Chapter 4

Federal Energy Use in General Operations

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FEDERAL GENERAL OPERATIONS ENERGY USES

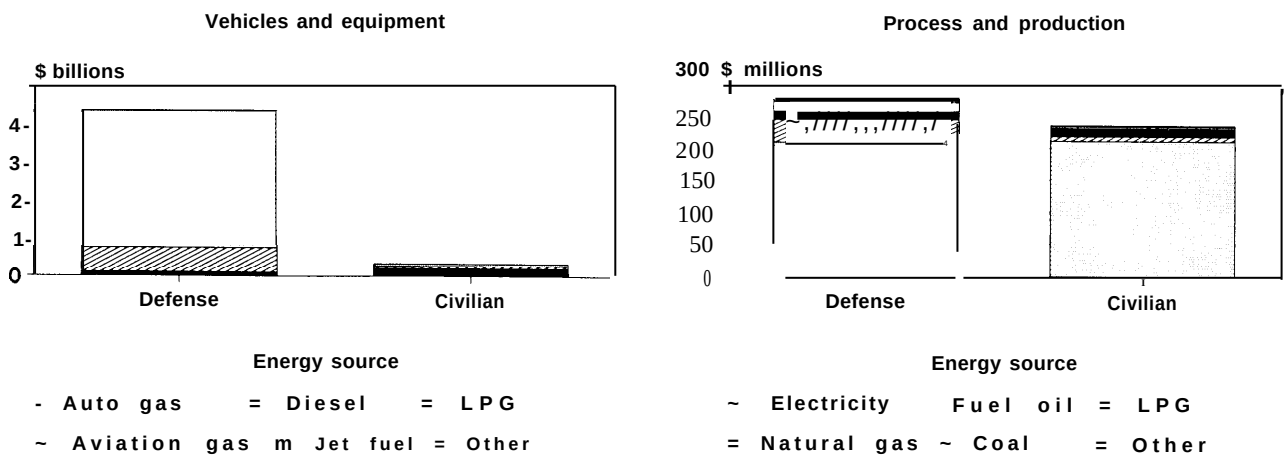
General operations energy uses in the Federal Government can be grouped into three categories: passenger vehicles and trucks; other vehicles and transport equipment (e.g., military aircraft and Naval fleets); and energy-intensive processes and equipment such as uranium enrichment facilities.

The great majority of the $4.8 billion spent on general operations energy in fiscal year 1989 was used for military mobility, including $3.6 billion for jet fuel (see figure 4-l). Much of the remaining operations energy use is also defense-related, used by the Department of Defense (DOD) in various processes and by the Department of Energy (DOE) in its uranium enrichment facilities and production nuclear reactors. Production reactors are industrial facilities for producing nuclear weapons material and nuclear fuel. Nondefense operations using large amounts of energy include DOE's research facilities such as reactors and linear accelerators.

General operations accounts for 92 percent of Federal petroleum use.[1] Again, the great majority of this petroleum is for jet fuel, and much of the remainder is used in military vehicles (see figure 4-2).

Because of the highly specialized nature of most operations energy uses (e.g., military mobility), examination of opportunities for energy and cost savings are largely beyond the scope of this report, with the exception of the fuel used in passenger vehicles and trucks. Specialized operations have also received far less detailed attention in Federal energy management legislation and Executive orders than energy use in buildings and vehicle fleets. However, there are energy saving opportunities, at least some of which are being tapped. For example, DOE completed a number of process retrofits including the installation of variable air volume control on fume hoods and makeup air systems at the Lawrence Livermore National Laboratory. DOE is planning more efficiency measures involving use of waste heat, advanced control systems, and scheduling of equipment.[2] There are also measures which,

Figure 4-l—General Operations Costs, Fiscal Year 1989

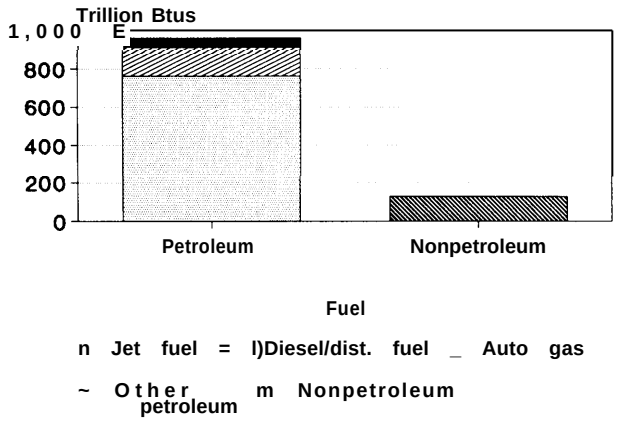


SOURCE: U.S. Department of Energy, Federal Energy Management Program, "Annual Report to Congress on Federal Government Energy Management and Conservation Programs," October 1990.

[1]U.S. Department of Energy, Federal Energy Management Program, "Annual Report to Congress on Federal Government Energy Management and Conservation Programs," October 1990, p. 5.

[2]Ibid., p. 49.

Figure 4-2-Operations Energy Use by Fuel, Fiscal Year 1989



NOTE: Source accounting used for electricity.

SOURCE: U.S. Department of Energy, Federal Energy Management Program, *'Annual Report to Congress on Federal Government Energy Management and Conservation Programs," October 1990.

although not performed primarily to save energy, do reduce energy use even for military mobility. For example, many flight simulators are in use by DOD. They supplement actual flying time and allow for improved pilot training with greater safety and lower cost. Part of the cost savings results from greatly reduced fuel consumption (e.g., fighter aircraft can consume more than 1,000 gallons per hour). Similarly, there are simulators for surface vehicles such as tanks. Although the use of simulators increases the use of electricity, this is more than offset by the reduction in fuel consumption.

PASSENGER VEHICLES AND TRUCKS

In total the Federal Government owned 106,108 sedans, 15,973 station wagons, and 323,479 light trucks in 1988. In addition, there were 12,641 buses and ambulances and 55,481 medium and heavy trucks. DOD and the U.S. Postal Service (USPS) have the largest fleets, each with about 30 percent of the total. The General Services Administration (GSA), which has oversight responsibility over federally owned and leased passenger vehicles, has about 20 percent of the total which it leases to other agencies.[3] Almost all Federal agencies own at least one vehicle and may lease many others from the GSA Federal Fleet Management System (figure 4-3).

The number of federally owned passenger vehicles and trucks is a very small percentage of the total in the United States, about one-quarter of 1 percent. As of 1988 there were 140 million automobiles and 43 million trucks and buses registered in the United States.[4] Despite the small number of federally owned vehicles, Federal procurement is responsible for nearly 1 percent of domestically produced vehicles. There are two reasons. First, agencies keep their automobiles and light trucks for only 3 to 6 years before replacement.[5] Thus each year, the government purchases around 100,000 cars and light trucks. (About 50,000 of these are procured by GSA.) Second, the Federal Government historically has purchased only domestic models for use in the United States.

In fiscal year 1989, the Federal fleet, including medium and heavy trucks, consumed over 329 million gallons of gasoline at a cost of $309 million.[6] In 1988, the domestic fleet covered more than 3.5 billion miles, and the average Federal sedan traveled 13,027 miles.[7]

Increasingly the Federal auto fleet is relying on compacts. In 1988 compacts outnumbered other classes of sedans by almost two to one. The shift in the makeup of the Federal fleet to smaller, more fuel efficient cars has resulted in higher fleet average fuel mileage. With few exceptions, the Federal automotive fleet uses conventional petroleum fuels (i.e., gasoline and diesel fuel), although there are some alternate fuel vehicles.

Three promising ways to reduce the Federal Government's passenger vehicle energy use are: 1) purchase automobiles with higher fuel economy, 2) encourage drivers to drive more efficiently, and

[3]U.S. General Services Administration Office of Fleet Management, ''Federal Motor Vehicle Fleet Report for Fiscal Year 1988," September 1990, table 7.

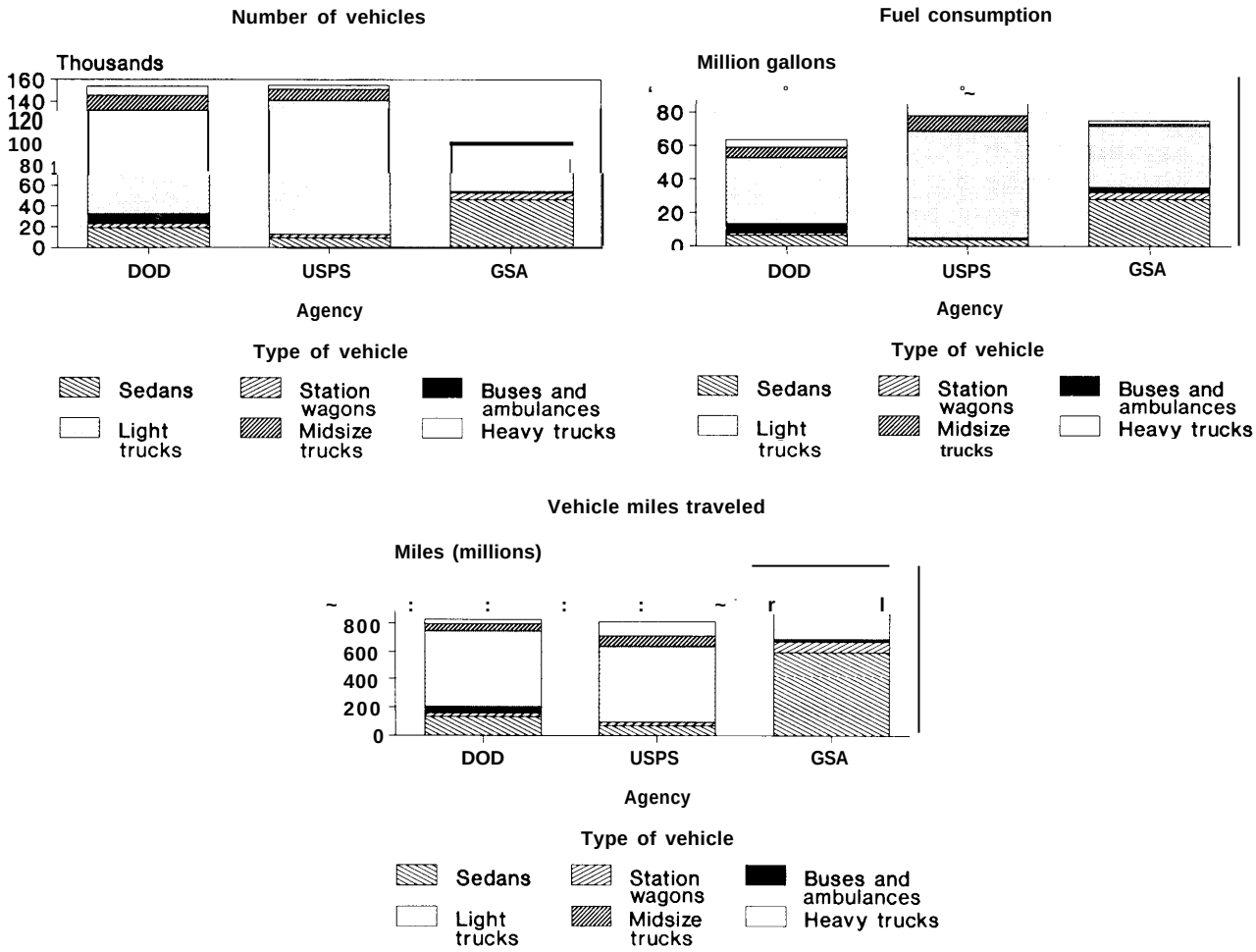
[4]U.S. Bureau of the Census, *Statistical Abstract of the United States: 1990,* 110th ed. (Washington DC: 1990), tables 1028 and 1029.

[5]Sean Allen, Director, GSA Fleet Management Division, personal communication, Nov. 14, 1990; and Larry Frisbee, GSA Fleet Management Division, personal communication, Jan. 10, 1991.

[6]U.S. Department of Energy, op. cit., footnote 1, p. 53.

[7]U.S. General Services Administration, Office of Fleet Management, ''Federal Motor Vehicle Fleet Report for Fiscal Year 1988," September 1990, tables 6 and 12. These figures account for only large domestic fleets, which makeup 91.7 percent of total fleet.

Figure 4-3-Federal Fleet Data, Fiscal Year 1988



SOURCE: U.S. General Services Administration, Office of Fleet Management, "Federal Motor Vehicle Fleet Report for FY 1988," September 1990.

3) reduce the number of work-related trips, for example, through increased use of teleconferencing. All three are being pursued currently by the Federal Government, although it appears that additional efforts could produce further energy and cost savings without sacrificing productivity. In addition, use of electric vehicles and alternate fuels such as methanol and natural gas can be a way to decrease Federal consumption of petroleum products.[8] Although not inherently an energy conservation measure, use of alternate fuels could potentially reduce dependence on imported petroleum. As in the case with the Federal Government's owned and leased facilities, there appears to have been no coordinated governmentwide effort to identify the potential for further energy and cost savings in Federal light-duty vehicle fleet use beyond that required by the Motor Vehicle Information and Cost Savings Act and Executive orders.

Automobile Fuel Economy[9]

The variety of vehicles available in today's market is great. With hundreds of vehicles to choose from, fuel economy is only one of many distinguish-

[8]See U.S. Congress, Office of Technology Assessment, *Replacing Gasoline: Alternative Fuels for Light-Duty Vehicles,* OTA-E-364 (Washington, DC: **U.S. Government Printing Office, September 1990).**

[9]**For a discussion of prospects for increased fuel economy of automobiles generally, see Steve Plotkin, "Improving the Fuel Economy of the U.S.** Automobile Fleet," Testimony before the Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives, Oct. 1, 1990.

ing characteristics. The automobile with the highest rated estimated mileage by the Environmental Protection Agency (EPA) gets 55 combined miles per gallon (mpg). In any class, estimated mileage varies considerably. For compacts, the highest in the class rates an EPA estimate of 40 mpg; the lowest rates 15.5 combined mpg. In midsize cars, two models received 28 combined mpg, while several others received under 12 combined mpg.[10]

GSA is responsible for managing the Federal fleet and assuring that it is in compliance with Executive Order 12375, which requires the Federal passenger fleet to attain the Corporate Average Fuel Economy (which is 27.5 mpg for cars) and light trucks to attain 20.5 mpg from 1990 on as specified by the Secretary of Transportation (see ch. 2). Currently, the Federal automobile fleet has an average EPA mileage rating of 29.4 mpg (combined city and highway), 7 percent higher than the minimum requirement.[11]

The shift in the makeup of the Federal fleet to smaller, more fuel efficient cars has been one approach to securing a higher fleet average. The code of Federal regulations includes a mandatory provision stating that "all motor vehicles acquired for official purposes by executive agencies shall be selected to achieve maximum fuel efficiency and limited to the minimum body size, and optional equipment necessary to meet agencies' requirements. [12]

Further increases in economy of the Federal fleet appear possible. For example, GSA's Automotive Commodity Center has contracted to purchase 13,000 passenger sedans in 1991 with EPA-estimated mileage of 26 combined mpg, all with automatic transmission.[13] Other vehicles in the same class have better mileage ratings, including four domestically produced models which get 27 mpg with an automatic transmission. The manual transmission versions get 28 mpg.[14] However, performance, safety, first cost, and resale value all differ between the models, and must be considered in any assessment of life-cycle costs.

Although sedans with manual transmissions have about 4 percent higher fuel economy, sedans in the Federal fleet use automatic transmissions. An effort by GSA to promote manual transmission models resulted in excessive vehicle repairs, primarily to clutches.[15] This is not surprising since many drivers of the Federal fleet are used to automatic transmissions in their own cars.

Maintenance and Driver Training

How an individual drives a vehicle can impact on the mileage that vehicle achieves. Operator training brochures and courses are offered by the Federal Government that encourage better driving habits, although results of these efforts are difficult to measure. Recommendations include steps like: avoid unnecessary idling, anticipate stops, avoid "jack rabbit' starts, and avoid speeds over 55 mph.[16] Each of these steps raises drivers' awareness to fuel efficient operation of their vehicles.

Regular maintenance can also affect the efficiency and operation of the vehicle. Examples of items that can affect fuel economy are dragging brakes, low transmission fluid levels, out-of-tune engine, poor tire pressure, and old, plugged fuel or air filters. Fleet maintenance programs in the Federal Government are intended to meet manufacturer standards, and GSA has had a computerized system to track and encourage preventive maintenance since 1985.

Teleconferencing

Many Federal employees travel regularly and extensively for meetings. Teleconferencing offers the opportunity to have meetings without the time and expense of traveling. Though it is only appropriate in certain circumstances, teleconferencing offers real possibilities for many of today's meetings in the Federal Government. There are both energy and

[10] U.S. Environment protection Agency, "1991 Fuel Economy Guide," Sept. 25, 1990.

[11] U.S. General Services Administration Automotive Commodity Center, "1991 Federal Standards for Automobiles, Light Trucks, and Medium Trucks," October 1990, p. iv.

[12] 41 CFR 101-38.101-2 (July 1, 1990 Ed.).

[13] Larry Frisbee, GSA Fleet Management Division, personal communication, Jan. 10 and Jan. 31, 1991.

[14] U.S. Environmental Protection Agency, op. cit., footnote 10.

[15] Larry Frisbee, GSA Fleet Management Division, personal communication, Jan. 31, 1991.

[16] U.S. Environmental Protection Agency, "Tips for Fuel Efficient Driving," October 1990, p. 1.

Photo credit: VideoTelecom Corp.

Video-teleconferencing is increasingly being used as an alternative to travel, saving employee time, travel expenses, and energy.

nonenergy benefits. In fact, energy savings may be only a Ii-action of the value of time saved by Federal employees through teleconferencing. Teleconferencing can reduce not only Federal fleet use, but also the Federal use of air travel.

In 1985 GSA issued a "Federal Information Resources Management Regulation Bulletin on Travel by Federal Telecommunications System," stating:

> Travel is expensive in terms of time, energy, and money. This bulletin briefly describes telecommunications services provided by the Federal Telecommunications System (FTS) that can be used instead of travel to promote and encourage governmentwide savings. [17]

The most advanced systems combine video-teleconferencing, which allows face to face meetings, with data networks that allow transfer of documents during a meeting. In the past 18 months, significant strides have been made in making video-teleconferencing high-quality and cost-effective, because of anticipated international standards and a continuing steep downward cost curve.[18]

Some Federal agencies, including the National Aeronautics and Space Administration and DOD, currently have their own video-teleconferencing systems in place, and GSA offers video-teleconferencing for lease to all agencies through its Federal Telecommunications Service.[19] These systems are gaining use in the Federal Government (see table 4-l). For example, EPA has a system linking its headquarters in Washington, DC with its office in Research Triangle, North Carolina. The system's cost was $150,000.20 GSA expects a continued drop in system costs over the next 18 months. Based on the successful results to date, EPA is expanding to an additional eight regional office sites. USPS inaugurated a $10-million satellite system with over 73 locations in December 1990. The two-way network was created to provide training and deliver messages to thousands of managers and employees. Assistant Postmaster General Elwood Mosley said, "This allows us to get to a large segment of the postal population quickly without bringing them to a central location. It's a very efficient, effective method to get information out to the field. "[21] The system is expected to pay for itself within 4 years.

The cost of operating a video-teleconferencing system, once installed, depends on the price of accessing the high-speed transmission lines required. This price has dropped from about $1,000 an hour in the mid-1980s to about $15 an hour in 1990. [22]

Alternative Fuels and Vehicle Design

Several experimental programs with alternative fuel vehicles are underway. The USPS has a growing number of compressed natural gas trucks, in addition to 67,000 fuel efficient long-life vehicles and over 6,000 diesel delivery vans. DOE and GSA are purchasing a small number of alcohol fuel-flexible vehicles and natural-gas-powered light trucks as required by the Alternative Motor Fuels Act.[23] The Interagency Fleet Management System is currently

[17] Frank J. Carr, Assistant Administrator for Information Resources Management U.S. General Services Administration, FIRMR Bulletin 16, 'Travel by Federal Telecommunications System," Jan. 28, 1985.

[18] Matt Kramer, "Teleconferencing: Meeting the 1990's Head-on,'' *PC Week*, Apr. 9, 1990, vol. 7, No. 14, p. 57(l).

[19] John Deluccha, U.S. General Services Administration, personal communication Nov. 28, 1990.

[20] S.A. Masud, ''EPA Offices To Cross Distances With Trial of Videoteleconferencing,' *Government Computer News, Nov. 27, 1989*, vol. 8, No. 24, p. 3(l).

[21] Mark Kodama, "Training via Television: Satellite System Gets the Word Out,'' *Federal Times*, Dec. 31, 1990, p. 13.

[22] Paul B. Carroll, "VideoPhones: Picture Looks Brighter at Last,'' *Wall Street Journal*, Aug. 13, 1990, p. 1.

[23] Linda G. Stuntz, Deputy Undersecretary for Policy, "Statement on H.R. 5521—The National Energy Policy Act of 1990," Sept. 13, 1990, p. 2.

Photo credit: Grumman Corp.

One of the U.S. Postal Service's growing fleet of long-life vehicles.

Table 4-I—Partial List of Agency Teleconferencing Facilities

Agency	Sites	Type of network
National Oceanic and Atmospheric Administration[1]	18	Data
National Weather Service[1]	NA	Data
Secret Service[1]	10	Data video
US. Army[1]	100	Video
U.S. Department of Agricultural	300	Data
US. Department of the Interior'	80	Data
U.S. Environmental Protection Agency[2]	11	Video
U.S. Postal Service[3]	73	Video

SOURCES: I Satellite Communications as reported by Datapro Research *Satellite Communications: Technology Briefing, MT20-620-101* (Delran, NJ: McGraw Hill, Inc., 1989), pp. 2-3.
[2]John DeLuccha, U.S. General Services Administration, personal communication, Nov. 28, 1990.
[3]Mark Kodama, "Training via Television: Satellite System Gets the Word Out," *Federal Times,* Dec. 31, 1990, p. 13.

operating 25 methanol flexible fuel sedans with an additional 40 such vehicles to be placed in service in the near future. In addition, a procurement is underway for light trucks fueled by compressed natural gas. DOE's Alternative Fuels Utilization Program has had a Methanol Fleet Project underway since 1985. An interim report found that energy efficiency in the methanol vehicles is slightly greater than the counterpart gasoline vehicles, but the alternative vehicles have required more service.[24] Development of electric delivery vans by domestic auto manufacturers, and improvements in electric vehicle batteries are continuing with support from the Electric Power Research Institute and may also be of use in certain applications in the Federal fleet.[25]

[24]R.N. McGill and S.L. Hillis, *Results From the Second Year of Operation of the Federal Methanol Fleet at Lawrence Berkeley Laboratory*, ORNL/TM10815 (Oak Ridge, TN: Oak Ridge National Laboratory, August 1989).

[25]See Electric power Research Institute, Electric G-Van, EPRI EU.2019.5.89R (Palo Alto, CA: 1989); and Electric Power Research Institute, *The Chrysler Electric TEVan,* EPRI EU.2022.11.90R (Palo Alto, CA: 1990).