Table **: Base SMR Parameters					
Reactor	iPWR	HTGR	PBR-HTGR	iMSR	Microreactor
Outlet Temp [C]	302 [1]	950[2]	750[3]	700 [4]	630 [5]
Thermal Transfer Eff. [%]	100	89.7	75.1	83.6	<i>89.7</i> [5]
Steam Temp [C]	302	852	563 [3]	585 [6]	565 [5]
Electric Power [MWe]	77 [7]	164[2]	80[3]	141 [8]	6.7[9]
Thermal Power [MWt]	250 [7]	350[2]	200 [3]	300[8]	20 [9]
Thermal Efficiency	0.31	0.47	0.4	0.47 [8]	0.33
MSL [MWe] *	<i>15.4</i> [10]	32.8	32.0[3]	28.2	2.7
MSTL [MWe] **	7.71 [1]	16.4	8	14.1	0.67
MDT [hr]	20	20	20	20	20
Ramp Rate [%/hr]	40 [11]	600 [12]	240 [3]	60[13]	<i>600</i> [12]
Ramp Rate [MWe/hr]	24	984	48	84.6	24
CAPEX [\$/kWe]	5,535 [14]	7,500 [15] +	4,569 [16]	4,091 [8]	10,902 [9]
FOPEX [\$/kWe-yr]	115 [17]	164 [2]	100 [18]	85 [4], [19]	264 [9]
VOM [\$/MWhe]	0.75 [17]	0 ^	0 ^	0.5 [4], [19]	0 [9] ^
Fuel Cost [\$/MWhe]	9	13[2]	13 [2]	11 [8]	0 [9] -
Startup Fixed Cost [\$/startup] ***	38,500	82,000	40,000	70,500	3,350

Calculated; Assumed (Weak); All 2020 \$

- [1] D. T. Ingersoll, Z. J. Houghton, R. Bromm, and C. Desportes, "NuScale small modular reactor for Cogeneration of electricity and water," *Desalination*, vol. 340, no. 1, pp. 84–93, May 2014, doi: 10.1016/J.DESAL.2014.02.023.
- [2] A. M. Gandrik, B. W. Wallace, M. W. Patterson, and P. Mills, "Technical Evaluation Study Assessment of High Temperature Gas-Cooled Reactor (HTGR) Capital and Operating Costs," Jan. 2012. Accessed: Jun. 07, 2022. [Online]. Available: https://art.inl.gov/NGNP/INL%20Documents/Year%202012/Assessment%20of%20High%20Temperature% 20Gas-Cooled%20Reactor%20-%20HTGR%20-%20Capital%20and%20Operating%20Costs.pdf
- [3] J. Cox *et al.*, "Flexible Nuclear Energy for Clean Energy Systems," Golden, Sep. 2020. Accessed: Jun. 30, 2022. [Online]. Available: https://www.nrel.gov/docs/fy20osti/77088.pdf
- [4] B. Mignacca and G. Locatelli, "Economics and finance of Molten Salt Reactors," *Progress in Nuclear Energy*, vol. 129, p. 103503, Nov. 2020, doi: 10.1016/J.PNUCENE.2020.103503.

^{* 20%} of nameplate [10], [20]

^{** 10%} of nameplate [1]

^{***} Based on \$500/MWe

⁺ This is substantially higher than MIT estimates of 5,200

[^] Considered 0 due to all O&M allocated to the Fixed.

⁻ These microreactors have no refuel, and their lifetimes are bound by initial fuel. As such, reported fuel costs are \$0

- Ultra Safe Nuclear Corporation, "USNC MICRO MODULAR REACTOR (MMR™ BLOCK 1) TECHNICAL INFORMATION," 2021. Accessed: Aug. 09, 2022. [Online]. Available: https://usnc.com/assets/media-kit/[022989][01]%20MMR%20Technical%20Information%20Document.pdf?v=4693eb5e69
- [6] J. Kutsch and Terrestrial Energy, "Terrestrial Energy, National Lab, Southern Company Partnership Overview Using Integral Molten Salt Reactor Technology with HyS Acid for Hydrogen Production," Oct. 2018. Accessed: Aug. 09, 2022. [Online]. Available: https://www.ammoniaenergy.org/paper/terrestrial-energy-national-lab-southern-company-partnership-overview-using-integral-molten-salt-reactor-technology-with-hys-acid-for-hydrogen-production/
- [7] LLC. NuScale Power, "HOW THE NUSCALE MODULE WORKS," *Technology Overview*, 2022. https://www.nuscalepower.com/technology/technology-overview (accessed Jun. 07, 2022).
- [8] L. Samalova, O. Chvala, and G. I. Maldonado, "Comparative economic analysis of the Integral Molten Salt Reactor and an advanced PWR using the G4-ECONS methodology," *Ann Nucl Energy*, vol. 99, pp. 258–265, Jan. 2017, doi: 10.1016/J.ANUCENE.2016.09.001.
- [9] M. Moore *et al.*, "Small Modular Reactor (SMR) Economic Feasibility and Cost-Benefit Study for Remote Mining in the Canadian North: A Case Study Ashlea Colton on behalf of Megan Moore," 2021.
- [10] D. T. Ingersoll, C. Colbert, Z. Houghton, R. Snuggerud, J. W. Gaston, and M. Empey, "Can Nuclear Power and Renewables be Friends?," May 2015.
- [11] LLC. NuScale Power, "NuScale SMR Technology: An Ideal Solution for Repurposing U.S. Coal Plant Infrastructure and Revitalizing Communities," 2021. Accessed: Jun. 07, 2022. [Online]. Available: https://assets.morningconsult.com/wp-uploads/2021/08/26155433/nuscale-smr-technology-an-ideal-solution.pdf
- [12] "Current status and future development of modular high temperature gas cooled reactor technology," Vienna, Austria, Feb. 2001. Accessed: Jun. 07, 2022. [Online]. Available: https://www-pub.iaea.org/MTCD/Publications/PDF/te 1198 prn.pdf
- [13] V. Singh, M. R. Lish, O. Chvála, and B. R. Upadhyaya, "Dynamics and control of molten-salt breeder reactor," *Nuclear Engineering and Technology*, vol. 49, no. 5, pp. 887–895, Aug. 2017, doi: 10.1016/J.NET.2017.06.003.
- [14] M. R. Weimar, A. Zbib, D. Todd, J. Buongiorno, and K. Shirvan, "Techno-economic Assessment for Generation III+ Small Modular Reactor Deployments in the Pacific Northwest April 2021," Apr. 2021, Accessed: Jun. 07, 2022. [Online]. Available: https://www.pnnl.gov/sites/default/files/media/file/PNNL%20report_Techno-economic%20assessment%20for%20Gen%20III%2B%20SMR%20Deployments%20in%20the%20PNW_A pril%202021.pdf
- [15] "X-energy signs Department of Energy's Advanced Reactor Demonstration Program (ARDP) Cooperative Agreement," Mar. 01, 2021. https://x-energy.com/media/news-releases/x-energy-signs-department-of-energys-advanced-reactor-demonstration-program-ardp-cooperative-agreement (accessed Aug. 09, 2022).
- [16] W. R. Stewart, E. Velez-Lopez, R. Wiser, and K. Shirvan, "Economic solution for low carbon process heat: A horizontal, compact high temperature gas reactor," *Appl Energy*, vol. 304, p. 117650, Dec. 2021, doi: 10.1016/J.APENERGY.2021.117650.
- [17] A. Fletcher and Z. Hausfather, "Can NuScale's SMR Compete With Natural Gas?," Sep. 08, 2020. https://thebreakthrough.org/issues/energy/nuscale-vs-gas (accessed Jun. 07, 2022).
- [18] R. F. S. Budi, A. P. Rijanti, S. M. Lumbanraja, M. D. Birmano, E. S. Amitayani, and E. Liun, "Fuel and O&M Costs Estimation of High Temperature Gas-cooled Reactors and Its Possibility to be Implemented in Indonesia," *IOP Conf Ser Mater Sci Eng*, vol. 536, no. 1, p. 012144, Jun. 2019, doi: 10.1088/1757-899X/536/1/012144.
- [19] A. Epiney, C. Rabiti, A. Alfonsi, P. Talbot, and F. Ganda, "Optimization of a Demonstration Case for a Static N-R HES Configuration using RAVEN," Idaho Falls, Apr. 2017. Accessed: Jun. 07, 2022. [Online]. Available: https://inldigitallibrary.inl.gov/sites/sti/Sort_1953.pdf
- [20] "Technical and Economic Aspects of Load Following with Nuclear Power Plants," Jun. 2011. Accessed: Jun. 07, 2022. [Online]. Available: https://www.oecd-nea.org/upload/docs/application/pdf/2021-12/technical and economic aspects of load following with nuclear power plants.pdf