



IS NUCLEAR RENAISSANCE BACK ON TRACK?

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The Fukushima nuclear disaster has had an impact on the overall pace of new build and attitude towards nuclear energy in general, but “has not brought an end to the nuclear renaissance in several countries”.¹ A focused observation on the post-Fukushima nuclear energy drive worldwide would reveal that most countries with or planning nuclear programmes opted for a slowdown rather than complete cessation. Nuclear continues to represent a major energy source – supplying about 11% of the world’s electricity and 21% in OECD countries.² At the end of 2010, the total global capacity fall from 375 GW to 369 GW at the end of 2011, but has since gradually risen to 374.3 GW by January 2014.³ The year 2014 started with 435 operable reactors along with 71 reactors under construction, totalling around 75 GWe – the highest number since 1989.⁴ Given this trend, should one argue that the nuclear renaissance is back on track?

The response could be both ‘yes’ and ‘no’. The Fukushima disaster has made everybody conscious to proceed on the basis of the lessons learned. Today, though strong pockets of optimism are visible in Asia, America, UK and Russia, the opposite is true when one looks at Germany, Switzerland, and Spain. Many countries in different parts of the world, for example Australia, Austria, Denmark, Greece, Ireland, Italy, Latvia, Lichtenstein, Luxembourg, Malta,

¹ Leon Flexman, Head of Communications, Horizon Nuclear Power, “Has The Nuclear Industry Emerged from the Cloud of Fukushima?”, *Power Engineering International*, January 27, 2014.

² “World Energy Needs and Nuclear Power”, World Nuclear Association, April 2014

³ Jong Kyun Park, Director, Division of Nuclear Power, IAEA, n. 1.

⁴ “Steady State for Nuclear in 2013”, *World Nuclear News*, January 07, 2014.

Portugal, Israel, Malaysia, New Zealand, and Norway, remain opposed to nuclear power.⁵ Also it will take more time to rebuild trust in Japan. Therefore, there are still challenges ahead for the nuclear industry; nevertheless, “the nuclear energy perspectives remain solid with the sign of bouncing back in near future”.⁶

This is evident from the 2013 IAEA low projection of 17 percent growth and high projection of 94 percent nuclear energy growth by 2030.⁷ This is however lower than its 2011-2012 projection. But it is certain that nuclear energy following Fukushima is expected to *continue* may be at a slower rate (for few years) than estimated prior to the accident. Number of operational reactors remained unchanged in 2013, with four joining the grids (3 in China and 1 in India) and four closing permanently (USA). Therefore, in 2013 the number of units considered “operational” remained stable, while in 2012 retirements outweighed the number of startups.

Over the past two years, an upward trend in the number of new reactors can be seen. Having dropped from 16 in 2010 to four in 2011⁸, construction starts increased to six in 2012 and reached ten in 2013.⁹ Some other significant developments include the start of reactor construction in USA after three and half a decade gap start of construction of its first reactor in Belarus, a country heavily impacted by fallout from the Chernobyl accident in 1986, and the start of work on Barakah-2 in UAE. .

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⁵ “Nuclear Power Phase-out”, http://en.wikipedia.org/wiki/Nuclear_power_phase-out

⁶ Tarik Choho, Chief Commercial Executive Officer, AREVA, “Has the Nuclear Industry Emerged from the Cloud of Fukushima?”, *Power Engineering International*, January 27, 2014.

⁷ “Nuclear Growth to Continue Despite Fukushima, Says IAEA”, NUCNET, <http://www.nucnet.org/all-the-news/2013/09/25/nuclear-growth-to-continue-despite-fukushima-says-iaea>, September 25, 2014.

⁸ Director General, IAEA, “International Status and Prospects for Nuclear Power 2012”, GOV/INF/2012/12-GC(56)/INF/6, August 15, 2012, p. 1.

⁹ Mycle Schneider and Antony Froggatt, “The World Nuclear Industry Status Report 2013”, <http://www.worldnuclearreport.org/IMG/pdf/20130716msc-worldnuclearreport2013-lr-v4.pdf>, p. 8.

More importantly, Asia remains the focus of expansion and of near and long-term growth prospects. In fact, out of the 71 reactors under construction, 47 are in Asia;¹⁰ similarly, 43 of the last 53 new reactors to be connected to the grid since 2000 are also in Asia.¹¹ China plans to increase nuclear generating capacity to 58 GWe with 30 GWe more under construction by 2020. It has completed construction and commenced operation of 17 new nuclear power reactors over 2002-13, and some 30 new reactors are either under construction or likely to be so by the end of 2014.¹² India's target is to have 14.6 GWe nuclear capacity on line by 2020 as part of its national energy policy. Seven power reactors are under construction of both indigenous and foreign design, and including a 500 MWe prototype fast breeder reactor. Especially, the reactor capacity factor has been increased from 71 in 2010-11 to 80 during 2012-13.¹³ Russia plans to increase its nuclear capacity to 30.5 GWe by 2020, using its world-class light water reactors.¹⁴ South Korea has approved a \$7 billion project to build new nuclear plants and aims to generate 29 percent of total power supply by 2035.¹⁵

In Europe,¹⁶ many countries are either on the expansion mode or have such plans. The first reactor to be built since Fukushima is the Hinkley Point C in the UK. In France, the 1600 MW unit at Flamanville is scheduled for 2016 with a second possibly to follow it at Penly. Finland and France are both expanding their fleets of nuclear power plants with the 1650 MWe EPR from Areva. Several countries in Eastern Europe are currently constructing or have firm plans to build new nuclear power plants (Bulgaria, Czech Republic, Hungary, Romania, Slovakia, Slovenia and Turkey). Hungary, Slovakia and Spain are all implementing or planning for life extensions on existing plants.

Five reactors are under construction with more than a 100 reactors already operable in USA today.¹⁷ Argentina and Brazil both have commercial nuclear reactors generating electricity,

¹⁰ n. 8, p. 4.

¹¹ n. 3.

¹² "Nuclear Power in the World Today", <http://www.world-nuclear.org/info/Current-and-Future-Generation/Nuclear-Power-in-the-World-Today/>, April 2014.

¹³ *Lok Sabha Questions*, Unstarred Question No 965, Answered on December 11, 2013, <http://164.100.47.132/LssNew/psearch/QResult15.aspx?qref=148331>

¹⁴ "Nuclear Power in Russia", <http://www.world-nuclear.org/info/Country-Profiles/Countries-O-S/Russia--Nuclear-Power/>, March 2014.

¹⁵ Meeyoung Cho, "South Korea Approves \$7 Billion Reactor Plans in Boost for Nuclear Power", *Reuters*, January 29, 2014.

¹⁶ n. 12.

¹⁷ "Nuclear Power in the USA", World Nuclear Association, March 2014.

and additional reactors are under construction. Chile has a research reactor in operation and has the infrastructure and intention to build commercial reactors.¹⁸

Seven newcomer countries – Lithuania, UAE, Turkey, Belarus, Vietnam, Poland, and Bangladesh – have expressed desire to launch nuclear programs in the near term. Nuclear power is under serious consideration in over 45 countries which do not currently have it.¹⁹

On the other hand, many countries have opted phase-out of their nuclear reactors and determined to go without nuclear as a source of national energy mix. Austria and Spain have enacted laws to cease construction on new nuclear power stations. Several other European countries including Germany have debated phase-outs. In recent years, more nuclear power reactors have closed than opened: in 2011, seven new reactors were connected but thirteen were permanently retired; twelve of the thirteen retirements were directly due to the Fukushima accident.²⁰ Critics do not believe that the risks associated with nuclear projects have technological solutions. Many countries today confront public resistance when they try to expand or restart their nuclear plants. The challenge, therefore, is how to increase social acceptance of nuclear energy while addressing the inherent risks in nuclear technology.

The bottom line, therefore, for nuclear energy as an attractive option for many states could be the compelling energy security imperatives. Nuclear power is more attractive where energy demand is growing rapidly, such as China and India; where alternatives are scarce or expensive, for example in Japan and South Korea; where energy supply security is a priority, such as Japan and Korea again, and possibly Europe looking ahead; where reducing air pollution is a priority.²¹ Secondly, the growth in nuclear energy will continue because, with or without Fukushima, we face the same challenge of energy scarcity. Specific substantial expansion plans in key countries like China and India have a big impact on overall global expectations. Therefore, as all these developments indicate a very positive future for nuclear energy, if not a renaissance right away.

¹⁸ “Emerging Nuclear Energy Countries”, World Nuclear Association, March 2014.

¹⁹ Ibid.

²⁰ n. 8.

²¹ Alan McDonald, “Nuclear Power Global Status”, <http://www.iaea.org/Publications/Magazines/Bulletin/Bull492/49204734548.html>

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