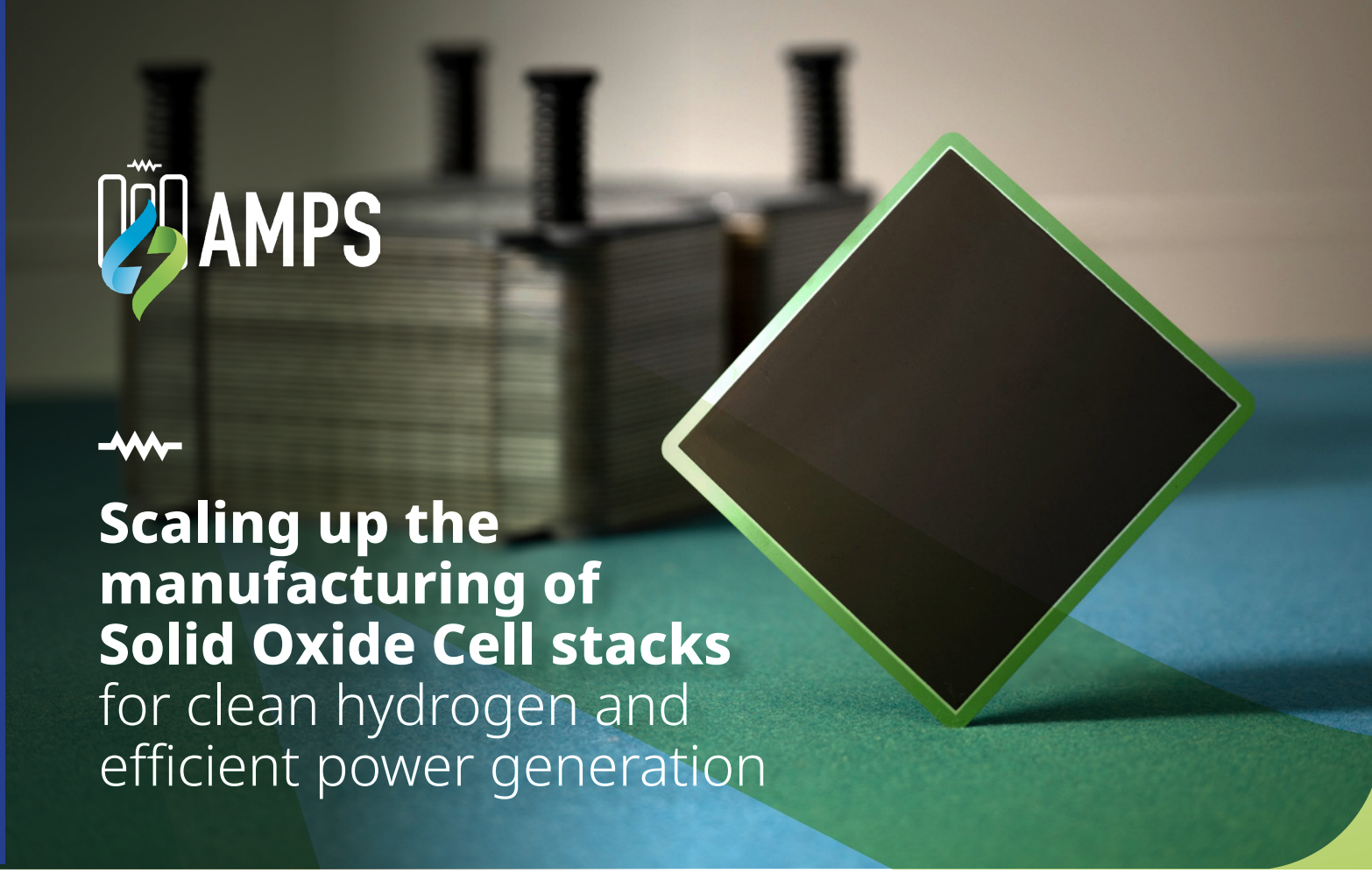


Scaling up the manufacturing of Solid Oxide Cell stacks for clean hydrogen and efficient power generation

Solid Oxide Cells: from clean energy potential to industrial scale

Solid Oxide Cells (SOCs) are an energy-conversion technology that can help produce cleaner electricity and hydrogen for a wide range of energy and industrial applications. Their particular advantage is that they can operate in two complementary ways: generating electricity efficiently from fuels or using electricity to produce hydrogen.

This flexibility can be especially useful in an energy system increasingly powered by renewables. When wind or solar generation is abundant, a reversible SOC system can use that electricity to produce hydrogen, storing energy in a form that can be used later. When power is needed, the process can be reversed, using hydrogen or other suitable fuels to generate electricity. In this way, SOC technology can help connect renewable energy, hydrogen production and reliable power supply.

These two functions correspond to two operating modes. As a Solid Oxide Fuel Cell (SOFC), the system converts fuel directly into electricity with high efficiency. Its ability to operate with fuels such as biogas, biomethane and hydrogen makes it particularly attractive for applications that require a stable and continuous supply of power.

As a Solid Oxide Electrolysis Cell (SOEC), it works in the other direction, using electricity to produce hydrogen. Because the process takes place at high temperatures, SOECs can achieve particularly high efficiencies when integrated into industrial facilities where heat is already available.

To move from an individual cell to a useful industrial system, multiple cells are assembled into stacks. These stacks provide the scale of power generation or hydrogen production needed for practical applications and are therefore a key building block of SOC technology.

Together, these characteristics give Solid Oxide Cells significant potential to support the transition towards cleaner energy and the decarbonisation of energy-intensive industries. But unlocking that potential at scale depends on making the technology easier, faster and more affordable to manufacture. This is the challenge AMPS is addressing, by developing automated production, integrated quality control and digital manufacturing solutions for SOC cells, components and stacks.

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