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report

Desalination

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1 Introduction

Desalination is increasingly being considered and adopted around the world as a way of providing fresh water for human consumption in regions where demand for potable water has exceeded supply or climate change has made traditional water supplies unreliable. Current desalination practices have large capital and environmental costs, which need to be addressed if desalination is to become an economically viable and environmentally sustainable alternative for water supply.

2 Market Drivers

A shortage of potable water is a problem faced by many regions around the world. Demand is increasing beyond sustainable supply due to rapid growth in population and industry. Furthermore, climate change has resulted in a hotter and drier climate in many areas, which has made traditional sources of water increasingly unreliable.

3 Problem

Desalination represents a viable alternative to traditional water supplies as it ensures certainty of water supply irrespective of climate conditions. However, desalination is not without its disadvantages. One of the major disadvantages of desalination is the significant amount of energy that it requires to operate. The energy required for the desalination process is primarily heat and electricity and the amount required is largely dependent on the type of desalination process being used. As a consequence of the large energy requirement, the process can be expensive and also result in a number of negative environmental impacts such as air pollution and greenhouse gas emissions. Desalination also produces highly concentrated brine solution, which can have a significant negative effect on the environment if it is not disposed of appropriately. The high capital and environmental costs associated with desalination need to be addressed if it is to become a viable and sustainable alternative to traditional water supplies.

4 Generic Solution

Significant investment needs to be made into infrastructure, research and development of desalination technologies that will increase the energy efficiency, reduce the cost and limit the environmental impact of the desalination process.

5 Specific Solution

In 2006, Western Australia became the first state in Australia to use desalination as a major public water source. The Perth Seawater Desalination plant has an initial daily capacity of 140,000m³/day with designed expansion to 250,000m³/day making it the largest of its kind in the southern hemisphere and the largest in the world to be powered by renewable energy (purchasing most of its electricity requirement from a wind farm). Supplying 17% of Perth City's water needs, the plant is the single largest contributor to the area's integrated water supply scheme.

In 2008, the Australian Federal government announced the establishment of a $20 million Centre of Excellence in Desalination under the National Urban Water and Desalination Plan[1]. In recognition of the existing skills, experience and technological base that exist in Western Australia, the centre will be located in Perth. The key objectives of the Centre are to:

- provide leadership in accelerating ground-breaking research on energy-efficient desalination
- provide facilities to researchers and industry to support the development and piloting of new technologies
- commercialise the resultant technologies for the benefit of the nation

The development of the Centre of Excellence in Desalination is an excellent opportunity to leverage the unique skills, experience and technologies that are present in Western Australia and to develop a world class industry in desalination technology. There is potential to generate significant strategic employment for Perth in areas of research and development as well as in the subsequent commercialisation and exportation of the new technology.

[1] Australian Government Department of the Environment, Water, Heritage and the Arts (2008) National Urban Water and Desalination Plan. http://www.environment.gov.au/water/programs/urban/index.html