

Appendix E. Technology Maturity Assessment

As discussed in Section 6 (Technology Selection and Pipeline Considerations) of this Options Paper, New York will likely need to apply a more significant level of technology assessment and technology selection for advanced nuclear than has typically been the case for other clean energy programs. Section 6 notes that in particular for the grid-scale use case under consideration in this Options Paper, technology maturity is an important factor in such technology assessment. Building on the assessment conducted already in the Zero by 40 Technoeconomic Assessment (0x40 Assessment), this appendix offers a more detailed assessment of maturity of the range of available grid-scale advanced nuclear designs. These designs are listed in Table E-2 below and include 9 of the 10 reactors referenced in Section 4.3.1 of the 0x40 Assessment, as well as 6 additional reactors. The additional reactors were included in an effort to ensure that the assessment encompassed a significantly wide range of designs.

The New York State Energy Research and Development Authority (NYSERDA) and the Department of Public Service (DPS) acknowledge the contribution of Sargent & Lundy, working as a subcontractor to The Brattle Group, in conducting the analysis described in this appendix.

The assessment in this appendix is offered as a foundation for a range of policy choices and program design aspects that may need to apply a level of technology selection, including the State intervention options raised throughout this Options Paper, as well as programs that New York may offer based on the full range of studies of the Master Plan for Responsible Advanced Nuclear Development in New York (Master Plan) currently being developed.

While an assessment based on technology maturity will be a key factor for the choices contemplated in Section 6 (Technology Selection and Pipeline Considerations) of this Options Paper, deeper technology assessment on a wider set of criteria will likely be needed as well. Section 7 (Procurement Mechanisms) considers options for a pre-qualification process to conduct such deeper due diligence with developers and technology providers as part of a process to award government support.

Consistent with the overall scope of this Options Paper, this appendix is limited to grid-scale nuclear technologies, defined here as grid-serving units 50 megawatt-electric (MWe) or above.






NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

The following screening criteria were used to assess maturity: (1) licensing & design maturity, and (2) evidence of active projects or committed buyers that demonstrate economic backing and deployment momentum.

1. **Licensing & Design Status:** A reactor deployment in the 2030s would require an established, mature technology. Significant progress towards the United States Nuclear Regulatory Commission (NRC) licensing process with discounted consideration for foreign regulatory actions. Design is either detailed and ready for construction or already being built (or already built in the case of the AP1000). A fully NRC-certified/approved design or one with a construction permit or operating license application under NRC review are indicative of mature licensing status and, by extension, design status. Alternatively, significant licensing and certification progress with nuclear regulators from Canada and/or the United Kingdom are also indicative of mature design and the potential for expedited licensing by the NRC. The United States Department of Energy (DOE) authorizes non-commercial construction and operation of nuclear reactors located on DOE/federal facilities. Significant progress in DOE authorization is indicative of mature design and the potential for expedited licensing by the NRC for commercial operation.
2. **Active Projects:** This criterion asks whether a design has economic backing already in place. A reactor already built with lessons learned to be gleaned from is preferable. If a reactor project is already underway with a buyer, this bodes well for the design. Public information about projects that identify significant commitments in financing are indicative of projects being actively developed. The development of test units at national laboratories or at academic institutions is also indicative of active project development. It should be noted that non-binding memoranda of understanding (MOUs) or power purchase agreements (PPAs) are not considered to be indicative of active project development.

Analysis in this section uses the qualitative scoring system summarized below in Table E-1. Table E-2 provides the assessment results.

Table E-1. Qualitative Scoring

Score	Scoring Description
	<i>Ideal characteristic/approach/low risk</i>
	<i>Favorable characteristic/approach/low-medium risk</i>
	<i>Acceptable characteristic/approach/medium risk</i>
	<i>Unfavorable characteristic/approach/medium-high risk</i>
	<i>Unacceptable characteristic/approach/high risk</i>





The maturity assessment in Table E-2 indicates significant differences between nuclear technologies that can be considered ready for deployment at scale and many that still face both licensing and project development hurdles before they can reasonably be deployed at scale in New York. Periodic reevaluation of the status of these nuclear technologies will be important to determine whether newer emerging technologies should be considered as a part of the State’s strategy to achieve 5 GW of deployment

NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER



Table E-2. Grid Power Use Case Screening Results

Reactor	Licensing Design Status	Active Projects
Westinghouse AP1000	<p>● The AP1000 design holds a Design Certification from the NRC, affording broad safety approval for deployment. The approval is for a generic version of the AP1000 that can be adapted to site specific characteristics.</p> <p>This Design Certification was successfully incorporated by reference into the Combined License Application for two AP1000 units that were constructed at the Vogtle site and currently operating. The approved design was modified to suit the unique parameters of the Vogtle site. These design changes were reviewed and approved by the NRC.</p> <p>The AP1000 has faced the full gamut of NRC safety reviews and has been approved. The Design Certification has been revised several times to incorporate improvements, currently at Revision 19. The NRC has extended approval of the design to 2046. The AP1000 represents the most mature advanced nuclear technology available in the US.</p>	<p>● Multiple AP1000s are currently in operation globally. These operating plants provide critical insight into the efficacy of the design and its operation, informing future iterations of the design. Additionally, operating plants maintain consistent demand from the supply chain, which will facilitate future deployments of the technology.</p> <p>2 operating at Vogtle, GA 4 operating in China 3 units planned for Poland 2 units planned for Bulgaria</p>



NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

Reactor	Licensing Design Status	Active Projects
<p>GEVH BWRX-300</p>	<p> The BWRX-300 design is currently under review by NRC as part of an application for a construction permit at the Clinch River site for TVA. This construction permit application includes only sufficient detail on the BWRX-300 reactor to allow the NRC to assess the safety of its design and function, but does not constitute a complete/final design of the whole nuclear power plant. Additionally, a similar construction permit application in Canada was submitted, reviewed, and approved by the Canadian regulator.</p> <p>The BWRX-300 implements advances in passive safety while still retaining familiar aspects of light water reactors in operation today.</p>	<p> The first of four units planned for the Darlington, Ontario site is actively under construction. Work at the Darlington site is informing design and construction planning for deployments elsewhere. TVA is actively pursuing the deployment of one BWRX-300 at their Clinch River site for which they already have site approval. GE Vernova Hitachi (GEVH) has signed agreements for multiple BWRX-300 deployments in Poland with Orlen and Synthos. Of the new nuclear technologies, the BWRX-300 is seeing the most active development of projects.</p>
<p>X-energy Xe-100</p>	<p> The Xe-100 design is currently under review by the NRC as part of an application for a construction permit at the Long Mott site for Dow Chemical. This construction permit application includes only sufficient detail on the Xe-100 reactor to allow the NRC to assess the safety of its design and function, but does not constitute a complete/final design of the whole nuclear power plant.</p> <p>The Xe-100 implements advanced safety features facilitated by its Tri-Structural Isotopic (TRISO)-fueled, gas-cooled design. This design represents a significant deviation from typical nuclear reactor design and operation.</p>	<p> X-energy is actively developing the deployment of a standard 4-unit plant at the Long Mott site in coordination with Dow Chemical, who will be the primary off-taker of the electricity and process heat. Additionally, Energy Northwest is actively developing plans to deploy three of the standard Xe-100 plants (12 total units) at their Columbia site. X-energy is being provided direct funding and execution support from Amazon.</p>

NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER





Reactor	Licensing Design Status	Active Projects
<p>Holtec SMR-300</p>	<p> Holtec has engaged in multi-year pre-application interaction with the NRC including submission of white papers and licensing topical reports in support of a pending construction permit application. Holtec submitted half of this construction permit application for their Palisades site in the form of a limited work authorization request focused on the environmental impacts on the site. This request only includes limited information on the design of the SMR-300. Holtec indicates that the second half of the application, including the safety information on the SMR-300 will be completed in the next year.</p> <p>This indicates a design maturity nearing the same level of the other designs currently under review by the NRC. But there still may be additional design and licensing work underway.</p> <p>The SMR-300 implements advances in passive safety while still retaining familiar aspects of light water reactors in operation today.</p>	<p> Holtec intends to deploy their first SMR-300 unit at their Palisades site where they are also restarting the existing retired reactor.</p>

NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER





Reactor	Licensing Design Status	Active Projects
NuScale VOYGR ¹	<p> The NuScale VOYGR plant holds a Design Certification from the NRC affording broad safety approval for deployment. The approval is for a generic version of the VOYGR that can be adapted to site specific characteristics. Additionally, NuScale applied for and received approval for an updated version of the VOYGR plant.</p> <p>This design is ready for incorporation into a license application by reference with site-specific design changes implemented. From a licensing prospective, this design is the most mature of the SMRs.</p> <p>The VOYGR reactor modules implement advances in passive safety while still retaining familiar aspects of light water reactors in operation today.</p>	<p> NuScale was developing a deployment at a site in Idaho before economic conditions and costs caused the primary off-taker to back out. Currently NuScale has no active projects in the US. NuScale is actively developing a 12-unit plant in Doicești, Romania.</p>

¹ Note that this assessment considers the updated NuScale VOYGR/US460 plant design as opposed to the US600 design.





NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

Reactor	Licensing Design Status	Active Projects
TerraPower Natrium	<p> As of March, 2026, The Natrium design has received a construction permit from the NRC. This construction permit application includes only sufficient detail on the Natrium reactor to allow the NRC to assess the safety of its design and function but does not constitute a complete/final design of the whole nuclear power plant.</p> <p>The licensing approach TerraPower is taking minimizes the size and scope of the nuclear structure under the purview of the NRC, separating out the non-nuclear aspects of the power plant (e.g., turbine-generator) to a commercial facility. This simplifies licensing and facilitates the rapid construction of the non-nuclear facility.</p> <p>The Natrium reactor implements advanced safety features facilitated by its uranium zirconium (UZr)-fueled, sodium-cooled design, and molten salt thermal storage. This design represents a significant deviation from typical nuclear reactor design and operation.</p>	<p> TerraPower is actively developing their deployment of a unit at their Kemmerer site. Given their separation of nuclear and non-nuclear systems, TerraPower has begun construction of non-nuclear facilities and training center. As of April 2026, TerraPower also began construction of nuclear systems after receiving a construction permit from the NRC. TerraPower has been provided with funding and execution support from Microsoft. TerraPower has also received interest from Meta.</p>
Rolls Royce SMR	<p> Rolls Royce is just beginning engagement with the NRC with no near-term plan for a license application. However, the Rolls Royce SMR has undergone extensive regulatory review and approval in the UK via the Generic Design Assessment process. Rolls Royce’s design is currently undergoing the last step (of three) of approval. This UK regulator review and approval indicates a mature design that could be more easily modified to meet NRC rules and regulations.</p>	<p> Rolls Royce was selected by Great Britain Nuclear, a public entity developing new nuclear power in the UK, to deploy three SMRs in Wales, targeting mid 2030s operation. Additionally, the SMR was selected for deployment in Czechia. This Czechia deployment agreement included a significant investment by Czech partners into Rolls Royce.</p>





NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

Reactor	Licensing Design Status	Active Projects
Kairos FHR	 Kairos has applied for and received construction permits for two small, non-power test reactors called HERMES. The commercial design, FHR, is an upscaled HERMES with a capacity of 150 MW (two 75 MW reactors with shared power conversion system). Test reactors receive lower levels of scrutiny from the NRC due to their small size and experimental nature. Although major features of the HERMES test reactors are applicable to the larger FHR design, it is unclear what licensing challenges the larger FHR will face, indicating a lower licensing maturity despite the success of the test reactors.	 Kairos is actively constructing two small, non-power test reactors (HERMES) at Oak Ridge National Lab. Kairos is developing their project with support from Google and has TVA on board to accept any electricity generated by the test reactors. There are no indications of active public projects for the deployment of their commercial FHR design. Kairos is being provided funding and execution support from Google.
Oklo Aurora	 Oklo is actively engaged with the NRC to develop a Combined License Application. The application has undergone a readiness review by the NRC, but has not been submitted. Development of the Aurora design is in progress. Oklo broke ground on a pilot plant at the DOE's Idaho National Lab demonstration area and is currently undergoing DOE authorization. Successful deployment at INL will directly inform commercial deployments, but significant progress in that pilot deployment has not occurred.	 Oklo is actively constructing a demonstration Aurora powerhouse at the DOE's INL site under the DOE's authorization process. Additionally, Oklo is actively constructing a fuel facility to support reactor deployments. Oklo announced intentions for a commercial deployment of the Aurora reactor at a site in Ohio. However, significant progress on this commercial deployment has not occurred.



NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

Reactor	Licensing Design Status	Active Projects
<p>ARC Clean Tech ARC-100</p>	<p> ARC has engaged in multi-year pre-application interaction with the NRC including submission of white papers and licensing topical reports in support of a future licensing application. ARC has indicated a desire to pursue advanced licensing pathways such as 10 CFR 53. Although 10 CFR 53 offers significant advantages for ARC for making their safety case to the NRC, implementation of the 10 CFR 53 rulemaking and guidance development is still a long way off. This means that ARC is not particularly close to being ready to support near-term licensing in the US.</p> <p>ARC is currently undergoing regulatory review and approval in Canada. ARC has indicated that their design philosophy is to ensure that their design meets the requirements of both the US and Canadian regulations. This would indicate that ARC is meeting progress on their design.</p>	<p> New Brunswick Power intends to deploy an ARC-100 reactor at their Point Lepreau. There are no indications of active public projects for the ARC-100 in the US.</p>
<p>Terrestrial IMSR</p>	<p> Terrestrial is engaged in preapplication engagement with the NRC. They are pursuing regulatory approval in Canada and have made significant progress for full approval of their design.</p>	<p> There are no indications of active public projects for the IMSR.</p>



NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

Reactor	Licensing Design Status	Active Projects
<p>GEH ABWR</p>	<p> The ABWR has a Design Certification Issued by NRC in 1997 affording broad safety approval for deployment. The approval is for a generic version of the ABWR that can be adapted to site specific characteristics.</p> <p>Significant work was performed to develop a license application for the deployment of two ABWRs at the South Texas Project site. However, this project was ultimately abandoned for financial reasons.</p>	<p> GEVH and Toshiba, both holders of ABWR certifications, have not indicated their willingness to commercially support any new ABWR projects, despite the design being approved by the NRC. Two AWBR units are in operation in Japan, but there has been no movement in expanding this fleet. The ABWR is a design from the previous generation of reactors and doesn't include many of the passive safety features that are typical in designs from this generation. Near-term deployment of this technology is considered unlikely in the US.</p>
<p>Westinghouse AP300</p>	<p> Westinghouse has engaged in limited NRC pre-application interactions. It has indicated that it wishes to pursue a Design Certification for the AP300, like that for the AP1000. The Design Certification process is long and would not be ready to support new power plant licensing for several years.</p> <p>Because the AP300's design philosophy focuses on using major features of the already-approved AP1000, licensing of the AP300 will likely not face significant challenges.</p>	<p> There are no indications of active projects for the AP300.</p>

NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

Reactor	Licensing Design Status	Active Projects
<p>KEPCO/KHNP APR1400</p>	<p> The APR1400 has a design certification issued by the NRC as of April 2019.</p> <p>This design is ready for incorporation into a license application by reference with site-specific design changes implemented.</p>	<p> KEPCO’s APR1400 fleet is now in full commercial service with four units in South Korea (Saeul/Shin Kori 3–4 and Shin Hanul 1–2) and four units at Barakah in the UAE, providing the design with multi-unit operating experience in both domestic and export settings.</p> <p>In Korea, two additional APR1400s at Saeul 3–4 are in the late stages of construction and commissioning, and Shin Hanul 3–4 are under construction with target operation dates in the early 2030s.</p> <p>Internationally, Korean Electric Power Company (KEPCO)/Korea Hydro & Nuclear Power Company (KHNP) has been selected to supply APR1400 units for Pątnów in Poland and two units for Dukovany in the Czech Republic, with contracts signed and construction of the Czech units expected to start around 2029.</p> <p>Following a settlement between KEPCO and Westinghouse on intellectual property disputes, near-term deployment of the APR1400 in the U.S. market is considered unlikely.</p>

NEW YORK ADVANCED NUCLEAR POLICY OPTIONS PAPER

Reactor	Licensing Design Status	Active Projects
General Atomics FMR	<p> Conceptual design has been completed, including core, systems, and pre-application licensing documents; GA has fabricated prototype SiC-clad HALEU/UO₂ fuel rods and begun irradiation testing at Idaho National Laboratory while moving into technology maturation and preliminary design.</p> <p>On licensing, FMR is only in NRC pre-application: GA has submitted a Principal Design Criteria topical report and a Quality Assurance Program Description, plus white papers on fuel qualification, source term methodology, licensing-basis event selection, SSC safety classification, and overall safety/PRA approach, which are docketed and in various stages of NRC staff review.</p>	<p> There are no indications of active projects for the FMR.</p>