

Tomorrow's powertrain technology: 100 years in the making

The SAE's 100th anniversary has all of the engineering community reflecting on past accomplishments. But more importantly, we look to the future to determine what will be the technologies that carry us through the next 100 years.

In 1905, there wasn't a single propulsion technology that met the needs of every customer, even with the advent of the internal combustion engine. Our future doesn't hold one either, which is why we must continue to make advancements on all propulsion technology fronts. From advanced internal combustion engine and transmission technologies, to clean diesels, alternative fuels, and hybrids, each powertrain technology will play a relevant role around the globe in the foreseeable future. This is why **General Motors** is focused on delivering these technologies to the markets in which they will be most effective.

One clear example of this is the considerable global resources we're employing to expand our portfolio of hybrid technology to offer customers three distinct systems, across a broad range of products.

Our strategy is to put hybrids in vehicles in which they have the potential to make the greatest fuel savings impact. The GM Allison diesel hybrid system, for example, improves bus fuel economy by up to 60% and reduces emissions by as much as 90% over a conventional diesel bus. In the near future, this technology will significantly improve the economy of full-size trucks and SUVs.

Looking farther out, hydrogen power will help us eliminate the vehicle from the environmental equation. Already today, GM has a number of fuel cell vehicles on the road, such as the HydroGen3, demonstrating the benefits of fuel cells and the hydrogen economy. If the past 100 years has set up the first stage in propulsion systems, hydrogen fuel cells will be the

sequel to this technology. And as powertrain engineers, our efforts with the internal combustion engine can further this advancement.

Take for example the small-block V8. As we reflect on this 100th SAE celebration, at General Motors we also celebrate the 50th anniversary of the most sustainable and flexible internal combustion engine ever built—the small-block V8. Since the small block's introduction a half century ago, General Motors has produced 90 million, while applying every form of fuel-saving and emissions-reducing technology, exemplifying the capabilities of the internal combustion engine. From fuel injection in 1962, to powering the world's first production hybrid pickup trucks in 2004, to running on hydrogen, the small block has done it all. And it will continue to do so for the foreseeable future, as we perfect fuel cell commercial availability.

At GM, we feel a mass-produced hydrogen internal combustion engine is unlikely because of its inefficiency compared to fuel cells. However, experiments such as our hydrogen-powered small block demonstrate the continued relevance of the internal combustion engine to aid the fuel cell invention process.

As an industry, we should not abandon the internal combustion engine. We should embrace it with advancements that continue the evolution of reduced emissions as well as improved efficiency and power. Tomorrow's successes will be the solutions that prove to be sustainable, both environmentally and economically.

As we look to the future, the challenge of 100 years ago will probably never result in a single industry propulsion solution. Yet we should all be proud to work in an industry where this challenge is what drives us all today, and it will fuel the engineers of tomorrow, for the next 100 years. *OHE*



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1955 small-block V8



General Motors hydrogen fuel cell vision