

Water provision in kuwait report examples

[Environment](#), [Water](#)



Introduction

Water is one the most valuable resources in the whole world. For every country to be able to support ecosystem and for a successful socio-economic development, there must exist water. Countries in arid land such as Kuwait find it very difficult to get this most valuable resource and have to go the extra mile to get water (Howard, 2014). The most common method of water provision in Kuwait is through the underground water and desalination process. This paper is set to analyzing the two provision methods to find out what impact they have in terms of cost and how they influence the environment. The great challenge in Kuwait and the Gulf Cooperation Council (GCC) is the severe shortage of water supply (Howard, 2014). Rainfall is very scarce, and the rate of evaporation is very high with limited renewable water system.

Background

The world has been experiencing several deaths on water related diseases with a population of 3. 4 million dies every year. The number of child deaths every hour due is deficient in of admittance to clean water and cleanliness. There is much water stress, water crisis, water deficit because of water scarcity around. With the rising level of population and the rise in the level of water demanded, there has been massive and continuous deterioration of the natural water resources in Kuwait. The increase in demand has escalated to 30 billion cubic meters (Bcm) from as low as 5 Billion Bcm within a decade. The demand has been escalated by the rise in agricultural

consumptions, which ranges takes up to 85 percent of the total water on use (Sayid, 2011). Another 14 percent consumed by the urban expansion.

Underground water

In order to manage the rising demand, water authorities in Kuwait have resorted to developing ground water that takes up to 91 percent of the used water, and the massive installation of plants for desalination, which is taking a proportion of 7 percent. Currently, there is overexploitation of underground water resources to meet demand from the agricultural activities, and there has been persistent deterioration in both quality as well as quantity (Pyne, 2011).

Desalination water method

For Kuwait to meet its domestic water supply adequately, it has turned to desalination. One explicit thing with desalination water supply is intensive capital and being costly; it has very negative impact to the environment. There is still water deficit even with the strenuous efforts to have water sustainability. It is doubtful whether the state will achieve an adequate supply in the future with no environmental impact and none expensive socio-economic cost.

The two water provision methods can compare in terms of cost and the impacts of both desalination and underground water to the environment. One reason as to why the demand of water has risen in Kuwait is highly subsidized underground and desalination water. Current consumption is \$0.60 USD/m³ with the production of desalinated water currently rated at \$5 USD/m³, based on the oil prices in 2007 (Howard, 2014).

According to the evaluation scenarios that took five years, from 2008 to 2012, two scenarios on the water plant that considered economic indicators; such as cost of fuel and the cost of water projects, and indicators relating to the environment, such as CO₂, water production, NO₂, and SO₂ emission. The first scenario is the current price that is operating in Kuwait which is a uniform rate of \$0.6 USD/m³ while the second scenario was the proposed price by Milutinovic, which accounts to \$1 USD/m³ (Howard, 2014).

When the second scenario is adopted, there will be a reduced demand by 113.3 billion of imperial gallons for 5 years. It will see, therefore, postpone the need for water projects up to 2020. As per the first scenario, the demand for water would overstretch beyond the production capacity. Implementation of the second scenario would see the energy consumed by water desalination reduce by 16.2 percent, which is the equivalent of 4.32 million of barrels of Crude Oil, 10.12 million barrels of fuel oil, 172 thousand barrels of oil gas, and 21421 million of Natural gas(SCF). It means that up to 1.5 billion USDs of net fuel will be saved reducing the level of emission to 16.2 percent (Pyne, 2011). Implementing desalination is very difficult as it is very costly compared to underground water.

Comparison of underground water and desalination methods

The two water provisions have multiple numbers of similarity and differences when compared in terms of cost and their impact on the environment.

Detailed comparison by cost and environmental category involve:

Comparison by Cost

Underground waters need less energy to produce, and low level of anti-scale emissions of chemicals to the environment whereas higher feed salinity waters consume much energy and emit many chemicals to the environment resulting affecting so negatively on the environment (National Research Council, 2013). Desalination water system requires very large plants that are of high initial capital. Even though desalination need high capital intensive, it is relatively cheaper when looked at as per unit cost due to large economies of scale. When the large plant increase the production, its marginal cost per water unit will reduce becoming cheaper than underground water.

Another cost that makes desalination water production more expensive when compared to underground water is the variable costs that comprise labor cost, cost of energy, emission of harmful chemical, and finally maintenance cost. The cost that is required to operate desalination machines are normally high compared to underground water as most of the underground do not need complicating machines. From the previous studies, the cost of desalted water, the cost of energy gas been found to be \$2, 762 USD/m³ for every m³ produced (National Research Council, 2013). Most underground waters in Kuwait do need any chemical to be consumed as most of the freshwaters, such as brackish groundwater, is only found in Dammam limestone aquifer. On the other hand, desalinated water requires heavy machines that emit a lot of toxic gases and toxic liquid which some of them are not carefully dumped. It normally led to air pollution and land pollution, which has prompted the use of fertilizer in the agricultural lands to reduce the salt content on the land. Since most underground waters in

Kuwait are fresh, they do not evaporate so much as desalinated water as a result, the required quantity can be obtained at a relatively lower cost than the one used in the desalted water.

Comparison by Environmental Impact

Focusing on the environmental impact of desalted water and the underground water, desalted plants are found to having some indirect impacts. In the process of burning fossil fuel to generate power required to produce desalted water, very poisonous gases such as carbon dioxide, nitrogen dioxide (NO₂), (NO), and (SO₂) are emitted (National Research Council, 2013). All the emission has a direct relationship with the quantity that is to be consumed in the fuel energy for every desalting process (Shindu, 2011). These environmental problems are not associated by underground water as there is no use of such energy. The other major environmental impact is the concentrated brine being discharged as b product of desalination. This concentrated substance, which is in the liquid for can, have up to 20 percent of the total dissolved solids (TDS) that are very harmful to the environment (World Health Organization, 2012). Marine habitats are normally the greatly affected by the concentrate properties and those that are receiving water environment. Marine resources can be adversely affected by the discharge of total dilution prior to release (Wright, 2013). Brine has greater density as compared to the density of seawater, which makes it possible to sink to the seabed. It has the potential to cause serious effect on the local marine biota.

Recommendations

The cost associated with underground option is relatively lower, and the impact it has to the environment is equally low compared to desalination option. It is, therefore, cheaper for the country to go for Underground source of water both through capital invested and through the environmental cost.

Findings

- Two common options can be exploited by Kuwait to solve the rising demand of water; that is, undergrounds water and desalination water method.
- The two weigh against in cost and environmental impacts with desalination being very expensive in the capital required and its effect to the environment.
- Water is of economic value and environmental values that need to be treated as an economic commodity (National Research Council, 2013).
- Proper and well-integrated management plan to help reduce the wasteful water and at the same time mitigate possible economic impacts of excessive consumption.

Reference

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