

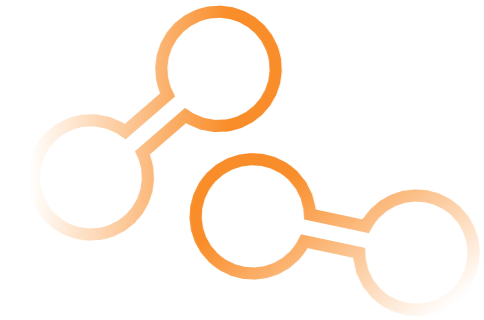
# REBUILD U.S. MANUFACTURING THROUGH LOW-CARBON INNOVATION

Rebuilding the nation's manufacturing sector and averting climate change are national challenges that have been dealt with in separate policy silos. In fact, they are deeply interconnected. **The U.S. must seize the opportunity to create an integrated manufacturing and climate strategy.**

Four industries exemplify the opportunity to rebuild the U.S. manufacturing sector while cutting greenhouse gas emissions.

## HYDROGEN PRODUCTION

Hydrogen, the lightest element, is a versatile energy carrier with the potential to perform many functions in a low-carbon economy, but current hydrogen production is carbon-intensive.

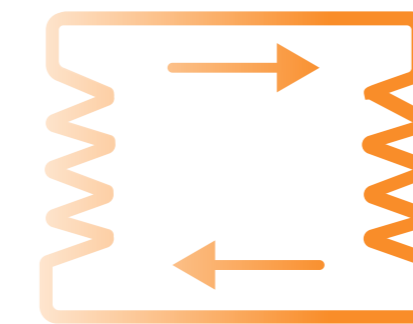


### A federal policy agenda should include:

- Shifting DOE's focus toward industry, energy storage, and heavy-duty transportation uses
- Funding a portfolio of pilot- and commercial-scale **demonstration projects** or clean hydrogen "hubs"
- Establishing more effective production **tax incentives**
- Expanding range of technologies eligible for DOE Loan Programs Office **assistance**

## HEATING, COOLING, AND DEHUMIDIFYING

Heating, cooling, and dehumidifying buildings, and providing low-temperature heat in industrial processes, are responsible for significant greenhouse gas emissions.



### A federal policy agenda should include:

- Establishing ambitious heat pump cost and performance **goals**
- Focusing on **innovation** in new refrigerants, next-gen heat exchangers, drilling/piping for geothermal heat pump systems, novel electric drying systems, and low-temperature industrial processes
- Funding pilots and **first-of-a-kind demonstrations** of zero-emission industrial processes
- Providing **loans** and financial assistance to manufacture advanced heat pumps domestically
- Expanding **appliance standards** to include a wider range of commercial and industrial equipment and consideration of system efficiency

## CHEMICALS PRODUCTION AND RECYCLING

Worldwide demand for chemicals made from oil and gas is growing rapidly, driven by increases in demand for plastics, as well as fertilizers, synthetic fabrics, paints, and many other products.

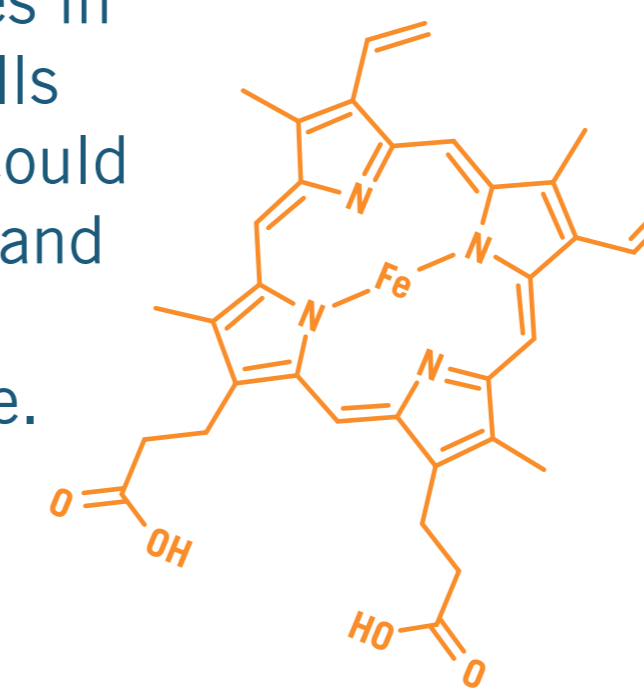


### A federal policy agenda should include:

- Investing in R&D to create plastics and other chemicals that can be recycled more cheaply and easily and **improved infrastructure** for recycling plastics
- Developing **crops** and **microorganisms** to produce feedstocks for bio-based chemical manufacturing
- Funding public-private partnerships to build and operate **large-scale test facilities**
- Creating a product **labeling system** that reflects climate impacts
- Establishing **"buy clean" programs** for low-emission chemicals

## BIOTECH-BASED ALTERNATIVES TO MEAT AND DAIRY PRODUCTS

Proteins made by microbes in fermenters and animal cells cultivated in bioreactors could substitute for many meat and dairy products, displacing emissions from agriculture.



### A federal policy agenda should include:

- Providing more support from USDA for **research** on alternative proteins
- Providing public funding for **testbed** facilities
- Developing a **Manufacturing USA innovation institute** for alternative protein production technology
- Focusing regulations on **potential risks** of new products
- Adding alternative proteins to federal **nutrition support programs**
- Assisting **farmers/ranchers** in joining alternative protein supply chains