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America, It's OK to favor Small Modular Reactors & phase out coal

By: John J. Licata

Last month the Environmental Protection Agency (EPA) proposed the first limits on greenhouse-gas emissions derived from “new” US power plants. Ten-year low natural gas prices coupled with these more stringent CO₂ emissions standards by the EPA only strengthen the economic reasoning to embrace small modular reactors (SMRs) and prevent construction of new coal-fired plants. With roughly 200,000 jobs at risk both directly (~83,000 jobs employed in coal mining) and indirectly by the coal industry, can the US justify (both economically and socially) adopting tomorrow’s energy sources today? We think the answer is a resounding yes to both.

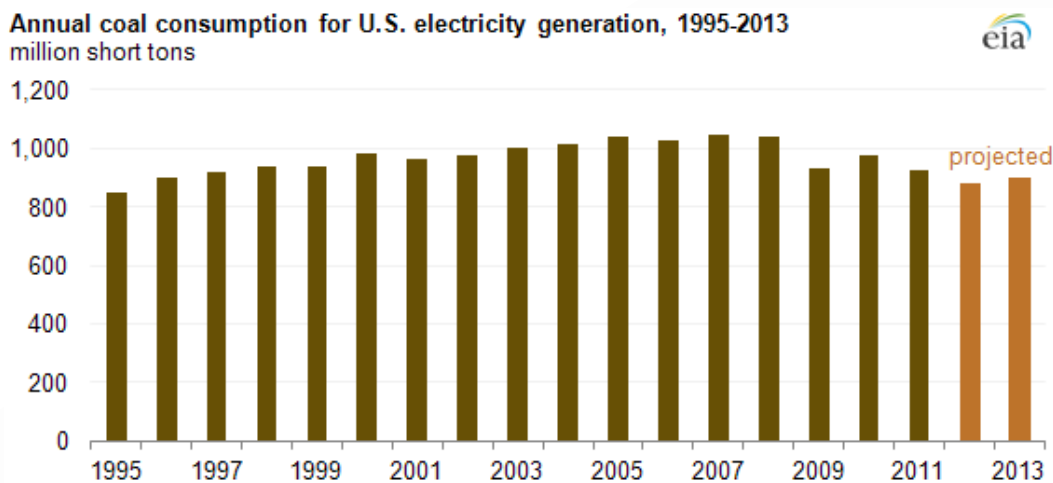


Our case for supporting SMRs is one that many feel obliged NOT to make for fear of challenging the coal industry, a sector that feeds ~42% of the country’s current electricity needs (that number is falling by the way). Nevertheless, we are calling on the EPA to put in place a roadmap for aging coal-plants to be *retired* gradually (over a 30-year time-frame). We say a “roadmap” because the type of move we foresee can’t happen overnight. We want to avoid rolling blackouts across in part of the country or a complete shock to domestic power prices that would come with any sudden change at a time when the US is attempting to recover from the worst recession since the Great Depression. This has us thinking the real winner in the battle to lower carbon emissions is not the natural gas bridge fuel we hear championed by the likes of T. Boone Pickens but rather the energy technology on the other side of that energy bridge—namely carbon free SMRs.

For those wondering how the US is going to create enough jobs to offset ones lost from the coal industry, let’s be clear -- We do not believe in any shape or form that the US should simply throw the

coal industry and its workers to the dogs. However, since coal does produce the most carbon from our energy arsenal, coal does need to see drastic carbon capture storage (CCS) technology or face

the fact that the industry's future is largely on the downside. That future is already appearing weak in its own right thanks to low natural gas prices which have made using coal less appealing in today's marketplace. Consider this: The share of US electricity generated by coal during the first quarter of 2011 was at the lowest level in more than 30 years as power plants switched to natural gas according to US Energy Information Administration (EIA). Now natural gas is at 10-year lows so we fully expect coal demand to supply even less of the country's electricity needs this year. The U.S. Energy Information Administration said in its March 2012 Short-Term Energy Outlook that coal demand by the power sector is forecast to fall another 5% this year to 884 million short tons—that would be the lowest level since 1995.¹



Source: EIA, March 29, 2012 Short-Term Energy Outlook

So why doesn't the US look now for its future energy sources? Well, the US actually seems more willing than ever to embrace energy change but we need to do more and be more open-minded about the possibilities in the process. Natural gas must be a part of our energy solution but simply can't be a one-trick pony (again)—we've already seen what that has done to this country with crude oil. Wind and solar are intermittent sources of energy so we still believe 24/7 baseload nuclear power is the future leading source of energy for the US. [Click here](#) to see our April 11, 2012, BNN TV podcast in which we briefly discuss why we believe SMRs have a bright future.

¹ <http://www.eia.gov/todayinenergy/detail.cfm?id=5610>

Cost

A case can be made that building a new coal-fired power plant can cost far greater than an SMR. For starters, rising prices for steel, concrete and other materials alone make a coal plant less appealing than SMRs. On top of the tangible costs, there is an environmental cost since coal-fired power plants add more carbon to the air than other types of power generation.

The average US coal plant emits 2,249 pounds of CO₂ for each megawatt hour of power produced, compared with 1,135 pounds for a natural gas plant, according to the EPA. The new EPA requirements would require new coal plants to meet an output of 1,000 pounds of CO₂ per megawatt-hour. So why not just use natural gas to replace all aging coal-plants? For starters, we are concerned about using robust levels of water for fracking (water is blue gold in our view and will be in grave supply globally within 20 years we believe). There is still not a smart solution to handle all the flowback water from fracking (many believe recent earthquakes seen in Ohio were the result of burying flowback water into the earth; recent moratorium put in place to add flowback water in Ohio as a result of safety concerns). Many natural gas companies are actually reversing more robust production plans due to gas prices at 10-year lows which makes some wells uneconomical. There is also speculation the US government will soon be regulating fracking which has been the key driver of surplus domestic supplies that have led to a dramatic move away from coal into gas.

Considering SMRs emit no carbon at all makes the case to use them versus coal-fired plants or even natural gas (think methane exposed from fracking) even stronger in our view (this would alleviate any environmental cost especially since SMRs are designed to be safer and made in factories). With the EPA's new stringent emissions standards for new US power plants put in place, the emphasis on cleaner sources of power makes us concerned that without acceptance of SMRs, the US will fall short of self-imposed goal of cutting carbon emissions by 17% by 2020 from 2005 levels. We also believe SMRs can be used for desalination of water which makes this technology even more cost effective with higher a ROI potential for investors and workers since SMRs could be used for multiple functionality purposes (i.e. power distribution on/off the grid, back-up generators, electric vehicle charging and desalination).

Keep in mind, with SMR designs capable to be mass produced in factories, there will be considerable reduction in time to market (and thus cost) once designs are approved by the NRC in the next few years (something needed sooner in our view). *There are mini SMRs which can be brought to market (an entire turn-key system, fuel, reactor and complete construction) for 1/10th of the \$1bln cost to build a new coal-fired power plant. So whether we are talking money or pollution, it is our view SMRs are a smarter choice over coal-fired plants.*

Job Growth

We need to be a nation that innovates, not relies on technologies and energy sources of our past. This is why we have seen new growth opportunities for those involved in the coal business—think alternative energy! Now we know many people don't think they have the necessary skill-set or the willingness to try something new after years of working in the coal mines but this is where the

government could help. There should be programs in the works to help conventional energy workers (especially younger workers) migrate into unconventional energy jobs. This is possible.

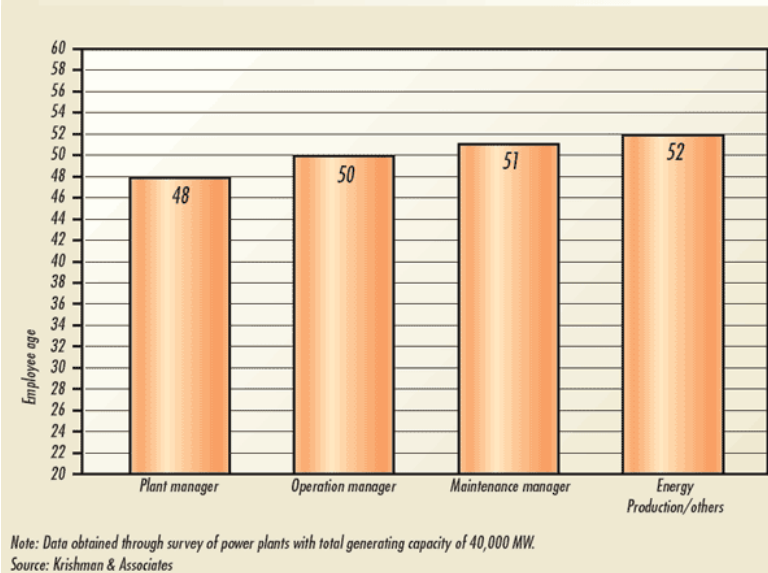
For those that may be skeptical that alternative energy positions will actually offset the unemployment figures from the coal industry, think again! Wind industry jobs alone surpassed coal mining jobs in 2008, as wind employment increased by 70% from 50,000 in 2007 to 85,000 in 2008.² Considering wind is an intermittent source of energy seen in only certain parts of the country, wind is not economical today with natural gas prices sub \$6mbtu (just ask T. Boone Pickens who lost \$150mln betting on wind and since left the industry to focus on natural gas). We believe the prospects for increased job growth in the SMR space is very credible in the next decade, especially related to manufacturing, engineering, transportation, construction, and craft labor. This means SMRs, which can provide 24/7 baseload power generation, can be developed domestically by Americans and also exported overseas with MADE IN USA label seen on the packaging.

Taking into account the average age for coal plant managers is 48 (55 in West Virginia) and the average age of coal operations and production workers is 50 to 52, the coal industry could face a losing battle over the next decade as half or more of its staff due to retirement, attrition or other issues.³

² American Wind Energy Association press release, 1/27/09

³ <http://www.power-eng.com/articles/print/volume-110/issue-6/features/easing-the-exodus.html>

FIGURE 1
AVERAGE AGE OF TODAY'S POWER PLANT EMPLOYEES



Innovation of technologies and wider acceptance of SMRs by the NRC could also boost wages for those involved in the space—this could be a welcome relief to coal workers that rank among the worst paid workers in the national job market (Wyoming is the largest US coal-producing state yet it ranks nearly at the bottom of all states in the US just ahead of Utah, Idaho and Mississippi when it comes to average income per person).⁴ So it seems that repositioning our future energy sources through the likes of SMRs could help wage growth in areas that support its development—another factor that could help this great nation leave the US recession behind us. Now that’s something we should all consider!

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⁴ http://www.usatoday.com/news/nation/2011-03-23-state-income-table_N.htm

