

Review of the Desalination and Water Purification Technology Roadmap

by Stephanie Johnson

In order to minimize future regional and international conflicts and maintain economic development, the United States will need sustainable supplies of high-quality fresh water. The *Desalination and Water Purification Technology Roadmap* (Roadmap) was developed by the Bureau of Reclamation (BuRec) and Sandia National Laboratories as a strategic pathway for future desalination and water purification research so that desalination technologies might “contribute significantly to ensuring a safe, sustainable, affordable, and adequate water supply for the United States.” BuRec plans to use the Roadmap to guide investment decisions and to help structure the selection of desalination research and development projects.

Over the last nine months, a WSTB committee has studied the Roadmap and provided its preliminary assessment in the *Letter Report on the Review of the Desalination and Water Purification Technology Roadmap*. The report addresses whether the Roadmap presents an appropriate and effective course to help address future freshwater needs in the United States and provides recommendations regarding the vision statement, targets for critical research objectives, desalination technology needs, and implementation. A more detailed review of the Roadmap will be provided in the committee’s final report, which is in review and expected to be released in January 2004.

Desalination technologies have the potential to become important components of future water supply management; thus, the report notes that a national research plan for desalination and water purification technology is important and necessary to help meet the nation’s future water needs. The report concludes that this Roadmap and its underlying process appear to present an appropriate framework for advancing research in several areas of desalination and water purification technology to help address future water needs

in the United States, and recommends their continuation.

The report offers several suggestions to improve the effectiveness of the Roadmap. A stronger emphasis on research to support advances in technology is encouraged, since little attention is devoted to the technologies and the associated research needed to meet the identified Roadmap’s water supply objectives. For example, the Roadmap presents targets for research, but the origin and plausibility of these targets are not explained. The Roadmap could be strengthened as a whole by more thorough descriptions of the technologies and associated research opportunities, along with a list of technical references supporting the technologies identified in the report.

Overall, the report concludes that the five broad areas of desalination and water purification technologies identified in the Roadmap (membrane, alternative, thermal, concentrate management, reuse/recycling) represent top priority areas for research and development, but the issues of corresponding energy use and air emissions resulting from these energy intensive technologies should also be addressed. The report also notes that the overarching vision for the Roadmap appears to stray into formulation of national water policy rather than remaining focused on a research plan to address desalination and water purification technologies related to future national water supply needs.

The report further concludes that the effectiveness of the Roadmap will ultimately depend on its future implementation plans, which are not yet resolved. The report recommends that a general plan of implementation for the research initiative be developed that should include mechanisms for setting priorities for research, engaging a

wide range of scientists and engineers, and funding research projects through a rigorous peer-review process. Information developed through the Roadmap should be communicated effectively to industry, decision makers, and the general public in order to advance new desalination technologies and maintain support for the program.

The committee’s final report will include an overview of water availability and desalination, a general assessment of the Roadmap that expands on the letter report, and a review of each of the broad desalination and water purification research areas identified in the Roadmap. It will present opportunities for cost reductions by further research in each of these areas, topics that deserve further study, and priorities for future research. The report will also provide suggestions for implementing the Roadmap and communicating the results of the initiative.

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