EXECUTIVE SUMMARY

Clean and Competitive: Opportunities for U.S. Manufacturing Leadership in the Global-Low Carbon Economy

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OVERVIEW

The United States needs an integrated national strategy to address the twin challenges of bolstering its manufacturing sector and averting climate change. Timely federal research, development, and demonstration (RD&D) and deployment policies targeted to specific manufacturing industries could create competitive advantage for domestic producers, expanding investment and employment.

Manufacturing has been a key engine of job creation in the United States, helping workers without a college education join the middle class. A strong manufacturing base creates a more resilient and equitable economy, accelerates innovation, strengthens international competitiveness, and improves national security.

Climate change is a national and global challenge of immense proportions. Industrial emissions account for more than 30 percent of the U.S. and global totals. Sincere efforts around the world to fulfill national pledges to achieve net-zero emissions will drive a nearly complete retooling of global manufacturing.

Until very recently, these two challenges have been treated largely within their own policy silos at the federal level. This division is counterproductive for both manufacturing and climate policies, and it overlooks a crucial opportunity to create an integrated national strategy that leverages the United States’ strength in science and technology.

However, to make the most of this opportunity, the federal government will have to act more strategically and forcefully than it has in the recent past, carefully targeting federal investment toward industries and technologies in which domestic producers are most likely to succeed against international competitors. Such an approach would complement economywide policies like carbon pricing, and it can be fully compatible as well with a rules-based global economy.

This report takes a first step toward creating such a strategy. Through a series of workshops and interviews with experts and stakeholders, we examined a broad swath of technologies around which the United States might find opportunities for domestic manufacturing with a high potential for economic growth and emissions reductions. The report focuses on four industries...
that exemplify these opportunities, but which have not yet received adequate attention or support: hydrogen production; heating, cooling, and drying equipment; chemicals production and recycling; and protein alternatives to meat and dairy products. It explains why each industry matters, sets out potential pathways to net-zero emissions, examines the comparative position of U.S. manufacturers, assesses opportunities and gaps, and lists policy recommendations.

Hydrogen could displace emissions from industry, power, and transportation, but current production methods are very carbon-intensive. The United States has historically been a world leader in this industry, but it has begun to fall behind just as demand for clean hydrogen is ramping up dramatically. A federal policy agenda for clean hydrogen production should set ambitious cost reduction targets and prioritize RD&D projects aimed at realizing these targets. The federal government should also support deployment by encouraging public agencies to become early adopters of clean hydrogen and enacting policies that bridge the cost differential between dirty and clean hydrogen.

Heating, cooling, and dehumidifying buildings, and the provision of low-temperature heat to industrial processes for drying, separations, and other purposes, are responsible for significant emissions globally. These emissions are likely to grow rapidly unless new solutions are widely deployed. U.S. manufacturers are not yet well-positioned to capture the markets for these solutions, like improved heat pumps. Detailed national plans should focus on developing high-efficiency, low-cost, highly reliable systems for buildings and industry, built around ambitious, specific goals. Federal funding for RD&D should target key features of these systems, accompanied by more expansive standards and incentives.

The chemical industry is responsible for about 18 percent of global carbon dioxide emissions, and it employs nearly 10 percent of the domestic manufacturing workforce. Demand for plastics is growing particularly rapidly and will likely accelerate. The United States leads the world in the skills and know-how that are most relevant to transition this industry to a low-carbon trajectory, but the federal government does not have a cohesive strategy to drive such a transition. It should invest much more in RD&D for plastics recycling and bio-based chemical production as well as large-scale test facilities, and improve and extend procurement and labeling programs.

Proteins made by microbes in fermenters and animal cells cultivated in bioreactors could substitute for many meat and dairy products, which are responsible for 12 percent or more of global emissions. Biotechnology-based alternative proteins are not generally cost competitive with conventional products today, but innovation should bring this goal within reach in the near future. The United States is a global leader in this emerging industry, thanks in large part to substantial federal investments in biotechnology and plentiful venture capital investment. A robust federal policy, including support for applied R&D, testbeds, and innovative manufacturing methods, and regulatory and procurement reform, could secure that position.

The United States faces the twin issues of rebuilding a vibrant, inclusive economy that includes a strong manufacturing sector while simultaneously accelerating progress toward net-zero emissions. The federal government should respond to these challenges by adopting an integrated strategy that targets specific industries with a high potential for both emissions reduction and high-quality job growth. The United States will not be alone in seeking to develop such industries, but sophisticated strategies can secure and sustain competitive advantage in many.
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