House of Representatives:

Select Committee on Energy Independence and Global Warming

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Written Statement Prepared by David Muyres and Geoff Wardle On Recommendations for a Strategy for the Long-term Future of the American Auto Industry ©

David Muyres
Vice President, Educational Initiatives
Art Center College of Design
Pasadena, California

Geoff Wardle
Director, Advanced Mobility Research
Art Center College of Design
Pasadena, California

Contents:

A. Introduction:

This document articulates four, over-arching recommendations to the House Select Committee on Energy Independence and Global Warming as it considers what to do about the future of General Motors, Chrysler and Ford.

These four main recommendations are followed by a more detailed discussion that supports them.

B. About the Authors:

David Muyres and Geoff Wardle specialize in future studies for the automotive and transportation industries. Both have many years of significant professional experience within the global automobile industry in design and product development. They are now directing their focus and energies into transportation design education as well as researching and advocating innovative design based processes to create future, sustainable transportation solutions. Between them they represent a nucleus of opinion, based on focused and broad research into the future of sustainable transportation in an increasingly challenged global economy and global ecology.

Their work is done at Art Center College of Design in Pasadena, California, one of the world's leading design schools that offered the very first degree program in transportation design, 60 years ago. A significant proportion of the car designers around the world have graduated from Art Center, including many of the current worldwide heads of design, including BMW, Nissan, Ford, McLaren, Peterbilt Trucks and Kenworth. Art Center graduates are also leading the design of alternative vehicle and start up companies, including Polaris, Tesla, Aptera, Bright Automotive and Fisker Automotive.

Muyres and Wardle advocate that design creativity and innovation should be at the core of all conversations and activities that concern the future of transportation, whether it is the future of the automobile industry or the larger, more complex issues of personal and freight transportation at large. They have been at the center of creating a series of five annual summits at their school on the subject of future, sustainable mobility. These summits bring together leading experts from around the world in sustainability, transportation and the auto industry to discuss the significant challenges that the developed and developing economies of the world face in providing ecologically and economically sustainable transportation.

C. Brief Biography for David Muyres:

David Muyres is Vice President, Educational Initiatives, for Art Center College of Design in Pasadena, California. In his current position, Muyres is responsible for developing new strategic educational offerings for the College. These have ranged from educational programs targeting business executives about the value of design to a new offering, ArtCenterPRO, that allows companies to sponsor real world design projects in a secure IP controlled environment.

Muyres is also responsible for directing the Art Center Summits, a series of annual events focused on Sustainable Mobility. The Summits bring together global business, design and governmental leaders to discuss the future of sustainable transportation. The Summits are raising awareness of the significant role designers can play in creating sustainable solutions to global problems. Outcomes of this program will help define the future role of those involved in transportation design, as well as shape Art Center's future curriculum and educational initiatives. The Sustainable Mobility Summits have a global audience and have included numerous high profile speakers, such as Robert F. Kennedy Jr., Paul Hawken, Dean Kamen, and Chris Bangle. The Summits have been sponsored by significant companies and organizations, including Honda, JCI, Ford, Milliken, BMW, Canadian National Railway and the Swedish Consulate. Representatives from the DOE, Boeing, Google. Many automotive manufacturers, consultancies and governmental organizations have also attended.

Prior to joining Art Center in 2005, Muyres worked at Johnson Controls Inc. (JCI), where he held various functional and management positions in the United States, Europe and Asia. As Vice President of Design and Consumer Research in Germany, he helped create JCI's European Design Center. In Japan, he served as Vice President and General Manager for all Product and Business Development. During his tenure at JCI, he received six design-related patents.

In addition to his role at Art Center, Muyres donates his time to many professional and non-profit organizations. He helped start and is on the board of directors of the Operation Wheels of Freedom Foundation (OWOFF). OWOFF is modeled after the USO, in seeking to honor, educate and entertain the men and woman of our Armed Forces through the use of cars, rather than celebrity entertainment. He is an advisor to many sustainability related organizations, including Opportunity Green, and the Pasadena Sustainable Transportation Action Committee (PASTAC). PASTAC seeks to coordinate new mobility efforts between CALTECH, JPL, CALSTART and the City of Pasadena to make the city a model for sustainable mobility.

Muyres was born in Minneapolis, Minnesota. He studied Mechanical Engineering and Philosophy at Rensselaer Polytechnic Institute in Troy, New York, and

graduated from Art Center College of Design in Pasadena, CA with a Bachelor of Science in Transportation Design.

D. Brief Biography for Geoff Wardle:

Geoff Wardle is Director of Advanced Mobility Research at Art Center College of Design in Pasadena, California. Wardle is also part of the core team that has been planning and delivering Art Center's "Designing Sustainable Mobility" series of Summits, the first of which was held in February 2007.

Educated first as a vehicle engineer and then as an automotive designer at the Royal College of Art in London, Geoff has had extensive experience as a professional vehicle designer across four continents and remains a passionate car enthusiast. However, because of his career in the automotive industry, Geoff became increasingly concerned about the future sustainability of this industry, personal mobility and transportation in general.

With more than a decade of full-time involvement with Art Center's Transportation Design department, in California and in Europe, Wardle has been a continual advocate for transportation designers becoming far more concerned and involved with the many other disciplines that make up mobility in its entirety, particularly in the urban environment.

His deep held interests dwell on the role that designers can play in helping our developed and developing economies transition gracefully from an unsustainable level of consumerism to compelling, ecologically and economically sustainable economies that focus on a high quality of individual experience, comfort and reward. Within this broad horizon, he has a commitment to leading opinion and expertise on the future of mobility and transportation and to be a valuable resource for industry.

Aside from his role as a researcher and educator, Geoff Wardle works with one or two selected vehicle companies as an external advisor on futurist and design strategies. He is also on the board of advisors for the Progressive Insurance Automotive X-Prize.

E. Four Main Recommendations

The business model of the traditional car industry is broken. The United States now needs a strong and innovative mobility industry more than it needs a powerful car industry, particularly when the market for automobiles is saturated. If General Motors, Chrysler and Ford are to survive, they will need to adapt to this reality.

Insisting that the auto industry develops energy efficient vehicles is, by itself, not an adequate prerequisite for financial assistance.

Below are four main recommendations that should be considered as part of any use of taxpayer money to help General Motors, Chrysler or Ford recover:

1. **The appointment of an immediate, Mobility Innovation and Strategy Think-Tank to brainstorm, create and recommend to the US Government an over-arching US transportation policy that includes the participation of a restructured American auto industry. Design representation should be a core part of this think-tank.**

2. **A portion of any taxpayer-financed fund should be used to assist the car industry through a prescribed transition period, based on any government mandates resulting from the think-tank recommendations. The financial aid should be conditional upon 100% cooperation through this transition period.**

3. **A portion of the taxpayer-financed fund should go towards a national investment program in public and private sector transportation systems and infrastructure redevelopment to create a guaranteed demand for a retooled auto industry manufacturing output.**

4. **The balance of the taxpayer-financed fund should be used for helping innovative, automotive start-up companies get their products into production, perhaps utilizing some of the legacy industry's manufacturing capability.**

F. Supporting Discussion:

The business model of the traditional car industry is broken.

It is our opinion that the 20th Century auto industry business model is broken. Designing, mass-producing and selling cars yields an unacceptable, or at best, sporadic return on investment. Arguably, only Honda, Toyota and BMW have consistently achieved an acceptable return, annually, over decades.

At the same time, however, the human need for personal mobility and transportation continues to rise. If there is a market demand for mobility but the auto industry cannot make good business out of it, this suggests that there is something fundamentally wrong with its business model.

The auto industry needs to see its future business as providing mobility. Building automobiles or hardware might still be a significant part of the industry's economic activity but it would be a means to an end, not the end in itself. As well as contributing to a new, national program for innovative transportation and infrastructure investment, the auto industry might do well to consider how it could provide consumers with a total mobility package. Such a mobility package could provide their current consumers with much more than just a car in their driveway. Depending on a pre-determined monthly premium, car companies could provide their customers with access to special purpose vehicles, travel arrangements and transportation services for business trips and vacations, for example. In today's tired automotive economy, selling the cars does not make enough money. It is all the services and products that are downstream of the vehicle purchase that yield the revenue stream for insurance companies, repair shops, replacement parts vendors, etc.

Proposal 1
The appointment of an immediate, Mobility Innovation and Strategy Think-Tank to brainstorm, create and recommend to the US Government an over-arching US transportation policy that includes the participation of a restructured American auto industry. Design representation should be a core part of this think-tank.

Before the optimal future for the domestic American auto industry can be imagined or decided, it would be smart for there to be an all-encompassing national strategy on mobility and transportation.

The United States pioneered a transportation vision in the first half of the 20th Century. At the 1939 New York World Fair, the "Futurama" concept (see Glossary) was unveiled as a far reaching and extraordinary vision of an American continent, connected by a national freeway system and cities based around an

automobile dominant infrastructure. For better or for worse, that amazing vision was brought to reality in the immediate post WWII years and was perhaps the most significant contribution to American economic development. The Futurama model was based on a number of assumptions that are no longer viable or acceptable: cheap energy, vast quantities of raw materials, little consideration for natural habitat, suburban proliferation, global climate change, population growth and no accounting for social and health costs.

The United States is now ready for a "New Futurama". However, the New Futurama should not be dependent upon the automobile, even though a much smarter and more ecologically sustainable form of the automobile might well be an important component. The New Futurama needs to be a visionary and thoroughly integrated mixture of existing and future transportation and mobility solutions.

These solutions might encompass modern, high-speed rail systems, PRT or personal rapid transit systems (see Glossary), intelligent highway systems (see Glossary), smart, automated driving technologies incorporated into autonomous cars (see Glossary), upgraded subways and BRT or bus rapid transit systems (see Glossary). These systems will be driven by new economic conditions where renewable and distributed electricity generation, local food production and rapid manufacturing technology will place less demand on the long-haul transportation of commodities and goods. Ecological and quality-of-life issues will bring different emphases to personal, urban mobility.

There are many experts around the country researching all of the above and more. Bringing this all together for the national good is a complicated, multi-disciplinary task that requires a vision that stretches over several decades. This is why we believe that it is an imperative for there to be the formation of a **Mobility Innovation and Strategy Think Tank.**

It is conceivable that this think-tank could be a precursor to the formation of a permanent government agency, perhaps linked to energy, as there is inter-dependency between mobility and energy i.e. "The National Energy and Mobility Administration" (NEMA)

Once this over-arching national mobility and transportation strategy has been established, a clear view of the long-term landscape for the current domestic auto industry can be fully understood and what kind of transition it will need to undergo.

Design representation should be a core part of this think-tank.

Too often designers in the auto industry are used only to restyle last year's cars rather than think freely about new ways of moving people and goods around. They are not given the opportunity to be the visionary and strategic thinkers that they have the predilection to be.

The future role of designers in industry will move beyond just designing new vehicles. They will understand that new transportation solutions are more about complete systems – systems that demand not only profit for enterprises but compelling, accessible and satisfying solutions to the end user as well as being ecologically sustainable. The generation of designers that we are currently educating is being equipped to appreciate and work with the many different disciplines that are required to develop integrated mobility solutions.

The creative processes that designers intuitively use in their normal work, also equip them to problem solve beyond the actual products or services that they design. Bringing in designers at the very beginning of any project that is about innovation and progress ensures that the widest number of possibilities are imagined and explored before premature or narrow-sighted decisions are made. Designers can also be good facilitators of the different disciplines, whose expertise contributes to the overall solution. Designers see it as their natural role to create balance to solutions – a balance between the end-user's needs, the commercial interests of the enterprise, the attributes of the end product and ecological responsibility.

Finally, designers are highly skilled at visualizing complex solutions in a format that all stakeholders can understand to help in the making of critical or far-reaching decisions.

Proposal 2:
A portion of any taxpayer-financed fund should be used to assist the car industry through a prescribed transition period, based on any government mandates resulting from the think-tank recommendations. The financial aid should be conditional upon 100% cooperation through this transition period.

We believe that if Congress decides to use Federal Funds to ensure a future for some or all of the American car industry it should be highly conditional. Insisting that the auto industry develops energy efficient vehicles is by itself **not** an adequate prerequisite for financial assistance.

It is our opinion that it is primarily the industry's design, product development, manufacturing capabilities and integrated supply chain that are of potential value to the United States' economy, not particularly the cars that they make.

Although new top leadership and strategic middle management would be required, the above assets can be utilized for the design, development and manufacture of other transportation and mobility related hardware such as subway cars, trains and advanced, rider friendly shuttle buses or personal rapid transit vehicles – not just highly fuel efficient conventional cars. In fact, there are conceivably other much needed machines and hardware that renewed economic activity in public infrastructure might demand, that are equivalent in scale and complexity to automobiles; for example, renewable energy generation turbines, innovative, affordable, pre-engineered housing systems and transportation infrastructure hardware.

To retool the current car industry to become an integral part of the "New Futurama" would take some years. Therefore it would be reasonable to give financial assistance to the Big Three to make this transition, conditional upon the companies constructively developing its management and manufacturing capabilities for these additional products. In return, however, the United States Government has to have a clear agenda and also a commitment to investing in the "New Futurama" that would create the demand for these new products.

Indeed, the United States has a huge opportunity here, if it seeks a new national transportation agenda. Harnessing General Motors', Ford's, Chrysler's and their formidable supply chain's product development and manufacturing abilities at a time when radical new approaches are needed for transportation at large, would seem to be a more sustainable business model than just building cars in a globally saturated market.

Hence the third recommendation:

Proposal 3:
A portion of the taxpayer-financed fund should go towards a national investment program in public and private sector transportation systems and infrastructure redevelopment to create a guaranteed demand for a retooled auto industry manufacturing output.

If the current, domestic automobile industry is to be retooled to contribute to a "New Futurama" then it is a prerequisite that there must be a strong demand for the new products described above, coming on stream as the car companies complete their transition.

None of the traditional American transportation industries, including the car industry are doing a very good job of developing new thinking for future transportation solutions – they are stuck in yesterday's thinking, which also argues that they are only responding to what the market demands.

So Congress has an unparalleled opportunity right now to drive mobility innovation by using some of its bail-out money as an incentive to some or all of the auto industry through a transition phase while using some of it to create demand – demand for manufactured hardware that is needed to modernize America's public transportation systems at large. This is why there is merit in linking Federal investment in new public infrastructure projects on a national scale with demands on the auto industry to become developers and suppliers of the hardware that these new public transportation and infrastructure projects would demand.

Proposal 4:
The balance of the taxpayer-financed fund should be used for helping innovative, automotive start-up companies get their products into production, perhaps utilizing some of the legacy industry's manufacturing capability.

The current car industry does an exceptionally good job of designing, developing and making vehicles that people no longer want.

Meanwhile, there are start up companies developing new, innovative, highly energy efficient vehicles that they are severely challenged to get into production.

At a time when America urgently needs vehicles that are substantially more energy efficient than the current CAFE standards require, it again seems to be an obvious opportunity to accelerate the start-up companies' product development process, where appropriate. In addition, at a time when there are redundant, experienced automotive development and manufacturing engineers, as well as spare manufacturing capacity, it ought to be possible to make these available to the start-ups. Of course, this arrangement would have to be managed so that legacy thinking and attitudes do not compromise the fresh, innovative attributes of the start-up companies' design solutions.

Using a portion of funds set aside to retool the legacy car industry would be more effectively deployed to help the game changers that already exist in the United States, such as Aptera, Fisker, Bright Automotive and Tesla.

G. Conclusion:

The debate currently seems to revolve around a rescue plan for the next 100 days. We strongly feel that the discussion needs to be centered on the next 100 years.

We see the Mobility Innovation think-tank playing a central role in defining a robust and sustainable long-term plan. It should be made up of an empowered, multi-disciplinary group of forward thinking transportation-minded specialists. This group would go far beyond traditional transportation experts to include engineers, transportation designers, sociologists, urban planners, scientists, architects, industrial designers, environmental designers, manufacturers and economists.

H. Glossary:

Art Center College of Design: Art Center College of Design (www.artcenter.edu) is a global leader in art and design education. Since its founding in 1930, Art Center's alumni continue to have a profound impact on popular culture, the way we live and important issues in our society today. Located in Pasadena, California, Art Center offers undergraduate and graduate degrees in a wide variety of art and design disciplines, as well as public programs for all ages and levels of experience.

Autonomous cars: The other side of the equation to intelligent highways, autonomous cars that never crash into each other allow the prospect of much lighter and fuel-efficient vehicles. Cars that never crash do not need to be engineered with very heavy crash structures. Traffic flow can be managed electronically rather than based on human rationale. Cars can also be streamed more densely along the infrastructure, dramatically increasing it effective capacity capacity.

BRT – Bus Rapid Transit: BRT can effectively offer the same service as light-rail or subway systems in urban environments but at a fraction of the cost per mile to build. Typically, BRT systems provide exclusive driving lanes to semi-express buses along strategic corridors. The buses often turn smart traffic signals green on their approach and stop only every two or three blocks to speed up progress.

Futurama: At the 1939 New York World Fair, a remarkable exhibition was shown that showed models and renderings of a vision for America's future transportation. The exhibition was called Futurama and was, ironically, largely created by General Motors. Generally regarded as a significant inspiration to the eventual national highways program that brought America its continent-wide and

urban freeway systems, Futurama was remarkably predictive. The exhibition went on to tour the United States as a traveling road-show

PRT – Personal Rapid Transit: A transportation system that is a hybrid between the personal automobile and a guided transit system. PRT provides, automated, on demand personal cars or "pods" that will transport typically up to four passengers using a mechanical guidance system, often elevated above ground level. Because the pods are lightweight, the guidance system can be relatively cheap and easy to install in urban environments. A well-known PRT system was introduced in Morgantown, West Virginia in 1975, to link the three campuses of West Virginia University. More recently, there has been renewed interest in PRT around the world, with several entrepreneurial companies building demonstration systems.

Intelligent Highways: Technology that will allow road vehicles to drive by themselves. By removing the human element, vehicles can be streamed far more efficiently along existing infrastructure and with potentially a very low accident rate. While early attempts at intelligent highways were not so successful, intelligent highways are still the Holy Grail for traffic engineers and there is promising technology on the horizon.

I. Contact Information:

Dave Muyres:

david.muyres@artcenter.edu

+1 626 396 4255 (w)

dmuyres@mac.com

+1 626 524 5802 (c)

Geoff Wardle:

wardle@artcenter.edu

+1 626 396 2421 (w)

geoffwardle@mac.com

+1 626 807 0053 (c)