# HSR C-Plan Version

#### The Federal Transit Administration should allocate its discretionary funds to supporting development of Bus Rapid Transit systems including inter-city rapid transit using Electric Fuel Cell Buses

### C-plan solves the Case

The c-plan solves for megaregions better than HSR

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The American Bus Association (ABA) believes our industry, motorcoach transportation is a much more viable solution than high speed rail to move millions of people safely each year between urban centers.¶ Intercity buses are the solution that saves money, provides hassle-free travel, fills in gaps by connecting to other travel modes, offers mobility to millions of rural citizens residing far from air and rail hubs, and which are re-deployable to anywhere that's paved.¶ Buses are here today and readily available as the simple solution that saves money. Motorcoach ridership has soared to more than 720 million passenger trips annually. Private intercity buses account for more passenger trips than the domestic airlines in some years.¶ For those that have not been on a modern motorcoach lately, many have free Wi-Fi, plug-ins for computers and other electronics, luxury seats and other amenities that are comparable or exceed the comfort level on planes and trains.¶ In addition, intercity buses can be routed to meet unexpected traveler demand at a moment's notice, such as is often the case during holidays. And they are tailored for the role of connecting to planes, trains and intra-city transit buses or light commuter rail.¶ The much-touted idea of spending on new High-Speed Rail (HSR) service, conversely, is cost-prohibitive given the billions of tax dollars it would require to buy the rights of way, lay the tracks, and subsidize the operational costs it would demand if and when it's ever built. That's in addition to the $1.2 billion Amtrak already receives from the federal government.¶ Several private bus lines compete successfully in the market for travelers within the Northeast corridor of the United States between Boston and Washington – at a fraction of the price of an Amtrak ticket, and with times that compare favorably with rail, air and personal autos.¶ Now with more double decker motorcoaches on the road, each motorcoach, either a single or a double decker can take between 55 and 80 single-occupant autos off of congested highways, mitigating congestion, reducing emissions and saving fuel, which bolsters U.S. energy security.¶ No less than the Union of Concerned Scientists have reported that motorcoaches are also the greenest way to travel in the organization’s "Getting There Greener" report.¶ The recent resignation of California’s leading high speed rail officials and the public’s concerns over the nearly 100 billion dollar program are another reason why lawmakers in Washington need to rethink high speed rail. There are better alternatives and motorcoaches are one of them.¶ Buses beat high-speed rail in terms of affordability, flexibility, and mobility, saving money and benefiting society. The transportation future can be less expensive, cheaper, more efficient and cleaner than ever. And that future is not far away. It's actually here today. It's called the bus. And America is riding on us.

#### Rapid intercity bus systems solve the economy and warming

REPORT OF A WORKING GROUP FOR THE¶ AMERICA 2050’S¶ STRATEGIC INVESTMENT FRAMEWORK 08¶

BEYOND DRIVING AND FLYING: http://www.america2050.org/upload/2009/04/Beyond%20Driving%20and%20Flying.pdf

Intercity rail and intercity bus travel today do not always provide these options but they¶ each can.¶ • Rail and buses could and sometimes do provide relief to overcrowded airports and¶ airspace;¶ • Rail and buses are more energy efficient and produce fewer carbon-based¶ emissions than air or auto alternatives; and¶ • Rail, and particularly buses can serve smaller towns and smaller markets not¶ served by air; moreover, buses can supplement intercity rail to offer more¶ frequent service and connections to smaller towns and to local transit systems;¶ Both these modes can also offer benefits that go beyond the individual:¶ • They can provide an economic boost to cities, deter land consuming sprawl and¶ dampen vehicle travel growth in metropolitan areas with related social and equity¶ benefits to urban areas;¶ • They can save energy, reduce carbon emissions and lower the threat of global¶ warming; and¶ • Given the expected growth in population and employment in the Untied States –¶ possibly by as much as 50 percent between now and 2050, and in particular in the¶ megaregions, it is unrealistic and unwise to ignore the optimization of all modes¶ through both capacity and management measures.

#### Bus Rapid Transit Solves for the Knowledge economy, industries will concentrate around BRT systems

Daniels & Mulley 11 Rhonda Daniels and Corinne Mulley¶ Institute of Transport and Logistics Studies, The University of Sydney Australasian Transport Exploring the role of public transport in agglomeration economies and centresResearch Forum 2011 Proceedings¶ 28-30 September, Adelaide, Australia¶ Publication website: http://www.patrec.org/atrf.aspx

The Centre for Transit Oriented Development (2011) studied the composition of employment in areas served by fixed-guideway transit in 34 US metropolitan areas and concluded certain “knowledge-based” industries are more likely to locate in central business districts and higher density regional employment areas, while the government sector has the greatest affinity for transit locations. Kang (2010) studied the impact of Bus Rapid Transit on creative industries in Seoul Korea and concluded that the BRT system favourably influenced the location of creative industries and service sectors within 500 m of BRT stops, and BRT increased the employment density within 500 m of stops by more than 50%.

## C-plan Time Frame advantage

#### C-plan alone has a massive time frame advantage-- BRT solves faster for the economy than rail based solutions

Weinstock et al 11

Annie Weinstock, Walter Hook, Michael Replogle, and Ramon Cruz of the Institute for Transportation and Development Policy in New York¶ May 2011¶ Recapturing Global¶ Leadership in¶ Bus Rapid Transit http://www.itdp.org/documents/20110526ITDP\_USBRT\_Report-LR.pdf

A recent report on the effects of the 2009 American¶ Recovery and Reinvestment Act ( aka, the¶ “stimulus” ) on job creation showed a disproportionately¶ greater number of jobs created per dollar¶ spent on public transportation versus highway¶ infrastructure ( 19,299 job-months per billion¶ dollars spent on public transportation and 10,493¶ job-months per billion dollars spent on highway¶ infrastructure ).6 The main explanation for this¶ is that “public transportation spends less on¶ land [ than highway infrastructure ] and more on¶ people.” Such findings could thus be extrapolated¶ for BRT investment. By choosing a public transportation¶ alternative with minimal infrastructure¶ costs and higher overall cost-effectiveness, more¶ BRT can be built and more jobs will be needed to¶ operate this more extensive system. More interaction¶ with transit unions on these issues will¶ help garner support.¶ Transit advocates and community activists may¶ also be swayed by the often much shorter implementation¶ timeline for BRT, which can deliver¶ nearly immediate benefits as compared to light¶ rail or metro which could take years or longer to¶ construct.¶ Non-governmental and grassroots organizations¶ can also play a role in solidifying community support¶ for a project. They already know many of the¶ issues faced in getting a project implemented.¶ Local groups are familiar with local political¶ situations. In Oakland, AC Transit has received¶ support from TransForm, an NGO whose mission¶ is “to create world-class public transportation¶ and walkable communities in the Bay Area and¶ beyond.” 7 During the early planning stages for the¶ East Bay BRT project, TransForm worked to build¶ a support base among community groups, church¶ groups, and labor unions.

#### BRT solves the economy and air pollution faster and cheaper

Weinstock et al 11

Annie Weinstock, Walter Hook, Michael Replogle, and Ramon Cruz of the Institute for Transportation and Development Policy in New York¶ May 2011¶ Recapturing Global¶ Leadership in¶ Bus Rapid Transit http://www.itdp.org/documents/20110526ITDP\_USBRT\_Report-LR.pdf

Today, cities are beginning to realize that a good¶ mass transit system helps attract an educated¶ workforce that forms the backbone of the¶ modern economy. A mass transit network is a¶ powerful tool in the fight against traffic congestion,¶ air pollution, rising road construction and¶ maintenance costs, and the economic hazards of¶ growing dependence on insecure and volatile oil¶ imports. Cities that have already made the decision¶ to invest in mass transit find BRT systems¶ attractive for the following reasons:¶ a. Speed of Implementation: the time from¶ planning to opening tends to be far shorter¶ for BRT than for rail-based alternatives — a¶ benefit very attractive to politicians facing¶ short election cycles.¶ b. Cost: capital costs tend to be considerably¶ lower than those for rail-based mass transit¶ alternatives; operating costs are also lower¶ in some contexts.¶ c. Network Connectivity: because parts of the¶ network can operate on normal streets, it is¶ much cheaper and faster to establish a full¶ network using bus-based mass transit. In this¶ way, modern BRT can offer more one-seat¶ rides than the typical trunk-and-feeder systems¶ offered by older BRT and most light rail,¶ metro, or commuter rail systems.

#### The c-plan is massively cheaper than rapid rail programs and solves

Florida Futures Survey 12

TRANSPORTATION bus rapid transport, Sun Rail, Orlando, mass transit and youth, airports, hubs, rail and economic growth, Miami

<http://www.floridafuturessurvey.com/2012/03/transportation-bus-rapid-transport-mass.html>

Introduction of bus rapid transport will boost public acceptance of busses as a mode of mass transit -- at a fraction of the cost of rapid rail. Dedicated traffic lanes will make bus schedules more reliable and service more frequent. Navigation technology will inform passengers about expected arrival times and pre-boarding payment will speed up departures. Improvements in design will make busses more comfortable and shelters more attractive. While BRT has found slow acceptance in the U.S., it “has revolutionized mobility in cities from Bogotá to Guangzhou.” One template for BRT in the U.S. is the Google bus -- the private bus service for employees that offers Wi-Fi, electircal outlets, bicycle racks, and cellphone alerts that warn riders when a bus is running late. The company considers that the Google bus gives it a competitive advantage in recuiting Silicon Valley workers. Cities and counties might follow Google example, touting its high-tech bus service when seeking new business start-ups and company re-locations. In the long-term, BRT helps to reduce auto congestion and auto pollution, and -- like rapid rail -- sees increasing property value along its routes.

#### The Bus system solves the economy and air pollution faster and better than rail

Weinstock et al 11

Annie Weinstock, Walter Hook, Michael Replogle, and Ramon Cruz of the Institute for Transportation and Development Policy in New York¶ May 2011¶ Recapturing Global¶ Leadership in¶ Bus Rapid Transit http://www.itdp.org/documents/20110526ITDP\_USBRT\_Report-LR.pdf

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#### Bus Rapid Transit solves faster for the economy than rail based solutions

Weinstock et al 11

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#### A gold standard Bus Rapid Transit system can be up and running quickly

Weinstock et al 11

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Changes to the federal funding process could push cities who depend on federal funding to¶ up their standards and go for the gold. A more robust alternatives analysis process could help¶ ensure that the most cost-effective option is included in the analysis and selected for funding.¶ An independent, third-party evaluator might take pressure off of FTA staff who are subject to¶ influence from political pressures. The federal government should also consider dedicating a¶ pot of money to fund projects that meet the gold standard.¶ The BRT timeline is short. If done right, from planning to implementation, a project may take¶ only four years. That means that by 2015, the United States could see its first gold-standard¶ project. And given the good proposals already in motion, an extra boost can help to open the¶ first American gold-standard BRT by 2014. This is well within the current terms of many U.S.¶ politicians. Now the question is: who will be the first?

### AT: Speed Solvency deficit

#### New Rapid Intercity bus systems are as fast as HSR

O’Toole 11

Randal O’Toole is a senior fellow with the Cato Institute 6-29-11¶ Intercity Buses¶ The Forgotten Mode http://www.cato.org/pubs/pas/PA680.pdf

¶ Instead, over the past two years, the Obama¶ administration has handed out more than $10¶ billion worth of high-speed rail grants, primarily¶ to states in the Northeast, Midwest, West¶ Coast, and North Carolina. All of the funded¶ rail corridors have intercity bus service and¶ most have new-model bus service featuring¶ low fares and onboard amenities such as wireless¶ Internet. Outside of California, none of¶ the high-speed rail projects now underway will¶ produce trains that go significantly faster than buses—and California has yet to raise most of¶ the funds it needs to complete its project.¶ Despite the hype about high-speed rail, intercity¶ buses are proving to be a far superior mode¶ of transportation for travelers who choose not¶ to drive or fly distances of about 100 to 300¶ miles or so. The buses are safer, more energy efficient,¶ and—despite Amtrak’s huge subsidies—¶ far less costly to ride than intercity trains. The¶ nascent growth of first-class buses, which offer¶ far more room per passenger and amenities¶ such as food service and movies, removes the¶ stigma sometimes associated with buses.

#### Intercity BRT get there as fast as HSR

O’Toole 11

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Because the new model of bus service is¶ mostly based on nonstop buses, buses can¶ compete against even so-called high-speed¶ trains because the trains typically make many¶ intermediate stops between major cities. For¶ example, Amtrak requires 6 hours and 30¶ minutes to carry passengers from Chicago to¶ Detroit, with fares starting at $31. Michigan¶ recently received grants from the Department¶ of Transportation that aimed to reduce this¶ travel time by 12 minutes.21 But Megabus already¶ offers the same trip in less time—just 5¶ hours and 40 minutes—at fares starting at $15.¶ Amtrak’s “regional trains” between Boston,¶ New York, and Washington go as fast as the¶ so-called high-speed trains the Obama administration¶ wants to start in New England, the¶ Midwest, the South, and the Pacific Northwest,¶ which are projected to typically average¶ 55 to 70 mph. Between Boston and New York,¶ where Amtrak regional trains average 53 to¶ 58 mph, both the regional trains and buses¶ take from 4 hours to 4 hours and 30 minutes.¶ Between New York and Washington, where¶ Amtrak regional trains average 62 to 70 mph,¶ the regional trains take from 3 hours and 12¶ minutes to 4 hours, while most buses take between¶ 4 hours to 4 hours and 15 minutes. In¶ both segments, the lowest Amtrak fares of $49¶ are more than three times the typical Internet¶ bus fares of around $15.

## AT: Perm do both

#### If we win that the c-plan solves the case first it would make no sense to spend billions more on a duplicative system of rails—The c-plan keeps presumption because it requires less change than the plan, is cheaper and more energy efficient. Even the Congressional Commission that recommended HSR recommended bus alone be tried first

O’Toole 11

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In December 2007, the final report of the congressionally chartered National Surface Transportation Revenue and Policy Study Commission, Transportation for Tomorrow, urged Congress to increase spending on intercity passenger trains by seven to nine times—the largest increase proposed for any mode of transportation.1 Although the report devoted many pages to intercity passenger trains, it mentioned intercity buses only twice: once to suggest that buses should be **considered as an alternative** before **investing in passenger trains**, and once to admit that buses use about 60 percent less energy per passenger mile than trains.2

#### Doing both guts solvency—If half full trains and buses are both running in every corridor it massively increases the inefficiency of the system and increases CO2 emissions—The systems would directly compete for passengers

#### Mixed transportation systems are bad—Buses alone are better

Taylor 6-15-12

Professor Brian Taylor, Chair UCLA Department of Urban Planning California Transportation Professor Makes the Case for BRT over Rail¶ http://reason.org/blog/printer/california-transportation-professor

Baruch Feigenbaum, Reason Foundation: Do you support Rail or BRT for high volume corridors? What are some of the reasons? ¶ Professor Brian Taylor, Chair UCLA Department of Urban Planning: Typically, I favor BRT over rail. My goal is to provide the best overall transit service. BRT projects are much cheaper to build than rail projects. As a result more funding is available for maintenance and operations (O&M). O&M is not sexy and many transit operators neglect it. No matter how attractive the train is, if the service breaks down and the train suffers major delays people are not going to use it. Well-designed BRT can be just as successful as rail. Ridership numbers in comparable BRT and rail corridors are very similar. Finally, BRT is a better compliment to local bus. From an O&M standpoint there are cost efficiencies with operating one type of transit. There are fewer efficiencies in a combined rail and bus operation. Since a local bus system is the backbone of any transit network, other transit service should complement local service, not the other way around. Economic development and other considerations are important, but they are not my primary focus. The most cost-effective transportation service is express buses because they move large amounts of people quickly and cheaply from one place to another. ¶

#### Turn, Doing both turns the warming advantage

O’Toole 11

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In addition to requiring both lower fares¶ and lower subsidies than Amtrak, intercity¶ buses are more energy efficient than Amtrak.¶ Transportation for Tomorrow noted that intercity¶ buses use less than 1,000 British thermal units¶ (BTUs) per passenger mile, while intercity passenger¶ trains use more than 2,500.29 Recent¶ increases in Amtrak ridership have reduced¶ rail’s energy usage to 2,400 BTUs per passenger¶ mile, but that is still far less energy efficient¶ than intercity buses.30¶ Most buses and trains are diesel powered,¶ and greenhouse-gas emissions from such vehicles¶ are proportional to fuel consumption.¶ Thus, diesel-powered Amtrak trains produce¶ roughly 2.5 times as much carbon emissions¶ as intercity buses. Amtrak trains in the¶ Northeast Corridor are electrically powered, but much, if not most, of that electricity is¶ generated by burning fossil fuels, so intercity¶ buses no doubt emit less carbon, per passenger¶ mile, Boston–Washington trains.31¶ A 2007 report prepared by M. J. Bradley &¶ Associates for the American Bus Association¶ found that the average Amtrak intercity train¶ used 2.8 times as much energy and emitted¶ 3.2 times as much carbon dioxide as intercity¶ buses. The most-efficient Amtrak trains were¶ about 9 percent more energy efficient than¶ the least-efficient intercity buses, but were¶ still estimated to produce twice the amount¶ of carbon-dioxide emissions per passenger¶ mile than buses.32 A full life-cycle analysis of buses vs. trains¶ would be even less favorable to rail because¶ passenger rail lines require so much infrastructure,¶ while highways—the basic infrastructure¶ for buses—are shared with cars and trucks. A¶ life-cycle analysis by researchers at the University¶ of California concluded that, over their¶ complete life cycle, passenger rail lines used¶ about 2.5 times as much energy as they used¶ in just operations, while highway users consumed¶ only about 1.6 times as much energy as¶ in operations.33

#### Buses alone solve warming better

O’Toole 11

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¶ There are two reasons why buses are more¶ energy efficient than Amtrak. The first is a matter of incentives. Since private bus operators¶ are profit driven, they operate in markets¶ where they can fill most of their seats. As previously¶ noted, the average intercity bus fills¶ about two-thirds of its seats. By comparison,¶ Amtrak is politically driven, and it fills, on average,¶ only about half its seats and runs many¶ trains that are only one-third full.¶ The second reason is sheer physics. Trains’¶ steel wheels provide less friction and so are¶ more efficient than buses’ rubber tires, but¶ their efficiency is offset by the greater weight¶ of railcars. The typical motorcoach weighs¶ about 35,000 pounds, which is about 1,000¶ pounds per passenger when the bus is twothirds¶ loaded. A typical 80-seat passenger railcar¶ weighs 110,000 to 150,000 pounds. A locomotive¶ capable of pulling five cars adds about¶ 50,000 pounds per car, so the total is around¶ 4,000 pounds per passenger when the railcars¶ are half loaded. Even at identical load factors,¶ the railcars would still weigh far more per passenger¶ than buses, and so would use more fuel¶ per passenger mile.

#### The c-plan alone saves funds for operating costs, is more effective and does not link to politics

Feigenbaum 12

Baruch Feigenbaum is Transportation Policy Analyst June 15, 2012, California Transportation Professor Makes the Case for BRT over Rail¶ http://reason.org/blog/printer/california-transportation-professor

Transit funding can be a contentious issue. While most transportation planners favor a local bus network as the backbone of a metro area’s transportation system, they are divided on whether higher volume corridors should be served by rail or Bus Rapid Transit (BRT). While many regions have extensive transit plans, there is only a finite amount of funding available. Additionally, transit systems in most U.S. cities consume a sizable percentage of cities' transportation budgets but move only a small percentage of residents. In many regions politics, economics and regional infighting further complicate the situation.¶ In an interview I conducted with UCLA Professor of Urban Planning Dr. Brian Taylor, we discussed the cost, effectiveness, and politics of BRT versus rail in Los Angeles. Los Angeles has utilized heavy-rail, light-rail, BRT, express bus, and local bus. The many transit technologies make the city a good case study.¶ While Los Angeles is often considered a car-oriented metropolis with poor transit, this is not an accurate description. Los Angeles has a higher population density than any city in the U.S. including New York City. Los Angeles has the second lowest number of expressway miles per capita of any U.S. metro area. And it has one of the top ten transit systems in the country. In many ways Los Angeles is more similar to San Francisco, Washington D.C., and Seattle than Atlanta or Houston. ¶ In general Professor Taylor favors BRT over rail. Constructing a BRT line is much more cost effective than constructing a rail line. The savings allows more money to be spent on operating and maintenance costs that are often underfunded. ¶ Also interesting is Dr. Taylor’s study on the politics of transit:¶ Major capital projects are sexy ribbon-cutting events that also attract media attention. However, from a media standpoint increasing service quality or reducing headways are non-events. Elected leaders are often more concerned with building political capital than with implementing the most cost effective transit service and new rail service raises political capital. Taxpayers see a tangible product from their tax dollars, even if it is often not the best use of those tax-dollars.¶ Below is a sample of the interview. The full interview is available here. ¶

#### Bus Rapid Transit between cities directly competes with HSR

O’Toole 11

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The debate over President Obama’s fantastically¶ expensive high-speed rail program has obscured¶ the resurgence of a directly competing¶ mode of transportation: intercity buses. Entrepreneurial¶ immigrants from China and recently¶ privatized British transportation companies¶ have developed a new model for intercity bus¶ operations that provides travelers with faster¶ service at dramatically reduced fares.¶ New-model bus companies save money by¶ selling tickets over the Internet and loading¶ and unloading passengers at curbsides rather¶ than in expensive bus stations. They speed service¶ by running most buses non-stop between¶ major cities rather than making numerous intermediate¶ stops. Some companies distinguish¶ themselves from their competition by providing¶ leather seats, free wireless Internet, more In 2006, scheduled intercity bus service¶ reached its lowest level in decades, yet intercity¶ buses still carried almost three times as many¶ passenger miles as Amtrak. Since then, intercity¶ buses have become the nation’s fastest-growing transportation mode, with ridership growing¶ almost twice as fast as Amtrak.¶ Intercity buses carry at least 50 percent¶ more passenger miles than Amtrak in Amtrak’s¶ showcase Northeast Corridor. They do so with¶ almost no subsidies and at fares that are about¶ a third of Amtrak’s regular train fares and little¶ more than 10 percent of Amtrak’s high-speed¶ Acela fares. Intercity buses are safe and environmentally¶ friendly, suffering almost 80 percent¶ fewer fatalities per billion passenger miles than¶ Amtrak and using 60 percent less energy per¶ passenger mile than Amtrak.

### Elections is a net-benefit

#### C-plan alone does not link to politics—Politicians will use rail programs as an election issue but not bus programs

Weinstock et al 11

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In short, U.S. BRT has suffered from a lack of¶ political leadership. Most major politicians in the United States are still unaware of BRT[Bus Rapid Transit] and do¶ not think of it as a worthy platform on which to¶ campaign. In fact, many politicians would rather¶ promise a rail system that they cannot deliver¶ than promise a BRT[Bus Rapid Transit] system that they do not quite¶ understand. Most transportation commissioners¶ have limited faith in their political leadership’s¶ understanding of transportation issues and are¶ reluctant to elevate their BRT[Bus Rapid Transit] projects to a higher¶ political level for fear that the political leadership¶ will intervene in a largely non-constructive way.¶ Perhaps because BRT is still seen as a lower-cost¶ consolation prize for cities without the funds¶ to implement a rail project, rather than a viable¶ alternative with significant operational advantages,¶ political leaders tend to pay less attention¶ to BRT[Bus Rapid Transit] projects than to rail projects.

#### High Speed Rail will require political capital and face massive Republican opposition

Freemark 10

Yonah Freemark is reporter for the Transport Politic http://www.thetransportpolitic.com/2010/11/03/for-advocates-of-alternative-transportation-a-difficult-election-day/

The 2010 midterm election wasn’t about transportation. But the takeover of several governorships, many Senate seats, and the U.S. House of Representatives in general by the Republican Party portends difficult times ahead for both the Obama Administration’s agenda and the Democratic Party in general.¶ For advocates who hope for the creation of a major high-speed rail system connecting the country’s largest cities, a Republican-led House is not good news: The party’s chosen spokesmen have been criticizing President Obama’s fast train initiative since it was announced in early 2009 and their rhetoric has been mostly unchanged. In general, Republican senators have been unwilling to vote for bills that have aided in the production of alternative infrastructure. The Bush Administration, the most recent example of Republican sentiment, was anti-rail and in favor of decreased funding for agencies like the Federal Transit Administration.¶ There are, of course, some GOP members who haven’t been enemies of the program, notably likely new House Transportation and Infrastructure Chairman John Mica of Florida; it is possible that he and people like him will play a more prominent role over the next two years.¶ Yet the more problematic aspect of the GOP’s new power is the party’s unity around the issue of fiscal austerity. Whatever one’s personal thinking about the importance of reducing budget deficits, the fact remains that transportation is largely funded by the government, so a decrease in public expenditures in general likely means fewer funds for highway and transit projects. There is little hope for exceptionalism in transportation: Considering their votes on the 2009 Stimulus bill and their complete opposition to increasing taxes (which will be necessary for any transportation program), Republicans appear not to share the philosophy of the Conservative Party in the United Kingdom, for instance, whose leaders have cut back massively on social programs even as infrastructure spending has been maintained.

## CPlan slows warming

#### BRT significantly reduces CO2

Vincent & Jerram 06

William Vincent, Lisa Callaghan Jerram

Breakthrough Technologies Institute Journal of Public Transportation, 2006 BRT Special Edition

http://www.gobrt.org/BTI\_BRT\_CO2\_Journal\_2006.pdf

BRT can provide significantly greater CO2 reductions than LRT for most U.S. cities.¶ The main reason appears to be the generation mix of electricity used to power¶ LRT. Electricity generated from fossil fuels produces a large amount of CO2, and¶ the trend in this country is toward greater use of fossil fuels in electricity generation.¶ A secondary reason is that BRT costs significantly less to build than LRT, and thus¶ more can be deployed for a given budget. However, even without this additional¶ benefit, the per passenger mile CO2 emissions for a BRT system are likely to be significantly¶ lower than those of an LRT system almost anywhere in the country.¶ The most significant potential appears to be if a number of cities, such as the signatories¶ to the Mayors Climate Protection Agreement, each agree to use BRT as¶ a CO2 reduction strategy. For example, if 20 cities each achieve results similar to¶ what we found with the 40-ft CNG vehicles, they could achieve total reductions¶ over 20 years in excess of 13 million metric tons. If these cities build additional corridors and make other changes over the 20 years, such as better integration of¶ transit and land use, the reductions could be much higher still.

#### BRT cuts CO2 emisions quickly

Rahim 11

Saqib Rahim, E&E reporter ClimateWire: June 28, 2011

U.S. lags behind China, Colombia in bus rapid transit

<http://www.eenews.net/public/climatewire/2011/06/28/1>

When it's done properly, bus rapid transit -- known as BRT -- ranks among the cheapest and quickest ways to cut CO2 emissions from transportation.¶ But it is not often done properly -- least of all in the United States, according to a new report.¶ In the complete vision, buses zoom down their own lanes of traffic, facing no competition from cars. They pull up to raised bus stops where people can step on or off quickly. They come every few minutes, so missing one won't wreck a commuter's morning.¶ The cities that have delivered this vision most successfully while cutting the most carbon are not in the United States or even Europe. They are in South Africa, Colombia, India and China.¶ The United States' top five systems fall well short of these countries' systems, according to findings by the Institute for Transportation and Development Policy (ITDP), a nonprofit that tracks transportation issues around the world.¶ On ITDP's 100-point scale, Bogotá, Colombia scored highest: Its BRT system got a 93. The new system in Guangzhou, China, ranked second at 89 (ClimateWire, April 27; ClimateWire, July 16, 2010).¶ The United States' leading BRT is Cleveland's, which scored a 63. The BRT system in New York City received a 35 -- by ITDP's standard, it cannot even technically be called BRT.¶ Backers see hope for improvements in U.S.¶ Walter Hook, ITDP's executive director, said the point is not that U.S. efforts are hopeless.¶ It's that the U.S. systems can refine and improve themselves to rival the best in the world. He thinks just one high-profile success would give the country a new transportation option for a cash-strapped era.¶ "Given the fairly significant financial crisis we're facing in the United States, the ability of cities to build out networks of light rail or metro system is pretty severely compromised," Hook said.¶ Modifying roads to let buses run loose? Not as hard, according to Hook and BRT supporters.¶ Cities already have road networks, so there is less new infrastructure that needs to be built. Most cities have buses, so they don't have to spring for brand-new vehicles if they don't want to.¶ These factors make BRT cheaper to build than rail, and they may shore up its bottom line while operating, an element that may appeal to congressional conservatives focused on the deficit.

# AT: People won’t use buses

#### BRT Will be used—Their evidence assumes old bus systems

Brosch 03

Gary Brosch¶ Executive Committee¶ National Bus Rapid Transit Institute; University of Florida ¶ Hearing: Bus Rapid Transit and Other Bus Service Innovations¶ Tuesday, June 24, 2003 <http://banking.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=c40237a7-97a6-42e2-93e5-29b6c307ee50&Witness_ID=bd0f6625-b1f2-4f79-9bbc-eeb2adc61072>

Another lesson learned is that even in auto dominated Los Angeles, people will ride a bus system that is fast, efficient, and convenient. The old myth that people will ride trains but not buses is based on a paradigm of trains being clean and fast and buses being dirty and slow. BRT has changed that paradigm! Success stories in the United States and abroad have shown that BRT can be a highly praised and successful form of public transit. Fast, convenient, and frequent service are what transit users want and BRT systems provide all of these factors in a very cost-effective manner.

#### People will use BRT

Weinstock et al 11

Annie Weinstock, Walter Hook, Michael Replogle, and Ramon Cruz of the Institute for Transportation and Development Policy in New York¶ May 2011¶ Recapturing Global¶ Leadership in¶ Bus Rapid Transit http://www.itdp.org/documents/20110526ITDP\_USBRT\_Report-LR.pdf

BRT holds great promise for the United States. In 2008, transit¶ ridership in the United States reached its highest level since the¶ mid-1950s and ridership grew faster than population and vehicle¶ miles travelled between 1995 and 2008 [ APTA 2010 Fact Book ]. The¶ flexibility and cost effectiveness of Bus Rapid Transit make it an¶ excellent choice for cities and transit agencies facing both increasing¶ demand for transit and increasingly constrained budgets.

#### BRT will change public perception of busses

Florida Futures Survey 12

TRANSPORTATION bus rapid transport, Sun Rail, Orlando, mass transit and youth, airports, hubs, rail and economic growth, Miami

<http://www.floridafuturessurvey.com/2012/03/transportation-bus-rapid-transport-mass.html>

Introduction of bus rapid transport will boost public acceptance of busses as a mode of mass transit -- at a fraction of the cost of rapid rail. Dedicated traffic lanes will make bus schedules more reliable and service more frequent. Navigation technology will inform passengers about expected arrival times and pre-boarding payment will speed up departures. Improvements in design will make busses more comfortable and shelters more attractive. While BRT has found slow acceptance in the U.S., it “has revolutionized mobility in cities from Bogotá to Guangzhou.” One template for BRT in the U.S. is the Google bus -- the private bus service for employees that offers Wi-Fi, electircal outlets, bicycle racks, and cellphone alerts that warn riders when a bus is running late. The company considers that the Google bus gives it a competitive advantage in recuiting Silicon Valley workers. Cities and counties might follow Google example, touting its high-tech bus service when seeking new business start-ups and company re-locations. In the long-term, BRT helps to reduce auto congestion and auto pollution, and -- like rapid rail -- sees increasing property value along its routes.

## AT: No solvency advocate

#### BRT Solvency Advocate

Weinstock et al 11

Annie Weinstock, Walter Hook, Michael Replogle, and Ramon Cruz of the Institute for Transportation and Development Policy in New York¶ May 2011¶ Recapturing Global¶ Leadership in¶ Bus Rapid Transit http://www.itdp.org/documents/20110526ITDP\_USBRT\_Report-LR.pdf

Chapter V recommends that the FTA create a¶ special grants program, called BRT Starts, to¶ stimulate the creation of gold-standard BRT in¶ the United States. It also recommends that the¶ alternatives analysis process be carried out by a¶ more independent body so that it may be kept¶ separate from political motives.

#### The federal government should prioritize support for BRT programs

Weinstock et al 11

Annie Weinstock, Walter Hook, Michael Replogle, and Ramon Cruz of the Institute for Transportation and Development Policy in New York¶ May 2011¶ Recapturing Global¶ Leadership in¶ Bus Rapid Transit http://www.itdp.org/documents/20110526ITDP\_USBRT\_Report-LR.pdf

There is an opportunity for U.S. DOT and Congress¶ to boost the priority for funding goldstandard¶ BRT by incorporating it into their grant¶ programs. By embracing a scoring system like the¶ BRT Standard, FTA can rank BRT projects based on¶ a broad range of criteria. This will enable them to¶ more optimally determine funding priorities.¶ DOT could incentivize high-quality BRT initiatives¶ through a competitive performance-focused¶ discretionary program, similar to the Urban¶ Partnership Agreements or Congestion Reduction¶ Pilot Projects initiatives under the Bush Administration¶ or the Livable Communities initiatives of¶ the Obama Administration.¶ Additionally, as changes now under consideration¶ are made in the rules for the New Starts¶ and Small Starts programs to give more weight¶ to environmental factors, BRT projects could be¶ given priority for funding if they meet the goldstandard¶ on the BRT Standard scale. Such projects¶ would be much more likely to produce positive¶ environmental benefits with high cost-effectiveness¶ compared to low-scoring BRT projects.

#### Federal support can establish an effective BRT system

Poole & Orski 03

Kenneth Orski ¶ heads the Urban Mobility Corporation and directs the MIT¶ International Mobility Observatory. ¶ Robert W. Poole, Jr. is Director of Transportation Studies at the Reason Foundation in Los Angeles. HOT NETWORKS: A NEW PLAN FOR CONGESTION¶ RELIEF AND BETTER TRANSIT <http://nexus.umn.edu/Courses/pa8202/ps305.pdf>

To implement this plan we recommend that Congress authorize a multi-year program of HOT Network¶ development to be jointly implemented by the Federal Highway Administration and the Federal Transit¶ Administration. Specifically, the program would aim to encourage states and metropolitan jurisdictions to:¶ 1. Incrementally create networks of premium toll lanes (HOT Networks) by extending, linking,¶ interconnecting and filling in gaps in existing metropolitan HOV systems;¶ 2. Implement Bus Rapid Transit services on the completed parts of the HOT Networks as soon as¶ practicable; and¶ 3. Develop innovative public-private financing arrangements involving tax-exempt toll revenue bonds to¶ help fund a significant portion of the capital cost of these projects.¶ Funds to support the federal portion of the program would come from special fund allocations drawn from¶ the FHWA’s National Highway System or Surface Transportation Program. The FTA’s New Starts program¶ would provide funds for bus acquisition and related BRT system components. The proportion of funds to be¶ contributed by each agency would be determined by congressional action in the authorizing legislation.¶ In sum, the HOT Networks concept is an approach by which nearly everyone would win. Transit riders¶ would win because many cities that could not afford to build a large-scale rail system would be able to¶ implement effective region-wide express transit service. Individual motorists would benefit by having the¶ option of faster and more reliable travel on a network of congestion-free lanes when saving time is really of¶ importance to them. Users of regular lanes would gain because regular lanes would become less congested as¶ some motorists switched to the toll lanes. And, importantly, HOT Networks could be built without the need for major new public funds by utilizing the revenue stream from toll charges paid by individual motorists.¶ In the 2003 surface transportation reauthorization, Congress will have an opportunity to make this vision a¶ reality. A congressionally authorized program of HOT Networks—built to benefit motorists and transit users¶ alike—would constitute a powerful expression of the increasingly intermodal nature of our federal surface¶ transportation program. And at a time when the need for transportation capital investment greatly exceeds¶ traditional sources of funding, HOT Networks would give America’s metropolitan areas a new option—both¶ congestion relief and improved transit service without the need for major new tax revenues.

#### The federal government should develop a broad BRT program

Poole & Orski 03

Kenneth Orski ¶ heads the Urban Mobility Corporation and directs the MIT¶ International Mobility Observatory. ¶ Robert W. Poole, Jr. is Director of Transportation Studies at the Reason Foundation in Los Angeles. HOT NETWORKS: A NEW PLAN FOR CONGESTION¶ RELIEF AND BETTER TRANSIT <http://nexus.umn.edu/Courses/pa8202/ps305.pdf>

The approach recommended in this report is to combine two innovative concepts—High-Occupancy Toll¶ (HOT) lanes and Bus Rapid Transit (BRT)— to create seamless metropolitan-wide networks of HOT lanes.¶ They would serve as guideways for Bus Rapid Transit and provide a faster congestion-free travel option to¶ toll-paying motorists. To implement this vision, we recommend that Congress authorize a multi-year¶ program of HOT Network development to be jointly implemented by the Federal Highway Administration¶ and the Federal Transit Administration. Specifically, the aim of the program would be to encourage states¶ and metropolitan jurisdictions to:¶ 1. Incrementally create networks of premium toll lanes (HOT Networks) by extending, linking,¶ interconnecting and filling in gaps in existing metropolitan HOV systems;¶ 2. Implement Bus Rapid Transit services on the completed parts of the HOT Networks as soon as¶ practicable; and¶ 3. Develop innovative public-private financing arrangements involving tax-exempt toll revenue bonds, to¶ help fund a significant portion of the capital cost of these projects.¶ Funds to support the federal portion of the program would come from special allocations from the FHWA’s¶ National Highway System (NHS) program (or, alternatively from the Surface Transportation Program), and¶ from the FTA’s Section 5309 New Starts program. The proportion of funds to be contributed by each agency¶ would be determined by congressional action in the authorizing legislation. Eligible expenses under this¶ program would include right-of-way acquisition (where needed); planning, design and construction of¶ premium toll lane facilities and ancillary bus stations; and acquisition of BRT rolling stock. The Section¶ 5309 funds could only be used for transit-related expenses (such as BRT stations and rolling stock). The¶ federal grant support could be supplemented, as needed, by long-term Transportation Infrastructure Finance¶ and Innovation Act (TIFIA) loans.

## C-plan is modeled

#### A successful BRT project will be modeled

Weinstock et al 11

Annie Weinstock, Walter Hook, Michael Replogle, and Ramon Cruz of the Institute for Transportation and Development Policy in New York¶ May 2011¶ Recapturing Global¶ Leadership in¶ Bus Rapid Transit http://www.itdp.org/documents/20110526ITDP\_USBRT\_Report-LR.pdf

Once a gold-standard BRT is in operation in the United States, American cities will¶ have a true example to look to. Today, the models are in cities abroad and international¶ examples do not always play well domestically. Instead, American cities aiming to implement¶ BRT often model themselves after other American cities which have good — but¶ not gold-standard — BRT and this leads to more systems in the United States which do¶ not reach their potential. The effective implementation of one gold-standard BRT in the¶ United States will have the likely impact of spurring other cities to see BRT as a viable,¶ high class transit system.

# FTA Has discretionary bus funds available

#### The discretionary funds are available for bus programs

DOT February 6, 2012

<http://www.dot.gov/affairs/2012/fta1012.html>

U.S. Transportation Secretary Ray LaHood today announced the availability of $826.5 million in Fiscal Year 2012 discretionary funds to modernize and repair transit vehicles and facilities around the country and promote the widespread use of sustainable clean fuel. The funding commitment highlights President Obama’s call for investing in an America that’s built to last.¶ “An American economy that’s built to last must be built on a solid foundation, and when we have buses, transit facilities, and other equipment that’s in disrepair, we simply cannot afford to ignore them,” Secretary LaHood said. “The President knows that transportation projects like those we’ll fund from today’s announcement will help provide businesses and families with the safest, fastest, most efficient way to connect with opportunity.”¶ “Reliable and desirable transit systems enable hard-working American families to keep billions of dollars in their wallets rather than hand them over at the gas pump,” said Federal Transit Administrator Peter Rogoff. “These investments will ensure that transit remains a dependable option and advance President Obama’s goal for an America Built to Last.” ¶ The notice of funding availability (NOFA) published in today’s Federal Register invites competitive proposals for three of the Federal Transit Administration’s (FTA) top policy priorities through the discretionary Bus and Bus Facilities and Clean Fuels grant programs, all subject to funding availability, as follows:¶ State of Good Repair. Approximately $650 million available in FY2012 discretionary funds will bring the three-year total to $1.5 billion for over 300 projects aimed at replacing or rehabilitating transit infrastructure and for transit asset management. As transit ridership continues to increase putting even greater demand on our transit systems, FTA will also consider maintenance facility and equipment expansion requests to help address ongoing capacity constraints that limit a transit agency’s ability to maintain vehicles and equipment in a state of good repair.¶ Livability. Approximately $125 million is available for projects that will improve the quality of life through expanded transportation choices, new and better intermodal connections, reduced congestion, and/or services aimed at economically disadvantaged populations, including senior citizens and people with disabilities.¶ Clean Fuels. Approximately $51.5 million is available to help communities meet national air quality standards that do not do so now. The program also supports the development and marketing of emerging clean fuel and advanced propulsion technologies for transit buses. This year, as in years past, FTA will consider expanding the eligible applicant pool by drawing upon additional discretionary Bus and Bus Facilities Program funds.¶ ¶ These discretionary funds are made available through FTA’s Bus and Bus Facilities and Clean Fuels Programs.

# General Economy Heg Bus C-plan

## C-Plan Text-

#### The Federal Transit Administration should allocate its discretionary funds to expansion of its expanded fuel cell electric bus program.

## C-Plan solves for Hedge and Economy

#### The c-plan will spur U.S. economic competitiveness and leadership

FCHEA 11

Fuel Cell and Hydrogen Energy Association Building a Commercially Viable National Fuel Cell Electric Bus Program http://cafcp.org/sites/files/Building%20a%20Commercially%20Viable%20National%20Fuel%20Cell%20Transit%20Bus%20Program.FINAL\_.v10.03-25-11.pdf

Commercialization of FCEBs is at hand, achievable within the next five years. A relatively modest¶ investment in heavy‐duty fuel cell transit fleets will lead to significant cost reductions. This clean, affordable, and sustainable transportation technology will serve as the standard for transit fleets¶ nationally and internationally. Additionally, a sizeable addition of green technology jobs will bolster the¶ American economy.¶ American Industrial Leadership – Given the advances in fuel cell and hydrogen technology within the¶ United States, America has an opportunity to establish itself as a global leader among nations providing¶ sustainable, energy‐efficient solutions for the transportation sector. Fuel cell and battery manufacturers,¶ hydrogen fuel providers, hybrid electric‐drive suppliers, and transit bus OEMs are prepared to expand¶ production capacity and employment opportunities with the growth of this quickly emerging industry.¶ Energy Security – Petroleum fuel prices are back on the rise, and at a rapid rate, now exceeding $4 per¶ gallon. Competition worldwide for petroleum, and our over‐reliance on imported oil, has created an¶ unstable and unsustainable state of affairs for the United States. Hydrogen and fuel cells are critically¶ important in establishing a long‐term diversified and domestically available energy portfolio, and¶ hydrogen for transportation can be produced completely from domestic and renewable sources,¶ insulating us from world events. This is an essential element to the economic security of America. We¶ need to develop and commercialize these technologies now rather than wait until energy inflation¶ creates even bigger financial and foreign affairs crises for America.

#### Fuel cells are a $6 trillion dollar market—We swamp their links to the economy

Billmaier 10

James Billmaier has served as CEO and Chairman of Asymetrix, Melodeo, and Diego, Inc. He had also served as Vice President and General Manager of Sun Microsystems Networking Software Division

http://joltthebook.org/

The internal combustion engine is dying. Its death throes may take 20 years, but make no mistake: the end is coming. And that’s an excellent thing, since as you’ll read in JOLT!, EVs represent a better, faster, and cheaper mode of transportation. Ending our nation’s reliance on foreign oil and helping the planet along is great. But the real reason EVs will come to dominate the personal transportation market—cars, SUVs, vans, and pick-up trucks—over the next couple of decades is that they make financial sense to the consumer. Bottom line: they are cheaper to operate and maintain than gas-powered vehicles. (And as you’ll learn, they’re an absolute blast to drive.) Just as consumers ultimately powered the computer and Internet revolutions, consumers will propel the EV revolution as well. Americans will adopt EVs in overwhelming numbers—in the process driving yet another paradigm shift of massive proportions.¶ Electric vehicles also offer a phenomenal business opportunity. While the Internet represents an annual $1 trillion market worldwide, legendary Silicon Valley venture capitalist John Doerr has projected that EVs and the associated energy market will be six times bigger, accounting for $6 trillion a year worldwide. Speaking before a Senate committee in 2009, Doerr told members that energy technology “is the mother of all markets, perhaps the biggest economic opportunity of the twenty-first century.”¶ The great unknown, however, is whether or not the U.S. will be prepared to profit from the EV revolution. The coming “electriconomy”— an economy based on an electrified personal transportation system—will result in both massive upheaval and massive opportunity. China, in particular, has acknowledged the inevitability and the potential of the EV revolution and is in fast-forward mode to implement the new technology. But the electriconomy is as essential to America’s national security as is energy independence, and Chinese ownership of the EV realm would leave the U.S. in a dangerous position. Possessing the technologies that power our economy is crucial to America’s strength and well-being.¶ There is no longer any question of whether or not we will adopt an electric-based transportation system. We will. And the transition will come much more quickly than most “experts” predict. All major auto-makers have some type of plug-in vehicle coming out in the very near future, with the first cars due out at the end of 2010. The U.S. can’t afford to be left behind. But we’re going to need to move fast to become the undisputed market leader.

#### We solve U.S. Industrial leadership

FCHEA 11

Fuel Cell and Hydrogen Energy Association Building a Commercially Viable National Fuel Cell Electric Bus Program http://cafcp.org/sites/files/Building%20a%20Commercially%20Viable%20National%20Fuel%20Cell%20Transit%20Bus%20Program.FINAL\_.v10.03-25-11.pdf

Unit Price At or Under $1 million – An expanded FCEB program would put the industry firmly on the¶ road to further per‐unit price reductions. Following the production of 200 buses under this proposed¶ deployment program, an industry projection shows that FCEBs priced at or under $1 million is¶ achievable with annual production quantities of at least 400 FCEBs beginning in 2017 or 2018. This could¶ constitute a second phase deployment program that would result in an entirely zero‐emission bus that is¶ competitive with electric trolley buses and other all‐electric‐drive, heavy‐duty transit buses. Centers of Excellence – An investment of $395 million would establish five regional Centers of¶ Excellence on the east and west coasts, the mid‐west, and the south or southeast, building upon existing¶ experience and core competencies. Each center would operate 40 buses targeted at $1.35 million each¶ (a 40% to 50% reduction in price since 2010), at least one fueling station at $4 million each (includes up¶ to $1 million for site improvements and local jurisdiction use requirements), and a maintenance/storage¶ service facility for hydrogen‐fueled buses at $1 million each. With the latest technology advancements in¶ infrastructure supply, hydrogen can be delivered at a fuel consumption price competitive with¶ petroleum fuels. Grants would also provide funds to upgrade fuel cell, battery, and hybrid‐drive components on FCEBs as¶ may be required in years five through twelve. This program would put a fleet of 200 FCEBs in passenger¶ service for 12 years and prove the commercial viability of hydrogen fuel and FCEBs for widespread¶ adoption of the technology by transit operators. Centers of Excellence will accomplish four principal objectives in pursuit of commercialization:¶ 1. Apply limited grant funds to larger scale demonstration programs that can adequately test and¶ develop technologies commensurate with large fleet operations¶ 2. Utilize resources more efficiently and effectively under the stewardship of a selected group of¶ well‐managed program teams¶ 3. Expand operational experience across major regions of the United States to expose each region¶ to the real‐world operating characteristics and benefits of the technology¶ 4. Develop a bigger technology program with more units to realize production and supply chain¶ economies of scale that will drive down production costs and purchase price.¶ DOT/FTA would prepare a competitive, performance‐based solicitation for a four‐year deployment¶ program. Competitive team proposals would be made up of bus OEM FCHEA 11

s, fuel cell suppliers, and hybriddrive¶ and battery suppliers, and each team proposal would include a consortium of five‐transit agencies.¶ Infrastructure would be competitively bid through a separate solicitation tied to facilities at each transit¶ agency designated to receive buses resulting from the first solicitation. Conclusion¶ FCEBs have been proven to reduce emissions, increase energy security, and achieve significantly greater¶ fuel economy than diesel. With centralized fueling facilities, public transit fleets present an obvious¶ opportunity to expand implementation. Expanding the nation's fleet of FCEBs will promote domestic¶ industrial leadership while reducing the per‐vehicle price to the point where this technology is costcompetitive¶ with other zero‐emission modes of transit. The energy security and environmental benefits of DOT’s initiative would be substantial, as reflected in the table below that shows the¶ extent of petroleum and emissions reductions achievable.

The c-plan solvency is fast

Center for Transportation and the Environment 09

A Report on Worldwide Hydrogen Bus Demonstrations, 2002-2007¶ http://www.fuelcells.org/wp-content/uploads/2012/02/busreport.pdf

Role of government in accelerating commercialization¶ Demonstration participants envisioned two main roles for government in future demonstrations: the development of a long-term strategic plan for fuel cell buses and an accompanying funding commitment until commercialization is viable, which is expected by 2013-2015. Generally, transit operators indicated that they could not commit to purchasing additional buses without government funding.¶ Moreover, participants believe that government should provide long-term support, rather than merely funding short-term projects. Without long-term support linked to a policy framework, it was generally believed that further substantial progress will be difficult.¶ Most suggested that government should focus funding on covering incremental costs of purchasing and operating fleet cell buses. Some also suggested funding for basic research and development to resolve some of the technical challenges revealed by these demonstrations.¶ Participants also believed that the next generation of demonstrations should be large-scale deployments of 50 or more buses. Many felt that demonstrating fewer than ten buses would simply be repeating what has already been done, rather than moving the technology forward.

#### Fuel cell powered bus technology is here now but we need an increase in federal investment in the public transit bus fleet to create economies of scale

FCHEA 11

Fuel Cell and Hydrogen Energy Association Building a Commercially Viable National Fuel Cell Electric Bus Program http://cafcp.org/sites/files/Building%20a%20Commercially%20Viable%20National%20Fuel%20Cell%20Transit%20Bus%20Program.FINAL\_.v10.03-25-11.pdf

In just the last few years, zero‐emission, hydrogen‐powered, fuel cell electric bus transit has advanced to¶ the point where fuel cell electric buses (FCEBs) are now providing service to hundreds of thousands of¶ passengers. Since 2006, FCEBs have logged over 550,000 miles in the United States alone. At the same¶ time, costs have dropped significantly – and within the next five years, it is projected that the per vehicle¶ price for an FCEB will be less than that of an electric trolley bus. The technology has and is being proven¶ by transit agencies around the world. What remains is to bring down the per‐unit cost, which can be¶ achieved with a modest investment in the economies of scale – increasing the number of FCEBs already¶ being operated in revenue service. A broad coalition of industry leaders and public transit providers¶ requests that a $395 million program to establish five regional Centers of Excellence and expand the¶ implementation of this rapidly advancing technology, be included in the Administration's plan for the¶ reauthorization of the transportation bill.¶ Fuel cell electric bus technology brings with it unique benefits that are unmatched by any other transit¶ bus mode:¶ 1. Completely zero‐emission buses with no toxic particulates or other criteria pollutants in city¶ neighborhoods¶ 2. Extremely quiet, smooth, vibration‐free, all‐electric operation¶ 3. Sufficient electric power to operate a vehicle in excess of 40,000 lbs of gross vehicle weight¶ 4. Better handling and overall driving performance compared to internal combustion engine¶ vehicles¶ 5. Clean and easy maintenance, with no toxic oils or fuels to handle¶ 6. Superb fuel economy in comparison with conventional internal combustion engines, including¶ hybrid‐drive engines¶ 7. Complete freedom from petroleum fuels, with the ease of using entirely domestic sources of¶ fuel to help establish true energy independence and price stabilization¶ 8. Significant well‐to‐wheel reductions in greenhouse gas (GHG) emissions with the potential of¶ eliminating all GHG emissions using carbon‐free, renewable sources to produce hydrogen.

#### Transit bus industry is key to key to transitioning to energy efficient cars

Schor 09

Elana Schor Congressional reporter, Environment & Energy Daily and Greenwire How Bus Transit Can Help the Auto Industry http://la.streetsblog.org/2009/10/26/how-bus-transit-can-help-the-auto-industry/

But the recession hasn't dampened the economic potential of hybrid bus production, as the Environmental Defense Fund (EDF) laid out today in a new report [PDF] on the industry. In fact, EDF found, transit bus companies share enough skills and regional foothold with the auto industry -- the map of bus makers pictured above could be mistaken for a map of automakers -- to pave the way for fuel-efficiency advances that would ultimately benefit all vehicles. ¶ After noting that 32 percent of American transit buses do not rely on gas or diesel to run, today's report continues:¶ The bus industry serves as an important entry point for advanced vehicle technologies, especially in new vehicles that require refueling infrastructure and other major changes. For instance, since transit agencies have a well-defined base of centrally managed fleets, they are ideal for testing and proving plug-in hybrid and all-electric buses — thus leading the way for the passenger car industry.¶

## C-Plan Solves for Economy

#### Federal investment in bus systems is a massive boost to the economy

Crowley 09

Environmental Defense Fund Environmental Defense Fund has linked science, economics, law and innovative private-sector partnerships to create breakthrough solutions to the most serious environmental problems.

http://world-wire.com/news/0910260001.html

Increasing government investment in conventional and green transit bus systems would create high-quality manufacturing jobs, especially in states with double-digit unemployment rates, while significantly cutting auto-related global warming pollution, according to a new report released today.¶ The high unemployment states include: California (12.2%), Indiana (10%), Michigan (15.3%), and Ohio (10.1%). The study is timely because Congress is debating renewal of the federal transportation bill, which provides funds to help local bus systems purchase equipment. The current transportation bill expired in September, but was extended until later this month, and is expected to be extended longer as Congress continues developing the renewed bill.¶ Current U.S. transportation policy favors highway spending and deemphasizes public transit, so bus orders are small and sporadic, making it difficult for the bus industry to grow, according to the study. “If federal, state, and local policy were to shift to a clear, sustained commitment to public transit, the nation would have the manufacturing capability to meet the resulting increased demand for transit buses,” the study concludes.¶ Entitled “Public Transit Buses: A Green Choice Gets Greener,” the study is the 12th installment of the series, “Manufacturing Climate Solutions: Carbon-Reducing Technologies and U.S. Jobs,” prepared by researchers at the Duke University Center on Globalization, Governance & Competitiveness and sponsored by Environmental Defense Fund.¶ While domestic uncertainty about transit funding stymies bus manufacturing for U.S. markets, the study notes that U.S. companies still have managed to establish themselves as global leaders in hybrid bus manufacturing. However, European firms are rapidly catching up, in part because of their governments’ long-term commitment to public transit.¶ The United States was an early leader of compressed natural gas (CNG) transit bus technology development, the most common type of green bus worldwide, and already has an extensive refueling infrastructure for CNG, with CNG pipelines connecting the entire continental United States. Bus fleets throughout the United States have incorporated CNG, including the Los Angeles Transit Authority, which operates 2,200 CNG buses, comprising 88 percent of its fleet. However, diesel-electric hybrid buses are rapidly overtaking CNG as the primary green bus option in the United States.¶ Early testing for hydrogen-electric hybrids is ongoing in California, at Sunline Transit, Santa Barbara Valley Transit Authority and AC Transit, and in Connecticut at CTTRANSIT. Proterra, a firm developing an electric hybrid transit bus, plans by June 2010 to have infrastructure in place for the Foothills Transit Agency, operating in the San Gabriel and Pomona Valleys in California, with four more cities to come online afterwards.¶ U.S. manufacturing for transit buses and components is located in nearly every state in the eastern United States, with the highest concentrations in Indiana, Michigan, Ohio and Pennsylvania.¶ “Many of these jobs are in Midwestern states deeply affected by the recession, where manufacturing employment and capacity, especially in the motor vehicle industry, are crucial for maintaining a leadership position throughout the recovery period and beyond,” said Marcy Lowe, lead author of the study and a research associate at the Duke University Center on Globalization, Governance & Competitiveness. “Many of these transit jobs are high-quality, long-term positions.”¶ Other studies have identified transit as an important component for reducing both air and global warming pollution because it provides commuters an alternative to single-passenger vehicles.¶ “We’ve known for awhile that transit is good for the environment,” said Kathryn Phillips, a transportation policy expert with Environmental Defense Fund based in Sacramento. “This study shows that transit investment also is good for the American manufacturers and American jobs.”¶ “We need a 21st Century transportation policy that is smarter, safer, cleaner and provides more options,” said James Corless, director of Transportation for America. “Investing in green transit will help achieve that new direction and create good-paying American jobs at a time when we desperately need them.”¶ The number of commuters using public transit to go to work increased from nearly six million in 2004 to 6.8 million in 2007. When gasoline prices soared in 2008, U.S. public transit use increased even more sharply, although official figures are not yet available. Buses are the main U.S. transit mode, accounting for 40 percent of all transit passenger miles.¶ Continuing growth in transit demand could translate into larger and more consistent bus orders. However, domestic demand is heavily dependent on the availability of public funding for bus transit, an inherent constraint that is naturally worsened by the current economic recession. Bus manufacturers in the United States primarily manufacture on a built-to-order basis.¶ “Public transit spending is not sufficiently steady or reliable to encourage growth in the industry,” the report notes. “Firms may receive increased orders only to see them fall in subsequent years when funding levels drop and demand has already been satisfied. Many agencies can no longer meet federal financing formulas that require a local funding match of 20 percent.”¶ “Increasing government investment in bus transit systems could be our generations’ Works Progress Administration in terms of its economic and environmental impact,” concluded Phillips. “This report shows we have a great opportunity to create new manufacturing jobs during tough economic times and cut greenhouse gas emissions. We only need the political will to make it happen.”

#### Even though the number of jobs is small in the bus market the plan has massive economic benefits

Lowe et. al. 09

Marcy Lowe, Bengu Aytekin and Gary Gereffi of the Center on Globalization, Governance & Competitiveness, an affiliate of the Social Science Research Institute at Duke University¶ Public Transit Buses: A Green Choice¶ Gets Greener¶ http://www.cggc.duke.edu/environment/climatesolutions/greeneconomy\_Ch12\_TransitBus.pdf

The total number of jobs in domestic manufacture of transit buses is relatively small, at 25,000 to

33,000 jobs, many overlapping with the heavy truck industry. Yet the value of this employment

extends well beyond job numbers in several ways. First, many of these jobs are in Midwestern

states deeply affected by the recession, where manufacturing employment and capacity,

especially in the motor vehicle industry, are crucial for maintaining a leadership position

throughout the recovery period and beyond. Second, the bus industry’s shared skills and

capacities with the heavy truck industry and other automotive segments help the motor vehicle

industry as a whole maintain a diverse supplier base and wide range of competencies. Third, the

bus industry provides an important entry point for innovations in automotive technologies,

especially in new vehicles that require refueling infrastructure and other major changes. For

instance, transit agencies constitute a well-defined base of centrally managed fleets, ideal for

testing and proving plug-in hybrid and all-electric buses—thus leading the way for the passenger

car industry. For these reasons, employment in the transit bus manufacturing industry is an

important benefit of investment in public transit.

#### Bus orders have ripple effects in the economy

Lowe et. al. 09

Marcy Lowe, Bengu Aytekin and Gary Gereffi of the Center on Globalization, Governance & Competitiveness, an affiliate of the Social Science Research Institute at Duke University¶ Public Transit Buses: A Green Choice¶ Gets Greener¶ http://www.cggc.duke.edu/environment/climatesolutions/greeneconomy\_Ch12\_TransitBus.pdf

The U.S. market for heavy-duty transit buses is small, currently delivering 5,000 to 5,500 buses¶ per year. U.S.-based firms dominate the North American bus market, with an 88% share in total¶ buses and a 51% share in heavy-duty transit buses. Only five original equipment manufacturing¶ (OEM) firms supply nearly the whole market, and four of them are either domestic firms or local¶ subsidiaries of foreign firms. A small and shrinking manufacturer base is a major concern. For¶ instance, Cummins is now the only supplier of bus engines, the single most expensive part in a¶ transit bus, accounting for roughly 20% of the total cost. General Motors, formerly an important¶ supplier to the bus industry, left the market in the summer of 2009, posing a significant challenge.¶ Under current U.S. transportation policy, which favors highway spending and de-emphasizes¶ public transit, bus orders are small and sporadic; this makes it difficult for the bus industry to¶ grow. In the current recession, some plants will likely be busy filling orders stimulated by the¶ American Recovery and Reinvestment Act of 2009, but this boost is also partly offset by sharp¶ cutbacks in states’ transit spending. In addition, firms given a temporary lift by stimulus funds¶ may see orders fall in subsequent years when funding diminishes to typical levels. Unpredictable¶ demand from a small pool of customers (municipal transit authorities) makes it difficult for¶ manufacturers to maintain their capacity and workforce without periodic layoffs. In addition,¶ firms are often required to build buses specifically to each transit agency’s preferences. This increases bus costs an estimated 20-30%, affects production stability, and makes R&D more¶ expensive than is typical of other motor vehicle industries.¶ One promising niche lies in several varieties of green buses. About 32% of U.S. transit buses¶ have an alternative power source, i.e., other than diesel or gasoline. The bus industry serves as an¶ important entry point for advanced vehicle technologies, especially in new vehicles that require¶ refueling infrastructure and other major changes. For instance, since transit agencies have a welldefined¶ base of centrally managed fleets, they are ideal for testing and proving plug-in hybrid¶ and all-electric buses—thus leading the way for the passenger car industry. Also on the horizon¶ are hydrogen-fueled hybrid buses and hydrogen fuel-cell buses. Although the bus market is not¶ export-oriented, if U.S. firms continue to lead green advances as they have in electric hybrid¶ buses, they have potential to build an export market in selected components for green buses.

#### Fuel Cell Industry is key to economy

Curtin et. al. 11

Sandra Curtin, Jennifer Gangi and Elizabeth Delmont of the Breakthrough Technologies Institute in Washington, DC http://www.fuelcells.org/wp-content/uploads/2012/02/2011-State-of-States-July-2011-update.pdf

The fuel cell industry is vital to American industrial growth, manufacturing and our environmental and economic well-being. The fuel cell marketplace is expected to grow exponentially in the coming years and is rapidly expanding as more companies are entering the marketplace with commercial products for more applications and energy needs. By encouraging American manufacturing, jobs are created, and economies of scale can be attained that will lead to further price reductions for fuel cell and hydrogen technology and related equipment.

#### New bus orders will create immediate economic benefits

Davis 10

Stephen Lee Davis is the Deputy Communications Director for Transportation for America

Cleaner buses can create jobs, improve the environment

<http://t4america.org/blog/2010/01/14/creating-jobs-and-environmental-benefits-with-cleaner-transit-buses/>

A new study by Duke University illuminates the fact that thousands of green jobs are waiting to be tapped in transit bus manufacturing — if the federal government will make a sustained commitment to investing in public transportation.¶ The Duke University Center on Globalization, Governance and Competitiveness released a new report this morning during a briefing at the Natural Resources Defense Council that evaluated the many U.S. job opportunities that can reduce carbon emissions in public transit buses. Jobs in and related to public transportation are some of the lowest hanging fruit in the push for green jobs, so what’s keeping the domestic manufacturing industry from ramping up?¶ The U.S. market for heavy-duty transit buses is small, currently delivering 5,000 to 5,500 buses per year. U.S.-based firms dominate the North American bus market, with an 88% share in total buses and a 51% share in heavy-duty transit buses. Under current U.S. transportation policy, which favors highway spending and de-emphasizes public transit, bus orders are small and sporadic; this makes it difficult for the bus industry to grow.¶ The report is well worth a read, but for a much simpler case study of what this means in real life, consider one piece of the complex supply chain for transit buses that we tend to take for granted: seats. On a crowded bus or train, you may not get the chance to sit in one, but when you do, you probably don’t think about the design or innovation that went into that seat. It probably didn’t occur to you that seats can add hundreds or thousands of pounds of weight that the bus needs energy to carry.¶ David McLaughlin, vice president of the American Seating Company, a U.S.-based manufacturer of seats for buses and railcars (among many other things), made it clear at this morning’s briefing that increased investment in transit would be good for business. But he also stressed that those benefits are not limited to American Seating alone. As a result of the stimulus bill from 2009, McLaughlin’s company calculated $2.9 million in new business, the bulk of which resulted from seat orders for buses and railcars ordered by transit agencies across the country with stimulus dollars.¶ “$2.9 million means 11 new jobs for us at American Seating,” he said. In another internal study, His company discovered that 1 job at American Seating sustained roughly 6 others in their immediate supply chain.¶ Take those two facts together and you begin to see the economic impact of the small public transit investment in the stimulus — and what could happen on a much larger scale. American Seating, just one manufacturer of one particular component that goes into transit vehicles, created the equivalent of 11 jobs through the stimulus. Those 11 jobs create or sustain 66 more at the company that supply them.¶ Stimulus spending will not be enough, however. Although the economic activity resulting from the stimulus was important, McLaughlin said his business needs investment that is reliable, consistent and predictable — like the funding that could result from a full six-year transportation bill. Stable funding sources will fuel the research and development that can cut seats weights even further and enable buses to use less energy.¶ “The stimulus package has been a good thing, but what we really need is sustained predictable investment, so we can make the investments we need to make to ensure our viability. This isn’t just a public issue, it’s a public-private issue. …It’s jobs,” he said.¶ The message from all fronts this morning was consistent. To spur job creation through manufacturing cleaner transit buses, the industry needs reliable, predictable investment and government policies that encourage innovation. Increasing the available federal funding for new transit lines and rolling stock is one aspect. Ensuring operation of these new transit lines remains affordable is another. Both are needed. As the report says:¶ If federal, state and local policy were to shift to a clear, sustained commitment to public transit, the nation would have the manufacturing capability to meet the resulting increased demand for transit buses. However, the transit bus industry is unlikely to have significant market growth in the absence of several major changes: better management of public transit funds and improved coordination with manufacturing firms; significant, sustained public funding; and perhaps most important, a comprehensive transportation policy shift that encourages public transit use.¶ Or, in other words, give transit agencies money to buy new rolling stock — and the money to operate them — and you’ll be creating green jobs on Main Street all across America. Buy new hybrid buses for New York City or San Francisco to reduce emissions there, and support new jobs in towns like Grand Rapids, Michigan that need jobs more than anything.

## C-plan Solves for warming, dependence, air pollution

#### The c-plan spurs a transition to zero emission vehicles

Preli 03

Dr. Francis R. Preli Jr.¶ Vice President Engineering¶ UTC Fuel Cells The Hydrogen Energy Economy¶ Subcommittee on Energy and Air Quality¶ May 20, 2003 http://republicans.energycommerce.house.gov/108/Hearings/05202003hearing926/Preli1464print.htm

The vision of an economy fueled by hydrogen generated from renewable energy sources is a revolutionary concept that will require evolutionary, incremental progress. We believe fuel cells will be deployed first in stationary devices and fleet vehicles such as transit buses and only later in the personal auto market. Transit buses are a strategic enabler on the pathway to autos powered by fuel cells. Hydrogen-fueling stations can be made available more readily given the relatively small number of inner city bus stations and the power plant size and weight requirements are less demanding than those associated with autos.¶ We need to walk before we run and gain experience in real world operating conditions. Fleet vehicles represent a perfect candidate for this type of practical experience since they offer an opportunity to enhance the range of operation for the vehicle, gain experience with heavy-duty cycles and train a core group of technicians.¶ As the industry gains experience in deploying fuel cells for stationary, inner city buses and fleet applications, these successes can pave the way for zero emission fuel cell cars and serve as benchmarks to measure progress towards the goals of the Administration's FreedomCAR and Fuel initiative. Similarly, we believe it is wise to continue the investments being made in electric drive train technology for hybrid cars and buses since fuel cell vehicles will incorporate this same technology and benefit from the technical advances and experience gained from these earlier vehicles.

#### That is the key to solving warming

Gordon 11

Deborah Gordon¶ Nonresident Senior Associate¶ Energy and Climate Program Carnegie Endowment for International Peace¶ Transportation Trifecta: Cars, Climate Change, and Oil Security¶ http://carnegieendowment.org/2011/04/18/transportation-trifecta-cars-climate-change-and-oil-security/wbs

Cars, not coal, need to be the priority in addressing climate change. That’s not to say coal—with its inherent environmental, health, and safety risks—is off the hook. It’s just not on the front burner.¶ Scientists now realize that air pollution and climate change must be treated as related challenges, not two distinct problems. The United Nations Environment Programme recently released new research that pins the short-term cause of growing climate disruption on ground-level ozone and black carbon, both of which result largely from oil-fueled vehicle engines. NASA’s climatologists separately concluded that cutting on-road transportation emissions of ozone-forming gases and black carbon would be unequivocally good over the short and long term—for both the climate and public health. This offers an environmental trifecta that is win-win-win.¶ We don’t need to look any farther than our own garages to see where the largest shares of climate disruption, smog, and oil use are coming from. Cars and trucks are 94 percent dependent on oil that, when burned, emit high levels of direct and indirect warming gases.¶ Cars are causing the climate to change before our eyes. The current decade is the warmest on record worldwide. The floods, fires, melting ice caps, feverish heat, and onslaught of winter blizzards witnessed in 2010 are signs of troubling climate change already underway. And, despite climate skeptics who doubt the cause and effect of a warming planet and frigid weather, polls show that the vast majority of Americans—three in four—continue to trust the scientists who say that global warming is real.¶ And as if climate concerns weren’t enough to combat, the democracy-seeking unrest brewing in Libya, Iran, and other oil-rich nations is stirring America’s energy fears. Fortunately for policymakers, it turns out that the two major concerns over climate and oil are related. They both have cars in common and two billion motor vehicles are forecasted to proliferate around the globe within this decade.¶ Cars—and trucks—present a unique opportunity to solve two vexing problems at once. Cutting oil use and mitigating climate change does not require economy-wide action, at least not in the near term, because the solution lies mostly with on-road transportation.¶ The key is to transform motor vehicles, cleaning up current ones and electrifying those that are yet to be built. These goals work in tandem. Electrification not only eliminates the tailpipe’s airborne, noxious, climate-forcing pollutants, it also requires a far more energy-efficient vehicle design. So along the road to plugging in, we can also commercialize conventional cars that burn 50 percent less oil and reinvent mobility, from cars to trucks and beyond. Using less oil means relying less on crude from unstable oil nations which is an energy coup these days.¶ Model simulations run by NASA scientists indicate that huge reductions in climate forcing from electrified transportation may be possible, making this technological shift an extremely worthwhile pursuit. The potential to improve the climate, alleviate local pollution, and wean cars off oil justifies increasing investments in battery and advanced vehicle research. This is exactly what the president is proposing by significantly boosting funds for the very agency—the Department of Energy—that was created in the midst of back-to-back oil crises in 1977.

#### The plan solves leadership, warming, air pollution and protects the grid

Department of Energy 12

http://www1.eere.energy.gov/hydrogenandfuelcells/about.html

The Fuel Cell Technologies Program conducts comprehensive efforts to overcome the technological, economic, and institutional barriers to the widespread commercialization of hydrogen and fuel cells. The program is aligned with the strategic vision and goals of the U.S. Department of Energy (DOE). The program's efforts will help secure U.S. leadership in clean energy technologies and advance U.S. economic competitiveness and scientific innovation.¶ Hydrogen and fuel cells offer a broad range of benefits for the environment, for our nation's energy security, and for our domestic economy, including reduced greenhouse gas emissions, reduced oil consumption, expanded use of renewable power (through use of hydrogen for energy storage and transmission), highly efficient energy conversion, fuel flexibility (use of diverse, domestic fuels, including clean and renewable fuels), reduced air pollution, and highly reliable grid support. Fuel cells also have numerous advantages that make them appealing for end-users, including quiet operation, low maintenance needs, and high reliability. In addition to using hydrogen, fuel cells can provide power from a variety of other fuels, including natural gas and renewable fuels such as methanol or biogas.¶ Hydrogen and fuel cells can provide these benefits and address critical challenges in all energy sectors—commercial, residential, industrial, and transportation—through their use in diverse applications, including distributed energy and combined-heat-and-power systems; backup power systems; systems for storing and transmitting renewable energy; portable power; auxiliary power for trucks, aircraft, rail, and ships; specialty vehicles such as forklifts; and passenger and freight vehicles, including cars, light trucks, buses, and short-haul trucks.

An expanded bus program is the key to hydrogen commercialization

Center for Transportation and the Environment 09

A Report on Worldwide Hydrogen Bus Demonstrations, 2002-2007¶ http://www.fuelcells.org/wp-content/uploads/2012/02/busreport.pdf

Hydrogen bus purchases require government assistance to help offset incremental costs greater than those for standard buses. Most participants believe that the cost issue will be resolved as the technologies move toward commercialization. A major factor will be bigger demonstrations and deployments by transit agencies (50-100 vehicles) and larger hydrogen bus purchases. For example, in a March 2006 presentation to the California Air Resources Board. UTC indicated that aggregate orders of at least 100 buses will drive capital cost to competitive levels of around $1 million per bus.¶ One transit agency noted that a premium of several hundred thousand dollars per bus might make fuel cell buses attractive for limited purchases, while another felt that a premium of $100,000 or less would make it possible for every bus in the fleet to be a fuel cell-powered. Participants noted that the impact of the premium for fuel cell buses will vary significantly, depending upon the extent to which air quality regulations will increasingly require zero-emission buses.¶ Similarly, participants recognized that additional volume will help reduce the cost to build hydrogen fueling stations, which currently runs about $2 million to $5 million per station. Many participants also suggested that the infrastructure industry needs a pathway, such as an industry roadmap. for installing and expanding new hydrogen infrastructure and for optimizing the stations for larger demand. Companies will be unwilling to invest in hydrogen fueling infrastructure unless a clear market is seen.¶ Finally, many participants felt that the cost of hydrogen fuel would drop once larger volumes are attained. To further improve the economics, better planning is needed to minimize venting of stored liquid hydrogen, which could be attained by better matching supply with anticipated demand, with more consistent and increased use of the station, and through the development of new storage technologies.

#### Transit bus industry is key to key to transitioning to energy efficient vehicles

Schor 09

Elana Schor Congressional reporter, Environment & Energy Daily and Greenwire How Bus Transit Can Help the Auto Industry http://la.streetsblog.org/2009/10/26/how-bus-transit-can-help-the-auto-industry/

But the recession hasn't dampened the economic potential of hybrid bus production, as the Environmental Defense Fund (EDF) laid out today in a new report [PDF] on the industry. In fact, EDF found, transit bus companies share enough skills and regional foothold with the auto industry -- the map of bus makers pictured above could be mistaken for a map of automakers -- to pave the way for fuel-efficiency advances that would ultimately benefit all vehicles. ¶ After noting that 32 percent of American transit buses do not rely on gas or diesel to run, today's report continues:¶ The bus industry serves as an important entry point for advanced vehicle technologies, especially in new vehicles that require refueling infrastructure and other major changes. For instance, since transit agencies have a well-defined base of centrally managed fleets, they are ideal for testing and proving plug-in hybrid and all-electric buses — thus leading the way for the passenger car industry.¶

#### An expanded federal government commitment to clean bus infrastructure is key solvency

Pollin 10

Robert Pollin- Political Economy Research Institute Univ of Mass

Industrial Policy and the Revival of U.S. Manufacturing

January 2010 http://www.peri.umass.edu/543/

An obvious priority here would be to build manufacturing capacity around clean energy technologies, including green buses and rail cars, as well as automobiles. Investments in these areas could be the basis for a revival of a transformed U.S. auto industry.¶ A program to dramatically improve public bus services throughout the country well illustrates the broader possibilities and approach. Let’s say, for example, the federal government commits to doubling the number of buses now operating throughout the country, and requires that all the new buses operate at high energy efficiency levels. Such a program could produce major environmental and social benefits: even at current fuel-efficiency standards, transporting people via public transportation, as opposed to private cars, produces a net reduction in carbon emissions of about 45 percent per passenger mile, while the average costs for passengers of public transportation are about half those of people traveling by car. Meanwhile, the government orders for clean-energy buses would establish a guaranteed market for manufacturers. Some of these orders could be filled by the current suppliers, all of whom now operate in the U.S. The rest could be supplied by U.S. auto firms, including GM and Chrysler, assuming these companies see the opportunities open to them through converting part of their unprofitable auto manufacturing operations into a newly-expanding market for clean-energy buses.

#### Buses are key to integration and expansion of fuel cell technology

Eudy 12

L. Eudy is Research specialist for National Energy Research Laboratory http://www.nrel.gov/hydrogen/proj\_fc\_bus\_eval.html

Transit buses are one of the best early transportation applications for fuel cell technology. Buses operate in congested areas where pollution is already a problem. These buses are centrally located and fueled, highly visible, and subsidized by government. By evaluating the experiences of these early adopters, NREL can determine the status of bus fuel cell systems and establish lessons learned to aid other fleets in implementing the next generation of these systems.

#### Federal investment in application of new fuel cell technologies spur their acceptance

Boesel 09

John Boesel, President and CEO of CALSTART¶ Before the Select Committee on¶ Energy Independence and Global Warming¶ On¶ Constructing a Green Transportation Policy:¶ Transit Modes and Infrastructure¶ March 19, 2009http://www.calstart.org/Libraries/Policy\_Documents/CALSTART\_Select\_Committee\_on\_Energy\_and\_Global\_Warming\_Testimony.sflb.ashx

There is a clear need to increase public investment in the¶ development of clean and efficient vehicle and fuel technologies. The public sector has¶ traditionally played a significant role in early stage technology development, and the need¶ for this public investment is increasing as the financial crisis deepens and private¶ companies cut back on risky long term investments. Specific needs for the medium- and¶ heavy-duty sectors include:¶ • Improved system integration and manufacturability¶ • Reduced energy storage costs specific to commercial vehicle designs¶ • Electrified and advanced components (to enable even greater fuel economy gains¶ in all trucks by reducing engine load and enabling start-stop operation)¶ • Improved thermal efficiency and thermal recovery¶ • Advanced aerodynamics¶ • Fuel-optimized and downsized engines, advanced combustion schemes, power¶ generation, light-weight materials, and advanced control systems.¶ Demonstration and validation – pre-production stage: successful and transparent¶ demonstrations can help to “unlock” the environmental and economic benefits of new¶ vehicle and fuel technologies by proving their viability in real world situations and speed¶ user feedback to more quickly design production systems. Public investment and¶ partnerships can help to overcome this barrier and bring these technologies from lab to¶ market. It is important that the demonstrations are public and that analysis of technology¶ performance is shared. Pilot programs can be used for the demonstration and validation¶ of vehicles and infrastructure. For example, CALSTART is working with a number of¶ California transit properties to secure funding for the Zero emission Transit User Group (ZTUG),¶ which would provide valuable real world testing and analysis of zero-emission¶ transit bus technologies. Other potential pilot programs include:¶ • Local designation where there is a high level of truck activity (near a port or¶ transfer location):¶ • Farming region, with potential link to fuel source¶ • A designated “Clean Transportation Corridor” program¶ • Construction Equipment¶ Purchase incentives – early market stage: new technologies in the early stages of market¶ deployment tend to cost more than the business case of fleet owners allow them to pay.¶ Smart and targeted purchase incentives, aligned with policy goals, can help technologies¶ get through this transition period by accelerating deployment and increasing demand. As¶ demand and production volumes increase over time, and as the innovation cycle¶ continues with process improvements and movement up the learning curve, purchase¶ costs can be expected to come down and the need for incentives should disappear.

Increasing federal investment from project specific to a longer term commitment is the key to spurring commercialization of new fuel cell technologies

Center for Transportation and the Environment 09

A Report on Worldwide Hydrogen Bus Demonstrations, 2002-2007¶ http://www.fuelcells.org/wp-content/uploads/2012/02/busreport.pdf

Demonstration participants envisioned two primary roles for government in future demonstrations: the development of a long-term, rather than project-specific, strategic plan for fuel cell buses and an accompanying funding commitment until commercialization is viable. Transit operators indicated that government funding will be needed to cover incremental costs of purchasing and operating fuel cell buses through 2015, based on current commercialization timeframes. Many participants believe that government support for larger deployments (50-100 vehicles), and bigger hydrogen bus purchases, will help to bring down bus costs. Several also believe that monetizing carbon emissions could significantly improve the life-cycle cost implications of hydrogen buses.

# SQ C-Plan

#### The present system has just launched a program to spur new fuel cell buses that will succeed

Willis 12

Paul Willis reporter for Earthtechling April 21, 2012

<http://www.earthtechling.com/2012/04/fuel-cell-buses-get-6-6-million-federal-boost/>

The federal government has given $6.6 million in funding to Calstart, an alternative-transportation consortium for the development of zero emission fuel cell buses. The funding came from the Federal Transit Administration (FTA) and will go towards regional development efforts around cleaner mass transit options. Five projects in total are getting support. These are:¶ - An advanced generation fuel cell bus which integrates a smaller, lighter, and more powerful fuel cell in a full-size transit bus. Built by New Flyer Industries and utilizing a BAE Systems hybrid electric drivetrain, CTTransit will operate the bus in Hartford, CT.¶ - The San Francisco Municipal Transportation Agency with BAE Systems will integrate and test an enhanced 30 kW Hydrogenics fuel cell to power the auxiliary systems in a lower cost commercial hybrid powertrain.¶ - Ballard will develop a more robust and affordable fuel cell for integration and testing in a bus operated by SunLine Transit Agency in the Coachella Valley, Calif.¶ - US Hybrid, a Torrance-based company, will develop and test a high-voltage, high efficiency, converter to power air conditioning systems for hybrid buses. Air conditioning systems are one of the biggest sources of energy consumption beyond the traction system.¶ - Calstart will conduct an analysis to assess the current market viability of fuel cell buses and provide recommendations on actions to accelerate the growth of the segment.¶ Nearly 60 percent of all 40-foot transit buses purchased in the United States rely on funding provided by the FTA. To qualify for this funding, buses must meet the agency’s “Buy America” requirements, which require 60 percent American-made components.¶ The FTA is currently overseeing a national program – the National Fuel Cell Bus Program [PDF] - focused on developing commercially viable fuel cell bus technologies. Calstart is one of three non-profit consortia chosen to manage projects competitively selected under the program.¶ They work with bus companies and fuel cell technology firms, acting as a catalyst for the growth of the clean transportation technology industry. One of their partners is BAE Systems, which has been manufacturing hybrid drive propulsion systems for over a decade and has more than 3,500 hybrid buses operating around the world.¶ Hybrid buses are growing more common in public transport systems around the world and yet many authorities still remain to be convinced. Not least because of the high cost of fuel cells. A 2007 U.S. Department of Transportation study put the fuel cell costs for an entire life cycle at three times that of diesel, CNG or diesel hybrid buses.¶ “We are extremely pleased with the announcement by Secretary LaHood,” said Calstart President and CEO John Boesel in a statement. ”Matched on a 1:1 basis by other sources, these federal grants will play an important role in accelerating the market adoption of zero emission fuel cell buses.”

#### The FTA just launched a new fuel cell bus demonstration program

NAFTC 6-5-12

National Alternative Fuels Training Consortium

http://naftcenews.wvu.edu/naftc\_enews/2012/06/05/department-of-transportation-funds-fuel-cell-bus-research

U.S. Transportation Secretary Ray LaHood recently announced that $13.1 million in federal funding will go toward research and demonstration projects under the Federal Transit Administration (FTA) National Fuel Cell Bus Program. The program aims to advance hydrogen fuel cell power for transit buses and reflects the Obama administration’s commitment to address the U.S.’s energy challenges, reduce the country’s dependence on foreign oil and promote cleaner air. “President Obama’s all-of-the-above energy strategy includes adopting alternative fuels that let transit agencies bypass the gas pump altogether and reduce our carbon footprint,” said LaHood. “This investment moves us closer to achieving the President’s goal of reducing oil imports by a third in a little over a decade.”¶ The funds were disbursed between CALSTART in Pasadena, Calif.; the Center for Transportation and the Environment in Atlanta and the Northeast Advanced Vehicle Consortium in Boston. All three will engage in work to develop various fuel cell components, test American-made buses under real-world conditions powered by fuel cells and conduct educational outreach.¶ “With gas prices on the rise, we know that the availability of reliable transit as a transportation choice is a significant part of relieving the pain at the pump for millions of riders each day,” said Federal Transit Administrator Peter Rogoff. “And, the Department is taking it a step further by investing in a new generation of clean-fuel technology to make transit an even more significant part of our nation’s overall approach to a secure energy future.”¶ The funding aims to bring fuel cell buses into commercial service faster, which would have a positive impact on the environment, as well as save energy. According to the National Renewable Energy Lab (NREL) and the FTA, every fuel cell-powered bus put into service in the U.S. could reduce carbon released into the atmosphere by 100 tons annually, as well as eliminate the need for 9,000 gallons of fuel every year over the life of the vehicle. That translates into a savings of more than $37,000 per year per vehicle for buses currently running on diesel fuel.¶ The FTA’s National Fuel Cell Bus Program was created to develop affordable hydrogen fuel cell buses for the nation’s public transit agencies and to increase public acceptance of fuel cell-powered vehicles. The 11 projects were selected among 26 proposals seeking $52 million in federal funds.

# Aff answers for HSR

#### Buses can’t solve and are not exclusive with trains

Ferry July 27, 2011

Daniel Ferry is a Summer Associate at America 2050, focusing on research and advocacy for a national high-speed rail network. He is currently a graduate student in City & Regional Planning and Real Estate Development at Cornell University While Buses Play a Valuable Role, they are no Replacement for High-Speed Rail<http://www.america2050.org/2011/07/while-buses-play-a-valuable-role-they-are-no-replacement-for-high-speed-rail.html>

Intercity buses provide a valuable service and are an important part of a complete and balanced transportation system. O'Toole makes several excellent suggestions for fostering a thriving bus system, including pricing city curb space at market rates. However, one of his central recommendations is to "end subsidies to Amtrak and spend no more money on high-speed rail." As we have seen, this recommendation is based on false premises and fails to account for the needs of the future. O'Toole would set buses and trains against each other as mutually exclusive paths, when in reality the services provide very different and complementary benefits. Buses provide a flexible and affordable transportation option, but they remain constrained by the limitations of the highway system - notably, congestion. High-speed trains provide a 21st century solution to the congestion and capacity constraints on our highways and airport runways, enhancing mobility and powering regional economies well into the future.

#### Inter-City buses cannot solve

Ferry July 27, 2011

Daniel Ferry is a Summer Associate at America 2050, focusing on research and advocacy for a national high-speed rail network. He is currently a graduate student in City & Regional Planning and Real Estate Development at Cornell University While Buses Play a Valuable Role, they are no Replacement for High-Speed Rail<http://www.america2050.org/2011/07/while-buses-play-a-valuable-role-they-are-no-replacement-for-high-speed-rail.html>

Intercity bus services run along highways, and are therefore subject to the same traffic jams that plague our automobiles. However, one railway with a single track in each direction has the capacity to transport as many people per hour as sixteen lanes of highway. Even if endlessly adding new lanes did work to curb congestion, our urban areas that struggle most with congestion simply do not have the space to build enough new highways to meet demand. Despite advances in traffic control and operations, highway congestion is predicted to get worse, not better, over the next few decades.¶ High-speed trains allow passengers to bypass this congestion, bringing passengers directly into center cities. In addition to their ability to move greater numbers of people than highways at higher speeds, well-managed high-speed rail networks can also deliver reliable service even while accommodating growing numbers of riders. For example, after introducing high-speed rail in 1992, Spain saw rail ridership rise from 16 to 51 percent of all trips (including car, bus, airplane, and rail) between Madrid and Seville, roughly the same distance as Boston to Philadelphia. Despite this tremendous growth in ridership, these trains are so reliable that passengers receive a full refund if their train is more than 5 minutes late. With traffic jams getting more frequent and more severe, our highways cannot be relied on for this caliber of on-time performance. High-speed rail is the most efficient way to provide new capacity for intercity travel, and adds a layer of redundancy and reliability that highways and airports cannot match.

#### Intercity buses are not an alternative to High Speed Rail—You should do both

Ferry July 27, 2011

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In a recent policy analysis, "Intercity Buses: The Forgotten Mode," Cato Institute transportation analyst Randal O'Toole hails the rise of intercity passenger bus service, and recommends several reforms to promote these services. Among his recommendations are the immediate cessation of funding for Amtrak and the High-Speed Intercity Passenger Rail program. This assertion reveals a fundamental misunderstanding of the strengths and value of passenger rail. Intercity buses and passenger rail should be seen as complementary services in a balanced transportation network, not as mutually exclusive alternatives. In making his case, O'Toole alleges that intercity buses require almost no public subsidies, and are safer than passenger rail. These claims are unproven at best and flatly incorrect at worst, and we shall address them in turn, but at the heart of the matter is O'Toole's flawed premise that transportation policy should reflect the needs of only the present, with no consideration to the future.

#### O’Toole’s claim that buses are safer than trains is manipulation of statistics

Ferry July 27, 2011

Daniel Ferry is a Summer Associate at America 2050, focusing on research and advocacy for a national high-speed rail network. He is currently a graduate student in City & Regional Planning and Real Estate Development at Cornell University While Buses Play a Valuable Role, they are no Replacement for High-Speed Rail<http://www.america2050.org/2011/07/while-buses-play-a-valuable-role-they-are-no-replacement-for-high-speed-rail.html>

O'Toole claims that intercity buses are far safer than rail, calculating that bus services see only 0.3 fatalities per billion passenger-miles to Amtrak's 1.4 fatalities per billion passenger miles. However, these figures drastically overstate the number of bus passenger miles traveled while minimizing the number of bus fatalities incurred to arrive at an incorrectly low fatality rate.¶ Complicating this picture is the absence of a universal definition of "intercity bus." The source O'Toole cites for intercity bus fatalities uses the relatively narrow definition provided by the National Highway Traffic Safety Administration's Fatality Analysis Reporting System, which considers only those buses making cross country or intercity journeys. Even this modest figure is known to severely undercount the number of fatalities incurred by this small category of buses. To count passenger miles, O'Toole uses the American Bus Association's 2005 Motorcoach Census, which counts passenger-miles logged by intracity airport shuttles, sightseeing tours, and private commuter buses, amongst other categories that are not making cross country or intercity trips. The Motorcoach Census even counts miles logged by Canadian buses, an obvious discrepancy as Canadian fatalities are not counted. Canadian buses account for nearly a fifth of all buses in North America and an unknown number of passenger-miles, seriously skewing the statistics.¶ Due to the varying definitions used by different sources, it is difficult to determine exactly what the safety rate of intercity buses should be. The only major source that reliably counts both passenger miles and fatalities is the Bureau of Transportation Statistics. The BTS does not provide statistics for intercity buses specifically, but we do know that any bus providing scheduled intercity service will have to travel along highways. According to the Bureau of Transportation Statistics, from 1999 - 2008, the fatality rate for all vehicles on highways was 9.6 deaths per billion passenger miles (Tables 2-1 and 1-40). Buses may well be safer than other highway users such as private automobiles, but O'Toole's figures claim buses are 32 times safer than other highway users.¶ O'Toole takes the opposite track in determining passenger rail's safety - artificially shrinking the number of passenger miles while inflating fatalities to result in an artificially high fatality rate. O'Toole counts passenger miles only for Amtrak trains, while counting fatalities for all passenger trains, including commuter rail. This is probably because the Bureau of Transportation Statistics itself counts passenger miles only for Amtrak, but records fatalities for all passenger trains. The American Association of State Highway and Transportation Officials puts Amtrak's actual safety record at 0.4 fatalities per billion passenger miles between 1980 and 2010.

#### Buses can’t solve and are not exclusive with trains

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Intercity buses provide a valuable service and are an important part of a complete and balanced transportation system. O'Toole makes several excellent suggestions for fostering a thriving bus system, including pricing city curb space at market rates. However, one of his central recommendations is to "end subsidies to Amtrak and spend no more money on high-speed rail." As we have seen, this recommendation is based on false premises and fails to account for the needs of the future. O'Toole would set buses and trains against each other as mutually exclusive paths, when in reality the services provide very different and complementary benefits. Buses provide a flexible and affordable transportation option, but they remain constrained by the limitations of the highway system - notably, congestion. High-speed trains provide a 21st century solution to the congestion and capacity constraints on our highways and airport runways, enhancing mobility and powering regional economies well into the future.