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Cheaper Fossil Fuels: The Relevance of Nuclear Energy

By Julius Cesar I. Trajano

Synopsis

As carbon-intensive fossil fuels have become cheaper, would nuclear power continue to be relevant? Nuclear power can help countries in their diversification from fossil fuels. But public concerns over post-Fukushima nuclear safety continue to haunt the global nuclear industry.

Commentary

THE GLOBAL prices of fossil fuels - oil, gas and coal – have been steadily declining for months and the world is awash with cheaper fossil fuels. Meanwhile, there is renewed interest in investing in nuclear power projects. According to the World Nuclear Association, of a total of the US\$1.2 trillion that could be invested in new nuclear power projects worldwide by 2030, half will be made in Asia. While in Europe, potential nuclear investments will amount to only US\$179 billion due to the scarcity of new nuclear projects there. What would then be the relevance of nuclear power amidst plummeting fossil fuel prices?

Oil is primarily used in transport, while nuclear power is used to generate electricity. These are still two separate sectors. So the direct impact of the low oil price on nuclear energy would be limited. However, other cheap fossil fuels such as natural gas and coal may have direct impact on nuclear power as these are among the main sources of electricity generation.

Mitigating Climate Change

According to the New Policies Scenario of the International Energy Agency (IEA), global primary energy demand is projected to increase to over 18 gigatonnes of oil

equivalent (Gtoe) by 2040. But in the context of the recently signed Paris Climate Agreement, countries are now committed to shift away from overreliance on carbon-intensive fossil fuels, to the massive deployment of clean energy technologies in order to decarbonise the global economy.

Despite the announced national policy pledges to mitigate climate change, greenhouse gas (GHG) emissions are projected to soar from their 2012 level by about 20% by 2040. The double challenge over the next decades will be to power the global economy by utilising affordable, safe and dependable energy sources while significantly reducing global GHG emissions. Based on many scientific studies, the highest GHG emissions are associated with coal-fired power plants among all power generation technologies. Gas is the second largest contributor to GHG emissions per unit of electricity produced.

Against this backdrop, the IAEA claimed that nuclear power is one of the lowest-carbon energy sources available today to produce electricity, and therefore it can significantly help mitigate climate change. Nuclear power is supplying 11% of the world's electricity needs, making it among the top sources of energy. Unlike cheaper fossil fuels, nuclear energy has negligible carbon intensity and even contributed 41 per cent to the global amount of 'avoided carbon emissions' over the period 1970-2012.

However, it was estimated that the contribution of nuclear energy to the reduction of GHG emissions will decline over the next decades in some countries that have decided to either phase out nuclear energy or reduce its share in their national energy mix in the aftermath of the Fukushima disaster. For instance, Japan's emissions rose by 1.2% to 1.408 billion metric tonnes of CO₂ in 2014, as nuclear power's share of the energy mix fell to 0% that year from 26% in 2010 and was mainly replaced with fossil fuels.

Nuclear in the Era of Shale Gas Revolution

Massive technological advances in horizontal drilling and hydraulic fracturing in the US have boosted the supply of natural gas. The ongoing transformation in the energy market driven by the shale gas revolution in the US may have an impact on investments in nuclear power in some countries. For instance, the abundance of cheap natural gas has been a contributing factor to lack of nuclear investments and even recent NPP retirements in the US.

Currently, the US is still considered the biggest nuclear operating country with 95 nuclear reactors but no new reactors are being constructed. Meanwhile, China is projected to overtake the US in terms of the number of nuclear operators in operation as it is set to build around 40 domestic NPPs over the next five years.

Apart from its role in mitigating climate change, nuclear power can also help address energy supply concerns. While fossil fuel prices have been plummeting in recent years, there are still concerns over the extreme volatility of fossil fuel prices, the possibility that they will return to high levels in the future, and challenges to the security of supply from troubled regions. These concerns partly drive countries' diversification from fossil fuels by utilizing renewable and nuclear energy sources. In

fact, even fossil fuel-rich Gulf countries Saudi Arabia and United Arab Emirates are already looking to commission their first nuclear reactors within the next 10 years as domestic demand for electricity is rising.

Tapping nuclear power, whose cost is more stable than fossil fuels, may result in electricity and aggregate price stability, leading to a more positive macroeconomic setting for economic growth. Nuclear vendors argue that the cost of electricity per kilowatt hour is the lowest compared to other sources of electricity such as fossil fuels and renewables.

Post-Fukushima Safety Concerns

But as countries weigh the perceived advantages of nuclear power even in an era of cheaper fossil fuels, there is still a big elephant in the room that needs to be adequately addressed and that is nuclear safety in the post-Fukushima setting. Concerns about nuclear energy regarding radiation risks, nuclear accidents, and radioactive waste management still exist and influence public acceptance.

For instance, the Fukushima crisis disaster reinforced worldwide fears of nuclear accidents and prompted some countries (e.g., Germany, Switzerland and Belgium) to phase out nuclear energy due to strong public opposition. Opponents of nuclear power argue that the nuclear industry still cannot permanently dispose high-level radioactive waste; thus it poses severe environmental and public health risks.

As several countries are contemplating the utilisation of nuclear power to replace cheap but unclean fossil fuels, challenges remain since comprehensive policy responses to the Fukushima disaster have yet to be institutionalised in key regions. While nuclear energy is deemed to be cleaner than fossil fuels, it is now timely to start considering a broader and coordinated approach to strengthening nuclear safety particularly in the context of nuclear emergency preparedness and response and radioactive waste management.

Julius Cesar I. Trajano is Associate Research Fellow with the Centre for Non-Traditional Security Studies at the S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore.

Nanyang Technological University
Block S4, Level B4, 50 Nanyang Avenue, Singapore 639798
Tel: +65 6790 6982 | Fax: +65 6794 0617 | www.rsis.edu.sg