

## The daily double – Betting on desalination and ethanol

Samuel Rosenbloom<sup>a\*</sup>, Mario D. Carelli<sup>b</sup>

<sup>a</sup>*Office of Nuclear Safety and Environmental Policy, USA*

*Tel. +1 301 903-5749; email: s\_rosenbloom@yahoo.com*

<sup>b</sup>*Westinghouse Electric Company in Pittsburgh, PA, USA*

Received 12 December 2007; Accepted in revised form 5 February 2009

---

### ABSTRACT

It is frequently stated that California is the sixth largest economy in the world. However, individual countries have issues other than the size of their economies. Individual countries must ensure the safety and welfare of their citizens, establish a stable currency, provide a defense against potential aggressors, etc. In this modern age, reliable public utilities, e.g. electricity and water are the hallmark of an advanced country. Those of us who live in areas with plentiful water supplies take this for granted. But it would not be particularly wise for an independent country to rely too heavily on external sources of water because in times of turmoil an external source could be cut off. From the perspective of being able to independently supply its citizens with sufficient water, one wonders how California would rank in the family of independent countries. It is tempting to say something clever about the conundrum the almighty created when he distributed the world's natural resources, but it should suffice to say simply that some geographical areas just do not have it all. Many industries require fresh water and the lack of this basic commodity is therefore an impediment to economic growth. Compounding the problem is that finding sufficient supplies of inexpensive, non-greenhouse gas emitting, environmentally friendly sources of energy is a vexing issue. It is vexing because energy is what makes generation of fresh water possible. Typically, in a reverse osmosis desalination plant, electricity accounts for about 44% of the production costs. While renewable energies such as wind and photovoltaic are growing, it makes eminent sense to use them to displace less friendly sources of electricity presently being delivered to consumers. One industry of great interest to Californians, but impeded by the lack of available water is ethanol production for motor fuel. It seems there is no way around the fact that ethanol production requires large amounts of fresh water. For each gallon of ethanol produced, multiple gallons of fresh water are consumed at an ethanol production plant. Ethanol production also requires large amounts of energy. In fact, the energy consumption required for ethanol production is the source of much of the debate around "ethanol." Ethanol and fresh water are two liquids that Californians would like to have billions of gallons more of. However, simply maintaining the status quo is challenging due to the unpredictability of drought and the increasing urban and agricultural demand for both water and imported oil. Nuclear energy is usually not associated with both ethanol production and desalination. However, nuclear cogeneration is very well suited for both of these.

---

\* Corresponding author.