Accelerate.

Turbocharging the Manufacturing Renaissance in an Era of Energy Abundance
Executive Summary

For more than two centuries, American industry has harnessed the nation’s abundance of natural resources, energy, talent and ingenuity to power and unleash the most productive economy in the world.

Dramatic shifts spurred by globalization, recession, regulatory and tax trends, ascendant and increasingly advanced industrial activity across Europe and Asia and accelerating changes in consumer demand have buffeted America’s industrial and manufacturing enterprises, threatening America’s place as a global superpower. Yet today, America finds itself facing a new, promising frontier shaped by two powerful transformations working in tandem:

• The generational re-emergence of advanced and highly productive manufacturing capacity in the United States; and
• The increasing abundance of innovative, sustainable, affordable and domestically-sourced energy.

To capitalize on this convergence, the Council on Competitiveness (Council) launched the Energy and Manufacturing Competitiveness Partnership (EMCP) in 2015, which leveraged more than a decade of leadership in the energy and manufacturing fields that began with the seminal National Innovation Initiative (NII) in 2003 and continued most recently with the Energy Security, Innovation and Sustainability Initiative (ESIS, 2007–2009), the U.S. Manufacturing Competitiveness Initiative (USMCI, 2010–2011) and the American Energy and Manufacturing Competitiveness Partnership (2012–2016). The EMCP, a C-suite-directed initiative, focused on the shifting global energy and manufacturing landscape and how energy transformation and demand are shaping industries critical to America’s prosperity and security.

Over a span of three years, the Council executed an ambitious roadmap to focus national attention on the intersection of the energy and manufacturing transformations. Recognizing the tremendous innovation and changing landscape across the manufacturing sector, from 3D printing to the proliferation of sensing devices and the use of advanced modeling and simulation tools, the EMCP was designed to approach the country’s diverse industrial landscape as a network of distinct but interdependent productive sectors, each with its own challenges and opportunities. Through a series of sector studies hosted around the nation by members of the Steering Committee, the EMCP identified the salient questions and challenges facing the energy-manufacturing nexus within key sectors of the economy.

Seeking input from leaders throughout the private sector, academia, the research and scientific community, NGOs and government, each of the six sector studies looked at how decision-makers can bolster the critical pillars of competitiveness—technology, talent, investment and infrastructure.

The picture painted by these sector studies is, from one perspective, bleak.

• The United States is plagued by outdated regulatory and physical infrastructure that is failing to keep pace with innovation in sectors from materials to aerospace and beyond.
• The absence of a coordinated, defined research agenda to guide insufficiently-funded research and development is limiting the potential for advancement in key sectors such as bioscience.
• Science has a perception problem that can only be combatted through increased scientific literacy.
• The skills gap is growing, and will continue to get worse as workforce demographics shift.
• And, while all this is happening at home in the United States, global competition is ramping up as countries around the world realize the advantages of investing in a strong innovation ecosystem.

Yet, the United States is not without its strengths. American innovators—icons of industry, brilliant scientists and engineers, and everyday geniuses—continue the nation’s 150-year legacy of reshaping entire industries, the marketplace and the world with breakthrough technologies, products and services. Hundreds of renowned research institutions and national laboratories keep the United States at the forefront of knowledge creation and on the cutting edge of game-changing technologies. The nation’s culture of entrepreneurship, risk-taking and creativity—stoked by venture capital—is unmatched around the globe. Additionally, America’s transition from energy dependence to energy abundance is of unparalleled promise.

Wise policies and practices, in many cases, could unleash these American strengths, boost manufacturing engines and raise technology commercialization to new heights, driving U.S. economic growth and job creation. Developing next-generation physical and regulatory infrastructure to support the nation’s advanced energy and manufacturing enterprise will build the foundation upon which America’s economy can thrive and compete. Fueling the innovation and production economy from idea to implementation will allow for increased industrial productivity as the United States reaffirms its leadership in new knowledge creation and its end-use application. Moreover, catalyzing the power and potential of the American worker to thrive in an advanced manufacturing economy will enable the advanced technology-based economy of the next decade to provide higher-paying jobs for American families.

These key challenges, opportunities and recommendations discussed throughout sector studies on water and manufacturing, advanced materials, bioscience, agricultural and consumer water use, energy and aerospace—along with findings from a three-dialogue series on American cybersecurity—underpin this report and are the foundation for the Council’s call to action.

The recommendations in this report—and the over ten years of work they encompass—have the power to turbocharge America’s manufacturing capabilities, improve America’s competitiveness and unleash a new wave of productivity, prosperity and resilience for all Americans.

“The United States stands at an economic inflection point where we can either seize the opportunity in front of us or watch others take the lead in critical sectors from AI to big data to additive manufacturing.”

The Honorable Deborah L. Wince-Smith
President & CEO
Council on Competitiveness
Call to Action

Building upon more than a decade of work on energy and manufacturing policy as key enablers of U.S. productivity, prosperity and security, the Council on Competitiveness in 2015 launched the Energy and Manufacturing Competitiveness Partnership (EMCP). Led by a C-suite group from industry, academia, labor and the national laboratories, the EMCP approached America’s diverse industrial landscape not as a monolith, but as a network of distinct yet interdependent sectors, each with its own challenges and opportunities.

Through six sector studies, the EMCP explored how cross-cutting factors play out within each sector, identified discrete factors shaping each sector and assessed common challenges and opportunities that span across the economy—most prominently, cybersecurity, which was explored in-depth through three regional dialogues across the country.

Based on the Council’s decade-long leadership and the learnings of the EMCP, this call to action constitutes a national policy agenda to drive America’s future energy and manufacturing competitiveness. If implemented, this agenda would turbocharge the U.S. manufacturing renaissance and drive economic prosperity for the nation and for all Americans.
Develop next generation physical and regulatory infrastructure to support the nation’s advanced energy and manufacturing enterprise.

1. Create a modern, enabling regulatory infrastructure to keep pace with innovation and spur economic growth.
   
   1.1. Encourage state and local governments to continue experimenting with new regulatory frameworks to test and evaluate the viability of disruptive technologies, from autonomous vehicles to next-generation nuclear power.
   
   1.2. Review federal regulations to avoid redundancy and ensure states and other entities have the flexibility to propose and implement innovative regulatory models and explore new technologies needed to enable the advanced energy and manufacturing enterprise.
   
   1.3. Make permanent Executive Order 13771 requiring that, subject to a rigorous cost/benefit analysis, two regulations be eliminated before a new regulation can be promulgated.

2. Break the cycle of incremental infrastructure improvements to spur creative and forward-looking approaches to the movement of goods, services and people.
   
   2.1. Substantially increase federal and state investment in U.S. infrastructure to repair and modernize the roads, airports, rails and water systems upon which the economy relies.

2.2. Dedicate a percentage of federal infrastructure funding to leapfrog demonstration projects that leverage next-generation technologies, obviating the “patch and repair” cycle of current infrastructure spending.

2.3. Create partnerships between industry and local governments to develop and propose innovative infrastructure models that support next generation energy and transportation initiatives.

   
   3.1. Secure U.S. leadership and investment in nuclear technology by leveling the regulatory playing field, ensuring adequate funding for basic nuclear research and increasing support for nuclear engineering degree programs.

   3.2. Modernize the electric grid by reforming state regulations to allow utilities to depreciate outdated equipment more quickly.

   3.3. Catalyze innovation in the utility sector by allowing utilities to recoup a percentage of investments in R&D through rate increases.
Fuel the innovation and production economy from idea to implementation.

4. Reaffirm U.S. leadership in new knowledge creation and better align research efforts to meet the grand challenges facing the nation and the world.
   4.1. Increase federal investment in research and development across all agencies at a consistent, predictable rate with an overall target of one percent of GDP.
   4.2. Under the direction of the Science Advisor to the President, align the national research agenda with industrial grand challenges and prioritize disruptive technologies with high potential for economic and societal impact.

5. Capture the value of investments in research by supporting and accelerating the development of advanced technologies in the United States.
   5.1. Increase federal and state support for regional technology test beds, such as the Manufacturing USA institutes.
   5.2. Incentivize technology transfer and partnerships between national laboratories, universities and businesses by streamlining intellectual property agreements, considering industry collaboration as part of promotion and tenure decisions, and clarifying that industrial partnerships with national labs are consistent with their mission.
   5.3 Close the valley of death in private sector financing to enable startup to scale-up.

6. Leverage and secure the Internet of Things to drive industrial productivity.
   6.1. Incentivize the use of sensors and monitoring equipment for energy and water usage in public and private sector facilities at the state and local level through tax credits and other mechanisms.
   6.2. Encourage greater uptake and use of standardized criteria, such as the UL Cybersecurity Assurance Program to increase supply chain security.
   6.3. Require that all new technology applied to the electric grid meet widely-accepted security standards to build cyber resilience.

7. Extrapolate insight and value from the data tsunami.
   7.1. Create a federal verification system for crowdsourced data to enhance the validity and usefulness of knowledge databases across multiple sectors.
Catalyze the power and potential of the American worker to thrive in an advanced manufacturing economy.

8. Develop a workforce capable of succeeding in the hyper-connected, cross-disciplinary, advanced technology-based economy of the next decade.

8.1. Integrate technical training into K-12 education, including industrial arts programming, to build a better base of technological understanding by all Americans.

8.2. Strengthen the lifetime linkages between universities and graduates to enable life-long learning opportunities.

8.3. Develop a multi-stakeholder public awareness campaign to increase scientific literacy.

9. Facilitate greater collaboration, interaction and exchange between industry and secondary and higher education institutions to spur partnerships and highlight workforce opportunities.

9.1. Reduce state and education institutional barriers to allow more practitioners into the classroom and to inspire the next generation of advanced manufacturing workers.

9.2. Encourage industry partnerships with educational institutions to enable practitioners to engage with students in K-12 and higher education.

10. Implement the Council on Competitiveness National Cyber Agenda

10.1. See appendix A