

Table 27 | Nuclear Reactors in the World “Under Construction” (as of 1 July 2019)

Country	Units	Capacity MW net	Model	Construction Start (dd/mm/yyyy)	Expected Grid Connection	Delayed
Argentina	1	25				
Carem25		25	CAREM (PWR)	08/02/2014	2021 ¹	yes
Bangladesh	2	2 160				
Rooppur-1		1 080	VVER-1200	30/11/2017	2023 ² (commercial operation)	
Rooppur-2		1 080	VVER-1200	14/07/2018	2024 ³ (commercial operation)	
Belarus	2	2 218				
Belarusian-1		1 109	VVER V-491	06/11/2013	Q4 2019 ⁴	yes
Belarusian-2		1 109	VVER V-491	03/06/2014	7/2020 ⁵	?
China	10	8 800				
CFR-600		600	FBR	29/12/2017	2023 ⁶	
Fangchenggang-3		1 000	HPR-1000	24/12/2015	2021 ⁷	
Fangchenggang-4		1 000	HPR-1000	23/12/2016	2022 ⁸	
Fuqing-5		1 000	HPR-1000	07/05/2015	6/2020 (completion) ⁹	yes
Fuqing-6		1 000	HPR-1000	22/12/2015	2021 ¹⁰	?
Hongyanhe-5		1 000	ACPR-1000	29/03/2015	2020 ¹¹	
Hongyanhe-6		1 000	ACPR-1000	24/07/2015	2021 ¹²	
Shidao Bay-1		200	HTR-PM	01/12/2012	2020 ¹³	yes
Tianwan-5		1 000	CNP-1000	27/12/2015	12/2020 ¹⁴ (commercial operation)	
Tianwan-6		1 000	CPR-1000	07/09/2016	10/2021 ¹⁵ (commercial operation)	
Finland	1	1 600				
Olkiluoto-3		1 600	EPR	12/08/2005	4/2020 ¹⁶	yes
France	1	1 600				
Flamanville-3		1 600	EPR	03/12/2007	2022 ¹⁷	yes
India	7	4 824				
Kakrapar-3		630	PHWR-700	22/11/2010	12/2019 ¹⁸ (commercial operation)	yes
Kakrapar-4		630	PHWR-700	22/11/2010	12/2020 ¹⁹ (commercial operation)	yes
Kudankulam-3		917	VVER V-412	29/06/2017	3/2023 ²⁰ (commercial operation)	
Kudankulam-4		917	VVER V-412	23/10/2017	11/2023 ²¹ (commercial operation)	
PFBR		470	FBR	23/10/2004	10/2021 ²²	yes

Country	Units	Capacity MW net	Model	Construction Start (dd/mm/yyyy)	Expected Grid Connection	Delayed
Rajasthan-7		630	PHWR	18/07/2011	12/2020 ²³ (commercial operation)	yes
Rajasthan-8		630	PHWR	30/09/2011	12/2021 ²⁴ (commercial operation)	yes
Japan	1	1325				
Shimane-3		1325	ABWR	12/10/2007	? ²⁵	yes
Pakistan	2	2 028				
Kanupp-2		1 014	ACP-1000	20/08/2015	2020 ²⁶ (expected operation)	
Kanupp-3		1 014	ACP-1000	31/05/2016	2021 ²⁷ (expected operation)	
Russia	5	3 379				
Akademic Lomonosov-1		32	KLT-40S 'Floating'	15/04/2007	2019 ²⁸	yes
Akademic Lomonosov-2		32	KLT-40S 'Floating'	15/04/2007	2019 ²⁹	yes
Kursk 2-1		1 115	VVER V-510	29/04/2018	2022	
Kursk 2-2		1 115	VVER V-510	15/04/2019	2023 ³⁰	
Leningrad 2-2		1 085	VVER V-491	15/04/2010	2022 ³¹ (commissioning)	yes
Slovakia	2	880				
Mochovce-3		440	VVER V-213	01/01/1985	2020 ³²	yes
Mochovce-4		440	VVER V-213	01/01/1985	2021 ³³	yes
South Korea	4	5 360				
Shin-Hanul-1		1 340	APR-1400	10/07/2012	11/2019 ³⁴ (commercial operation)	yes
Shin-Hanul-2		1 340	APR-1400	19/06/2013	7/2020 ³⁵ (commercial operation)	yes
Shin-Kori-5		1 340	APR-1400	03/04/2017	3/2023 ³⁶ (commercial operation)	yes
Shin-Kori-6		1 340	APR-1400	20/09/2018	6/2024 ³⁷	
Turkey	1	1 114				
Akkuyu-1		1 114	VVER V-491	03/04/2018	2024 ³⁸	yes
UAE	4	5 380				
Barakah-1		1 345	APR-1400	19/07/2012	2020 ³⁹	yes
Barakah-2		1 345	APR-1400	30/05/2013	2021 ⁴⁰	yes
Barakah-3		1 345	APR-1400	24/09/2014	2022 ⁴¹	yes
Barakah-4		1 345	APR-1400	30/07/2015	2023 ⁴²	yes
UK	1	1 630				
Hinkley Point C-1	1	1 630	EPR-1750	11/12/2018 ⁴³	2025 ⁴⁴	
USA	2	2 234				
Vogtle-3		1 117	AP-1000	12/03/2013	11/2021 ⁴⁵	yes
Vogtle-4		1 117	AP-1000	19/11/2013	11/2022 ⁴⁶	yes
World	46	44 557		1985–2019	2019–2025	27–29

Notes

1 - Delayed several times. Carem is now expected to be in operation in late 2021 or 2022, a further delay of at least one year since WNISR2018. See WNA, “Nuclear Power in Argentina”, June 2019, see <http://www.world-nuclear.org/information-library/country-profiles/countries-a-f/argentina.aspx>, accessed 16 June 2019; and Matías Alonso, “CAREM: Reactor en alta tensión”, *Agencia TSS*, 21 February 2019 (in Spanish), see <http://www.unsam.edu.ar/tss/carem-reactor-en-alta-tension/>, accessed 16 May 2019.

2 - Rosatom, “First concrete poured at the constructed Rooppur NPP site (Bangladesh)”, Press Release, 30 November 2017, see <http://rosatom.ru/en/press-centre/news/first-concrete-poured-at-the-constructed-rooppur-npp-site-bangladesh/>, accessed 30 November 2017.

3 - Rosatom, “Main construction of the 2nd Unit of Rooppur NPP begins with the ‘First Concrete’ ceremony”, Press Release, 14 July 2018, see <http://rosatom.ru/en/press-centre/news/main-construction-of-the-2nd-unit-of-rooppur-npp-begins-with-the-first-concrete-ceremony/>, accessed 15 July 2018.

4 - Delayed. Grid connection is expected in last quarter 2019. No delay since WNISR2018. See *BelTA*, “Belarusian nuclear power plant specialists issued nuclear energy permits”, *Belarus News*, 20 May 2019, see <https://eng.belta.by/society/view/belarusian-nuclear-power-plant-specialists-issued-nuclear-energy-permits-121157-2019>, accessed 21 May 2019.

5 - *BelTta*, “Belarusian nuclear power plant to give electricity to national power grid in Q4 2019”, *Belarus News*, 28 March 2018, see <http://eng.belta.by/economics/view/belarusian-nuclear-power-plant-to-give-electricity-to-national-power-grid-in-q1-2019-110418-2018>, accessed 24 April 2018.

6 - CFR-600 is not listed as under construction by PRIS. Concrete pouring is reported to have taken place in December 2017; commercial operation was then expected 2023. See *WNN*, “China begins building pilot fast reactor”, 29 December 2017, see <http://www.world-nuclear-news.org/NN-China-begins-building-pilot-fast-reactor-2912174.html>, accessed 30 December 2017.

7 - No information concerning expected startup date in CGN’s announcement of construction start. CGN’s Annual Reports for 2016 to 2018 refer to 2022 as “Expected Date of Commencement of Operation” for both units. CGN, “Annual Report 2018”, 2019, see <http://www3.hkxnews.hk/listedco/listconews/sehk/2019/0408/LTN20190408772.pdf>, accessed 9 April 2019. Sources in China suggest that because the two units are the first HPR-1000 to be constructed, grid connection appears impossible before 2020–21 for Unit 3 and 2021–22 for Unit 4, although CGN has pledged to do its utmost to connect its first domestic Generation III reactor to the grid in 2021, at the earliest in November 2021. WNISR2019 advances the date from 2022 to 2021.

8 - See previous note.

9 - CNNC Chairman quoted by *Reuters* in March 2016, said that hopes are that construction of the first Hualong (Fuqing5) will be completed by June 2020. See *Reuters*, “China’s debut Westinghouse reactor delayed until June 2017”, 9 March 2016, see <http://www.reuters.com/article/us-china-parliament-nuclear-idUSKCN0WB09F>, accessed 24 June 2016. No change since WNISR2016, already delayed from original startup date of 2019. Other sources (World Nuclear Association, *Nuclear Engineering International*) keep 2019 as completion date.

10 - Probably delayed. 2020 was the completion date announced at construction start. See *WNN*, “First concrete for sixth Fuqing unit”, 22 December 2015, see <http://www.world-nuclear-news.org/NN-First-concrete-for-sixth-Fuqing-unit-2212154.html>, accessed 26 June 2016. Other sources in China point to dome hosting only implemented in March 2018 and installation of the pressure vessel in January 2019. The earliest expected grid connection would be June 2021.

11 - At construction start of Hongyanhe-5, it was announced that Hongyanhe-5 & -6 would be completed by 2021. Operation of Hongyanhe5 was later reported to be expected in November 2019, change introduced in WNISR2017. See *NEI*, “Dome installed at China’s Hongyanhe5”, 17 April 2017, see <http://www.neimagazine.com/news/newsdome-installed-at-chinas-hongyanhe-5-5787690>, accessed 6 August 2017. As CGN’s annual reports refer to second semester 2020 as “Expected Date of Commencement of Operation”, WNISR2018 reinstated 2020.

12 - At construction start of Hongyanhe-5, *WNN* wrote “the company aims to have Hongyanhe-5 & -6 in operation by 2021.” Later, as it announced construction start of Hongyanhe6, *WNN* used 8/2020 as startup date. CGN’s annual report for 2018 still refers to 2021 as “Expected Date of Commencement of Operation”. WNISR2018 reinstated 2021 as a target, however sources in China indicated that grid connection could be achieved in 2020.

13 - Further delay of one year since WNISR2018. According to sources in China, problems with the manufacturing of the steam generators for ShidaoBay will make it difficult to finish construction in 2019; startup is therefore likely to be postponed until 2020 at the earliest.

14 - WNISR, “China: Grid Connection for Fuqing-3 and Construction Start on Tianwan-6”, 9 September 2016, see <https://www.worldnuclearreport.org/China-Grid-Connection-for-Fuqing-3-and-Construction-Start-on-Tianwan-6.html>, accessed 22 August 2019.

15 - Ibidem.

16 - Delayed several times from its original planned commissioning in 2009. According to new schedule provided in July 2019, grid connection is now expected in April 2020, and regular electricity generation in July 2020. A further delay of about one year compared to WNISR2018. TVO, “OL3 EPR’s regular electricity generation starts in July 2020”, Press Release, 13 June 2018, see <https://www.tvo.fi/news/2124>, accessed 17 July 2019.

17 - Delayed several times from its original planned startup date of 2012. In July 2019, EDF announced that following the decision of the French Nuclear Safety Authority (ASN) concerning the penetration welds (see *France Focus*) it was studying three different scenarios concerning “the impacts on schedule and costs in the coming months”, and would communicate on the matter, adding that “at this stage, commissioning cannot be expected before end of 2022”. See EDF, “2019 half-year results—Stable EBITDA—Confirmation of 2019 targets and 2019–2020 ambitions”, Press Release, 26 July 2019, see <https://www.edf.fr/sites/default/files/contrib/groupe-edf/>

espaces-dedies/espace-finance-en/financial-information/publications/financial-results/h1-2019/20190726-h1-2019-cp-en.pdf, accessed 26 July 2019.

18 - Delayed several times. See NPCIL, “Status of Project under Construction—Kakrapar Atomic Power Project”, Undated, see https://www.npcil.nic.in/content/301_1_KakraparAtomicPowerProject.aspx, last accessed 19 July 2019.

19 - Ibidem.

20 - No indication of delay. See NPCIL, “Status of Project under Construction—Kudankulam Atomic Power Project”, Undated, see https://www.npcil.nic.in/content/831_1_KudankulamNuclearPowerProject.aspx, accessed 25 June 2019.

21 - NPCIL, “Status of Project under Construction—Kudankulam Atomic Power Project”, op. cit. In 2018, ASE quoted 2024 as “guarantee operation date”. See Atomstroyexport, “Kudankulam NPP (India)”, Undated, see http://www.atomstroyexport.ru/wps/wcm/connect/ase/eng/about/NPP+Projects/Current/Kudankulam_india/, accessed 9 May 2018.

22 - Further delayed. Criticality is now announced for 2020 with commissioning in October 2021. A further delay of 3 years compared to WNISR2018. See Ministry of Statistics and Programme Implementation, “Flash Report on Central Sector Projects (Rs. 150 crore and above) March 2019”, Government of India, 2019, see http://www.cspm.gov.in/english/flr/Fr_mar_Report_2019.pdf, accessed 20 June 2019.

23 - Delayed. According to NPCIL, the original scheduled dates for Commercial Operation for Rajasthan-7 & -8 were June and December 2016, respectively. As of June 2019, they are expected to be December 2020 and December 2021. See NPCIL, “Status of Project under Construction—Rajasthan Atomic Power Project”, Undated, see https://www.npcil.nic.in/content/300_1_RajasthanAtomicPowerProject.aspx, accessed 24 June 2019.

24 - Delayed. See previous note.

25 - Construction status unclear. Chugoku “took the first step” toward Shimane-3 startup by asking prefectural and local governments for their consent on applying to the Nuclear Regulation Authority (NRA) for safety screening; see *The Asahi Shimbun*, “Process begins at Shimane nuclear plant to operate new reactor”, 22 May 2018, see <http://www.asahi.com/ajw/articles/AJ201805220043.html>, accessed 22 May 2018. Still no clear date for startup.

26 - No information on possible delay. Expected start of operation, according to PNRA, “PNRA Annual Report 2018”, 2019, see <https://www.pnra.org/upload/pnrapr/PNRA%20Report%202018.pdf>, accessed 15 May 2019.

27 - Ibidem.

28 - Rosatom, “Floating nuclear power plant The Akademik Lomonosov has received an operating license”, 28 June 2019, see <https://www.rosatom.ru/en/press-centre/news/floating-nuclear-power-plant-the-akademik-lomonosov-has-received-an-operating-license-/>, accessed 20 July 2019.

29 - Ibidem.

30 - WNA, “Nuclear Power in Russia”, April 2019, see <http://www.world-nuclear.org/information-library/country-profiles/countries-o-s/russia-nuclear-power9.aspx>, accessed 23 April 2019.

31 - Delayed several times. In 2018, TASS agency reported that Russia was ready to postpone ‘Commissioning of two Nuclear Plants’. Commissioning of Leningrad 22, then planned for February 2020, would be postponed by two years. See *NucNet*, “Russia Ready To Postpone Commissioning Of Two Nuclear Plants, Says Official Agency”, 5 February 2018, see <https://www.nucnet.org/all-the-news/2018/02/05/russia-ready-to-postpone-commissioning-of-two-nuclear-plants-says-official-agency>, accessed 7 February 2018. However, the reactor might be commissioned in 2021. See Judith Perera, “What’s next for Leningrad?”, *NEI*, 2 May 2019, see <https://www.neimagazine.com/features/featurewhats-next-for-leningrad-7183813/>, accessed 1 July 2019.

32 - Delayed several times. Construction was suspended between March 1993 and June 2009. In the Framework of the Strategic Plan, approved by the extraordinary General Assembly of Slovenské Elektrárne, a.s. (SE) on 28 March 2017, operation of Mochovce3 was expected by the end of 2018. In May 2019, CEO of SE Branislav Strycek announced that startup would be delayed again to March 2020, an optimistic variant being November 2019. See TASR, “B. Strýček: Tretí blok elektrárne Mochovce spustíme najskôr v novembri”, *TERAZ.sk*, 6 May 2019 (in Slovak), see <http://www.teraz.sk/ekonomika/strycek-treti-blok-elektrarne-mochovce/393763-clanok.html>, accessed 20 July 2019. A delay of at least one year compared to WNISR2018.

33 - Delayed several times. Construction was suspended between March 1993 and June 2009. In the Framework of the Strategic Plan, approved by the extraordinary General Assembly of Slovenské Elektrárne, a.s. (SE) on 28 March 2017, operation of Mochovce4 was expected by the end of 2019. It is now expected in 2021. A delay of over a year compared to WNISR2018.

34 - Delayed several times. In January 2019, KHNP’s webpage dedicated to ShinHanul1 announced a change in Commercial Operation (November 2019), with fuel loading to take place in June 2019, which did not happen as of 1 July 2019. A delay of one year compared to WNISR2018. KHNP, “Nuclear Power Construction—ShinHanul #1,2”, 1 January 2019, see <http://cms.khnp.co.kr/eng/content/547/main.do?mnCd=EN03020303>, accessed 17 June 2019.

35 - Delayed several times. In January 2019, KHNP’s webpage dedicated to Shin-Hanul-2 announced a change in Commercial Operation (July 2020) a delay of around 10 months compared to WNISR2018. See previous note.

36 - Further delayed. Construction officially started in April 2017, suspended in July to resume in October of the same year. Commercial operation at construction start was October 2021, it is now expected in March 2023, almost 1.5 year of delay. KHNP, “Nuclear Power Construction—Shin-Kori #5,6”, various dates, see <http://cms.khnp.co.kr/eng/content/548/main.do?mnCd=EN03020304>, last accessed 10 August 2019.

37 - KHNP, “Nuclear Power Construction—Shin-Kori #5,6”, Various dates, see <http://cms.khnp.co.kr/eng/content/548/main.do?mnCd=ENo3020304>, last accessed 10 August 2019

38 - Delayed. In March 2019, the project management announced that it had finished the concreting of the basemat for the nuclear island and that it was now expected that Akkuyu-1 would be physically completed in 2023, with generation coming at a later date. Phil Chaffee, “New Build, Revised 2023 Milestone for Akkuyu”, NIW, 29 March 2019.

39 - Delayed several times. In May 2017, startup of Barakah-1 was first postponed to 2018. In May 2018, the reviewed forecast of its operator, Nawah, after it had “completed a comprehensive operational readiness review to generate an updated schedule for the start-up”, is that “the loading of nuclear fuel assemblies required to commence nuclear operations at Barakah Unit 1 will occur between the end of 2019 and early 2020”. See Nawah, “Next phase of preparations for Barakah Unit 1 Nuclear Operations starts”, 28 May 2018, Press Release, see <https://www.nawah.ae/media/press-news/2018/05/26/Next-phase-of-preparations-for-Barakah>, accessed 26 July 2019. In July 2019, FANR announced that “Unit 1 construction is complete and the unit is currently undergoing commissioning and testing, prior to receipt of the Operating License from FANR, which is currently in the final stages of reviewing the Operating License application for the Unit, in preparation for the loading of the first nuclear assemblies”. See FANR, “FANR Certifies ENEC’s First group of UAE National Nuclear Reactor Operators”, 8 July 2019, see <https://www.fanr.gov.ae/en/media-centre/news?g=0b7fd437-2044-4346-90ef-76d8eae5c59>, accessed 8 July 2019.

40 - Delayed. No new date for Barakah-2 in updated schedule (see previous note). WNA uses 2021, a three year delay compared to original schedule. See WNA, “Nuclear Power in the United Arab Emirates”, April 2019, see <http://www.world-nuclear.org/information-library/country-profiles/countries-t-z/united-arab-emirates.aspx>, accessed 17 April 2019.

41 - Delayed. No new date for Barakah-3 in updated schedule. WNA uses 2022, a three year delay compared to original schedule. (See previous notes).

42 - Delayed. No new date for Barakah-4 in updated schedule. WNA uses 2023, a three year delay compared to original schedule. (See previous notes).

43 - See WNISR, “The Oddly Discreet Construction Start of Hinkley Point C”, 29 December 2018, see <https://www.worldnuclearreport.org/The-Oddly-Discreet-Construction-Start-of-Hinkley-Point-C.html>, accessed 24 August 2019.

44 - EDF, “Clarifications on Hinkley Point C project”, 3 July 2017, see <https://www.edf.fr/en/the-edf-group/dedicated-sections/journalists/all-press-releases/clarifications-on-hinkley-point-c-project>, accessed 7 May 2018.

45 - Delayed. Georgia Power is expressing confidence that it can meet target dates of November 2021 and November 2022 for Unit 3 and 4 respectively announced in 2018. Georgia Power, “Georgia Power’s Vogtle Unit 3 achieves Initial Energization”, Press Release, 7 May 2019, see <https://southerncompany.mediaroom.com/2019-05-07-Georgia-Powers-Vogtle-Unit-3-achieves-Initial-Energization>, accessed 20 July 2019. No change since WNISR2018.

46 - Delayed. No change since WNISR2018. (See previous note).