



Renewable energy businesses

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The transition to net zero is well underway, but it is not happening fast enough. Growth in key climate technologies, including wind and solar power and electric vehicles (EVs), has helped accelerate decarbonization efforts worldwide. Solutions such as green hydrogen and long-duration energy storage (LDES) are becoming available and, if scaled, could reduce global emissions even further. But the pace of scaling these technologies has not kept up with projections for a warming planet. Governments and companies have done an admirable job developing and deploying climate technologies to date, but a significant acceleration is required to meet net-zero targets--and stave off the most dire effects of climate change.

This article is a collaborative effort by Rob Bland, Laura Corb, Anna Granskog, Tomas Nauc^lr, and Giulia Siccardo, representing views from McKinsey's Sustainability Practice.

Three areas have emerged that should now be priorities for those navigating the challenges and seeking opportunities: building up supply chains (often through cross-sector partnerships), proactively addressing an emerging skills gap, and exploring different avenues for financing and investments.

In this article, we lay out the evolving landscape for scaling climate technologies and explore three areas of potential action for green business builders.

More than 4,000 companies have set or are in the process of committing to emissions reductions²"Companies taking action," Science Based Targets, accessed February 22, 2023. and 70-plus countries have set net-zero targets.³"For a livable climate: Net-zero commitments must be backed by credible action," United Nations, accessed February 22, 2023. How quickly would key climate technologies need to scale to help meet such goals?

Historically, growth in solar and wind has often outpaced projections, and new players entering the market (oil and gas companies, private equity players, and institutional investors, for example) show signs that the current pace of deployment could speed up.⁵"Renewable-energy development in a net-zero world," McKinsey, October 28, 2022. Nevertheless, the potential gap for renewables to meet net-zero targets looks steep.

Climate technologies that are high-potential but relatively less advanced in their commercialization (compared with renewables) would need to scale at an even greater rate. Consider hydrogen. Our analysis indicates that supply of green hydrogen, which is produced with renewables, would need to grow by a factor of 200 times.

Through our work with organizations that have built and scaled green businesses successfully, we have identified seven key principles. This framework is a way for leaders to navigate both the opportunities and risks involved in scaling climate technologies--and potentially set their companies up for significant growth. There is no one right combination of these factors, and most existing players have combined several of these

elements.

Lead with game-changing ambition. Effective green business builders tend to set their sights on creating something significant from the start. Game-changing ambition may mean aspiring to produce a zero-carbon product at a competitive cost (which enables a competitive price), compared with a less sustainable alternative, and scaling new capacity fast.

Accelerate to the point of cost advantage. Building a business around a clean technology may require analyzing different technological pathways, including some technology options that are not yet commercialized. When analyzing a new technology, leaders must understand the scale break point for cost competitiveness, to reach lower unit costs faster and potentially be competitive on price from the start.

Sign up captive demand before scaling. Successful green business builders often set up demand with a strong commercial plan prior to expanding, to reduce risk. One way of accomplishing this is through purchase agreements. For example, Swedish battery manufacturer Northvolt signed a supply agreement with BMW.¹ "BMW Group signs long-term supply agreement for battery cells with Northvolt," Northvolt, July 13, 2020.

Build capacity with parallel scaling. To reach scale-up goals, the ability to drive several investments or market introductions in a limited time frame is key. We've seen leaders "parallelize the scaling" from the start--that is, initiate additional growth waves before they complete the first one. One approach is scaling through partnerships in the value chain. For example, investing in production capacity in a company's home region while finding a partner to deploy the same technology in another. Or coinvesting in expanding manufacturing capacity with suppliers.

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