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PAKISTAN'S MINISCULE NUCLEAR POWER PROGRAMME

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In mid-October, the connection of a new nuclear reactor – Chashma-3 to the electricity grid, brought Pakistan's atomic power generation capacity to 1065 Mega Watt electric (MWe)¹. Chashma-3 is a Pressurised Water Reactor (PWR) having a generating capacity of 340 MWe. This takes Pakistan's operating nuclear reactors to a total of 4, out of which 3 have been built with Chinese assistance, including Chashma-3.

Looking back, the Pakistan Atomic Energy Commission was set up in 1956 with the purpose of promoting peaceful use of nuclear energy. However, the construction of its first nuclear plant started ten years later in 1966 in Karachi. Pakistan has always shown interest in expanding its civil nuclear network. Yet, the second plant, Chashma-1, took another twenty years to begin construction after Karachi-1 became operationalised. According to the International Atomic Energy Agency (IAEA), this was "due to unfavourable international environment coupled with lack of indigenous technological and

industrial capabilities and construction."² Chashma-1 was constructed in 1993 with assistance from the China National Nuclear Cooperation (CNNC) and became operational in 2000. The Chinese arm stretched on to setting up Chashma-2 as well, which became operational in 2011. Located in Chashma, a town in the central province of Punjab, the reactors are part of Pakistan's energy security strategy to over-come its riddling power shortages.

It is estimated that "over 140 million Pakistanis either have no access to the power grid or suffer 12 hours of load shedding daily."³ Reports often paint Pakistan's plight of energy deficiency as an "energy crisis."⁴ Therefore, the addition of Chashma-3 was lauded and praised by Pakistani officials. Yet, Pakistan's civil nuclear network remains relatively small considering its atomic energy commission was set up in 1956. In comparison, the Indian Atomic Energy Commission was first setup in August 1948. India currently has 21 commercially operational reactors, a bulk of which has been indigenously



built, with a generating capacity of 5780 MWe.⁵ The second unit of the Kudankulam Nuclear Power Project will start commercial operation in December this year, thereby adding another 1000 MWe to India's civil nuclear basket. Four more indigenous reactors of 700 MWe⁶ capacity each are currently being set up. India is also progressing in developing its Prototype Fast Breeder Reactor (PFBR) with a capacity of 500 MWe.⁷ India has developed a robust private industry to cater to the requirements of its nuclear programme. The facts illustrate that India has a capacity substantially larger than Pakistan's generating capacity of 1065 MWe. This is also indicative of India's progress and commitment towards peaceful uses of nuclear energy via a roadmap that involves indigenous Research and Development (R&D) and international cooperation.

In contrast to India's engagement with the international nuclear players, Pakistan's dependence solely on China in expanding its civil nuclear power programme connotes a sort of isolation from other players in the global nuclear commerce. Abdul Hameed, a Pakistani physicist, brands the relationship as simply a "marriage of convenience."⁸ He further goes on to say, "The Pakistan-China nuclear trade can be explained by a single fact that no other country in the world is ready to sell a nuclear power reactor to Pakistan, and no other country has shown any interest in buying nuclear power reactors made in China."⁹ However, this is steadily changing after the

United Kingdom's civil nuclear deal with China over Hinkley Point C. Nevertheless, transfer of technology by China to Pakistan is prone to scrutiny.

China is a signatory of the Nuclear Non-Proliferation Treaty (NPT). Pakistan is not. It refuses to sign the NPT as a reaction to India's stand on the treaty, assuring that it will follow suit only after India signs it. This means that it is not bound to adhere to the safeguards that ensure fissile materials being used for peaceful purposes only. It is known that China is a violator of global nuclear non-proliferation norms because Nuclear Suppliers Group (NSG) guidelines do not allow such transfer of technology to states like Pakistan which "has not adopted full-scope International Atomic Energy Agency (IAEA) safeguards."¹⁰ The perpetual lack of transparency between China and Pakistan in nuclear deals is further underscored. China and Pakistan signed an Agreement for Co-Operation in the Peaceful Uses of Nuclear Energy, of indefinite duration, on 15 September 1986. However, both countries insist on continuing with the "grandfathered" deals since China signed the NPT and joined the NSG after the deals were signed (1992 and 2004, respectively). A point for scrutiny further arises after China and Pakistan signed a civil nuclear deal estimated at \$6.4 billion to construct a reactor in Karachi. Experts in the field, G Balachandran and Kapil Patil, accurately summarised the future of Pakistan's civil nuclear programme as such:

“It is quite likely that unless political, scientific and industrial environment, domestic and international, changes substantially China will be the sole source of Pakistan’s civilian NPP program for the foreseeable future and there will be no bar on such cooperation from NSG.”¹¹

In 2005, the Pakistan Energy Security 2030 outline included a nuclear capacity target of 8,800 MWe by 2030. This target corresponds to 5.4% of the installed capacity and about 8% of generation in 2030.¹² Pakistan currently has three more reactors in line for construction. These are Chashma-4 (340 MWe), Karachi-2 (1100 MWe), and Karachi-2 (MWe).¹³ The connection of these reactors to the grid would take Pakistan’s atomic energy production capacity to 3605 MWe, if the targets are met. Given the current political and economic situation of the country, that is a big if.

Given the very small share of the Pakistani nuclear power programme in its national electricity generation, Pakistan’s claim for parity with India is ludicrous. Neither the scale of the programme nor its industry counts for much right now. Pakistan would do itself a service if it were to pay greater attention to its “energy crises,” instead of creating false claims of nuclear parity with India.

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS])

Notes

¹ Nuclear Power: A Viable Option For Electricity Generation, Pakistan Atomic Energy Commission, see <http://www.paec.gov.pk/NuclearPower/>. Accessed on 26 October 2016.

² 'Pakistan', Country Nuclear Power Profiles - 2015 Edition, International Atomic Energy Agency, see http://www-pub.iaea.org/MTCD/publications/PDF/CNPP2015_CD/countryprofiles/Pakistan/Pakistan.htm. Accessed on 27 October 2016.

³ '7 facts about Pakistan's energy crisis – and how you can help end it', *Dawn*, 5 august 2016, see <http://www.dawn.com/news/1275116>. Accessed on 25 October 2016.

⁴ Ibid.

⁵ Plants Under operation, Nuclear Power Corporation of India Limited, see <http://www.npcil.nic.in/main/AllProjectOperationDisplay.aspx>. Accessed on 26 October 2016.

⁶ Status of Projects Under Construction, Nuclear Power Corporation Of India Limited website, see <http://www.npcil.nic.in/main/ProjectConstructionStatus.aspx>. Accessed on 28 October 2016.

⁷ SB Bhoje, 'Fast Breeder Reactor Technology', Department of Atomic Energy website, see <http://dae.nic.in/?q=node/179>. Accessed on 27 October 2016.

⁸ Zofeen T Ebrahim, 'Pakistan’s nuclear energy plans: Q&A with physicist Abdul H Nayyar', *Dawn*, 19 March 2015, see <http://www.dawn.com/news/1170383>. Accessed on <http://www.dawn.com/news/1170383>.

⁹ Ibid.

¹⁰ Rohan Joshi, 'China, Pakistan, and Nuclear Non-Proliferation', *The Diplomat*, 16 February 2015, see <http://thediplomat.com/2015/02/china-pakistan-and-nuclear-non-proliferation/>. Accessed on 26 October 2016.

¹¹ G Balachandran and Kapil Patil, 'China’s Reactor Sale to Pakistan: The Known Unknowns,' Issue Brief, IDSA, 15 November 2013, see http://www.idsa.in/issuebrief/ChinasReactorSaletoPakistan_gbalachandran_151113. Accessed on 27 October 2016.

¹² Ibid.

¹³ n. 1.