

DEMOGRAPHIC POLICY AND POWER PLANT SITING<sup>1</sup>Alvin M. WeinbergThis document is  
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I shall consider one small, but I believe important, aspect of the relation between energy policy and national goals. The national goal I shall focus upon is the rational use of land, and the humane development of an acceptable population policy. The aspect of energy policy I shall speak to is the siting of power plants: in my view, these matters are all interrelated. In addressing myself to this relatively narrow aspect of national energy policy, I assume that other speakers in this symposium will consider such important matters as energy and environment, the adequacy of our energy supply, the social cost of production of energy, and the relative balance between different modes of producing energy.

Much is made these days of the idea that the United States is "overpopulated". Under the prodding of such extreme proponents of the doctrine of overpopulation as Paul Ehrlich (who in his widely read book, Population, Resources, Environment,<sup>2</sup> argues for a U. S. population of 50 million), many have come to believe that, indeed, we have "too many people" in the United States.

This view is anathema to most professional demographers. They point out that there are more acres of woodland in Connecticut today than there were 100 years ago. Anyone who has visited the plains of Kansas or Iowa knows that we have enormous sparsely populated parts of the United States that could accept more people than now live there. On the other hand, there

<sup>1</sup>Submitted to the Senate Internal and Insular Affairs Committee for the Symposium on Energy Policy and National Goals, Washington, October 20, 1971.

<sup>2</sup>W. H. Freeman and Company, San Francisco, 1970.

**MASTER**

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are few who will deny that our large cities are too large, and too sprawling: that they would be much better places in which to live if their populations were smaller and less dense.

A rational population policy, and a rational policy for distributing our population, seems to me to be an essential long-term National Goal. In fact, the President's Research Staff on National Goals emphasized that a viable option to urban growth and its problems "... is a policy of encouraging growth in alternate growth centers, away from the large urban masses ...".<sup>3</sup> Also, an official of the Department of Housing and Urban Development has suggested that 30% of the 100 million population growth (by 2000 AD) should live in planned new cities: nine cities of about one-half million population, 14 at the quarter million level, and 84 cities of 75,000 people.<sup>4</sup>

We are a democratic country, and we value our human freedom, perhaps more than anything else. Yet there are many who are beginning to question whether a rational demographic pattern in the United States can be established without limiting some of our most strongly held personal freedoms.

I do not know the answer to this question. Yet I would suggest that there may be some ways of encouraging a better geographic distribution of people that would not require coercive action by a central authority. One such action is exemplified by the Rural Development Incentive Act of 1971. This act, which was reintroduced by Tennessee Congressman Joe L. Ewins, September 27, provides investment credit to industry in small towns. I think such actions are important and should be encouraged.

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<sup>3</sup>"Toward Balanced Growth: Quantity with Quality", Report of the National Goals Research Staff, U. S. Government Printing Office, Washington, July 4, 1970.

<sup>4</sup>Jerome P. Pickard, Director, HUD Program Analysis and Evaluation Staff, as reported in Professional Builder, 34, October 1969.

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Let me suggest another approach based on the strategic deployment of our technologically-based utilities. One can make a case for the idea that new settlements spring up and flourish where the underlying natural or man-made utilities are most convenient. The mill towns in New England capitalized on local water power. Large cities like Chicago grew up around railroad junctions. There is evidence that the redistribution of our population in the United States in the 60's was strongly influenced by the location of our interstate highways. Local abundance of cheap energy has certainly encouraged industrial growth and settlement - for example, the chemical industry around Galveston, Texas, or around Charleston, West Virginia, has been based on cheap natural gas, and the growth of the Tennessee Valley region, on relatively low priced TVA electrical power.

Let me relate all this to energy policy. A pressing question concerning our energy supply for the future is the development of a rational policy with regard to power plant siting. Moreover, the siting of power plants might have impact on the distribution of population in the United States. I would therefore argue that imaginative siting of power plants could and should be used as one means of encouraging a more optimum distribution of our population.

The two recent Office of Science and Technology reports<sup>5,6</sup> on site selection and related environmental matters briefly mention power plant siting as a focal point for industrial development and stimulation for the creation of new cities. These reports, however, apparently do not visualize power plant siting

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<sup>5</sup>"Considerations Affecting Steam Power Plant Site Selection," The Energy Policy Staff, Office of Science and Technology, U. S. Government Printing Office, Washington, 1968.

<sup>6</sup>"Electric Power and the Environment," The Energy Policy Staff, Office of Science and Technology, U. S. Government Printing Office, Washington, August 1970.

as an instrument for achieving a better geographic distribution of our population.

Consider also that United States utilities must somehow find an estimated 265 new sites for power stations larger than 500 Mwe within the next 20 years. During this time our present electrical generating capacity (~350,000 Mw) may well increase to over a million megawatts.

As a response to the two requirements for more energy, and of rational growth of new centers of population, I suggest that the Federal Government designate a few locations as possible sites for the generation of power during the next 50 or 100 years, with the intention of encouraging migration to those areas and possibly the development of new cities there.

## II

I cannot pretend that I understand fully the relation between power plant siting and the migration or settlement of people. There are, however, a number of issues which I think may be relevant.

(1) As a general point, I believe there is good evidence that abundance of cheap energy helps develop an area industrially, and therefore tends to promote in-migration to the area. The whole TVA experiment was predicated on this belief, and it is my impression that the 35 years since inception of TVA has lent support to this conception.

At the time TVA was organized, undeveloped water resources were the basis of the cheap energy TVA provided. Later, cheap Appalachian coal supplemented water power, and the Tennessee Valley remains one of the country's low-cost energy areas.

The advent of nuclear power now makes it possible to locate relatively cheap sources of power quite independently of the availability of cheap

fossil fuel. This means that, insofar as one would expect the industry and therefore the population of a general area to cluster around sources of prime energy, we now have, or are close to having, the technology for developing less developed parts of our country by strategically locating prime sources of nuclear energy.

(2) Several studies at ORNL suggest that energy centers - power stations producing heat and electricity - might create new social and economic bases where they do not now exist.<sup>7</sup> Depending on the natural and human resources at a particular site, a large nuclear power plant combined with energy-intensive industrial processes and large-scale agriculture can provide profitable opportunities for primary industry entrepreneurs. Secondary supply and service industries and a variety of labor skills naturally would be attracted by the primary manufacturers. Other studies have shown the feasibility of integrating the city's municipal and commercial utility needs - centralized waste disposal, heating and air conditioning - into the energy complex.<sup>8</sup> Some important added advantages of this central, multipurpose concept are the reduced environmental degradation (less smoke and waste heat) and the reduced consumption of our diminishing fuel resources (by using the heat as well as the electricity). Also, our study of urban decentralization concluded that energy centers appear to be an attractive possibility for redirecting growth.<sup>9</sup>

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<sup>7</sup>"Nuclear Energy Centers, Industrial and Agro-Industrial Complexes," ORNL-4290, Oak Ridge National Laboratory, November 1968.

<sup>8</sup>"The Use of Steam Electric Power Plants to Provide Thermal Energy to Urban Areas," ORNL-HUD-14, Oak Ridge National Laboratory, January 1971.

<sup>9</sup>"An Introduction to Urban Decentralization Research," ORNL-HUD-3, pp 74-78, Oak Ridge National Laboratory, June 1971.

I recognize that city planning based only on technical and economic factors would have an unhappy outcome. The great importance of many social factors in new city planning certainly outweighs the technical and economic ones. Suffice it to say, all three aspects must be planned simultaneously and the task is extremely difficult.

(3) Another, somewhat different, issue would be the question of whether nuclear power plants should be built singly and separately or should be clustered into parks. The 80-odd nuclear power plants now under construction are located, mostly, to be convenient to the anticipated load centers. In this sense, their location tends to accentuate existing demographic trends. I would like to see a siting policy for nuclear power plants that would encourage migration into areas that are underpopulated. If such a policy were coupled with a policy to restrict the growth of power facilities in already overpopulated areas, this might discourage the growth of population in presently overcrowded parts of the country.

In particular, I would recommend a study of the demographic impact of what I call "nuclear parks". A nuclear park is an area in which are clustered several 1000-Mw nuclear reactors, together with the necessary chemical reprocessing and other ancillary facilities. The park appeals to me as having these advantages:

(a) Lines of transport are internal: Hence shipment of radioactivity would be better controlled than if common carriers are used.

(b) Safety: If an accident occurred, the massive resources of the entire nuclear park would be at hand to confine and reduce the consequences of the accident.

(c) Economy of scale: The cost of electricity at a nuclear park would probably be lower than at an isolated station because many facilities might be shared in common.

(d) Around a large nuclear park could be clustered energy-intensive industry that would capitalize on lower transmission costs. Such industry would tend to draw more people into the area. Thus the nuclear park and industrial complex might be expected to have significant demographic impact.

Nuclear parks also have disadvantages:

(a) The disposal of heat from so concentrated a source may be difficult. This requires careful examination, case by case.

(b) If the parks did not attract industry and they remained far from load centers, transmission costs would be high.

(c) Parks may be more vulnerable than isolated plants to acts of God or of war.

(d) Nuclear park siting would require a restructuring of our utility industry: the utilities might then largely distribute rather than generate electricity.

What impact would establishment of, say, 100 nuclear parks during the next 30 years have upon the distribution of our population? I should think the effect might be considerable if at the same time we placed a limit upon the generation of energy at other sites. But this is a matter that above all requires further study.

### III

There are probably many other factors that affect the distribution of population more strongly than does siting of electrical power plants. On the other hand, in thinking about the task set by this symposium - to identify national goals, and to relate aspects of energy policy to achievement of these goals - I was much influenced by my belief in the importance both

of a rational demographic policy as a National Goal, and of a sensible plan for power plant siting as an aspect of energy policy. I am convinced that the two are connected; and I would hope that in any continuing study the degree of connection between them is given serious attention.

October 13, 1971