



# VIRGINIA ADVANTAGES

## Plastics & Advanced Materials



**VIRGINIA ECONOMIC  
DEVELOPMENT PARTNERSHIP**

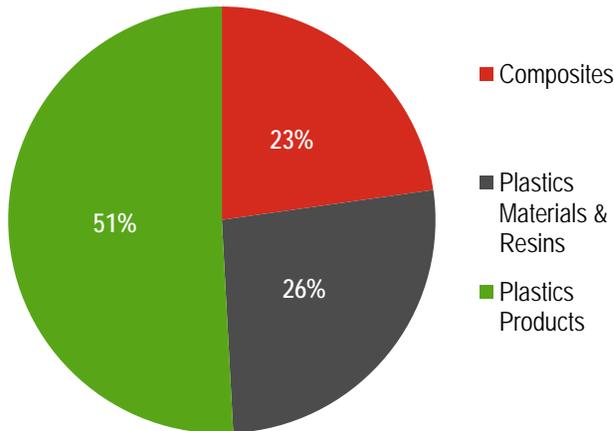
**YESVIRGINIA.ORG**

## Plastics & Advanced Materials in Virginia

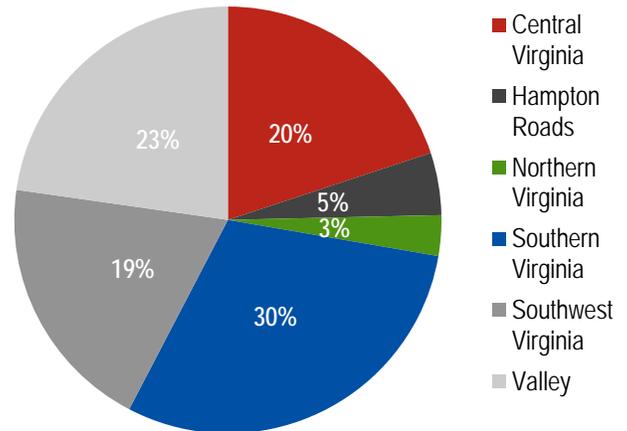
Virginia's strategic mid-Atlantic location, superior transportation network and competitive operating costs combine to make an ideal location for Plastics & Advanced Materials companies. Virginia is home to over 200 plastics companies that employ more than 20,700 Virginians. Plastics & Advanced Materials have a direct economic output of \$12.2 billion in Virginia and support an additional \$6.0 billion in economic activity.

Since 2006, Plastics & Advanced Materials companies have invested \$1.08 billion and created more than 4,200 new jobs in Virginia. Major announcements include: Rubbermaid Commercial Products, Trex Company, Hanwha Azdel, Creative Urethanes Inc., Eastman Chemical Company, and North American Mold Technology (NAMT).

Employment by Sector



Employment by Region



## Virginia's Plastics & Advanced Materials Technologies

- Plastics material and fiber manufacturers
- Film/sheet manufacturers
- Blow molders
- Injection molders
- Pipe/profile manufacturers
- Thermoformers
- Composites
- Equipment manufacturers

## Major Plastics & Advanced Materials Employers in Virginia

BGF  
Celanese Corporation  
CP Films  
DuPont  
General Dynamics

Honeywell  
IAC Strasburg  
Invista  
Klockner Pentaplast  
O'Sullivan

Presto  
Rubbermaid Inc.  
Strongwell  
Trex  
Universal Fibers

## Advanced Composites in Virginia

Virginia plays a key role in the Advanced Composites sector. Over 4,700 people are employed at 32 Advanced Composites firms across Virginia. The top universities in Virginia conduct Advanced Composites R&D and are supported by federal entities like the NASA Langley Research Center and the Defense Advanced Research Projects Agency. The National Institute of Aerospace in Hampton manages NASA's Advanced Composites Consortium, which is working to improve composite materials research and certification.

## Major Advanced Composites Employers in Virginia

BGF Industries	Honeywell
DuPont	Trex Company
General Dynamics	Strongwell

## Advanced Composites R&D in Virginia

*Virginia Tech* - **The Advanced Materials and Technologies Laboratory (AMTL)** focuses on issues pertaining to the design and manufacturing science of advanced materials with an emphasis on understanding the complex physical phenomena of fabrication, through theoretical and experimental investigations. **The Center for Intelligent Material Systems and Structures (CIMSS)** focuses on the use and development of smart materials and structures, starting from materials science and working through the chain of research and development, including device design and modeling. CIMSS has many active projects in structural dynamics, structural health monitoring, energy harvesting and applications of materials science for smart materials and structures.

*University of Virginia* - **The Intelligent Processing of Materials Laboratory (IPML)**, one of the nation's premier centers for research on the processing of advanced materials, focuses on developing innovative process technologies, creating models for predicting materials evolution during processing, designing advanced in-situ sensors for tracking material changes during processing, and creating model-based path optimization and feedback control.

*Norfolk State University* - **The Center for Materials Research (CMR)** conducts pioneering research in materials science in four categories: Optics, Plasmonics and Meta-materials; Nano-materials and Nano-technology; Advanced Functional Materials and Devices; and Semiconductor Materials and Devices.

*James Madison University* - **The Center for Materials Science (CMS)** aims to develop and maintain an innovative cross disciplinary and multidisciplinary curriculum in materials science, to integrate undergraduate education with basic and applied research in materials science and to increase funding for applied and basic research in materials science.

**The Applied Research Center (ARC)** is the flagship research facility for the Applied Research Center Consortium, a collaboration of four Virginia colleges (Christopher Newport University, Old Dominion University, Norfolk State University, and the College of William and Mary) and the Jefferson Lab. Its mission is to advance the use of processes that control energy to create and modify materials, structures and devices critical for high value-added manufacturing in aerospace, automotive, marine, and semiconductor industries.

## PLASTICS AND ADVANCED MATERIALS ANNOUNCEMENTS

2006 - 2015

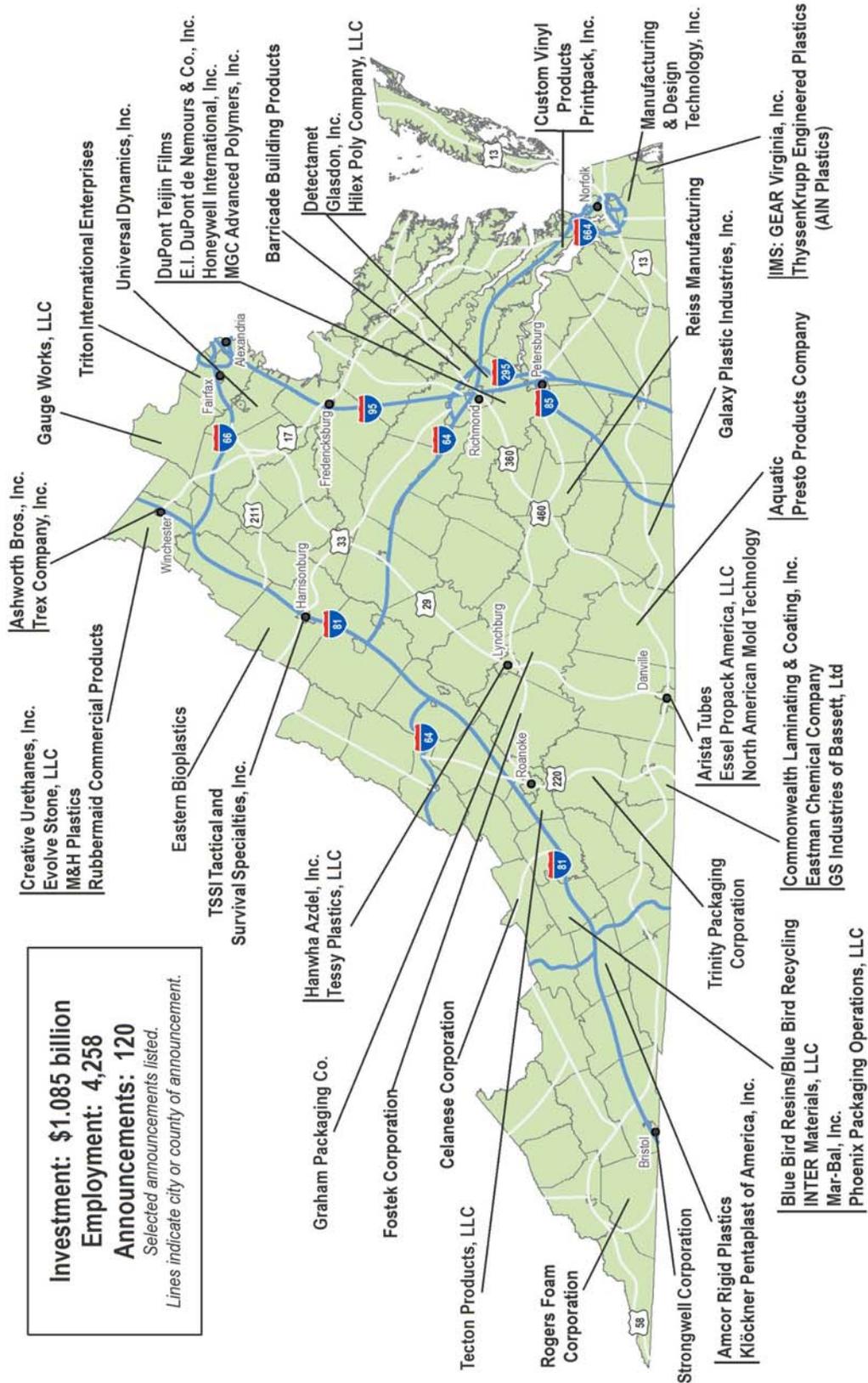
**Investment: \$1.085 billion**

**Employment: 4,258**

**Announcements: 120**

*Selected announcements listed.*

*Lines indicate city or county of announcement.*



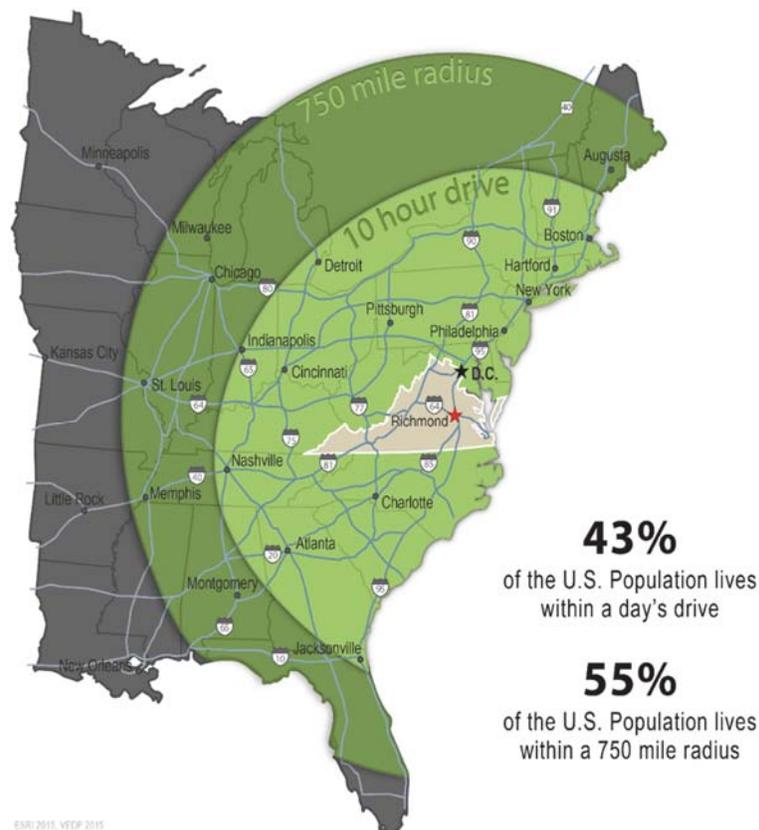
© 2016 VEDP [AnnualAnnouncementsMaps]

Sources: ESRI 2015, VEDP 2016

## Virginia is a Leading Gateway to the World

- Two of the nation's largest Class 1 railroads, CSX Corporation and Norfolk Southern Corporation, have extensive infrastructure throughout the State
- Eight shortline railroads provide freight service in the Commonwealth
- Nearly 3,400 miles of railway (excluding trackage rights) traverse Virginia
- Six major interstate highways, I-95, I-85, I-81, I-64, I-77 and I-66, provide quick access to Northeast, Southeast and Midwest markets
- Fourteen commercial airports serve the Commonwealth, including two of the nation's largest - Washington Dulles International and Ronald Reagan Washington National
- Nearly 30 international shipping lines offer direct, dedicated service to and from Virginia through the Port of Virginia, with connections to 200+ countries around the world

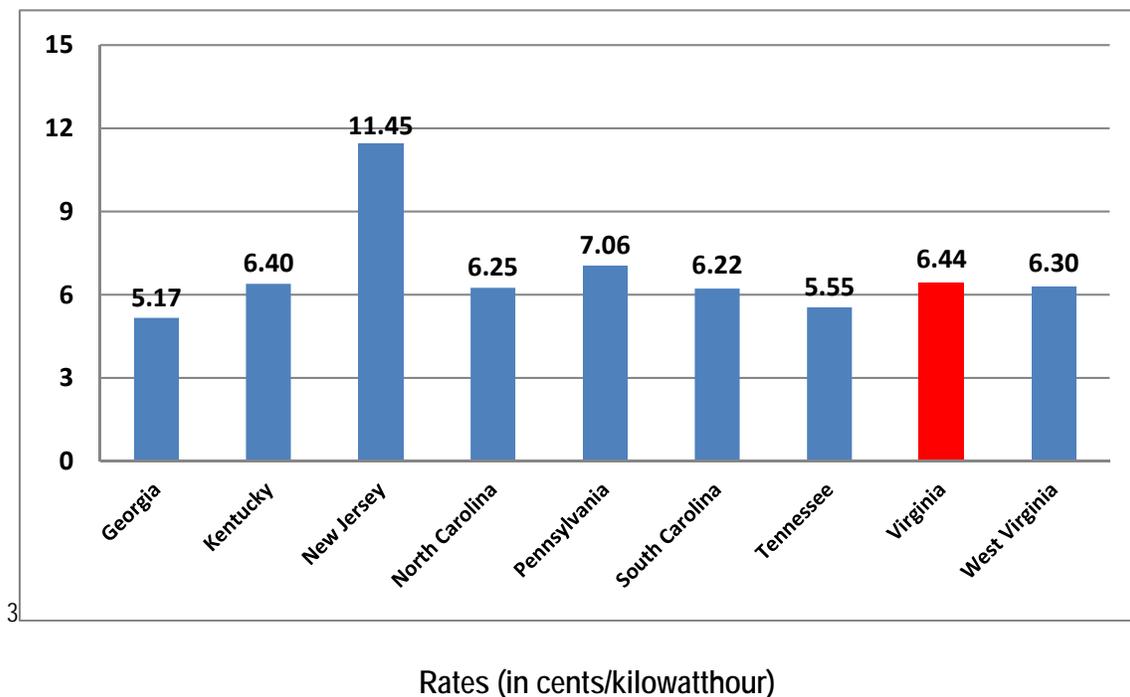
## Virginia's Central East Coast Location—Access to Markets



## Virginia's Competitive Operation Costs

- Average cost per unit of electricity for the industrial sector is 6.44 cents, compared to 6.92 cents for the nation
- Unemployment tax burden that is lower than the national average
- At \$0.77 per \$100 of payroll, Virginia's workers' compensation employer insurance costs ranks 4th lowest nationally
- Six percent corporate income tax rate has not been increased since 1972
- Right-to-work law allows individuals the right to work regardless of membership in a labor union or organization

## Average Industrial Electric Rates: 2016

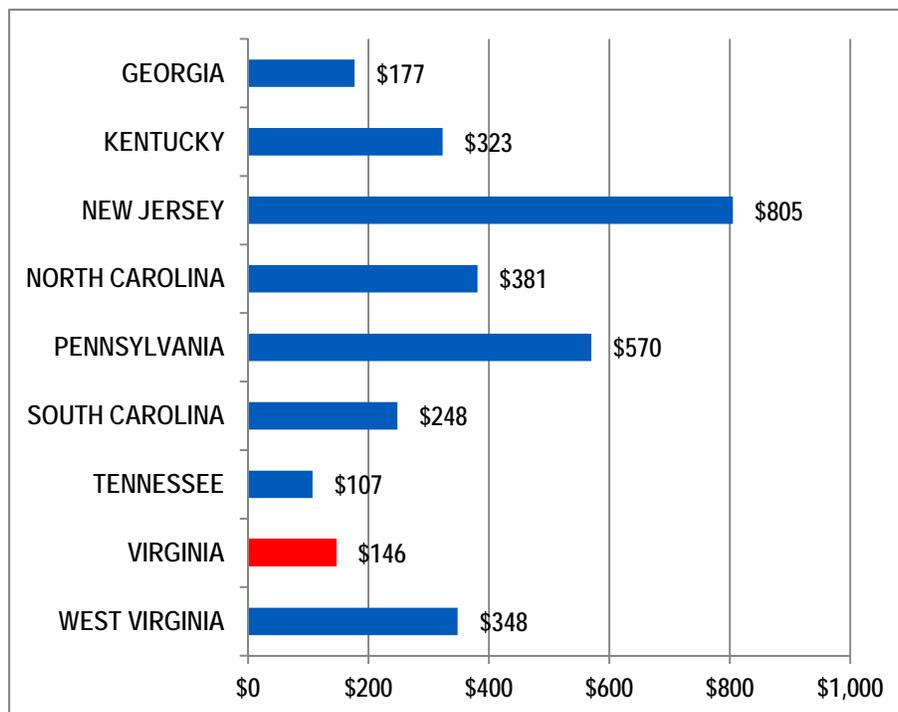


Source: Edison Electric Institute, *Typical Bills and Average Rates Report, Summer 2016*

Virginia is among the states with a low unemployment insurance tax burden in the U.S. According to United States Department of Labor estimates, employers in Virginia paid an estimated average tax rate of 0.32% of total wages in 2016, compared with the national average of 0.66%.

Tax rates are based on the employer's past unemployment experience (known as the employer's experience rating) and on the state's unemployment compensation experience as reflected by the condition of the State Unemployment Compensation Trust Fund. Basic computed tax rates range from a minimum of 0.17% on the first \$8,000 of each employee's annual wages to a maximum of 6.27%. New employers pay a rate of 2.57% on the \$8,000 wage base for as little as two years.

## Estimated Unemployment Insurance Tax Per Employee



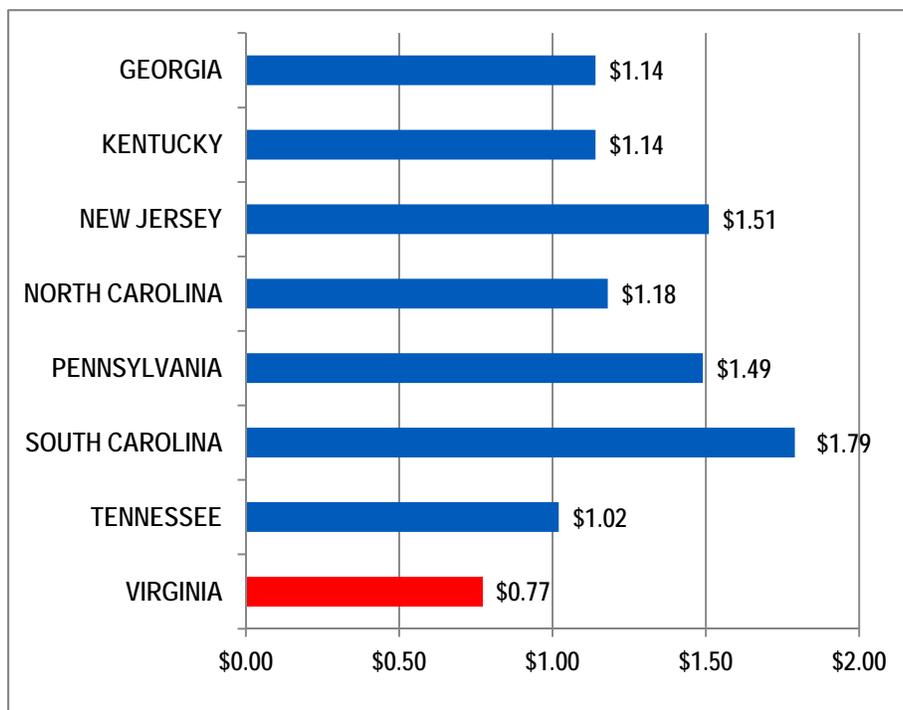
*Estimates of unemployment insurance tax per employee are a product of the average unemployment insurance tax as a percentage of taxable wages and the taxable wage base. Source: Average Employer Contribution Rates, By State, 2016 Estimates, Employment and Training Administration, United States Department of Labor*

Virginia employers benefit from a workers' compensation system that is efficiently managed and has a low frequency of claims. Several key state features contribute to these results, including a restrictive definition of compensable injury and a low rate of attorney involvement. The Virginia Workers' Compensation Commission also provides considerable assistance to employers and employees in the dispute resolution process.

In Virginia, an employer must carry workers' compensation insurance with a private insurance carrier or have a certificate of self-insurance issued by the Virginia Workers' Compensation Commission. Employers cannot deduct any part of the cost of workers' compensation insurance from the wages of any employee.

Virginia offers one of the lowest workers' compensation employer insurance rates in the nation. In 2014, Virginia ranked 4th lowest with an employer cost of \$0.77 per \$100 of payroll versus \$1.32 per \$100 for all states, aggregated across all types of insurance arrangements.

## Workers' Compensation Employer Insurance Costs



*Estimates of workers' compensation employer insurance costs are aggregated across all types of insurance arrangements (private, state-funded, self-insured, etc.). Source: National Academy of Social Insurance, Workers' Compensation: Benefits, Coverage, and Costs, 2014, October 2016*

## Higher Education and Training

Strong occupational and technical training programs designed to meet the needs of the Plastics & Advanced Materials industry are provided by Virginia's colleges and universities, Community College System, and communities.

- Virginia Tech is home to the interdisciplinary Macromolecules and Interfaces Institute (MII), integrating macromolecular and interfacial sciences and engineering. It is consistently ranked as a leading institution in polymer research and education.
- The Center for High Performance Manufacturing (CHPM) at Virginia Tech works to help manufacturing firms stay competitive via research and development of tools. The research, development, and education are managed through specific areas of specialization.
- The Virginia Community College System, with 23 colleges on 40 campuses across Virginia, offers Career Studies Certificates as well as diplomas and associate degrees through a variety of programs and curricula.
- Danville Community College in Southern Virginia offers Manufacturing Technician and Polymer Processing Technician Certificates through its Workforce Services Programs. Its Regional Center for Advanced Technology and Training (RCATT) includes polymers laboratory space, a rapid prototyper, an injection molder, an extruder, and auxiliary equipment for hands-on training.
- Dabney S. Lancaster Community College in Western Virginia offers an Advanced Manufacturing Technology curriculum at its Virginia Packaging Applications Center (VAPAC). This state-of-art training lab gives students an extensive, hands-on experience.
- The Institute for Advanced Learning and Research (IALR) in Danville researches biomass crops and technologies for biopolymers. More than 4,000 square feet of dedicated lab space is available to characterize, analyze, develop and manufacture materials.
- ChemQuest Technology Institute is a state-of-the-art facility in Southern Virginia providing coatings suppliers the ability to test their products in a controlled environment that replicates a range of production conditions. The lab offers a wide selection of technologies, 6-axis robotics, electrostatic and wet spray, flat and hang lines, IR, UV, convection curing, and an automobile sized cross-ventilated spray booth suitable for robotic or manual equipment.
- The Center for Advanced Film Manufacturing located in Martinsville offers a 28-credit program through Patrick Henry Community College and the New College Institute. The curriculum includes solar control films, photovoltaic frontsheets and backsheets, precision coating, laminating and industrial dyeing. Students are offered a hands-on or paid internship at Eastman or Commonwealth Laminating & Coating as part of the curriculum.