

SOME SUPERIOR CHARACTERISTICS OF CATALYTIC CONVERTERS

Among the reasons why General Motors believes the catalytic converter approach is superior to other emission control approaches at this time are:

1. The catalytic converter is an aftertreatment device. It allows the engine to be retuned for improved fuel economy and driveability because exhaust emissions are oxidized in the converter.
2. The converter-equipped conventional engine is less "sensitive" than the proposed alternatives in terms of starting, warm-up, stalling and driving characteristics.
3. The converter can be adapted to a variety of engine sizes and configurations.
4. New development in converter technology, including more effective and durable catalyst formulations, make the converter concept increasingly more attractive for exhaust emission control.

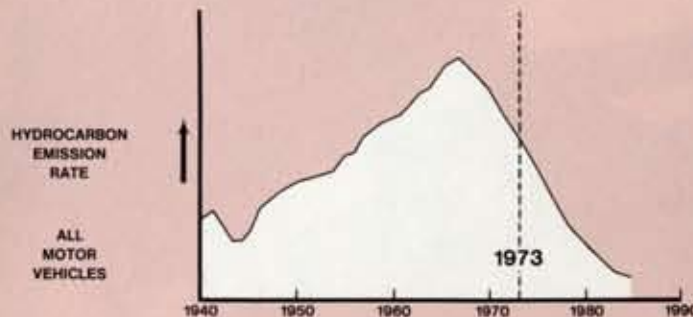
COSTS WILL BE AS LOW AS POSSIBLE

The big question is: How much more will the 1975 system cost the customer? No one really knows precisely at this time. However, GM is doing everything possible to keep the cost as low as possible. GM is determined that its 1975 models will provide the customer good value in terms of price, fuel economy, driveability, and attractiveness.

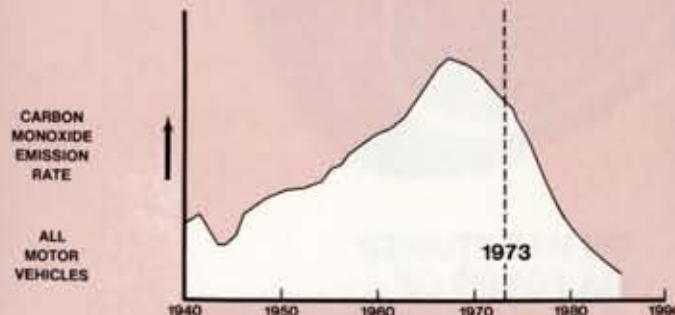
THE 1976-1977 STANDARDS

Looking beyond the 1975 models, the situation is uncertain. The very stringent hydrocarbon and carbon monoxide emission standards for 1976-model cars and the oxides of nitrogen standard for 1977-model cars have not been revised. However, the EPA has asked Congress for authority to revise the standard for oxides of nitrogen. The EPA's assessment of the health risk associated with this pollutant no longer supports the need to reduce NO_x emission by 90 percent, as the Clean Air Act specifies. General Motors not only agrees that the NO_x standard for 1977-model cars is based on outdated scientific data and is excessively stringent but also believes the 1976 federal standards for hydrocarbons and carbon monoxide are more stringent than necessary to achieve satisfactory air quality.

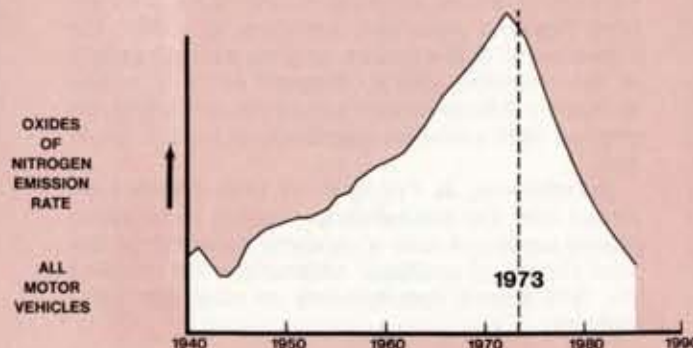
MOTOR VEHICLE HYDROCARBON EMISSIONS (TYPICAL U.S. URBAN AREAS)



MOTOR VEHICLE CARBON MONOXIDE EMISSIONS (TYPICAL U.S. URBAN AREAS)



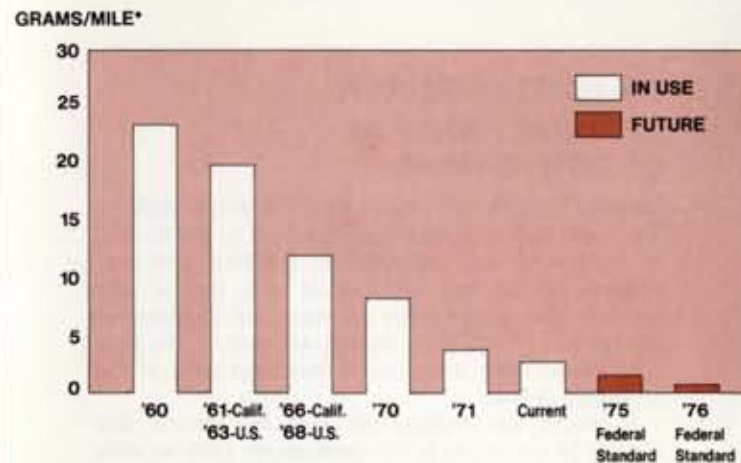
MOTOR VEHICLE OXIDES OF NITROGEN EMISSIONS (TYPICAL U.S. URBAN AREAS)



POLLUTION FROM CARS IS GOING DOWN

In any discussion of automotive emissions, the principal point to remember is that the nation has "turned the corner" on automotive air pollution. According to government data, hydrocarbon and carbon monoxide emissions "turned the corner" nationwide in 1968 and have been declining steadily. The other major automotive pollutant, oxides of nitrogen, peaked last year and has begun a similar decline. These declines will continue into the future as the charts show. GM's 1973-model cars achieve reductions of more than 80 percent in hydrocarbons, nearly 70 percent in carbon monoxide and about 40 percent in oxides of nitrogen compared with uncontrolled cars of 1960. GM has made great progress toward taking the automobile out of the air pollution problem—in many parts of the country it already is removed from the problem—and that progress will continue until we have achieved that goal everywhere.

TOTAL HYDROCARBON EMISSION LEVELS FROM CUSTOMER OWNED GM CARS



*(Equivalent to 1975 Federal Test Procedures)



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FACTS ABOUT THE CATALYTIC CONVERTER



WHAT IS A CATALYST?

A catalyst has two fundamental characteristics. First, it can make a chemical reaction go faster. For example, a temperature of 1800°F would be required without a catalyst to oxidize the same amount of carbon monoxide to carbon dioxide that is oxidized at only 1100°F when a catalyst is used. Second, although it takes part in the chemical reaction the catalyst is unchanged.

WHAT IS A CATALYTIC CONVERTER?

A catalytic converter is a container in which an inactive or inert substance (called the substrate) is coated with a catalytic material (formulation containing platinum and palladium). The substrate can be either beads or a single piece called a monolith. In either case, the surface has millions of tiny irregularities so that there is a great deal of catalytic substance exposed to the exhaust stream.

By using only unleaded fuels and keeping the engine properly maintained, the converter is designed to have only slight deterioration in lasting 50,000 miles. Unleaded gasoline is used to reduce combustion chamber deposits, corrosion and to prevent lead contamination of the catalyst that would render it ineffective.

WHY DOES GM LIKE CATALYTIC CONVERTERS?

With an effective catalytic converter cleaning up pollutants in the exhaust stream, GM engineers are confident that they can modify engines toward optimum fuel economy and driveability and still meet 1975 emission goals. Thus we expect to have an outstanding combination—a power plant with high energy conversion efficiency but with low emission characteristics.

In other words—low emissions, improved fuel economy and improved driveability—all at the same time.

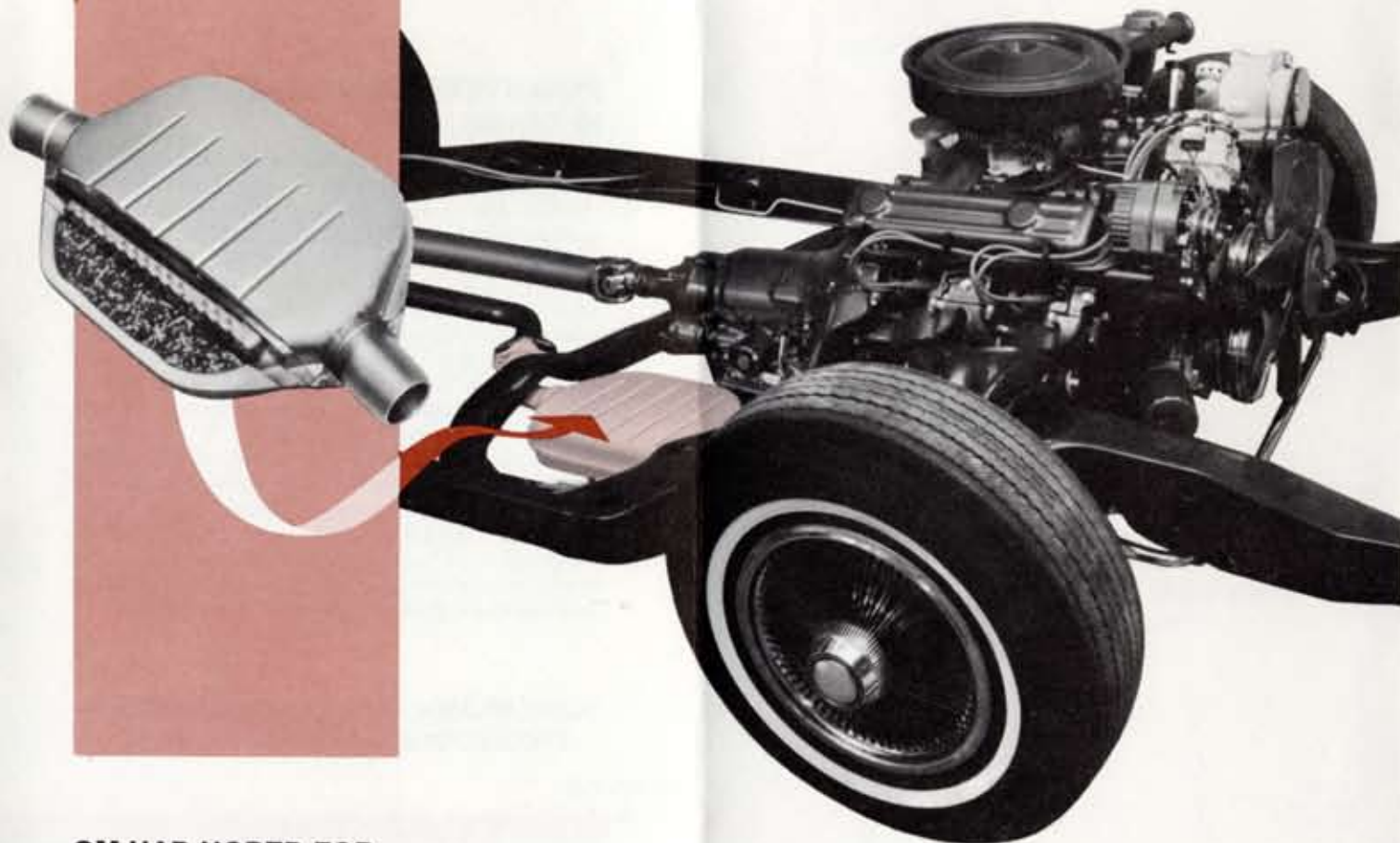
GM PLANS FOR 1975 EMISSION CONTROLS

The design of 1975-model passenger cars to be sold in the United States has been affected substantially by the need to comply with provisions of the federal Clean Air Act.

The subject has received much attention by the news media and in other quarters. Some of the reports and speculation have been confusing and sometimes contradictory. Here is the background.

The Clean Air Act is administered by the Environmental Protection Agency. On April 11, 1973, the EPA deferred for one year the emission control standards originally set for 1975-model cars. Instead, the EPA established new and only somewhat less stringent interim standards for the nation for 1975-model cars, and even more difficult requirements for cars to be sold in California.

In its decision, the EPA noted that meeting the standards for California will require the use of catalytic converters on all 1975-model GM cars sold in that state. However, the EPA believes interim standards for the rest of the nation could be met "on most models without use of catalytic devices." General Motors disagrees—our engineers believe that the interim 1975 standards are stringent enough that catalytic converters may be required on many of our 1975 models nationwide, particularly if we are also to have improved fuel economy and driveability.



GM HAD HOPED FOR GRADUAL PHASE-IN OF CONVERTERS

General Motors had hoped the EPA would confine the initial use of catalytic converters to California, an area with well established facilities and procedures to control production and test a new system. This would have allowed GM to phase-in production of the new equipment and in the long run, would have been in the best interests of the motoring public.

It should be emphasized that the reason GM wanted to avoid using the catalyst on 1975 models except in California was that phasing-in advanced control systems is a logical and proven technique for introducing new technology. We don't doubt the wisdom of using converters—in GM's ongoing development and testing programs, engineers are finding that the GM catalytic converters are providing good emission control efficiency and durability. Field test cars equipped with the converter are showing driveability and fuel economy characteristics at least as good as our 1973 models, and in many cases better. GM hopes to make still more positive progress in these areas.

GM HAS STUDIED ALL FORMS OF ALTERNATE POWER PLANTS

General Motors and other manufacturers have been criticized for self-serving reluctance to develop alternatives to the conventional automobile engine. This criticism of General Motors is completely unfounded. GM has been extremely energetic in investigating just about every type and configuration of power plant that possibly could be used in motor vehicles. At the same time we have intensive programs underway to modify the conventional spark-ignition engine, including study of the stratified charge concept which receives so much publicity as being capable of meeting the original 1975 emission standards, at least in small cars.

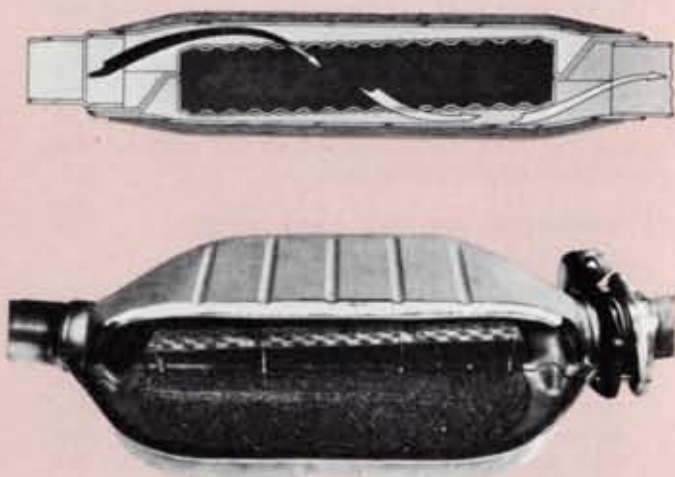
Nonetheless, at this point in time GM is convinced that the conventional internal combustion engine equipped with a catalytic converter is the best choice of available alternatives for meeting the 1975 federal requirements on most GM automobiles.

Some critics have voiced disagreement with this choice apparently because of a misconception that the catalytic converter exacts a large fuel penalty. However, GM studies show this is not the case so far as meeting the 1975 interim emission standards are concerned. We expect that our 1975 cars equipped with catalytic converters will not only give as good or better fuel economy than our 1973 models but also will perform better in everyday driving.

1975 GM MODELS WILL HAVE APPEAL AND VALUE

Although far from satisfied with the EPA decision, General Motors will meet 1975 federal requirements—and with products that measure up to traditional General Motors standards of buyer appeal and value. GM is determined to meet the requirements of the marketplace as well as the requirements of the law.

Accordingly, General Motors is doing everything possible to make sure that if catalytic systems are used on some or all GM cars nationwide, it can be accomplished with a minimum of uncertainty and disruption to GM customers, the public, and to the Corporation. In addition to a field fleet of test cars equipped with prototype converter systems, GM has made contractual arrangements with a supplier to assure availability of platinum and palladium, which are used in the catalyst formulation, and will have arrangements with several suppliers to provide the necessary catalysts. AC Spark Plug Division has begun preparations to produce catalytic converters in facilities at Oak Creek, Wisconsin, and initial orders have been placed with suppliers of components and materials on a potential across-the-board basis.



TYPICAL 1975 GM EMISSION CONTROL SYSTEM

