

# Desalination Technology Roadmap

## Development

### Future Vision

#### Background

A technology roadmap is a program-planning document that identifies the critical system requirements, the process-performance targets, technology alternatives, and the milestones for meeting those targets. The roadmap identifies precise objectives and associated time horizons and helps focus resources on the critical technologies needed to meet those objectives. In effect, the technology roadmap identifies alternate technology “roads” for meeting certain performance objectives.

#### Approach

A desalination technology roadmap serves a number of critical developmental needs. There are multiple national and international organizations sponsoring desalination research. These efforts have led to substantial technological improvements over the past 50 years; however, the need for coordinating future activities is even greater as the need for desalination grows. The U. S. government is interested in funding critically needed desalination research as focused by the roadmap process. A federal partnership between Sandia National Laboratories and the Bureau of Reclamation has been established in support of desalination research.

The primary technological method of generating additional water supplies is through desalination and enhanced water reuse and recycling technologies. The efficiency of desalination and water purification technologies currently evolves at a rate of approximately four percent per year. Continuing along this path will result in future evolutions of current-generation technologies that continue to produce water that is too expensive for many applications. Thus, the primary goal of the Roadmap is to chart a series of research and development activities that will result in cost-effective, efficient revolutionary desalination and water purification technologies that can meet the nation’s future needs. The Roadmap’s secondary goal is to establish development activities that will accelerate the rate of improvement of current-generation desalination and water purification technologies, thus allowing these technologies to better meet the near-term needs of the nation.

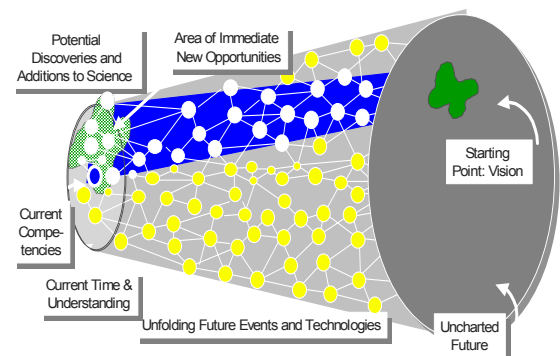
Improvements in five technology areas are considered:

- Membrane Technologies
- Thermal Technologies
- Reuse and Recycling Technologies
- Alternative Technologies
- Concentrate Management Technologies

#### Vision

The vision for desalination technology provides the necessary direction for future research by using our understanding of current competencies to help map the future.

***By 2020, water purification and desalination technologies will contribute significantly to meeting the need to assure a safe, sustainable, affordable, and adequate water supply for the United States.***



An implementation strategy will assist in the realization of the vision. This strategy may include the following goals:

- Achieve economic competitiveness with conventional water sources
- Maintain sustained desalination growth
- Achieve an environmentally friendly process
- Address all national water quality needs

## Roadmapping Process

### Purpose of the Desalination Roadmap

The purpose of the desalination roadmap is to guide desalination research, technology, manufacturing, markets and policy through the year 2020.

### Needs Driven Process

The desalination roadmap is needed to focus future research to meet specific needs. A needs-driven process assures that research activities meet programmatic goals. The roadmap committee specifically articulated these needs.

### Participants

Participants for this roadmapping process were selected from among water research organizations, water use organizations, government agencies, national laboratories, state water agencies, equipment manufacturers, and environmental agencies.

### Essential Conditions

The following conditions must be present to successfully develop and implement the roadmap.

- A perceived need
- Needs driven - not a "solution looking for a problem"
- Multiple parties involved
- Adversarial conditions must not exist between parties
- Industry "umbrella," consortium needed
- This consortium must develop framework but not stifle creativity

## National Scale

The desalination roadmap is based on case studies that consider the needs of both large and small inland communities, coastal communities, the population induced water purification issues of the major cities of the northeast and the opportunities associated with the use of produced waters from the oil and gas industry. These five case studies provide a national scope that makes the roadmap applicable to the entire nation.

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