

## Westinghouse: from historical icon to history’s dust bin Perry Sioshansi’s letter from America

### Nuclear’s future prospects look dire at best, finds Perry Sioshansi.

The legendary fight between George Westinghouse’s alternative current (AC) vs. Thomas Edison’s direct current (DC) was settled in favour of the former.

Ironically, many are convinced that Edison’s DC would have been a superior solution. It certainly makes more sense in today’s environment where, for example, solar-generated power comes in DC and has to be converted to AC, then back to DC to be used in many of today’s modern electronic devices. Likewise, today’s micro-grids it is argued, would be more efficient to operate with DC if they are designed as such from the ground up. But that is another story.

In 1886, Westinghouse founded the iconic Westinghouse Electric Co., and for over a century, it was among the brightest of the blue-chip stocks, along with its rival General Electric Co. (GE) – which is also struggling to re-invent itself to remain viable as an industrial conglomerate.

Over the years, Westinghouse’s rise to a powerhouse was impressive. In 1893, it provided 25,000 electric lights to illuminate the Chicago World’s Fair, a lighting spectacle never seen before. The company designed and built the first commercial nuclear power plant in Shippingport, Pennsylvania in 1957, ushering in the age of commercial nuclear power in the US, and elsewhere. In 1969, a Westinghouse camera transmitted the first video of the moon landing back to Earth.

But as the years went by, the company’s fortunes began to falter. After a wave of orders in the 1970s and 1980s, the business went south as orders for new reactors dwindled in the US and Europe due to persistent delays and cost-over-runs. In 2006, Toshiba Corp. bought Westinghouse for \$5.4bn, aiming to revive its nuclear business with the AP1000, a radically new reactor design that promised to be quicker to build and cheaper and safer to operate. Both Westinghouse and Toshiba were betting on a US nuclear renaissance once AP1000 was approved by the US Nuclear Regulatory Commission (NRC).

The turning point came in 2012 with what, at the time, seemed a major coup. Regulators in Georgia and South Carolina approved applications from

Figure 1: World nuclear generation and capacity, 2017

Country	As of April 2017		2016	
	Number of Nuclear Units	Nuclear Capacity (MW)	Nuclear Generation (GWh)	Nuclear Fuel Share (Percent)
ARGENTINA	3	1,632	7,677.4	5.6
ARMENIA	1	375	2,194.9	31.4
BELGIUM	7	5,913	41,430.5	51.7
BRAZIL	2	1,884	14,970.5	2.9
BULGARIA	2	1,926	15,083.5	35.0
CANADA	19	13,554	95,650.2	15.6
CHINA	36	31,384	197,829.0	3.6
CZECH REPUBLIC	6	3,930	22,729.9	29.4
FINLAND	4	2,764	22,280.1	33.7
FRANCE	58	63,130	386,452.9	72.3
GERMANY	8	10,799	80,069.6	13.1
HUNGARY	4	1,889	15,183.0	51.3
INDIA	22	6,240	35,006.8	3.4
IRAN, ISLAMIC REPUBLIC OF	1	915	5,924.0	2.1
JAPAN	43	40,290	17,537.1	2.2
KOREA, REPUBLIC OF	25	23,077	154,306.7	30.3
MEXICO	2	1,552	10,272.3	6.2
NETHERLANDS	1	482	3,749.8	3.4
PAKISTAN	4	1,005	5,438.9	4.4
ROMANIA	2	1,300	10,388.2	17.1
RUSSIA	37	26,528	184,054.1	17.1
SLOVAKIA	4	1,814	13,733.4	54.1
SLOVENIA	1	688	5,431.3	35.2
SOUTH AFRICA	2	1,860	15,209.5	6.6
SPAIN	7	7,121	56,102.4	21.4
SWEDEN	10	9,740	60,647.4	40.0
SWITZERLAND	5	3,333	20,303.1	34.4
Taiwan, China	6	5,052	30,461.0	13.7
U.K.	15	8,918	65,149.0	20.4
U.S.*	99	99,319	805,327.2	19.7
Ukraine	15	13,107	76,077.8	52.3
Total	451	391,521	2,476,671.2	

\* IAEA and EIA nuclear capacity figures vary slightly.  
Source: International Atomic Energy Agency  
Updated: 4/17

Source: NEI website

Southern Co. and Scana Corp., to build four new AP1000 reactors. That, as it turned out, would lead to major cost over-runs and schedule delays, which led to the bankruptcy filing in 2017 and the virtual end of the iconic company in 2018.

In early January 2018, Brookfield Business Partners LP, a Canadian private-equity firm, announced that it would acquire the assets of the fabled enterprise for \$4.6bn. Analysts don’t expect any new nuclear plants to be built in the US. Of the four AP1000 reactors under construction, two were cancelled in 2017 by Scana, leaving Southern Company’s subsidiary, Georgia Power Co. as the only US utility brave – or stubborn – enough to proceed with its two half-finished reactors, which are over budget and behind schedule.

Why would a private equity firm invest \$4.6bn in a bankrupt company with no future growth prospects? The answer is that the existing 450 reactors operating around the world (see Figure 1) need fuel and constant maintenance – a stable business, which only a handful of competitors can provide. And when and if they shut down, they will need to invest additional billions to decommission

the reactors. While not a growing business, it is a lucrative one for years to come – a classic cash cow. And that, everyone agrees, explains the interest from private equity investors. Stable, predictable and relatively safe returns for the foreseeable future.

What about the future of nuclear energy, especially in a carbon-constrained world, as envisioned under the Paris Climate Accord? On the surface, it seems that carbon-free nuclear energy would be the perfect solution to the world’s desire to move away from fossil fuels. It may, however, be a lost opportunity because too many investors in the West have lost interest in the nuclear option. It has become synonymous with delays and cost overruns, and it is not overwhelmingly popular with voters as a safe technology following the disastrous 2011 Fukushima accident in Japan, which led major countries including Germany to phase them out entirely. And it typically comes on a big scale at a time when the power industry is going decentralized.

The final nail in nuclear’s coffin, however, may be the fact that renewables, in particular solar and wind, are abundant, cheaper, faster to build, and run on free and boundless carbon-free fuel – once you build them. They come in a variety of sizes, from distributed rooftop solar panels to massive wind farms or utility-scale solar plants. Why would anyone in his right mind wish to take a bet on nuclear?

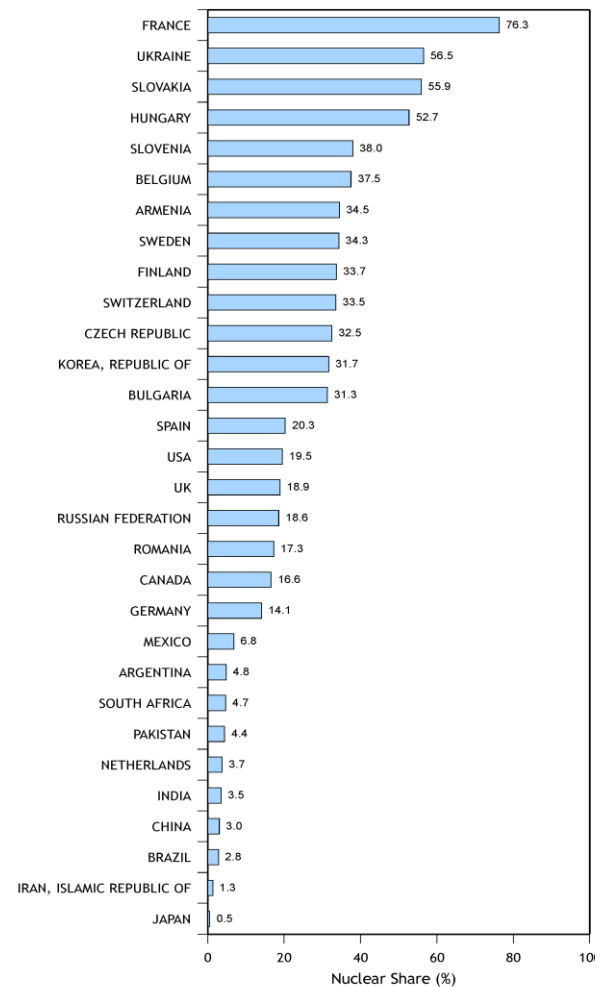
In this context, nuclear’s future prospects appear limited at best, even in centrally-planned economies of China or Russia. France and South Korea, both bastions of nuclear power, are cutting back their over-dependence on nukes, and Japan’s nuclear future appears dire with each passing day while India is mostly investing in renewables moving forward. That leaves a few sweet spots for nuclear, including the new Korean-designed reactors recently built in the UAE.

Commenting on nuclear’s diminishing prospects, Mycle Schneider, a Paris-based independent expert on the subject, was recently quoted in *The Wall Street Journal* (5 January 2018) pointing out: “Not a single commercial Chinese reactor went under construction last year (2017). Not a single one. None. At the same time, China connected to the grid over 50GW of solar alone.”

What is that telling you?

It seems that, slowly but surely, the world is gradually pivoting towards renewables, or what Schneider calls fire-free electricity. And if the trend continues, as many expect, in time much of the

**Figure 2: Nuclear share of total electricity generation in 2015, %**



Source: International Atomic Energy Agency (IAEA), Vienna, 2016

“fire” we currently use to make electricity, drive our cars, trucks and trains – possibly even short-haul planes at some point – can come from fire-free and carbon-free sources. And these will get cheaper over time. Add more and cheaper storage, more efficient appliances and cars and better-insulated buildings plus a culture of frugal energy use and little waste, and the outlines of a more sustainable future begin to emerge.

Nuclear once had a promising future and enjoyed a good run – in the 1970s and 80s – but it was squandered. The future now belongs to fire-free electricity, once the fire-feeders are defeated.

**Perry Sioshansi is Founder and President of Menlo Energy Economics and is the editor and publisher of *EEnergy Informer*, from which we have sourced this article, and which we commend.**