

Moving Towards Sustainable Transport

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Remarks Presented at Northeast Diesel Collaborative
October 27, 2015

Our meeting today is a good opportunity to step back and reflect on the progress we've made and the challenges ahead. Effective leadership towards sustainability demands that we simultaneously find effective ways to demonstrate near-term progress while inspiring and nurturing shared long-term strategic vision and the partnerships that can enable its realization at scale.

Each of us gathered here today has something unique to contribute in the quest to curb global warming, achieve healthful air quality, and develop sustainable and equitable communities and regional economies. We are all, in various ways, contributing to the development of more efficient passenger and freight transportation systems.

I'd like to reflect today about my own life's journey in this arena and offer my vision of how we might move towards greater transportation sustainability.

I was born in Chicago. I moved before I was a year old to New York City, then to a Long Island railroad suburb, then to increasingly car-dependent suburbs of Pittsburgh, Erie, and Philadelphia. I early on discovered public transportation as a ticket to freedom, enabling me to access the city. But my teen years also revealed how a lack of safe places to bike and walk made it hard to get to transit. I saw treasured woods chewed up by suburban sprawl. I witnessed how water pollution led to massive fish kills that closed the beaches of Lake Erie for swimming for weeks on end.

In the 1960s as a child in Pennsylvania I woke up some mornings to air so thick with smog I could only see a few houses away. It made my nose run, my eyes sore, and it made me cough, just as the air does today in Beijing or Delhi.

As a child I and millions of others had a dream of blue skies. Though the job is not over, in my lifetime, through popular pressure, we enacted clean air laws that have brought much

more healthful air quality to America's cities, reducing tailpipe pollution by more than 98% and requiring transportation plans to conform to clean air attainment plans. Now, we need to take actions of even greater scale to address a great threat to our prosperity and civilization: climate change.

When I moved to downtown Philadelphia to attend the University of Pennsylvania in the 1970s, I found my bicycle was the best way to get around – cheaper and faster than taking the bus. I became a bicycle activist to press for bike lanes that didn't exist in those days in Philadelphia or most other US cities.

I decided to add civil and urban engineering to my sociology major. I was interested in how technology affects societal evolution and saw a chance in engineering to subvert the dominant car-focused paradigm for US transportation planning.

I traveled to Europe for a few months after getting my master's degree in engineering. I saw first hand how healthy, wealthy, livable cities could be if they gave priority to walking, cycling, and public transport. I came back and moved to Washington,

DC, working for several years for Public Technology, the technical arm of the US League of Cities, focusing on transfer of best practices in urban transportation and energy conservation. I continued my bicycle activism. I got the National Park Service to close many miles of roads in Washington's Rock Creek Park to car traffic on weekends and holidays, borrowing best practice from New York City.

In 1982, I traveled around the world for months as a journalist documenting best practices in transportation and energy conservation in Japan and Europe, writing for an audience of US local government officials. I wrote book on bicycle access to transit. The Japanese and European focus on ensuring high quality bike access to transit stations enabled people to get to transit cheaper and more conveniently in both the city and the suburbs, and to get from suburban stations to nearby jobs and schools. America's focus on building car parking at suburban transit stations, without attending to high quality bicycle and pedestrian access, locked US transit systems into the declining suburb-to-central city travel market.

came back to the US and finished my book. I went to work for Montgomery County, MD doing transport and land use

planning. There I led studies showing how that County could double jobs and housing without congestion problems if it focused new development around an expanded transit network, made those nodes pedestrian and bicycle friendly, and managed parking supply and cost. That work planted seeds that are now bearing fruit in Montgomery County and the approach was picked up by other communities across America, such as Portland, Oregon.

Seeing the US blow up oil storage facilities in Nicaragua in 1984, a few friends and I organized others to recycle bicycles to aid health and education workers and capitalize bike industry development in Central America, Africa, and the Caribbean, ultimately sending tens of thousands of bikes. We started with 100 bikes, then 1000, and it just kept going.

In 1985 I founded ITDP as an umbrella organization for BNB and other projects in Haiti and Mozambique, and broader policy reform efforts. I set about pressing the World Bank and other Multilateral Development Banks to focus more attention on bicycling and the transport needs of the poor. I and others had a vision of curbing America's over-dependence on cars and promoting sustainable transport best practices from Asia and

Europe across the globe. With persistence and global collaboration, we succeeded in taking our ideas from the margins to the mainstream.

In late 1989, with other environmental and public transport advocates, I started a campaign to reform US transportation laws in favor of public and non-motorized transportation. With long struggle, we changed the laws and defended them against repeated efforts to turn them back, contributing to trends we see today.

We demonstrated best practices to link land use and transport planning in places like Portland, Oregon, and helped adapt those to many other cities. Portland in the 1970s had poor air quality but visionary leadership. Its mayor decided to stop building or widening motorways and to put the city's resources into light rail, with transit oriented development. The Portland region adopted an urban growth boundary. The state passed growth management legislation. An initiative by 1000 Friends of Oregon which I advised in the late 1980s and early 1990s looked at how the region could grow more jobs and population while cutting traffic by making the land use-air quality-transport (LUTRAQ) connection. That project convinced OR

DOT to drop its plans for a circumferential Western Bypass in favor of expanding light rail and Transit Oriented Development (TOD), with Travel Demand Management (TDM). That ultimately led to the Portland 2040 Plan and creation of Portland METRO, a elected regional government. This enabled Portland to cut its VMT and GHGs from transportation per capita significantly more than other US cities. And Portland has achieved clean air that meets federal health standards.

In 1990-91, federal transportation laws were changed to help level the playing field between investment in roads and in transit, walking, and cycling and to bring about greater harmonization of transportation plans with air quality attainment plans. About that time, I left Montgomery County government to work as transportation director for the Environmental Defense Fund. I took a decade of challenging state, federal, and regional agencies to enforce the law and tough efforts to resist Congressional backtracking, but those initiatives bore fruit.

Cars and trucks are cleaner, get better fuel economy, and the trend towards ever rising traffic growth has stopped and even reversed in many places. There is still much to do, especially at

the state and local level where transportation investments are made and are managed. There are continuing efforts by some in industry, such as Volkswagen, to cheat on pollution standards. While European and rich Asian cities still lead the way on sustainable transport, American cities are beginning to catch up on transit, walking, and biking and have gotten lots done with clean vehicle standards and programs.

As in Europe, the long-term trend in America is for less driving per person each year. Younger people would rather surf the web than drive cars. Suburban sprawl has stalled out and most of America's cities are growing healthy again, after years of decline.

Freight remains a challenge, with rising global trade flows and the long life of diesel vehicles. But as your discussions here reveal, there is progress being made in cleaning up ports, railways, trucks, and intermodal services. The private sector is doing a lot to improve the efficiency of logistics and supply chains. And we continue to move towards an uncoupling of economic growth and mobility growth.

Our vision, with hard work, persistence, and partnerships, is

slowly becoming a reality.

But now, let's take our bearings on the global context.

When I was born in 1953, slightly over 1 in 5 people worldwide and 2/3's of Americans lived in cities. Since 2008, for the first time in history, majority of the world's population lives in cities. In the US, urbanization exceeds 80% and is even higher in our northeastern region. Urbanization is accelerating globally and cities will absorb virtually all of the population growth in coming decades. I don't exaggerate when I say that the pattern of transport systems and urban developments in the coming decade – which underpin whether or not our consumption patterns are sustainable – do much to determine our common global well-being.

Today more than one billion people still live in extreme poverty. Well-managed urbanization and sustainable transport is a key pathway to shared prosperity and environmentally sustainable development. But today in many countries unmanaged motorization and urban development are increasing both economic inequality and the prospect of catastrophic global environmental degradation.

When cars fill up streets, many see only prosperity. Mobility is a peculiar problem because, absent strategies to manage motorization, it will grow worse as societies get richer. Economists forecast there will be more than one billion new middle class consumers by 2025, mostly living in emerging market cities. How their aspirations for improved mobility are addressed will have a huge influence on whether the poor will be lifted out of poverty or instead face increasing social and economic isolation; whether traffic in cities will move efficiently or be mired in gridlock; whether the air will be healthy to breathe or not; and whether we will succeed in slowing the pace of human-induced climate change.

How mobility is addressed will have important effects on economic growth. Already traffic congestion results in losses of more than 2% of GDP in many rapidly motorizing cities. Traffic exposes billions of people to unhealthful levels of transportation-related air pollution and noise, injures 15 million, and kills one and a quarter million people per year.

Fossil fuel subsidies of over \$40 billion a year globally spur traffic and pollution and disproportionately benefit upper

income consumers at the expense of the poor.

Transportation contributes a quarter of energy-related global CO2 emissions, and these emissions are growing fast.

Today, fewer than 1 out of 7 billion people own a car. Even by 2050, the majority of the world's population will not likely own a car. They will walk, bike, and take buses, trains, and other forms of public transport. Unless these inclusive modes are given priority in street space and transport investment, the vast majority of mankind faces ever-diminishing access to opportunities and services, and inclusive sustainable growth will be impossible. Without adequate public transport cities will lock-in land use patterns dependent on high-cost motorized personal mobility.

Technology fixes alone will not solve the challenges of transportation in either developed or developing countries. Near-term improvements in existing technologies and regulatory and pricing incentives to reduce vehicle weight, power, and activity, along with a phase-out of internal combustion motor vehicles and fossil fuels by mid-century in favor of electric vehicles and low carbon biogas fuels will be

necessary but not sufficient to put the world on a path to a 2-degree climate change target that scientists agree is necessary to prevent runaway warming.

Smarter vehicles and infrastructure, with adaptive cruise control, dynamic speed limits, and peer-to-peer intelligent vehicle systems could help further, but these are likely to be politically unsustainable unless they are managed to give priority to walking, cycling, and public transport modes that more than half the world's people will still depend on even in 2050.

We must grow our cities in ways that avoid unnecessary travel, shift trips to more sustainable modes, and improve the efficiency of the remaining mobility with cleaner vehicles, fuels, and better managed transport network operations. This new paradigm is often referred to as, “avoid-shift-improve.”

In 2014, coauthored a report with Lew Fulton of UC Davis, *A Global High Shift Scenario: Impacts and Potential of More Public Transport, Walking, and Cycling, with Lower Car Use*. We adapted a global mobility model from the International Energy Agency to focus on urban passenger transport. Our study found

that by shifting about one-fifth of the global investment projected to go towards private motorization between now and 2050 to go instead to public transport, walking and cycling, consumers and governments could save over \$100 trillion in cumulative spending on infrastructure, fuel, vehicles, and operating costs, about a fifth of the total, while sustaining urban mobility. Public transport access by the poorest half of the world's urban population would double. And a co-benefit would be to cut greenhouse gas emissions from urban passenger transport by 40 percent in 2050 emission levels, which would grow to 55 percent if combined with the Global Fuel Economy Initiative, which seeks to double motor vehicle fleet fuel economy in coming decades.

So what way forward? We must ensure Smart Cities are Just Cities, built on principles of increasing equality of access to opportunities for all, with inclusive growth. To quote the former Mayor of Bogota, Enrique Penalosa, who was just re-elected as Bogota's Mayor on Sunday, "a truly advanced city is not one in which the poor drive cars, it is one in which the rich ride public transport, walk, and bike." We must respond positively to the aspirations of the world's poor for growing mobility with more sustainable access.

In New York City, where I recently took the post of Deputy Commissioner for Policy, we are working to advance a vision for *OneNYC* advanced by Mayor Bill de Blasio. It puts Vision Zero traffic safety at the core of transportation policy and calls for more attention to equity, building on the vision of Mayor Bloomberg for an economically and environmentally sustainable and resilient city.

Vision Zero started as a 1990s road traffic safety initiative in Sweden, aspiring to achieve a highway system with no traffic fatalities or serious injuries in road traffic. It is built on a ethic that protection of human life and health is paramount over other mobility system goals. It focuses on shared responsibilities between providers and regulators of the road traffic system and users. It recognizes human fallibility and the need to focus on mechanisms for change to guarantee the safety of all citizens. Vision Zero has been widely adopted by a large and growing number of government authorities worldwide and has helped bring about major reductions in traffic fatalities.

As part of *OneNYC* New York will have the cleanest air of any

big American city by 2030. We will move towards smarter transportation management that improves equity of access for all, with more transit oriented development and affordable housing. We are working on both a long term roadmap and short term plan for near term progress to cut our GHGs by 80% by 2050 from a 2005 base.

I am confident that a key enabler of system transformation will be the interpenetration of information and communication technologies into Smart Cities, including surface transportation management and operations. This will enable better transport system management, governance, and accountability. I will enable governments to focus on setting goals and measuring performance, on managing performance-based contracts and funding programs, on coordinating integrated transport, land use, resource management, and economic development.

Today, most people think about traffic the way they think about the weather. Some days are just bad and you have to put up with it. It's unreliable. If you can afford it, buy a comfortable car with a good sound system. If you're dependent on public transport, plug in your earbuds and tune it out as you ride. Either way, allow extra time in your schedule for unpredictable

delays.

In many countries electricity is a relatively reliable public utility; though weather may cause problems brownouts and blackouts, these are few and far between. Technologists manage and balance supply and demand, adding more costly peak supply and shedding loads as needed to keep the network from failure.

Imagine if transportation networks were operated the same way as electricity, using all the tools in the kit of modern traffic engineering. This would include integrated real time demand and supply management. It would be based on ubiquitous real time data from cell phones, sensors, and probes, treated as a public good and subject to appropriate strict privacy safeguards. If combined with much cleaner motor vehicle technologies and fuels, and smarter land use and urban design, with affordable housing close to jobs, and priority for walking, cycling, and public transport, the result might move us well towards the OneNYC goals and global sustainable development goals.

Experience in several cities shows such transformations are

achievable. Take Singapore. In the mid-1970s, fewer than a third of trips there were made on public transport and congestion was a terrible problem. Some in Singapore envisioned a more modern mobility system. Today time-of-day tolls are adjusted every few minutes at more than 70 charging locations on the arterial and motorway network to keep traffic free flowing at least 85% of the time.

Vehicle Quota System limits the number of new motor vehicle registrations, with a price determined by monthly auctions. Parking is managed. While the city has developed world-class rail Mass Rapid Transit, it is buses unburdened by congestion delay that carry the majority of public transport trips. Real time passenger information systems let you know when the next bus or train will arrive.

Almost all housing is high quality, occupant owned, and within walking distance of public transport, with safe and secure pedestrian conditions, with shade and rain covers offering some protection from equatorial weather. Today although car ownership has tripled compared to 1970 and incomes are 10 times higher, public transport carries 60% of all travel. Singapore is among the countries with the lowest road traffic

deaths per capita.

Other nations have adapted Singapore's best practices. Vehicle quota systems have been adopted in a growing number of major cities in China. Congestion pricing has been a success in a dozen cities across Europe and has been adapted to a growing number of roadways in North America. Research by the US Federal Highway Administration shows that real-time highway congestion pricing can prevent the loss of as much as half of the effective road capacity during times of peak demand by preventing inefficient stop-and-go turbulent traffic flow. Pricing and managing two existing lanes can boost capacity the same amount as adding one new unmanaged lane while generating revenues that can be used to boost public transport options.

Imagine if we could deliver comprehensive real-time management of existing metropolitan transportation networks that is as reliable as electricity, with basic transport services available to all. This could be reality in coming decades.

Achieving this will demand confidence building and incremental demonstration of new approaches that can gain

public support. The public often distrusts transport authorities' competence to use tolls to manage traffic for better performance. People want to see they are being given improved travel alternatives to avoid driving. Once they see these results, public opinion turns around rapidly. We saw that happen in Stockholm in 2008 and in Milan in 2012.

Road user charging would work, but it may or may not be the right path for near term progress in cities like New York. Political trade-offs and legal authority pose barriers to that approach. Cities like Paris, Zurich, and Barcelona show how many of the same benefits of urban road user charging can be accomplished with strong parking management and pricing and lower speed limits.

But let's imagine years from now being faced with a new set of travel choices in your Smart City of the future. If you spontaneously jump in your car to drive alone downtown to work during peak hours, you may be faced with very high distance-based road user charges and parking fees at your destination. But if you pre-plan your trip, accept riders to fill the empty seats in your car, and accept the route and scheduling window guidance of the network manager, you

might find your trip and parking costs offset by travel credits. If you take public transport, you will get real-time information on when the vehicle will be at your stop so you can walk or bike there and board with little delay, paying a fare subsidized by road user charges. Private or public sector network operators may compete to be compensated under performance contracts that depend on effective load, supply, and demand management. Independent evaluators may audit performance and arbitrate contract disputes. Government officials might focus on setting system performance goals, urban and street design standards, land use policies, and transport operator contracting rules, and ensuring transparency and accountability.

Cities and nations would be encouraged to adopt freight plans and low emission zones to guide the provision of safe, efficient, and environmentally friendly goods movement. Pricing and regulatory incentives would reward efficient logistics management, increasing the occupancy of good vehicles by encouraging smarter freight consolidation and scheduling of deliveries.

Achieving this will take action by policy makers, investors,

transport professionals, entrepreneurs, and citizens who join in a vision that we can offer a brighter future to our children than the one that seems apparent by just projecting current trends. With your hard work and determination, working together, our dream can become a reality.