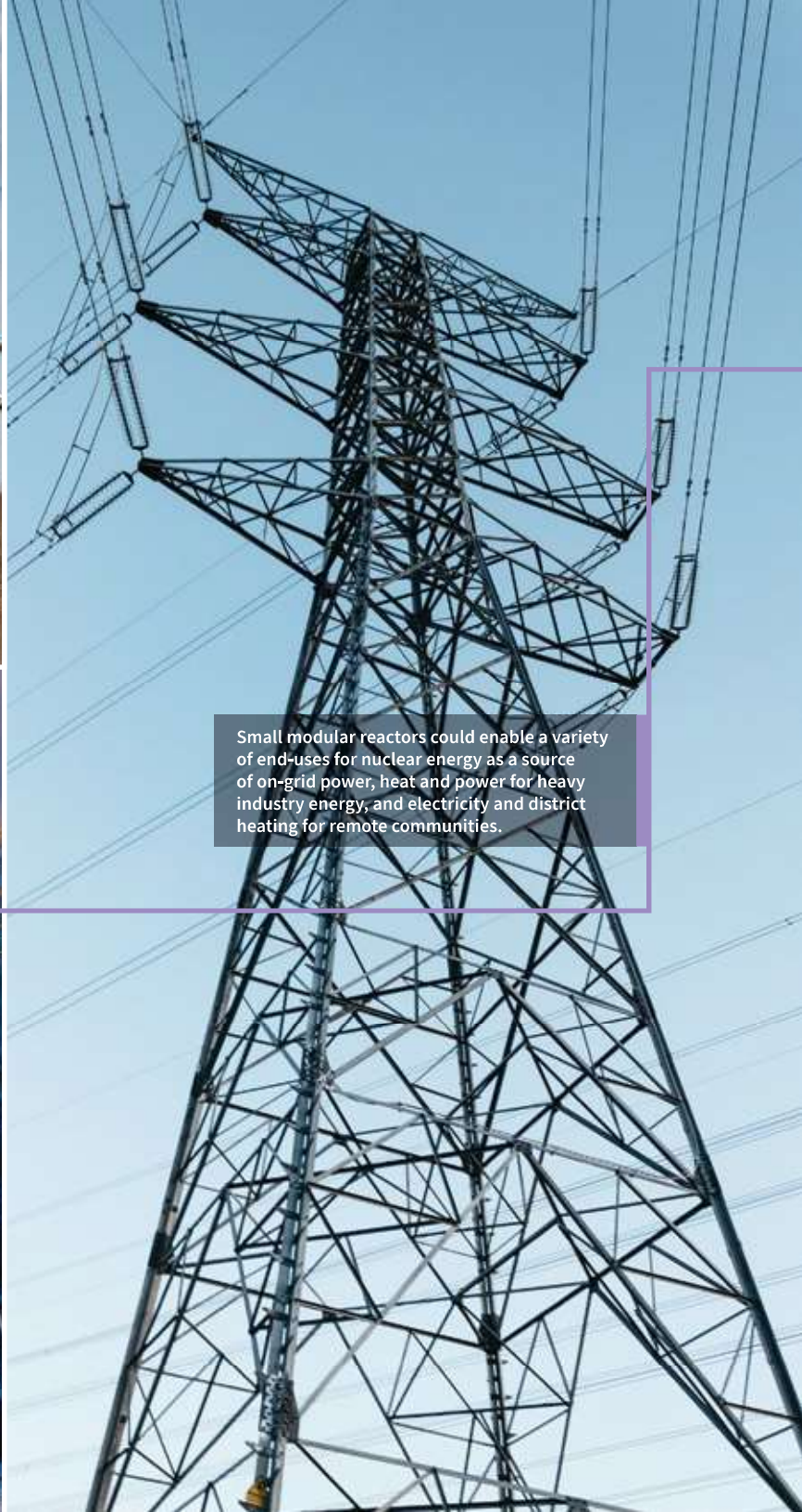

Small modular reactors could enable a variety of end-uses for nuclear energy as a source of on-grid power, heat and power for heavy industry energy, and electricity and district heating for remote communities.

SMALL MODULAR REACTORS

A building block of clean energy systems

Telephones used to be just for talking. Now they're for texting, shopping, keeping track of today's calorie burn, and settling arguments over who played R2D2 in the first Star Wars movie. Nuclear reactors are ready to take on new roles, too.

Ever since the first commercial nuclear plant opened in 1958—the Shippingport Atomic Power Station in the United States—reactors have fit one mold: big machines for producing baseload electricity.

But a new generation of reactors could make a familiar technology much more flexible and useful, just as the smartphone did to the telephone.

Small Modular Reactors (SMRs) have the potential to radically change not only how we make electricity, but how we make chemicals and plastics, how we integrate wind and solar into energy grids, and, indeed, how we live and interact with the infrastructure that produces our power.

These factory-built reactors provide less than 300 megawatts-electric, about one-quarter the output of big plants today, and sometimes far less—perhaps as little as a few megawatts.

Why get small? Because they are easier to build, easier to site, and easier to use.

They can be manufactured in a factory, one after the other, the way that airplanes or ships are—with all the economies of assembly-line production this offers—instead of being constructed on site, as is currently the case. And then they can be delivered to the intended site by rail, barge or heavy-haul truck. Because reactor manufacturing and construction of the surrounding infrastructure are conducted in parallel, these plants can be deployed promptly and at lower start-up costs.

For a large electricity grid, a power plant could incorporate multiple SMRs. Start with one or two and add more, like building blocks, as the need develops to respond quickly to changes in demand.

Big power plants need big grids to consume their supply, but SMRs can fit comfortably even on small grids, with no fears about electricity supply reliability when they shut down for refueling or maintenance since they are smaller units.

Because SMRs make use of the latest safety technologies, they could be located in the middle of a city to produce electricity where it is needed, or sited at a decommissioned coal plant to make use of existing infrastructure, such as transmission lines.

SMRs are designed for a modern grid, where demand can vary sharply over the course of a day, and where supply is mismatched because solar and wind electricity is abundant but variable. Some SMRs can switch between electricity production and other uses.

Because they are so adaptable, SMRs could enable "energy parks" that provide heat for industrial processes, steam for heating, or electricity for cooling homes, offices and shops—all without emissions of soot, smog precursors or carbon dioxide.

Their ease of transport and installation means that SMRs could be delivered to remote locations to provide pollution-free power for years or even decades before being returned for decommissioning—all without refueling, and without the need for hundreds of miles of transmission lines.

This isn't science fiction. SMRs are being deployed for delivery of electricity in some countries already and are near deployment for other, newer applications around the globe. SMRs are real. They are happening. And they offer a versatility and utility that doesn't just play by the rules—it promises to change the game altogether.