editorial

A service to the nation

On page 77 this month we report on the findings of the Study Group on Nuclear Fuel Cycles and Waste Management, the fourth in the series of studies on energy-related questions sponsored by The American Physical Society with Federal support. The first three studies, "Light-Water Reactor Safety," "Radiation Effects on Materials," and "Efficient Energy Utilization," were carried out in parallel in 1974–75. (The reactor-safety study and the radiation-effects study are available as Supplements 1 and 3 of Vol. 47 of *Reviews of Modern Physics;* the efficient use of energy study is available as Vol. 25 of the AIP Conference Proceedings series.) At the time these studies were undertaken some physicists questioned whether it was appropriate for APS to get involved in studies of this kind and whether they would result in worthwhile contributions. In fact the APS Council itself, in approving commissioning of the studies, had noted cautiously that they were to be considered "one-time experiments."

Doubts about these studies were largely dispelled by the positive reception accorded the reports from the three study groups when they were released in 1975. Any lingering doubts about the propriety or value of the APS studies should be eliminated completely by more recent evidences of wide public impact as reflected by a comment in *Business Week* praising the APS study on efficient use of energy. In its 25 April cover article devoted to energy conservation, *Business Week* notes that the APS study "was the first to stress the tremendous importance of applying thermodynamic principles in any rational appraisal of energy efficiency." The piece goes on to explain the point made by the authors of the study that the most meaningful measure of the efficiency of an energy device is not the theoretical (first-law) efficiency but rather the ratio of the heat or work usefully transferred by the device to the theoretical maximum heat or work that could be transferred by any device serving the same function.

This elucidation of the "second-law" efficiency has caught the attention of energy planners and must be regarded as an important contribution to the thinking that is shaping the nation's energy program.

The new study on the problems confronting the nuclear fuel cycle, undertaken with a more solid backing of enthusiasm than the first studies, promises to have an impact of equal importance. Looking into the future, APS is now considering the possibilities of sponsoring studies in the areas of air quality, coal as an energy source, fusion and solar power.

The APS deserves congratulations for bringing about this series of studies that is proving a significant service to the nation, and all physicists can take pride in the efforts of our colleagues who have served as members of these study groups.

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