We create resources by inventing the technology that does so [1]

Written by **Tim Worstall** [2] | Sunday 17 March 2013

One of the things that is so difficult to get over to the "Arrrgh! We're running out of everything!" crowd is that we humans actually create resources by inventing the technology that does that creation. I've blathered about this with respect to minerals here often enough. Today's example is fresh water. Of course, we all know that there's a water cycle, that we don't destroy water by using it, we just dirty it. But it is true that there are areas of the world that are becoming short of potable water. We would obviously like there to be a solution for this and it looks like there is [3]:

> The process, officials and engineers at Lockheed Martin Corp say, would enable filter manufacturers to produce thin carbon membranes with regular holes about a nanometer in size that are large enough to allow water to pass through but small enough to block the molecules of salt in seawater. A nanometer is a billionth of a meter. Because the sheets of pure carbon known as graphene are so thin - just one atom in thickness - it takes much less energy to push the seawater through the filter with the force required to separate the salt from the water, they said.

This is reverse osmosis which is nothing very new. But here's what the new part is:

> "The energy that's required and the pressure that's required to filter salt is approximately 100 times less."

100 x less?

> "If you can design a membrane that's completely different than what we use today, then there's a chance for more than two orders of magnitude (100 times) increase in the permeability of the membrane," Grossman said.

Well, yes, because the cost in reverse osmosis is indeed the cost of maintaining the pressure differential on either side of the membrane.

Just to put this into actual numbers. The average UK household uses some 100 cubic metres of water a year. (100,000 litres [4]). At current desalination costs this is $50 a year for a rough guide is 50 cents per cubic metre. Reduce that cost by 100 and we're talking about a cost per household of 50 cents, or 25 pence. At which price it really doesn't matter whether we're putting rainwater, rivers, reservoirs or desalinated water into the pipes now, does it?

This also applies everywhere else too of course. Lagos, Lima, LA...potable water simply becomes a non-problem. Agreed, you'd probably still not use it to irrigate wheat but at these sorts of prices water for industrial or human consumption simply becomes something that isn't a problem.

This is entirely apart from the fact that such a water filter fine enough to seive out the sodium and chlorine ions is obviously going to be fine enough to dispose of all microbes and viri, all heavy metals and so on, any oestrogen or other molecule, thus making cleaning up polluted water vastly cheaper. Factory run off, heck, if you really wanted to, fertiliser run off from farming.

There is good news for the worrying crowd though. You can still worry about the fact that we're running out of scarce resources to worry about running out of.

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