COMMUNITY IMPACTS AND LOCAL AUTONOMY
William A. Brobst, Moderator
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H. B. GAMBLE:

The raw materials sources for most forms of energy -- petroleum, coal, uranium, geothermal, hydro -- are found in very specific locations throughout the world. In most cases, these raw materials must be extracted, moved to a point for processing or refining, and the resultant energy form then delivered to the ultimate consumer. In the case of petroleum, coal, and uranium, the waste products or by-products of processing and generation must then be transported to disposal sites. It would be interesting to tally the total amount of energy required to move energy from original source to final consumption. My guess is it would be staggering. For example, take a mine-mouth power plant in Pennsylvania. The coal must be moved from the mine head to the shaft, up the shaft, thence to the breaker, washer, and grader, and then to the power plant. Or, if not a mine-mouth operation, then from the mine (deep or strip) to the coal washer and breaker, thence by rail or truck to the power plant. At the power plant, the coal is stored in large outdoor piles. It must be moved to the boilers. The power, of course, is transmitted over high-power transmission lines, sometimes hundreds of miles to the point of consumption, with energy loss all along the way because of line resistance.

Back at the generating plant, fly ash and sulphur oxides scrubbed from the stack gases must be transported to disposal points. There is plenty of this stuff. At one large plant in Indiana County, about every 20 minutes a 15 ton dump truck leaves with a load of this toothpaste consistency gunk.

What proportion of the total amount of energy embodied in the original ton of coal was represented by the energy required to accomplish all of the transport discussed above? That would be an interesting figure to see. I suspect that to move a barrel of petroleum from deep underground in Saudi Arabia to the finished product, gasoline, on the service station dealer's underground tank in Potter County, Pennsylvania, is even less energy transport efficient.

There is one major source or form of energy that we have not considered. In terms of energy transport it is quite important -- in fact it is a question of survival. I am referring to food. If we talk about transport of energy, shouldn't this include the transport of the principal source of energy for human life -- food? Now if we add together all the energy required to transport to farms all the necesary inputs required by modern agriculture, to move all the farm products from farms to processing plants, move the processed foods thence to distribution centers and retail stores, and all the energy embodied in consumer shopping trips, we have a real dandy subject for research. I have not been too turned on by the subject of this conference thus far. Relative to other energy and transportation issues and problems it appears to me to be quite minor. But if we consider foodstuffs as an energy form, then I think we have a relevant topic.

For one thing, it strongly involves the issue of land use, and this is almost always a timely topic. A research endeavor at the University of Massachusetts -- the METLANDS project (1)-- examined the total energy requirements in locally produced food versus food produced in the traditional food specializing regions in the country. There were some interesting results. A gallon of milk produced in Northcentral Massachusetts required 74 percent less energy than a gallon of milk produced in Wisconsin by the time it reached the consumer. These figures include the energy consumption of the more efficient Wisconsin farms. A community of 10,000 people in Massachusetts would require an additional 305,457 gallons of diesel fuel if all of the apples it consumed came from Washington rather than from local orchards. This suggests an important new dimension in the arguments for conserving agricultural land in urban fringe areas. Including the high costs of delivering energy in all its forms to the suburban sprawl patterns of settlement so characteristic of most of our urban areas, the study of the relationship between land use and transport of energy becomes even more relevant and important.

In the remaining time I would like to address one specific issue that is important to us here in Pennsylvania as it relates to transportation of energy -- coal haul roads. There appears little doubt that coal will be playing an increasingly important role in supplying the future energy needs of this country, particularly if the energy policies recently enumerated by the President are carried out. Coal, as it comes from either deep or strip mines, must be hauled to a breaker and wash plant, a power plant, or a rail head for shipment. In the future, liquefaction or gasification plants may be included. In many cases, such deliveries involve the travel of very heavy trucks over roads and highways. Except in very rare instances, these are accomplished over local roads rather than interstate highways. In almost every case, local roads are simply not constructed to take the beating imposed by constant heavy truck traffic, particularly in the winter and spring months when the frost is coming out of the ground. As a result, local roads and bridges in many sections of rural Pennsylvania, and other states too, are in a deplorable condition. Moreover, these roads are almost always curvy and narrow, reflecting the kinds of terrain in which most coal is found.

Many of these roads go through small towns and hamlets. The noise, dirt, and dust, not to mention the safety hazards from all of the truck traffic, impose additional burdens on local residents who already must bear the brunt of the environmental costs of mining. Thus we can see the many inequities associated with coal mining.

Townships just don't have the fiscal means to keep these roads in proper repair. The cost of upkeep, or the costs to motorists in wear, tear, and lost time when the roads are not maintained, imposed by the local coal operators and final users, must be borne by all local residents. Thus the costs are borne by one group of people whereas the benefits are realized by another group, the latter usually far removed from the local scene. In a very real sense then, rural people in Appalachia are subsidizing energy costs for urban people elsewhere. The price of energy to the final consumer should include an amount sufficient to cover the costs of road maintenance and the alleviation of other environmental disamenities to local rural communities at the points of origin.

In summary, if we consider foodstuffs as an energy form, and I see no good reason why we should not, then problems associated with settlement patterns, preservation of agricultural lands, and land use in general are opened to us for legitimate inquiry. Second, with coal destined to play a much more important role in meeting our domestic energy needs, ways must be found to more equitably distrib-

ute the costs and benefits associated with moving coal from mine to consumer and the disposition of the waste by-products from coal power generation.

Reference

M. Braiterman, J. Fabos, and J. Foster. Energy Saving Landscapes, Environment, Vol. 20, No. 6, July-August 1977, pp. 30-37.

PANEL DISCUSSION

W. Lovejoy

I'll concern myself with a discussion of possible transportation of energy impacts in urban areas. Now first of all, I'd like to say that when we get into the subject of impacts, it's pretty difficult, in fact it's misleading, to try to talk in terms of global impacts. What we really have to do is focus on the particular area where we're trying to measure impacts, because each of the urban areas or parts of this country have such different characteristics as far as transportation is concerned and as far as the energy requirements are concerned. I'll concentrate my remarks on the transportation situation as it's likely to develop in energy along the Eastern Seaboard and since I know more about the New York metro area than any other place, I'll start from there in my discussion.

As many of you know, the Eastern Seaboard has quite different characteristics from the U.S. norm in their energy use and therefore their energy transportation problems. All the major urban areas, from Boston down to Baltimore, are heavy users of petroleum. In the New York area, for instance, 75% of the total energy that's used in that large metro area, and that includes northeastern New Jersey, is petroleum and a very large proportion, something like 65 to 70%, of that petroleum is imported. So right off the bat, you can see that whereas we've been talking almost exclusively in the whole meeting of land transportation problems, the major problem that the Eastern Seaboard urban areas have is how to handle the ocean or water movement of energy materials and what does that mean in terms of impacts on the local areas? In 1978, these ports from Boston south to Baltimore received something pretty close to a hundred million long tons of petroleum imports; and that's a lot of petroleum coming in.

Conversely, with a few exceptions, because of transportation costs or problems and/or environmental restrictions, the use of coal in these areas even by the utilities is very minimal. In the New York area, it's just about nonexistent. We used to import 25 million tons of coal a year into the New York area; that was used primarily by the utilities in the area. That was 25 years ago. Now we import something less than a million tons of coal into this area. And so, again, we have a situation which is atypical when you're thinking of the average which exists in the country. We also have substantial power coming into the region, and this is also true of the whole East, through the grid system that was mentioned yesterday. This eliminates any fuel transportation requirements for this energy since the power comes in through wire in the form of electricity. And, finally, we make a substantial use of natural gas. The use of natural gas was discouraged a couple of years ago, as you know, and the utilities and some industries in the region along the East Coast began to switch away from that fuel. Now, the trend has turned, at least temporarily, and some of the utilities and industries are switching back to natural gas.

Well what does this mean in terms of transportation? First of all, and the only figures I have are for New York so I hope you will excuse my rather parochial view of the situation, we had in the last year some 4,500 tanker movements into and out of the port of New York. These tankers are carrying crude oil for the refineries along the coast of New Jersey. They're carrying large amounts or residual oil, which is used primarily by the utilities in the region, and they're carrying a substantial amount of product, aviation fuel, gasoline, and other types of distillates which are used for various purposes in the region. Now all along the Eastern Seaboard, there are channel limitations which severely restrict the size of tankers used to bring the oil into the region. New York Harbor, and the Hudson River Channel have a 45-foot depth. Most of the other ports are restricted to about 35 feet which keeps the size of tankers down anywhere from 30,000 tons to an exceptional 70,000-ton tanker. This means that we have many more tanker movements than we would need to have if we could handle large supertankers. It also means that the transportation costs of moving the needed petroleum to this region are higher than they would be if the energy were moved in supertankers. And this inevitably leads to suggestions which have been made frequently in the past few years, that we ought to have some kind of a supertanker terminal off the shore of the East Coast cities. This was a very real possibility for a while, in fact, we're still continuing to look at it; but the announced Federal policy of restricting the imports of oil, in fact, cutting down the imports of oil, makes the economics of the very costly construction of a terminal like this rather questionable. So I expect that for the foreseeable future no supertanker terminal will be constructed off the East Coast and whatever oil comes in from overseas, (and this also includes oil that may come by water all the way from Alaska or some coming up from the Gulf) will have to come by small tankers which produce higher transportation costs as well as environmental problems in terms of spillage. The traffic is heavy enough so that we have accidents, groundings, collisions, and there seems to be very little that can be done to improve that situation because of the great economic problems which would be involved in setting up a system where the larger tankers could be used and therefore the movement of tankers could be diminished. Okay, that's the unique situation we have as far as oil is concerned.

Coal, as I said, we use very little. If the President's policy of achieving only a 50% use of oil by the utilities were to be implemented in our area, it would require two things: first of all, we have very high restrictions as to air quality. We have .3 percent sulphur requirements for both oil and coal, which means in effect that we cannot use coal at all since the coal that's available to us from the Appalachian areas where the transportation costs can be managed has a higher sulphur content. Also most of the oil that we must use has to come from the OPEC nations where low sulphur crude oil is available to us. In terms of coal, that sulphur content restriction either has to be changed or there has to be some drastic improvement both technologically and economically in the ability to remove the sulphur from the emissions when the utilities burn higher sulphur coal. The second thing that has to be done is to devise a system of transporting the coal to the region in the volumes that would be required, which would be substantial. As I said before, 25 years ago in the New York area, we used to handle well over 20 million tons of coal a year.