at the Urban Land Institute (ULI) and is responsible for guiding the organization's approach to national and global transportation, water and energy policy issues. At ULI, Rachel directs the production of an annual state-of-infrastructure report, manages a program to examine federal transportation policy and make recommendations for reform, and leads a multi-year initiative to engage ULI's local chapters in programming to better link transportation and land use at the regional level. Internationally, Rachel has managed and participated in a variety of consulting projects for the Asian Development Bank and the World Bank, with a focus on projects in China, when she was working for global infrastructure provider AECOM from 2004 to 2008.

Rachel began her career in urban planning as a transportation planner for the city of Washington DC, where she worked from 2001 to 2004. Rachel has lived and worked extensively in China since 1994, when she began studying Chinese. She is fluent in Mandarin. Rachel holds a master's degree in public affairs and urban and regional planning from the Woodrow Wilson School at Princeton University.

Paul Minett, Trip Convergence Ltd., New Zealand

Paul Minett is the Co-Founder of Trip Convergence, a New Zealand-based developer of solutions that make it easier and more rewarding for people to share rides. He has an MBA from the

University of Auckland. He is a founding supporter of the Ridesharing Institute, and a member of the Emerging and Innovative Public Transport and Technologies Committee of the Transportation Research Board.

List of Attendees

Thomas	Autrey	Supervisor, Transportation Planning	Maryland-National Capital Park and Planning Commission (MNCPPC)
Keith	Cole	Director of Legislative Affairs	General Motors
James	Corbett	Professor, College of Earth, Ocean and Environment	University of Delaware
Asher	Dahan	Senior Vice President Customers	Israel Electric Corp.
Lauren	Dennis	Policy Associate	Alliance to Save Energy
Ryan	Edmiston	Intern	Alliance to Save Energy
Bill	Eisenstein	Executive Director	Center for Resource Efficient Communities, UC-Berkeley
Maria	Ellingson	Senior Program Manager	Alliance to Save Energy
Richard Alden	Feldon	Senior Strategist	ICLEI - Local Governments for Sustainability
Sarah	Froman	Office of Transportation and Air Quality	U.S. Environmental Protection Agency
Lindsey	Geisler	Staff Assistant to the Assistant Secretary	U.S. Dept of Transportation
Kelley	Greenman	Environmental Policy Analyst	U.S. Department of Transportation
Dario	Hidalgo	Senior Transport Engineer	EMBARQ
Neal	Humphrey	Senior Program Associate	Alliance to Save Energy
Tadashi	Kaneko	Senior Representative	Japan International Transport Institute
Drew	Kodjak	Executive Director	ICCT
Walt	Kulyk		Dept. of Transportation
Rodolfo	Lacy	Program Coordinator	Mario Molina Center
Sally	Larsen	Policy Associate	Alliance to Save Energy
James	Leather	Principal Transport Specialist	Asian Development Bank
Diana	Lin	Associate	Alliance to Save Energy
Mark	Lister	Interm CEO	Australian Alliance to Save Energy
Rachel	MacCleery	Managing Director, Infrastructure	Urban Land Institute
Taylor	Marshall	Program Associate	American Council On Renewable Energy
Alexis	Michea	Subrogating Head of the Energy Efficiency Division	Chile Ministry of Energy
William	Millar	President	American Public Transportation Association

Paul	Minett	Managing Director	Trip Convergence, Ltd
Petra	Mollet	Vice President, Strategy	APTA
Victor	Ogunmakin	Director	Ministry of Niger Delta Affairs
Beth	Osborne	Deputy Assistant Secretary	U.S. Dept of Transportation
Caroline	Paulsen	Program Manager for Climate Change	American Association of State Highway and Transportation Officials (AASHTO)
Michael	Replogle	Global Director and Founder	ITDP
Maria	Riquelme Zambrano	International Affairs Officer	National Energy Efficiency Program-Chile
Peter	Scarpelli	Vice President Global Energy Services	CB Richard Ellis
Theodore	Schultz	Vice President, Energy Efficiency and Smart Grid	Duke Energy Corporation
Dereje Azemraw	Senshaw	Student	University of Flensburg
Patrick	Sherry		University of Denver
Jeffrey	Skeer	International Relations Specialist, Office of European and Asian Affairs	U.S. Dept of Energy
Heru	Sutomo	Chairman, Board of Researchers	Gadjah Mada University
Joseph	Traini	Senior International Transportation Specialist	U.S. Department of Transportation
Polly	Trottenberg	Assistant Secretary for Transportation Policy	U.S. Dept of Transportation
Diane	Turchetta	Transportation Specialist	US DOT-FHWA
Shruti	Vaidyanathan	Research Associate, Transportation Program	American Council for an Energy Efficiency Economy
Art	Von Lehe	Policy Officer	ICLEI
Youngha	Yu	Foreign Affairs Officer – Franklin Fellow, Bureau of East Asian and Pacific Affairs	U.S. Department of State