Wisconsin Agribusiness Council, Inc.

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January 7, 1998

To: State Representative Eugene Hahn
State Capitol, Madison

From: Russel R. Weisensel
Director, Legislative Affairs

Re: AB 623 Flexible-Fuel Vehicles

Please express to the Assembly Government Operations Committee our support for this bill.

It is a logical way to further encourage the use of sustainable fuels. Both the environment, and in the long run, the economy will be benefited by the use of these fuels.

This position is clearly in concert with the following resolution adopted by our members at last January's annual meeting:

Resolution 3.3 (Reaffirm 1988 - 1997 resolution.)

ALTERNATIVE AG PRODUCT AND BY-PRODUCT RESEARCH

WHEREAS, this country faces a surplus of certain ag commodities; and
WHEREAS, development of additional efficient energy sources from agricultural products and by-products could both reduce our grain surplus and be a positive factor in our U.S. balance of trade; and
WHEREAS, new uses for ag products, such as biodegradable plastic, and further research into energy alternatives, such as ethanol, could reduce surpluses; provide jobs and income; and have a positive impact on the environment.
NOW, THEREFORE, Be It Resolved, that the Wisconsin Agribusiness Council support efforts to encourage the Wisconsin State Legislature and the U.S. Congress to make funds available to qualified research facilities to develop efficient methods for utilizing ag products, by-products and ag production.
Be It Further Resolved, that we support the development of efficient additional consumer and industry products from renewable resources.

STATE OF WISCONSIN
COMMITTEE HEARINGS
COMMITTEE ON GOVERNMENT OPERATIONS
1:00 P.M. WEDNESDAY, JANUARY 7, 1998
415 NORTHWEST STATE CAPITAL
ASSEMBLY SUBSTITUTE AMENDMENT TO AB 623
TESTIMONY

Good afternoon Chairman Dobyns and Committee Members. Thank you for the opportunity to testify before your Committee today. I am Jeffery Knight, Director of the Department of Administration Bureau of Transportation. The Department of Administration has been proceeding in the direction taken by this legislation and I am here on behalf of the Department to support AB 623. Your inclusion of all types of alternative fueled vehicles rather than strictly ethanol-blended motor fuel increases our ability to meet the requirements of federal and state legislation. There are many good reasons that our state has been procuring and operating alternative fueled vehicles for a number of years. Here are three:

First, in 1995 Governor Thompson set forth his "2000 BY 2000" Program that called for the State of Wisconsin to purchase 2000 alternative fueled vehicles by the year 2000. This bold initiative not only anticipated and supported federal programs, but also provided an impetus for the entire alternative fueled vehicles industry. 34% of the manufacturing base in Wisconsin is related to automobiles. Wisconsin's extensive fleet of alternative fueled vehicles provides this industry with a wealth of real-world operating information – a virtual laboratory on wheels.

Second, the federal Energy Policy Act of 1992, known as EPACT, requires states to purchase alternative fueled vehicles in certain percentages that escalate from 10% in model year 1997 to 75% in 2001 and thereafter. The exact number of vehicles is calculated each year through a complex formula that excludes law enforcement and other special service vehicles. As part of EPACT, states are allowed to earn credits when they purchase alternative fueled vehicles before the start of the law, and in excess of its requirements. Because the State of Wisconsin became a leader in the introduction of alternative fueled vehicles, we have acquired 292 EPACT credits to date, and anticipate more than doubling this number with model year 1997. We believe that EPACT credits could potentially be an innovative new revenue source. As a result of our initiatives, the State of Wisconsin received the U.S. Department of Energy Alternative Fueled Vehicle All Star Award.

A third reason why we have been procuring alternative fueled vehicles is that it simultaneously serves to achieve energy independence and stimulate Wisconsin's agricultural and manufacturing economy. The State of Wisconsin has substantially contributed to the alternative fuel industry through partnerships with all of the stakeholders. Currently, the State of Wisconsin is operating 461 alternative fueled vehicles in the state fleet.

In conclusion, on behalf of Secretary Mark Bugher, I once again offer the Department of Administration's support for AB 623. I also wish to thank your legislature for its vision and effort toward achieving energy independence, clean air, and continued Wisconsin national leadership.

For your reference, please find a list of the procurement requirements under the federal EPACT and Clean Air Act, and a list of light duty alternative fueled vehicles currently offered by manufacturers.

ASA 2 (s0379/2)
to AB ~~263~~ 623 (-2393/1)

1997 Session

FISCAL ESTIMATE
DOA-2048 (R10/92)

☐ ORIGINAL ☐ UPDATED
☐ CORRECTED ☒ SUPPLEMENTAL

LRB or Bill No./Adm. Rule: AB 623 with ASA2

Amendment No. if pplicable:

Subject

Use of flexible fuels in state vehicles

Fiscal Effect

State: ☒ No State Fiscal Effect

Check columns below only if bill makes a direct appropriation or affects a sum sufficient appropriation.

☐ Increase Existing Appropriation ☐ Increase Existing Revenues
☐ Decrease Existing Appropriation ☐ Decrease Existing Revenues
☐ Create New Appropriation

☐ Increase Costs - May be possible to absorb Within Agency's Budget ☐ Yes ☐ No

☐ Decrease Costs

Local: ☐ No local government costs

1. ☐ Increase Costs
   ☐ Permissive ☐ Mandatory
   ☐ Decrease Costs
   ☐ Permissive ☐ Mandatory

3. ☐ Increase Revenues
   ☐ Permissive ☐ Mandatory

4. ☐ Decrease Revenues
   ☐ Permissive ☐ Mandatory

5. Types of Local Governmental Units affected:
   ☐ Towns ☐ Villages ☐ Cities
   ☐ Counties ☐ Others _____
   ☐ School Districts ☐ VTAE Districts

Fund Sources Affected

☐ GPR ☐ FED ☐ PRO ☒ PRS ☐ SEG ☐ SEG-S

Affected Ch. 20 Appropriations

s. 20.505(1)(kb) and others

Assumptions Used in Arriving at Fiscal Estimate

Existing plans under the Energy policy Act of 1992, the Clean Air Act Amendments of 1990, Wisconsin Act 351, and the Governor's Alternative Fuels Task Force, will shift the Wisconsin state vehicle fleet to the use of alternative fuels. AB623 with ASA2 is consistent with Department of Administration plans and will have no additional fiscal effect.

Long-Range Fiscal Implications

Agency/Prepared by: (Name & Phone No.)	Authorized Signature/Telephone No.	Date
Richard Wagner (608)266-0653 (DOA)	Charles E. McDowell 7-3836	2/12/98

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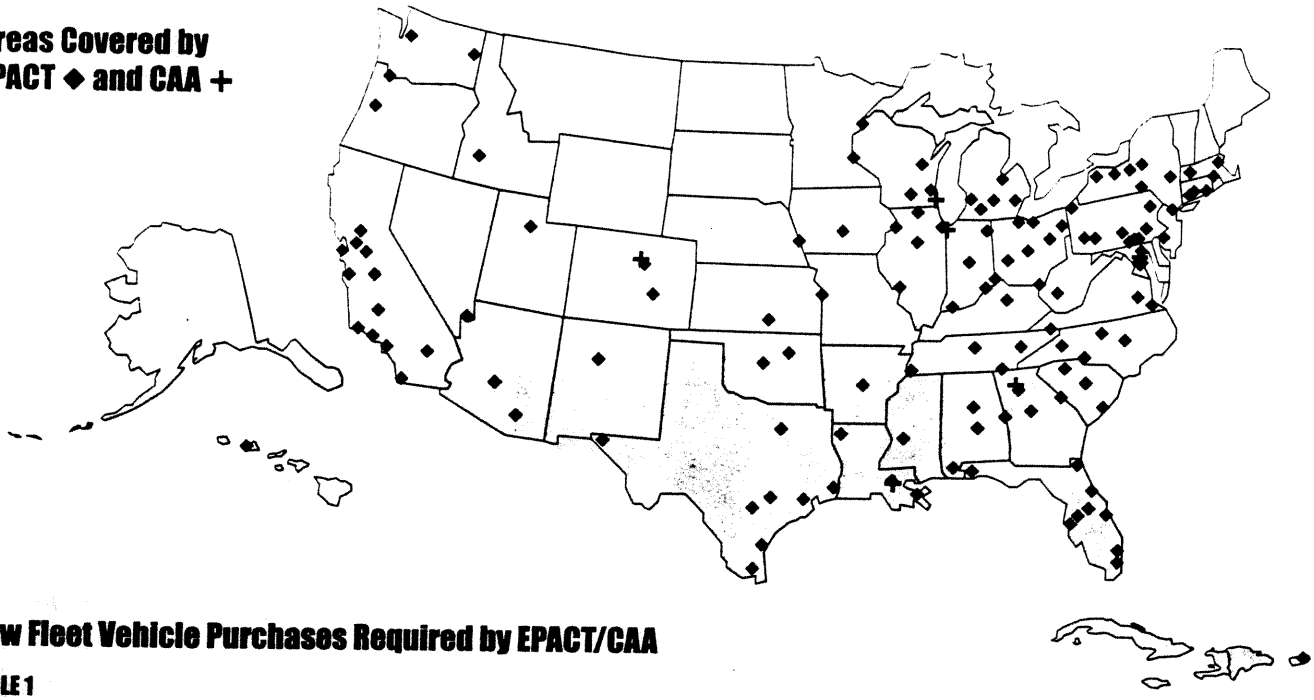
AB623

Errata

The following updated information became available as this brochure went to press. The map appears on page 5 and Table 1 on page 6.

Areas Covered by EPACT ◆ and CAA +

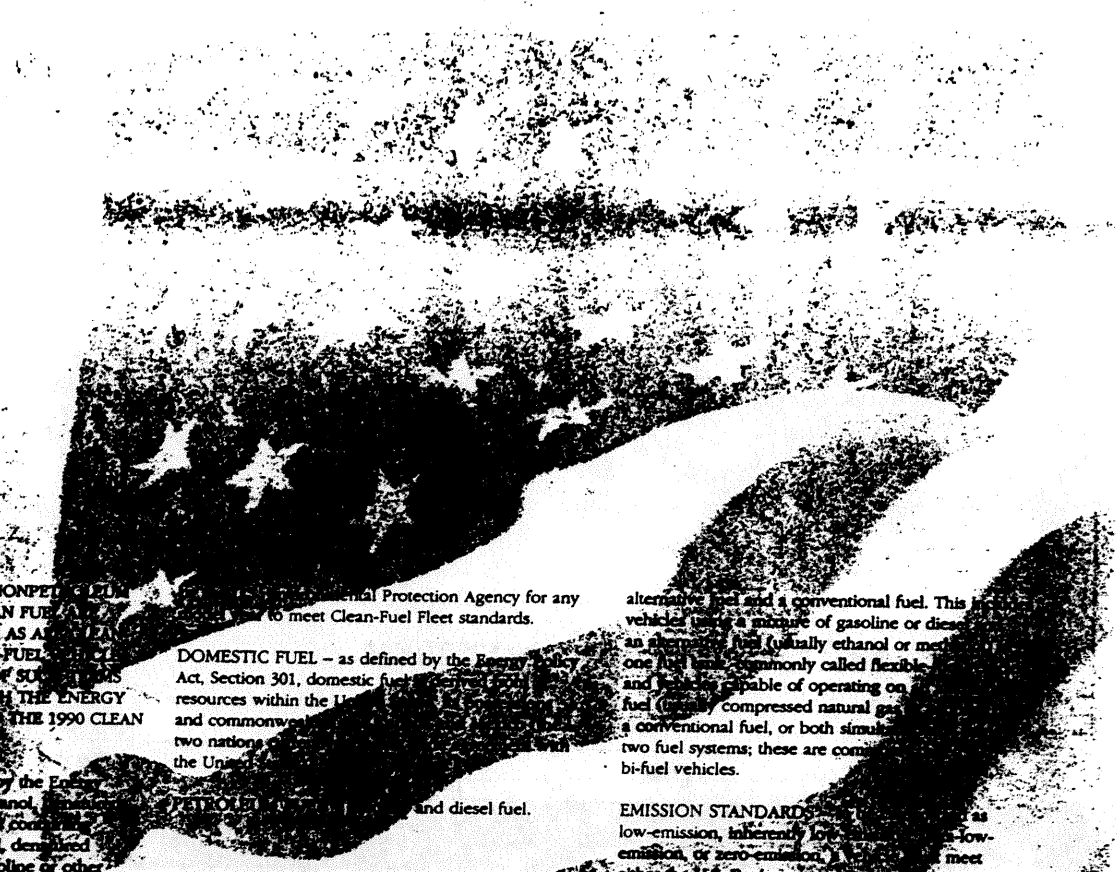


New Fleet Vehicle Purchases Required by EPACT/CAA

TABLE 1

Year	CAA		EPACT			
	GVWR less than 8,500 lb (% of CFVs)	GVWR less than 26,000 lb (% of CFVs)	Federal[a] (% or # of AFVs)	✱ State[b] (% of AFVs)	Alternative-Fuel Provider[b] (% of AFVs)	Municipal/ Private[c] (% of AFVs)
1993			5,000			
1994			7,500			
1995			10,000			
1996			25%			
1997			33%	10%	30%	
1998			50%	15%	50%	
1999	30%	50%	75%	25%	70%	
2000	50%	50%	75%	50%	90%	
2001	70%	50%	75%	75%	90%	
2002	70%	50%	75%	75%	90%	20%
2003	70%	50%	75%	75%	90%	40%
2004	70%	50%	75%	75%	90%	60%
2005	70%	50%	75%	75%	90%	70%
2006	70%	50%	75%	75%	90%	70%

[a] Fiscal year for federal fleet acquisition requirements, model year for all others.
[b] As required by 10CFR Part 490.
[c] May be required by regulations if DOE finds these acquisitions are necessary.



GLOSSARY OF TERMS

THE TERMS ALTERNATIVE FUEL, NONPETROLEUM FUEL, DOMESTIC FUEL, AND CLEAN FUEL ARE OFTEN USED INTERCHANGEABLY AS ARE ALTERNATIVE-FUEL VEHICLE AND ALTERNATIVE-FUEL IN THIS PUBLICATION. THE USE OF SUCH TERMS IS DEFINED IN ACCORDANCE WITH THE ENERGY POLICY ACT (EPACT) OF 1992 AND THE 1990 CLEAN AIR ACT (CAA).

ALTERNATIVE FUEL – as defined by the Energy Policy Act, alternative fuels are methanol, denatured ethanol, and other alcohols; mixtures containing 85% or more by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; natural gas; liquefied petroleum gas; hydrogen; coal-derived liquid fuels; fuels (other than alcohol) derived from biological material; and electricity.

ALTERNATIVE-FUEL PROVIDER – a fuel provider (or any affiliate or business unit under its control) is an alternative-fuel provider if its principal business is producing, storing, refining, processing, transporting, distributing, importing, or selling (at wholesale or retail) any alternative fuel (other than electricity), or generating, transmitting, importing, or selling (at wholesale or retail) electricity; or if that fuel provider produces, imports, or produces and imports (in combination) an average of 50,000 barrels per day of petroleum and 30% (a substantial portion) or more of its gross annual revenues are derived from producing alternative fuels.

ALTERNATIVE-FUEL VEHICLE (AFV) – as defined by the Energy Policy Act, this is any dedicated or dual-fueled vehicle. In practice, this term also refers to bi-fuel and flexible-fuel vehicles.

CLEAN FUEL – as defined by the Clean Air Act, this is any fuel or power source that enables a vehicle to emit less pollution than would be the case with conventional gasoline or diesel fuel. Clean fuels include alternative fuels, reformulated gasoline, and clean diesel fuel.

CLEAN-FUEL VEHICLE (CFV) – as defined by the Clean Air Act, this is a vehicle in a class or category of vehicles that has been certified [illegible] Protection Agency for any [illegible] to meet Clean-Fuel Fleet standards.

DOMESTIC FUEL – as defined by the Energy Policy Act, Section 301, domestic fuel [illegible] resources within the U[illegible] and commonwe[illegible] two nations [illegible] the Uni[illegible]

PETROLEU[illegible] and diesel fuel.

OTHER TERMS THAT WILL BE HELPFUL TO KNOW AS YOU READ THIS PUBLICATIO[illegible] ARE DEFINED BELOW:

BI-FUEL VEHICLE [illegible] an [illegible] but uses only one fuel at a [illegible] are referred to as "dual-fuel" vehicles by [illegible] and EPACT.

CONSOLIDATED METROPOLITAN STATISTICAL AREA (CMSA) – an urban center and surrounding areas, as currently defined by the U.S. Bureau of the Census, with a population greater than 250,000.

CONVERTED OR CONVERSION VEHICLE – a vehicle designed to operate on gasoline or diesel that has been modified or altered to run on an alternative fuel.

DEDICATED VEHICLE – a vehicle that operates solely on one fuel. Generally, dedicated vehicles have superior emissions and performance results because their design has been optimized for operation on only a single fuel.

DUAL-FUEL VEHICLE (CAA DEFINITION) – a vehicle with two separate fuel systems, designed to run either on an alternative fuel or on gasoline or diesel, but using only one fuel at a time.

DUAL-FUEL VEHICLE (EPACT DEFINITION) – a vehicle designed to operate on a combination of an alternative fuel and a conventional fuel. This [illegible] vehicle [illegible] a mixture of gasoline or diesel [illegible] an alternative fuel (usually ethanol or meth[illegible] one fuel tank commonly called flexible- [illegible] and [illegible] capable of operating on [illegible] fuel (usually compressed natural gas [illegible] a conventional fuel, or both simul[illegible] two fuel systems; these are com[illegible] bi-fuel vehicles.

EMISSION STANDARDS [illegible] as low-emission, inherently [illegible] low-emission, or zero-emission [illegible] meet either the U.S. Environmental [illegible] Agency's Clean-Fuel Fleet or the California Air Resources Board's emission standards [illegible]

- Low-Emission Vehicle (LEV) – emits fewer emissions than a conventional vehicle. Fleet owners opting for early or extra purchase of clean-fuel vehicles that meet LEV [illegible] earn credits that can be "banked" or [illegible] against fleet vehicle purchase requirements within the CMSA, as designated by the Clean Air Act.
- Inherently Low-Emission Vehicle (ILEV) – meets ILEV exhaust emission standards and produces very few or no evaporative emissions. ILEVs will be dedicated alternative-fuel vehicles in most cases. ILEV credits can also be banked within the CMSA.
- Ultra-Low-Emission Vehicle (ULEV) – produces fewer exhaust emissions than does a LEV. ULEV credits can also be banked within the CMSA.
- Zero-Emission Vehicle (ZEV) – a vehicle that emits no exhaust emissions at vehicle tailpipe. ZEV credits can also be banked within the CMSA.

FLEXIBLE-FUEL VEHICLE (FFV) – a vehicle with a single tank, powered by any mixture of gasoline and either ethanol or methanol.

OEM – original equipment manufacturer.

Methanol

Fuel Description:
Odorless clear liquid, produced from natural gas, coal, or biomass. M85 (a blend of 85% methanol and 15% gasoline) is for light-duty applications. M100 (pure methanol) is for heavy-duty applications.

Domestic Content of Fuel

- As high as 100%; about 90%, depending on world market price.

Fueling

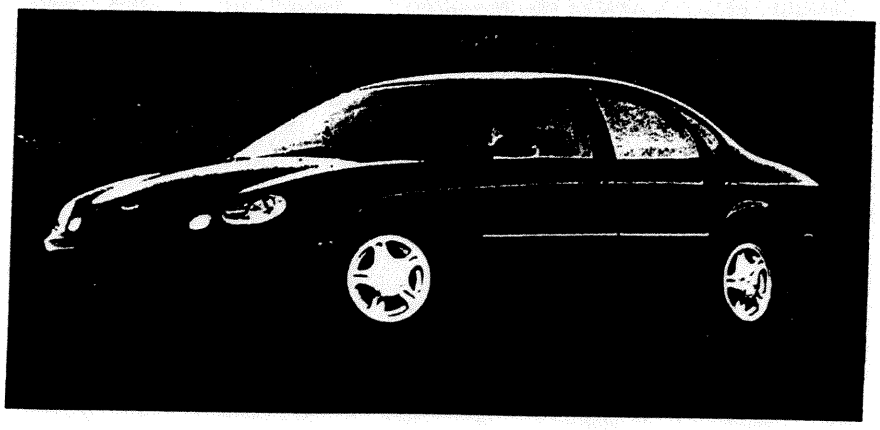
- Fueling is the same as with conventional gasoline or diesel fuel.

Fuel Availability

- Fueling stations are widely available in California; they are also available in New York City, Atlanta, Denver, Houston, Detroit, and other locations.
- M100 is available through bulk suppliers in most major cities.

Vehicle Experience

- More than 15,000 M85 flexible-fuel vehicles are in operation.



Operational Performance

- Because of methanol's lower energy content, mileage will be slightly lower than for comparable gasoline-powered vehicles.
- Power, acceleration, and payload are comparable with those for equivalent internal-combustion engines.

Maintenance and Reliability

- Use special lubricants available by direct order from supplier (significant cost premium over conventional motor oils).
- Use M85-compatible replacement parts (that is, identify M85 as fuel when ordering).

Safety

- Adequate training is required to operate and maintain vehicles.

Costs

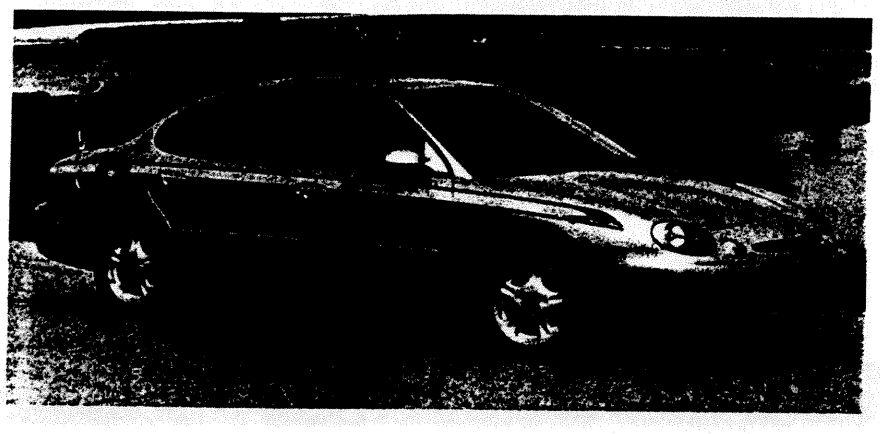
- M85 fuel cost is equal to, or slightly above, that for premium-blend gasolines. In California, the major methanol supplier adjusts the price of methanol to the average cost for regular unleaded gasoline (after accounting for the difference in energy content).
- M85 flexible-fuel vehicles are being offered at prices equivalent to or $345 less than those of comparable gasoline-powered vehicles.

For More Information, Contact:

- American Methanol Institute
  202-467-5050
  http://www.methanol.org
- California Energy Commission
  916-654-4634
- National Alternative Fuels Hotline
  800-423-1DOE

Ethanol

Fuel Description:
Liquid alcohol produced from grain or agricultural waste. E85 (a blend of 85% denatured ethanol and 15% gasoline) is for light-duty applications, while E95 (a blend of 95% denatured ethanol and 5% gasoline) is for heavy-duty applications.



Domestic Content of Fuel

- 100%

Fueling

- Fueling is the same as with gasoline or diesel fuel.

Fuel Availability

- Fueling stations are located primarily in the Midwest: more than 50 public E85 stations are available, in 12 states.
- E95 is available only through bulk suppliers.

Vehicle Experience

- More than 4,000 vehicles configured specifically for E85 are in use.

Operational Performance

- If compression ratio is optimized for higher octane rating, ethanol has approximately 80% or more of the energy density of gasoline.
- Requires more frequent fueling.
- Power, acceleration, payload, and cruise speed provided are comparable with those for equivalent conventional fuels.

Maintenance and Reliability

- Use special lubricants available by direct order from supplier (significant cost premium over standard motor oils).
- Use E85 replacement parts (that is, identify E85 as the fuel when ordering).
- Maintenance assistance is available from local dealers; practices are very similar, if not identical, to those for conventionally fueled operations.

Safety

- Adequate training is required to operate and maintain vehicles.

Costs

- E85 is sold in the Midwest at prices equivalent to those for midgrade unleaded gasoline.
- E85 flexible-fuel vehicles are provided in 1997 and 1998 by OEMs for $345 less to $1,000 more than comparable gasoline vehicles.

For More Information, Contact:

- National Ethanol Vehicle Coalition 573/635-8445 or 800/E85-8895
- Renewable Fuels Association 202/289-3835
- Clean Fuels Development Coalition 301/913-3033
- American Biofuels Association 703/522-5592
- National Alternative Fuels Hotline 800/423-1DOE

Propane

Fuel Description:
Liquefied petroleum gas, or LPG (commonly called propane), is a liquid mixture (at least 90% propane, 2.5% butane and higher hydrocarbons, and the balance ethane and propylene). It is a by-product of natural gas processing or petroleum refining.

Domestic Content of Fuel

- Between 95 and 98%.

Fueling

- Similar to filling a gas grill tank; time is comparable with that needed for gasoline or diesel fuel.
- Tank should be filled to no more than 80% capacity, to allow for liquid expansion as ambient temperature rises.

Fuel Availability

- Publicly accessible fueling stations exist in all states—over 5,000 are documented. A directory is available.

Vehicle Experience

- Over 350,000 on- and off-road propane-powered units in the United States, and about 3.5 million worldwide.

Operational Performance

- Range is almost equivalent to that of comparable gasoline-powered vehicle.
- Power, acceleration, payload, and cruise speed are comparable with those obtained using an equivalent internal-combustion engine.

Maintenance and Reliability

- Some fleets report two to three years longer service life and extended time intervals between required maintenance. However, manufacturers and converters recommend conventional maintenance intervals.
- Propane combusts in the gaseous phase, resulting in less corrosion and engine wear.

Safety

- Adequate training is required to operate and maintain vehicles.

Costs

- Bulk purchases provide about a one-fifth saving in fuel cost compared with gasoline.
- Cost for fueling station is similar to, or lower than, that for a comparably sized gasoline dispensing system.
- Service and diagnostic equipment would probably be required if access to commercial propane vehicle maintenance facilities is not available.
- Factory-installed truck conversion costs about $1,000 over the conventional vehicle base price; nonfactory conversions average about $2,500.

For More Information, Contact:

- National Propane Gas Association 708-515-0600
- Propane Vehicle Coalition 202-371-0202
- National Alternative Fuels Hotline 800-423-1DOE

Natural Gas

Fuel Description:
Extracted from underground reserves, composed primarily of methane. For compressed natural gas (CNG), gas is compressed to 2,400–3,600 pounds per square inch in specially designed and constructed cylinders. For liquefied vehicle fuel (LNG), gas is cooled to minus 259°F and stored in insulated tanks.

Domestic Content of Fuel

- 100%

Fueling

- "Slow" fill (up to 8 hours) and "quick" fill (3 to 5 minutes) are available for CNG. LNG is dispensed like propane; fueling times are comparable with those for gasoline or diesel fuels.

Fuel Availability

- CNG fueling stations are located in most major cities and in many rural areas.
- LNG is only available through suppliers of cryogenic liquids.

Vehicle Experience

- Over 35,000 in the United States and nearly one million worldwide.

Operational Performance

- For CNG and LNG vehicles, the range depends on fuel storage capacity, but generally it is less than that of comparable gasoline-fueled vehicles.
- Power, acceleration, and cruise speed are comparable with those of an equivalent internal-combustion engine.
- Cylinder location and number may displace some payload capacity.

Maintenance and Reliability

- High-pressure tanks require periodic inspection and certification.
- Some fleets report two to three years longer service life and extended time between required maintenance. However, manufacturers and converters recommend conventional maintenance intervals.

Safety

- Pressurized tanks have been designed to withstand severe impact, high external temperatures, and automotive environmental exposure; they are as safe as gasoline tanks. Design changes have resolved problems responsible for earlier in-service failures.
- Adequate training is required to operate and maintain vehicles; training and certification of service technicians is required.

Costs

- Fuel cost is approximately 75% that of gasoline, per gasoline gallon equivalent; local utility rates vary.
- Conversion costs about $2,000 to $3,000 per vehicle. The manufacturer's price premium can be $250 to $6,000.
- Fleets may need to purchase service and diagnostic equipment if access to commercial CNG LNG vehicle maintenance facilities is not available.

For More Information, Contact:

- Natural Gas Vehicle Coalition
  703/527-3022
- American Gas Association
  703/841-8000
- Gas Research Institute
  773/399-8100
- Your local gas utility
- National Alternative Fuels Hotline
  800/423-1DOE

Biodiesel Fuel

Fuel Description:
Liquid produced from such renewable sources as vegetable oils, animal fats, and used oil and fats. Biodiesel in its pure form (called neat biodiesel) has been designated as an alternative fuel for Energy Policy Act programs.

Domestic Content of Fuel
- 100%

Fueling
- Fueling is the same as with diesel fuel.

Fuel Availability
- Available only through bulk suppliers.
- Contact National Biodiesel Board for list of registered suppliers.

Vehicle Experience
- In the United States, over 30 million miles have been driven on neat biodiesel and biodiesel blends.

Operational Performance
- Horsepower, torque, and fuel economy are similar to those for diesel fuel.
- Cetane number is significantly higher than that of conventional diesel fuel.

Maintenance and Reliability
- Lubricity is improved over that of conventional diesel fuel.
- Costs are similar to those for conventional diesel fuel.
- Biodiesel-compatible elastomers (hoses, gaskets, etc.) are required for use with neat biodiesel and high-percentage biodiesel blends.

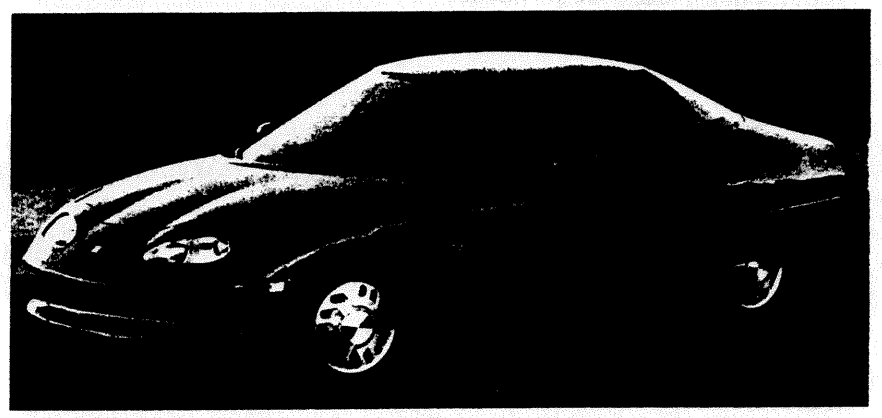
Safety
- Adequate training is required to operate and maintain vehicles.
- Flashpoint is significantly higher than that of conventional diesel fuel.
- Neat biodiesel is nontoxic and biodegradable.

Costs
- Use of biodiesel requires little or no engine modification.
- Neat biodiesel costs approximately $3.00 per gallon. However, costs are largely dependent on choice of feedstock.

For More Information, Contact:
- National Biodiesel Board
  573/635-3893 or 800/841-5849
- National Alternative Fuels Hotline
  800/423-1DOE

Electricity

Fuel Description:
Onboard rechargeable batteries power an electric motor.



Domestic Content of Fuel

- Over 95%, based on current mix of input energy (coal, natural gas, nuclear, hydropower, renewables) for electric-power generation.

Fueling

- A cord and plug (conductive) or cord and paddle (inductive) system connects to a 120-volt, 240-volt, or higher-voltage electrical source. The connecting device may be located aboard the vehicle or in a fixed, off-vehicle location.
- Time needed for charging depends on voltage of the electrical source; temperature; and size, type, and remaining state-of-charge of the batteries.

Fuel Availability

- Most homes, government facilities, fleet garages, and businesses have adequate electrical capacity for charging. Special hookups or upgrades may be required.
- Public charging facilities are being developed in many areas, especially in Southern California and Arizona.

Vehicle Experience

- Over 2,000 electric vehicles are operating throughout the United States (with the largest number in California and Arizona). Most are conversions of gasoline-powered vehicles.
- Many conversions and manufacturer-built prototypes have been used in utility fleets for testing and demonstrations.

Operational Performance

- Range for auto manufacturers' electric vehicles spans from 60 to 125 miles. Variables include the vehicle's weight, engineering and design features, and type of battery.
- Weather extremes and use of accessories (such as heating and air conditioning) can affect the range.
- Electric drivetrains are more energy-efficient than internal-combustion engines.
- Acceleration, speed, and handling for well-designed vehicles are equivalent to, or better than, those of comparable internal-combustion powered vehicles.

Maintenance and Reliability

- Lead-acid battery packs are replaced, on average, about every 30,000 miles or three years.
- Service requirements are expected to be somewhat less. No tune-ups, oil changes, timing belts, water pumps, radiators, fuel injectors, or tailpipes are required.

Safety

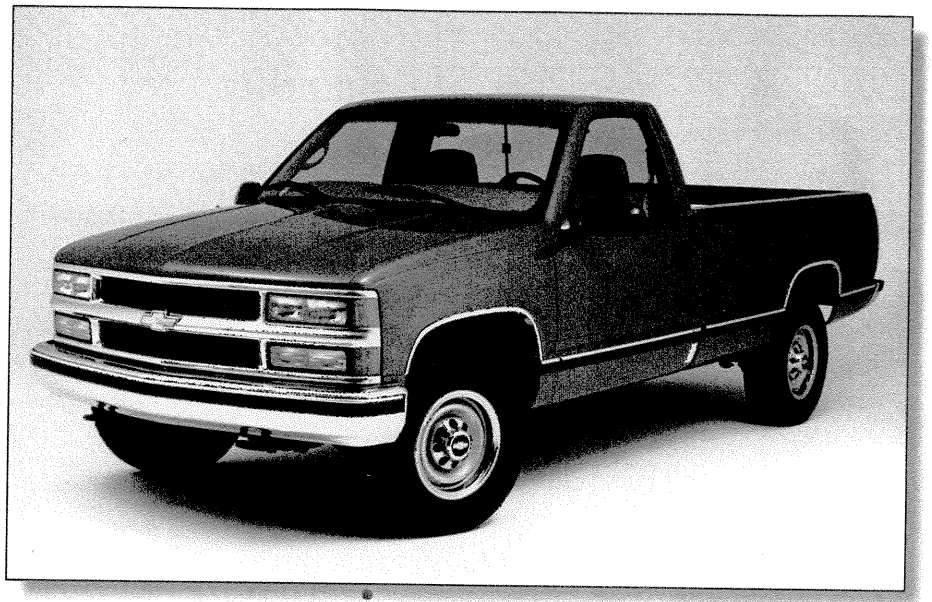
- Auto suppliers will assist fleets with technical training. Some community colleges offer training for EV mechanics.
- EV-specific standards, specifications, and industry practices are being developed.

Costs

- Replacement packs for lead-acid batteries may cost $8,000 or more.
- Initial commercial production vehicles are expected to be priced in the $30,000s. Tax incentives could significantly lower costs. Leasing options will be available through manufacturers.
- Electricity costs less per mile than gasoline; local utility rates may vary.
- Installation of equipment at charging locations may involve additional expense.

For More Information, Contact:

- Electric Transportation Coalition
  202-508-5995
- The Electric Vehicle Association of the Americas
  415-249-2690 or 800-4EV-FACT
  e-mail: ev@evaa.org
  http://www.evaa.org
- Electric Power Research Institute
  415-855-2984
- Electric Auto Association
  800-557-2882
- Your local electric utility
- National Alternative Fuels Hotline
  800-423-1DOE



Finally, a GM Propane Truck Certified for Operation in all 50 States.

Specifications

MODELS: **CHEVROLET / GMC PICK-UP**

Model #	Size / Description	2WD / 4WD	CAB	Bed
C20903	3/4 Ton (8600 GVW)	4 x 2	Regular Cab	8′
K20903	3/4 Ton (8600 GVW)	4 x 4	Regular Cab	8′
K20753	3/4 Ton (8600 GVW)	4 x 4	Extended Cab	6′
C30903	1 Ton	4 x 2	Regular Cab	8′
C30943	1 Ton	4 x 2	Crew Cab	8′
K30943	1 Ton	4 x 4	Crew Cab	8′
C31003	1 Ton Cab Chassis	4 x 2	Regular Cab	N/A
C31403	1 Ton Cab Chassis	4 x 2	Regular Cab	N/A
C30943	1 Ton Cab Chassis	4 x 2	Crew Cab	N/A
K30943	1 Ton Cab Chassis	4 x 4	Crew Cab	N/A

Half Ton Model Under Review

Engine: Vortec 5700 V8

Emissions: Meets 50 State Tier 1 / Gaseous Fuel Standards

Fuel System: **BI-FUEL PROPANE WITH AUTOMATIC SWITCHOVER**

Targeted Availability: February 1998

5.7L PROPANE SYSTEM

Features

- Vortec 5700 V8 engine optimized for gaseous fuel use
- Turn-key vehicle conversion
- Backed by 40 years of experience in propane fuel systems
- Validated at component and vehicle level
- Complete OEM-style package
- CARB certified
- Designed with safety in mind
- GM warrants base vehicle / gaseous-fuel compatible parts
- IMPCO offers supplemental 3 year / 36,000 mile single point warranty on propane fuel system
- Supplemental owner's manual provided
- Recommended maintenance schedule provided
- Point of maintenance is customer selectable
- Air / fuel ratio controller designed for 125,000 mile durability; tamper-proof with electronic idle and air fuel control
- Fuel Storage 312 PSI working pressure
- System will start and operate on propane until propane fuel storage is depleted at which time, the system will automatically switch to gasoline
- A single fuel gauge is used to indicate both propane and gasoline fuel quantity
- The fuel mode indicator includes a light that will illuminate whenever the vehicle is operating on gasoline

IMPCO reserves the right to change specifications without notice.

IMPCO®

TECHNOLOGY, DEVELOPMENT & NEW VENTURES DIVISION

IMPCO TECHNOLOGIES, INC. • 16804 Gridley Place, Cerritos, CA 90703-1741 • (562) 860-6666 • FAX (562) 860-5216

More Specifications

Fuel Injection:	(1) Sequential Central Port Fuel Injection (Gasoline)
	(2) Throttle-Body Gaseous Air / Fuel Controller (Propane)
Transmission:	4L80E (Electronic 4-Speed Automatic)
Gasoline Tank:	34.0 U.S. Gallons (128.8 Liters)
Propane Tank:	See Propane Tank Package
Rear Axle Ratio:	1 Ton - 4.10 / 3/4 Ton - 3.73
Suspension:	Front Coil, Rear Multi-Leaf Spring
Brakes:	Front Disc, Rear Drum - with 4-Wheel ABS
Wheel:	16" x 6.5', 6-Bolt Attachment on 5.5" Bolt Circle
Tires:	LT245 / 75R16-E
Battery:	12-volt, 600 Cold Cranking Amps @ 0°F
Front Seat:	Bench
Other:	Daytime Running Lamps
	Long-Life Coolant (5-year/50,000-mile)
Targeted Availability:	February 1998

Benefits

- Quality installation of propane system by authorized upfitter delivered fully equipped to end-user
- Better performance, fuel economy, reliability and durability
- Improved quality, appearance and safety
- Certified to operate in all fifty states

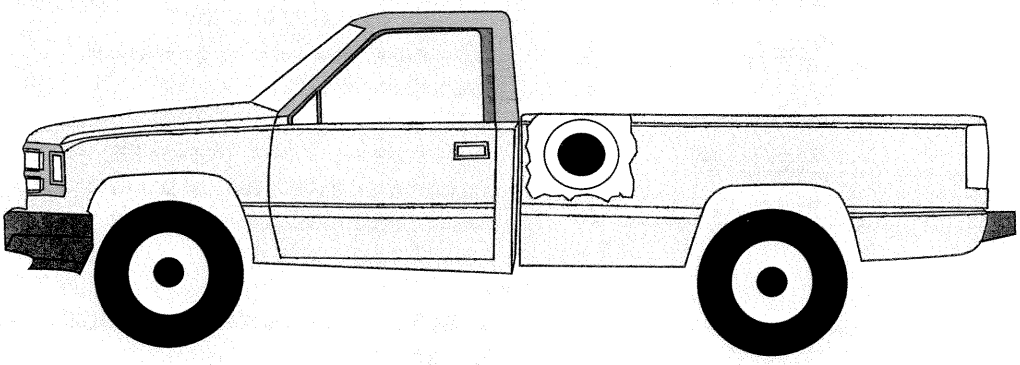
Propane Tank Packages

A) Single 18" x 60" (48 Usable Gallons of Propane) Bed Mounted

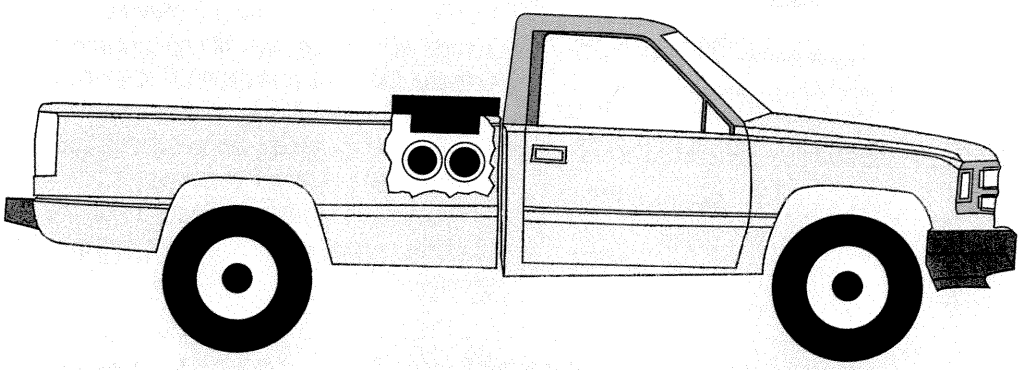
B) Manifold (Dual) 10" x 10" x 60" (30 Usable Gallons of Propane) Bed Mounted for use with a Toolbox Application

C) Tap in (No Tank - Cab Chassis only)

Single 18" x 60"



Manifold (Dual) 10 x 10 x 60



To Order, Contact Your Local General Motors Commercial Dealer or Contact IMPCO Sales at:

(888) 90-IMPCO

Finally, a GM Medium Duty Propane Truck Certified for Operation in all 50 States.

Specifications

MODELS: CHEVROLET / GMC MEDIUM DUTY CONVENTIONAL

Engine:	6.0L (366 Cu. In.) / 7.0L (427 Cu. In.)
Body Style:	Cab & Chassis
	Bus Option Currently Being Reviewed
Wheelbase:	All Options Available
GVW:	All Options Available
Emissions:	California Certified, 49 State LEV Emissions
Fuel System:	**DEDICATED**
	Throttle-body Air / Fuel Controller (Propane)
Transmission:	Manual 5 & 6 Speeds & Automatic
Propane Tank:	A) 45 Gallons Usable Propane
	B) 75 Gallons Usable Propane
	C) Tap in (No Tank)
Brakes:	All Options Available
PTO:	Option Available
Other:	Hood with Access Door Available
Targeted Availability:	Available Now

6.0L/7.0L PROPANE SYSTEM

Features

- 6.0L / 7.0L engine optimized for gaseous fuel use
- Turn-key vehicle conversion
- Backed by 40 years of experience in propane fuel systems
- Validation conducted at component and vehicle level
- Complete OEM-style package
- CARB certified
- Designed with safety in mind
- GM warrants base vehicle / gaseous-fuel compatible parts
- IMPCO offers supplemental 3 year / 36,000 mile single point warranty on propane fuel system
- Supplemental owner's manual provided
- Recommended maintenance schedule provided
- Point of maintenance is customer selectable
- Air / fuel ratio controller designed for 125,000 mile durability; tamper-proof with idle & air fuel control

Benefits

- Quality installation of propane system by authorized upfitter delivered fully equipped to end-user.
- Better performance, fuel economy, reliability and durability
- Improved quality, appearance and safety

To Order, Contact IMPCO Sales at:

(888) 90-IMPCO

IMPCO reserves the right to change specifications without notice.

IMPCO®

TECHNOLOGY, DEVELOPMENT & NEW VENTURES DIVISION

IMPCO TECHNOLOGIES, INC. • 16804 Gridley Place, Cerritos, CA 90703-1741 • (562) 860-6666 • FAX (562) 860-5216

F-Series Bi-Fuel Propane Pick-up

Ford is excited to announce the availability of a propane-powered pick-up for sale in the 1998 model year. Key specifications include:

- F-150, F-250
- 4x2, 4x4
- Regular Cab with long box (30-gallon gasoline tank), SuperCab with short box (25-gallon gasoline tank)
- 5.4-litre, V-8 engine with 4-speed automatic transmission
- Single in-bed propane tank: 16x60, 33.75 gallons, range = approximately 395 miles
- Dual in-bed propane tank (tool box): 2x10x60, 28.4 gallons, range = approximately 332 miles
- Targeting LEV emission certification

For Further Information

Look for Ford representation at key propane industry conventions and trade shows as well as other direct mail notices. Please plan on viewing our dealership interactive television broadcast on June 20, 1997. Contact 1-800-ALT-FUEL to find the participating dealer nearest you or if you have specific comments and questions.

Orders open-to-go: Summer, 1997

Product available: Fall, 1997

HOW TO ORDER

- Contact your local Ford dealer to determine if Ford Gaseous Fuel dealer
- If dealer is Ford Gaseous Fuel Dealer
  - determine tank configuration
  - determine options
  - dealer orders vehicle
  - service and warranty handled by dealer
- If dealer is not Ford Gaseous Fuel dealer ask dealer to call 1-800-ALT-FUEL to sign up

1998 F-150 (Under 8,500# GVWR)

CODE	MODEL	REMARKS/RESTRICTIONS
F17	Regular Cab 4x2 Styleside	Flareside not available
F18	Regular Cab 4x4 Styleside	Flareside not available

(Wheelbase 139" — 8' Box w/Regular Cab)

CODE	POWERTRAIN	REMARKS/RESTRICTIONS
99Z	5.4L Gaseous Fuel Prep Engine	Use code 66P for propane fuel system

CODE	OTHER OPTIONS	
65I	Propane fuel tank — standard	Single in-bed tank, 16x60. Available with Regular Cab
653	Propane fuel tank — optional	Dual in-bed tank, 2x10x60. Available with Regular Cab

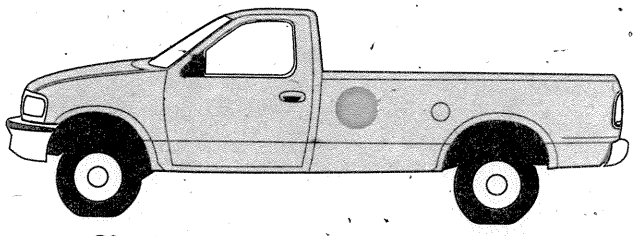
1998 F-250 (Under 8,500# GVWR)

CODE	MODEL	REMARKS/RESTRICTIONS
F27	Regular Cab 4x2 Styleside	Flareside not available
F28	Regular Cab 4x4 Styleside	Flareside not available
X27	SuperCab 4x2 Styleside	Flareside not available, SuperCab available on F-250 only
X28	SuperCab 4x4 Styleside	Flareside not available, SuperCab available on F-250 only

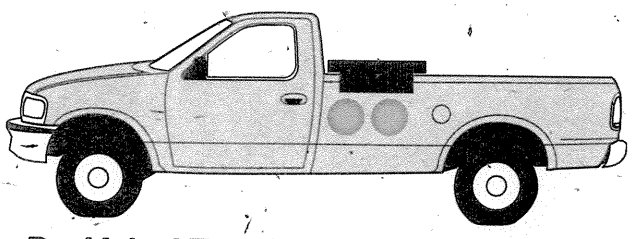
(Wheelbase 139" — 8' Box with Regular Cab; 6.5' Box with SuperCab)

CODE	POWERTRAIN	REMARKS/RESTRICTIONS
99Z	5.4L Gaseous Fuel Prep Engine	Use code 66P for propane fuel system

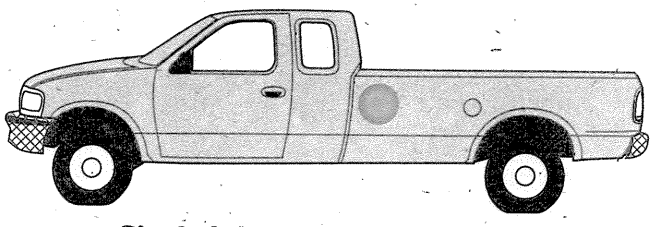
CODE	OTHER OPTIONS	
65I	Propane fuel tank — standard	Single in-bed tank, 16x60. Available with Regular Cab or SuperCab
653	Propane fuel tank — optional	Dual in-bed tank, 2x10x60. Available with Regular Cab or SuperCab



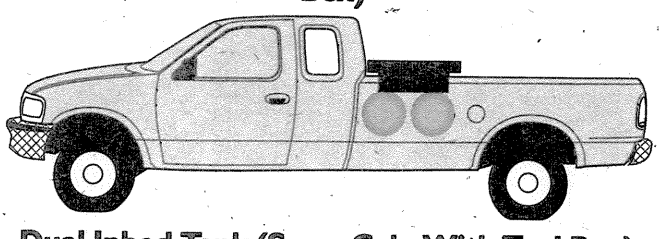
Single Inbed Tank (Regular Cab)



Dual Inbed Tank (Regular Cab, With Tool Box)



Single Inbed Tank (SuperCab)



Dual Inbed Tank (SuperCab, With Tool Box)