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Small Modular Nuclear Reactors (SMRs): Development of Small Nuclear Reactors (SMRs) to Supplement Power Needs

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Small Modular Nuclear Reactors (SMRs): Development of Small Nuclear Reactors (SMRs) to Supplement Power Needs

Abstract

- Small Modular Reactor (SMR) is a small nuclear reactor that can operate as part of or independently of the electrical grid system
- 100 to 1,000 times smaller than typical nuclear reactors
- Modular and easily transportable
- Reliable and operationally flexible

Comments

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Small Modular Nuclear Reactors (SMRs)

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OVERVIEW

- Small Modular Reactor (SMR) is a small nuclear reactor that can operate as part of or independently of the electrical grid system
- 100 to 1,000 times smaller than typical nuclear reactors
- Modular and easily transportable
- Reliable and operationally flexible



MRP Microreactor Program

Figure 1: SMR in Transport



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Award Number: 2221665

Development of Small Modular Nuclear Reactors (SMRs) to Supplement Power Needs

COST

 Nuclear Battery/SMR should cost 70-115 USD/MWh to be competitive • Disposal of spent fuel will cost around 1 USD/MWh (~every 3 to 10 years) • Large scale production makes these figures much more attainable



APPLICATIONS

• Can act as power sources for remote areas (i.e remote mining operations) • SMRs have the ability to quickly generate power and shut down as needed. This makes the a reliable and safe energy source.

 Useful when power needs aren't being met due to

- Renewable energies being unreliable during a 24 hours cycle
- Increased demand during evening hours and certain times of the year

• Energy security for critical infrastructure such as hospitals, military installations, and emergency response centers.



- operations Offset cost of trucking fuel and overloading power grid during operations experience power extremes during certain times of the year • i.e unstable weather conditions programs for local talent and job growth address industry challenges and encourage reactor design and safety
- Use SMRs when performing remote Develop SMRs for communities that Implement nuclear sector training Provides research opportunities to

- innovation.



• Easy installation and transportation • Easier to operate than large power reactors Varied application potential

RECOMMENDATIONS







OBSTACLES

 SMRs may challenge current laws and regulations in the United States and internationally Adequate space and access to water, fuel, backup power • Accessibility to site for security and emergency responses • High capital and operations and maintenance (O&M) costs

Figure 2: Small Modular Reactor (SMR)

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