

Does America Need Nuclear Energy?

WASHINGTON – Can nuclear power come back as a cost-effective modality to generate electricity in America? Some scientists and innovators claim that the sector, challenged by prohibitively high costs of construction and fears of accidents may have a future after all, and it is called Small Modular Reactors, or SMRs. According to them, it would appear that the sweet spot for nuclear will not be in the traditional model of large scale, expensive and difficult to build power plants that will serve millions of customers. The future is in Small Modular Reactors, SMRs that can be built quickly and cheaply.

Small nuclear?

If this were indeed so, if we could indeed quickly build several SMRs at a reasonable cost, this would be a true game changer, for the nuclear power industry, for the future of electrical power generation in the U.S., and more broadly for all efforts aimed at devising a mix of electrical power generation sources that will help us drastically reduce carbon emissions, and therefore finally put a stop to global warming.

On the road to extinction

By most account, here in the U.S., nuclear power plants are on the road to a silent and unlamented extinction. A combination of fears of accidents, uncertainties about a reliable way to dispose of all the spent fuel and then huge, in fact prohibitive, upfront construction costs for new plants created almost insurmountable policy, political, psychological and financial barriers that work against the very notion that nuclear is a viable, safe, reliable, non carbon solution to our needs for electricity.

As all this was debated here in America several years ago, the Fukushima Daiichi accident of March 11, 2011, in Japan was an additional and huge body blow to the entire nuclear power sector and the companies and policy-makers that support it.

Leaving aside all the technical analyses about the very specific circumstances that caused that major accident in Japan, (a major tsunami that flooded the plant, disabling the pumps), U.S. public opinion, or at least a big chunk of it, became even more convinced that nuclear power generation is inherently dangerous.

There are other options

Therefore, energy experts argued, as we do indeed have choices, let's discard nuclear power as a means to generate safe and reliable electricity. The Greens of course advocated renewables. Others focused on the emerging and promising shale gas sector. Indeed, with so much new and cheap natural gas coming on line, America could reliably generate all the affordable electricity it needs, for decades.

And so, as a result of all this skepticism regarding nuclear, while other commercially viable alternatives have been developed, we are witnessing the progressive shrinking of the U.S. nuclear power electricity generation sector. The stark reality is that no new nuclear plants are built, while old plants little by little are phased out and decommissioned.

This is a big deal. Nuclear used to provide about 20% of all electrical power generation in America, a huge percentage of the total and a large overall amount for an advanced industrial power like the U.S. that produces and consumes a great deal of electricity.

Nuclear is dangerous and too expensive

As indicated above, for some this transformation may not be so bad. Nuclear –they argue– is dangerous, as we do not have an

effective way to dispose of all the waste produced by the plants. And then there are possible accidents. May be not of the Fukushima kind. But other possible malfunctions may cause the release of harmful radiations in the atmosphere. The consequences of such events would be dire.

On top of that, the fact that nuclear is now so expensive is an additional reason for deciding to move on to other more promising technologies. If you are Green, you want to focus on solar and wind, technologies that have become much more cost-effective in recent years. If solar has become so cheap, why bother with nuclear? If you are not Green but are simply looking at cost-effective ways to generate electricity, you focus on shale gas, not exactly clean, but far better than coal when it comes to emissions.

Renewables are not enough

Well, the advocates of SMRs argue against complete reliance on renewables as the silver bullet that will deliver enough safe and sustainable, non carbon based, power. Unless renewables become dramatically more efficient, they argue, you simply cannot install enough renewable energy sources to meet current and future power needs. As things stand today, it is impossible to build enough wind farms and solar plants to power the entire planet. And if we seriously want to progressively “decarbonize” our power generation mix, they tell us, then shale gas will not do it. Yes, it is better than coal, but it is not clean.

In the end, say the SMRs advocates, if we want green solutions, solar and wind, plus hydro power wherever it may be possible to develop it, will simply not be enough. You also need nuclear.

Small Modular Reactors to the rescue

Here is the strong argument in favor of a new generation of SMRs. If we agree that coal is bad, and natural gas from shale

only somewhat less harmful, we simply cannot focus solely on solar and wind as the means to deliver all the power we need.

Unless we assume tremendous technological breakthroughs that will substantially increase the productivity of all existing renewable technologies, while solving at the same time the huge bottle neck of a lack of energy storage – a problem that limits the flexibility and therefore the usefulness of solar and wind power generation– renewables are simply not enough. Without large scale, effective storage solutions, renewables produce electricity; but not 24/7. No sun at night. No power when there is no wind.

And then there is the energy density issue. We simply cannot successfully address our planetary electrical power generation needs by building thousands upon thousands of wind farms, while covering large chunks of the Earth's surface with solar panels. It is just not practical.

That said, if we want to drastically diminish and eventually phase out our dependence on carbon based electrical power generation, we better come up with something else that can be successfully added to the mix.

Are SMRs commercially viable?

Hence the importance of refocusing on nuclear, albeit a different type of nuclear: small, modular, cheap, and effective. Of course, all this is very interesting. Except for one basic fact. SMRs, although the object of serious studies and research, are not commercially viable at this stage. They are more than concepts, but they are not part of the choices commercially available today to utilities and consumers. At this stage, SMRs are a hope, not a real alternative.

If this SMRs hope does not soon become reality in terms of companies that can offer safe and reliable SMRs to utilities at a competitive price, we are in a real bind. We can generate all the electricity we need; but we shall be unable to

seriously curtail greenhouse gases emissions.

And this is bad news for Planet Earth.