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COMMENTS BY CLAUDE S. BRINEGAR, SECRETARY OF TRANSPORTATION, BEFORE SCIENTIFIC AMERICAN ENERGY CONSERVATION IN TRANSPORTATION ROUNDTABLE CONFERENCE, WASHINGTON, D.C., MARCH 17, 1974.

The Arab oil embargo has, in one sense, done us all a great favor by bringing to center stage a series of national issues that have too long been ignored. Now, suddenly, the important questions are being asked, and not just on page 47, back with the corset ads, but on page 1: Where indeed are our future energy supplies coming from? What are the likely price levels? How efficiently are we using our present energy supplies? What opportunities are there to improve the efficiency?

I will use my time today to offer some perspective on the transportation sector and its energy usage; also I will make some general comments--hopefully, comments that will serve as a launching point to stimulate tomorrow's roundtable discussion--on likely future directions in transportation energy conservation.

First, let's establish a few key facts.

Fact one: Of the nation's total current liquid fuel usage of about 18 million barrels per day, just about half now goes to various kinds of transportation. Thus, any serious effort at energy conservation must devote a high priority to transportation uses.

Fact two: Recent growth rates of energy usage in transportation have exceeded the national average of all energy usage. Unless this trend is slowed, by 1985 the transportation sector alone could be requiring some 15-16 million barrels per day of liquid fuels.

Fact three: Based on present technology--or even plausible projections from present technology--there seems little near-term opportunity to shift any appreciable part of the transportation sector from a liquid-fuel energy source to some other source. While there are a few long-term prospects for increased usage of electricity, especially in rail and urban transportation, I cannot realistically see them making much material impact in, say, the next two decades, and possibly even longer. Thus, available liquid energy supplies must increasingly be directed to the transportation sector.

Fact four: Transportation's various uses of energy differ widely in terms of relative efficiency. This is well illustrated by the data in Table 1, where we have ranked the uses in terms of passenger miles and freight ton miles per gallon of fuel. As this table clearly demonstrates, our major efforts at improved energy efficiency must concentrate heavily on our 100 million automobiles. In fact, it's fair to say that only by significantly improving automobile efficiency can our nation make the necessary energy savings. Trucks are a poor second in importance and the commercial air carriers a poor third. All other transportation uses are materially less important.

Fact five: Energy is important in determining future national policy, but it is not the only factor of importance. We must maintain a balanced perspective. Certainly we should not shut-down our airplanes and require everyone to travel long distances by bus or train just because these modes are many times more energy efficient. Likewise, trucks, despite their low ranking in terms of ton miles per gallon of fuel, nevertheless have an important role in freight movement because of their flexibility and reliability.

Let me now shift to a brief review of the policy implications of these facts.

As brought out above, our priority efforts to stimulate energy conservation must concentrate on the automobile, the truck, and the airplane. To the maximum possible extent, the private sector--responding to the stimulus of consumer demand and a free-market determination of energy prices--must take the lead in achieving these energy savings. We see the Federal role as largely that of catalyst--of making sure the right reactions take place, of eliminating structural blocks in the system, and possibly that of setting performance standards or guideposts. The one exception is in achieving better and more efficient urban transportation, where our role is much more of an activist one. I will discuss this in more detail subsequently.

I see better automobile efficiency coming over three time frames: Near-term savings can come quickly--and, in fact, are coming--by simply slowing everyone down and by discouraging needless trips. It's worth noting that there is a worthy side-effect of slowing down and driving less: traffic deaths in early 1974 have fallen by 25%. Coming a little later, though still part of this first time frame, are the impacts of the steps to increase automobile occupancy, especially through various incentives to form car pools, and to shift people from the

automobile to public transportation. Today's average automobile occupancy of less than two represents an enormously underutilized resource. All of these changes will happen through a series of linked responsibilities, extending from the federal level on down to local governments, businesses, and individuals. Overall, I believe that this effort offers a near-term potential for fuel savings in the order of 10% of total transportation energy usage.

The second time frame, and probably the one of greatest importance, covers the period in which a concentrated effort is made to use known technologies to produce energy-efficient automobiles. This is almost entirely a private-sector responsibility. Small, light-weight cars are now being demanded by buyers and Detroit is responding by shifting its productive capacity accordingly. Engine, gear train, radial tires, and numerous small design modifications can do a great deal to achieve better fuel efficiencies over the next two to five years. After about a decade, these new energy-efficient cars (say 40-50% better than today's fleet average of 13 mpg) should be available in sufficient quantity to produce at least a 15% saving in transportation energy usage. I see an important Federal role here in avoiding regulations that are excessively

wasteful of energy without providing for more than offsetting societal gains in terms of environmental or safety benefits.

The automobile's third time frame covers a much longer time period--say 15 to 20 years. This is the period in which new engine concepts, new materials, and radically new body designs must emerge, be proven, and then move to quantity production and widespread usage. Although it's little more than an informed guess, I would place the fuel savings in 15 years available through such a new-technology approach--as distinct from today's technology--at something in the order of 15% of transportation energy usage.

Though the above numbers for these three time frames are not entirely additive, they do suggest a reasonable 10-15 year range of savings in automobile fuel usage of 30-40% of total transportation fuel usage. Very roughly this translates to a savings in the order of five million barrels a day of what would be demanded in the mid-1980's in the absence of an energy shortage. The long-term Federal role in achieving such savings is, to me, not yet well defined, and I would hope this group would explore it. At the very least, I see us developing better knowledge and understanding of what can be done to improve fuel efficiency,

eliminating regulatory roadblocks to efficiency, perhaps establishing public standards, and possibly even carrying out some direct research and development work. And, of course, we should free-up the price system.

It is to me most urgent that our nation somehow finds the ways to achieve these automobile fuel savings. The automobile's great virtues of convenience, privacy, accessibility, and flexibility are too overriding to cause it to be abandoned in any significant quantity, except in perhaps our largest cities. Thus, we must concentrate on making the automobile structurally safe, environmentally clean, and energy efficient, and we must more intellingently fit it into our society.

Now, I would like to shift away from the automobile and offer a few very brief comments on trucks, airplanes, and what we call, for the lack of better phrase, the "intermodal connectivity problem."

I find not much in the way of hard facts on what we can do, in a technical sense, to increase the fuel efficiency of our 20+ million trucks. For example, I can't even find out for sure if the large intercity trucks are more or less energy

efficient at high or low speeds. We have some departmental work underway to remedy this lack, but for now, at least, I can only surmise that I would expect better aerodynamics to help in terms of reducing wind resistance, though it might have an offsetting disadvantage in terms of pay load. I can, however, be much more positive when it comes to trucking inefficiencies resulting from regulatory resistance--especially that of the Interstate Commerce Commission. Although the ICC has made some encouraging moves recently in terms of reduced restrictions on route circuity of the regulated carriers, there is still a great deal to be done in the way of savings by cutting down on empty backhauls, part-loads due to commodity restrictions, and so on. Achieving these savings will require Congressional action and a great deal of patience.

Our commercial air carriers, until quite recently, were flying at about a 50% load factor, on the average. This is obviously both a poor use of fuel and a hard way to make a profit. Cutbacks triggered by the fuel shortage and falling profits have pushed this up to about 60%. Past actions by the Civil Aeronautics Board in route structuring, as well as the airlines' desires to have the very latest in equipment

well in advance of need, have made it difficult to long sustain a load factor as high as 60%. Hopefully, future CAB policies and airline management practices will be more successful in achieving or even exceeding this objective, for it is by far the best way to increase airline fuel efficiency.

The "intermodal connectivity problem" refers to the whole string of inefficiencies that result from our disjointed approach to hooking the various modes together--both passenger and freight. Terminals are usually separate, operations are unrelated, and the operators often indifferent or even hostile to other modes. We are convinced that much can be done to improve efficiency of all kinds through better coordination of modal connections, but, in the interests of time, I will limit my comments to simply identifying the problem.

Taking the trucks, the airplanes, and all other non-automotive fuel users as a group, I would hazard a guess that energy conservation opportunities do not exceed 10% of total transportation energy usage, at least in the absence of extreme regulatory or price action. This suggests a potential additional savings by 1985 of 500,000-1,000,000 B/D.

Let me conclude with some general observations on the urban transportation problem, leaving the specifics of what we

are doing to Mr. Frank Herringer, Administrator of the Urban Mass Transportation Administration.

The efficient transportation of people and freight within our major urban areas poses most difficult problems. Our cities have grown haphazardly, with little thought to future overall size, shape, or needs for transportation. Wiedespread automobile ownership has encouraged a "sprawl" that is now efficiently served only by the automobile. Various Federal programs (e.g., housing, highways, welfare) have encouraged urban growth, but overall urban planning to direct this growth has been woefully inadequate. And now, the pressures of the energy shortage, the requirements of the Clean Air Act, and the problems of peak-hour traffic congestion have combined into a demand for action.

But what kind of action?

Our analyses, as well as our experience in administering the Urban Mass Transportation grant program (from which $3 billion has been given since 1970 to over 150 cities to buy buses and help build or improve rail systems) offer these policy guidelines:

1. It is essential to recognize that each urban area is different. No standardized solution is possible.

2. The major obstacles to improving urban transportation are more human than technical. We are especially concerned about: (a) the lack of comprehensive local planning that is broad enough to embrace the entire spectrum of urban issues; (b) the lack of a public decision-making mechanism to solve local problems; and (c) the lack of comprehensive management of the public transportation system of each urban area.

3. Except for our largest cities--perhaps the top dozen--the urban transportation problem is principally one of peak-hour capacity. During most of the day, the streets and particularly the transit systems are significantly underutilized. Less than 25 percent of the available transit seat miles are actually in use.

4. The very large cities with high-density cores have by far the most serious transportation problems. As a result of this high density and its accompanying congestion, the cost of constructing and operating transportation facilities in these city cores is disproportionately high.

5. Cities that do not now have rail transit systems should carefully consider all alternatives prior to starting new systems. The solution for most cities is more in the direction of traffic management, special bus systems, exclusive bus lanes, incentives for car pools, and peak-hour stretch-outs.

6. While improved public transit--especially bus transit--can and will attract a great many new riders, the automobile will remain the dominant form of transportation for all but the largest cities for a long, long time. We should recognize this and do all we can to see that its role in the city is effectively managed.

To stimulate your thinking and discussion, I have prepared the attached Table 2, which shows, for our 25 largest urban areas, the total population, the population density, and those cities that now have fixed rail transit systems either in operation or under construction.

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As I reflected over the above thought, I realized that they are perhaps overweighted from a short-term and narrow perspective. Rather than direct my thinking to totally new kinds of transportation, or new sources of fuel, or new concepts for cities, I find I have labored over what to do with what we've got, or at least are likely to have, over the next decade or so. Perhaps Mr. Herringer will fill this gap with some longer-view thoughts. But, in my defense, I would say that getting through this coming transitional period may, in fact, be our most serious problem. I'm convinced that we will, sometime in the next century, have new sources of fuel, new kinds of transportation, and possibly even rationally designed cities. But shifting from yesterday's energy affluent life-style to today's harsh new era of energy scarcity will put--as it already has started to do--painful and

disruptive strains on our system and our society. The intelligent management of these pains and strains will certainly challenge all of us to the utmost.

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Table 1

ENERGY USAGE AND APPROXIMATE EFFICIENCIES (1973)

Passenger Mode	Fuel Usage 1,000 B/D	Passenger Miles Per Gallon of Fuel
Rail	10	100-150
Bus	70	75-150
Automobile		
Non-Urban	2,000	35
Urban	3,000	25
Air	700	15

Freight Mode	Fuel Usage 1,000 B/D	Freight Ton Miles Per Gallon of Fuel
Water	300	300
Rail	300	180
Truck	1,500	50

Note: Various miscellaneous uses (international carriers, non-freight trucks, recreational) use about 1.3 million B/D.

Table 2

UNBANIZED AREAS OF THE UNITED STATES

WITH POPULATIONS OVER 1,000,000

(1970)

Area	Population (Million)	Density (1,000 people per sq.mile)		Fixed Rail System?
		Total	Central City	
New York-New Jersey	16.2	6.6	26.3	Yes
Los Angeles-Long Beach	8.4	5.3	7.0	No
Chicago-NW Indiana	6.7	5.3	15.2	Yes
Philadelphia-New Jersey	4.0	5.4	15.2	Yes
Detroit	4.0	4.6	11.0	No
San Francisco-Oakland	3.0	4.0	11.0	Yes
Boston	2.7	4.0	13.9	Yes
Washington-Md-Va	2.5	5.0	12.3	Under const.
Cleveland	2.0	3.0	9.9	Yes
St. Louis	1.9	4.1	10.2	No
Pittsburgh	1.8	3.1	9.4	No
Minneapolis-St. Paul	1.7	2.4	7.1	No
Houston	1.7	3.1	3.8	No
Baltimore	1.6	5.1	11.6	Under const.
Dallas	1.3	2.1	3.3	No
Milwaukee	1.3	2.7	8.0	No
Seattle-Everett	1.2	3.0	6.4	No
Miami	1.2	4.7	9.8	No
San Diego	1.2	3.1	3.6	No
Atlanta	1.2	2.7	3.9	Under const.
Cincinnati-Kentucky	1.1	3.3	5.9	No
Kansas City	1.1	2.2	3.9	No
Buffalo	1.1	5.1	11.2	No
Denver	1.0	3.6	7.6	No
San Jose	1.0	3.3	3.7	No

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