

Section IV

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The Technology Assessment Act (Public Law 92-484) requires the Office to provide Congress with “early indications of the probable beneficial and adverse impacts of applications of technology.” The Act notes that “it is essential that, to the fullest extent possible, the consequences of technological applications be anticipated, understood, and considered in determination of public policy on existing and emerging national problems.”

The Act established three mechanisms by which OTA assessments may be initiated: by the chairman or ranking minority member of congressional committees, by the OTA Congressional Board, or by the Director in consultation with the Board. In its first 5 years of operation, the major proportion of OTA’s work has originated through committee initiatives, the remainder developing from requests from its Board. During this period, requests for OTA work exceeded its resources and often were for examination of short-term, but urgent, issues.

Early in 1978, OTA initiated a process through which a more appropriate portion of the Office’s effort could be directed toward longer range and more global and comprehensive assessments of the impacts of technological applications. The goal of this activity was to establish a priority list of major national and global, scientific and technological issues of long-term importance to the Nation and Congress on which the Office might perform analyses.

This list of 30 or so projects, to be revised at least annually, is to be used by the Director in selecting projects for submittal to the Board for their consideration for approval. The Board can then weigh these requests along with those coming from chairmen and ranking minority members of congressional committees and Members of the Board in deciding how to allocate OTA’s resources. The Office anticipates that 10 to 15 priority projects might be initiated in 1979.

The Outreach

From the outset, the OTA priorities process was open and broadly participatory. Between February and May, more than 5,000 persons were asked to consider the critical technological issues that they thought were of especial importance to the United States and the world, and to submit their top three candidate items to OTA. Letters inviting suggestions were sent to public institutions and such private organizations as the National Academies of Sciences and Engineering, the Stanford Research Institute, RAND Corporation, the World Future Society, and the American Council of Learned Societies. Solicitations were also sought in a workshop held at the annual meeting at the American Association for the Advancement of Science (AAAS).

At the same time, the Congressional Research Service (CRS) and the General Accounting Office (GAO) were asked for their suggestions. Within OTA, a series of internal meetings were held to elicit ideas of its staff. In addition, OTA sent letters to its consultants, contractors, panel members, and other advisors, past and present—some 1,000 persons in all—requesting their input. In March, the Advisory Council received a 2-hour briefing on the design of the priorities process to date and for the remainder of the year allocated nearly all its time toward the development of the priority list.

The Ranking Criteria

These efforts to solicit priority issues from as broad and informed a set of contributors as possible resulted in 1,418 suggested topics for study. OTA extracted another 2,293 items from the published literature. To sort out these 4,293 total items and to give them a rank order, OTA mobilized its staff to organize, combine, winnow, and eventually reduce the list to a more manageable size.

To accomplish this sorting and ranking process, OTA senior staff developed a set of 25 criteria by which to judge and rank the suggested topics. The criteria comprised characteristics that fell into topical, organizational, and client-related categories.

The five most important are:

- Does the assessment involve the impact of technology?
- Is there congressional interest?
- Does the technology impact significantly on human needs and quality of life?
- Would the assessment provide foresight?
- Can OTA do the assessment?

(The complete list of 25 criteria is presented in table 1.)

In June, the staff representatives of OTA Board members were briefed and solicited for their own ideas as well as for advice on how to improve the process.

Processing the Candidate Items

Having refined the criteria and the process for applying them to the evaluation of specific candidate items, groups of OTA staff met to rank the 4,293 items that had come in both in response to the outreach and from published sources. They grouped the items into general categories, clustered them around specific subtopics, and eliminated some of them.

At this stage, OTA program groups were asked to evaluate these clusters, regroup them where necessary, and generally deal with all items falling under their sphere of interest and capability. For example, in the area of telecommunications, a group of people, including OTA staff and several individuals from outside the organization, helped to evaluate and weigh 238 topical items.

The OTA Group Managers' Candidates

During the period of criteria refinement and candidate evaluation, OTA group managers,

Table 1.—Criteria for Judging Suggested Priority Items

Organizational:

1. Can OTA make a unique contribution?
2. Does the project have an early warning or impacts analysis component?
3. Is it doable?
4. How much time will it take to do?
5. Is the project manageable and capable of being bounded?
6. Will an analysis or knowledge on the subject make a difference?
7. Is OTA qualified to address this issue?

Client-Related:

8. What is the likelihood of congressional use?
9. Is it policy relevant?
10. How important is the item to national priorities and needs?
11. Can this topic or a series of studies on it yield information for Congress?
12. Can a study be completed in time to influence key decisions?
13. Is the item focused on development of policy rather than program evaluation or implementation?
14. Is the subject an appropriate one for Government consideration?
15. Is this now or likely to become a major national issue?

Topical:

16. Is this a systems problem with links to other systems?
17. Will this be a significant issue or opportunity in the future (10 to 30 years)?
18. Does this item represent a major new national opportunity?
19. Will it affect the societal infrastructure to a great extent?
20. Will a study help structure national debate?
21. What will be the impacts on human needs?
22. What will be the effect on the quality of life?
23. What is the national importance of this item?
24. How many people are likely to be affected?
25. What is the intensity, dimension, and duration of the potential impacts?

working with his or her staff, forwarded a half dozen or so candidate items for the final list. These inputs were collected into a list of 66 items, which were scrambled before sending them back to each group manager for his or her vote on the top 15 items. From this exercise, five items clearly emerged showing a high level of interest:

- Alternative Energy Futures.
- Global Food System Goals and the Implications for the Application of United States Science and Technology.
- Genetic Engineering.
- Effects on Climate of Coal Burning and Biomass Energy Production.
- Water Policy.

While OTA was considering and developing the lists of issues from published sources and suggested by various outside individuals and OTA staff, GAO and CRS were developing their own lists for submission to OTA. The inputs from both of these congressional research agencies strongly reinforced OTA's ranking process. Indeed, several of their suggested items wound up at or near the top of OTA's final priorities list.

On the basis of these numerous inputs to the priority-setting process, a list of 286 candidates for consideration was assembled. The list included the 66 items suggested by OTA group managers plus 220 synthesized from all other sources. A description of each was prepared, and the entire package was given to the OTA Director in July for consideration.

The Director's Initial Review

During the last 2 weeks of July, the Director, in consultation with senior staff, carefully reviewed the 286 candidate items. At this time, they screened the items through the "importance" and "convergence" criteria relating to the Office as an organization, and through those relating to Congress.

At the end of this period, 50 items considered to be of top priority were selected for further scrutiny and development. (See table 2.) Through individual consultation and group meetings of OTA senior staff, the list was further modified to yield a new list of 37 useful prospects for study by OTA. Each of these items was then assigned to a senior staff person for more detailed analysis. For each topic, a 10-page background paper and a 1-page summary sheet were prepared. These "problem descriptions" were prepared in a variety of ways.

Where strong staff expertise in the given area existed, the paper was written in-house. In some cases, a consultant expert prepared the document. In others, a workshop was held and the paper was based on its outcome.

Following this exercise and further consideration of prospective priorities, the list was reduced to 32 items. Although many other important projects were on the larger list, the 32 items were felt to approach a more manageable number within OTA's resources. The potential priority items on risk assessment, technology and centralization/decentralization, and considerations of quality of life relevant to technology assessment were initiated as exploratory projects to meet the methodological needs of the Office.

During this process, the Director consulted widely with others. He held face-to-face personal interviews with each member of OTA's Congressional Board. He elicited their personal sense of priorities and at the same time asked their evaluations of OTA's working list of priorities. He sent copies of the developing priorities list to each member of the Advisory Council and asked for their comments and advice. He also met with the staff of several congressional committees, as well as with OTA Board staff.

The First Board Action

Having received and weighed the various opinions of all of these advisors, the topic order of the priority items was rearranged for presentation to a joint OTA Board-Advisory Council meeting on September 18, 1978. At this joint meeting, unanimous support was expressed for the process. The September 18 list was further revised as a result of continuing review by the Advisory Council and consultation with committee staffs.

Even in this preliminary phase, the priority setting process helped define choices for OTA's immediate program. At its October 3 meeting, the Board approved six items from the priorities list for OTA study. A seventh item on the prelimi-

Table 2.—Preliminary Working List, August 1978

1. Alternative National Energy Futures	27. Furthering the Efficacy/Cost Ratio in Health Care
2. Alternative Global Food Futures	28. Impact of Technology on National Defense (Risk of Nuclear Warfare and Terrorism, U.S. vs. U.S.S.R. Capabilities, Command and Control, Utility of Surface Naval Vessels)
3. Alternative National Water Futures	29. Potential for a Totally Replenishable Energy System
4. Impacts of Genetic Engineering	30. Technology and the Developing World (Meeting Basic Human Needs—Food, Health, Water, Education)
5. Impacts of Food on Health	31. Effect of Technology on Small Business
6. The Potential of Preventive Medicine	32. Technology and Mental Health
7. Technological Innovation (The Federal Role: Regulations, Patents, and Basic Research)	33. The Future of Wood
8. Impact of New Telecommunications Technology (Microprocessing, The Information Society)	34. Ratio of Civilian to Military Technology vs. Economic Prosperity (West Germany, Japan, U.S.S.R.)
9. Impact of Technology on World Population	35. Technology and Decentralization (Risks of Centralization)
10. Deterioration of Life-Support Systems (The Carrying Capacity)	36. Impact of Technology on Risks to Humankind
11. Peace Technology (Satellite Surveillance, Economic Conversion)	37. Impact of Technology on Gross National Product and on the Quality of Life (Social Indicators)
12. Impact of Technology on Weather and Climate	38. Role of Technology in Meeting Housing Needs
13. U.S. Vulnerability to Reports of Materials	39. Potential of Ocean Minerals
14. Impact of Wastes on Marine Resources	40. Impact of the Breeder Reactor
15. R&D Priorities for U.S. Food Production (Nitrogen Fixation, Photosynthetic Efficiency, Genetics)	41. Space Utilization
16. Potential for Food from the Ocean	42. Potential for Controlled Nuclear Fusion
17. Impact of Technology on Employment (Automation, New Businesses, Job Satisfaction)	43. Impact of Non-ionizing Radiation
18. Technology and Inflation	44. Chemotherapy and Vaccines for Infectious Diseases
19. Technology and Education (Telecommunications, Scientific Illiteracy)	45. Prospects for Increased Longevity
20. Application of Information Technology to Health Care	46. Technology of Prophylactic Dentistry
21. Allocating the Electromagnetic Spectrum Globally	47. Prescription Drug Use
22. Potential for Advanced Air Transport	48. More Efficient Energy Utilization
23. Implications of High-Speed Ground Transport Technologies	49. Electric Utilities and Solar Energy
24. Telecommunications and the Automobile	50. Technology and Antarctica
25. Energy Technology and the Environment	
26. Designing for Conservation of Materials	

nary list had been approved earlier by the Board. These seven are:

- Alternative National Energy Futures.
- Regulations and Technological Innovation.
- Effects of Nuclear War.
- Impacts of Telecommunications Technology.
- Impacts of Applied Genetics.
- Cost Effectiveness of Medical Technologies.
- Potential for Advanced Air Transport.

From October through December a special effort was made to complete the process of soliciting the views of staffs of all of the committees of

Congress. This effort plus continuing work with OTA staff members and the Advisory Council helped to establish the final 1979 priorities list.

The priority-setting activity combined broad public outreach, the systematic application of criteria for judging suggestions, and the selection of specific projects to meet congressional needs. The success of this effort is reflected in the support given it by the Board, Advisory Council, and OTA personnel and congressional committee staffs. In separate statements, the chairman and vice-chairman of the Board and the chairman of the Advisory Council all testified to the impor-

tance of the priorities list for Congress, OTA, and the American public.

The Final 1979 Priorities List

The OTA priority list for 1979 is as follows:

1. Impact of Technology on National Water Supply and Demand.
2. Alternative Global Food Futures.
3. Health Promotion and Disease Prevention Technologies.
4. Technology and World Population.
5. Impact of Technology on Productivity of the Land.
6. Impact of Technology on Productivity, Inflation, and Employment.
7. Technology and the Developing World—Meeting Basic Human Needs.
8. Peace Technology.
9. Impact of Microprocessing on Society.
10. Applications of Technology in Space.
11. Designing for Conservation of Materials.
12. Future of Military Equipment.
13. Impact of Technology on the Movement of Goods.
14. Weather and Climate Technology.
15. Allocating the Electromagnetic Spectrum Globally.
16. Implications of Increased Longevity.
17. Controlled Thermonuclear Fusion.
18. Technology and Mental Health.
19. Technology and Education.
20. Prescription Drug Use.
21. Forest Resource Technologies.
22. Health Technologies and Third-World Diseases.
23. Electric Vehicles: Applications and Impacts.
24. R&D Priorities for U.S. Food Production.
25. Alternative Materials Technologies.
26. Deep Ocean Minerals Development.
27. Energy Efficiency in Industry.
28. Role of Technology in Meeting Housing Needs.
29. Ocean Waste Disposal.
30. Technology and the Handicapped.