MDF
Manufacturing Demonstration Facility

From concept to commercialization, ORNL's world-leading facilities and expertise enable research focused on reducing the energy intensity of US industry, supporting development of new products, and strengthening our nation's clean-energy economy to meet the commercial and national security needs of tomorrow.

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The CFTF is an integral part of ORNL's broader initiatives in advanced manufacturing technologies falling under the umbrella of the Manufacturing Demonstration Facility (MDF). For more information, contact

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www.ornl.gov/manufacturing

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CARBON FIBER TECHNOLOGY FACILITY

Demonstrating Innovative Low-Cost Carbon Fiber for Energy and National Security Applications

OAK RIDGE National Laboratory

Innovation in Carbon Fiber Production

Carbon fiber is a strong, stiff, lightweight enabling material for improved performance in many applications; however, its use in cost-sensitive, high-volume industrial applications such as automobiles, wind energy, oil and gas, and infrastructure is limited because of today's relatively high price. Current methods for manufacturing carbon fiber and carbon-fiber-reinforced composite structures tend to be slow and energy intensive. New innovative manufacturing processes for low-cost precursor development and conversion technologies hold the key for reducing carbon fiber cost for energy applications. Similarly, innovative performance-focused materials and processes can potentially drive significant performance improvements for national security applications.

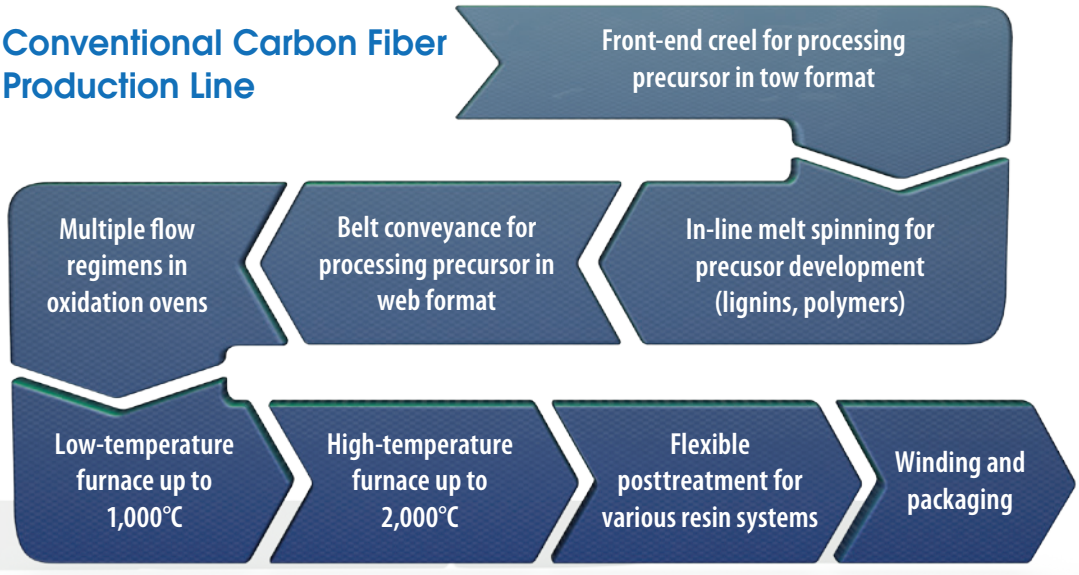
Why Low-Cost Carbon Fiber?

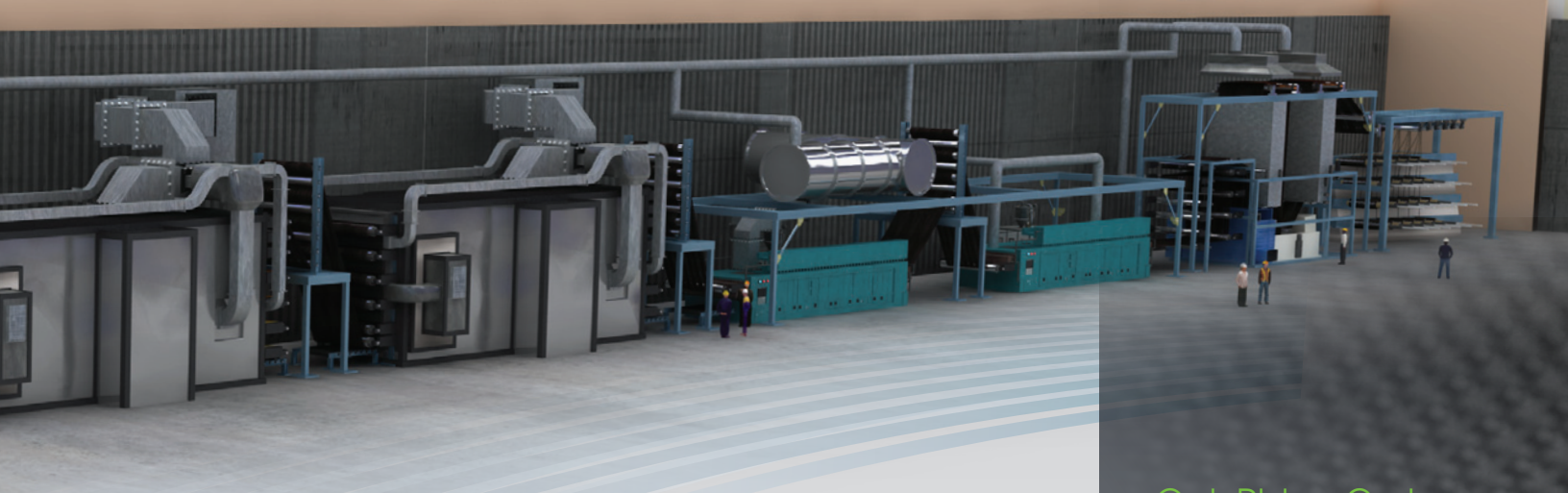
- ***Energy Independence***
  Increase the nation's investment in energy technologies for a more sustainable energy future
- ***US Manufacturing***
  Spur the development and growth of existing and new US carbon fiber and composites
- ***Job Growth***
  Seed regional and national job growth and economic development

Role of the Carbon Fiber Technology Facility

- Demonstrate low-cost carbon fiber (LCCF) technology scalability with the last scaling step before full-scale commercial production
- Produce development quantities of LCCF needed for large-scale material and process evaluations and prototyping
- Deploy a training system, including educational internships and industrial training and recertification, for developing the future carbon fiber workforce

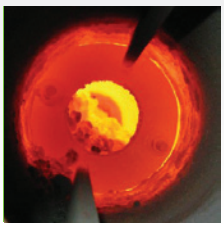
Conventional Carbon Fiber Production Line





Semiproduction-Scale Carbon Fiber Pilot Plant

As the nation's leader in LCCF research and development, Oak Ridge National Laboratory's new Carbon Fiber Technology Facility (CFTF) offers a highly flexible, highly instrumented LCCF facility for demonstrating technology scalability and producing market-development volumes of such fiber. The new facility houses a thermal (conventional) conversion line and a melt-spinning precursor fiber production line and includes space for a future advanced conversion line.

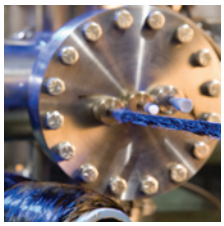


Thermal (Conventional) Conversion Line

The thermal conversion line is rated for 25 tonnes/year of polyacrylonitrile (PAN)–based fiber and can convert both melt-spun and solution-spun precursors. It is baselined for standard modulus PAN but designed with the flexibility to accommodate lignin, polyolefin, and pitch precursors and can be readily upgraded to convert rayon and high modulus PAN precursors. It is designed to process materials in either tow or web forms.

Melt-Spun Precursor Fiber Production Line

The melt-spinning line is rated at 65 tonnes/year of polyethylene fiber and is designed to also spin lignin and pitch-based precursors in either tow or web forms. It is upgradable to melt-spin PAN when the technology is sufficiently developed.



Advanced Technology Conversion Line

ORNL is currently developing advanced conversion technology based on microwave and plasma processing technologies. Provisions have been made for the future construction of an advanced technology line, similar in scale to the conventional conversion line, when the technologies are sufficiently mature for semiproduction-scale demonstration.

Working with ORNL

The CFTF is available to industrial collaborators throughout the value chain, with emphasis on the creation and execution of vertically integrated partnerships, but academia, national laboratories, government agencies, and nongovernmental organizations may also use the facility. Access is granted through various partnering mechanisms, and both proprietary and nonproprietary work can be conducted. All partnerships are conducted in compliance with statutory restrictions, specifically export control.

Oak Ridge Carbon Fiber Composites Consortium

The Oak Ridge Carbon Fiber Composites Consortium is a public–private partnership enabling a national network for innovations in manufacturing. The consortium's mission is to foster industry–government collaborations to accelerate the development and deployment of lower-cost carbon fiber materials and processes and create a new generation of strong, lightweight composite materials that will improve America's competitiveness.

Membership benefits include opportunities for

- *participating in two annual membership events and technology progress briefings,*
- *building relationships with other companies across the carbon fiber composites value chain, and*
- *providing market-based input to help accelerate the full-scale commercialization of low-cost carbon fiber composites.*

Learn more at www.cfcomposites.org

Carbon Fiber Composites
Oak Ridge
Consortium