Extreme Nuclear Makeover

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Four days after President Obama announced plans to revive the United States' nuclear power program [1] in his State of the Union speech, we received the news that radioactive tritium, produced during the fission process, is leaking from at least 27 of the nation's 104 nuclear plants [2].

A radiation biologist quoted in the story played down the risk to the public, while another academic quoted a report that found even the smallest exposure to ionizing radiation to be dangerous. Either way, it wasn't good news for anyone living near a leaky plant. (Update: Turns out tritium levels at the Vermont Yankee nuclear plant are nine times higher than previously reported [3].)

Nuclear power is not without its faults, but one of its biggest challenges is its public image. I blame *The Simpsons,* particularly the three-eyed fish living in the shadow of Mr. Burns' plant.

In all seriousness, any plant that doesn't perform the necessary maintenance and use corrosion controls is going to end up with deteriorated underground pipes (the likely cause of most leaks). It amazes me that a plant with such dangerous and — as far as the general public is concerned — scary effluent isn't held to standards that far exceed what is necessary.

No doubt lack of funding and aging infrastructure are to blame for the leaks. I just hope that this easily addressed issue (I nearly used "low-hanging fruit" … phew) doesn't cloud the bigger issues of solid nuclear waste disposal and cost.

Firstly, I think that a lot of people would be surprised by the fact that large nuclear plants only produce about 3 cubic meters (25 to 30 ton) [4] of solid radioactive waste per year. We're certainly not talking about a large volume of material.

The down side is that 3 cubic meters of “hot” nuclear waste could easily kill and sicken tens of thousands of people, and radiation from the leftover uranium, plutonium and curium could remain at dangerous levels for millions of years.

There is a theoretical solution to this problem that involves the use of fusion power [5]. The waste generated in fusion power production would have a much shorter half-life than that produced by fission, eliminating long-term storage concerns. The problem is that very little progress has been made in civilian use of fusion power since the hydrogen bomb was first tested in 1952.

So while the current use of fission power is technically viable, it is not cost competitive with low-cost fossil fuels. Cap and trade appears to be off the table for 2010, but a carbon tax could bring nuclear and coal power prices closer together. (NASA climate scientist James Hansen discusses the benefits of a carbon tax in this video [6].)

The President’s climate and energy policies have become clear cut in the last couple of weeks with climate change action coming in the form of short-term solutions such as nuclear power, biofuels and clean coal [7]. He wins points for taking decisive action and keeping nuclear- and coal-supporting Republicans happy, but I doubt many environmentalists are jumping for joy. If anyone has ever been to a climate change rally (okay, you busted me), you would know that calls for the death of coal-powered plants are followed closely by “No nuclear either.”

Unless we all greatly reduce our energy use, getting rid of coal and nuclear power is simply not an option. And let’s face it, the world can’t run on silicone implants [8] alone.

Where do you stand on nuclear power? Drop me a line at luke.simpson@advantagemedia.com [9].

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