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Ninth Annual Garrett Morgan Sustainable Transportation Symposium, MTI Report S-08-04

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Department of Transportation

MTI

Ninth Annual Garrett Morgan Sustainable Transportation Symposium

MTI Report S-08-04

May 2009

MINETA TRANSPORTATION INSTITUTE

Ninth Annual Garrett Morgan Sustainable Transportation Symposium



MTI Report S-08-04



MINETA TRANSPORTATION INSTITUTE

The Norman Y. Mineta International Institute for Surface Transportation Policy Studies (MTI) was established by Congress as part of the Intermodal Surface Transportation Efficiency Act of 1991. Reauthorized in 1998, MTI was selected by the U.S. Department of Transportation through a competitive process in 2002 as a national “Center of Excellence.” The Institute is funded by Congress through the United States Department of Transportation’s Research and Innovative Technology Administration, the California Legislature through the Department of Transportation (Caltrans), and by private grants and donations.

The Institute receives oversight from an internationally respected Board of Trustees whose members represent all major surface transportation modes. MTI’s focus on policy and management resulted from a Board assessment of the industry’s unmet needs and led directly to the choice of the San José State University College of Business as the Institute’s home. The Board provides policy direction, assists with needs assessment, and connects the Institute and its programs with the international transportation community.

MTI’s transportation policy work is centered on three primary responsibilities:

Research

MTI works to provide policy-oriented research for all levels of government and the private sector to foster the development of optimum surface transportation systems. Research areas include: transportation security; planning and policy development; interrelationships among transportation, land use, and the environment; transportation finance; and collaborative labor-management relations. Certified Research Associates conduct the research. Certification requires an advanced degree, generally a Ph.D., a record of academic publications, and professional references. Research projects culminate in a peer-reviewed publication, available both in hardcopy and on TransWeb, the MTI website (<http://transweb.sjsu.edu>).

Education

The educational goal of the Institute is to provide graduate-level education to students seeking a career in the development and operation of surface transportation programs. MTI, through San José State University, offers an AACSB-accredited Master of Science in Transportation Management and a graduate Certificate in Transportation Management that serve to prepare the nation’s transportation managers for the 21st century. The master’s degree is the highest conferred by the California State University system. With the active assistance of the California Department

of Transportation, MTI delivers its classes over a state-of-the-art videoconference network throughout the state of California and via webcasting beyond, allowing working transportation professionals to pursue an advanced degree regardless of their location. To meet the needs of employers seeking a diverse workforce, MTI’s education program promotes enrollment to under-represented groups.

Information and Technology Transfer

MTI promotes the availability of completed research to professional organizations and journals and works to integrate the research findings into the graduate education program. In addition to publishing the studies, the Institute also sponsors symposia to disseminate research results to transportation professionals and encourages Research Associates to present their findings at conferences. The World in Motion, MTI’s quarterly newsletter, covers innovation in the Institute’s research and education programs. MTI’s extensive collection of transportation-related publications is integrated into San José State University’s world-class Martin Luther King, Jr. Library.

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MTI REPORT S-08-04

**NINTH ANNUAL GARRETT MORGAN SUSTAINABLE
TRANSPORTATION SYMPOSIUM**

May 2009

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Thank you to this year's participating schools, their teachers and transportation agency sponsors for contributing to the education for future transportation industry professionals:

George Flamson Middle School in Paso Robles, California, and eighth-grade teacher I.N. Johnson; Loleta Union Elementary School in Loleta, California, and eighth grade teacher Jackie Carter; Redland Middle School in Rockville, Maryland, and school principal and teacher Kimberly McLurkin-Harris; Riverview Middle School from Oakland, California and eighth grade teacher Rosemary Hatcher; the School of International Studies at Meadowbrook in Norfolk, Virginia, and teacher Jeanine Harris; and Riverside Meadows Intermediate School in Pumas Lake, California, which sent two classes to participate in this year's symposium. Thank you to seventh grade teacher Michelle Dietz and eighth grade teacher Amy Duchesne.

Additional thanks are offered to the technicians at each videoconference site. Without your technological know-how and troubleshooting, this event simply could not take place.

As always, MTI wishes to acknowledge the Honorable Norman Y. Mineta for his unwavering support for this event and in promoting the transportation industry as a viable future for young people from all walks of life.

For their work in producing this event and its report, thanks are offered to MTI staff, including Director of Communications and Special Projects Donna Maurillo, former Director of Research Trixie Johnson, Research Project Manager Meg Fitts, Student Publications Assistant Sahil Rahimi and Student Webmaster and Technical Assistant Ruchi Arya.

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Please note that all research for this symposium was performed by middle school students and the Mineta Transportation Institute cannot verify the accuracy of the contents of each group's presentation.

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FOREWORD

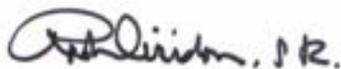
It is my pleasure to present this edited transcript from the ninth annual Garrett Morgan Sustainable Transportation Symposium, which was held on March 25, 2009. This event is integral to the Mineta Transportation Institute's ongoing mission of information and technology transfer, and within this event's target audience, junior high-aged students, are transportation's future leaders and innovators.

Today is an exciting time to be involved in the transportation industry. There is a newly renewed emphasis on improving public transportation, creating modes of sustainable transportation, and bringing out state and federal highways and rail systems up to par, including firm plans for high-speed rail in several state and metropolitan regions. These exciting projects will require the expert services of engineers, urban planners and transportation policy managers for years to come.

Where will those new engineers, urban planners and transportation policy managers come from? The participants in this and past Garrett Morgan events are certainly a good start! The challenges these students faced in creating their sustainable transportation entries for this competition utilized many of the skills that are required of transportation professionals-math, physics, chemistry and other sciences, and of course, excellent communications skills.

I'm happy to be able to congratulate all of our students for meeting the challenge and for a job well done. I'd also like to extend my personal thanks to those individuals included in the acknowledgements section. Without each of you, this educational opportunity simply would not exist.

Sincerely,



Rod Diridon, Sr.

Executive Director, Mineta Transportation Institute

EXECUTIVE SUMMARY

On March 25, 2009, the Mineta Transportation Institute (MTI) continued its support of the U.S. Department of Transportation's Garrett A. Morgan Technology and Transportation Futures Program by conducting the ninth National Garrett Morgan Symposium and Videoconference on Sustainable Transportation.

The purpose of this national videoconference was to stimulate the minds of young people and encourage them to pursue the academic programs that will prepare them for professional careers in transportation engineering, planning, administration and technology.

Purpose

The Garrett A. Morgan Technology and Transportation Futures Program was established in 1997 by former U.S. Secretary of Transportation Rodney E. Slater. The program has three cornerstone components:

- To establish a partnership among the U.S. Department of Transportation, state departments of transportation, public and private transportation providers and local communities to ensure that today's students are prepared to become the next generation of transportation leaders
- To develop a curriculum that can interest younger students in transportation and provide learning tools that can guide them to advanced academic and professional levels
- To provide the technologies that will enable students to develop skills that they can apply to future careers in transportation

Participating Schools

This year's videoconference schools included:

- Loleta, California: Loleta Union Elementary School, sponsored by Emma Cleveland from Caltrans District 1.
- Oakland, California: Riverview Middle School, sponsored by Shannon Flynn from Caltrans District 4.
- Paso Robles, California: George Flamson Middle School, sponsored by Janet Newland and Julia Bolger from Caltrans District 5.
- Pumas Lake, California: Riverside Meadows Intermediate School sponsored by Elaine Bradford from Caltrans District 3.
- Rockville, Maryland: Redland Middle School, sponsored by Starleta Gattis from the American Public Transportation Association (APTA).
- Norfolk, Virginia: The School of International Studies at Meadowbrook, sponsored by Tamara Poulson from Hampton Roads Transit.

Event Highlights

The students were welcomed by MTT's Executive Director, Rod Diridon, Sr., who was in residence at the Caltrans District 5 site in Oakland. Joining Mr. Diridon in welcoming remarks were APTA's President Bill Millar, United States Secretary of Transportation Ray LaHood, and Caltrans Director Will Kempton. The students enjoyed an impromptu but short question and answer period with Secretary LaHood.

Mr. Diridon reminded the students of the importance of the event:

We absolutely need bright young people in transportation, because with our new President Obama and Governor Schwarzenegger here in California, there is a great focus on improving our transportation systems, especially sustainable transportation systems, and that emphasis has not been there for many, many years.

This year's subjects were as varied, including presentations about solar energy, using salt water and hydrogen as a sustainable fuel source, urban sprawl, bus and pedestrian safety, and a program to maximize use of an already extensive public transit system.

First, George Flamson Middle school presented its Salt Water-Powered Car. Student team members included Kaitlin Bidell, Shbun Kohol, Garret Lewis, and Christian Jensen van Ransberg, and their teacher was I.N. Johnson.

The salt water-powered car was a logical extension from this same school's project from last year, which was the Stirling engine, a self-contained non-polluting energy source that uses the expansion of gases at high temperature to generate energy. The students proposed using salt water as a source of energy by using radio waves to separate the salt from the water, and then derive hydrogen from the salt.

The technology is in its infancy, having been discovered by John Kanzius (March 1, 1944-February 18, 2009), an American inventor who was searching for a cure for his own cancer.

Next up was Loleta Union Elementary School, inventors of HumRET: Humboldt County Renewable Energy Transportation. Student team members Sarah Cameron, Stephen Stockton, Jordan Alberts and Neo Rodriquez, and their teacher was Jackie Carter.

This group proposed the use of a fleet of alternative fuel vehicles, including electric/internal combustion, electric, or plug-in/internal-combustion/hydrogen hybrid, with an emphasis on an all-electric vehicle.

Hydrogen was also promoted as a fuel source, but the source of that hydrogen may in part be a certain type of green algae, which is currently part of research at University of California Berkeley.

HumRET utilizes all alternative energy sources available to the region, including wave and solar technology for generating electricity, thereby reducing dependence on fossil fuel sources.

The third classroom that presented was Redland Middle School, whose students chose to tackle the issue of bus safety with their presentation, Improving the Safety of Public Bus Transportation. The students who produced this project are Julie, Marisa, Tyasia Craig and Nadje, and their teacher was Kimberly McLurkin-Harris.

The students observed that bus accidents were on the rise and that there are simply technologies already in existence that could help keep bus riders safe, including seat belts, specially placed air bags, lowering hand straps for shorter riders who must stand on the bus, installation of bars for standing passengers to better brace themselves, and extra emergency exits at the center of the bus. They also suggested improvements to the bus that would assist in increased pedestrian safety, including more strategically paced mirrors, and a public safety information campaign.

Next, a pair of classrooms from Riverside Meadows Intermediate School made their presentations. First up was Michelle Dietz' seventh grade class, inventors of the

Solar Powered Bike Car. The students presenting this idea were Mir, Deanie, Eric Beeman, and Dillon Clifton.

All of the components of the solar powered bike car are already available. The car would be powered by two renewable solar batteries, which would drive four sprockets joined together by a chain (like a bicycle) which would drive the wheels. When the battery begins to lose its charge, the vehicle would automatically deploy a solar panel from the trunk. The solar panel would be mounted on a spoiler and would automatically adjust its direction to maximize exposure to the sun.

The second classroom from Riverside Meadows Intermediate School was Amy Duchesne's eighth graders. This group, including students Rafe Smith, Thomas Williams, Sean Bilstad, Christian Krum, Danielle Aros and Gabby Santos, proposed the use of the Magic Muffler Fiberglass Muffler and Biodiesel Engine Combination System.

The Magic Muffler would greatly reduce emissions and noise pollution. It would be lighter in weight than current metal mufflers. Paired with a biodiesel engine, the students claim there will be much less emissions that contribute to global warming, and potential long-term health benefits, including less cancers (because of the loss of the ozone layer) and less noise in urban areas. It will also reduce dependency on fossil fuels, decrease the number of muffler-caused wildfires, and stop the polar ice cap from melting.

The videoconference next traveled to Oakland, to Riverview Middle School and its presentation, Sustainable Transportation Urban Sprawl. Student presenters included Alejandra, Jessica, Kilani, Elijah, and their teacher was Rosemary Hatcher.

The students initially discussed the use of solar energy and then switched their focus on urban sprawl and how it is harmful to the environment. They used Contra Costa County as an

example of an area with uncontrolled urban sprawl. The observed that the road system in the county was already inadequate and overburdened, and remarked that the cost of commuting from a Contra Costa County suburb could be as high as \$625,000, assuming a 120-mile daily commute for 30 years, over the life of a home's mortgage.

The best possible solution could be to encourage those people to use electric vehicles, and for those residents to install solar panels to create the electricity to power those vehicles.

Last but not least, Jeanina Harris' students at the School of International Studies at Meadowbrook, including Matthew Anderson, Bryce Berry, Taylor Farland, and Kierra Pfeiffer presented their "Naturally Clean" law in a mock business meeting format.

The group presented a fully integrated intermodal plan for increasing ridership on Hampton Roads' transit system, utilizing all modes: ferry, bus and light rail. Public transit users would be rewarded with tax breaks or rebates depending on their transit usage, which would be tracked through the use of a scanable personalized card at boarding.

The most creative aspect of this class' presentation was a video public service announcement.

A lively question and answer period followed the presentation, first the classes asking questions of each other, then the students asking questions about transportation careers from the experts who were in residence at every videoconference site.

The winning team was announced at a later time. The students from the School of International Studies at Meadowbrook will be traveling to California in June to attend MTT's annual scholarship banquet and will make themselves available to answer questions about their project. The full transcript of their project, including a link to their public service announcement, is included in this publication as Appendix A.

INTRODUCTIONS

ROD DIRIDON

Good morning, everyone. My name is Rod Diridon, and I am the executive director of the Mineta Transportation Institute. The Mineta Transportation Institute is a Congressionally-created research and education institute founded back in 1991. Today's ninth annual Garrett Morgan Sustainable Transportation Symposium was established by the U.S. Department of Transportation, and then-Secretary of Transportation, Rodney Slater. In choosing a name for this education symposium, Secretary Slater, who is very proud of the fact that he is African American, chose to honor the memory of Garrett Morgan, an African American genius who was the inventor of the street light system that we now use on our streets throughout the world to save lives at intersections.

The idea of this gathering is to encourage bright young people to pursue math and science classes in high school, so they will be prepared to succeed when they take more difficult classes in college, such as civil engineering and planning and other challenging classes that will prepare them for careers in transportation.

We absolutely need bright young people in transportation, because with our new President Obama and Governor Schwarzenegger here in California, there is a great focus on improving our transportation systems, especially sustainable transportation systems, and that emphasis has not been there for many, many years. So we're very proud of the opportunity that is presented by that attention at the very top levels, and recognize that literally hundreds of billions of dollars are being invested now in transportation infrastructure, and it's up to you youngsters to get through college and begin your transportation careers, so we know those funds are spent on sustainable transportation systems that not only improve the mobility of our nation, but also sustainability, which fights global warming and other kinds of environmental problems.

So that's what we're about today. We appreciate each one of you attending. We wish you good luck in the competition. Note that the class that wins the competition—and that will be judged by a group of judges on the conclusion of the presentations—will have its lead students, its teacher and a parent attend the Mineta Transportation Institute's annual scholarship banquet and masters in transportation management graduation on June 27. You'll have a chance to make a speech at the banquet, and earn a thousand dollar grant for your school. It's an important gathering that we're involved in today, and I wish you great good luck.

Now let me introduce the president of the American Public Transportation Association, and the chair of the board of the Mineta Transportation Institute, Bill Millar.

BILL MILLAR, PRESIDENT, APTA

Thanks very much, Rod, and good morning, everyone. A special welcome to our students, not only here in Washington DC, but across the nation. As Rod said, this is the ninth annual Garrett Morgan Sustainable Transportation for the 21st Century Symposium, and we're so pleased to have so many schools involved this year.

Today's program allows us to focus on ways that we might make our transportation system more sustainable, how we might keep the public transit industry moving well into and beyond the 21st century, and the participation in this event by the schools and students shows the commitment to the future in terms of developing the transportation leaders that will continue to lead our country to greatness.

This morning, here in Washington DC, we are extremely honored to have the secretary of transportation, the Honorable Ray LaHood, join us. Before he began his career in government, Secretary LaHood was a high school teacher. He's now the secretary of transportation, having been appointed by President Obama, and confirmed by the Senate.

As the secretary of transportation, he leads a cabinet-level agency in the federal government that has some 55,000 employees. Secretary LaHood has oversight responsibility for over \$70 billion, in all the different modes—air, marine and surface transportation, on rail, on bus. You name it—he's responsible for it.

Before becoming the secretary of transportation, Secretary LaHood had a long service in public service. He served 14 years as the elected representative of the 18th Congressional District in Illinois. During that time, he has served on several committees, including the Transportation and Infrastructure Committee, and the House Appropriations Committee.

Now, as the secretary of transportation, he has primary responsibility for implementing the president's transportation priorities, [which] include safety in all the different modes, helping with restoring our economy, creating jobs, improving the sustainability of our nation, all the different issues that are going to be important not only now, but for many decades in the future.

So please join me in welcoming the 16th secretary of transportation, the Honorable Ray LaHood. Mr. Secretary, welcome.

SECRETARY OF TRANSPORTATION RAY LAHOOD

Thank you, Bill, and thank you to the students for participating in today's program. Norm Mineta, my predecessor in this job, called me and asked me if I would participate, and I'm delighted to do that. I know this is a very important program to try and get young people involved and knowledgeable about transportation and its issues.

As a former teacher, I can tell you that during the time that I taught, I really wanted to teach because of the teachers that I had when I was growing up and I can tell you, when I was your age, as a student, none of my classmates would have ever predicted that Ray LaHood was going to be the secretary of transportation. I can also tell you none of my classmates would ever have told you that Ray LaHood was going to be a member of Congress. My point in saying that is that I feel privileged to be a part of a very, very historic administration.

President Obama is a young man when it comes to this position that he holds, and he was a member of the United States Senate before he was elected president. Throughout his campaign, he talked about the importance of getting young people involved in many different aspects of public service, and so I'm delighted to say to all of you, you're a part of a very important program. The idea of public service, whether it's transportation or any other aspect of public service, is very, very important.

And the reason that I mention that, people would be surprised if they went back to my classmates and asked them, "Can you believe that Ray LaHood's the Secretary of Transportation, or was a member of Congress?" Because when I was growing up, and when I was your age, the one important thing that I knew is that getting a good education was the one thing that would lead to my success. Whether it's a congressman or the secretary of transportation or a teacher, having a good education is absolutely your ticket to success in America.

Though my father never graduated from high school, he knew the value of education. He knew that if you had a good education, you could do whatever you want in America. You can write your own ticket. And many of you are going to have many different jobs. You're going to start in a job and think it's the job that you really want and then find out that there's another opportunity and another opportunity—but the important thing that can lead to all of these opportunities is knowledge. It's having the knowledge and the information that you can do whatever you want with a good education.

So I encourage you to participate as much as you can today. I know that you're going to be judged on some essays that all of you have put together, and projects that you have put together, but you're all winners. Everybody's a winner here today, because you're a part of the program. You value the idea that learning more about transportation, learning more about the different things that we do, has value to building on the other things like reading, writing, and arithmetic, which are pretty basic, but are the foundation for lots of other opportunities.

I encourage you to continue your educational opportunities as long as you possibly can. We never stop learning. The formal part of it is what you're involved with now, but the more informal part will be when you go out into the workplace and seek careers and really become a part of the fabric of America that has made our country so great, a knowledge-based [citizenry] that can really do what needs to be done. I'm delighted to be a part of the introductory part of your program today, and if there's a question or two from any of the students that are gathered here, or in California, I'd be happy to answer them.

REDLAND MIDDLE SCHOOL

Secretary LaHood, with the present economic crisis, what challenges do you (inaudible)?

SECRETARY LA HOOD

When the president invited me to be a part of his administration, he told me his number one priority was to get people to work, to get people to work in good-paying jobs and part of his strategy for doing that is what we're doing in the department. Congress passed a bill that allocated billions of dollars to build new roads, new bridges, to get people onto buses, to give money to transit districts so they can buy buses. In order to pay the people that are working in the transit districts to develop a complete rail system around the country, including high-speed rail, we have been working with the governors and the people in those states to provide money to put people in good-paying jobs building roads and bridges and helping our transit districts. So one part of what the president really has tried to accomplish is during this spring, summer, and fall, you're going to see an enormous number of people working around the country in good-paying jobs as a result of the legislation that the president proposed, and Congress passed, that will help people get to work.

Our economy is very bad right now. There are a lot of people out of work and at DOT, we're trying to help people get back to work in good-paying jobs and the president is also working with the banks. He's also working with the real estate people to try and get both of those industries back into a position where they can really be strong again, and the combination of what the president's doing with the banking industry, with the real estate industry, what we're doing at DOT with the money that Congress has given us, you're going to see an enormous number of people working in good-paying jobs and hopefully getting our economy back to where it once was, where we don't have so much unemployment and people are working.

The Department of Labor has money available to train people for new opportunities, but we believe, over the next year, that we will have many opportunities to get people back to work, to get our economy back in a position to where it's in a much better shape than it is right now. So I don't know if that answers your question, but I think that addresses some of the things you were asking about.

ROD DIRIDON

Bill, we're certainly able to take another couple of questions, if you'd like.

BILL MILLAR

Okay, great... as long as Secretary LaHood is willing, let's do it!

ROD DIRIDON

I think District 1 in California has a question.

LOLETA ELEMENTARY SCHOOL

What exactly is the Department of Transportation doing for sustainability?

SECRETARY LAHOOD

Sustainability is now something that we're really focused on as we get into development of a new, what we call "highway bill," a new transit bill, really trying to sustain the assets that we have in our country. We have a state-of-the-art interstate system second to none anywhere in the world, and part of what we need to do in the highway bill is to make sure we protect those assets, that we have the money, the resources, to make sure that those assets are really protected.

We want to do that with other forms of transportation, whether it be rail or light rail, or whether it be what we're doing with our assets at airports, where we know that a lot of people fly in and out of airports. We're right on the cutting edge, or the beginning of developing sustainable opportunities for the assets that we have, and the way forward is to make sure that there is sustainability in everything that we do.

SCHOOL OF INTERNATIONAL STUDIES

What do you believe is the greatest problem in the environment today in America? And what would you like to change about it?

SECRETARY LAHOOD

I think that one of the big issues that America is now addressing is the awareness that we have some very serious environmental problems and concerns that need to be addressed by this administration and by Congress. You have to identify the problem, and people have to be aware, and I think people are becoming aware, because of the work former Vice President Gore and others have done, and are able to say, "We've got some serious environmental problems."

It's not just the United States. It's a worldwide problem, worldwide issue. The awareness of this is certainly the first way that we identify we have a problem.

The president has a team of people working in the White House on clean air, clean water and developing standards with the automobile manufacturers, with those in the United States that want to be a part of the solution, to really come up with some standards to clean up the air and to set fairly high standards. The way forward is that we recognize there's a problem, we

identify what the solutions are and we have to get the stakeholders, the automobile manufacturers, those people in the coal industry, those people that produce energy, to recognize they have to be a part of the solution.

Eventually I think the president will send a list of principles to Capitol Hill that he would like to achieve to make our air and water cleaner, to really make our environment much more livable. We're right in the beginning of that process, and we're making progress. You're going to see a lot more written about this, and you'll see a lot more activity because of President Obama, who feels very strongly that we have to address the environmental concerns of our country.

ROD DIRIDON

Bill, if we have no other questions, we probably should proceed with the competition.

BILL MILLAR

All right. I think that's the case. Again, Secretary LaHood, we thank you very, very much for being with us today, and for your leadership.

ROD DIRIDON

Bill and Mr. Secretary, let me offer thanks also from our great mutual friend, former Secretary Mineta, and let you know that he had intended to be here. This is the first one he has missed. But he was unfortunately called away to a conference in Japan today, so he could not be with us, and he sends his regards.

STUDENT PRESENTATIONS

ROD DIRIDON

Let's proceed with the competition! It's my honor now to introduce the director of the California Department of Transportation, the corresponding person to Secretary LaHood, only in California, and that's a great friend of all of ours, a special personal friend, Director Will Kempton. Will is in Sacramento and he's going to be introducing the schools, both on the East and West Coasts. Director Kempton?

WILL KEMPTON

Thank you, Rod. As you know, this program is very, very important to California, and in fact, we are the reigning Garrett Morgan champions in this country. Edna Brewer Middle School in Oakland, California, was the winner last year, sweeping away the competition. We have five more schools from California participating in the competition today, so we're looking forward to a lively discussion and some interesting presentations.

I really appreciate the fact that Secretary LaHood had an opportunity to address the students. It demonstrates his commitment to developing a future workforce, which is vitally important to ensuring that some of the things that I know you, as students, are concerned about in terms of sustainability, contributing to solving environmental issues, dealing with global warming, reducing greenhouse gas emissions. All of these are transportation issues.

If you take what you've done as part of the Garrett Morgan Symposium today, and your project work that you've labored so hard on, and move into the future in a transportation profession, these are the kinds of things that you're going to be able to work on, because the future is very, very bright for transportation. The technology opportunities are great. We look forward to many of you participating in a transportation career in the years ahead.

I just want to mention, if you'll notice behind me, you'll see the Caltrans logo up on the wall. That's a subliminal message to all of you students that when you finish your education, when you go to college, and you're looking for a job, we want you to come to the California Department of Transportation. We'll have a job waiting for you.

Now it's my great privilege to introduce the schools. There are seven classes from across America, five from my home state of California. We've got one from Maryland and one from Virginia.

First, we have the George Flamson Middle School eighth graders from Paso Robles, California. The teacher is I.N. Johnson, and that group has been sponsored by Janet Newland and Julia Bolger from our Caltrans District 5 office in San Luis Obispo.

We have the Loleta Union Elementary School seventh and eighth graders out of Loleta, California. The teacher is Jackie Carter, and they're sponsored by Emma Cleveland from our Caltrans District 1 office in Eureka.



Figure 1 Caltrans District 1 sponsors and Loleta Union Elementary School team, from left to right, standing, Caltrans sponsor Emma Cleveland, Caltrans District 1 Director Charlie Fielder, and Loleta School Superintendent/Principal Louis Hoiland. Seated, left to right, Loleta School students Stephen Stockton, Sarah Cameron, Jordan Albers, and Neo Rodriguez.

We have the Redland Middle School eighth graders out of Rockville, Maryland. The teacher and principal is Kimberly McLurkin-Harris, and they are sponsored by Starleta Gattis with the American Public Transportation Association. Thank you, Bill Millar, for your efforts in that regard.

We have the Riverside Meadows Intermediate School seventh graders from Plumas Lake, California. The teacher is Michelle Dietz, sponsored by Elaine Bradford out of our Caltrans District 3 office in Marysville.

We have a second group from Riverside Meadows Intermediate School, the eighth graders, so we'll have the seventh and eighth graders competing against each other. The teacher is Amy Duchesne, and they are sponsored also by Elaine Bradford from our Marysville office.

And we have the Riverview Middle School eighth graders from Oakland, California. The teacher is Rosemary Hatcher. The sponsor is Shannon Flynn from Caltrans District 4 in Oakland.

Finally, we have the School of International Studies at Meadowbrook, the sixth and seventh graders from Norfolk, Virginia. The teacher is Janine Harris, and the sponsor is Tamara Poulson, from Hampton Roads Transit.

Congratulations to all of you, and good luck in the competition.

ROD DIRIDON

Will, thank you very much for being with us today. I know how busy you and Secretary LaHood are, and it's very wonderful that you'd take the time to be with these youngsters as they begin their careers as transportation professionals.

We'll proceed now with the competition and let me introduce Donna Maurillo. Donna is the Research and Special Projects Director at the Mineta Transportation Institute. She has been involved in creating this program with all of the different district offices and the people that have related to the effort for years now and Donna is here to guide the competition.

DONNA MAURILLO

Thanks, Rod. I will give you a run-down of how the competition works, and then we'll proceed from there.

We will present the schools in alphabetical order, starting with George Flamson Middle School, and going on through the School of International Studies, and each school will have approximately 10 minutes to make their presentation. As you know, it's all about sustainable transportation.

We will have the judging as the students are making their presentations, and we have a couple of judges from both the East and West Coast, and they will be judging the classes on their presentation, including overall quality, logical information flow, teamwork, how well you work as a group, and if you have good presentation skills; and then, on your concept, whether it's sustainable, whether it's original, whether it's universally available-things like that. A perfect score is 150.

We also will be giving extra points to schools who ask and answer questions. So you'll be getting extra points for those, so be sure ask each other questions.

At the end of all the presentations, the schools will have a chance to ask each other more details about their presentations. Following that, we will have questions and answers with the transportation professionals so that the students can find out what it's like to work in transportation

I'd like to point out that most people think of working in transportation as working with a shovel on the side of the highway, but of course there's much, much more that goes into that. There is marketing. There is community relations. There is clerical work. There is engineering. There is soils testing. There's budgeting. There are all kinds of things. So don't think that if you're not an engineer, you can't work in transportation. It covers a lot of things. So you'll be able to ask professionals questions like that, as well.

We will go first with George Flamson Middle School eighth grade broadcasting from the Caltrans District 5 site.

GEORGE FLAMSON MIDDLE SCHOOL: SALT WATER-POWERED CAR

Students: Kaitlin Bidell, Shbun Kohol, Garret Lewis, and Christian Jensen van Ransberg

Teacher: I.N. Johnson

Sponsors: Caltrans District 5/Janet Newland and Julia Bolger

Flamson Middle School's Salt Water-Powered Car was created using the premise that salt water can be burned using radio waves which produce immense heat. That heat will be enough to power a vehicle's pistons, which ultimately turn the wheels. The inventors believe it is a good alternative to gasoline.

Using salt water as an energy source is a very real technology, invented by John Kanzius (March 1, 1944-February 18, 2009), an American inventor who discovered the potential of using radio waves to separate salt from salt water, and then using that salt as an energy source. Kanzius made this discovery while trying to find a cure for his own cancer. He died from complications of chemotherapy earlier this year.

Hydrogen, which can be derived from salt, and of course is present in ocean water, is a flammable element and thus a potential energy source. In its original form, salt has the highest energy content of any common fuel by weight. Hydrogen is 10.82 percent of salt water, so it is relatively abundant. Once separated from the water, it has the potential for releasing a great deal of energy, producing heat that can reach up to 1500 degrees Celsius.

The energy source itself is designed for a Stirling engine, where key gases are compressed and power the pistons and turn the vehicle's wheels. The pistons are powered by heat, and the expanding gas from the cylinder to the crankshaft powers the pistons and makes the vehicle move.

The radio waves that are used to separate salt from the water are electromagnetic waves that are able to separate the hydrogen and the oxygen. Using electromagnetic waves is a necessary component to this technology. The same radio waves are used to burn more water, which produces more energy.

How it works—as salt water is burned using radio waves, the heat and energy produce an immense energy release. Hydrogen is released due to the physical properties of radio waves and ignited. Then the pistons are powered by the heat as it was in gasoline, placing the selected vehicle in motion. Salt water will be supplied from the water tank.

The benefits from using salt water as an energy source are:

- Does not contribute to global warming because the residue from this energy source is water vapor.

- It is a renewable energy source, because the water vapor will return to the earth as rain and pure water.
- It is relatively inexpensive, with the only changes to existing vehicles a conversion to a Stirling engine, and a radio-frequency generator as produced by Kanzius.

The main reasons to convert cars to this fuel source are:

- Burning gasoline is toxic to the atmosphere and dangerous
- Gasoline is a fossil fuel and is not abundant.

LOLETA UNION ELEMENTARY SCHOOL: HUMRET: HUMBOLDT COUNTY RENEWABLE ENERGY TRANSPORTATION

Students: Sarah Cameron, Stephen Stockton, Jordan Alberts and Neo Rodriquez

Teacher: Jackie Carter

Sponsor: Caltrans District 1/Emma Cleveland

This group proposed the use of a fleet of alternative fuel vehicles, including electric/internal combustion, electric, or plug-in/internal-combustion/hydrogen hybrid. The group's focus is on the use of a hydrogen hybrid vehicle. Because the electric/gasoline hybrid still requires the use of fossil fuels, and a purely electric car does not have enough battery storage for longer drives, a plug-in hydrogen hybrid can use renewable sources of energy, such as solar, wind or wave to create electricity, or can use green algae as a hydrogen source.

A major disadvantage of an electric vehicle is that it required a source of electricity, which of course is usually created by burning fossil fuels. The HumRET would be powered by wind, save or solar energy and also use those energy sources to create hydrogen through electrolysis. Electrolysis is the splitting of molecules into hydrogen and oxygen molecules. Hydrogen would also be derived from green algae.

When deprived of sulfur, green algae can switch to producing hydrogen for up to four days. The algae is cultivated in a series of sealed tubes called a tubular bioreactor. At the University of California at Berkeley, a professor is studying this particular green algae and is trying to achieve a levels of efficiency higher than his current 15 percent.

HumRET owners would need hydrogen fueling stations that would be as accessible as modern gas stations. Governor Schwarzenegger has already proposed that hydrogen fueling stations be made available throughout the state of California. There is already a hydrogen fueling station at Humboldt State University.

Owners of the HumRET would be able to charge the car at home and drive on its electric charge for everyday short distances.



Figure 2 Loleta Elementary School students check out a hydrogen-powered vehicle at the Schatz Energy Research Center on the campus of Humboldt State University in Arcata, CA.

Pictured are Caltrans Resident Engineer Susan Tappan, Superintendent/Principal of Loleta Elementary School Louie Hoiland, and Humboldt State grad student Andrea Allen, station operator. Students pictured are Sarah Cameron, Jordan Albers and Stephen Stockton. The border collie is Rico.

HumRET plans to utilize wave energy as well. Electricity is produced by turbines placed on the surface of the ocean. When the water rises and falls, it powers the generator that produces electricity. PG&E is currently planning a site of generators in Humboldt Bay. Humboldt County is an opportune place for wave power because of its large coastline and strong winds.

Another type of renewable energy to put electricity into HumRET's grid is solar. Solar panels convert radiation to electricity. Acquiring solar energy is very practical because solar panels can be placed on top of roofs and not use any extra space.

The sun makes electricity from the solar panels and also through wave and wind. The solar would be turned into AC current, and the wave and wind would start out as that, turning into grid electricity over at the right side, which would go down through the electric outlet into the HumRET vehicle.

Wind power is a very promising and useful source of renewable energy. Wind turbines are quite effective and cost-efficient because of their low cost to make and keep up their high efficiency of 50 percent. In Humboldt County, Shell Gasoline is currently installing a large site of wind turbines near our school. The energy from these turbines will go into the grid to lessen fossil fuels' burning for electricity.

For the hydrogen, the sun directly produces algae, which makes hydrogen for the HumRET vehicle directly, and some of the electricity from the solar, wave and wind would go through electrolysis to create hydrogen for the vehicle.

To help pay for this project, the students suggested that the government take away some of the money they use to subsidize the petroleum industry, and use it toward implementing renewable energy. Also, a tax could be put on gasoline and proceeds would subsidize renewables by monetary incentives, low-interest loans and tax cuts. Eventually money from the car itself would support all renewable energies.

REDLAND MIDDLE SCHOOL EIGHTH GRADE: IMPROVING THE SAFETY OF PUBLIC BUS TRANSPORTATION

Students: Julie, Marisa, Tyasia, Craig and Nadjé

Teacher: Kimberly McLurkin-Harris

Sponsor: American Public Transportation Association/Starleta Gattis

Redland Middle School's project was ways to improve safety in the public bus transportation sector-improving safety for the bus passengers as well as pedestrians. Because of high gasoline prices, the students believe public transportation is the best alternative for Americans, and by making buses safer, ridership will increase.

Bus accidents have been on the increase since 2003, and there were seven bus-related incidents in 2003–2004. The proposed safety measures will decrease the number of fatalities and injuries that occur during bus accidents.

There are ways that bus passengers can be safer. Seat belts can be a great asset to bus safety. The group believes that most seats on a bus do need seat belts, especially those seats in the very front of the bus, or those facing the inside of the bus, or those in the very rear of the bus. The students recognize that the seat belts can be uncomfortable, but if the bus makes an abrupt stop, the lives of passengers might be in danger. It's essential that the seat belts be easy to remove in case of emergency, so passengers can get off the bus quickly. If people are trapped by their seat belts, that can also cause safety problems, and maybe even lawsuits.

The students also suggest there be adjustable hand straps for shorter riders who have to stand on the buses to help them stay stable on their feet. More handrails should also be installed on the bus so passengers can brace themselves better during an accident. The handrails could prevent an accident from happening on the bus.

Emergency airbags installed around the interior of the bus will lessen the impact during a collision. They work well in cars, so why not install them in buses, too?

There are actions that can be taken to increase pedestrian safety. A public information campaign consisting of announcements to the public about crossing the streets and yielding to buses, particularly if the pedestrian is not in the crosswalk, could be beneficial.

Extra mirrors are needed on the buses so that the drivers have a better view of the streets and areas.

On buses, passengers need to be reminded of the proper use of emergency exits. Riders should be given a review of how to use emergency exits and their locations. Additionally, a side emergency exit should be included because it would make exiting faster. In case a passenger is in the middle of the bus, he or she wouldn't have to choose from front or back exits.

Lastly, periodic emergency practices would be (audio lost).

DONNA MAURILLO

Did the Washington site go down? It looks like it did. We'll proceed with the next school, and if Washington gets its site back up again, we can continue with them. Does that work for everybody?

We'll proceed now with Riverside Meadows Intermediate School seventh grade in Plumas Lake, California and they're broadcasting from the Caltrans District 3 site. Okay, Riverside Meadows seventh grade, go ahead.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL SEVENTH GRADE: SOLAR POWERED BIKE CAR

Students: Mir, Deanie, Eric Beeman, and Dillon Clifton

Teacher: Michelle Dietz

Sponsor: Caltrans District 3/Elaine Bradford

This seventh grade class' project was the Solar Powered Bike Car. It is a simple device, put into motion by chains to a sprocket, and each car has two batteries that power the four sprockets. The car will be primarily electric, and when the batteries lose their charge, a solar panel will pop out from the vehicle's trunk. The panels are installed onto a spoiler, and will extend about four inches out of the trunk and adjust itself to face toward the sun to keep the car's batteries running.

The materials needed to propel this vehicle are simple: two Duralast car batteries or any other car batteries that will run this car. It will also require four 7-inch sprockets and two 14-foot roller chains that will rotate the sprockets, and one 2-foot-by-5-inch heat-seeking solar panel.

The reasons for building this car are simple. It was invented because the students are most certain that this will help stop the pollution in the air caused by the fumes coming from other exhaust pipes of cars or other running vehicles. They also created this vehicle because they believe that people using their method will save money on gas and will help everyone with their health.



Figure 3 The District 1 team at Riverside Meadows School

(left to right) Rafe Smith, Thomas Williams, Sean Bilstad, Joseph C. Caputo II, P.E. (Caltrans' North Region Chief, Program/Project Management), Eric Beaman, Christen Crum, Dillon Clifton, Danielle Arlt and Gabby Santos. Photo includes both teams.

Because the car doesn't use gasoline in any form, and is powered by a renewable source, pollution will be decreased. There are already too many cars on the road, so why not choose this alternative-powered car?

The students showed a collection of solar-powered cars that have already been invented. The URLs the students used for images and information included www.solarpanels.com, www.sma.com, and www.news.nationalgeographics.com.

A model of the car was also presented. Rubber bands indicated the location of the chains and were installed between the sprockets that worked as a drive train to the vehicle's tires. Other rubber bands indicated the connections between the batteries and the sprockets. Once the batteries lost their charge, a spoiler would slide out of the trunk area. On the spoiler were mounted solar panels, and the spoiler would automatically turn itself toward the sun to charge the battery. Once the battery was recharged, the spoiler and solar panels would slip back into the trunk.

DONNA MAURILLO

Thank you very much. That was a really good presentation.

We're going to stay at the same site, with Riverside Meadows Intermediate School's eighth grade, also from Plumas Lake, California, who are also are broadcasting from the Caltrans District 3 site. You can start whenever you're ready.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL EIGHTH GRADE: MAGIC MUFFLER FIBERGLASS MUFFLER AND BIODIESEL ENGINE COMBINATION SYSTEM

Students: Rafe Smith, Thomas Williams, Sean Bilstad, Christian Crum, Danielle Aros and Gabby Santos

Teacher: Amy Duchesne

Sponsor: Caltrans District 3/Elanie Bradford

Riverside Meadows Elementary School's invention is the Magic Muffler, a fiberglass-muffler and biodiesel-engine combination system.

Why create the magic muffler? Because global warming is negatively impacting the earth—the polar icecaps are melting, which has endangered many species such as polar bears. Ocean sea levels are rapidly rising, which has the potential to cause billions of dollars in damage to coastal cities.

The ozone layer is fading away. UV rays are causing cancer in many animals and humans. Fires are starting at a high rate, causing the carbon dioxide to increase. The result is some animals go extinct. This shows the global temperatures rising.

Cars contribute to the problem. There are 143,781,202 cars in the United States, and on approximately 600 billion cars, and this number is also growing due to the industrialization of countries such as India and China. Each car gives off 18 metric tons of emissions a year. In the United States alone, that equals about 1 quadrillion metric tons of pollution due to cars per year. Worldwide, that is a total of 5 quadrillion metric tons of pollution per year.

Car engines burn gas in order to produce energy. The engine disposes of the smoke produced by this process to the muffler. Mufflers are positioned along the exhaust and release the emissions of the engine into the environment.

Why fiberglass mufflers? Fiberglass mufflers are better for the environment for a variety of reasons. They dramatically reduce emissions. The metal in a stock muffler weighs 7.5 pounds. By using fiberglass, much less metal will be used per car. Also, fiberglass mufflers are quieter by 40 decibels, which results in less noise pollution.

What are the advantages of a biodiesel engine? Biodiesel is a renewable energy source, made from fat or vegetable oil. Biodiesel extends the life of an engine, and helps lower emissions, lessening carbon dioxide by 80 percent and sulfur by 100 percent.

Riverside Meadows' project combined fiberglass mufflers with biodiesel engines in order to substantially lessen emissions. Adding ultrafine fiberglass to the muffler would greatly decrease the emissions from a biodiesel engine. The minimal particles emitted in the system would be diverted back to the biodiesel fuel and reprocessed by the engine instead of being released into the environment.

There are positive results to using this system. Cities will be quieter because of the fiberglass mufflers' ability to decrease noise. The natural habitat will be saved because there will be less wild fires and the polar icecaps will remain. There will be fewer deaths due to cancer because the ozone will block the harmful UV rays. There will be more conservation of natural resources due to using less fossil fuels and metals. Thank you for listening to our presentation. We hope our project will be chosen and help the world lessen greenhouse gasses.

DONNA MAURILLO

Now we'll move back here to Oakland, California, for Riverview Middle School's eighth grade, and we'll be broadcasting right here from the District 4 site.

RIVERVIEW MIDDLE SCHOOL: SUSTAINABLE TRANSPORTATION URBAN SPRAWL

Students: Alejandra, Jessica, Kilani, Elijah

Teacher: Rosemary Hatcher

Sponsor: Caltrans District 4/Shannon Flynn

Harvesting solar power requires getting the energy where and when it's available, converting it to electrical energy, usually storing it, and raising it to a useful level when you need it. It is available at a specific, modest rate of about 1 kilowatt hour per daylight hour and is converted to electrical energy with only about 25 percent efficiency.

However, the main reason solar power is not widely exploited is economic. Traditional semiconductor technology-based solar panels are expensive to produce and they are rigid and don't conform well to many surfaces. Silicon crystals must be grown in batches, limiting production and size, thus raising costs. Nanotechnology may be the answer here. It has been estimated that running a household using current solar power technology would require a base equipment cost of about \$9 per watt, which is quite costly in comparison to fossil-fuel power.

The students offered a discussion about urban sprawl. How does urban sprawl affect the community?

According to Riverview Middle School, it creates health issues for children and young adults. Many fast-food restaurants, small shopping malls are farther away, which makes it harder for people to drive to places like McDonald's, KFC, Burger King, and it makes it easier for people to pollute the air and cause obesity. If shopping malls and restaurants were in more

communities, people would walk to these places, which would reduce the risk of young-adult health issues and pollution.

In the U.S., there are many urban cities. In California, Los Angeles is number 6 in the top 100 sprawl cities, with 393.8 square miles of sprawl. San Diego is number 11, with 309.5 square miles of sprawl. San Francisco-Oakland is also known on the list as number 22, with 193.1 square miles of sprawl.

Is nearby Contra Costa County an example of Smart Growth or urban sprawl? Contra Costa County has been known as the “wild west of development” because of its freewheeling approach to urban growth. Subdivisions like malls and office parks have spread rapidly across the landscape in ways that work against long-term livability or sustainability. Building roads in east Contra Costa County to accommodate our new residents will cost billions of dollars.

Highway 4 is already operating beyond design capacity, and the funds do not exist to widen it east of Bailey Road and Pittsburgh. New homes being built in East County are marketing primarily to commuters. Jobs are often up to 60 miles away, and at \$1.10 per mile, a typical rate for calculating the cost of driving, a 120-mile round trip commuting costs \$625,000 over the life of a 30-year mortgage.

The group claimed that this is the dumb-growth cycle that eventually leads to tax increases.

Electric vehicles (EV) can offer some solutions for urban sprawl. Transit industry officials believe that electric vehicles will increase public transportation ridership, increase access to public transportation and will decrease reliance on gasoline-powered automobiles, making the interstates less crowded and emissions less concentrated.



Figure 4 Riverview Middle School students at Caltrans District 4 site

Proponents of electric cars argue that EVs produce less air, noise and water pollution and if aggressively marketed, can substantially reduce congestion typical of the rush-hour commute. Widespread use of EVs will may dual benefits: improving the commuter experience and cleaning up the environment.

Electricity can be used to power electric and plug-in hybrid electric vehicles directly from the power grid. Vehicles that run on electricity produce no tailpipe emissions. The only emissions that can be attributed to electricity are those generated in the production process at the power plant. Electricity is easily accessible for short-range driving.

Electricity can be used as a fuel to power electric-battery vehicles. EVs store electricity in an energy-storage device such as the battery. The electricity powers the vehicle's wheels via an electric motor. EVs have limited energy-storage capacity, which must be replenished by plugging into an electric source.

Plug-in hybrid electric vehicles combine the benefits of pure electric vehicles and hybrid electric vehicles. Like electric vehicles, they are plugged into the electric grid, and can be powered by the stored electricity alone. Like hybrid electric vehicles, they have engines that enable a greater driving range and battery recharging.

Hybrid electric vehicles, HEVs, combine the benefits of high fuel economy and low emissions with the power range and convenience of conventional diesel and gasoline fueling. HEV technologies also have potential to be combined with alternative fuels and fuel cells to provide additional benefits. Future offerings might also include plug-in-hybrid electric vehicles.

Solar panels are another fuel source. They can reduce the greenhouse effect, lower your PG&E bill, or get rid of your bill, or power your car batteries-and reduce dependence on fossil fuels.

Sustainable transport is fundamentally a grassroots movement. Many other cities throughout the world have recognized the need to link sustainability and transport policies. An example is the organization, Cities for Climate Protection.

The students proposed the hills around their community have solar panels wired to the power grid connected to every house in Bay Point. Each home has a solar-powered electric-hybrid vehicle. Batteries will provide energy for both the car and home.

The power from the grid will store energy to power the homes and charge the vehicles by night with no need of fossil fuels. The sustainable fuel source used would be the sun. The group provided an image of this community.

With urban sprawls on the increase, the students believe that greenhouse gases will be reduced or eliminated using their method of alternative energy.

The group recognized that a healthy environment is very important because living in an area where there is pollution is not safe. It could also cause health problems. Global warming is also creating health issues in our environment. Thank you for listening to our presentation.

DONNA MAURILLO

Thank you very much!

The next school is the School of International Studies at Meadowbrook. Before I get on with that, I'd like to thank Dan McNamara, who is the Deputy Director of Caltrans District 4, for staying through the presentation here.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK: "NATURALLY CLEAN" LAW

Students: Mathew Anderson Bryce Berry, Taylor Farland, Kierra Pfeiffer

Teacher: Jeanina Harris

Sponsor: Hampton Roads Transit/Tamara Poulson

The School of International Studies at Meadowbrook students presented their new law, "Naturally Clean," in a mock-business meeting format presentation at an imaginary city council meeting. The purpose of the "meeting" was to introduce the city council to the new law, which supports current federal legislation, making use of current technologies, recognizing the need to keep costs low during today's economically stressed times.

The mock committee chairperson offered facts about air pollution and what today's dependence on the automobile is doing to the environment. It is this environmental impact that prompted the creation of the new law.



Figure 5 Students from the School of International Studies at Meadowbrook waiting their turn to present

In the United States, there are 752 automobiles for every 1,000 people. Americans use about 26 percent of the world's petroleum to produce energy. Of that amount, 16 percent of it is used for transportation by trucks and automobiles. Thirty-three percent of the world's carbon dioxide emissions are from the use of automobiles. The average commute time in the Hampton Roads area is 23 minutes. Road use in the past decade has increased significantly and congestion has become a major issue at all the bridge and tunnel crossings in the Hampton Roads area.

Due to the environmental concerns, the law directs tax benefits to citizens who choose to use public transportation.

The mock community advocate summed up how the law would work and benefit any adult citizen who chooses to utilize public transportation on a regular basis. Each person who uses the public transit system in any mode, including bus, ferry or light rail, will use a pass that maintains record of his or her usage. At the end of the year, they will receive a record of how many times they used public transit, and be able to use those credits to prepare their taxes and perhaps receive a rebate. Those individuals who use public transit for more than 50 percent of their commute will receive rebates. The rebates will be funded by an increased gasoline tax.

In an anticipated response to increased use of public transit, Hampton Roads Transit would increase its current 50-plus routes to around 75. There are already express routes that provide a quicker way to travel to work. The light rail system will be expanded to provide more alternate routes.

The mock financial advisor addressed the costs of implementing the "Naturally Clean" law. It will be funded with government funds and increased taxes, but the average citizen choosing to use public transit will save funds.

The average American spends 18 cents of every dollar on transportation costs. These costs mostly go towards the purchase, maintenance and operation of a personal vehicle. By utilizing the Hampton Roads Public Transportation system, which is intermodal, the citizens will lower their cost to about six cents of every dollar. This works out to a savings of about \$115 per month just by riding the transit system. The main cost in implementing the Naturally Clean act involves the rebates that are offered to the citizens and the majority of these costs would be offset by the increase in the gas tax. The gas tax would offset these costs by as much as 72 percent. The remaining costs would be covered by both income from fares as well as taking advantage of federal-government support.

With the new economic stimulus laws, there will be an increase in savings for the commuter as well as more support for the Naturally Clean Act.

This law also has many benefits for business owners. The abundant use of public transportation creates a large return in investments made. For every dollar invested, there is \$6 in return. It also will provide opportunities for more jobs and allow people to have more accessibility to jobs. In addition, it will increase public revenues. Not only will this benefit us as citizens, but it will have a great impact on the community and the environment.

The mock mayor is an environmental advocate. She remarked that the long-range effect of our citizens' utilizing public transportation rather than personal automobiles is significant. Some of the reasons for this include the fact that many of the HRT buses that are currently operating are hybrid buses. Many of the buses have been converted to ultra-low-sulfur diesel. According to the group's plan, Hampton Roads Transit will switch all buses over to hybrids in the next 20 years. This way, all buses will adhere to the clean-diesel engine requirements. By reducing the number of automobiles on the road, it is our hope to see a decrease of about 50 percent in the number of emissions released into the environment. They anticipate a decline in the traffic congestion and damage to the roadways. They also claim they will be contributing to the healthy lifestyles of our citizens by encouraging walking to and from the bus, train, and ferry stops.

A few other changes that will benefit those who are riding the various means of transportation include the fact that all buses and the light-rail systems will be Wi-Fi capable, allowing patrons to be productive during their commutes. There will be an increase in the number of routes and locations to make the system more accessible. Bike racks will be available on all buses and trains to allow for those who like to ride their bikes to and from stops. Overall, the group feels that this law will be beneficial to all citizens of Hampton Roads and will provide for a naturally clean and better environment.

The students then aired a public-service announcement.

AUDIO OF PSA

Do you find yourself constantly stuck in traffic? The average commute time in Hampton Roads is 23 minutes. Ride the bus and get there faster. HRT offers many direct routes with HRT Max.

Gas prices hurting your wallet? Use public transportation and receive tax rebates.

Getting behind on your work? New Wi-Fi access on all HRT transit systems gives you time to complete that overdue report.

Care about the environment? Riding public transit reduces emissions by up to 20 percent per household.

Naturally Clean. It's the law.

Thank you.

QUESTIONS AND ANSWERS: STUDENT PRESENTATIONS

DONNA MAURILLO

Now what we'll do is we will open the floor for questions from each of the schools and if you have a question, please identify yourself and then state the name of the school that you're asking the question of, okay? Who wants to start?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

We have a question for Flamson Middle.

Where will the heat come from to burn the salt water?

GEORGE FLAMSON MIDDLE SCHOOL

Hydrogen is a natural producer of heat, so once hydrogen is ignited, the heat [is] produced.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

Thank you.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Thank you. George Flamson, the cost of desalinization is high and is a very difficult process. How do you plan to make this accessible to all people?

GEORGE FLAMSON MIDDLE SCHOOL

Using the RFG has actually proven to be quite cheap. You just need the machine accessible and salt water.

Actually, it's electrolysis.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Yes, thank you.

GEORGE FLAMSON MIDDLE SCHOOL

You're welcome.

DONNA MAURILLO

Okay. We have a question here at District 4. Go ahead.

RIVERVIEW MIDDLE SCHOOL

For George Flamson. We want to know where will the source of salt water be found?

GEORGE FLAMSON MIDDLE SCHOOL

Well, 70 percent of the earth's water is salt water, so it wouldn't be that hard to use it.

And anyways, ocean levels are rising rapidly due to the polar icecaps' melting, so it will actually be beneficial to the environment.

RIVERVIEW MIDDLE SCHOOL

Okay, thank you.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

How would you refuel the car if you're far away from [an] ocean, and you ran out of salt?

GEORGE FLAMSON MIDDLE SCHOOL

Well, basically, the plan is for the driver to have a good source of water with him or with her, so it's like recommended that they just carry extra fuel.

Also, there would be refueling stations with salt and water, so you are able to access it nearly anywhere, as today's gasoline stations.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Meadowbrook has a question for Loleta.

Wouldn't your car cause more traffic and congestion in your area because everyone would want to buy the car?

LOLETA UNION ELEMENTARY SCHOOL

Well, since you can only really drive one car at once, I mean you would not have that one car with you. I mean you'd only have one car at a time, so you would—It wouldn't be more—
Okay. Do you know what I'm saying?

REDLAND MIDDLE SCHOOL

No.

LOLETA UNION ELEMENTARY SCHOOL

Okay. There wouldn't be more traffic because, if you drive this car, you wouldn't be driving your old car anyways, right? Does that answer your question?

REDLAND MIDDLE SCHOOL

This question is for Loleta Union Elementary School. If going a far distance, how would these electric vehicles work? Because you said these cars will be produced by renewable energy that helps a car run for everyday short distances.

LOLETA UNION ELEMENTARY SCHOOL

No, we said the plug-in would make it run for short distances. We'd have another engine in there that would be hydrogen, and you could drive longer distances for that. Does that answer your question?

GEORGE FLAMSON MIDDLE SCHOOL

What would be the cost of this vehicle?

LOLETA UNION ELEMENTARY SCHOOL

It would be quite similar to a conventional gasoline vehicle.

GEORGE FLAMSON MIDDLE SCHOOL

Also, is mass production possible?

LOLETA UNION ELEMENTARY SCHOOL

Yes.

REDLAND MIDDLE SCHOOL

Loleta Union Elementary School, how would you keep the car running if it so happened that the electrical thingy stopped?

LOLETA UNION ELEMENTARY SCHOOL

It would have both engines, the electric engine and also the hydrogen engine at the same time in the car, so if...the electric charge should run out, it would revert to the hydrogen engine.

DONNA MAURILLO

Meadowbrook, question for whom?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Riverside Meadows, seventh grade.

How would your vehicle run during inclement weather?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

The weather doesn't really matter, right, 'cause it's going to have a body cover over it, unless you have the windows down. I don't know. It won't affect the car anyway. Oh, the batteries? The batteries are inside the hood, so it's covered.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

But if you're driving and your battery is low, and you needed to charge your car, how would it work if it's raining outside?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

You can't, 'cause there's no sunlight. Then you wouldn't be driving it. You should drive only when you have a full battery.

DONNA MAURILLO

District 1 has a question?

LOLETA UNION ELEMENTARY SCHOOL

Yes. For the School of International Studies, Meadowbrook.

How would our government be able to monitor all the people's commute to see if they used public transportation for 50 percent of it?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

You would get a card that would be available at almost anywhere you went—grocery stores, convenience stores—and this card, you would scan it, and it would put a monitor on your time on the bus, and at the end of the year, it totals up all of your time, and if you spent more than 50 percent of your time using public transportation, you'd get your tax rebates and your tax benefit. Does that answer your question?

LOLETA UNION ELEMENTARY SCHOOL

Is it like 50 percent of all of your time altogether?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

All of your public transportation time. It doesn't matter what kind of public transportation.

DONNA MAURILLO

Okay, go ahead District 3. For whom?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

For Meadowbrook.

DONNA MAURILLO

Okay. District 3, question for Meadowbrook.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

What would you do if you weren't able to get to an area for the public transportation? If you lived too far away?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Well, that's what we're saying, because we would have stations near communities, so you wouldn't have to do that. So you could just walk or ride your bike.

And this would be intermodal.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

What if you work out of town and you have to commute far?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

There would be a station out of nearby towns. The hope is for it to expand, hopefully, for most of the eastern border of Virginia, so that it would be more accessible for people who even worked out of town.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

All right. Thank you.

RIVERVIEW MIDDLE SCHOOL

District 4 has a question for Riverside Meadows, seventh grade.

In your presentation, you have said something about sprockets and we wanted to know exactly what they were. Can you describe those?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

Yes. A sprocket is what moves a bike, how the chains are moved. A sprocket is making the chains move inside, and it fits with a chain, and the chain keeps it moving inside a sprocket, and the pole is holding it in place.

RIVERVIEW MIDDLE SCHOOL

And what were the sprockets going to be used for?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

To make the chains and the wheels move.

DONNA MAURILLO

Go ahead, District 5. Who's your question for?

GEORGE FLAMSON MIDDLE SCHOOL

For Redland Middle School—We were wondering, is this project cost-effective?

REDLAND MIDDLE SCHOOL

Yes, it is every effective, because, first of all, you shouldn't put a price on safety, and the price anyways would be minimal.

GEORGE FLAMSON MIDDLE SCHOOL

How much would it cost to install these safety equipment in the public transportation?

REDLAND MIDDLE SCHOOL

Probably half a million dollars. And it will vary by agency.

DONNA MAURILLO

Okay, go ahead District 1.

LOLETA UNION ELEMENTARY SCHOOL

For Riverside Meadows' eighth grade class—Where and what renewable way would be the biodiesel for this car be obtained?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (8TH GRADE)

Well, you could either make it by yourself, 'cause it's just vegetable oil, basically, or we could like have biodiesel gas stations set up.

DONNA MAURILLO

Okay, go ahead Meadowbrook.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

We have a question for Riverview. How can the average family afford an electrical vehicle, or can switch to an electrical vehicle?

RIVERVIEW MIDDLE SCHOOL

Well if you switch to the vehicle, it has solar panels, so it will help the cost and everything and get rid of the bill and stuff because it's taking on more energy from the sun.

We would even to put it on a house, too, and it helps your PG&E bill, and it decreases the bills that you have and stuff, all the costs and emissions.

DONNA MAURILLO

District 3 has a question for Riverview Middle School's eighth graders.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

What year is this possible?

How do you think we could fix big cities that already have a lot of pollution in them?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (8TH GRADE)

Well, yeah, okay. We were thinking to start with the smaller communities and then urban sprawl. It's helping the communities with all their pollution and decreasing some of that, like all the fast-food restaurants and stuff, and all the people that are having drive to places that are nearby.

Start with smaller communities at a time, and then work our way up to bigger cities.

DONNA MAURILLO

District 5 has a question, for Riverside Meadows eighth grade.

GEORGE FLAMSON MIDDLE SCHOOL

How does the fiberglass in the muffler help reduce emissions?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (8TH GRADE)

Well, the fiberglass itself already lowers emissions, but the biodiesel lowers CO₂.

It's like a bunch of fibers wrapped together, and it's really fine, so the emissions can't get out.

And also the biodiesel also lessens emission for 80 percent for CO₂ and 100 percent for sulfur. Makes it safer.

GEORGE FLAMSON MIDDLE SCHOOL

But you mentioned that the fiberglass would help reduce emissions, so how does it help reduce the emissions?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (8TH GRADE)

The fiberglass is ultra-fine, so the emissions can't get out of the muffler, which reduces them. And the smoke doesn't get out, so it goes back in and reuses it for fuel.

GEORGE FLAMSON MIDDLE SCHOOL

So where do the emissions go?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (8TH GRADE)

Back into the engine.

DONNA MAURILLO

Meadowbrook and then District 4. Okay, go ahead, Meadowbrook. Who's your question for?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Riverside seventh grade. How many people can fit in your vehicle? It looks awfully small. If a family of six wanted to go on a vacation, what would they do?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (7TH GRADE)

Yeah, get a bigger car. You wouldn't have to use that one. You can make a truck out of that car, too. It's not just a car.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Wouldn't that cost more money?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (7TH GRADE)

No. It would depend on what type of car.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Wouldn't that cost more money?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (7TH GRADE)

No. It would be the same price, 'cause of everything. Everything's the same. It's just a different body.

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

But that would be more money. But that would need more money to even make this new body for the vehicle.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (7TH GRADE)

Not really.

DONNA MAURILLO

District 4 has a question. They were in line first, so we'll go ahead with District 4's question for?

RIVERVIEW MIDDLE SCHOOL

Meadowbrook.

RIVERVIEW MIDDLE SCHOOL

What would happen if you don't have enough time to charge the battery? What would be your backup plan?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Battery.

Our buses? Most of the buses are already hybrids. There are more than enough buses. It wouldn't just be one hybrid bus running. We're hoping to convert all of the buses that are already working to be hybrids. And our light rails and the ferry system, most of that is already hybrid, and there would always be backups. In case something happening to one of them, there would always be another one to take its place.

DONNA MAURILLO

Wait a minute! One at a time. Everybody has a question. I'll tell you what. There was a school that went offline, 'cause they had some technical difficulties. I'd like to give them a chance to ask some questions. Now which school was that?

REDLAND MIDDLE SCHOOL

Redland.

DONNA MAURILLO

Okay, Redland, do you have any questions?

REDLAND MIDDLE SCHOOL

Yes, many.

DONNA MAURILLO

Go ahead with your first question.

REDLAND MIDDLE SCHOOL

Our first question was to Riverside Meadows Intermediate School, the seventh grade.

The question was, would this car have two wheels like a bike? If not, what features of the bike would be included in this car, except for roller chains?

RIVERSIDE MEADOWS INTERMEDIATE

It has four wheels, and it's just like a bike, because it's got sprockets and chains, except the sprockets and chains are connected to the batteries what are making the wheels move.

REDLAND MIDDLE SCHOOL

Okay. So it's built like a car but has some features of a bike.

RIVERSIDE MEADOWS INTERMEDIATE

Yes.

REDLAND MIDDLE SCHOOL

Our next question is for George Flamson Middle School.

How are they going to take all the salt water out of the lakes without killing the fish and yeah and without losing the fishes' reproduction?

GEORGE FLAMSON MIDDLE SCHOOL

Salt water is taken out of the ocean and, due to the rapid polar ice caps' melting, there would be no major effect. And anyways, once the water is burned, it comes back down as rain, so it's technically going back into the water body.

REDLAND MIDDLE SCHOOL

But it's eventually going to lose its abundance of water, isn't it?

GEORGE FLAMSON MIDDLE SCHOOL

Well, as I said before, once it's burned, it goes back into the atmosphere and comes back down as rain, so technically, it's replaced.

DONNA MAURILLO

We'll have time for two more questions and then I would like to go on to asking questions of the transportation professionals, okay? So you'll still have time to ask questions, but not of the schools. You'll ask them of the transportation professionals. So is there a school who has not had an opportunity to ask a question yet? So everybody has asked a question. Okay. How do I do this fairly?

I'm going to ask a question, okay? Who has not asked a question in a while?

We'll go with District 5 and then District 3 and then District 1. Okay. District 5, go ahead.

Who do you want to ask?

GEORGE FLAMSON MIDDLE SCHOOL

Meadowbrook from Virginia.

DONNA MAURILLO

Okay, go ahead. Ask your question of Meadowbrook.

GEORGE FLAMSON MIDDLE SCHOOL

This question is for Meadowbrook. What would your law do for the people who need personal vehicles for their professions?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Well, we could make separate cars for handicapped people who need more room and area, and we will have bike racks for everybody in one separate car, and a handicapped car and then everybody who doesn't have any disabilities would be able to go.

But as far as a personal vehicle, there are drastically few professions that require a personal vehicle. Most professions can be reached by public transportation, which is what we hope to do, where there isn't anyplace very far that you can't go to, that you can't reach by bus, ferry, light rail, or train. It would all connect. So everything would be interconnected. Does that answer your question?

GEORGE FLAMSON MIDDLE SCHOOL

No. Would the people who do things that require a car for their for profession, they'd still be taxed for it?

If they absolutely have to have a car? Say a contractor? Yeah. Would they be taxed for it?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

No. We're not planning on taxing people who do have their own forms of private transportation. We are just hoping to reduce the amounts and give tax cuts to those who choose to use public transportation, but there won't be any penalties for those who don't, and if you absolutely do need a car, we would also give benefits for those who had a hybrid vehicle—you would have it logged. You would have someone write it down, and it would be logged that you have a hybrid vehicle.

You would still receive part of that tax benefit. Does that answer your question?

GEORGE FLAMSON MIDDLE SCHOOL

Yes, it does. Thank you.

DONNA MAURILLO

Let's keep the questions short, because there are some schools on the East Coast who have to get back to class. So District 3 and then District 1, and then we'll have some professional questions. Go ahead District 3.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

Who is going to provide the money cost to make this happen?

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

At the moment, there are many forms of transportation that are hybrids, that are already out, ready to perform their tasks. As of now, in Hampton Roads, we are putting in our brand-new light-rail system, and so it wouldn't cost very much at all, because most of what we would have, that mode of transportation that we have out, would be concerning the law that we have, that we would love to put in place. Does that answer your question?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

How is it "new?"

SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

Well, it doesn't necessarily have to be new. It just has to be sustainable, especially in the economic downfall that we have now, wouldn't it better to try and spend the least amount of money as possible, and that's what we're trying to do. We're trying to incorporate the economic crisis that is in play now, and what we already have, to make it all work together, and make a sustainable life for ourselves. Does that answer your question?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

Yes, thank you.

DONNA MAURILLO

Last question, from District 1.

LOLETA UNION ELEMENTARY SCHOOL

This is for Riverside seventh grade. Most of the pictures you showed us of solar cars had solar panels covering like the entire top of the car. Would the amount of solar panels that would come out of the trunk be enough to power this car when the other charge runs out?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL (7TH GRADE)

Yes. It doesn't matter on the size. It just matters on the kilowatts.

DONNA MAURILLO

Thank very much, everybody. Excellent questions. Very impressive answers, especially thinking on your feet.

Okay. Does anybody have questions about transportation professions?

STUDENT QUESTIONS AND ANSWERS FROM TRANSPORTATION PROFESSIONALS

UNIDENTIFIED SCHOOL

This is open for any professional in the transportation that we have met so far. What do you think would be a better way, if you did implement one plan, just to decide how to help, what do you think is the biggest crisis that you would love to address in your public transportation?

DAN MCNAMARA, DEPUTY DIRECTOR OF CALTRANS DISTRICT 4

Good morning and good afternoon on the East Coast. Just let me say first, as Secretary LaHood had mentioned, education is what you need to treasure for your future. Grab the opportunities, whether it's math, science, or other academics. Don't be distracted by everything else that's going on in the world. You have the opportunity. Take that opportunity.

What is the greatest crisis I would like to tackle today? I think, when you talk about "greening" transportation, that's been the theme today. That's extremely important to everybody that we know, our family and friends and everybody in our communities across the nation. If we can do that, through transit as you've presented, through greener vehicles, for solar power, that is a challenge for all of us. As you've seen in the news in recent times, whether it's additional funding for transit, or high-speed rail coming to California and on the East Coast, those will be huge steps for our nation. You can be a big part of that, and today was another step for each of you. So thank you so much for what you did today. I really appreciate it.

LOLETA UNION ELEMENTARY SCHOOL

About the transportation as a career, what classes are especially important to focus on and be good at for a career in transportation?

RICH KRUMHOLZ, DIRECTOR, CALTRANS DISTRICT 5

I'll take that one. I think Secretary LaHood already mentioned the arithmetic. Of course math and science are very important, but also written and verbal communication are extremely important in today's work environment no matter what career you go into and I think, I have to tell you, I'm very impressed by every team in terms of their communication skills today.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL

What do you think are the best ways to get rid of pollution?

1. RICH KRUMHOLZ

Well, I guess I could try to take that one on. I think sustainable energy sources outside of petroleum-based are definitely the key to cutting down on climate change in terms of greenhouse gas and global warming, along with solar and hydrogen and others discussed today. I think they are part of the solution, for sure.

GEORGE FLAMSON MIDDLE SCHOOL

What are some recent transportation advancements?

DAN MCNAMARA

I believe the question is, what are some of the newer technologies that are happening now in transportation. When you're in the urban areas, you'll see a whole network of highways that support the traffic congestion, and congestion relief such as cameras and changeable message signs. Beyond that, there's a lot research and testing involved with tracking traffic using cell phones and feeding that information back to the users so that, whether you're in your car, or you're leaving your house, you have the most current information available to you. You'll be seeing that in the near future, and that will help us all manage traffic congestion, and weigh in other options such as riding rail or bus. So keep that in mind.

RIVERVIEW MIDDLE SCHOOL

How will careers in transportation help President Obama's plan for energy? And will the money be put aside to educate those that want a career in transportation?

CHARLES C. FIELDER, DIRECTOR, CALTRANS DISTRICT 1

Transportation is going to be playing a key role in the managing of our energy use here throughout the nation. The work that you guys are doing here today is pretty much the prediction of where we're heading into the future, and trying to find more efficient use of our energy out there is going to be very critical for managing that limited resource, but also being able to manage it within our own borders.

As far as the education goes, I know President Obama, at least in some of the speeches he's been making, has been indicating a willingness to invest in our future. He sees the United States investing in students, and it is something that we're all going to have to be supporting, and so the work that you're doing here today is a good step in leading toward that vision.

REDLAND MIDDLE SCHOOL

How do you become a manager of a rail system?

DONNA MAURILLO

Rod, you might want to take that one! How do you become manager of a rail system? I think Rod Diridon would like to answer that question. He's Mr. Train!

ROD DIRIDON

Ladies and gentlemen, maybe this is a good segue into the conclusion of our presentation today, because we are over time, and some of the sites are going to have to pay extra if we go much beyond right now—but let me answer the question first.

If you want to become the manager of a transportation agency, you need to take math and science in high school. You have to prepare for technical or complicated degrees in college and you can't do that unless you take math and science courses in high school. That's why we're communicating with you while you're junior high school students.

As you launch yourself into high school, take the harder courses. Don't take the easy course, because you can't get anywhere in life just doing easy things. You have to do the hardest classes, do well in them, then move on into college and take civil engineering or planning or earn a business degree in accounting—any degree that prepares you to do management work—that's really the key to it.

Once you get out of college, you probably ought to go on to earn a master of science of some sort. We have a Master of Science in Transportation Management at the Mineta Transportation Institute that's taught through video conference. Our students can take the courses at any of the Caltrans video conference locations or across the nation through video streaming, and there are other universities that have the same kind of programs.

So there's a continuum. Try hard while you're in junior high school. Take your math and science in high school. Earn a civil engineering or other kind of degrees that launch you into a career in transportation when you're in college. Work toward a master's degree that relates to your area of study, whether it's in management or transportation management, and then work very hard when you get into your professional opportunities. Work with mentors, people like the leaders you've seen today across the nation who are your site sponsors, so they can teach you how to do your work in the best possible way.

CONCLUDING REMARKS

ROD DIRIDON

I think that concludes today's activities. Each one of us has been careful to score each one of your presentations and they will be given to Ms. Maurillo. She will tally those up from the judges across the nation and will let you know in the next couple of weeks as to which one of these schools has won the thousand dollar scholarship and the trip to the Mineta Transportation Institute's graduation on June 27.

Let me end this annual video conference for the Garrett Morgan competition by thanking each one of the site sponsors, especially thanking Secretary LaHood, Director Kempton, President Bill Millar from APTA, and all of the others who have sponsored sites. We will be back with you again at this time next year for this competition. You might encourage your schools to participate again next year so they can possibly win the competition and certainly, even if they don't win, be involved in the question and answer process that prepares you to become leaders in solving our transportation problems for the future and as you heard today, we certainly need that solution quickly. Global warming and congestion and the other problems that are facing us are going to be solved by people like you in your generation. So we thank you for your involvement. We thank you for your creativity, and we wish you well in your future careers.

APPENDIX A

WINNING ENTRY: SCHOOL OF INTERNATIONAL STUDIES AT MEADOWBROOK

DONNA MAURILLO

Right now, we will go to Norfolk, Virginia, to meet the School of International Studies at Meadowbrook, the sixth and seventh grades. So take it away, Meadowbrook!

TAMARA POULSON, APTA

Good afternoon. I wanted to introduce the School of International Studies on behalf of Hampton Roads Transit in Norfolk, Virginia. We're also the home of Virginia's first light-rail system, and we are privileged to have the School of International Studies here again for a second year. Thank you.



Figure 6 Students from the School of International Studies at Meadowbrook

TAYLOR FARLAND

Good morning! We would like to thank you for joining us this morning at our Hampton Roads joint city council meeting. The purpose of today's meeting is to introduce you to the new law, *Naturally Clean*. This new law supports the current and federal legislation, and makes use of the current technology, allowing us to keep the costs low during this economically stressful time. It is with great excitement that we are bringing together the business

community leaders and citizens of the Hampton Roads area to make a difference in our impact both locally and globally on our environment.

Here with me today are several prominent members of the team who have worked hard to bring this law into effect, and to develop our campaign for public awareness. First, we have our committee chair, Mr. Bryce Barry. Mr. Barry will be presenting the needs that led to the creation of this new law. Mr. Barry?

BRYCE BERRY

Good morning, Miss Mayor and members of the community. Driving a car is the most air-polluting act a citizen can do. Today I would like to present you with a few startling facts about the impact we are having on our environment.

In the United States, there are 752 automobiles for every 1,000 people. Americans use about 26 percent of the world's petroleum to produce energy. Of that amount, 16 percent of it is used for transportation by trucks and automobiles. Thirty-three percent of the world's carbon-dioxide emissions are from the use of automobiles. The average commute time in the Hampton Roads area is 23 minutes. Road use in the past decade has increased significantly and congestion has become a major issue at all the bridge and tunnel crossings in the Hampton Roads area.

Because of this and many other environmental concerns, it was decided that there needed to be a law established in which citizens of the Hampton Roads area would receive tax benefits for choosing to address this issue personally by using public transportation. I would like to introduce to you our community advocate, Miss Kierra Pfeiffer, who will share with you the new law that is now in place.

KIERRA PFEIFFER

Thank you, Mr. Barry. Naturally Clean. This law will benefit any adult citizen who is willing to utilize public transportation on a regular basis. Each person who rides the public-transit system, whether it is a bus, ferry, or a light-rail train, will use a pass that maintains records of their usage. At the end of each year, citizens will receive a record of their usage, and then be able to complete their local taxes. Citizens who used public transportation for more than 50 percent of their commute will receive tax rebates. In addition, as part of this law, there will be an increase on the local tax on gasoline. This increase in the gas tax will help us fund the rebates received by individuals choosing mass transit.

The HRT public-transportation system is committed to provide you with a safe and quick ride to and from your destination. Currently, HRT is offering over 50 routes and plans to increase that number to around 75. There are many express routes providing a more-direct and quicker

way to work. The light-rail system will continue to be expanded to provide alternates for transit. At this time, I will turn the floor over to our financial advisor, Matthew Anderson, who will share the new finances of the new law.

MATTHEW ANDERSON

Good morning, ladies and gentlemen. How much is this going to cost? Let me start with the basis and then I will explain several of the ways that this cost of this law will be offset through government funds and increased taxes. First, the average citizen will save funds.

The average American spends 18 cents of every dollar on transportation costs. These costs mostly go toward the purchase, maintenance and operation of a personal vehicle. By utilizing the Hampton Roads Public Transportation system, which is intermodal, the citizens will lower their cost to about six cents of every dollar. This works out to a savings of about \$115 per month just by riding the transit system. The main cost in implementing the Naturally Clean Act involves the rebates that are offered to the citizens and the majority of these costs would be offset by the increase in the gas tax. The gas tax would offset these costs by as much as 72 percent. The remaining costs would be covered by income from fares as well as taking advantage of federal government support.

With the new economic stimulus laws, there will be an increase in savings for the commuter as well as more support for the Naturally Clean Act.

This law also has many benefits for business owners. The abundant use of public transportation creates a large return in investments made. For every dollar invested, there is \$6 in return. It also will provide opportunities for more jobs and allow people to have more accessibility to jobs. In addition, it will increase public revenues. Not only will this benefit us as citizens, but it will have a great impact on the community and the environment. I would like to turn this back over to Miss Mayor, Miss Taylor Farland, a great advocate of protecting the environment. She would like to share the impact that this change could have on our environment. Miss Mayor?

TAYLOR FARLAND

Thank you, Mr. Anderson. As you will see in our environmental impact statement, the long-range effect of our citizens' utilizing public transportation rather than personal automobiles is significant. Some of the reasons for this include the fact that many of the HRT buses that are currently operating are hybrid buses. Many of the buses have been converted to ultra-low-sulfur diesel. In addition, according to our plan, we will switch all buses over to hybrids in the next 20 years. This way, all buses will adhere to the clean diesel engine requirements. By reducing the number of automobiles on the road, it is our hope to see a decrease of about 50 percent in the number of emissions released into the environment. We

should see a decline in the traffic congestion and damage to the roadways. Finally, we will be contributing to the healthy lifestyles of our citizens by encouraging walking to and from the bus, train, and ferry stops.

A few other changes that will benefit those who are riding the various means of transportation include the fact that all buses and the light-rail systems will be Wi-Fi capable, allowing patrons to be productive during their commutes. There will be an increase in the number of routes and locations to make the system more accessible. Bike racks will be available on all buses and trains to allow for those who like to ride their bikes to and from stops. Overall, we feel that this law will be beneficial to all citizens of Hampton Roads and will provide for a naturally clean and better environment. Now please sit back and relax while we show you one of our public service announcements that will be aired at the beginning of next month. Thank you.



Figure 7 Public service announcement of winning team

<http://www.youtube.com/watch?v=JQnchh93ZJQ>

AUDIO OF STUDENT-PRODUCED PUBLIC SERVICE ANNOUNCEMENT

Do you find yourself constantly stuck in traffic? The average commute time in Hampton Roads is 23 minutes. Ride the bus and get there faster. HRT offers many direct routes with HRT Max.

Gas prices hurting your wallet? Use public transportation and receive tax rebates.

Getting behind on your work? New Wi-Fi access on all HRT transit systems gives you time to complete that overdue report.

Care about the environment? Riding public transit reduces emissions by up to 20 percent per household.

Naturally Clean. It's the law.

Thank you.

APPENDIX B

ABOUT GARRETT AUGUSTUS MORGAN

GARRETT AUGUSTUS MORGAN, 1877-1963

Garrett Augustus Morgan, for whom the U.S. Department of Transportation Technology and Transportation Futures Program is named, was born in Paris, Kentucky, in 1877. The seventh of 11 children, his parents were former slaves. Although his formal education ended at the sixth grade, Garrett Morgan went on to become a world-famous inventor and entrepreneur.

Despite his humble beginnings and lack of formal education, Mr. Morgan made an impact on the course of human events. Shortly after his death in 1963, Morgan was awarded a citation by the U.S. government for his significant inventions.

Notably, in 1923, Mr. Morgan invented and patented a successful early traffic signal. It was during this time that the automobile was becoming common, sharing the nation's streets with bicycles, horse-drawn vehicles and pedestrians. Collisions were frequent and often bloody. After witnessing such an accident in Cleveland, Ohio, Mr. Morgan decided to invent a device to make the flow of traffic safer. The Morgan traffic signal was a T-shaped pole topped with three illuminated signs: stop, go and an all-directional stop that let pedestrians cross the busy street.



Figure 8 A pair of images of Garrett Augustus Morgan

At night, or when traffic was minimal, the Morgan signal could be positioned in a half-mast posture, alerting approaching motorists to proceed through the intersection with caution. This

technology was the basis of the modern-day traffic signal and was a significant contribution to what we now know as Intelligent Transportation Systems.

The Mineta Transportation Institute presents an annual symposium by videoconference as part of its ongoing mission to provide technology transfer, education and research on current issues and emerging solutions in the field of sustainable surface transportation. The videoconference is part of the Garrett A. Morgan Technology and Transportation Futures Program, which was established by the Honorable Rodney Slater, former Secretary of the U.S. Department of Transportation.

Teachers and students address the topic of sustainable transportation and propose innovations for the surface transportation industry. The purpose of the symposium is to stimulate the minds of young people and encourage them to excel in mathematics and science, which could lead to careers in transportation engineering, transportation planning, environmental science, public transportation, and innovations in transportation safety and security.

Through the efforts of many people, this event and this publication will add to the positive spirit of innovative transportation progress so ably personified by Garrett Augustus Morgan.

MINETA TRANSPORTATION INSTITUTE

The Norman Y. Mineta International Institute for Surface Transportation Policy Studies (MTI) was established by Congress as part of the Intermodal Surface Transportation Efficiency Act of 1991. Reauthorized in 1998, MTI was selected by the U.S. Department of Transportation through a competitive process in 2002 as a national “Center of Excellence.” The Institute is funded by Congress through the United States Department of Transportation’s Research and Innovative Technology Administration, the California Legislature through the Department of Transportation (Caltrans), and by private grants and donations.

The Institute receives oversight from an internationally respected Board of Trustees whose members represent all major surface transportation modes. MTI’s focus on policy and management resulted from a Board assessment of the industry’s unmet needs and led directly to the choice of the San José State University College of Business as the Institute’s home. The Board provides policy direction, assists with needs assessment, and connects the Institute and its programs with the international transportation community.

MTI’s transportation policy work is centered on three primary responsibilities:

Research

MTI works to provide policy-oriented research for all levels of government and the private sector to foster the development of optimum surface transportation systems. Research areas include: transportation security; planning and policy development; interrelationships among transportation, land use, and the environment; transportation finance; and collaborative labor-management relations. Certified Research Associates conduct the research. Certification requires an advanced degree, generally a Ph.D., a record of academic publications, and professional references. Research projects culminate in a peer-reviewed publication, available both in hardcopy and on TransWeb, the MTI website (<http://transweb.sjsu.edu>).

Education

The educational goal of the Institute is to provide graduate-level education to students seeking a career in the development and operation of surface transportation programs. MTI, through San José State University, offers an AACSB-accredited Master of Science in Transportation Management and a graduate Certificate in Transportation Management that serve to prepare the nation’s transportation managers for the 21st century. The master’s degree is the highest conferred by the California State University system. With the active assistance of the California Department

of Transportation, MTI delivers its classes over a state-of-the-art videoconference network throughout the state of California and via webcasting beyond, allowing working transportation professionals to pursue an advanced degree regardless of their location. To meet the needs of employers seeking a diverse workforce, MTI’s education program promotes enrollment to under-represented groups.

Information and Technology Transfer

MTI promotes the availability of completed research to professional organizations and journals and works to integrate the research findings into the graduate education program. In addition to publishing the studies, the Institute also sponsors symposia to disseminate research results to transportation professionals and encourages Research Associates to present their findings at conferences. The World in Motion, MTI’s quarterly newsletter, covers innovation in the Institute’s research and education programs. MTI’s extensive collection of transportation-related publications is integrated into San José State University’s world-class Martin Luther King, Jr. Library.

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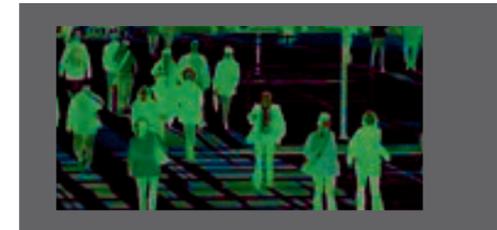
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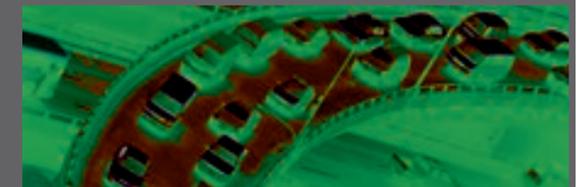
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