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Transportation Solutions to the Energy "Crisis"

by

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TRANSPORTATION SOLUTIONS TO THE ENERGY "CRISIS" *

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Transportation accounts for almost one-quarter of total U.S. energy consumption and roughly one-half of total petroleum usage. In the circumstances, it is hardly surprising, perhaps inevitable, that various "transportation solutions" to today's energy shortages should be sought.

Clearly, though, various proferred methods to conserve on transport use of energy vary widely in potential effectiveness and other important respects as well. For example, some are more consistent with the achievement of full employment than others. Some tend to be rather more regressive in their incidence by income groups. Some are more consistent than others with achieving a longer run equilibrium in energy supply and demand—an equilibrium which probably will be at energy price levels 50 percent or more higher than when all this started.

Policy decisions, moreover, seem to be imminently needed. Unfortunately, our knowledge is not as precise and quantitative as it should be about the energy consequences of various transport policies. The time, though, has probably come to at least list what little we do know about the different characteristics of different transportation solutions to energy problems. The remainder of my remarks will be largely devoted to such an effort, proceeding through a "catalog" of different transport solutions—some widely discussed, some not so publicly acknowledged.

Expand Rail Transit

As a solution to the immediate energy shortage, expansion of rail transit is simply a nonstarter. New rail transit systems usually require approximately a decade to plan, finance, and build; substantial additions to existing systems require only a bit less. Furthermore, rail transit systems are expensive and usually require a good deal of energy for their construction. And even if we could wave a magic wand and immediately create several new systems overnight, it is not at all clear that this would immediately reduce total energy demand. Past experiences with new transit systems or extensions in North America strongly suggest that a very large percentage of total patronage usually comes from previously existing public transit, usually buses or streetcars. The net propulsive efficiency of a reasonably well-loaded bus is not too much different or less than that of rail transit. Moreover, it is usually somewhat easier to schedule buses so as to minimize "deadheading" or so-called empty backhauls than it is for rail systems. Also, rail systems tend to be less ubiquitous, especially in their residential coverage, and the number of stops that can be efficiently

Note: The views expressed herein are strictly those of Mr. Meyer and in no way reflect any policy conclusions or advocacies of any organizations with which he is associated.

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made with a rail transit system are usually less than for bus, so that with supplantation of bus by rail transit, some slight increase may occur in the number of car miles driven to get to and from public transit facilities. Indeed, if a rail transit system eliminates enough bus competition and that bus competition has a more ubiquitous route-structure and more stops, the net effect of developing rail transit might be some slight reduction in total transit patronage.

Expand Existing Commuter Rail Services

Adding cars and trains to existing commuter rail systems would probably help, but only marginally. The reason, simply, is that rail commutation accounts for a very small percentage of total commutation in the United States, less than 1 percent. Accordingly, even a 50 percent increase in such rail commutation would make only a small contribution to the solution of the total energy problem. A massive increase in total rail commuter services, moreover, would be very difficult to effectuate, mainly because most such facilities are nearly fully utilized now during the crucial peak commuter hours. However, some small help might be garnered from expanding existing rail commuter services and these could prove particularly useful during the off-peak hours when more unutilized capacity is likely to be available.

Expand Existing Rail Transit Services

Much the same comments apply as to the expansion of rail commuter services. The potential, though, is somewhat greater: about 2.5 percent of total commutation is by subway or elevated trains. However, the peak hour capacity constraint is perhaps even more binding for public subway or elevated services than for suburban rail commuter services. Moreover, electric propulsion is deemed by many engineers not to be as energy efficient as more direct, self-contained systems. Again, though, expansion of off-peak use—for example, through reduced or promotional fares—could prove useful.

Expand Transit Bus Services

The sensible way to do this would be to set aside for exclusive or priority bus use more of our existing urban streets and, more importantly, urban high-performance expressways. The Shirley Highway experiment and the special bus lanes on several of the tunnels feeding into Manhattan are examples of what can be done. The objective would be to make bus service more attractive than auto commutation by increasing bus speeds relative to auto. Evidence suggests that public transit patronage is more sensitive to service differentials than to price incentives. To the extent that bus vehicles are available and at least some spare capacity would appear to be available, highway-priority express bus systems can be implemented rather quickly. Indeed, the very act of improving bus performance speeds during rush hours would augment effective capacity when most needed. Furthermore, unlike expanded rail commuter or rail transit service, the possibility is not limited to just a few American cities, but could be implemented virtually everywhere. Besides the limitation on available buses, the major difficulty in implementing widespread experimentation with express bus services would be the generally desperate or impoverished financial state of most public and private transit systems in the United States today. Most local transit companies or systems are in no position—or mood—to undertake any large-scale risks, including experimentation with express services. Moreover, some delicate problems will be encountered in coordinating the many different public and private agencies involved, ranging from Federal and State highway authorities to public regulatory commissions to transport workers' unions to State and local franchising bodies. Nevertheless, a relatively modest infusion of money for such bus services, say up to one-half billion dollars annually might make quite an impact. Certainly, the Urban Mass Transit Administration—UMTA—of the Department of

Transportation might give such projects priority consideration.

Improve Traffic Controls on Major Urban Expressways

It is perfectly clear that cars or trucks or buses when standing still in traffic congestion continue to idle their engines and therefore are wasting fuel. The truth is, moreover, that congestion of a highway usually reduces the highway's effective carrying capacity. As a traffic engineer once described it: "A high-performance urban highway is very much like a toilet; it works perfectly well as long as you don't try to put too much through it at one time." Accordingly, we can effectively increase both our highway capacity and fuel efficiency by controlling access to high-performance highways to prevent their total coagulation during rush hours. As an overall fuel-saving strategy, however, such devices may not work, unless augmented by other policies. Specifically, if the speed and effective capacity of urban expressways are improved, more auto travel may be induced; moreover, average speed almost certainly will go up so that the "cruising speed" fuel economy of vehicles may be somewhat lessened. Accordingly, an urban traffic management strategy for conserving fuel probably would work best if augmented by set-asides of urban expressways for exclusive or priority use by buses or by direct gasoline rationing or some other measure that would reduce overall travel demands.

Commuter Carpooling

This is a potentially most efficacious policy since the net propulsive efficiency of a fully loaded automobile, particularly a compact, or subcompact, is remarkably high—and only marginally worse than that of much public transit—while the propulsive efficiency of a standard sized U.S. car with one person in it is rather low. It has been estimated that an increase of one in the number of passengers in every commuting auto would save almost 800,000 barrels a day of gasoline in the United States! The difficulty, of course, is getting people to do the pooling. Pooling means adjusting individual schedules, extra time for picking up and terminating, and abandoning some of the seeming preference of Americans for privacy. The mechanics of actually matching people by origins and destinations to facilitate carpooling is not terribly complex in this computer age. In all likelihood, however, it will require a substantial increase in gasoline prices or actual gas rationing to provide the requisite incentives. Carpooling is not, moreover, necessarily pure gain: the unpooled commuter car may be used more for shopping stops and delivering or picking up other members of a family at schools and other destinations. Cars would also be more available at home during the day so that use for noncommuting purposes would increase. On balance, however, carpooling if implementable, could save fuel and quickly.

Use Smaller Automobiles

Without much question, the use of smaller automobiles would be one of the simplest and least disruptive ways to reduce total U.S. energy consumption. Roughly 30 percent of total petroleum used in the United States now goes to propelling automobiles. Accordingly, even a small economy in this sector can add up to a substantial total. It has been estimated, for example, that if the average U.S. car weighed 2,500 pounds instead of 3,500 pounds the United States would save a little over 2 million barrels of crude daily or just under 12 percent of total consumption today.

Besides conserving fuel, the use of smaller cars should also help reduce air pollution—and perhaps especially the costs of reducing auto contributions to such pollution—downtown street congestion and the costs of building and maintaining parking facilities. In fact, one of the few negative aspects of smaller cars might be that by reducing congestion and auto operating costs, they might increase total miles traveled by car, thereby

offsetting some potential fuel economies. The public policy question with regard to small cars would seem to be whether any special or additional inducements are needed to expedite the move. Clearly, higher fuel prices, let alone the threat of actual gasoline rationing, are already having an impact on American automobile tastes. A weight- or horsepower-related Federal tax on automobiles might accelerate the trend. As a means of meeting the immediate energy shortage, however, the small car solution is obviously limited: it may take 8 to 10 years to turn over or renew the American automobile fleet. In the short run, the most that could be expected would be that higher gasoline prices, taxes, or direct rationing of gas might induce somewhat greater use of smaller cars in two-car families and some acceleration of the rate at which people would purchase small cars instead of larger cars—though the constraint on small car buying now appears to be more on the supply than demand side.

Eliminate Inefficiency in Commercial Airline Operations

The usual suggestion is to permit cartelization on major intercity airline route segments so as to achieve a controlled reduction in the amount of competition on such segments and a concomitant increase in load factors. Needless to say, such cartelization has some obvious profit attractions for the airline companies; not surprisingly, therefore, this particular fuel saving strategy has been one of the easiest to implement. It would appear that 100,000 barrels a day of aviation jet fuel, or distillates, can be, or perhaps already are, being saved by these cartel agreements. Another 100,000 or so daily barrels can perhaps be squeezed out by similar devices being used to reduce flights during the winter doldrums. The next obvious step, at least from an efficiency standpoint, would be to reduce commercial airline service to many small towns where the traffic generated is hardly sufficient to sustain commercial operations. The difficulty is political unpopularity, particularly in the small towns where service is dropped. Nevertheless, in many instances not much would be lost in terms of the quality of service rendered, particularly if increases in air services occurred at nearby "regional consolidation points" or if good alternative bus service were available. However, the volume of fuel involved is probably not all that great and if gasoline rationing induces a massive reduction in private transport alternatives, then some increase in demand for public transportation might ensue and the economics of some marginal points might also improve.

Another possibility for improving airline efficiency would be to open up more international gateways so as to reduce the amount of discontinuity now often introduced into international travel by the necessity of traveling to New York, Los Angeles, or other major international gateway cities. Again, though, the amount of fuel to be saved is probably trivial and not worth the administrative effort.

Expand Intercity Rail Passenger Service

This policy encounters supply constraints similar to those hamstringing expansion of suburban commuter or public transit rail services. To begin, much of the rail roadbed is really not in proper condition to sustain high-speed intercity rail passenger service today. Moreover, there is a certain irony in cutting back on today's dominant mode of intercity public passenger travel, the commercial airlines, and at the same time expanding an alternative mode. Of course, the substitution might make sense if the propulsive efficiency of rail was a great deal higher than that of the airlines. Apparently, rail intercity passenger service does have a higher fuel efficiency than intercity commercial airlines if very dense corridor volumes are involved; that is, the train is a very efficient mode, at least in terms of fuel consumption, if 500 to 800 or more people can be moved in one train. At lesser volumes, which are characteristic of the vast majority

of U.S. intercity links, the bus or the airplane operate more efficiently; that is, in units of 50 to 450 or so passengers. In short, the potentialities of gaining any substantial fuel economy through expanded rail service are almost certainly limited to a few of the very high volume passenger corridors in the United States, the Northeast corridor being the most prominent and perhaps the only realistic example.

Expand Intercity Bus Service

If the demand is there, this is probably a desirable adjustment. A loaded bus is quite economical in terms of the amount of fuel required per passenger mile of travel. As long as fuel supplies are made available, moreover, bus service will almost surely expand automatically to meet any increase in demand. The moral, thus, is to insure that the fuel is available.

Substitute Rail For Trucks on Longer Distance Intercity Freight Hauls

The usual initial observation on this possibility is that railroads only require about one-fourth to one-third as much fuel per ton-mile of freight carried as a truck. This observation, however, is probably strictly true only as it applies to the so-called line haul portion of the trip. While it is difficult to quantify or to document the case, much of the line-haul efficiency of the railroad may be lost in greater fuel consumption being required to terminate or originate rail shipments, particularly manufactured goods coming from or going to small towns or more remote industrial sites not located on rail main lines. "Containerized" or "piggyback" shipment of such goods normally would be the most efficient, both in total costs and fuel requirements. Containerization or piggyback, in fact, would be a good long run approach to most long-distance shipment of manufactured products; in essence, such a move would specialize railroads and trucking in what they best do.

In the short run, however, capacity constraints will limit any shift in this direction. Furthermore, with a fuel shortage and fuel costs rising, truck costs, and therefore truck rates, should rise more rapidly than for the railroads—and perhaps sufficiently to keep railroad capacity and capabilities fully occupied over the next few months. If some further incentives were deemed desirable in the short run, some reduction in ICC regulation could be contemplated. In particular, agricultural and bulk commodity exemptions presently enjoyed by truck and other carriers might be extended to the railroads. Similarly, common carriers might be granted the right to selectively change their tariffs by, say, up to 10 percent annually without first obtaining ICC permission. Among other advantages, greater freedom in ratemaking would aid the carriers in adjusting to higher fuel costs. And in the long run, more ratemaking freedom would be desirable under any circumstances, permitting different transport modes to specialize more in what they did best and to adapt better to changing circumstances.

Remove Other Regulatory Restrictions of Transport

Possibilities exist for immediately reducing the total number of miles trucks must travel in order to move their traffic by lifting certain existing ICC and other regulatory restrictions on truck route selection. Such a step would also improve the long-run efficiency of the transportation system. Similarly, if some of the present restrictions on contract and private carriage trucking were removed, these truckers could fill up more of their backhauls. The same holds true for the "mixing rules" that limit the efficiency of some barge operations.

In general, most existing ICC regulations on surface freight transport are invitations to inefficiency. Overall, economists suspect that $4 billion to $10 billion a year might be saved by simply eliminating most of these regulations. A substantial fraction of this total saving, moreover, almost surely would

represent reduced fuel use: at a minimum, rationalization of surface freight—including diverting some traffic from truck to rail—could save 100,000 barrels of fuel a day. And such savings would also make a modest contribution to reducing inflationary pressures in our economy.

This catalog of transport solutions to the energy problem has been somewhat rambling and discursive. In extenuation, I would point out that transport changes usually involve fairly difficult systems evaluations in which the secondary and tertiary effects of any policy move are not always obvious, and may often counterbalance or undo the initial or primary effects.

Nevertheless, we can identify some policy priorities. Specifically, the transportation policies most likely to help with the immediate fuel shortage would appear to be as follows:

(1) Emphasize UMTA policies for the next 2 years or so that develop high-performance express bus services in and around American cities; if this requires some slowdown in the development of future rail transit, so be it; indeed a crash program to develop express bus services might well be in order, consideration should also be given to policies that stimulate—or maintain lower transit fares, at least for the duration of the energy shortage.

(2) Remove much of the present ICC regulation of intercity surface freight transportation; at least eliminate or reduce the restrictions on truck route selection and extend agricultural and similar bulk commodity exemptions now enjoyed by truck and water carriers to the railroads; similarly, at least an "emergency" 6 months to 1 year exemption might be granted to private and contract carriers on restrictions that now hinder their filling up their empty backhauls; greater freedom should also be given to all common carriers, including the railroads, to modify their rates, say, by 10 percent a year, without waiting for ICC approval.

(3) Be certain that any fuel rationing or allocation scheme does not severely cut back on availability of fuels for the operation of basic freight and public transportation facilities; for example, it is one thing to reap some short run benefits from a reduction in excess intercity air passenger service, but an entirely different matter to allow a fuel shortage to prevent desirable expansions in public transportation of all kinds; similarly, it is inane to use informal rationing by "congestion"—such as the 20-gallon limit per stop now apparently being imposed on many truckers—as a means of reducing total fuel consumption; in general, public transportation can usually be designed to be more efficient in the use of fuel than private transportation and more and better public transport should ease the impact of any cut in the private sector.

(4) Develop and implement traffic metering or flow control programs that would eliminate congestion and tie-ups of major urban expressways but only if accompanied by the express bus development program outlined above or by a reasonably comprehensive nationwide program of gasoline rationing.

Gasoline rationing—by prices, coupons, taxes, or some mix of these—is perhaps a good point on which to conclude. It is reasonably obvious, simply because of the bulk of the volumes involved, that the only way in which substantial cuts can be made in fuel consumption in the transport sector is by reducing the fuel used by private automobiles. Almost 90 percent of intercity passenger travel is by automobile; over 80 percent of the populace commutes, either as drivers or riders, in private automobiles. Accordingly, if really big energy savings are to be sought through so-called transportation solutions, much of that must come from the private automobile. Moreover, since one-third or so of private automobile travel is estimated to be for pleasure driving, the odds are that a substantial reduction can be made in private auto use without too disastrously disrupting the productive efficiency and employment levels of our economy. And that, after all, almost certainly should be the dominant consideration in making these difficult policy choices.