

# PCIVs, Redefining Sustainable Transportation for the 21<sup>st</sup> Century

Presented at the Volpe Center

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August 4, 2008

Good morning. It's both a great pleasure and an honor to help kick off this workshop on Exploring the Safety Benefits of Plastic and Composite Intensive Vehicles (PCIVs). I'm excited to be here today because it's not often I have the opportunity to address a group of experts.

Yes, I'm talking to you. Everyone in this room has the expertise and the opportunity to be a hero and I'm about to tell you how.

Think about our purpose today. First and foremost, the work we'll do here together can make future vehicles safer and ultimately save lives. That's the work of heroes because passenger safety is but one of the benefits of our collaboration.

Today's automotive industry stands at a precarious point, with domestic sales at a crawl, oil and natural gas volatility, and regulatory and international demands increasing. --- Incremental change may not be sufficient to restore prosperity to the automotive sector in particular, and, to manufacturing as a whole.

What's needed is innovative change, groundbreaking, pioneering, landmark, and revolutionary thinking and action on the technology development and business planning fronts: and that's where you come in. Substantially advancing the role of plastics in the automotive industry holds the promise of greater energy independence, economic growth, and environmental sustainability.

If that doesn't sound like a job for a hero to you, you're not seeing the same news I am.

Let me give you just a few examples to illustrate my point.

Plastics consume only a small fraction – just three per cent – of U.S. oil and natural gas. That fraction is used so effectively that fossil fuel reserves can last longer as a result. In fact, it's estimated that the use of plastics as a whole can save more energy overall than it takes to make them.

Using corrosion-resistant composites for the box of a full-size pick-up truck model, can save almost 10 million gallons of fuel over the life of the fleet.

Replacing the fenders on that same truck with plastics could save nearly 6 million gallons more. That makes the energy to make those plastics shrink in comparison.

And fuel economy is only the start. It's estimated that the use of lightweight plastics in vehicle components not only saves 88 million barrels each year through fuel efficiencies but also leads to a reduction of CO2 emissions of 30 million tons. That helps limit global warming.

Plastics can have an advantage even at the vehicle's end-of-life. Right now only about 10% of the weight in an average passenger vehicle is some form of plastic. But as autos become more plastics intensive, we believe our research with partners including Argonne National Laboratory has demonstrated the market viability of automotive plastics recycling. In fact, end-of-life plastics can actually give back energy that was used to make them. Using an optimum combination of recovery techniques, up to 14 million barrels of oil equivalent (BOE) could be recovered yearly through recycling automotive plastics.

Consider too that while the upward trend in gasoline prices is changing the automobile design and use in America, globally automobile use is growing exponentially. China in the last decade lifted the equivalent of the entire U.S. population – 300 million people – out of poverty. Advances in lightweight design, manufacturing, operation, and recovery technologies will help stem the environmental impact of that growth in a world where “auto-mobility” is increasingly a “right” of the middle class.

So far, for plastics, that's a win-win-win on the sustainability meter: less environmental impact at the point of material manufacture, less demand during the use phase on environmental resources because of lightweighting, and finally - energy and material recovery possibilities at end-of-life. But the many contributions that plastics and composites can make – with your hard work and creative energy – don't stop there.

Compressed natural gas, advanced batteries, and hydrogen fuel cells are reshaping the powertrains of the future. The challenge of course, is fuel and energy storage and driving range. These requirements point to lightweight, high strength-to-weight ratio materials like impact resistant plastics and plastic composite tanks.

Furthermore, plastic is integral as an optimal lightweight material for hybrid vehicles. An obscure example - A newly developed plastic separator film promises to significantly enhance the power, safety and reliability of lithium ion batteries.

With all these advantages, the ACC suggests to you today, that to achieve truly revolutionary change, we must look at the role of plastics in a fundamentally new way. **Rather than thinking in terms of metal substitution, we should be thinking in terms of the plastic and composite intensive vehicle** --, its advantages, risks, strengths, weaknesses, sustainability and its safety!

Just a few short years ago, no one would have entertained such an idea. After all, it was just over 10 years ago that the National Highway Traffic Safety Administration released its galvanizing study suggesting that smaller, lighter cars fared much worse in accidents than larger, heavier cars.

Today we know that's not the whole story. Today we know that larger energy absorbing space may be better, but heavier is not. And plastics make larger and lighter possible.

Consider these facts:

- Composite materials can absorb 6 to 12 times more crash energy than steel, though they weigh about half as much.
- Reducing the weight of an SUV by 20% can reduce injuries to the other driver by more than 50%.
- Using plastics in the upper part of an SUV can reduce its tendency to roll over. One study found that reducing the weight of vehicles by 100 pounds could have saved almost 10% of lives lost in rollover accidents in 1999. Since 10,000 people die each year from rollover accidents, that's a significant safety consideration.
- 26% of all light vehicle fatal crashes of 2 vehicles involve side impacts. Molded plastic interior door panels weigh less, are simpler and less costly to install, and can incorporate integral side impact safety features. Foam filled B-pillars today help absorb side impact pressures.
- Self-reinforced plastics are relatively new composite materials created for use in such applications as load floors, underbody shields and even for pedestrian protection. In that application, small, lightweight and energy absorbent panels are strategically placed in the front end of the vehicle.

Clearly, plastics are being integrated in more creative and beneficial ways than ever before. This is in part the result of the focus that has come from the automotive plastics technology roadmapping workshop co-sponsored in 2000 by the American Chemistry Council and the U.S. Department of Energy. When we talk about **revolutionary** change and looking at the role of plastics in an entirely new light, we can trace that kind of paradigm-shifting thought to that event.

The nexus of plastics and passenger safety has also been advanced by Congress and DOE, working together to involve the National Science Foundation in fundamental Composite Research & Development and in Predictive Engineering. In our work here today, we owe a nod of gratitude to our government supporters.

In the ACC-Plastics Division's Technology Integration Report derived from an earlier safety workshop held in cooperation with NHTSA, the plastics and automotive industries have articulated their wish to develop innovative materials and methods which will radically improve vehicle safety for passengers and pedestrians. The PCIV Safety Roadmap will build on that goal, and today we've come together to further define the challenges, refine research priorities, and spotlight opportunities. All we need to make that happen is a roomful of heroes.

I ask you today to bring your "A" game, to engage with one another, to share your insights, and to ask the hard questions. Please tell us what we don't know, where we need more research, what our concerns should be, and how we can capture the public imagination in this quest.

We are on the road to revolutionary, innovative change, but we're not there yet. Getting there will be an amazing feat – it will mean safer cars, our primary objective. But also greater energy efficiency, lower emissions, enhanced energy security, and more economic stability through the creation of good manufacturing jobs. Both the consumer and society will benefit. That's more than any one hero can achieve. But together, we can make it happen.

Thank you for being here, and thank you for the work you'll do today and in the future.