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Cars of the 1980s

How Detroit Plans to Produce Autos of the Future

Cars For The '80s: Sleek,

By Gary Witzenburg

It's a question auto executives, engineers, and designers are asked every day: What's ahead for the automobile? And for once, it's a question that's fairly easy to answer, since government requirements are fast funneling the carmakers into a cast-in-stone set of numbers and standards that leave little room for engineering individuality.

Assuming Congress or some other power like OPEC does not change the status quo, every car sold in quantity in the United States will conform to the same very tough safety, damageability, and emissions standards year by year. And by 1985, every manufacturer's and importer's total fleet of cars will average a minimum of 27.5 miles per gallon in combined city and highway EPA testing. Given the enormous amount of money needed to comply with these laws and the short lead times involved, it's a safe bet that most car builders will follow nearly identical paths down Regulation Road.

Average car size will settle in somewhere between today's compact GM X-car and Chrysler's subcompact Omni/Horizon—with some larger and some smaller cars, of course, to suit the tastes and needs of buyers. This means an overall length ranging from 164.8 to 176.7 inches and a width of 65.8 to 68.3 inches. Engines will be predominantly four cylinders and V-6s, with just a smattering of small V-8s surviving the next five years. Body shapes will be aerodynamically slippery, tires will be constructed for minimum rolling resistance, and all drivetrain and accessory components will be engineered for the maximum possible efficiency.

What happens beyond 1985 depends completely on fuel and environmental situations, world and national politics, and whatever further federal regulation results from these factors. If the corporate average fuel economy (CAFE) standards go beyond 27.5 miles per gallon, vehicle sizes and weights will continue to fall.

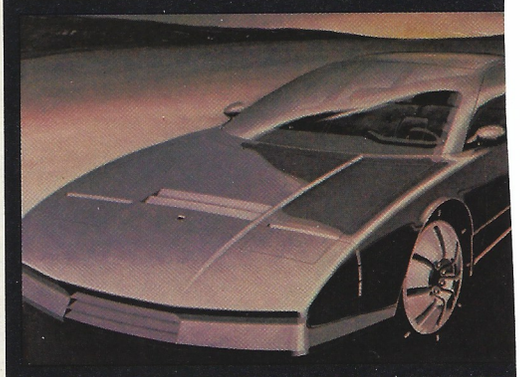
So much for generalities. What about specifics? Since the 1977 model year, domestic manufacturers have been furiously downsizing and re-engineering their products as fast as budgets and lead times would allow. At General Motors, it was the big cars first, mid-size second, luxury coupes third, and compacts fourth. The subcompacts are next in line for rebirth a year from this spring. Significantly, all but the intermediate and full-size cars have front-wheel drive; and they, too, will become front-wheel-drive cars when they're next redesigned in 1982 and '83, respectively. Only the sporty Camaro and Firebird (all-new models planned for '82) and the Corvette (scheduled for an '83 redo) will retain conventional rear-wheel drive through mid-decade.

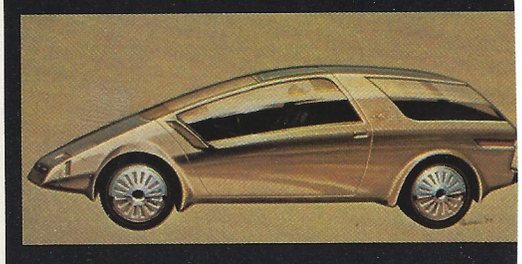
Chrysler intends to go 100 percent front-wheel drive in the next few years. "By stacking all of the machinery in one end of the vehicle, we can do a more efficient job of packaging people and luggage," says Hal Sperlich, Chrysler Executive Vice President of Engineering and Product Development. "If we tried to do these cars with rear-wheel drive, they'd have to be larger and heavier to achieve the same interior package." Chrysler will convert its compact lines this fall, its mid-size and large cars between 1983 and 1985.

Some people still prefer traditional rear-drive handling characteristics, and for this reason, Ford apparently intends to stay with rear-wheel drive for its compact, mid-size, and large cars, at least through mid-decade. Only replacements for the subcompact Ford Pinto and Mercury Bobcat, due this fall, will feature a transverse-engine, front-drive configuration.

American Motors will probably stick with its current rear-drive and four-wheel-drive machinery until an all new front-wheel-drive design can be developed in conjunction with the company's French partner, Renault. In light of the industry trend, the obvious packaging advantages for smaller cars, and Renault's preference for front-wheel drive, it's virtually certain that AMC will go that way by 1984 or so.

With the entire industry moving toward the same average weight and size goals (100- to 104-inch wheelbase and about 2,700 pounds curb weight),



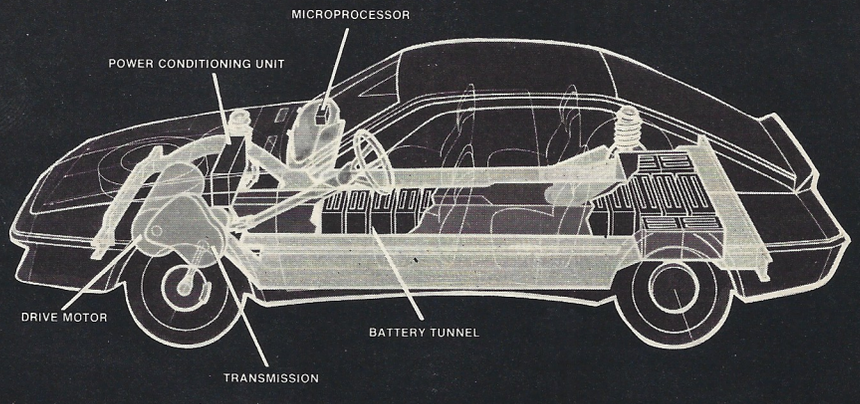


Above, top to bottom: American Motors' Concept Electron is a three-passenger commuter car, designed for short city trips, while the AMC futuristic two-door sport wagon with roof-hinged doors is built for comfortable highway travel.

The four-door luxury sedan design from General Motors reflects the growing demand for fuel-efficient cars.

An artist's conception shows how a Ford may look in the 1990s.

Small, And Sensible



Clockwise from top: Ford's sleek white MegaStar II is a futuristic wedge-shaped sports car designed for high-speed stability and tested for fuel economy.

The General Motors Electro Vette is used to test batteries and electric motors.

The diagram reveals the inner workings of an experimental electric car developed by General Electric and the Chrysler Corporation for the Department of Energy's electric vehicle program.

Aerodynamic turbine concept car by Chrysler could be developed in the 1990s.

stylists, or designers as they're called today, will be busier than ever creating exciting and attractive shapes to wrap around these more efficient packages. The new shapes will be taut, lean, and clean, with little wasted space, and they will be fine-tuned through countless hours of wind-tunnel work.

Once important only to designers of airplanes and exotic race cars, the science of aerodynamics is now a critical factor in every new-car program. Seemingly small decreases in wind drag can result in substantial fuel economy improvements, even at fifty-five miles per hour and below.

Maintaining or improving passenger and luggage room will be critically important as cars continue to get smaller and lighter. Motorists aren't necessarily going to acquire these efficient new cars if the vehicles don't offer the quietness, comfort, and luxury of older models. "I don't buy the concept that we'll all be driving around in unexciting, uninspired little horizontal phone booths that get forty miles per gallon," said Dick Teague, American Motors Design Vice President. "Once the engineers get through doing their jobs, I think you'll see a wide variety of cars, perhaps with mechanicals dictated by Washington, but with really exciting concepts in design."

The average car of the mid-1980s will accommodate four people with occasional room for one or two more when necessary, but the true five- and six-passenger car as we know it may not survive the decade. "We're not certain just how much we can do with the so-called six-passenger family car," says Chuck Brady, Executive Director of the GM Engineering Staff for Current Product Engineering. "We think that car is a viable product within the 27.5 fuel economy requirement. But the government is saying now that it wants to go higher, which would make that large a car very difficult to maintain, or may eliminate it entirely."

Besides downsizing, another obvious way to take weight out of cars is to substitute a lot of lightweight materials for heavier steel wherever possible. But these materials are fairly expensive, and the industries that supply them will have to expand at a rate equivalent to the increasing demand. According to Chrysler's Charles Heinen, Director of Research and Materials Engineering, plastics and aluminum will play a much bigger part in auto construction over the next ten years, and so will lightweight steel. "The big thing will be high strength, light alloy (HSLA) steel," Heinen said, "because it's not that much more expensive than mild steel."

Obviously smaller and lighter cars can make do with smaller, lighter, and more fuel-efficient engines. "The average guy will be driving a four," says Heinen, "while the luxury guy will have a V-6." The few remaining V-8s will be reserved for light trucks, which will need the extra power for hauling, and for the most expensive performance and luxury cars—Corvettes and Cadillacs, perhaps. Electronic fuel injection, and precise, computerized engine control and emissions systems will be necessary across the board to achieve the government's stiffer pollution and fuel economy standards. Most domestic cars will carry these space-age systems when the 1981 models are unveiled this fall.

The mini-wizard computers and their associated sensors, actuators, and circuitry will add to the costs and complexity of the car of the 1980s, but they should be more reliable than the old-style mechanical systems. And they open up a veritable Christmas list of exciting possibilities. Already available in some luxury cars, and sure to spread to more affordable machinery as production volume increases and costs come down, are electronic instrument panels, keyless entry systems, trip computers and information centers, level control, climate control, exotic entertainment systems, and more.

What about alternate fuels and powerplants? Most experts agree that the gasoline-powered piston engine will continue to dominate throughout the coming decade and engineers, naturally, have some tricks up their sleeves to milk the last morsels of fuel efficiency out of them. Turbochargers can be added to smaller, high-mileage engines to make them perform like larger ones on demand. Extra valve systems and advanced combustion chamber designs can improve combustion efficiency.

Depending upon what is determined about possible health hazards of diesel exhaust products, diesel engines may or may not continue their popularity spiral. GM sees the diesel as a way to retain fairly large-size family cars in the 27.5 miles-per-gallon fleet and has already invested heavily in development and production capacity. The other do-

mestic makers are waiting to see where diesel exhaust standards will go before committing large sums of money. Barring legislation to the contrary, diesel engines should power fifteen percent of the U.S. fleet by 1990.

Although GM has made good progress in developing better batteries and promises to market electric vehicles by the mid-1980s, large numbers of electric cars are unlikely to be in production till late in the decade, if then. "We haven't got a design that's suitable for mass production," says Chrysler's Heinen, "and we're working with the most advanced design yet." Until significantly better and longer-life batteries are developed and production capacity is in place to build them, electric cars will remain too slow, too short range, and their batteries too short-lived to suit many drivers.

No major breakthroughs are in sight for steam or other external combustion automotive powerplants such as the Stirling engine, but Heinen says he does see a clear path toward practical, affordable turbine-powered cars—not quite in this decade, but perhaps by the early 1990s. The Chrysler executive says that developments the turbine needed to make it a serious candidate—high temperature ceramic materials at reasonable costs and a continuously variable transmission (CVT)—have happened in the last few years. "The turbine could be cost-competitive, lighter, and have equal economy and better performance compared to the diesel," Heinen said. Low emissions and the ability to run on almost anything "from perfume to peanut oil" make the turbine particularly attractive for the next decade and beyond.

Fact is, most of the knowledge and hardware that will move us to 27.5 miles per gallon new-car fleets already exists. "If you look at our newer cars today," says GM's Brady, "you're basically looking at the technology we'll be dealing with in the next ten years. If anyone is planning to build any alternate vehicles or powerplants in significant numbers by 1985, let's say, they'd better be doing their brick-and-mortar work right now." The task ahead is to refine that technology during the 1980s while conceiving and developing the new technology we'll need for the rest of this century. •

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