A technical project with Dow and Ford created a novel composite material, which has achieved part level material performance such that Ford is willing to declare it acceptable for specification on future vehicle platforms.The material was compression molded into liftgates to validate.

The new material with recycled carbon fiber was injection molded into fenders. The resulting fender has 60% lower embodied neergy than if using the original carbon fiber, which is the current traiditonal method. These results open new doors for cost savings for creating a lighterweight material for automotive production.

Vartega then recovered the fiber from the scrap material that was not created into a liftgate. Michelman and TechmerPM compounded the material with 10% carbon fiber, so it could be utilized in injection molding capacities.

In 2020 Vartega gained recognition for this project from:
- SAMPE
- ACMA
- JEC World
- JEC Composites Pavilion at NAIAS
- ReFocus Sustainability with the Plastics Industry Association

IACMI – The Composites Institute
www.iacmi.org
2360 Cherahala Blvd.
Knoxville, TN 27932

University, State, Regional, National Laboratory, & Association Partners

The Institute for Advanced Composites Manufacturing Innovation (IACMI), managed by the Collaborative Composite Solutions Corporation (CCS). CCS is a not-for-profit organization established by the University of Tennessee Research Foundation. As a Manufacturing USA institute, IACMI is supported the U.S. Department of Energy's Advanced Manufacturing Office in the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE).

IACMI – The Composites Institute®

Institute Outcomes in Colorado

April 2019

IACMI Members in Colorado

Strengthening wind energy growth in U.S. energy market

Colorado is home to IACMI – The Composite Institute's wind technology area. The National Renewable Energy Laboratory (NREL), Colorado School of Mines, Colorado State University, and the Colorado Office of Economic Development and International Trade (OEDIT) lead IACMI's Colorado activities with a focus on wind turbine technology. Capitalizing on the long and productive history of collaboration between NREL and the major wind industry OEM's, including GE, Siemens Gamesa, Vestas, TPI Composites and LM Windpower, IACMI's Wind Turbine Technology Area is developing, testing, and deploying transformational manufacturing methods, designs, and materials that will result in increased opportunities for wind power utilization in the US energy market and for catalyzing economic growth in Colorado.

According to the U.S. Department of Energy, wind energy has the potential to support more than 600,000 jobs in manufacturing, installation, and maintenance; and it will have a capacity for 404.25 gigawatts of energy produced across 48 states by 2050. Companies in Colorado are part of this growing ecosystem and are demonstrating long-term impact to the state through their workforce training, technology innovations, capital investments, and job creation.

About IACMI

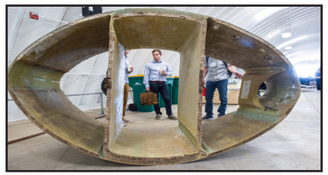
IACMI – The Composites Institute is a 160+ member community of industry, academia, and government agencies leading innovation and workforce development initiatives to drive the adoption of advanced composites to grow U.S. manufacturing and support national security. IACMI, a Manufacturing USA institute, is supported by the U.S. Department of Energy's Advanced Manufacturing Office, as well as key state and industry partners.

Advanced composites provide strength and stiffness while being very lightweight. These characteristics provide advantages in many transportation, energy, and inrastructure applications. Greater deployment of advanced composites can offer benefits, such as providing safer, more energy-efficient vehicles. IACMI is working to drive the large-scale adoption of advanced composites in diverse markets.

IACMI – The Composites Institute creates an **ecosystem of innovation** to drive **commercial outcomes** that lead to **economic growth**.

Creating an Innovation Network

Support for IACMI in Colorado provided by COLORADO Office of Economic Development & International Trade; NREL NATIONAL RENEWABLE ENERGY LABORATORY



Thermoplastic Composite Development for Wind Turbine Blades
IACMI is investigating new developments in thermoplastic materials to lower production costs, improve recyclability of wind turbine blades, and expand applicability to components demonstrated at large scale. The long-term impact could reduce costs and improve reliability in composite structures, which allow for process improvements on a larger scale, increasing energy efficiency.
Partners: led by TPI Composites in collaboration with NREL, Johns Manville, Colorado School of Mines, Arkema, Purdue University, University of Tennessee, and Vanderbilt University

JEC GROUP; materialstoday; north american WINDPOWER

Coverage of the 9M wind blade has been picked up by national media and trade media including North American Wind Power, Materials Today, KnoxNews, Plastics.com, JEC Composites, Lucintel, Yahoo, ChooseColorado and more.

Finalist for innovation awards at CAMX and JEC World

As a next step in the project, the technology is being scaled-up to a 13M wind blade – which is an industry standard size for utilization.

Establishing an Environment for Innovation

The Composites Manufacturing Education and Technology Facility (CoMET)
The CoMET, at NREL's National Wind Technology Center (NWTC) paves the way for innovative wind turbine components and accelerated manufacturing. The CoMET, located near Boulder, CO, is home to IACMI's Wind Technology Area.

Innovations through Colorado-based research

Recycled carbon fiber for automotive applications
Through the use of innovative and novel enabling technologies the Vartega-led project team will characterize and validate materials to meet the growing demand for cost effective carbon fiber needed for vehicle weight reductions to improve fuel economy, reduce emissions, and extend electric vehicle range.
Project partners: Michelman; Oak Ridge National Laboratory; Colorado School of Mines; Michigan State University; University of Dayton Research Institute; and University of Tennessee, Knoxville; with support from BASF and Ford.

Wind energy IACMI members

Gates; DMS DIVERSIFIED MACHINE SYSTEMS; STEELHEAD COMPOSITES ISO 9001:2008 Certified Company; ARKEMA INNOVATIVE CHEMISTRY; SIEMENS Gamesa RENEWABLE ENERGY; tpi COMPOSITES; JM Johns Manville; LOCKHEED MARTIN

Serving Workforce Needs

6 Colorado Internship placements

500 Composites training workshop participants in Colorado, in partnership with Composites One

Internship program training next generation of engineers
The internship program began in the summer of 2016 with 15 participants and 8 sites and has now graduated graduated over 100 interns from the program. Colorado interns have been hosted at NREL's CoMET facility and at Vartega working on projects to increase the recyclability of wind turbine blades.

"IACMI and Vartega opened so many doors for me, allowing me to become a project leader, attend industry events, offer client-facing solutions, and present my work." – Kylie Van Aken, 2018 IACMI Intern at Vartega; present Vartega mechanical engineer

Impacting Economic Development

IACMI catalyzes small and medium sized companies to succeed through workforce training, ecosystem collaboration, and R&D resources. A few of the SMEs that have participated in IACMI events include Vartega, Steelhead, Allegheny Science and Technology, and Ability Composites.

Hundreds Trained in Colorado Workforce Initiatives
Nearly 500 technicians, business owners, students, and professionals representing over 200 companies have been trained during IACMI's hands on workshops held annually at the CoMET facility, with a total estimated short term economic impact of nearly $600,000 to the state of Colorado.

National composites industry impact:

$400M Investment in eight states **3,000** Jobs announced