

## Is a Miniature Nuclear Reactor Coming to a Town Near You?

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In May of 2023, plans were announced for the construction of a first of its kind Small Modular Reactor, known as an SMR, in southern Ohio.<sup>1</sup> The proposed facility would produce 30 megawatts of clean energy and over 50 megawatts of clean heating.<sup>2</sup> In addition, to the proposed reactor, another company opened a uranium enrichment facility in Ohio to produce the exact kind of fuel an SMR would need.<sup>3</sup> In the world of SMR's, three companies are betting big on this yet to be proven technology including Centrus, Oklo Inc. and NuScale, and they are all betting big on Ohio.<sup>4</sup> Centrus and Oklo Inc. are jointly developing the first SMR in the United States at a former Department of Energy site in southern Ohio, and NuScale is planning on deploying 77 SMRs in Ohio by 2029.<sup>5</sup> While many plans are in motion for these SMR's, plenty of questions abound. Since they are so new, it is yet to be determined how viable they are either technologically or economically speaking. Many regulatory hurdles also remain, as only one SMR design has been approved by federal regulators.<sup>6</sup>

SMRs are aimed at addressing the shortcomings of traditional large scale nuclear power plants. Traditional nuclear plants have become prohibitively expensive to build and cannot compete with the per megawatt cost of natural gas or renewable energy.<sup>7</sup> SMRs are designed to be small enough to be manufactured in mass and installed in localities or with factories to meet their energy demands.<sup>8</sup> SMRs are much simpler than their traditional large format counterparts, requiring much less fuel and are predicted to be much cheaper and more efficient while still producing carbon free energy.<sup>9</sup> Advocates for SMRs also predict that while they do not currently produce energy as cheaply as natural gas and renewables, that this will soon change in the future with increased efficiency, as well as predictions that natural gas will become much more expensive once costs of carbon capture and carbon reduction are factored in.<sup>10</sup> Since SMRs do not produce carbon emissions, SMR facilities will not have to worry about the future costs of producing carbon or reducing their carbon footprint.

While SMRs have a lot of potential, they are still experimental and have many possible roadblocks before they can be fully deployed. For starters, only one SMR design has been approved by the United States Nuclear Regulatory Commission.<sup>11</sup> While many other designs are in the process of getting approval, it is unknown how many will get approved. This is in addition

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<sup>1</sup> Stephen Singer, *Oklo announces plans for 2 nuclear plants in Ohio area touted as prime real estate for advanced reactors*, UTILITYDIVE (May 22, 2023), <https://www.utilitydive.com/news/oklo-ohio-nuclear-sites-sodi/650827/>

<sup>2</sup> *Id.*

<sup>3</sup> Kathiann Kowalski, *As nuclear fuel plant opens in Ohio, can small reactors compete?*, ENERGY NEWS NETWORK (Oct. 23, 2023), <https://energynews.us/2023/10/23/as-nuclear-fuel-plant-opens-in-ohio-can-small-reactors-compete/>

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

<sup>8</sup> Joanne Liou, *What are Small Modular Reactors (SMRs)?*, INTERNATIONAL ATOMIC ENERGY AGENCY (Sept. 13, 2023), <https://www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs>

<sup>9</sup> *Id.*

<sup>10</sup> *Id.*

<sup>11</sup> *Small Modular Reactors*, NUCLEAR REGULATORY COMMISSION, <https://www.nrc.gov/reactors/new-reactors/smr.html>

to the fact that since this technology itself is so new, the federal regulators are still determining the best way to regulate them.<sup>12</sup> Meaning ever changing regulations can add uncertainty to future SMR projects. In addition to regulatory uncertainty, SMRs economic viability have been put into question. Estimates from Colorado State University place the per unit of energy cost of SMRs on par with currently existing large scale nuclear reactors, which have been proven to be not economically viable.<sup>13</sup> In addition to installation costs, SMRs will have a relatively high operating cost compared to current renewable technologies because SMRs will have to handle the cost of disposal of their nuclear waste.<sup>14</sup> However, proponents for SMRs argue that the costs of installation of an SMR facility will end up being far less than current renewable energy.<sup>15</sup> This is because wind and solar require much more land than SMRs and typically require great investments in power transmission infrastructure, while SMRs do not require the same investment into power transmission since they can be placed in areas where power transmission infrastructure already exists.<sup>16</sup> However, even when accounting for these differences, the Colorado State study still found that as they currently exist, SMRs will not be economically feasible when compared to renewables or natural gas.<sup>17</sup>

Ultimately only time will tell if SMRs ever reach real world viability. If so, they would be a great tool in our fight against climate change since they can produce a relatively large amount of carbon free energy. This is in addition to the fact that one of their greatest advantages compared to renewable energy is they can produce power consistently and independent of weather conditions.<sup>18</sup> However, SMRs have some of the same issues as their older larger conventional nuclear power plant predecessors. SMRs still have to navigate the heavy regulatory burden of proving safety, as well as finding a way to safely dispose of their nuclear waste.<sup>19</sup> SMRs will also need to face a likely hostile public and will have to prove their safety record before communities are comfortable with them operating in their backyard. The proponents of SMRs argue that they have all of the benefits of traditional nuclear reactors without the burdensome costs, while other experts predict SMRs will come with the same costs and burdens as traditional nuclear reactors and will be unable to compete with renewable energy.<sup>20</sup> In reality, I predict SMRs will have their place alongside renewable energy. In order to reach a carbon neutral energy grid, we will likely need many new technologies, SMRs can be a large part of the solution. Their benefits of producing consistent clean energy while being small enough to match current needs are a great advantage and will likely outweigh their disadvantages when compared to renewables. Once the first SMRs are built in the United States, their viability will really be put to the test, and we will be one step closer to seeing if they really will be part of the solution to a carbon neutral energy grid.

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<sup>12</sup> Kowalski, *supra* note 3.

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> Singer, *supra* note 1.

<sup>19</sup> *Id.*

<sup>20</sup> Kowalski, *supra* note 3.