THIRD WAY

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Solving Energy Challenges in Remote Communities

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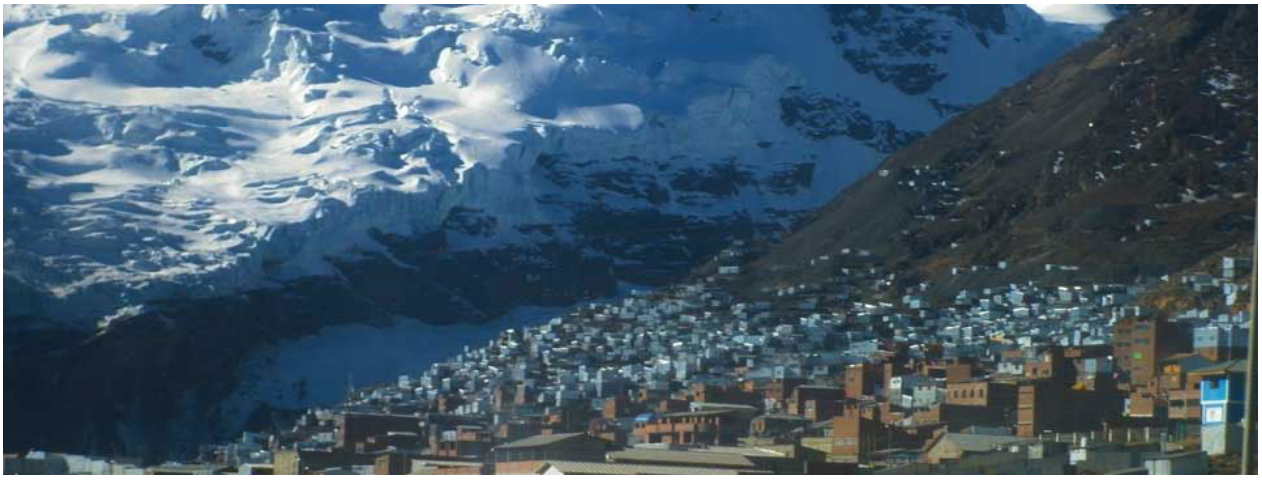
There are many communities around the globe that are incredibly isolated. People on the island of Tristan Da Cunha in the South Atlantic are 1,200 miles away from their closest neighbors. The Siwa Oasis in Egypt is surrounded by endless stretches of the Saharan Desert. Even some of the world's wealthiest countries like Sweden, Canada, Australia, and the U.S. have very remote populations. Due to immense distances and rugged terrain, these communities do not have access to the interconnected electrical grids that provide bulk reliable electricity.

These isolated populations rely on diesel generators for electricity and require large stores of imported oil and natural gas for heating. These fuels are often shipped or even flown in from long distances. Energy systems like these have helped small municipalities survive the challenges that come with their isolation, but they're far from ideal. Relying so heavily on shipments of fossil fuels is extremely expensive, poses unique reliability challenges, leaves residents vulnerable to fuel shortages, adds to greenhouse gas emissions, and increases environmental and public health risks from air pollution and storage tank leaks.



Advanced Reactors Can Help:

The new generation of advanced nuclear reactors currently under development have several attributes that could help alleviate the energy challenges that remote communities are facing:

- Unlike today's plants that can power a full city (~1000 MW), advanced reactor designs **offer a range of sizes**, including some that could fit the needs of even a small, rural town (< 2 MW).
- Many are being designed to **run for years without refueling or servicing**, making them especially valuable in locations that are inaccessible during parts of the year.
- Reactors can be configured to supply a microgrid serving the whole community on their own, or ramp production up and down to **align with renewable power sources**.
- They generate reliable energy **without emitting greenhouse gases or other air pollutants**.
- Advanced reactors can also **supply clean heat** for residential, commercial, or even industrial needs.

Some of these advanced designs are close to market introduction, with commercial projects expected to be online within the next decade. As state and local authorities plan for the long-term energy needs of rural communities, they should consider the potential for advanced nuclear to create a more affordable, secure, and sustainable future.

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Case Study: Tuluksak, Alaska

There are approximately 200 remote communities in the state of Alaska alone, with populations ranging from 20 to several thousand people. These towns can be hundreds of miles apart and some are only accessible by sea or air. These communities are also set to experience more extreme weather-related events as their proximity to the Arctic causes them to warm at two times the global

average. Electricity in these villages and towns can cost upwards of $1,000/MWh, and rates have been known to reach 16 times those of the rest of the U.S. Even with millions in federal and state subsidies to help offset the cost, some households still spend nearly half of their income on energy.

One of these places is Tuluksak, a village of 400 people in southwest Alaska, where the main occupation is fishing. The entire community is powered by a primary diesel generator. But even with a backup generator, this has proven to be a highly unreliable source of energy. Technical problems with both devices have caused several multi-day power outages. These generators were only a few years into their useful life when they started breaking down, and the cost of replacement parts alone has already exceeded $600,000. And on one occasion in 2014, lack of power for refrigerators and freezers caused the community to lose most of the food being stored for winter.

A microreactor could be an excellent solution for Tuluksak. According to a recent analysis of several new designs, the average lifetime cost of advanced reactors is $60/MWh, making them competitive with most traditional power sources and much less than the $960/MWh that customers in Tuluksak were recently paying for electricity. At that rate, an advanced reactor would have saved Tuluksak $500,000 in electricity costs over the course of a year, or roughly $1,300 per resident. In addition to power, a next-generation nuclear plant could also serve as a source of affordable heat, proving useful for a community that wants another option for space heating in public buildings, district heating for a residential neighborhood, or cheap process heat to enable a new industry like greenhouse farming or food processing.

Reviews of this App:

“I have long supported and advocated for the development and deployment of small modular reactors... The potential for this technology in my home state of Alaska is very exciting — the size, power potential, and ability to add unit by unit could be a game changer for small, remote communities that currently pay extremely high energy costs or to supply power to our military bases.”

Sen. Lisa Murkowski (R-Alaska), chairwoman of the Energy and Natural Resources Committee

"Small modular reactors have great potential as an emerging technology that could supply low-carbon energy for a range of users, including remote communities, mining operations and the oil and gas industry.”

Jim Carr, Canada’s Minister of Natural Resources

"When you have that threat of a diesel bill hanging over your head every month, that is very motivating to find solutions."

Jennifer Richcreek, Regulatory Specialist at the Kodiak Electric Association on the need for innovative energy solutions, including microgrids

TOPICS