



Industries of the Future – West Virginia:

IOF-WV Overview

2005 Wheeling Workshop:
Waste Minimization and Energy Efficiency

September 22, 2005



Carl Irwin
WVU NRCCE
(304) 293-7318 ext. 5403
Carl.Irwin@mail.wvu.edu



What is IOF-WV?

- IOF-WV is a cooperative effort between the WV Development Office and WVU.
- The goal is to develop alliances and partnership projects to improve energy and resource efficiency and productivity of energy-intensive manufacturing and production companies.
- IOF-WV was originally modeled after the U.S. DOE's national IOF program – now referred to as the Industrial Technology Program (ITP).

WV Energy-Intensive Industry Sectors

Industry Sectors	GSP (\$M)	Employment	GSP/Emp
Primary & Fabricated Metals	1,060	14,919	\$71,050
Stone, Clay, & Glass	260	4,521	\$57,509
Chemicals & Polymers	1,705	11,715	\$145,540
Rubber & Plastics	296	4,001	\$73,982
Wood Products Manufacturing	552	8,989	\$61,429
Total for IOF-WV Sectors	3,873	44,142	\$87,740
Total for WV Manufacturing	5,228	67,511	\$77,439
IOF-WV % of Manufacturing	74%	65%	
Fossil Fuel Production	3,160	25,800	\$122,481
State Totals	46,726	883,895	

*Source: U.S. Department of Commerce, Bureau of Labor Statistics, 2003 data, www.bea.doc.gov

Industry Working Groups are the Heart of the IOF-WV Program

- University researchers with strong industry ties
- Enthusiastic industry contacts – (that provide cost share!)
- National lab expertise
- West Virginia Development Office – industry representatives, energy efficiency program
- Co-funding agencies and foundations

Proposals and Co-Funding

- Since January 1, 2004, approximately 40 proposals have been submitted – eleven projects have been funded
- Since 1997, more than \$19 million in federal and state funding and about \$10 million in industry cost share for a total R&D value to the State of more than \$29 million
- The ITP budget in FY 2003 was \$90 million – the administration's request for FY 2006 was \$57 million

Examples of On-going Projects

- *Multifunctional Metallic and Refractory Materials for Molten Metal Handling* – WVU, UMR, ORNL, Wheeling-Nisshin, Special Metals, Sturm Rapid Response, ...
- *Preventing Solidification Defects in Large Superalloy Castings Used in Advanced Electric Power Systems* – WVU, Penn State, Special Metals
- *Plant-wide Assessment at PPG Industries* – WVU, PPG
- *Technologies and Processes for Durable, High-Strength Wood-Polymer Composites* – WVU, Crompton

Examples of On-going Projects (con't)

- *University-Industry Center for Extrusion Compounding of Additives for Superior Plastics Performance – WVU, PAZ, ...*
- *Demonstration of Crosswell Imaging Technology and Advanced Drillstring Radar Navigation for Horizontal Directional Drilling – WVU, CONSOL, Sandia, ...*
- *Low-Cost, Reliable Energy & Chemical Feedstocks for Energy-Intensive Industry Clusters: Marshall County Feasibility Study – WVU, Marshall Co. Chamber of Commerce, PPG, Bayer, Ormet, Venco ...*

Energy Efficiency Results for West Virginia Companies

- Targeted energy savings at Century Aluminum of \$15 million per year with new diagnostic and control system
- Pechiney plant-wide energy assessment - \$2.5 million per year in energy savings with average payback period of less than eight months
- Permitting productive reuses of spent foundry sand has saved HK Casting over \$1 million over the past four years

Energy Efficiency Results for West Virginia Companies (cont'd)

- \$1.48 million in energy saving opportunities at Bayer through plant-wide energy assessment
- Development of new processes to disperse polymer adhesives in pressure sensitive adhesives – potential annual savings to the industry of \$6 million and 1 trillion BTU per year by 2020.
- Energy assessments at eight WV wood/forest products plants revealed opportunities for saving more than \$8.6 million annually for the industry

Proposals and New Initiatives

- *Response of Materials Manufacturing Industries to High and Variable Energy Prices* – Alfred P. Sloan Foundation
- *West Virginia Center for Materials Industries Innovation Partnerships* – National Science Foundation
- *Strategic Growth of the Mid-Atlantic CHP Application Center* – U.S. DOE State Energy Program

Proposals and New Initiatives (con't)

- *Natural Gas Utilization Center* – WVDO
Energy Efficiency Program
- *Manufacturers Resource Network* – WVMA,
IOF-WV, WVU College of Business &
Economics
- *Utilization of by-product H_2* at PPG, Bayer and
Mittal-Weirton Steel

New Initiatives for Industrial Energy Savings

- ***Wood/polymer composites***
 - Development of composite materials utilizing residues from wood products industry and virgin or recycled plastics. North American WPC annual market growth is projected at 15% through 2010.
- ***Continuous optimization of manufacturing/utility systems***
 - An expert system that couples advanced sensor and control technologies with data mining techniques and industrial best practices can result in significant energy savings and productivity improvements for manufacturing operations. This process incorporates data and experience from hundreds of industrial energy assessments and technologies developed on other IOF-WV projects
- ***Develop technologies to reduce residual stress in cast aluminum ingots***
 - Minimizing residual stress reduces ingot cracking and many eliminate the need for the stress relieve furnace operation

Outreach Activities

- Annual IOF-WV Symposia
- Annual IOF-WV Day at the State Capitol
- IOF-WV monthly *UpDate*
- Talks, exhibits, and consulting on the IOF-WV “journey”
- Newspaper and magazine articles
- Radio and television interviews
- IOF-WV Video

IOF-WV Team

- *IOF-WV Researchers*
 - Larry Banta, Xingbo Liu, Bruce Kang, Rakesh Gupta, Richard Turton, Joe McNeel, Ben Dawson-Andoh, Bob Creese, B. Gopalakrishnan, Syd Peng, Richard Bajura, Ken Means
- Co-Directors: Carl Irwin, Jeff Herholdt
- Engineering Scientist 1: Bill Johnson
- Engineering Scientist 2: Michael Carr
- Program Coordination: Kathleen Cullen, open position

Thanks! And please contact us!

Visit <http://iofww.nrcce.wvu.edu>

**See you at the 2005 IOF-WV Symposium,
November 8-9, Charleston, WV!**