

References for The NEA Small Modular Reactor Dashboard: Volume II

NUCLEAR ENERGY AGENCY

NUCLEAR TECHNOLOGY AND ECONOMICS DIVISION

Table of contents

1	BWX Technologies - BANR SMR	7
1.1	Table Information	7
1.2	Licensing Readiness.....	8
1.3	Siting.....	8
1.4	Financing	9
1.5	Supply Chain.....	9
1.6	Engagement	9
1.7	Fuel.....	10
2	BWX Technologies - Project Pele	11
2.1	Table Information	11
2.2	Licensing Readiness.....	11
2.3	Siting.....	12
2.4	Financing	12
2.5	Supply Chain.....	13
2.6	Engagement	14
2.7	Fuel.....	14
3	Research Centre Řež - Energy Well.....	16
3.1	Table Information	16
3.2	Licensing Readiness.....	16
3.3	Siting.....	16
3.4	Financing	16
3.5	Supply Chain.....	17
3.6	Engagement	17
3.7	Fuel.....	17
4	Dual Fluid Energy – DF300	18
4.1	Table Information	18
4.2	Licensing Readiness.....	18
4.3	Siting.....	18
4.4	Financing	19
4.5	Supply Chain.....	19
4.6	Engagement	19

4.7	Fuel.....	20
5	Holtec International - SMR-160	21
5.1	Table Information	21
5.2	Licensing Readiness.....	21
5.3	Siting.....	22
5.4	Financing	23
5.5	Supply Chain.....	23
5.6	Engagement	24
5.7	Fuel.....	24
6	Japan Atomic Energy Agency - GTHTR300	25
6.1	Table Information	25
6.2	Licensing Readiness.....	26
6.3	Siting.....	26
6.4	Financing	26
6.5	Supply Chain.....	26
6.6	Engagement	26
6.7	Fuel.....	27
7	Japan Atomic Energy Agency - HTTR.....	28
7.1	Table Information	28
7.2	Licensing Readiness.....	29
7.3	Siting.....	29
7.4	Financing	29
7.5	Supply Chain.....	29
7.6	Engagement	29
7.7	Fuel.....	30
8	Jimmy Energy - Jimmy.....	31
8.1	Table Information	31
8.2	Licensing Readiness.....	31
8.3	Siting.....	31
8.4	Financing	32
8.5	Supply Chain.....	32
8.6	Engagement	32
8.7	Fuel.....	33

9	Korea Atomic Energy Research Institute - SMART.....	34
9.1	Table Information	34
9.2	Licensing Readiness.....	34
9.3	Siting.....	35
9.4	Financing	35
9.5	Supply Chain.....	36
9.6	Engagement	36
9.7	Fuel.....	37
10	Last Energy - PWR-20.....	38
10.1	Table Information	38
10.2	Licensing Readiness.....	38
10.3	Siting.....	38
10.4	Financing	39
10.5	Supply Chain.....	40
10.6	Engagement	41
10.7	Fuel.....	41
11	<i>newcleo</i> - LFR AS 200	42
11.1	Table Information	42
11.2	Licensing Readiness.....	42
11.3	Siting.....	43
11.4	Financing	43
11.5	Supply Chain.....	43
11.6	Engagement	44
11.7	Fuel.....	44
12	N.A. Dollezhal Research and Design Institute of Power Engineering - BREST-OD-300.....	45
12.1	Table Information	45
12.2	Licensing Readiness.....	45
12.3	Siting.....	46
12.4	Financing	46
12.5	Supply Chain.....	47
12.6	Engagement	47
12.7	Fuel.....	47
13	Radiant - Kaleidos	49

13.1	Table Information	49
13.2	Licensing Readiness.....	49
13.3	Siting.....	49
13.4	Financing	50
13.5	Supply Chain.....	50
13.6	Partnerships & Engagement	50
13.7	Fuel.....	51
14	Rosatom - RITM-200M	52
14.1	Table Information	52
14.2	Licensing Readiness.....	52
14.3	Siting.....	53
14.4	Financing	53
14.5	Supply Chain.....	53
14.6	Engagement	54
14.7	Fuel.....	54
15	Seaborg Technologies - Compact Molten Slat Reactor (CMSR).....	55
15.1	Table Information	55
15.2	Licensing Readiness.....	55
15.3	Siting.....	56
15.4	Financing	56
15.5	Supply Chain.....	57
15.6	Engagement	58
15.7	Fuel.....	58
16	State Power Investment Corporation - HAPPY200	59
16.1	Table Information	59
16.2	Licensing Readiness.....	59
16.3	Siting.....	60
16.4	Financing	60
16.5	Supply Chain.....	60
16.6	Engagement	61
16.7	Fuel.....	61
17	Terrestrial Energy – Integrated Molten Salt Reactor (IMSR)	62
17.1	Table Information	62

17.2	Licensing Readiness.....	62
17.3	Siting.....	63
17.4	Financing.....	63
17.5	Supply Chain.....	64
17.6	Engagement.....	66
17.7	Fuel.....	67
18	ThorCon International - TMSR-500.....	70
18.1	Table Information.....	70
18.2	Licensing Readiness.....	70
18.3	Siting.....	71
18.4	Financing.....	71
18.5	Supply Chain.....	72
18.6	Engagement.....	73
18.7	Fuel.....	73
19	Toshiba Energy Systems & Solutions Corporation - 4S.....	74
19.1	Table Information.....	74
19.2	Licensing Readiness.....	74
19.3	Siting.....	75
19.4	Financing.....	75
19.5	Supply Chain.....	75
19.6	Engagement.....	75
19.7	Fuel.....	75
20	Westinghouse Electric Company - Westinghouse LFR.....	76
20.1	Table Information.....	76
20.2	Licensing Readiness.....	76
20.3	Siting.....	77
20.4	Financing.....	77
20.5	Supply Chain.....	78
20.6	Engagement.....	78
20.7	Fuel.....	79
21	Západočeská univerzita v Plzni and Czech Technical University in Prague TEPLATOR.....	80
21.1	Table Information.....	80
21.2	Licensing Readiness.....	80

21.3 Siting..... 81

21.4 Financing 81

21.5 Supply Chain..... 81

21.6 Engagement 82

21.7 Fuel..... 82

1 BWX Technologies - BANR SMR

1.1 Table Information

[1] Thermal Power (MWth): World Nuclear News (2022), "BWXT provides update on microreactor progress",
www.world-nuclear-news.org/Articles/BWXT-provides-update-on-microreactor-progress
(accessed 23 June 2023).

[2] Thermal Power (MWth): NC State Nuclear YouTube channel (3 December 2021), "NE Seminar 11/11/2021 - Overview of BWXT's Advanced Nuclear Reactor (BANR) Development Program", BWXT Advanced Technologies,
www.youtube.com/watch?v=2koz996oRdY (accessed 23 June 2023).

[3] Outlet Temperature (°C): NC State Nuclear YouTube channel (3 December 2021), "NE Seminar 11/11/2021 - Overview of BWXT's Advanced Nuclear Reactor (BANR) Development Program", BWXT Advanced Technologies,
www.youtube.com/watch?v=2koz996oRdY (accessed 23 June 2023).

[4] Spectrum (Thermal/Fast): Nygaard, E. (2021), " BWXT's Advanced Nuclear Reactor (BANR)", BWX Technologies,
www.nationalacademies.org/documents/embed/link/LF2255DA3DD1C41C0A42D3BEF0989ACAEC E3053A6A9B/file/DD7F72C500641846CD3FC86C8D19F97B8889C926B7DE?noSaveAs=1 (accessed 23 June 2023).

[5] Fuel Type: World Nuclear News (2022), "BWXT provides update on microreactor progress",
www.world-nuclear-news.org/Articles/BWXT-provides-update-on-microreactor-progress
(accessed 23 June 2023).

[6] Fuel Type: Donahue, A. J. et al. (2022), "BWXT ADVANCED NUCLEAR REACTOR (BANR) REGULATORY ENGAGEMENT PLAN BANR-PLAN-111554 Revision 0 August 2022", BWX Technologies,
<https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22243A112>
(accessed 23 June 2023).

[7] Fuel Type: NC State Nuclear YouTube channel (3 December 2021), "NE Seminar 11/11/2021 - Overview of BWXT's Advanced Nuclear Reactor (BANR) Development Program", BWXT Advanced Technologies,
www.youtube.com/watch?v=2koz996oRdY (accessed 23 June 2023).

[8] Fuel (LEU/HALEU/HEU): World Nuclear News (2022), "BWXT provides update on microreactor progress",
www.world-nuclear-news.org/Articles/BWXT-provides-update-on-microreactor-progress
(accessed 23 June 2023).

1.2 Licensing Readiness

[1] Donahue, A. J. et al. (2022), "BWXT ADVANCED NUCLEAR REACTOR (BANR) REGULATORY ENGAGEMENT PLAN BANR-PLAN-111554 Revision 0 August 2022", BWX Technologies, <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22243A112> (accessed 23 June 2023).

[2] Donahue, A. J. et al. (2022), "BWXT ADVANCED NUCLEAR REACTOR (BANR) REGULATORY ENGAGEMENT PLAN BANR-PLAN-111554 Revision 0 August 2022", BWX Technologies, <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22243A112> (accessed 23 June 2023).

[3] Schilthelm, S. et al. (2022), "BANR Licensing Activities NRC Kick-Off Meeting", BWX Technologies, <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22286A214> (accessed 23 June 2023).

[4] United States Nuclear Regulatory Commission (n.d.), "ML22335A417 Package documents", <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22335A417> (accessed 23 June 2023).

[5] United States Nuclear Regulatory Commission (2023), "PUBLIC MEETING ANNOUNCEMENT", <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23157A017> (accessed 23 June 2023).

[6] Haggerty, M. et al. (2023), "BWXT Advanced Nuclear Reactor (BANR) Regulatory Update", BWX Technologies, <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23156A226> (accessed 23 June 2023).

[7] Haggerty, M. et al. (2023), "BWXT Advanced Nuclear Reactor (BANR) Regulatory Update BANR-LTR-23-0261 Non-Proprietary Enclosure 2", BWX Technologies, <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23143A380> (accessed 23 June 2023).

[8] United States Nuclear Regulatory Commission (2023), "PUBLIC MEETING ANNOUNCEMENT", <https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML23157A017> (accessed 23 June 2023).

1.3 Siting

N/A

1.4 Financing

[1] World Nuclear News (2022), "BWXT provides update on microreactor progress", www.world-nuclear-news.org/Articles/BWXT-provides-update-on-microreactor-progress (accessed 23 June 2023).

[2] BWX Technologies (2020), "BWXT to Lead \$106.6 Million Microreactor Design Project", www.bwxt.com/news/2020/12/23/BWXT-to-Lead-1066-Million-Microreactor-Design-Project (accessed 23 June 2023).

[3] World Nuclear News (2022), "BWXT provides update on microreactor progress", www.world-nuclear-news.org/Articles/BWXT-provides-update-on-microreactor-progress (accessed 23 June 2023).

[4] Neutron Bytes (2022), "DOD to Build & Test Project Pele Mini Reactor at INL", <https://neutronbytes.com/2022/04/14/dod-to-build-test-project-pele-mini-reactor-at-inl/> (accessed 23 June 2023).

[5] AiThORITY (2020), "BWXT to Lead \$106.6 Million Microreactor Design Project", <https://aithority.com/technology/energy-management/bwxt-to-lead-106-6-million-microreactor-design-project/> (accessed 23 June 2023).

1.5 Supply Chain

[1] Duchnowski, E. M. et al. (2022), "Pre-conceptual high temperature gas-cooled microreactor design utilizing two-phase composite moderators. Part I: Microreactor design and reactor performance", *Progress in Nuclear Energy*, Volume 149: 104257, <https://doi.org/10.1016/j.pnucene.2022.104257> (accessed 23 June 2023)

[2] Kraev, K. (2022), "US / BWXT Microreactor Selected For DOE's Advanced Demonstration Programme", NUCNET, www.nucnet.org/news/bwxt-microreactor-selected-for-doe-s-advanced-demonstration-programme-4-3-2022 (accessed 15 June 2023).

[3] NC State Nuclear YouTube channel (3 December 2021), "NE Seminar 11/11/2021 - Overview of BWXT's Advanced Nuclear Reactor (BANR) Development Program", BWXT Advanced Technologies, www.youtube.com/watch?v=2koz996oRdY (accessed 23 June 2023).

1.6 Engagement

N/A

1.7 Fuel

[1] Nygaard, E. (2021), " BWXT's Advanced Nuclear Reactor (BANR)", BWX Technologies, www.nationalacademies.org/documents/embed/link/LF2255DA3DD1C41C0A42D3BEF0989ACAEC E3053A6A9B/file/DD7F72C500641846CD3FC86C8D19F97B8889C926B7DE?noSaveAs=1 (accessed 23 June 2023).

[2] Nygaard, E. (2021), " BWXT's Advanced Nuclear Reactor (BANR)", BWX Technologies, www.nationalacademies.org/documents/embed/link/LF2255DA3DD1C41C0A42D3BEF0989ACAEC E3053A6A9B/file/DD7F72C500641846CD3FC86C8D19F97B8889C926B7DE?noSaveAs=1 (accessed 23 June 2023).

[3] Kraev, K. (2022), "US / BWXT Microreactor Selected For DOE's Advanced Demonstration Programme", NUCNET, www.nucnet.org/news/bwxt-microreactor-selected-for-doe-s-advanced-demonstration-programme-4-3-2022 (accessed 23 June 2023).

[4] World Nuclear News (2022), "BWXT provides update on microreactor progress", www.world-nuclear-news.org/Articles/BWXT-provides-update-on-microreactor-progress (accessed 23 June 2023).

[5] Nuclear Newswire (2020), "Microreactor work at ORNL fueled by BWXT" www.ans.org/news/article-32/microreactor-work-at-ornl-fueled-by-bwxt/ (accessed 23 June 2023).

[6] Office of NEPA Policy and Compliance (2022), "CX-026152: Development of Advanced Fuel Materials for the BWXT Advanced Nuclear Reactor (BANR)", U.S. Department of Energy, www.energy.gov/nepa/articles/cx-026152-development-advanced-fuel-materials-bwxt-advanced-nuclear-reactor-banr (accessed 23 June 2023).

[7] Day, P. (2023), "U.S. ramps up advanced fuel production capabilities", Reuters, www.reuters.com/business/energy/us-ramps-up-advanced-fuel-production-capabilities-2023-02-16/ (accessed 23 June 2023).

[8] BWX Technologies (n.d.), "TRISO FUEL", www.bwxt.com/what-we-do/strategic-nuclear-materials/triso-fuel (accessed 23 June 2023).

2 BWX Technologies - Project Pele

2.1 Table Information

[1] Thermal Power (MWth): World Nuclear News (2022), "BWX Technologies selected to build Project Pele microreactor", www.world-nuclear-news.org/Articles/BWX-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[2] Outlet Temperature (°C): N/A

[3] Spectrum (Thermal/Fast): N/A

[4] Fuel Type: World Nuclear News (2022), "BWX Technologies selected to build Project Pele microreactor", www.world-nuclear-news.org/Articles/BWX-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): World Nuclear News (2022), "BWX Technologies selected to build Project Pele microreactor", www.world-nuclear-news.org/Articles/BWX-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

2.2 Licensing Readiness

[1] Waksman, J. (2020), "Project Pele Overview: Mobile Nuclear Power For Future DoD Needs", Office of the Secretary of Defense, https://gain.inl.gov/GAINEPRINEI_MicroreactorProgramVirtualWorkshopPres/Day-2%20Presentations/Day-2-am.02-Nichols_PeleProgOverviewPublicMarch2020,19Aug2020.pdf (accessed 23 June 2023).

[2] World Nuclear News (2022), "BWX Technologies selected to build Project Pele microreactor", www.world-nuclear-news.org/Articles/BWX-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[3] Sondgeroth, J. (2023), "Interview: Pentagon's Jeff Waksman on Project Pele Microreactor", Energy Intelligence Group, www.energyintel.com/00000186-7b02-d1cb-a3ee-ffbf32940000 (accessed 23 June 2023).

[4] World Nuclear News (2022), "BWX Technologies selected to build Project Pele microreactor", www.world-nuclear-news.org/Articles/BWX-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[5] Nuclear Newswire (2022), "Final EIS for Project Pele microreactor available", www.ans.org/news/article-3697/final-eis-for-project-pele-microreactor-available/ (accessed 29 June 2023).

2.3 Siting

[1] World Nuclear News (2022), "BWXT Technologies selected to build Project Pele microreactor", www.world-nuclear-news.org/Articles/BWXT-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[2] Reuters Events Nuclear (2022), "BWXT wins Project Pele contract; DOE awards \$61 mln to nuclear projects", www.reutersevents.com/nuclear/bwxt-wins-project-pele-contract-doe-awards-61-mln-nuclear-projects (accessed 23 June 2023).

[3] Walton, R. (2022), "Defense Department picks BWXT to build 1st US advanced nuclear microreactor, with 2024 delivery", Utility Dive, www.utilitydive.com/news/defense-department-microreactor-bwx-technology-first-advanced-small-nuclear/625187/ (accessed 23 June 2023).

[4] Conner, A. M. et al.(2021), "Pre-conceptual Evaluation of Department of Defense Pele Microreactor Sites at Idaho National Laboratory", Idaho National Laboratory, https://inldigitalibrary.inl.gov/sites/sti/sti/Sort_53280.pdf (accessed 23 June 2023).

[5] Idaho National Laboratory (2022), "2022 IN REVIEW", <https://inl.gov/article/2022-in-review/> (accessed 23 June 2023).

2.4 Financing

[1] World Nuclear News (2022), "BWXT Technologies selected to build Project Pele microreactor", www.world-nuclear-news.org/Articles/BWXT-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[2] Reuters Events Nuclear (2022), "BWXT wins Project Pele contract; DOE awards \$61 mln to nuclear projects", www.reutersevents.com/nuclear/bwxt-wins-project-pele-contract-doe-awards-61-mln-nuclear-projects (accessed 23 June 2023).

[3] Nuclear Innovation Alliance (2022), "ADVANCED NUCLEAR REACTOR TECHNOLOGY: A PRIMER", <https://nuclearinnovationalliance.org/sites/default/files/2022-07/ANRT-APrimer-July2022.pdf> (accessed 23 June 2023).

[4] Green Stock News (2022), “BWX Technologies Starts Production of TRISO Fuel for First U.S. Generation IV Microreactor”,
<https://greenstocknews.com/news/nyse/bwxt/bwxt-starts-production-of-triso-fuel-for-first-u-s-generation-iv-microreactor> (accessed 23 June 2023).

[5] Thomas, W. (2022), “Efforts to Transform US Nuclear Industry Entering Full Bloom”, American Institute of Physics, www.aip.org/fyi/2022/efforts-transform-us-nuclear-industry-entering-full-bloom (accessed 29 June 2023).

[6] Day, P. (2023), “U.S. ramps up advanced fuel production capabilities”, Reuters,
www.reuters.com/business/energy/us-ramps-up-advanced-fuel-production-capabilities-2023-02-16/ (accessed 23 June 2023).

[7] World Nuclear Association (2023), “Small Nuclear Power Reactors”,
www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors.aspx (accessed 23 June 2023).

2.5 Supply Chain

[1] World Nuclear News (2022), “BWX Technologies selected to build Project Pele microreactor”,
www.world-nuclear-news.org/Articles/BWX-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[2] Nuclear Newswire (2022), “BWXT wins Project Pele contract to supply U.S.'s first microreactor”
,
www.ans.org/news/article-4035/bwxt-wins-project-pele-contract-to-supply-nations-first-microreactor/ (accessed 23 June 2023).

[3] Waksman, J. (2020), “Project Pele Overview: Mobile Nuclear Power For Future DoD Needs”, Office of the Secretary of Defense,
https://gain.inl.gov/GAINEPRINEI_MicroreactorProgramVirtualWorkshopPres/Day-2%20Presentations/Day-2-am.02-Nichols_PeleProgOverviewPublicMarch2020,19Aug2020.pdf (accessed 23 June 2023).

[4] Walton, R. (2022), “Defense Department picks BWXT to build 1st US advanced nuclear microreactor, with 2024 delivery”, Utility Dive,
www.utilitydive.com/news/defense-department-microreactor-bwx-technology-first-advanced-small-nuclear/625187/ (accessed 23 June 2023).

[5] Sondgeroth, J. (2023), “Interview: Pentagon's Jeff Waksman on Project Pele Microreactor”, Energy Intelligence Group,
www.energyintel.com/00000186-7b02-d1cb-a3ee-ffbf32940000 (accessed 23 June 2023).

2.6 Engagement

[1] Energy Communities Alliance (2022), “ECA Forum: Hosting New Nuclear Development August 3-5, 2022”,
<https://static1.squarespace.com/static/55c4c892e4b0d1ec35bc5efb/t/62b60343a942d142bfbf19bb/1656095555676/Draft+Agenda+ECA+Forum+Hosting+New+Nuclear+Development+4872-9341-4688+v.18.pdf> (accessed 23 June 2023).

[2] Beck, M. (2022), “The Pentagon is sending a new nuclear design to Idaho”, Mountain West News Bureau,
www.boisestatepublicradio.org/science-research/2022-04-15/the-pentagon-is-sending-a-new-nuclear-design-to-idaho (accessed 23 June 2023).

[3] World Nuclear News (2021), “US DOD invites public comment on Project Pele draft EIS”,
www.world-nuclear-news.org/Articles/US-DOD-invites-public-comment-on-Project-Pele-draft (accessed 23 June 2023).

[4] United States Department of Defense (2022), “Record of Decision for the Final Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement”, Federal Register,
www.federalregister.gov/documents/2022/04/15/2022-08039/record-of-decision-for-the-final-construction-and-demonstration-of-a-prototype-mobile-microreactor (accessed 23 June 2023).

[5] BWX Technologies (2022), “BWXT to Build First Advanced Microreactor in United States”,
www.bwxt.com/news/2022/06/09/BWXT-to-Build-First-Advanced-Microreactor-in-United-States (accessed 23 June 2023).

[6] Waksman, J. (2020), “Project Pele Overview: Mobile Nuclear Power For Future DoD Needs”, Office of the Secretary of Defense,
https://gain.inl.gov/GAINEPRINEI_MicroreactorProgramVirtualWorkshopPres/Day-2%20Presentations/Day-2-am.02-Nichols_PeleProgOverviewPublicMarch2020,19Aug2020.pdf (accessed 23 June 2023).

[7] Walton, R. (2022), “Defense Department picks BWXT to build 1st US advanced nuclear microreactor, with 2024 delivery”, Utility Dive,
www.utilitydive.com/news/defense-department-microreactor-bwx-technology-first-advanced-small-nuclear/625187/ (accessed 23 June 2023).

2.7 Fuel

[1] Nygaard, E. (2021), “BWXT’s Advanced Nuclear Reactor (BANR)”, BWX Technologies,
www.nationalacademies.org/documents/embed/link/LF2255DA3DD1C41C0A42D3BEF0989ACAEC E3053A6A9B/file/DD7F72C500641846CD3FC86C8D19F97B8889C926B7DE?noSaveAs=1 (accessed 23 June 2023).

[2] World Nuclear News (2022), “BWXT Technologies selected to build Project Pele microreactor”, www.world-nuclear-news.org/Articles/BWXT-Technologies-selected-to-build-Project-Pele-mi (accessed 23 June 2023).

[3] Waksman, J. (2020), “Project Pele Overview: Mobile Nuclear Power For Future DoD Needs”, Office of the Secretary of Defense, https://gain.inl.gov/GAINEPRINEI_MicroreactorProgramVirtualWorkshopPres/Day-2%20Presentations/Day-2-am.02-Nichols_PeleProgOverviewPublicMarch2020,19Aug2020.pdf (accessed 23 June 2023).

[4] Nuclear Newswire (2020), “Microreactor work at ORNL fueled by BWXT”, www.ans.org/news/article-32/microreactor-work-at-ornl-fueled-by-bwxt/ (accessed 23 June 2023).

[5] Dalton, D. (2022), “Triso / BWXT Announces ‘Landmark’ Production Of Advanced Fuel That Will Power Microreactor”, NUCNET, www.nucnet.org/news/bwxt-announces-landmark-production-of-advanced-fuel-that-will-power-microreactor-12-1-2022 (accessed 23 June 2023).

[6] Green Stock News (2022), “BWXT Technologies Starts Production of TRISO Fuel for First U.S. Generation IV Microreactor”, <https://greenstocknews.com/news/nyse/bwxt/bwxt-starts-production-of-triso-fuel-for-first-u-s-generation-iv-microreactor> (accessed 23 June 2023).

[7] Day, P. (2023), “U.S. ramps up advanced fuel production capabilities”, Reuters, www.reuters.com/business/energy/us-ramps-up-advanced-fuel-production-capabilities-2023-02-16/ (accessed 23 June 2023).

[8] Sondgeroth, J. (2023), “Interview: Pentagon's Jeff Waksman on Project Pele Microreactor”, Energy Intelligence Group, www.energyintel.com/00000186-7b02-d1cb-a3ee-ffbf32940000 (accessed 23 June 2023).

[9] Waksman, J. (2020), “Project Pele Overview: Mobile Nuclear Power For Future DoD Needs”, Office of the Secretary of Defense, https://gain.inl.gov/GAINEPRINEI_MicroreactorProgramVirtualWorkshopPres/Day-2%20Presentations/Day-2-am.02-Nichols_PeleProgOverviewPublicMarch2020,19Aug2020.pdf (accessed 23 June 2023).

3 Research Centre Řež - Energy Well

3.1 Table Information

[1] Thermal Power (MWth): Energy well (n.d.), "Use of the Energy Well reactor", Centrum výzkumu u Řež, www.energywell.cz/faq#Use%20of%20the%20Energy%20Well%20reactor (accessed 29 June 2023).

[2] Outlet Temperature (°C): Energy well (n.d.), "Technical Details", Centrum výzkumu Řež, www.energywell.cz/technical-details (accessed 29 June 2023).

[3] Spectrum (Thermal/Fast): Energy well (n.d.), "Technical Details", Centrum výzkumu Řež, www.energywell.cz/technical-details (accessed 29 June 2023).

[4] Fuel Type: Reungoat, M. (2022), "ENERGY WELL PROJECT", Centrum výzkumu Řež, <https://snetp.eu/wp-content/uploads/2022/06/SNETP-TS1-P12-Energy-Well.pdf> (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): Energy well (n.d.), "Technical Details", Centrum výzkumu Řež, www.energywell.cz/technical-details (accessed 29 June 2023).

3.2 Licensing Readiness

[1] Energy well (n.d.), "Technical Details", Centrum výzkumu Řež, www.energywell.cz/technical-details (accessed 29 June 2023).

3.3 Siting

N/A

3.4 Financing

[1] ČEZ Group (2020), "CEZ Group Annual Report 2020", <https://dl.bourse.lu/dl?v=smae/SrOPSMGD+aPdIAPnHg+h/g/dHmyD+dwsRvS9cwePS4UG+ACvPdRHCN7KilcInImHpJdRDUI9wLoItxRwMBmkb2Ssu/DaHQ0+B/HhsOI9rAc8yiO2I/2Zi9bXxyBPza5LWkNTwKftlaECDKkcBdwGUZH+eNu4YNS9LmszmvY5FKuAxzEqKlpakmxAofqzJW0wDVm9DHUN49V2GoS/Z6A8/adbXVTPKBtIsWbxt644meh+Y1ZdZ/n413194p> (accessed 23 June 2023).

3.5 Supply Chain

[1] ČEZ Group (2021), “CEZ GROUP 2021 ANNUAL REPORT”, www.cez.cz/webpublic/file/edee/ospol/fileexport/investori/vz-2021/cez_group_annual_report_2021.pdf (accessed 23 June 2023).

[2] Kříž, L. (2022), “ČEZ finally takes over ŠKODA JS, a major Czech company, primarily operating in nuclear servicing and engineering”, ČEZ Group, www.cez.cz/en/media/press-releases/cez-finally-takes-over-skoda-js-a-major-czech-company-primarily-operating-in-nuclear-servicing-and-engineering-167450 (accessed 23 June 2023).

[3] Vaňkát, M. (2021), “Energy Well”, Centrum výzkumu Řež, www.jadernedny.cz/data/folders/Va%C5%88k%C3%A1t_JD2021-f87.pdf (accessed 23 June 2023).

3.6 Engagement

N/A

3.7 Fuel

[1] Ruščák, M. (n.d.), “Energy Well”, Centrum výzkumu Řež, www.ujv.cz/file/edee/2021/05/mmr_energy_well_m_ruscak_cvr.pdf (accessed 23 June 2023).

4 Dual Fluid Energy – DF300

4.1 Table Information

[1] Thermal Power (MWth): Dual Fluid (n.d.), “Reinventing Nuclear”,
https://dual-fluid.com/wp-content/uploads/2022/03/Dual-Fluid_Whitepaper_EN_screen.pdf
(accessed 23 June 2023).

[2] Outlet Temperature (°C): Dual Fluid (n.d.), “Reinventing Nuclear”,
https://dual-fluid.com/wp-content/uploads/2022/03/Dual-Fluid_Whitepaper_EN_screen.pdf
(accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): Dual Fluid (2022), “Dual Fluid can reduce the nuclear waste problem”,
<https://dual-fluid.com/dual-fluid-can-reduce-the-nuclear-waste-problem/> (accessed 23 June 2023).

[4] Fuel Type: World Intellectual Property Organization (2020), “1. WO2020088707 - DUAL FLUID REACTOR – VARIANT WITH LIQUID METAL FISSIONABLE MATERIAL (DFR/ M)”,
<https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2020088707> (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): Sierchuła, J. et al. (2019), “Determination of the liquid eutectic metal fuel dual fluid reactor (DFRm) design – steady state calculations”, *International Journal of Energy Research*, Volume 43(8): 3692,
<https://doi.org/10.1002/er.4523> (accessed 23 June 2023).

4.2 Licensing Readiness

[1] Canada’s SMR Action Plan (2022), “Dual Fluid Energy”,
<https://smractionplan.ca/content/dual-fluid-energy> (accessed 23 June 2023).

4.3 Siting

[1] Geinitz, C. (2023), “Wir Deutsche sind klimapolitische Geisterfahrer” [We Germans are climate policy wrong-way drivers], Frankfurter Allgemeine,
www.faz.net/aktuell/wirtschaft/atomausstieg-atomphysiker-haelt-stromausfaelle-fuer-bedrohlich-18820870.html (accessed 23 June 2023).

4.4 Financing

[1] Dual Fluid (2021), “Canadian-German nuclear startup raises millions in seed funding”, <https://dual-fluid.com/canadian-german-nuclear-startup-raises-millions-in-seed-funding/> (accessed 23 June 2023).

4.5 Supply Chain

[1] TRIUMF (2023), “TRIUMF launches MOU with Dual Fluid”, www.triumf.ca/current-events/triumf-launches-mou-dual-fluid (accessed 23 June 2023).

[2] Nuklearforum Schweiz (2022), “Dual Fluid kooperiert mit TU München und PSI” [Dual Fluid cooperates with Technical University of Munich and PSI], www.nuklearforum.ch/de/news/dual-fluid-kooperiert-mit-tu-muenchen-und-psi (accessed 23 June 2023).

[3] Wang, X. (2017), “Analysis and Evaluation of the Dual Fluid Reactor Concept”, Technische Universität München, <https://mediatum.ub.tum.de/1343008> (accessed 23 June 2023).

[4] Paul Scherrer Institut (n.d.), “PostDocs”, www.psi.ch/en/fast/postdoctoral-fellows (accessed 23 June 2023).

[5] Raß, L. (2022), “Kerntechnik-Startup Dual Fluid kooperiert mit TU Dresden für Safety Report” [Nuclear technology startup Dual Fluid cooperates with TU Dresden for Safety Report], Presseportal, www.presseportal.de/pm/161131/5126879 (accessed 23 June 2023).

[6] Phd4Gen (n.d.), “PROJECT OBJECTIVES”, <http://phd4gen.pl/> (accessed 23 June 2023).

[7] Dual Fluid (n.d.), “Scientific publications”, <https://dual-fluid.com/publications/> (accessed 23 June 2023).

[8] Sierchuła, J. et al. (2019), “Determination of the liquid eutectic metal fuel dual fluid reactor (DF Rm) design – steady state calculations”, *International Journal of Energy Research*, Volume 43(8): 3 692, <https://doi.org/10.1002/er.4523> (accessed 23 June 2023).

4.6 Engagement

[1] Klute, R. (2013), “GreenTec Awards: Publikumsvotum respektieren, Dual-Fluid-Reaktor nominieren!” [GreenTec Awards: Respect the public vote, nominate dual-fluid reactor!], Nuklearia, <https://nuklearia.de/2013/06/17/greentec-awards-publikumsvotum-respektieren-dual-fluid-reaktor-nominieren/> (accessed 23 June 2023).

[2] Maxeiner, D. and M. Miersch (2013), "Wie man einen Reaktor verschwinden lässt" [How to make a reactor disappear], Welt, www.welt.de/debatte/kolumnen/Maxeiner-und-Miersch/article117088671/Wie-man-einen-Reaktor-verschwinden-laesst.html (accessed 23 June 2023).

[3] openPetition (n.d.), "GREENTEC AWARDS: PUBLIKUMSVOTUM RESPEKTIEREN, DUAL-FLUID-REAKTOR NOMINIEREN!" [GREENTEC AWARDS: RESPECT THE PUBLIC VOTE, NOMINATE DUAL-FLUID REACTOR!], www.openpetition.de/petition/online/greentec-awards-beruecksichtigen-sie-das-publikumsvotum-und-nominieren-sie-den-dual-fluid-reaktor (accessed 23 June 2023).

4.7 Fuel

[1] World Intellectual Property Organization (2020), "1. WO2020088707 - DUAL FLUID REACTOR – VARIANT WITH LIQUID METAL FISSIONABLE MATERIAL (DFR/ M)", <https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2020088707> (accessed 23 June 2023).

5 Holtec International - SMR-160

5.1 Table Information

[1] Thermal Power (MWth): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] Outlet Temperature (°C): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

5.2 Licensing Readiness

[1] World Nuclear News (2021), “Holtec and Hyundai finalise SMR design and deployment agreement”,

www.world-nuclear-news.org/Articles/Holtec-and-Hyundai-finalise-SMR-design-and-deployment (accessed 23 June 2023).

[2] United States Nuclear Regulatory Commission (2023), “SMR-160”,

www.nrc.gov/reactors/new-reactors/smr/licensing-activities/pre-application-activities/holtec.html (accessed 23 June 2023).

[3] Canadian Nuclear Safety Commission (2023), “Pre-Licensing Vendor Design Review”, www.nuclearsafety.gc.ca/eng/reactors/power-plants/pre-licensing-vendor-design-review/index.cfm (accessed 23 June 2023).

[4] Canadian Nuclear Safety Commission (2020), “Phase 1 Pre-Licensing Vendor Design Review Executive Summary: SMR, LLC.”, www.nuclearsafety.gc.ca/eng/reactors/power-plants/pre-licensing-vendor-design-review/holtec-international-executive-summary.cfm (accessed 23 June 2023).

[5] Sondgeroth, J. (2023), “Interview: Holtec's Springman on Moving Into SMRs”, Energy Intelligence Group, www.energyintel.com/00000187-0507-da79-a9f7-7dafb1c60000 (accessed 23 June 2023).

[6] Gov.uk (2023), “Advanced Nuclear Technologies”, www.gov.uk/government/publications/advanced-nuclear-technologies/advanced-nuclear-technologies (accessed 23 June 2023).

5.3 Siting

[1] Sondgeroth, J. (2023), “Interview: Holtec's Springman on Moving Into SMRs”, Energy Intelligence Group, www.energyintel.com/00000187-0507-da79-a9f7-7dafb1c60000 (accessed 23 June 2023).

[2] Neutron Bytes (2021), “Holtec Plans 160 MWe SMR at Oyster Creek Nuclear Site in NJ”, <https://neutronbytes.com/2021/01/10/holtec-plans-160-mwe-smr-at-oyster-creek-nuclear-site-in-nj/> (accessed 23 June 2023).

[3] Nuclear Newswire (2022), “Holtec defines \$7.4B SMR build plan, inks agreement with Entergy”, www.ans.org/news/article-4152/holtec-defines-74b-smr-build-plan-inks-agreement-with-entergy/ (accessed 23 June 2023).

[4] Holtec International (2022), “Holtec Advances Project Delivery Plan for SMR-160 in Czech Republic”, <https://holtecinternational.com/2022/10/25/holtec-advances-project-delivery-plan-for-smr-160-in-czech-republic/> (accessed 23 June 2023).

[5] European Nuclear Society (n.d.), “SMR-160 Project Advances In Czech Republic”, www.euronuclear.org/news/smr-160-project-advances-in-czech-republic/ (accessed 23 June 2023).

[6] Holtec International (2018), “Energoatom and Holtec Sign Historic Memorandum to Build SMR-160 Plants in Ukraine”, <https://holtecinternational.com/2018/03/01/energoatom-and-holtec-sign-historic-memorandum-to-build-smr-160-plants-in-ukraine/> (accessed 23 June 2023).

[7] World Nuclear News (2018), “MOU sees Holtec SMR-160 for Ukraine”, www.world-nuclear-news.org/Articles/MOU-sees-Holtec-SMR-160-for-Ukraine (accessed 23 June 2023).

5.4 Financing

[1] Sondgeroth, J. (2023), “Interview: Holtec's Springman on Moving Into SMRs”, Energy Intelligence Group, www.energyintel.com/00000187-0507-da79-a9f7-7dafb1c60000 (accessed 23 June 2023).

[2] Sondgeroth, J. (2023), “Interview: Holtec's Springman on Moving Into SMRs”, Energy Intelligence Group, www.energyintel.com/00000187-0507-da79-a9f7-7dafb1c60000 (accessed 23 June 2023).

[3] Office of Nuclear Energy (2020), “Energy Department’s Advanced Reactor Demonstration Program Awards \$30 Million in Initial Funding for Risk Reduction Projects”, U.S. Department of Energy, www.energy.gov/ne/articles/energy-departments-advanced-reactor-demonstration-program-awards-30-million-initial (accessed 23 June 2023).

5.5 Supply Chain

[1] Sondgeroth, J. (2023), “Interview: Holtec's Springman on Moving Into SMRs”, Energy Intelligence Group, www.energyintel.com/00000187-0507-da79-a9f7-7dafb1c60000 (accessed 23 June 2023).

[2] Sondgeroth, J. (2023), “Interview: Holtec's Springman on Moving Into SMRs”, Energy Intelligence Group, www.energyintel.com/00000187-0507-da79-a9f7-7dafb1c60000 (accessed 23 June 2023).

[3] World Nuclear News (2021), “Holtec and Hyundai finalise SMR design and deployment agreement”, www.world-nuclear-news.org/Articles/Holtec-and-Hyundai-finalise-SMR-design-and-deploym (accessed 23 June 2023).

[4] U.S. Department of Energy (2021), “DOE-ID NEPA CX DETERMINATION”, www.energy.gov/sites/default/files/2021-08/CX-024247.pdf (accessed 23 June 2023).

[5] U.S. Department of Energy (2021), “DOE-ID NEPA CX DETERMINATION”, www.energy.gov/nepa/articles/cx-024247-us-doe-advanced-reactor-demonstration-project (accessed 23 June 2023).

[6] World Nuclear News (2018), “MOU sees Holtec SMR-160 for Ukraine”, www.world-nuclear-news.org/Articles/MOU-sees-Holtec-SMR-160-for-Ukraine (accessed 23 June 2023).

5.6 Engagement

[1] Southwest Public Policy Institute (2023), “SPPI-TV Ep. 8: Small Reactors, Big Potential – Unleashing the Power of Nuclear Energy”, <https://southwestpolicy.com/sppi-tv-ep-8-small-reactors-big-potential-unleashing-the-power-of-nuclear-energy-2/#respond> (accessed 23 June 2023).

[2] Delmar, J. and P. O’Brien (2022), “Holtec International Overview”, Holtec International, www.vanburencountymi.gov/DocumentCenter/View/2734/Holtec---PCAP-Presentation---April-13-2022-PDF?bidId= (accessed 23 June 2023).

5.7 Fuel

[1] Sondgeroth, J. (2023), “Interview: Holtec's Springman on Moving Into SMRs”, Energy Intelligence Group, www.energyintel.com/00000187-0507-da79-a9f7-7dafb1c60000 (accessed 23 June 2023).

[2] World Nuclear News (2021), “Holtec and Hyundai finalise SMR design and deployment agreement”, www.world-nuclear-news.org/Articles/Holtec-and-Hyundai-finalise-SMR-design-and-deploym (accessed 23 June 2023).

[3] Framatome (2020), “Framatome remporte un contrat de fourniture de combustible pour le petit réacteur modulaire de Holtec”, www.framatome.com/medias/framatome-remporte-un-contrat-de-fourniture-de-combustible-pour-le-petit-reacteur-modulaire-de-holtec/?lang=fr (accessed 23 June 2023).

[4] General Electric (2018), “GE Hitachi and Holtec Announce Cooperation to Accelerate Commercialization of SMR-160 Small Modular Reactor”, www.ge.com/news/press-releases/ge-hitachi-and-holtec-announce-cooperation-accelerate-commercialization-smr-160 (accessed 23 June 2023).

6 Japan Atomic Energy Agency - GTHTR300

6.1 Table Information

[1] Thermal Power (MWth): Nishihara, T. et al. (2018), "Excellent Feature of Japanese HTGR Technologies", *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[2] Thermal Power (MWth): Kunitomi, K. et al. (2002), "Design Study on Gas Turbine High Temperature Reactor (GTHTR300)", *Transactions of the Atomic Energy Society of Japan*, Volume 1(4): 352, <https://doi.org/10.3327/taesj2002.1.352> (accessed 23 June 2023).

[3] Outlet Temperature (°F): Nishihara, T. et al. (2018), "Excellent Feature of Japanese HTGR Technologies", *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[4] Outlet Temperature (°C): Kunitomi, K. et al. (2002), "Design Study on Gas Turbine High Temperature Reactor (GTHTR300)", *Transactions of the Atomic Energy Society of Japan*, Volume 1(4): 352, <https://doi.org/10.3327/taesj2002.1.352> (accessed 23 June 2023).

[5] Spectrum (Thermal/Fast): Nishihara, T. et al. (2018), "Excellent Feature of Japanese HTGR Technologies", *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[6] Spectrum (Thermal/Fast): Kunitomi, K. et al. (2002), "Design Study on Gas Turbine High Temperature Reactor (GTHTR300)", *Transactions of the Atomic Energy Society of Japan*, Volume 1(4): 352, <https://doi.org/10.3327/taesj2002.1.352> (accessed 23 June 2023).

[7] Fuel Type: Nishihara, T. et al. (2018), "Excellent Feature of Japanese HTGR Technologies", *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[8] Fuel Type: Kunitomi, K. et al. (2002), "Design Study on Gas Turbine High Temperature Reactor (GTHTR300)", *Transactions of the Atomic Energy Society of Japan*, Volume 1(4): 352, <https://doi.org/10.3327/taesj2002.1.352> (accessed 23 June 2023).

[9] Fuel (LEU/HALEU/HEU): Nishihara, T. et al. (2018), "Excellent Feature of Japanese HTGR Technologies", *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[10] Fuel (LEU/HALEU/HEU): Kunitomi, K. et al. (2002), "Design Study on Gas Turbine High Temperature Reactor (GTHTR300)", *Transactions of the Atomic Energy Society of Japan*, Volume 1(4): 352, <https://doi.org/10.3327/taesj2002.1.352> (accessed 23 June 2023).

6.2 Licensing Readiness

[1] Sato, H. et al. (2014), “GTHTR300—A nuclear power plant design with 50% generating efficiency”, *Nuclear Engineering and Design*, Volume 275: 190, <https://doi.org/10.1016/j.nucengdes.2014.05.004> (accessed 23 June 2023).

6.3 Siting

N/A

6.4 Financing

[1] Kunitomi, K. et al. (2002), “Design Study on Gas Turbine High Temperature Reactor (GTHTR300)”, Japan Atomic Energy Research Institute, www.jstage.jst.go.jp/article/taesj2002/1/4/1_4_352/_pdf/-char/en (accessed 23 June 2023).

[2] Suyama, K. et al. (2021), “炉心溶融のない高温ガス炉コジェネプラント” [High-temperature gas-cooled reactor cogeneration plant without core melting], Mitsubishi Heavy Industries, www.aesj.or.jp/division/ard/documents/AESJ-2021A-ARD-3.pdf (accessed 23 June 2023).

[3] Kunitomi, K. et al. (2004), “Japan's future HTR—the GTHTR300”, *Nuclear Engineering and Design*, Volume 233(1-3): 309, <https://doi.org/10.1016/j.nucengdes.2004.08.026> (accessed 23 June 2023).

6.5 Supply Chain

[1] Nishihara, T. et al. (2018), “Excellent Feature of Japanese HTGR Technologies”, JAEA-Technology, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[2] Yan, X. L. (2018), “Advanced Reactor Design for High Temperature Applications”, Japan Atomic Energy Agency, https://nucleus.iaea.org/sites/INPRO/df16/Day-1/Keynote_YAN.pdf (accessed 29 June 2023).

6.6 Engagement

N/A

6.7 Fuel

N/A

7 Japan Atomic Energy Agency - HTTR

7.1 Table Information

[1] Thermal Power (MWth): Saito, S. et al. (1994), "Design of High Temperature Engineering Test Reactor (HTTR)", Japan Atomic Energy Research Institute, <https://jopss.jaea.go.jp/pdfdata/JAERI-1332.pdf> (accessed 23 June 2023).

[2] Thermal Power (MWth): Ilas, G. et al. (2012), "Validation of SCALE for High Temperature Gas-Cooled Reactor Analysis", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML1220/ML12201A080.pdf (accessed 23 June 2023).

[3] Outlet Temperature (°C): Saito, S. et al. (1994), "Design of High Temperature Engineering Test Reactor (HTTR)", Japan Atomic Energy Research Institute, <https://jopss.jaea.go.jp/pdfdata/JAERI-1332.pdf> (accessed 23 June 2023).

[4] Outlet Temperature (°C): Ilas, G. et al. (2012), "Validation of SCALE for High Temperature Gas-Cooled Reactor Analysis", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML1220/ML12201A080.pdf (accessed 23 June 2023).

[5] Spectrum (Thermal/Fast): Saito, S. et al. (1994), "Design of High Temperature Engineering Test Reactor (HTTR)", Japan Atomic Energy Research Institute, <https://jopss.jaea.go.jp/pdfdata/JAERI-1332.pdf> (accessed 23 June 2023).

[6] Spectrum (Thermal/Fast): Ilas, G. et al. (2012), "Validation of SCALE for High Temperature Gas-Cooled Reactor Analysis", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML1220/ML12201A080.pdf (accessed 23 June 2023).

[7] Fuel Type: Saito, S. et al. (1994), "Design of High Temperature Engineering Test Reactor (HTTR)", Japan Atomic Energy Research Institute, <https://jopss.jaea.go.jp/pdfdata/JAERI-1332.pdf> (accessed 23 June 2023).

[8] Fuel Type: World Nuclear Association (2023), "Small Nuclear Power Reactors", www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors.aspx (accessed 23 June 2023).

[9] Fuel (LEU/HALEU/HEU): Saito, S. et al. (1994), "Design of High Temperature Engineering Test Reactor (HTTR)", Japan Atomic Energy Research Institute, <https://jopss.jaea.go.jp/pdfdata/JAERI-1332.pdf> (accessed 23 June 2023).

[10] Fuel (LEU/HALEU/HEU): World Nuclear Association (2023), "Small Nuclear Power Reactors", www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors.aspx (accessed 23 June 2023).

7.2 Licensing Readiness

[1] Nishihara, T. et al. (2018), “Excellent Feature of Japanese HTGR Technologies”, *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

7.3 Siting

[1] Japan Atomic Energy Agency (n.d.), “Outline of High Temperature Engineering Test Reactor”, www.jaea.go.jp/04/o-arai/nhc/en/faq/htrr.html (accessed 23 June 2023).

7.4 Financing

[1] Nishihara, T. et al. (2018), “Excellent Feature of Japanese HTGR Technologies”, *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

7.5 Supply Chain

[1] Nishihara, T. et al. (2018), “Excellent Feature of Japanese HTGR Technologies”, *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[2] Minatsuki, I. et al. (1998), “Construction of High Temperature Engineering Test Reactor”, Mitsubishi Heavy Industries, <https://dl.ndl.go.jp/view/prepareDownload?itemId=info%3Andljp%2Fpid%2F3527068&contentNo=1> (accessed 23 June 2023).

7.6 Engagement

[1] Japan Atomic Energy Agency (2022), “原子力機構 「2021年度環境報告書」 2021年度における原子力機構の環境配慮活動報告” [JAEA FY2021 Environmental Report Report on JAEA's Environmental Consideration Activities in FY2021], www.jaea.go.jp/about_JAEA/environment/2022/all.pdf (accessed 23 June 2023).

[2] Japan Atomic Energy Agency (n.d.), “広聴・広報活動と情報公開” [Public Relations Activities and Information Disclosure], www.jaea.go.jp/02/kankyo/2015/16.pdf (accessed 23 June 2023).

[3] Japan Atomic Energy Agency and Mitsubishi Heavy Industries (2022), “カーボンニュートラル実現に向けたHTTRによる水素製造実証事業の開始” [Start of hydrogen production demonstration project by HTTR to realize carbon neutrality], www.jaea.go.jp/02/press2022/p22042202/ (accessed 23 June 2023).

[4] Nishihara, T. et al. (2018), “Excellent Feature of Japanese HTGR Technologies”, *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[5] Ibaraki Prefectural Government (2022), “茨城県原子力安全対策委員会開催結果” [Results of the Ibaraki Prefectural Nuclear Safety Committee], www.pref.ibaraki.jp/seikatsukankyo/gentai/anzen/nuclear/anzen/anzenzetaisaku.html (accessed 23 June 2023).

7.7 Fuel

[1] Nishihara, T. et al. (2018), “Excellent Feature of Japanese HTGR Technologies”, *JAEA-Technology*, 2018-004, DOI:10.11484/jaea-technology-2018-004 (accessed 23 June 2023).

[2] Ministry of Education, Culture, Sports, Science and Technology (2014), “民間における高温ガス炉に関する取組” [Initiatives related to high-temperature gas-cooled reactors in the private sector], www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu2/072/shiryo/_icsFiles/afieldfile/2014/09/11/1351766_10.pdf (accessed 23 June 2023).

[3] Ito, Y. (n.d.), “Message from President”, Nuclear Fuel Industries, www.nfi.co.jp/e/company/message (accessed 23 June 2023).

8 Jimmy Energy - Jimmy

8.1 Table Information

[1] Thermal Power (MWth): Jimmy (n.d.), “Le générateur Jimmy est simple et sûr”, www.jimmy-energy.eu/notre-technologie (accessed 23 June 2023).

[2] Outlet Temperature (°C): Jimmy (n.d.), “Le générateur Jimmy est simple et sûr”, www.jimmy-energy.eu/notre-technologie (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[5] Fuel Type: Electric Power Research Institute (2019), “Uranium Oxycarbide (UCO) Tristructural Isotropic (TRISO) Coated Particle Fuel Performance: Topical Report EPRI-AR-1(NP)”, www.epri.com/research/products/000000003002015750 (accessed 23 June 2023).

[6] Fuel (LEU/HALEU/HEU): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

8.2 Licensing Readiness

[1] Institut de Radioprotection et de Sûreté Nucléaire (2022), “AVIS IRSN N° 2022-00187: Analyse du projet de dossier d’options de sûreté du réacteur HTR “JIMMY””, www.irsn.fr/sites/default/files/documents/expertise/avis/2022/Avis-IRSN-2022-00187.pdf (accessed 23 June 2023).

8.3 Siting

N/A

8.4 Financing

- [1] Jimmy (n.d.), "Le projet Jimmy", www.jimmy-energy.eu/a-propos (accessed 23 June 2023).
- [2] BFM Business (2022), "Antoine Guyot (Jimmy) : Jimmy Energy candidate au plan d'investissement France 2030 - 24/10", www.bfmtv.com/economie/replay-emissions/good-morning-business/antoine-guyot-jimmy-jimmy-energy-candidate-au-plan-d-investisement-france-2030-24-10_VN-202210240066.html (accessed 23 June 2023).
- [3] Guichard, G. (2022), "Jimmy Energy lève 15 millions pour développer un petit réacteur nucléaire", Le Figaro Économie, www.lefigaro.fr/societes/jimmy-energy-leve-15-millions-pour-developper-un-petit-reacteur-nucleaire-20221023 (accessed 23 June 2023).
- [4] BFM Business (2022), "Antoine Guyot (Jimmy) : Jimmy Energy candidate au plan d'investissement France 2030 - 24/10", www.bfmtv.com/economie/replay-emissions/good-morning-business/antoine-guyot-jimmy-jimmy-energy-candidate-au-plan-d-investisement-france-2030-24-10_VN-202210240066.html (accessed 23 June 2023).
- [5] Gouvernement de la République française (2022), "FRANCE 2030 : 241 LAURÉATS RÉCOMPENSÉS LORS DE LA CÉRÉMONIE 2021/2022 DES CONCOURS D'INNOVATION DE L'ÉTAT", www.entreprises.gouv.fr/files/files/enjeux/innovation/20220704_CP_Laureats_Concours_innovation_2021_2022.pdf (accessed 23 June 2023)
- [6] French Tech (2022), "French Tech Green20", <https://lafrenchtech.com/fr/la-france-aide-les-startup/french-tech-green-20/?cn-reloaded=1> (accessed 23 June 2023).

8.5 Supply Chain

- [1] Nuclear Valley (n.d.), "Annuaire des membres (adhérents, observateurs, associés, d'honneurs) Jimmy Energy", www.nuclearvalley.com/annuaire/jimmy-energy/ (accessed 23 June 2023).

8.6 Engagement

N/A

8.7 Fuel

[1] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] Fuel (LEU/HALEU/HEU): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

9 Korea Atomic Energy Research Institute - SMART

9.1 Table Information

[1] Thermal Power (MWth): Reitsma, F. (2020), "OVERVIEW OF SMALL MODULAR REACTOR TECHNOLOGY DEVELOPMENT", Generation IV International Forum, www.gen-4.org/gif/upload/docs/application/pdf/2020-07/gen_iv_webinar_series_43_mr_frederik_reitsma_29jul_2020_final.pdf (accessed 23 June 2023).

[2] Outlet Temperature (°C): Reitsma, F. (2020), "OVERVIEW OF SMALL MODULAR REACTOR TECHNOLOGY DEVELOPMENT", Generation IV International Forum, www.gen-4.org/gif/upload/docs/application/pdf/2020-07/gen_iv_webinar_series_43_mr_frederik_reitsma_29jul_2020_final.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): Reitsma, F. (2020), "OVERVIEW OF SMALL MODULAR REACTOR TECHNOLOGY DEVELOPMENT", Generation IV International Forum, www.gen-4.org/gif/upload/docs/application/pdf/2020-07/gen_iv_webinar_series_43_mr_frederik_reitsma_29jul_2020_final.pdf (accessed 23 June 2023).

[4] Fuel Type: Kim, J. H. et al. (2019), "Current Status of Small & Modular Reactor R&D in Republic of Korea", Ulsan National Institute of Science and Technology (UNIST), https://nucleus.iaea.org/sites/INPRO/df17/VI.5-Republic%20of%20Korea_Ji%20Hyun%20Kim.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): Reitsma, F. (2020), "OVERVIEW OF SMALL MODULAR REACTOR TECHNOLOGY DEVELOPMENT", Generation IV International Forum, www.gen-4.org/gif/upload/docs/application/pdf/2020-07/gen_iv_webinar_series_43_mr_frederik_reitsma_29jul_2020_final.pdf (accessed 23 June 2023).

9.2 Licensing Readiness

[1] Nuclear Safety And Security Commission (2012), "제5회(2012-3. 7.4) 원자력안전위원회 안건" [The fifth (5-2012. 3.7) Nuclear Safety Commission Agenda], www.nssc.go.kr/ko/cms/FR_BBS_CON/BoardView.do?SITE_NO=2&BOARD_SEQ=14&BBS_SEQ=3596&MENU_ID=170&CONTENTS_NO=1 (accessed 23 June 2023).

[2] Nuclear Safety And Security Commission (2012), "제5회(2012-3. 7.4) 원자력안전위원회 개최결과(회의록)" [The fifth (5-2012. 3.7) Nuclear Safety Commission meeting results (minutes)], www.nssc.go.kr/ko/cms/FR_BBS_CON/BoardView.do?MENU_ID=170&CONTENTS_NO=1&SITE_NO=2&BOARD_SEQ=14&BBS_SEQ=3597&P_BBS_SEQ=&CATE_SEQ=&pageNo=&SEARCH_SEQ=&SEARCH_FLD=&SEARCH=&PREV_IDX=3597&NEXT_IDX=3528&MODULATE_KEY=%242a%2410%24vP

[Zqat6n0VBmty%2FoSxHW2OPOR9Ht%2F0ZxxksGARCfm2szS%2FwmKxGo6&_csrf](#) (accessed 23 June 2023).

[3] Paik, C. Y. and D. I. Kim (2019), “Construction Strategy of SMART Nuclear Power Plants in Saudi Arabia”, SMART Power, https://www.kns.org/files/pre_paper/41/19S-260-%EB%B0%B1%EC%B2%A0%EC%9A%A9.pdf (accessed 16 June 2023).

9.3 Siting

[1] Paik, C. Y. and D. I. Kim (2019), “Construction Strategy of SMART Nuclear Power Plants in Saudi Arabia”, SMART Power, www.kns.org/files/pre_paper/41/19S-260-%EB%B0%B1%EC%B2%A0%EC%9A%A9.pdf (accessed 23 June 2023).

[2] World Nuclear News (2023), “MoU sees KAERI, Alberta cooperation on SMRs”, <https://world-nuclear-news.org/Articles/MoU-sees-KAERI,-Alberta-cooperation-on-SMRs> (accessed 23 June 2023).

[3] Nuclear Newswire (2023), “KAERI, Alberta to consider SMRs for province” www.ans.org/news/article-4945/kaeri-alberta-to-consider-smrs-for-province/ (accessed 23 June 2023).

[4] Goulet, J. (2023), “Alberta’s government signs small modular reactor agreement with Korean institute”, Lethbridge News Now, <https://lethbridgenewsnow.com/2023/04/21/albertas-government-signs-small-modular-reactor-agreement-with-korean-institute/> (accessed 23 June 2023).

9.4 Financing

[1] Kim, S. (2012), “‘SMART’ 17개월 만에 표준설계인가 획득” [‘SMART’ obtained standard design approval in 17 months], Korea Nuclear Power Times, www.knpnews.com/news/articleView.html?idxno=5662 (accessed 23 June 2023).

[2] Aju Business Daily (2015), “SMART 원자로, 해외수출 첫 걸음 내딛다... 사우디와 상세설계 협약 체결” [SMART reactor takes the first step in overseas export... Signed a detailed design agreement with Saudi Arabia], www.ajunews.com/view/20150902105824504 (accessed 23 June 2023).

9.5 Supply Chain

[1] Ministry of Science and ICT (n.d.), “< PPE Agreement for Saudi SMART Nuclear Plant Construction Signed >- First step taken for SMART reactor export”, www.msit.go.kr/eng/bbs/view.do?sCode=eng&mId=4&mPid=2&pageIndex=&bbsSeqNo=42&nttSeqNo=107&searchOpt=&searchTxt (accessed 23 June 2023).

[2] Nuclear Engineering International (2020), “South Korea and Saudi Arabia strengthen cooperation on SMART reactor”, www.neimagazine.com/news/newssouth-korea-and-saudi-arabia-strengthen-cooperation-on-smart-reactor-7591629 (accessed 23 June 2023).

[3] World Nuclear News (2019), “Korea, Saudi Arabia to cooperate on SMART deployment”, www.world-nuclear-news.org/Articles/Korea,-Saudi-Arabia-to-cooperate-on-SMART-deployment (accessed 23 June 2023).

[4] Doosan Enerbility (n.d.), “소형모듈원전(SMR)” [Small Modular Reactors], www.doosanenerbility.com/kr/business/smr_smart (accessed 23 June 2023).

[5] 제15회 창원시 기술혁신 전략 세미나 (2021), “소형모듈원자로(SMR) 개발 현황과 산업 연계 및 육성 세미나” [Small Modular Reactor (SMR) Development Status and Industry Linkage and Development Seminar], www.kns.org/boards/download/14738 (accessed 23 June 2023).

[6] Lee, S. (2016), “한국전력기술, 100MW급 스마트 소형원전 설계 착수” [KEPCO starts design of 100MW smart small nuclear power plant], Energy & Environment News, www.e2news.com/news/articleView.html?idxno=93973 (accessed 23 June 2023).

9.6 Engagement

[1] 충청뉴스 CCN News (2009), “한국원자력문화재단-한국원자력연구원 MOU체결” [Korea Atomic Energy Culture Foundation and Korea Atomic Energy Research Institute signed MOU], www.ccnnews.co.kr/news/articleView.html?idxno=13310 (accessed 23 June 2023).

[2] Korea Atomic Energy Research Institute (2023), “한국형 SMR 'SMART(스마트)' 해외진출 발판 마련” [Korean SMR 'SMART' Gains a foothold in overseas expansion], www.kaeri.re.kr/board/view?linkId=11012&menuId=MENU00326 (accessed 23 June 2023).

9.7 Fuel

[1] International Atomic Energy Agency (2011), "Status report 77 - System-Integrated Modular Advanced Reactor (SMART)",
<https://aris.iaea.org/PDF/SMART.pdf> (accessed 23 June 2023).

10 Last Energy - PWR-20

10.1 Table Information

[1] Thermal Power (MWth): Last Energy (n.d.), “Fully modular, factory made”, www.lastenergy.com/technology (accessed 23 June 2023).

[2] Outlet Temperature (°C): Last Energy (n.d.), “Fully modular, factory made”, www.lastenergy.com/technology (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): Last Energy (n.d.), “Fully modular, factory made”, www.lastenergy.com/technology (accessed 23 June 2023).

[4] Fuel Type: Last Energy (n.d.), “Fully modular, factory made”, www.lastenergy.com/technology (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): Last Energy (n.d.), “Fully modular, factory made”, www.lastenergy.com/technology (accessed 23 June 2023).

10.2 Licensing Readiness

[1] UK Parliament (2022), “Nuclear power technologies of the future to be examined by MPs”, <https://committees.parliament.uk/committee/135/science-innovation-and-technology-committee/news/174541/nuclear-power-technologies-of-the-future-to-be-examined-by-mps/> (accessed 23 June 2023).

10.3 Siting

[1] Patel, S. (2022), “NuScale, Last Energy Make Significant Insteps for SMRs in Poland”, POWER, www.powermag.com/nuscale-last-energy-make-significant-insteps-for-smrs-in-poland/ (accessed 23 June 2023).

[2] Patel, S. (2023), “Last Energy Secures PPAs for 34 SMR Nuclear Power Plants in Poland and the UK”, POWER, www.powermag.com/last-energy-secures-ppas-for-34-smr-nuclear-power-plants-in-poland-and-the-uk/ (accessed 23 June 2023).

[3] Kraev, K. (2022), “Poland / Enea Group To Work With US-based Last Energy On SMR Development”, NUCNET, www.nucnet.org/news/enea-group-to-work-with-us-based-last-energy-on-smr-development-6-2-2022 (accessed 23 June 2023).

[4] Kraev, K. (2022), "Poland / Enea Group To Work With US-based Last Energy On SMR Development", NUCNET, www.nucnet.org/news/enea-group-to-work-with-us-based-last-energy-on-smr-development-6-2-2022 (accessed 23 June 2023).

[5] Dobreanu, I. (2022), "O companie americană va construi un reactor nuclear mic la Pitești" [An American company will build a small nuclear reactor in Pitesti], Economica, https://www.economica.net/o-companie-americana-va-construi-un-reactor-mic-modular-la-pitesti-567090.html?mc_cid=5ea9a43ba0&mc_eid=607bd7d763 (accessed 23 June 2023).

10.4 Financing

[1] Judge, P. (2023), "Last Energy claims to have sold 24 nuclear reactors in the UK for £2.4 billion", Data Centre Dynamics, www.datacenterdynamics.com/en/news/last-energy-claims-to-have-sold-24-nuclear-reactors-in-the-uk-for-24-billion/ (accessed 23 June 2023).

[2] Patel, S. (2023), "Last Energy Secures PPAs for 34 SMR Nuclear Power Plants in Poland and the UK", POWER, www.powermag.com/last-energy-secures-ppas-for-34-smr-nuclear-power-plants-in-poland-and-the-uk/ (accessed 23 June 2023).

[3] First Round Capital (n.d.), "Last Energy", <https://firstround.com/companies/?selected=last-energy> (accessed 23 June 2023).

[4] Gigafund (n.d.), "Gigafund", www.gigafund.com/ (accessed 23 June 2023).

[5] PitchBook (n.d.), "Last Energy", <https://pitchbook.com/profiles/company/265186-36#timeline> (accessed 23 June 2023).

[6] Crunchbase (n.d.), "Last Energy", www.crunchbase.com/organization/last-energy (accessed 23 June 2023).

[7] Takahashi, D. (2020), "Last Energy raises \$3 million to fight climate change with nuclear energy", VentureBeat, <https://venturebeat.com/business/last-energy-raises-3-million-to-fight-climate-change-with-nuclear-energy/> (accessed 23 June 2023).

[8] Patel, S. (2023), "Last Energy Secures PPAs for 34 SMR Nuclear Power Plants in Poland and the UK", POWER, www.powermag.com/last-energy-secures-ppas-for-34-smr-nuclear-power-plants-in-poland-and-the-uk/ (accessed 23 June 2023).

[9] Wade, W. (2023), "Last Energy Signs Deals Worth \$19 Billion for Nuclear Plants", Bloomberg News,

www.bnnbloomberg.ca/last-energy-signs-deals-worth-19-billion-for-nuclear-plants-1.1898161 (accessed 23 June 2023).

[10] Forbes (2023), "Bret Kugelmass of Last Energy aims to build his first 10 inexpensive, off-the-shelf fission reactors in eastern Europe.", LinkedIn, https://ug.linkedin.com/posts/forbes-magazine_bret-kugelmass-of-last-energy-aims-to-build-activity-7027272574162112513-HejM (accessed 29 June 2023).

[11] Takahashi, D. (2020), "Last Energy raises \$3 million to fight climate change with nuclear energy", VentureBeat, <https://venturebeat.com/business/last-energy-raises-3-million-to-fight-climate-change-with-nuclear-energy/> (accessed 23 June 2023).

10.5 Supply Chain

[1] Kraev, K. (2022), "Poland / Enea Group To Work With US-based Last Energy On SMR Development", NUCNET, www.nucnet.org/news/enea-group-to-work-with-us-based-last-energy-on-smr-development-6-2-2022 (accessed 23 June 2023).

[2] Halper, E. (2023), "See how this company plans to transform nuclear power", The Washington Post, www.washingtonpost.com/photography/interactive/2023/last-energy-modular-nuclear/ (accessed 23 June 2023).

[3] The Associated Press (2023), "Nuclear micro reactors to hit the market", <https://newsroom.ap.org/editorial-photos-videos/detail?itemid=48f2d699d2cc4d5da453068c42a08e00> (accessed 23 June 2023).

[4] The Associated Press (2023), "Several US Universities to Experiment With Micro Nuclear Power", Voice of America, www.voanews.com/a/several-us-universities-to-experiment-with-micro-nuclear-power-/6955392.html#:~:text=Last%20Energy%27s%20demonstration%20unit%20that,2023%2C%20in%20Brooks%20hire%2C%20Texas (accessed 23 June 2023).

[5] Hydrock (2022), "US-based Last Energy appoint Hydrock for micro nuclear strategic safety review", www.hydrock.com/news/us-based-last-energy-appoint-hydrock-for-micro-nuclear-strategic-safety-review (accessed 23 June 2023).

10.6 Engagement

[1] GlobeNewswire (2022), “Last Energy, Enea Group to Develop Small Modular Nuclear Reactors, As Polish Government Prioritizes Energy Security and Net-Zero Goals”, www.globenewswire.com/news-release/2022/06/23/2468500/0/en/Last-Energy-Enea-Group-to-Develop-Small-Modular-Nuclear-Reactors-As-Polish-Government-Prioritizes-Energy-Security-and-Net-Zero-Goals.html (accessed 23 June 2023).

[2] UK Parliament (2022), “23 November 2022 - Delivering nuclear power - Oral evidence”, <https://committees.parliament.uk/event/14631/formal-meeting-oral-evidence-session/> (accessed 23 June 2023).

[3] Bauduin, P. (2023), “Dutch province creates nuclear energy alliance to support energy transition with SMRs”, Enlit, www.enlit.world/nuclear/dutch-province-creates-nuclear-energy-alliance-to-support-energy-transition-with-smrs/#:~:text=The%20Dutch%20province%20of%20Limburg,world%2C%20both%20internationally%20and%20locally (accessed 23 June 2023).

[4] Ministry of Economic Affairs and Climate Policy (2022), “Scenariostudie kernenergie Rapport” [Scenario study nuclear energy Report], <https://hcss.nl/wp-content/uploads/2022/10/Scenariostudie-Kernenergie-2022.pdf> (accessed 23 June 2023).

[5] Government of the Netherlands (2021), “Marktconsultatie kernenergie” [Market consultation on nuclear energy], www.rijksoverheid.nl/documenten/rapporten/2021/07/07/kpmg-marktconsultatie-kernenergie (accessed 23 June 2023).

[6] UK Parliament (2022), “Nuclear power technologies of the future to be examined by MPs”, <https://committees.parliament.uk/committee/135/science-innovation-and-technology-committee/news/174541/nuclear-power-technologies-of-the-future-to-be-examined-by-mps/> (accessed 23 June 2023).

10.7 Fuel

[1] Last Energy (n.d.), “Specifications”, www.lastenergy.com/technology#specifications (accessed 23 June 2023).

11 newcleo - LFR AS 200

11.1 Table Information

[1] Thermal Power (MWth): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] Outlet Temperature (°C): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): N/A

11.2 Licensing Readiness

[1] Mathis, W. (2022), "Nuclear Power Startup Newcleo Raises \$315 Million for UK, France Expansion", Bloomberg UK,

www.bloomberg.com/news/articles/2022-06-20/nuclear-power-startup-newcleo-raises-315-million-for-uk-france-expansion#xj4y7vzkg (accessed 23 June 2023).

[2] Gov.uk (2023), "Advanced Nuclear Technologies",

www.gov.uk/government/publications/advanced-nuclear-technologies/advanced-nuclear-technologies (accessed 23 June 2023).

[3] ENEA (2022), "Energy: newcleo signs agreement with ENEA to develop safe and innovative nuclear systems",

www.enea.it/en/news-enea/news/energy-newcleo-signs-agreement-with-enea-to-develop-safe-and-innovative-nuclear-systems (accessed 23 June 2023).

[4] Largue, P. (2023), “Enel and newcleo partner on fourth-generation nuclear technology”, Power Engineering International, www.powerengineeringint.com/nuclear/enel-and-newcleo-partner-on-fourth-generation-nuclear-technology/ (accessed 23 June 2023).

11.3 Siting

N/A

11.4 Financing

[1] World Nuclear News (2022), “Newcleo, ENEA to cooperate on advanced reactors”, www.world-nuclear-news.org/Articles/Newcleo,-ENEA-to-cooperate-on-advanced-reactors (accessed 23 June 2023).

[2] Mathis, W. (2022), “Nuclear Power Startup Newcleo Raises \$315 Million for UK, France Expansion”, Bloomberg UK, www.bloomberg.com/news/articles/2022-06-20/nuclear-power-startup-newcleo-raises-315-million-for-uk-france-expansion#xj4y7vzkg (accessed 23 June 2023).

[3] World Nuclear News (2022), “Newcleo raises USD316 million, talks with Orano”, www.world-nuclear-news.org/Articles/Newcleo-raises-USD316-million,-talks-with-Orano (accessed 23 June 2023).

[4] Reuters (2023), “Nuclear technology company newcleo plans to raise up to 1 bln euros”, www.reuters.com/article/britain-france-nuclear-idUSFWN35R01K (accessed 23 June 2023).

[5] Nuclear Valley (n.d.), “Annuaire des membres (adhérents, observateurs, associés, d'honneurs) newcleo SA”, www.nuclearvalley.com/annuaire/newcleo-sa/ (accessed 23 June 2023).

[6] Ministère de l'Économie, des Finances et de la Souveraineté industrielle et numérique (2022), “France 2030 : ouverture de l'appel à projets « réacteurs nucléaires innovants »”, www.economie.gouv.fr/france-2030-ouverture-appel-projets-reacteurs-nucleaires-innovants (accessed 23 June 2023).

11.5 Supply Chain

[1] World Nuclear News (2022), “Newcleo, ENEA to cooperate on advanced reactors”, www.world-nuclear-news.org/Articles/Newcleo,-ENEA-to-cooperate-on-advanced-reactors (accessed 23 June 2023).

[2] Neutron Bytes (2022), “Czech Launches Tender for New Reactor at Dukovany”, <https://neutronbytes.com/2022/03/18/czech-launches-tender-for-new-reactor-at-dukovany/> (accessed 23 June 2023).

[3] Lague, P. (2023), “Enel and newcleo partner on fourth-generation nuclear technology”, Power Engineering International, www.powerengineeringint.com/nuclear/enel-and-newcleo-partner-on-fourth-generation-nuclear-technology/ (accessed 23 June 2023).

[4] Nuclear Valley (n.d.), “Annuaire des membres (adhérents, observateurs, associés, d'honneurs) newcleo SA”, www.nuclearvalley.com/annuaire/newcleo-sa/ (accessed 23 June 2023).

11.6 Engagement

N/A

11.7 Fuel

[1] Mathis, W. (2022), “Nuclear Power Startup Newcleo Raises \$315 Million for UK, France Expansion”, Bloomberg UK, www.bloomberg.com/news/articles/2022-06-20/nuclear-power-startup-newcleo-raises-315-million-for-uk-france-expansion#xj4y7vzkg (accessed 23 June 2023).

[2] World Nuclear News (2022), “Newcleo raises USD316 million, talks with Orano”, www.world-nuclear-news.org/Articles/Newcleo-raises-USD316-million,-talks-with-Orano (accessed 23 June 2023).

[3] Reuters (2023), “Nuclear technology company newcleo plans to raise up to 1 bln euros”, www.reuters.com/article/britain-france-nuclear-idUSFWN35R01K (accessed 23 June 2023).

12 N.A. Dollezhal Research and Design Institute of Power Engineering - BREST-OD-300

12.1 Table Information

- [1] Thermal Power (MWth): Generation IV International Forum (2021), "GIF LEAD-COOLED FAST REACTOR",
www.gen-4.org/gif/upload/docs/application/pdf/2021-11/lfr_prpp_white_paper_2021_final_221_02021-clean2_2021-11-10_13-49-32_287.pdf (accessed 23 June 2023).
- [2] Outlet Temperature (°C): Generation IV International Forum (2021), "GIF LEAD-COOLED FAST REACTOR",
www.gen-4.org/gif/upload/docs/application/pdf/2021-11/lfr_prpp_white_paper_2021_final_221_02021-clean2_2021-11-10_13-49-32_287.pdf (accessed 23 June 2023).
- [3] Spectrum (Thermal/Fast): Rosatom (2021), "ROSATOM starts construction of unique power unit with BREST-OD-300 fast neutron reactor",
<https://rosatom.ru/en/press-centre/news/rosatom-starts-construction-of-unique-power-unit-with-brest-od-300-fast-neutron-reactor/> (accessed 23 June 2023).
- [4] Fuel Type: Rosatom (2021), "ROSATOM starts construction of unique power unit with BREST-OD-300 fast neutron reactor",
<https://rosatom.ru/en/press-centre/news/rosatom-starts-construction-of-unique-power-unit-with-brest-od-300-fast-neutron-reactor/> (accessed 23 June 2023).
- [5] Fuel (LEU/HALEU/HEU): Dragunov, Y. G. et al. (2015), "Lead-Cooled Fast-Neutron Reactor (BREST)", Rosatom,
https://nucleus.iaea.org/sites/INPRO/df10/day-3/04.Lemekhov_Russia.pdf (accessed 23 June 2023).
- [6] Fuel (LEU/HALEU/HEU): Rosatom (2023), "Rosatom: a Breakthrough",
<https://rosatomnewsletter.com/2021/07/28/rosatom-a-breakthrough/> (accessed 23 June 2023).

12.2 Licensing Readiness

- [1] Rosatom (2021), "Rostechnadzor issued the license to build BREST-OD-300 reactor",
<https://rosatom.ru/en/press-centre/news/rostechnadzor-issued-the-license-to-build-brest-od-300-reactor/> (accessed 23 June 2023).
- [2] TVEL (2021), "Rosatom starts construction of unique power unit with BREST-OD-300 fast neutron reactor",
www.tvel.ru/en/press-center/news/?ELEMENT_ID=8787 (accessed 23 June 2023).

12.3 Siting

[1] TVEL (2021), “Rosatom starts construction of unique power unit with BREST-OD-300 fast neutron reactor”,

www.tvel.ru/en/press-center/news/?ELEMENT_ID=8787 (accessed 23 June 2023).

[2] Rosatom (2021), “ROSATOM starts construction of unique power unit with BREST-OD-300 fast neutron reactor”,

<https://rosatom.ru/en/press-centre/news/rosatom-starts-construction-of-unique-power-unit-with-brest-od-300-fast-neutron-reactor/> (accessed 23 June 2023).

12.4 Financing

[1] Nuclear Engineering International (2022), “Russian government allocates about RUB100 billion for new nuclear projects”,

www.neimagazine.com/news/newsrussian-government-allocates-about-rub100-billion-for-new-nuclear-projects-9481402 (accessed 23 June 2023).

[2] Соколов, А. (2022), “На развитие атомных технологий государство готово направить почти 100 млрд рублей” [The state is ready to allocate almost 100 billion rubles for the development of nuclear technologies], Rosatom,

<https://strana-rosatom.ru/2022/02/22/na-razvitie-atomnyh-tehnologij-gosud/> (accessed 23 June 2023).

[3] World Nuclear News (2021), “Rosatom 'plans new nuclear technology exports’”,

<https://world-nuclear-news.org/Articles/Rosatom-plans-new-nuclear-technology-exports> (accessed 23 June 2023).

[4] РИА Томск (2017), “Rosatom ready to spend up to 1.1 billion rub for BREST-300 researches”,

www.riatomsk.ru/article/20170126/rosatom-ready-to-spend-up-to-11-billion-rub-for-brest-300-researches/ (accessed 23 June 2023).

[5] Proctor, D. (2021), “Nuclear First—Work Starts on Russian Fast Neutron Reactor”, POWER,

www.powermag.com/nuclear-first-work-starts-on-russian-fast-neutron-reactor/ (accessed 23 June 2023).

[6] Rosatom (2021), “Proryv: Breaking Through”,

<https://rosatomnewsletter.com/2021/12/01/proryv-breaking-through/> (accessed 23 June 2023).

[7] TVEL (2017), “Innovative Activities in the Nuclear Industry”,

<http://tvel2017.ru/innovative-policy/en/> (accessed 23 June 2023).

[8] World Nuclear Association (2010), “Nuclear Power in Russia”,

https://atompool.ru/images/data/gallery/1_2327_Nuclear_Power_in_Russia.pdf (accessed 23 June 2023).

12.5 Supply Chain

[1] Rosatom (2021), "ROSATOM starts construction of unique power unit with BREST-OD-300 fast neutron reactor",
<https://rosatom.ru/en/press-centre/news/rosatom-starts-construction-of-unique-power-unit-with-brest-od-300-fast-neutron-reactor/> (accessed 23 June 2023).

[2] Eurasia Diary (2019), "ROSATOM subsidiary awards contract for construction of BREST-OD-300 fast reactor facility and power unit",
<https://ednews.net/en/news/science/405808-rosatom-subsiary-awards-contract-for> (accessed 23 June 2023).

[3] TVEL (2017), "Innovative Activities in the Nuclear Industry",
<http://tvel2017.ru/innovative-policy/en/> (accessed 23 June 2023).

[4] Nuclear Engineering International (2023), "Progress continues at Russia's Brest reactor project",
www.neimagazine.com/news/newsprogress-continues-at-russias-brest-reactor-project-10656278 (accessed 23 June 2023).

[5] Rosatom (2021), "Rosatom will manufacture unique equipment for the BREST-OD-300 power unit",
www.rosatom-southasia.com/press-centre/news/rosatom-will-manufacture-unique-equipment-for-the-brest-od-300-power-unit/ (accessed 23 June 2023).

[6] World Nuclear News (2019), "Russia awards contract to build BREST reactor",
<https://world-nuclear-news.org/Articles/Russia-awards-contract-to-build-BREST-reactor> (accessed 23 June 2023).

12.6 Engagement

N/A

12.7 Fuel

[1] Rosatom (2021), "ROSATOM starts construction of unique power unit with BREST-OD-300 fast neutron reactor",
<https://rosatom.ru/en/press-centre/news/rosatom-starts-construction-of-unique-power-unit-with-brest-od-300-fast-neutron-reactor/> (accessed 23 June 2023).

[2] Nuclear Engineering International (2022), "Construction of Russia's Brest-300 reactor ahead of schedule",
www.neimagazine.com/news/newsconstruction-of-russias-brest-300-reactor-ahead-of-schedule-10085878 (accessed 23 June 2023).

[3] AO SOSNY Research and Development Company (n.d.), "FUEL ROD ASSEMBLY LINE FOR BREST-OD-300 REACTOR",
<https://sosnycompany.com/our-products/fuel-rod-assembly-line-for-brest-od-300-reactor.html> (accessed 23 June 2023).

[4] National Nuclear Center of the Republic of Kazakhstan (2022), "TESTING OF A PROMISING MIXED NITRIDE URANIUM-PLUTONIUM FUEL OF THE RUSSIAN LEAD-COOLED FAST REACTOR (BREST-OD-300)",
www.nnc.kz/en/news/show/369 (accessed 23 June 2023).

[5] Rosatom (2021), "Rosatom will manufacture unique equipment for the BREST-OD-300 power unit",
www.rosatom-southasia.com/press-centre/news/rosatom-will-manufacture-unique-equipment-for-the-brest-od-300-power-unit/ (accessed 23 June 2023).

[6] World Nuclear News (2020), "Siberian Chemical Combine reports milestone with new fuel production",
www.world-nuclear-news.org/Articles/Siberian-Chemical-Combine-reports-milestone-with-n (accessed 23 June 2023).

[7] World Nuclear Association (2021), "Russia's Nuclear Fuel Cycle",
<https://world-nuclear.org/information-library/country-profiles/countries-o-s/russia-nuclear-fuel-cycle.aspx> (accessed 23 June 2023).

13 Radiant - Kaleidos

13.1 Table Information

[1] Thermal Power (MWth): Radiant (n.d.), "Kaleidos a Portable Nuclear Microreactor that Replaces Diesel Generators",
www.radiantnuclear.com/ (accessed 23 June 2023).

[2] Outlet Temperature (°C): N/A

[3] Spectrum (Thermal/Fast): Radiant (2022), "Radiant Seeks TRISO Partnership",
www.radiantnuclear.com/blog/radiant-seeks-triso-partnership/ (accessed 23 June 2023).

[4] Fuel Type: Radiant (2022), "Radiant Seeks TRISO Partnership",
www.radiantnuclear.com/blog/radiant-seeks-triso-partnership/ (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): Radiant (2023), "Radiant Industries Partners with Centrus Energy to Secure Commercial HALEU Supply for Kaleidos Portable Microreactor",
www.radiantnuclear.com/blog/radiant-centrus-partnership/ (accessed 23 June 2023).

13.2 Licensing Readiness

[1] United States Nuclear Regulatory Commission (2022), "Congressional Budget Justification: Fiscal Year 2023 (NUREG-1100, Volume 38)",
www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1100/v38/index.html (accessed 23 June 2023).

13.3 Siting

[1] Finan, A. E. et al. (2022), "NRIC 2022 Program Review Session 1", Idaho National Laboratory,
https://inldigitallibrary.inl.gov/sites/sti/sti/Sort_57210.pdf (accessed 23 June 2023).

[2] Finan, A. E. (2021), "Laying the Foundation for New and Advanced Nuclear Reactors in the United States", National Reactor Innovation Center,
www.nationalacademies.org/event/11-15-2021/docs/D8C57382D80FE40C3D3F739BC5F17E3DF425EE1C66B8 (accessed 23 June 2023).

[3] Radiant (2023), "Radiant Industries Partners with Centrus Energy to Secure Commercial HALEU Supply for Kaleidos Portable Microreactor"
www.radiantnuclear.com/blog/radiant-centrus-partnership/ (accessed 23 June 2023).

13.4 Financing

[1] The Small Business Innovation Research and Small Business Technology Transfer Programs (2021), “Portable Microreactor Fleet Simulation”, U.S. Small Business Administration, www.sbir.gov/node/2171497 (accessed 23 June 2023).

[2] The Small Business Innovation Research and Small Business Technology Transfer Programs (2022), “36b - Multi-physics multi-scale (MPMS) approach to TRISO fuel performance modeling using NEAMS Code Results for Risk-Informed Regulatory Analysis”, U.S. Small Business Administration, www.sbir.gov/node/2276805 (accessed 23 June 2023).

[3] Maxwell, T. (2021), “A startup raised \$1.2 million to create mini nuclear reactors”, INPUT, www.inverse.com/input/tech/a-startup-raised-12-million-to-create-mini-nuclear-reactors (accessed 23 June 2023).

[4] Wilson, F. (2022), “Radiant”, Union Square Ventures, www.usv.com/writing/2022/03/radiant/ (accessed 23 June 2023).

13.5 Supply Chain

[1] Gateway for Accelerated Innovation in Nuclear (n.d.), “NE-23-29919 – An Advanced Multiphysics Simulation Capability for Radiant’s Microreactor Design and Shielding Analysis”, https://gain.inl.gov/SiteAssets/2023VoucherAbstracts-1stRound/ABSTRACTS/Radiant_Abstract_FINAL_23.1.pdf (accessed 23 June 2023).

[2] Sagoff, J. (2023), “Argonne to work with nuclear companies in 3 projects funded by the Department of Energy”, Argonne National Laboratory, www.anl.gov/article/argonne-to-work-with-nuclear-companies-in-3-projects-funded-by-the-department-of-energy (accessed 23 June 2023).

[3] Gateway for Accelerated Innovation in Nuclear (n.d.), “NE-21-26061, Microreactor Control Drum Failure Simulation”, https://gain.inl.gov/SiteAssets/2021VoucherAbstracts-2ndRound/NE-21-26061_Radiant_MicroreactorControlDrumFailureSimulation.pdf (accessed 23 June 2023).

13.6 Partnerships & Engagement

N/A

13.7 Fuel

[1] Radiant (2023), "Radiant Industries Partners with Centrus Energy to Secure Commercial HALEU Supply for Kaleidos Portable Microreactor"

www.radiantnuclear.com/blog/radiant-centrus-partnership/ (accessed 23 June 2023).

[2] Centrus Energy (27 January 2023), "Proud to be working with @RadiantNuclear to help fuel the future of #nuclear.", Twitter,

https://twitter.com/centrus_energy/status/1618991411306844160?s=20 (accessed 23 June 2023).

[3] Tompkins, J. (2022), "TRISO-Coated UCO Fuel Compact Fabrication", Radiant,

www.radiantnuclear.com/assets/documents/Radiant_TRISO_RFP_DOC-09C8_Rev1.0.pdf (accessed 23 June 2023).

[4] Radiant (2022), "Radiant Seeks TRISO Partnership",

www.radiantnuclear.com/blog/radiant-seeks-triso-partnership/ (accessed 23 June 2023).

14 Rosatom - RITM-200M

14.1 Table Information

[1] Thermal Power (MWth): Turusov, A. Y. (2021), “Плавучие энергоблоки для объектов Арктики и Северного морского пути” [Floating power units for facilities The Arctic and the Northern Sea Route], Rosatom, <http://crism-prometey.org/conferences/Arctech-2021/MTA-21-OKBM-Afrikantov.pdf> (accessed 23 June 2023).

[2] Outlet Temperature (°C): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

14.2 Licensing Readiness

[1] Rosatom (2021), “Rosatom Overseas Receives Russian Regulator’s License for Nuclear Installations Construction”, <https://rosatom-europe.com/press-centre/news/rosatom-overseas-receives-russian-regulator-s-license-for-nuclear-installations-construction/> (accessed 23 June 2023).

[2] Proctor, D. (2021), “Icebreaker Reactor Approved for Ground-Based Nuclear Plant”, POWER, www.powermag.com/icebreaker-reactor-approved-for-ground-based-nuclear-plant/ (accessed 23 June 2023).

14.3 Siting

[1] ТАСС (2020), “Лихачев заявил, что в Мьянме построят атомную станцию малой мощности с реакторами РИТМ” [Likhachev said that a low-power nuclear power plant with RITM reactors will be built in Myanmar],

<https://tass.ru/ekonomika/16976571> (accessed 23 June 2023).

[2] РИА Новости (2022), “Россия и Филиппины подписали соглашение о строительстве АЭС малой мощности” [Russia and the Philippines signed an agreement on the construction of a low-power nuclear power plant],

<https://ria.ru/20220120/aes-1768770816.html> (accessed 23 June 2023).

[3] Rosatom (2022), “Russia and the Philippines Plan to Perform Pre-Feasibility Study on SMRs in the Philippines”

[https://rosatom-europe.com/press-centre/news/russia-and-the-philippines-plan-to-perform-pre-feasibility-study-on-smrs-in-the-philippines-/](https://rosatom-europe.com/press-centre/news/russia-and-the-philippines-plan-to-perform-pre-feasibility-study-on-smrs-in-the-philippines/) (accessed 23 June 2023).

14.4 Financing

[1] Prospero Events Group (2022), “Russia to Invest €1.5 Billion in New Nuclear Projects”, www.prosperevents.com/russia-invests-in-new-nuclear-projects/ (accessed 23 June 2023).

[2] Rosatom (2022), “ROSATOM finished the first RITM-200 reactor for the Yakutia icebreaker”, <https://rosatom-europe.com/press-centre/news/rosatom-finished-the-first-ritm-200-reactor-for-the-yakutia-icebreaker/> (accessed 23 June 2023).

[3] World Nuclear News (2021), “Rosatom 'plans new nuclear technology exports’”, <https://world-nuclear-news.org/Articles/Rosatom-plans-new-nuclear-technology-exports> (accessed 23 June 2023).

14.5 Supply Chain

[1] AtomInfo.Ru (2022), “ROSATOM finished the first RITM-200 reactor for the Yakutia icebreaker”, <http://atominfo.ru/en/news4/d0880.htm> (accessed 23 June 2023).

[2] World Nuclear News (2022), “Manufacturing starts on largest ever marine reactor”, www.world-nuclear-news.org/Articles/Manufacturing-starts-on-largest-ever-marine-reactor (accessed 23 June 2023).

14.6 Engagement

N/A

14.7 Fuel

[1] International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] TVEL (2022), “Росатом разработал ядерное топливо для судовых реакторов РИТМ-200С для будущих четырех модернизированных плавучих энергоблоков на Чукотке” [Rosatom has developed nuclear fuel for RITM-200S ship reactors for the future four modernized floating power units in Chukotka], *Атомная энергия 2.0*, www.atomic-energy.ru/news/2022/12/20/131367 (accessed 23 June 2023).

15 Seaborg Technologies - Compact Molten Salt Reactor (CMSR)

15.1 Table Information

[1] Thermal Power (MWth): International Atomic Energy Agency (2022), “*Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS) – 2022 Edition*”,
https://aris.iaea.org/Publications/SMR_booklet_2022.pdf (accessed 23 June 2023).

[2] Thermal Power (MWth): International Atomic Energy Agency (2022), “*Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS) – 2022 Edition*”,
https://aris.iaea.org/Publications/SMR_booklet_2022.pdf (accessed 23 June 2023).

[3] Outlet Temperature (°C): International Atomic Energy Agency (2022), “*Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS) – 2022 Edition*”,
https://aris.iaea.org/Publications/SMR_booklet_2022.pdf (accessed 23 June 2023).

[4] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), “*Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS) – 2022 Edition*”,
https://aris.iaea.org/Publications/SMR_booklet_2022.pdf (accessed 23 June 2023).

[5] Fuel Type: Seaborg (n.d.), “OUR TECHNOLOGY”,
www.seaborg.com/the-reactor (accessed 23 June 2023).

[6] Fuel Type: International Atomic Energy Agency (2022), “*Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS) – 2022 Edition*”,
https://aris.iaea.org/Publications/SMR_booklet_2022.pdf (accessed 23 June 2023).

[7] Fuel (LEU/HALEU/HEU): Seaborg (2023), “KEPCO Nuclear Fuel, GS Engineering & Construction, and Seaborg sign a Memorandum of Understanding for Fuel Salt production.”,
www.seaborg.com/press-release-fuel-salt-mou (accessed 29 June 2023).

15.2 Licensing Readiness

[1] American Bureau of Shipping (2022), “IN THE SPOTLIGHT: ABS completes feasibility study on Molten Salt Reactor Technology”,
<https://news.cision.com/american-bureau-of-shipping/r/in-the-spotlight--abs-completes-feasibility-study-on-molten-salt-reactor-technology,c3744259> (accessed 23 June 2023).

[2] World Nuclear News (2023), “Samsung completes design of CMSR Power Barge”, www.world-nuclear-news.org/Articles/Samsung-completes-design-of-CMSR-Power-Barge (accessed 23 June 2023).

[3] World Nuclear News (2022), “Seaborg and BEES sign MoU relating to floating Compact Molten Salt Reactor”, www.world-nuclear-news.org/Articles/Seaborg-and-BEES-sign-MOU-relating-to-floating-Com (accessed 23 June 2023).

15.3 Siting

[1] World Nuclear News (2022), “Samsung, Seaborg partnership on floating nuclear reactors”, www.world-nuclear-news.org/Articles/Samsung,-Seaborg-partnership-on-floating-nuclear-r (accessed 23 June 2023).

[2] The Trade Council of Denmark in the Philippines (2023), “Golden milestone for nuclear science in PH”, LinkedIn, www.linkedin.com/posts/danish-trade-council-in-ph_energy-health-agriculture-activity-7005748875688886272-wBNg/?utm_source=share&utm_medium=member_desktop (accessed 23 June 2023).

[3] Badan Riset dan Inovasi Nasional (2023), “ORTN - BRIN dan Seaborg Technologies Jajaki Kerja Sama Pengembangan Teknologi Molten Salt Reactor di Indonesia” [ORTN - BRIN and Seaborg Technologies Explore Cooperation in Molten Salt Reactor Technology Development in Indonesia], www.terraxis.org/news-and-events/seaborg-joins-terraxis-coal-to-nuclear-initiative (accessed 23 June 2023).

[4] World Nuclear News (2022), “Study examines option for floating nuclear power in Vietnam”, www.world-nuclear-news.org/Articles/Study-examines-option-for-floating-nuclear-power-i (accessed 23 June 2023).

15.4 Financing

[1] European Innovation Council (2022), “Most competitive EIC Accelerator cut-off awards major funding round to 74 of Europe’s high potential start-ups”, https://eic.ec.europa.eu/news/most-competitive-eic-accelerator-cut-awards-major-funding-round-74-europes-high-potential-start-ups-2022-06-07_en (accessed 23 June 2023).

[2] Energy Technology Development and Demonstration Programme (n.d.), “Saltlagring”, www.eudp.dk/en/node/16532 (accessed 23 June 2023).

[3] PreSeed Ventures (n.d.), “PreSeed Ventures”, <https://preseedventures.dk/?fund=alumni> (accessed 23 June 2023).

[4] Seaborg (2021), “Danish state makes a profit selling Seaborg shares”, www.seaborg.com/press-release-preseed (accessed 23 June 2023).

[5] Nordic 9 (n.d.), “The Index Project”, <https://nordic9.com/companies/index-design-to-improve-life-investor5432394732/> (accessed 23 June 2023).

[6] Seaborg (2021), “Danish state makes a profit selling Seaborg shares”, www.seaborg.com/press-release-preseed (accessed 23 June 2023).

[7] Seaborg (2020), “Seaborg Technologies secures 8-Digit Euro sum in private funding to accelerate deployment of molten salt reactors”, www.seaborg.com/press-release-nov-2020 (accessed 23 June 2023).

[8] Nordic 9 (2020), “Seaborg Technologies secures \$24 million from Brightfolk et al”, <https://nordic9.com/news/seaborg-technologies-secures-24-million-from-brightfolk-et-al-news7737584180/> (accessed 23 June 2023).

[9] Crunchbase (n.d.), “Seaborg Technologies”, www.crunchbase.com/organization/seaborg-technologies/company_financials (accessed 23 June 2023).

15.5 Supply Chain

[1] Samsung Heavy Industries (2022), “삼성중, '원자력 발전 설비' 바다에 띄운다” [Samsung floats 'nuclear power plant' in the sea], <https://blog.samsungshi.com/840> (accessed 23 June 2023).

[2] ERA-LEARN (2018), “Project: Seaborg External multiphysics Architecture for Licensing and Ip development Of Nuclear reactors”, www.era-learn.eu/network-information/networks/eurostars-2/eurostars-cut-off-8/seaborg-external-multiphysics-architecture-for-licensing-and-ip-development-of-nuclear-reactors (accessed 23 June 2023).

[3] Nuclear Engineering International (2021), “Seaborg completes experiments to optimise its molten salt reactor design”, www.neimagazine.com/news/newsseaborg-completes-experiments-to-optimise-its-molten-salt-reactor-design-9048040 (accessed 23 June 2023).

[4] Technical University of Denmark (n.d.), “HIGH TEMPERATURE CORROSION OF MATERIALS FOR MOLTEN SALT NUCLEAR REACTORS”, <https://projektbank.dtu.dk/en-us/Pages/BulletinView.aspx?EntityId=225a3491-9917-eb11-8149-005056a057de> (accessed 23 June 2023).

[5] World Nuclear News (2023), “Samsung completes design of CMSR Power Barge”, www.world-nuclear-news.org/Articles/Samsung-completes-design-of-CMSR-Power-Barge (accessed 23 June 2023).

[6] World Nuclear News (2023), “Partnership formed to deploy Seaborg's Power Barge”, www.world-nuclear-news.org/Articles/Partnership-formed-to-deploy-Seaborg-s-Power-Barge (accessed 23 June 2023).

15.6 Engagement

[1] World Nuclear News (2023), “SEABORG JOINS TERRAPRAXIS COAL-TO-NUCLEAR INITIATIVE“, TerraPraxis, www.terra Praxis.org/news-and-events/seaborg-joins-terra Praxis-coal-to-nuclear-initiative (accessed 23 June 2023).

[2] Arirang News YouTube channel (22 August 2022), “GROWING INTEREST IN SMALL MODULAR REACTORS“, www.youtube.com/watch?v=O2pxhyVYJvI (accessed 23 June 2023).

[3] Harvard Business Review (2022), “How To Make Nuclear Energy Safe (with Seaborg’s Troels Schönfeldt)“, <https://hbr.org/podcast/2022/03/how-to-make-nuclear-energy-safe-with-seaborgs-troels-schönfeldt> (accessed 23 June 2023).

[4] TEDx Talks YouTube channel (6 December 2019), “Combating the climate crisis with next-generation nuclear | Eirik Eide Pettersen | TEDxArendal“, www.youtube.com/watch?v=CiyrwAM7-LE (accessed 23 June 2023).

[5] Puente-Espel, F. and M. V. Rønsbo (n.d.), “The Importance of public acceptance – the start-up perspective“, Seaborg, <https://nucleus.iaea.org/sites/INPRO/df19/1.4.F.PuenteEspel-Denmark%20-%20Importance%20of%20public%20acceptance.pdf> (accessed 23 June 2023).

15.7 Fuel

[1] Fuel (LEU/HALEU/HEU): Seaborg (2023), “KEPCO Nuclear Fuel, GS Engineering & Construction, and Seaborg sign a Memorandum of Understanding for Fuel Salt production.”, www.seaborg.com/press-release-fuel-salt-mou (accessed 29 June 2023).

[2] World Nuclear Association (2022), “Conversion and Deconversion”, <https://world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/conversion-and-deconversion.aspx> (accessed 23 June 2023).

16 State Power Investment Corporation - HAPPY200

16.1 Table Information

[1] Thermal Power (MWth): Gang, Z. and C. Liao (2018), "SPIC Nuclear Energy Multi-application for Decarbonization", State Power Investment Corporation, www.ifnec.org/ifnec/upload/docs/application/pdf/2018-11/s4_8-spic-gang-final.pdf (accessed 23 June 2023).

[2] Outlet Temperature (°C): Gang, Z. and C. Liao (2018), "SPIC Nuclear Energy Multi-application for Decarbonization", State Power Investment Corporation, www.ifnec.org/ifnec/upload/docs/application/pdf/2018-11/s4_8-spic-gang-final.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

16.2 Licensing Readiness

[1] International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

16.3 Siting

[1] International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] TONG, J. (2019), "SMR Design, Technology Development and Construction Status in China", Institute of Nuclear and New Energy Technology, https://nucleus.iaea.org/sites/htgr-kb/twg-smr/Documents/TWG-2_2019/D11_SMR%20in%20China%202019%20-Tong.pdf (accessed 23 June 2023).

[3] International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Nuclear Engineering International (2019), "China signs agreement for nuclear heating demonstration project", www.neimagazine.com/news/newschina-signs-agreement-for-nuclear-heating-demonstration-project-7039593 (accessed 23 June 2023).

[5] 中国核电网 (2019), "东北两核能供热项目加快推进：吉林白山核能供热项目、佳木斯综合智慧核能供热示范项目总承包框架协议签署" [The two nuclear energy heating projects in Northeast China have been accelerated: the general contracting framework agreement of Jilin Baishan Nuclear Energy Heating Project and Jiamusi Comprehensive Smart Nuclear Energy Heating Demonstration Project was signed], www.cnnpn.cn/article/18005.html (accessed 30 June 2023).

16.4 Financing

[1] State Power Investment Corporation (n.d.), "ABOUT SPIC", <http://eng.spic.com.cn/2021/whoweare/aboutspic/> (accessed 23 June 2023).

[2] State Power Investment Corporation (n.d.), "Corporate Profile", <http://eng.spic.com.cn/AboutUs/cp/> (accessed 23 June 2023).

16.5 Supply Chain

[1] State Power Investment Corporation (n.d.), "Corporate Profile", <http://eng.spic.com.cn/AboutUs/cp/> (accessed 23 June 2023).

16.6 Engagement

[1] International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] Nuclear Engineering International (2019), "China signs agreement for nuclear heating demonstration project", www.neimagazine.com/news/newschina-signs-agreement-for-nuclear-heating-demonstration-project-7039593 (accessed 23 June 2023).

16.7 Fuel

[1] International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

17 Terrestrial Energy – Integrated Molten Salt Reactor (IMSR)

17.1 Table Information

[1] Thermal Power (MWth): Terrestrial Energy (n.d.), “The IMSR® plant uses demonstrated molten salt reactor technology with patented enhancements for commercial-scale thermal and electrical energy generation”,
www.terrestrialenergy.com/technology/molten-salt-reactor/ (accessed 23 June 2023).

[2] Outlet Temperature (°C): Terrestrial Energy (n.d.), “The IMSR® plant uses demonstrated molten salt reactor technology with patented enhancements for commercial-scale thermal and electrical energy generation”,
www.terrestrialenergy.com/technology/molten-salt-reactor/ (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): Terrestrial Energy (n.d.), “The IMSR® plant uses demonstrated molten salt reactor technology with patented enhancements for commercial-scale thermal and electrical energy generation”,
www.terrestrialenergy.com/technology/molten-salt-reactor/ (accessed 23 June 2023).

[4] Fuel Type: Terrestrial Energy (n.d.), “The IMSR® plant uses demonstrated molten salt reactor technology with patented enhancements for commercial-scale thermal and electrical energy generation”,
www.terrestrialenergy.com/technology/molten-salt-reactor/ (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): Terrestrial Energy (n.d.), “The IMSR® plant uses demonstrated molten salt reactor technology with patented enhancements for commercial-scale thermal and electrical energy generation”,
www.terrestrialenergy.com/technology/molten-salt-reactor/ (accessed 23 June 2023).

17.2 Licensing Readiness

[1] United States Nuclear Regulatory Commission (2023), “Integral Molten Salt Reactor (IMSR)”,
www.nrc.gov/reactors/new-reactors/advanced/licensing-activities/pre-application-activities/imsr.html (accessed 23 June 2023).

[2] Canadian Nuclear Safety Commission (2023), “Pre-Licensing Vendor Design Review”,
<https://nuclearsafety.gc.ca/eng/reactors/power-plants/pre-licensing-vendor-design-review/?pedisable=true> (accessed 23 June 2023).

[3] United States Nuclear Regulatory Commission (n.d.), “Joint CNSC-U.S. NRC First Round of Questions to Terrestrial Energy Inc. and Terrestrial Energy USA, Inc. Under the CNSC-U.S. NRC Memorandum of Cooperation”,
www.nrc.gov/docs/ML2113/ML21138A672.pdf (accessed 23 June 2023).

17.3 Siting

[1] Canadian Nuclear Laboratories (n.d.), “Siting Canada’s First SMR”, www.cnl.ca/clean-energy/small-modular-reactors/siting-canadas-first-smr/ (accessed 23 June 2023).

[2] World Nuclear News (2018), “Project to demonstrate hydrogen production using IMSR”, www.world-nuclear-news.org/Articles/Project-to-demonstrate-hydrogen-production-using-IMSR (accessed 23 June 2023).

17.4 Financing

[1] Maloney, J. (2017), “THE NUCLEAR SECTOR AT A CROSSROADS: FOSTERING INNOVATION AND ENERGY SECURITY FOR CANADA AND THE WORLD”, House of Commons of Canada, www.ourcommons.ca/Content/Committee/421/RNNR/Reports/RP9016887/rnnrrp05/rnnrrp05-e.pdf (accessed 23 June 2023).

[2] Terrestrial Energy (2016), “Terrestrial Energy Announces Completion of CAD\$10 Million Series A Funding”, www.terrestrialenergy.com/2016/01/08/terrestrial-energy-announces-completion-cad10-million-series-funding/ (accessed 23 June 2023).

[3] Terrestrial Energy (2016), “Terrestrial Energy Surpasses CAD \$20 Million Financing Milestone for IMSR Development”, www.terrestrialenergy.com/2016/09/07/terrestrial-energy-surpasses-cad-20-million-financing-milestone-imsr-development/ (accessed 23 June 2023).

[4] Advanced Research Projects Agency - Energy (n.d.), “Modeling-Enhanced Innovations Trailblazing Nuclear Energy Reinvigoration (MEITNER)”, https://arpa-e.energy.gov/sites/default/files/documents/files/MEITNER_Project_Descriptions_FINAL.pdf (accessed 23 June 2023).

[5] Office of Nuclear Energy (2018), “U.S. Advanced Nuclear Technology Projects to Receive \$18 Million from the U.S. Department of Energy”, U.S. Department of Energy, www.energy.gov/ne/articles/us-advanced-nuclear-technology-projects-receive-18-million-us-department-energy (accessed 23 June 2023).

[6] Government of Canada (2020), “Government of Canada invests in innovative small modular reactor technology”, www.canada.ca/en/innovation-science-economic-development/news/2020/10/government-of-canada-invests-in-innovative-small-modular-reactor-technology.html (accessed 23 June 2023).

[7] Office of Nuclear Energy (2021), “DOE Awards \$8.5 Million to Advance Promising Nuclear Technologies”, U.S. Department of Energy, www.energy.gov/ne/articles/doe-awards-85-million-advance-promising-nuclear-technologies (accessed 23 June 2023).

17.5 Supply Chain

[1] University of New Brunswick (2017), “University of New Brunswick partners with Terrestrial Energy”, <https://blogs.unb.ca/newsroom/2017/03/university-of-new-brunswick-partners-with-terrestrial-energy.php> (accessed 23 June 2023).

[2] Terrestrial Energy (2015), “Terrestrial Energy Engages with Dalton Nuclear Institute”, www.terrestrialenergy.com/2015/05/27/terrestrial-energy-engages-dalton-nuclear-institute/ (accessed 23 June 2023).

[3] Cleantech Canada (2015), “Ontario firm working with University of Tennessee on nuclear tech”, Canadian Manufacturing, www.canadianmanufacturing.com/research-and-development/ontario-firm-working-university-tennessee-nuclear-tech-144732/ (accessed 23 June 2023).

[4] Terrestrial Energy (2015), “Terrestrial Energy Announces Initial Collaboration with Oak Ridge National Laboratory”, www.terrestrialenergy.com/2015/01/07/terrestrial-energy-announces-initial-collaboration-oak-ridge-national-laboratory/ (accessed 23 June 2023).

[5] Oak Ridge National Laboratory (2023), “The Future of Nuclear Energy”, www.ornl.gov/file/future-nuclear-energy/display (accessed 23 June 2023).

[6] Research Money (2014), “Terrestrial Energy to contract with CNL”, <https://researchmoneyinc.com/article/terrestrial-energy-to-contract-with-cnl> (accessed 23 June 2023).

[7] The Fourth Generation (2017), “ORGANIZATION OF CANADIAN NUCLEAR INDUSTRIES ANNOUNCES SUCCESSFUL SUPPLIER DAY FOR TERRESTRIAL ENERGY”, <https://4thgeneration.energy/organization-canadian-nuclear-industries-announces-successful-supplier-day-terrestrial-energy/> (accessed 23 June 2023).

[8] World Nuclear News (2018), “L3 MAPPS, Terrestrial team for IMSR simulation”, www.world-nuclear-news.org/Articles/L3-MAPPS,-Terrestrial-team-for-IMSR-simulation (accessed 23 June 2023).

[9] Nuclear Engineering International (2021), “Terrestrial Energy awards BWXT contracts for IMSR steam generators”, <https://www.neimagazine.com/news/newsterrestrial-energy-awards-bwxt-contracts-for-imsr-steam-generators-9194039> (accessed 29 June 2023).

[10] Nuclear Research and consultancy Group (2019), "NRG graphite irradiation program produces data in support of operation for Molten Salt Reactor", www.nrg.eu/en/news/nrg-graphite-irradiation-program-produces-data-in-support-of-operation-for-molten-salt-reactor (accessed 23 June 2023).

[11] Frazer-Nash Consultancy (2019), "Frazer-Nash to support Terrestrial Energy with nuclear graphite moderator construction", www.fnc.co.uk/discover-frazer-nash/news/frazer-nash-to-support-terrestrial-energy-with-nuclear-graphite-moderator-construction/ (accessed 23 June 2023).

[12] KSB SE (n.d.), "Partnership for developing molten salt recirculation pumps", www.ksb.com/en-global/media/press-releases/uebersicht/partnership-for-developing-molten-salt-recirculation-pumps-1165832 (accessed 23 June 2023).

[13] World Nuclear News (2020), "Terrestrial Energy, L3Harris to develop simulator for IMSR", <https://world-nuclear-news.org/Articles/Terrestrial-Energy-L3Harris-to-develop-simulator> (accessed 23 June 2023).

[14] Ontario Power Generation (2020), "OPG paving the way for Small Modular Reactor deployment", www.opg.com/media_releases/opg-paving-the-way-for-small-modular-reactor-deployment/ (accessed 23 June 2023).

[15] CANDU Owners Group (2021), "Canada's SMR plan springs ahead", www.candu.org/COGNews/SMR%20development%20springs%20into%20action.pdf (accessed 23 June 2023).

[16] Terrestrial Energy (2021), "Terrestrial Energy Signs Agreement with Hatch for IMSR Power Plant Engineering and Construction Services", www.terrestrialenergy.com/2021/05/04/terrestrial-energy-signs-agreement-with-hatch-for-imsr-power-plant-engineering-and-construction-services/ (accessed 23 June 2023).

[17] Canadian Manufacturing (2021), "Terrestrial Energy signs agreement for supply of steam turbines for nuclear power plant", www.canadianmanufacturing.com/manufacturing/terrestrial-energy-signs-agreement-for-supply-of-steam-turbines-for-nuclear-power-plant-276127/ (accessed 23 June 2023).

[18] Energy Northwest (2018), "Official Statement \$633,425,000 ENERGY NORTHWEST", www.energy-northwest.com/whoweare/finance/Documents/Investor%20Relations/WAEnergyNorthwest02a-FIN.pdf#search=molten%20salt%20reactor (accessed 23 June 2023).

[19] Gateway for Accelerated Innovation in Nuclear (n.d.), "NE-22-28244 Investigation of the Structural Integrity and Corrosion Resistance of Surface Treatment on Alloy-709 in a Molten Fluoride Salt Environment", https://gain.inl.gov/SiteAssets/2022VoucherAbstracts-2ndRound/Abstracts/TerrestrialEnergyTechnicalAbstract_FINAL_22-2.pdf (accessed 23 June 2023).

[20] Gateway for Accelerated Innovation in Nuclear (n.d.), “RFA-18-15368, Advancement of Instrumentation to Monitor IMSR® Core Temperature and Power Level“, https://gain.inl.gov/SiteAssets/2018VoucherAbstracts/RFA-18-15368_TerrestrialUSA.pdf (accessed 23 June 2023).

[21] Gateway for Accelerated Innovation in Nuclear (n.d.), “RFA-17-14615, IMSR® Fuel Salt Property Confirmation: Thermal Conductivity and Viscosity“, [https://gain.inl.gov/SiteAssets/2017%20Voucher%20Abstracts/RFA-17-14615%2C%20Terrestrial%20Energy%20USA%20\(3\).pdf](https://gain.inl.gov/SiteAssets/2017%20Voucher%20Abstracts/RFA-17-14615%2C%20Terrestrial%20Energy%20USA%20(3).pdf) (accessed 23 June 2023).

17.6 Engagement

[1] World Nuclear News (2018), “Project to demonstrate hydrogen production using IMSR“, www.world-nuclear-news.org/Articles/Project-to-demonstrate-hydrogen-production-using-I (accessed 23 June 2023).

[2] Terrestrial Energy (2019), “Terrestrial Energy Forms Nuclear Innovation Working Group to Support IMSR Power Plant Development“, www.terrestrialenergy.com/2019/02/13/terrestrial-energy-forms-nuclear-innovation-working-group-to-support-imsr-power-plant-development/ (accessed 23 June 2023).

[3] Terrestrial Energy (2021), “Terrestrial Energy Signs MOU With First Nations Power Authority“, GlobeNewswire, www.globenewswire.com/news-release/2021/09/28/2304569/0/en/Terrestrial-Energy-Signs-MOU-With-First-Nations-Power-Authority.html (accessed 23 June 2023).

[4] Cameco (2021), “Cameco and Terrestrial Energy to Examine Partnerships for Deploying IMSR Generation IV NPPs“, www.cameco.com/media/news/cameco-and-terrestrial-energy-to-examine-partnerships-for-deploying-imsr-ge (accessed 23 June 2023).

[5] Fuel Cell & Hydrogen Energy Association (n.d.), “Terrestrial Energy“, <https://www.fchea.org/member-terrestrial> (accessed 23 June 2023).

[6] World Nuclear News (2022), “IMSR to be considered for ammonia production“, www.world-nuclear-news.org/Articles/IMSR-to-be-considered-for-ammonia-production (accessed 23 June 2023).

[7] DL E&C (2022), “[프로그램/행사] DL이앤씨, 소형모듈원전(SMR) 사업 진출한다” [[Program/Event] DL E&C enters small modular nuclear power plant (SMR) business], www.dlenc.co.kr/pr/InfoView.do?cd_scrmn_cl=&cd_advt_cl=&searchword=¤tPage=46&cd_mnu=KU082&no_ntc_plte_sral=22412 (accessed 23 June 2023).

[8] World Nuclear News (2022), “Terrestrial Energy to work with Alberta on SMR commercialisation”,
www.world-nuclear-news.org/Articles/Terrestrial-Energy-to-work-with-Alberta-on-SMR-commercialisation (accessed 23 June 2023).

[9] Terrestrial Energy (2023), “Terrestrial Energy Opens Office in Alberta”,
www.terrestrialenergy.com/2023/03/terrestrial-energy-opens-office-in-alberta/ (accessed 23 June 2023).

[10] World Nuclear News (2022), “Terrestrial joins TerraPraxis coal-to-nuclear initiative”,
www.world-nuclear-news.org/Articles/Terrestrial-joins-TerraPraxis-coal-to-nuclear-initiative (accessed 23 June 2023).

[11] Calgary Herald (2023), “Terrestrial Energy opens nuclear technology development office in Calgary”,
<https://calgaryherald.com/business/local-business/terrestrial-energy-opens-nuclear-technology-development-office-in-calgary> (accessed 29 June 2023).

17.7 Fuel

[1] Canadian Nuclear Laboratories (2020), “CNL & Terrestrial Energy partner on SMR fuel research”,
www.cnl.ca/cnl-terrestrial-energy-partner-on-smr-fuel-research/ (accessed 23 June 2023).

[2] ENGIE Laborelec (2021), “Terrestrial Energy and ENGIE Laborelec to advance development of IMSR, a small modular reactor power plant that uses molten salt technology”,
www.laborelec.com/terrestrial-energy-engie-laborelec-to-advance-development-of-imsr/ (accessed 23 June 2023).

[3] European Commission (2018), “Collaboration agreement with Terrestrial Energy”,
https://joint-research-centre.ec.europa.eu/jrc-news/collaboration-agreement-terrestrial-energy-2018-03-14_en (accessed 23 June 2023).

[4] Centrus Energy (2020), “Terrestrial Energy USA and Centrus Energy Partner on Fuel Supply for IMSR Generation IV Nuclear Plants”,
www.centrusenergy.com/news/terrestrial-energy-usa-and-centrus-energy-partner-on-fuel-supply-for-imsr-generation-iv-nuclear-plants/ (accessed 23 June 2023).

[5] Gateway for Accelerated Innovation in Nuclear (2016, 2017), “GA-16AN020102, Verification of Molten-Salt Properties at High Temperatures RFA-17-14615, Integral Molten Salt Reactor Fuel Salt Property Confirmation: Thermal Conductivity and Viscosity”,
https://gain.inl.gov/VoucherSummaries/RFA-17-14615_TEUSA-R3.pdf (accessed 23 June 2023).

[6] Terrestrial Energy (2021), “Terrestrial Energy, Westinghouse and UK National Nuclear Laboratory Sign Agreement for IMSR Nuclear Fuel Supply”, www.terrestrialenergy.com/2021/08/17/terrestrial-energy-westinghouse-and-uk-national-nuclear-laboratory-sign-agreement-for-imsr-nuclear-fuel-supply/ (accessed 23 June 2023).

[7] Orano USA (2021), “Terrestrial Energy and Orano Sign Comprehensive Agreement for Nuclear Fuel Supply for IMSR Power Plant”, <https://www.orano.group/usa/en/our-news/news-releases/2021/september/terrestrial-energy-and-orano-sign-comprehensive-agreement-for-nuclear-fuel-supply-for-imsr-power-plant> (accessed 23 June 2023).

[8] Terrestrial Energy (2022), “Terrestrial Energy and Orano Complete Successful IMSR Fuel Packaging and Transportation Evaluation”, www.terrestrialenergy.com/2022/11/01/terrestrial-energy-and-orano-complete-successful-imsr-fuel-packaging-and-transportation-evaluation/ (accessed 23 June 2023).

[9] Terrestrial Energy (2022), “Terrestrial Energy Expands IMSR Fuel Salt Testing Program at Argonne National Laboratory”, www.terrestrialenergy.com/2022/01/25/terrestrial-energy-expands-imsr-fuel-salt-testing-program-at-argonne-national-laboratory/ (accessed 23 June 2023).

[10] World Nuclear News (2022), “IMSR developer partners with ANSTO on waste treatment technology”, www.world-nuclear-news.org/Articles/IMSR-developer-partners-with-ANSTO-on-waste-treatment (accessed 23 June 2023).

[11] Terrestrial Energy USA (n.d.), “IMSR® Core-unit Definition Applicable Structures, Systems and Components”, www.nrc.gov/docs/ML2009/ML20097B839.pdf (accessed 23 June 2023).

[12] Orano USA (2022), “Terrestrial Energy and Orano Complete Successful IMSR Fuel Packaging and Transportation Evaluation”, www.orano.group/usa/en/our-news/news-releases/2022/november/terrestrial-energy-and-orano-complete-successful-imsr-fuel-packaging-and-transportation-evaluation (accessed 23 June 2023).

[13] Cameco (2021), “Cameco and Terrestrial Energy to Examine Partnerships for Deploying IMSR Generation IV NPPs”, www.cameco.com/media/news/cameco-and-terrestrial-energy-to-examine-partnerships-for-deploying-imsr-generation-iv-npps (accessed 23 June 2023).

[14] World Nuclear News (2021), “Partnership set up for IMSR fuel supply”, www.world-nuclear-news.org/Articles/Partnership-set-up-for-UK-IMSR-fuel-supply (accessed 23 June 2023).

[15] Nuclear Engineering International (2021), “Terrestrial Energy, Westinghouse and UK NNL collaborate on IMSR Fuel”, www.neimagazine.com/news/newsterrestrial-energy-westinghouse-and-uk-nnl-collaborate-on-imsr-fuel-9012391/ (accessed 23 June 2023).

[16] Orano USA (2022), “Terrestrial Energy and Orano Complete Successful IMSR Fuel Packaging and Transportation Evaluation”, www.orano.group/usa/en/our-news/news-releases/2022/november/terrestrial-energy-and-orano-complete-successful-imsr-fuel-packaging-and-transportation-evaluation (accessed 23 June 2023).

18 ThorCon International - TMSR-500

18.1 Table Information

[1] Thermal Power (MWth): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] Outlet Temperature (°C): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*,

https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

18.2 Licensing Readiness

[1] Badan Pengawas Tenaga Nuklir (2022), “BAPETEN Menerima Pengajuan Laporan Kajian (High Level Safety Assessment) Keselamatan Desain TMSR500” [BAPETEN Receives High Level Safety Assessment Report on TMSR500 Safety Design],

www.bapeten.go.id/berita/bapeten-menerima-pengajuan-laporan-kajian-high-level-safety-assessment-keselamatan-desain-tmsr500-104202?lang=en (accessed 23 June 2023).

[2] United States Nuclear Regulatory Commission (2020), “NRC Site Search: Search All Sites”,

www.nrc.gov/site-help/search.html?site=AllSites&searchtext=Thorcon (accessed 23 June 2023).

[3] Hadi, A. (2023), "ThorCon submits paperwork for Indonesia's first nuclear power plant", The Jakarta Post, www.thejakartapost.com/business/2023/03/29/thorcon-submits-paperwork-for-indonesias-first-nuclear-power-plant.html (accessed 23 June 2023).

[4] Badan Pengawas Tenaga Nuklir (2023), "PRESS RELEASE Executive Meeting for Nuclear Power Plant Licensing March 28, 2023 Number: 001/SP/HM 00 04/BHKK/III/2023 (Copied)", <https://bapeten.go.id/upload/33/7a63d4f3c9-siaran-pers-01-executive-meeting-perizinan-pltnenglish.pdf> (accessed 23 June 2023).

[5] ThorCon (n.d.), "ThorCon has signed an agreement with BAPETEN to carry out a pre-licensing consultation to create a roadmap for licensing the ThorCon 500 MW demonstration power plant in Indonesia.", <https://mailchi.mp/d2babe8eb522/indonesia-nuclear-regulator-bapeten-and-thorcon-begin-pre-licensing-consultation?e=0dbcf9d6d7> (accessed 23 June 2023).

[6] World Nuclear News (2023), "ThorCon begins pre-licensing consultation in Indonesia", <https://world-nuclear-news.org/Articles/ThorCon-begins-pre-licensing-consultation-in-Indon> (accessed 23 June 2023).

18.3 Siting

[1] Badan Pengawas Tenaga Nuklir (2022), "BAPETEN Menerima Pengajuan Laporan Kajian (High Level Safety Assessment) Keselamatan Desain TMSR500" [BAPETEN Receives High Level Safety Assessment Report on TMSR500 Safety Design], www.bapeten.go.id/berita/bapeten-menerima-pengajuan-laporan-kajian-high-level-safety-assessment-keselamatan-desain-tmsr500-104202?lang=en (accessed 23 June 2023).

[2] Neutron Bytes (2022), "Russia Submits Bid for Saudi Arabia's Twin Nuclear Reactors", <https://neutronbytes.com/2022/12/18/russia-submits-bid-for-saudi-arabias-twin-nuclear-reactors/> (accessed 23 June 2023).

[3] World Nuclear News (2023), "ThorCon begins pre-licensing consultation in Indonesia", <https://world-nuclear-news.org/Articles/ThorCon-begins-pre-licensing-consultation-in-Indon> (accessed 23 June 2023).

18.4 Financing

[1] Thorcon Power Indonesia (n.d.), "About ThorCon US, Inc.", <https://thorconpower.id/about/#:~:text=About%20ThorCon%20US%2C%20Inc.&text=The%20CEO%20of%20ThorCon%20US,company%27s%20principal%20designer%20and%20founder> (accessed 23 June 2023).

18.5 Supply Chain

[1] Neutron Bytes (2022), "Russia Submits Bid for Saudi Arabia's Twin Nuclear Reactors", <https://neutronbytes.com/2022/12/18/russia-submits-bid-for-saudi-arabias-twin-nuclear-reactors/> (accessed 23 June 2023).

[2] Neutron Bytes (2022), "Empresarios Agrupados Tapped as A/E for Thorcon TMSR-500", <https://neutronbytes.com/2022/01/27/empresarios-agrupados-tapped-as-a-e-for-thorcon-tmsr-500/> (accessed 23 June 2023).

[3] World Nuclear News (2022), "Empresarios Agrupados contracted for first ThorCon reactor", www.world-nuclear-news.org/Articles/Empresarios-Agrupados-contracted-for-first-ThorCon (accessed 23 June 2023).

[4] Intan, K. (2019), "ThorCon International Pte,Ltd dan PT PAL akan bangun PLTN" [ThorCon International Pte,Ltd and PT PAL to build nuclear power plant], Kontan.co.id, <https://industri.kontan.co.id/news/thorcon-international-pteltd-dan-pt-pal-akan-bangun-pltn> (accessed 23 June 2023).

[5] Neutron Bytes (2022), "Russia Submits Bid for Saudi Arabia's Twin Nuclear Reactors", <https://neutronbytes.com/2022/12/18/russia-submits-bid-for-saudi-arabias-twin-nuclear-reactors/> (accessed 23 June 2023).

[6] Neutron Bytes (2020), "Nuclear Energy Projects Move Ahead Despite Global Virus Threat", <https://neutronbytes.com/2020/03/22/nuclear-energy-projects-move-ahead-despite-global-virus-threat/> (accessed 23 June 2023).

[7] World Nuclear Association (2022), "Nuclear Power in Indonesia", www.world-nuclear.org/information-library/country-profiles/countries-g-n/indonesia.aspx (accessed 23 June 2023).

[8] World Nuclear Association (2022), "Nuclear Power in Indonesia", www.world-nuclear.org/information-library/country-profiles/countries-g-n/indonesia.aspx (accessed 23 June 2023).

[9] Badan Riset dan Inovasi Nasional (2022), " Kerja Sama Wujudkan Prototipe PLTN, BRIN Gandeng PT ThorCon Power Indonesia" [Cooperation to Realize NPP Prototype, BRIN Collaborates with PT ThorCon Power Indonesia], <https://brin.go.id/news/99408/kerja-sama-wujudkan-prototipe-pltn-brin-gandeng-pt-thorcon-power-indonesia> (accessed 23 June 2023).

[10] Universitas Sebelas Maret (2021), "UNS Signs Partnership Agreement with ThorCon International in Nuclear", <https://uns.ac.id/en/uns-signs-partnership-agreement-with-thorcon-international-in-nuclear/> (accessed 23 June 2023).

18.6 Engagement

[1] Universitas Sebelas Maret (2021), "UNS Signs Partnership Agreement with ThorCon International in Nuclear",
<https://uns.ac.id/en/uns-signs-partnership-agreement-with-thorcon-international-in-nuclear/> (accessed 23 June 2023).

[2] Universitas Sebelas Maret (2020), "UNS Collaborates With ThorCon International on Nuclear Development",
<https://uns.ac.id/en/uns-collaborates-with-thorcon-international-on-nuclear-development/> (accessed 23 June 2023).

18.7 Fuel

[1] Gateway for Accelerated Innovation in Nuclear (2018), "NE-18-16098, Quantify Sodium Fluoride/Beryllium Fluoride Salt Properties for Liquid Fueled Fluoride Molten Salt Reactors",
https://gain.inl.gov/VoucherSummaries/NE-18-16098_ThorConUSA.pdf#search=thorcon (accessed 23 June 2023).

19 Toshiba Energy Systems & Solutions Corporation - 4S

19.1 Table Information

[1] Thermal Power (MWth): Ota, H. and M. Fukuie (2010), "4S Small Fast Reactor and Fast Reactor Technologies", Toshiba, www.global.toshiba/content/dam/toshiba/migration/corp/techReviewAssets/tech/review/2010/12/65_12pdf/a14.pdf (accessed 23 June 2023).

[2] Outlet Temperature (°C): Toshiba (2008), "4S Design Description", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0814/ML081440765.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): Toshiba (2008), "4S Design Description", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0814/ML081440765.pdf (accessed 23 June 2023).

[4] Fuel Type: Toshiba (2008), "4S Design Description", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0814/ML081440765.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): Toshiba (2008), "4S Design Description", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0814/ML081440765.pdf (accessed 23 June 2023).

19.2 Licensing Readiness

[1] Ota, H. and M. Fukuie (2010), "4S Small Fast Reactor and Fast Reactor Technologies", Toshiba, www.global.toshiba/content/dam/toshiba/migration/corp/techReviewAssets/tech/review/2010/12/65_12pdf/a14.pdf (accessed 23 June 2023).

[2] Toshiba (2007), "Pre-Application Meeting Request for Design Approval of the Toshiba 4S Reactor", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0725/ML072540677.pdf (accessed 23 June 2023).

[3] Toshiba (2012), "Submittal of Technical Report "4S.Safety Design Criteria"", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML1229/ML12296A027.pdf (accessed 23 June 2023).

[4] Retting, M. (2011), "Why nuclear energy is on hold for Alaska", newsminer.com, https://web.archive.org/web/20160713133023/http://www.newsminer.com/news/local_news/why-nuclear-energy-is-on-hold-for-alaska/article_51958987-2a69-5528-aa4b-fd2755913460.html (accessed 23 June 2023).

19.3 Siting

[1] Alaska Electric Light & Power (2007), "Re: Pre-Application Review of Toshiba 4S Reactor Design", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0728/ML072840028.pdf (accessed 23 June 2023).

[2] City of Nome (2007), "Re: Pre-Application Review of Toshiba 4S Reactor Design", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0733/ML073371190.pdf (accessed 23 June 2023).

[3] Retting, M. (2011), "Why nuclear energy is on hold for Alaska", newsminer.com, https://web.archive.org/web/20160713133023/http://www.newsminer.com/news/local_news/why-nuclear-energy-is-on-hold-for-alaska/article_51958987-2a69-5528-aa4b-fd2755913460.html (accessed 23 June 2023).

19.4 Financing

N/A

19.5 Supply Chain

N/A

19.6 Engagement

[1] Toshiba (2008), "Submittal of Design Description for the 4S Reactor (Non-Proprietary)", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0814/ML081440765.pdf (accessed 23 June 2023).

[2] Toshiba Corporation and Central Research Institute of Electric Power Industry (2013), "SUPER-SAFE, SMALL AND SIMPLE REACTOR (4S, TOSHIBA DESIGN)", <https://aris.iaea.org/PDF/4S.pdf> (accessed 23 June 2023).

19.7 Fuel

[1] Ota, H. and M. Fukuie (2010), "4S Small Fast Reactor and Fast Reactor Technologies", Toshiba, www.global.toshiba/content/dam/toshiba/migration/corp/techReviewAssets/tech/review/2010/12/65_12pdf/a14.pdf (accessed 23 June 2023).

[2] Toshiba (2008), "Submittal of Design Description for the 4S Reactor (Non-Proprietary)", United States Nuclear Regulatory Commission, www.nrc.gov/docs/ML0814/ML081440765.pdf (accessed 23 June 2023).

20 Westinghouse Electric Company - Westinghouse LFR

20.1 Table Information

[1] Thermal Power (MWth): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[2] Outlet Temperature (°C): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[4] Fuel Type: International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): International Atomic Energy Agency (2022), *Advances in Small Modular Reactor Technology Developments, A Supplement to: IAEA Advanced Reactor Information System (ARIS)*, https://nucleus.iaea.org/sites/smr/Shared%20Documents/2022%20IAEA%20SMR%20ARIS%20Booklet_rev11_with%20cover.pdf (accessed 23 June 2023).

[6] Fuel (LEU/HALEU/HEU): Ferroni, P. et al. (2022), "The Westinghouse Lead Fast Reactor: overview and progress in development", International Conference on Fast Reactors and Related Fuel Cycles FR22: Sustainable Clean Energy for the Future (CN-291), <https://conferences.iaea.org/event/218/contributions/18730/> (accessed 23 June 2023).

20.2 Licensing Readiness

[1] Ferroni, P. et al. (2022), “The Westinghouse Lead Fast Reactor: Design overview and update on development activities”, Westinghouse Electric Company, https://conferences.iaea.org/event/218/contributions/18730/attachments/11938/17808/286_Westinghouse_LFR_IAEA_FR22_April_2022.pdf (accessed 23 June 2023).

20.3 Siting

N/A

20.4 Financing

[1] Cision PR Newswire (2020), “Westinghouse Program Awarded £10m From UK Government Advanced Modular Reactor Project”, www.prnewswire.com/news-releases/westinghouse-program-awarded-10m-from-uk-government-advanced-modular-reactor-project-301091285.html (accessed 23 June 2023).

[2] Gov.uk (2020), “Advanced Modular Reactor (AMR) Feasibility and Development Project”, www.gov.uk/government/publications/advanced-modular-reactor-amr-feasibility-and-development-project (accessed 23 June 2023).

[3] Jandeska, K. E. (2017), “Department of Energy awards flow into Argonne”, Argonne National Laboratory, www.anl.gov/article/department-of-energy-awards-flow-into-argonne (accessed 23 June 2023).

[4] Office of Technology Transitions (2018), “Department of Energy Announces Technology Commercialization Fund Projects”, U.S. Department of Energy, www.energy.gov/technologytransitions/articles/department-energy-announces-technology-commercialization-fund (accessed 23 June 2023).

[5] U.S. Department of Energy (2019), “Department of Energy Announces 2019 Technology Commercialization Fund Projects”, www.energy.gov/articles/department-energy-announces-2019-technology-commercialization-fund-projects (accessed 23 June 2023).

[6] Office of Technology Transitions (2021), “2021 Technology Commercialization Fund Project Selections”, U.S. Department of Energy, www.energy.gov/technologytransitions/articles/2021-technology-commercialization-fund-project-selections (accessed 23 June 2023).

[7] Mitchell, A. (2021), “Department of Energy awards \$4.15 million to Argonne to support collaborations with industry”, Argonne National Laboratory, www.anl.gov/article/department-of-energy-awards-415-million-to-argonne-to-support-collaborations-with-industry (accessed 23 June 2023).

20.5 Supply Chain

[1] World Nuclear News (2022), “Westinghouse and Ansaldo Nucleare collaborate on next-gen LFR nuclear plant”, www.world-nuclear-news.org/Articles/Westinghouse-and-Ansaldo-Nucleare-collaborate-on-n (accessed 23 June 2023).

[2] Gov.uk (2020), “Advanced Modular Reactor competition: phase 2 development - project descriptions”, www.gov.uk/government/publications/advanced-modular-reactor-amr-feasibility-and-development-project/advanced-modular-reactor-feasibility-and-development-successful-projects (accessed 23 June 2023).

[3] Ferroni, P. et al. (2022), “The Westinghouse Lead Fast Reactor: overview and progress in development”, International Conference on Fast Reactors and Related Fuel Cycles FR22: Sustainable Clean Energy for the Future (CN-291), <https://conferences.iaea.org/event/218/contributions/18730/> (accessed 23 June 2023).

[4] Lee, S. J. et al. (2023), “Westinghouse Test Facilities for Lead Fast Reactor Development”, *Nuclear Technology*, <https://doi.org/10.1080/00295450.2023.2197667> (accessed 23 June 2023).

[5] Caramello, M. et al. (2023), “The Versatile Loop Facility: A New Infrastructure for Testing Components and Systems of Lead Fast Reactor Technology”, *Nuclear Technology*, <https://doi.org/10.1080/00295450.2023.2181043> (accessed 23 June 2023).

[6] Gateway for Accelerated Innovation in Nuclear (2017), “RFA-17-14611, Development of an Integrated Mechanistic Source Term Assessment Capability for Lead- and Sodium-cooled Fast Reactors.”, https://gain.inl.gov/VoucherSummaries/RFA-17-14611_FauskeAssociates-R3.pdf (accessed 23 June 2023).

[7] Gateway for Accelerated Innovation in Nuclear (2018), “NE-18-16167, Development and Testing of Alumina-forming Austenitic Stainless Steels for Lead Fast Reactor Application”, https://gain.inl.gov/VoucherSummaries/NE-18-16167_WestinghouseElectric.pdf (accessed 23 June 2023).

20.6 Engagement

N/A

20.7 Fuel

[1] Westinghouse Electric Company (n.d.), “Fuel Fabrication & Operations”, www.westinghousenuclear.com/nuclear-fuel/fuel-fabrication-operations (accessed 23 June 2023).

[2] Ferroni, P. (2021), “Westinghouse Lead Fast Reactor Design and Safety”, Westinghouse Electric Company, https://inis.iaea.org/collection/NCLCollectionStore/_Public/52/041/52041030.pdf (accessed 23 June 2023).

21 Západočeská univerzita v Plzni and Czech Technical University in Prague TEPLATOR

21.1 Table Information

[1] Thermal Power (MWth): Neuman, P. et al. (2022), "Tetov & Teplator. Studie bezemisního dálkového vytápění východních (a středních) Čech" [Tetov & Teplator. Study of emission-free district heating in Eastern (and Central) Bohemia], AF POWER, <https://allforpower.cz/jaderna-energetika/tetov-teplator-studie-bezemisniho-dalkoveho-vytapeni-vychodnich-a-strednich-cech-614> (accessed 23 June 2023).

[2] Outlet Temperature (°C): Neuman, P. et al. (2022), "Tetov & Teplator. Studie bezemisního dálkového vytápění východních (a středních) Čech" [Tetov & Teplator. Study of emission-free district heating in Eastern (and Central) Bohemia], AF POWER, <https://allforpower.cz/jaderna-energetika/tetov-teplator-studie-bezemisniho-dalkoveho-vytapeni-vychodnich-a-strednich-cech-614> (accessed 23 June 2023).

[3] Spectrum (Thermal/Fast): N/A

[4] Fuel Type: TA ČR Starfos (2020), "TEPLATOR: Nuclear district heating solution", <https://starfos.tacr.cz/en/result/RIV%2F49777513%3A23220%2F20%3A43960528> (accessed 23 June 2023).

[5] Fuel (LEU/HALEU/HEU): TA ČR Starfos (2020), "TEPLATOR: Nuclear district heating solution", <https://starfos.tacr.cz/en/result/RIV%2F49777513%3A23220%2F20%3A43960528> (accessed 23 June 2023).

21.2 Licensing Readiness

[1] Pojar, P. (2023), "Teplator, geniálně jednoduchý malý jaderný reaktor určený k výrobě tepla, který v Česku narazil" [Teplator, an ingeniously simple small nuclear reactor designed to produce heat, which came across in the Czech Republic], ČESKÉSTAVBY.cz, www.ceskestavby.cz/clanky/teplator-genialne-jednoduchy-maly-jaderny-reaktor-urceny-k-vyrobe-tepla-ktery-v-cesku-narazil-31729.html (accessed 23 June 2023).

[2] Kubátová, Z. (2022), "„Teplátor“ zaujal soukromé investory. Slibují mu stovky milionů" ["Teplator" attracted private investors. They promise him hundreds of millions], Seznam Zprávy, www.seznamzpravy.cz/clanek/ekonomika-teplator-zaujal-soukrome-investory-slibuji-mu-stovky-milionu-221476 (accessed 23 June 2023).

21.3 Siting

N/A

21.4 Financing

[1] Pojar, P. (2023), "Teplator, geniálně jednoduchý malý jaderný reaktor určený k výrobě tepla, který v Česku narazil" [Teplator, an ingeniously simple small nuclear reactor designed to produce heat, which came across in the Czech Republic], ČESKÉSTAVBY.cz, www.ceskestavby.cz/clanky/teplator-genialne-jednoduchy-maly-jaderny-reaktor-urceny-k-vyrobe-tepla-ktery-v-cesku-narazil-31729.html (accessed 23 June 2023).

[2] Kurzy.cz (n.d.), "TEPLÁTOR, a.s. , Praha IČO 17472598 - Obchodní rejstřík firem" [TEPLÁTOR, a.s. , Prague Company ID 17472598 - Commercial Register of Companies], <https://rejstrik-firem.kurzy.cz/17472598/teplator-as/> (accessed 23 June 2023).

[3] Kubátová, Z. (2022), "„Teplátor“ zaujal soukromé investory. Slibují mu stovky milionů" ["Teplátor" attracted private investors. They promise him hundreds of millions], Seznam Zprávy, www.seznamzpravy.cz/clanek/ekonomika-teplator-zaujal-soukrome-investory-slibuji-mu-stovky-milionu-221476 (accessed 23 June 2023).

21.5 Supply Chain

[1] Czech Technical University in Prague (n.d.), "Teplator", www.ciirc.cvut.cz/research-education/projects/navrh-systemu-rizeni-reaktivity/ (accessed 23 June 2023).

[2] Vilímová, E. et al. (2022), "Possible Implementation of Ex-Core Measurement in TEPLATOR Graphite Reflector", *ASME J of Nuclear Rad Sci.*, Volume 8(4): 041505, <https://doi.org/10.1115/1.4050990> (accessed 23 June 2023).

[3] Nowoczesne Ciepłownictwo (2022), "JAK ENERGIA JĄDROWA MOŻE ZASILIĆ SYSTEMY CIEPŁOWNICZE" [HOW NUCLEAR POWER CAN POWER DISTRICT HEATING], <https://nowoczesnecieplownictwo.pl/jak-energia-jadrowa-moze-zasilic-systemy-cieplownicze/> (accessed 23 June 2023).

[4] World Nuclear News (2022), "Viewpoint: How nuclear can fuel district heating schemes", www.world-nuclear-news.org/Articles/Viewpoint-Nuclear-and-the-district-heating-indust (accessed 23 June 2023).

[5] Iryna, D. (2023), "Euratom Research in Action and Opportunities for Europe: EU Strategic Autonomy and the Future Energy Systems", Ministry of Education and Science of Ukraine,

<https://ms.nauka.gov.ua/en/events/euratom-research-in-action-and-opportunities-for-europe-eu-strategic-autonomy-and-the-future-energy-systems/> (accessed 23 June 2023).

[6] International Conference Nuclear Energy for New Europe (2021), “30th International Conference Nuclear Energy for New Europe 2021 September 6-9 BLED-SLOVENIA”, www.djs.si/nene2021/Contents.html (accessed 23 June 2023).

21.6 Engagement

[1] Research and Innovation Centre on Advanced Industrial Production (n.d.), “Technology is Essential for our Future, Said Frans Timmermans During his Visit to RICAIP and CIIRC CTU “, <https://ricaip.eu/timmermans-visited-ricaip/> (accessed 23 June 2023).

[2] Teplator (n.d.), “ABOUT PROJECT”, www.teplator.cz/o-projektu/?lang=en (accessed 23 June 2023).

[3] International Conference Nuclear Energy for New Europe (2021), “30th International Conference Nuclear Energy for New Europe 2021 September 6-9 BLED-SLOVENIA”, www.djs.si/nene2021/Contents.html (accessed 23 June 2023).

[4] Peltan, T. et al. (2020), “Natural Uranium as Alternative Fuel for TEPLATOR”, 29th International Conference Nuclear Energy for New Europe 2020 September 7-10 PORTOROŽ -SLOVENIA, https://scholar.google.com/scholar_lookup?title=Natural+uranium+as+alternative+fuel+for+TEPLATOR&author=T.+Peltan%2C+E.+Vil%3ADmov%3%A1%2C+and+R.+%C5%A0koda&journal=Proc.+29th+International+Conference+Nuclear+Energy+for+New+Europe+%28NENE+2020%29&pages=406.1406.8&publication_year=2020 (accessed 23 June 2023).

21.7 Fuel

[1] Abushamah, H. A. S. et al. (2021), “Economics of reusing spent nuclear fuel by Teplator for district heating applications”, *International Journal of Energy Research*, Volume46(5): 5771, <https://doi.org/10.1002/er.7521> (accessed 23 June 2023).

[2] Dalton, D. (2021), “Czech Republic / ‘Teplator’ Can Use Spent Nuclear Fuel Rods To Heat Cities, Say Scientists”, NUCNET, www.nucnet.org/news/teplator-can-use-spent-nuclear-fuel-rods-to-heat-cities-say-scientists-4-5-2021 (accessed 23 June 2023).

[3] European Nuclear Society (n.d.), “Teplator, A Revolutionary Nuclear District Heating System”, www.euronuclear.org/news/teplator-heating-system-spent-nuclear-fuel/ (accessed 23 June 2023)

[4] Palata, L. (2021), "Nuclear heating: A low-cost, greener option?", Deutsche Welle, www.dw.com/en/czech-researchers-develop-revolutionary-nuclear-heating-plant/a-57072924 (accessed 23 June 2023).

[5] Nuclear Engineering International (2021), "Czech researchers propose used fuel as a source for district heating", www.neimagazine.com/news/newsczech-researchers-propose-used-fuel-as-a-source-for-district-heating-8681385 (accessed 23 June 2023).

[6] Nowoczesne Ciepłownictwo (2022), "JAK ENERGIA JĄDROWA MOŻE ZASILIĆ SYSTEMY CIEPŁOWNICZE" [HOW NUCLEAR POWER CAN POWER DISTRICT HEATING], <https://nowoczesnecieplownictwo.pl/jak-energia-jadrowa-moze-zasilic-systemy-cieplownicze/> (accessed 23 June 2023).

[7] TA ČR Starfos (2020), "TEPLATOR: Nuclear district heating solution", <https://starfos.tacr.cz/en/result/RIV%2F49777513%3A23220%2F20%3A43960528> (accessed 23 June 2023).

[8] Nowoczesne Ciepłownictwo (2022), "JAK ENERGIA JĄDROWA MOŻE ZASILIĆ SYSTEMY CIEPŁOWNICZE" [HOW NUCLEAR POWER CAN POWER DISTRICT HEATING], <https://nowoczesnecieplownictwo.pl/jak-energia-jadrowa-moze-zasilic-systemy-cieplownicze/> (accessed 23 June 2023).