THE OIT TIMES

"Turning Industry Visions into Reality"

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SPRING 2001

Expo 4's concentration on shared interests of energy-intensive, resource-based industries draws record crowd

Nearly 1300 attendees met at OIT's 4th Biennial Industrial Energy Efficiency Symposium and Expo in Washington on February 19-22. Their common goal: to learn more about the challenges facing energy-intensive, resource-based industries and identify new opportunities to save energy and boost productivity now and in the future.

"Expo's all about sharing ideas and information, experience and insights–in the sessions, in the exhibit hall, in the hallways as people interact and meet new contacts and partners," said Denise Swink, DOE's Deputy Assistant Secretary for Industrial Technologies. "This event is unique in that it addresses many of the common challenges facing our country's most energy-intensive industries–such as optimizing energy use, environmental stewardship, technology development, competition for skilled workers and more. It provides attendees a rare opportunity to share concerns and successes that cross industry boundaries."

Informative speaker sessions

Expo's speaker sessions were organized into four tracks, addressing areas often discussed in various industry strategic visions and roadmaps. The **Manufacturing Megatrends** track (see pages 2, 3) identified several overarching forces impacting manufacturing. Experts in Lean Manufacturing described how it is enabling manufacturers to eliminate waste and be more responsive to customer needs, and is fast becoming a tool for competitive advantage. Supply Chain Management is likewise changing the way leading firms do business, and is driving greater cooperation with suppliers for mutual benefit, using both cutting-edge technologies and more traditional methods. Contract Manufacturing is growing as many companies outsource some or all operations to shave time and costs. Leading firms are also using Internet Trading Exchanges to lower costs on both buy and sell sides.

The **Technology and Environment** track (pages 4, 5) focused on how new technologies and environmental expectations are shaping the Industries of the Future. Emerging and Future Trends in Application of Traditional Materials highlighted the transformations that have made many basic industries virtually "unrecognizable" compared to a generation ago in terms of how materials are produced and used. A second session focused on some of the overriding Long Term Technology Trends that could transform basic industries–including biotechnology, nanoscience, and the internet. A third session focused on Global Climate Change and presented the latest thinking on both sides of this often heated debate.

Global Markets and Investment Potential (pages 6, 7) featured securities analysts who discussed The Market Outlook for Basic Industries from the investor's perspective, identifying trends impacting the bottom line and stock prices of firms in the metals, mining, petroleum, and forest products industries. Global Markets and Industries took an even wider perspective, discussing threats and opportunities facing these industries in Europe, Asia and Latin America. Valuation by Securities Analysts and Investors looked at how analysts evaluate heavy industries and the corresponding impact on bond ratings and the cost of capital.

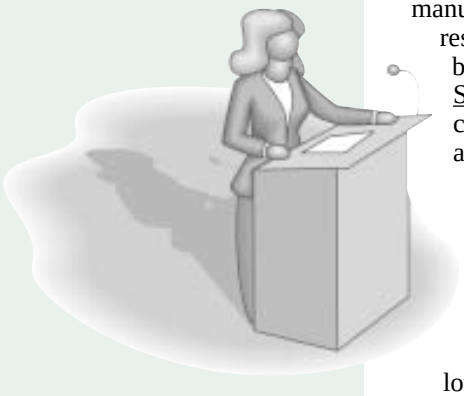
The **Human Resources** track (page 8) highlighted another area of universal concern–the ability of basic industries to find and keep talented workers. The Workforce Development session elaborated on some of the issues related to this concern, and suggested ways to alleviate the skilled worker shortfall. The session on Engineers of the Future looked at initiatives to ensure a steady supply of high-quality engineers interested in basic industries.

Keynote speakers address "threats"

Expo's two keynote speakers both warned of threats facing America's basic industries (pages 10, 11). Eamonn Fingleton's opening talk described the fundamental role that "hard industries" play in a healthy economy. Unlike new economy companies, for example, they provide jobs for everyone, not just "geniuses and near geniuses," and are America's best hope for lowering the trade deficit. Still, driven by

(continued on page 16)

INSIDE



Lean Manufacturing: "Spend ideas–not dollars"

Richard McCormack, publisher of *Manufacturing News,* moderated a lively session that explored the meaning of "lean." McCormack's recommended reading includes *The Japan That Can't Say No* by Ishihara, *Only the Paranoid Survive* by Andy Grove, and *The Machine That Changed the World* by Womack, Jones, and Roos.

Panelist Robert Emiliani of the Center for Lean Business Management explained that "lean" is the philosophy and practice of eliminating waste. "It works wherever information is exchanged and pertains to all business practices." It requires respect for all stakeholders, discipline, and new leadership behaviors. By allowing no margin for error, the approach forces plants to solve each problem at its root.

Ken Kreafle, General Manager for Quality Control with Toyota-Kentucky, observed that the Toyota Production System (TPS) eliminates waste by changing the way management thinks. Direction setting flows from the top down, while information flows from the bottom up. The focus is on the process rather than the results.

To be effective, the philosophy must embrace all company operations, even sales and supply. It is not about consensus or self-directed teams, but about getting people involved. Not to be confused with any specific lean manufacturing tools, the philosophy focuses on people and fosters continuous improvement.

David Squier, recently retired CEO of Howmet Corporation, began leading the company's jet engine component manufacturing plants toward lean manufacturing in the early 1990s. Instead of lighting a fire under the company's 11,500 employees, he helped light a fire inside them. Once inter-plant competitions were replaced by a focus on company-wide performance, plants began working together and sharing best practices. Within five years, valuation jumped from $200 million to $2.2 billion, and *Aviation Week* recognized Howmet as the best-managed, mid-sized aviation company in the business.

Supply Chain Management: Cost-saving success stories

This session provided three real-world perspectives on Supply Chain Management (SCM) in business today. Arthur Rowe of John Deere Company ascribes his company's success in reducing supply chain costs to heavy supplier involvement and education. Suppliers are now so active, they often outnumber Deere employees at project sites. Deere educates its suppliers in the latest SCM techniques and sponsors an MBA program with Arizona State University. The company is also currently creating an in-house costing system for its suppliers.

John Oleson of Dow Corning related that chemical companies of all sizes are integrating their supply chains and eliminating unnecessary activities. Initially, this means reducing inventory levels, cutting the number of plants and warehouses, and setting up tier systems for customer care. The industry is now fine-tuning more basic SCM-related operations, such as improving the flexibility of batch processes to speed responsiveness to customer orders.

John Wilson of IBM noted that despite unrealistic early expectations of e-commerce, the technology is steadily changing the economics of goods and services. Speed and visibility of transactions are increasing, and the promise of "frictionless commerce" is being fulfilled. Pressuring suppliers to reduce price is being replaced by technology-enabled collaborative opportunities. To maximize your e-business, demand open systems, purchase best-in-class software components (vs. an integrated software suite), and view SCM as an ongoing journey.

Bob Emiliani (Rensselaer P.I.), Ken Kreafle (Toyota) and Dave Squier (Carlyle Group) discuss "Lean Manufacturing."

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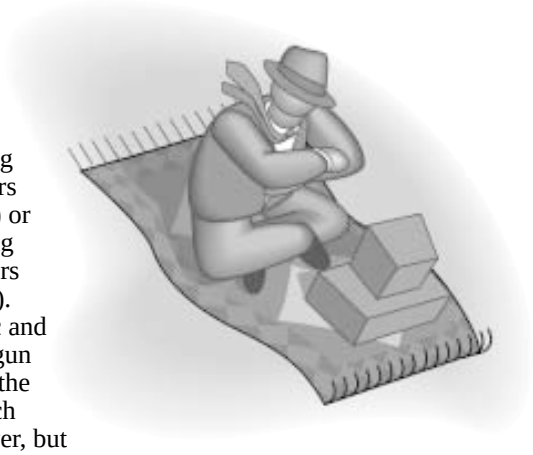
Internet Trading Exchanges:
Dot-com failures obscuring a revolution in e-commerce

Business to business e-commerce has only just begun according to our panel–Craig Iseli (moderator) of Deloitte Touche; Austin Whitehead, Research Director for the Gartner Group; Andy DuPont, Director of E-Market Channels with Dow Chemical Co. and Roger Nagel of the Enterprise Systems Center at Lehigh University.

E-marketplaces defined. Whitehead defined e-marketplaces as exchanges that bring together multiple sellers and buyers, provide a variety of services for participants, and generate revenue. "Public e-marketplaces include buying services, auctions, and reverse auctions. Emerging private e-marketplaces involve one buyer transacting with many sellers (e-procurement) or one seller trading with many buyers (Web storefront). Recently, public and private have begun to merge, as on the Enron site, which sells Enron power, but offers other products on a public marketplace," he said.



Whitehead warned that although e-trading "will access value that has gone untapped for years," it involves more than posting a Web site. Strategy is everything, and there is no "one-size-fits-all" approach.

"It's not about technology. It's about providing choices for our customers." Andy DuPont discussed lessons learned in the e-marketplace. One early chemical marketplace failed because "The chemical industry wants to know who's buying its products. They want to get closer to the consumer," he said. A successful new chemical e-marketplace, Elemic, ensures relationships and provides customized services, auctions, and catalogs.

Nagel reiterated that passive Web site building is not enough. He pointed to the value of search engines, databases, and information. Web marketplaces must serve their niche markets. "Every site on the Internet is not for everyone." He identified a few success stories, such as 3re.com, which sells returned items for suppliers; Freemarkets, which specializes in reverse auctions; and Altra Energy, for real-time energy trading.

Contract Manufacturing:
Will trend in electronics manufacturing spread?

Panel moderator Dr. Joe Wirth of the National Research Council points out that, although contract manufacturing has long been an option, it has only become popular in the last few decades. Panel members Jerry Labowitz and Brian White of Merrill Lynch, Vincent DePalma of Solectron, and Michael Reardon of Dow Chemical Co. testified to the benefits contract manufacturing offers companies of diverse size and focus.

Contract manufacturer Solectron, the first two-time winner of the Malcolm Baldrige National Quality Award, has enjoyed an annual growth rate of 45% since 1999. By providing fast turnaround and high quality, they enable major electronics manufacturers to streamline operations and still meet manufacturing and market goals. Streamlining allows both Solectron and its customers to eliminate major capital investments at the time of plant design and construction and provides flexibility to help reduce labor inventory costs.

Michael Reardon of Dow Chemical observed that electronics is the driving force in contract manufacturing, but pharmaceutical companies such as Merck, Pfizer, and Proctor & Gamble, are the largest users in the chemicals industry. Within the last five years, virtual pharmaceutical companies have emerged on the scene and are growing rapidly in the Boston and San Diego areas. These virtual companies do not manufacture anything themselves, but just develop products. In many cases, virtual companies do not even market their products; they partner with larger pharmaceutical firms to perform that service.

Cargill Dow's Pat Gruber accepting OIT's Technology of the Year Award for 2001 for Polylactic Acid Polymers.

Emerging, Future Trends in Materials Use: "Not your father's industries"

This informative session provided insight into the technology trends that are shaping the future of four key industries. One speaker noted that these "aren't your father's" industries because many IOFs have dramatically transformed themselves in recent years.

Glass. Bruce Jennings of Schott Glass Technologies noted that the future lies primarily with technology-driven applications, and less with the traditional, cost-driven commodity applications (e.g., soda bottles, eyeglasses). Specialty glass applications in telecommunications, computers, lighting, and other areas demand properties that only glass can deliver, and represent the direction of future industry growth.

Steel. Steve Denner of National Steel focused on the use of Advanced High-Strength Steels (AHSS) in reducing the weight of today's automobiles. Through a recent DOE partnership, the industry has used super-formable steels and micro-alloyed, high-strength steels to significantly reduce vehicle weights, and they are now building a steel automobile that meets the PNGV weight goal while delivering even greater safety.

Chemicals. Louis Glasgow of DuPont Co. explained that the Chemical polymers industry is using biotechnology to increase functionality, lower costs, and reduce environmental impacts. Today's chemical engineers use multi-disciplinary methods and manipulate genetic material to identify energy-efficient production methods. For example, propanediol is being synthesized from one-celled organisms, and many polymers will be cost-effectively synthesized using non-food crops such as switchgrass.

Forest Products. According to Del Raymond of Weyerhaeuser, the Forest Products industry is also being transformed by biotechnology, which is leading to new materials. In addition, the industry is increasing use of recycled materials. A new sticky-removal process developed with OIT is helping to reduce recycling costs and environmental impacts.

Steve Denner (National Steel), Darryl Tenney (NASA), Lou Glasgow (DuPont) addressing "Trends in Materials Use."

Global Climate Change: While experts argue, industry acts

The Honorable Don Ritter of the National Environmental Policy Institute moderated this lively session featuring prominent spokesmen for opposite sides of the climate debate.

Dr. Dan Lashoff, Senior Scientist with the National Resources Defense Council, reviewed the temperature records and analyses that led the International Panel on Climate Change (IPCC) to declare that "warming observed over the last 50 years is attributable to human activities." The IPCC is now convinced that CO_2 emitted by the burning of fossil fuels is primarily responsible for altering our atmosphere; lesser contributing gases include methane, nitrous oxide, and halocarbons. More recently, the IPCC has said that "recent regional climate changes have already affected many physical and biological systems," such as coral reefs, mountain glaciers, and permafrost.

Individual companies are taking responsible action. Members of the voluntary Climate Neutral Network, for example, are cutting their emissions through energy efficiency, green power purchases, and cogeneration. They offset their remaining emissions through additional activities and gain a market advantage for their efforts.

Long Term Technology Trends:
Potential major impacts on 'Industries of the Future'

In this session, moderated by Ed Starke, Chairman of the National Materials Advisory Board, representatives from the fields of biochemistry, nanotechnology, and the digital economy explored technology trends that may have a dramatic impact on the Industries of the Future.

Biotechnology. Dr. Ganesh Kishore, Chief Scientist with Auxyn Biosciences Venture Funds, discussed genetically engineered crop products and their place in society s future. Given our planet s growing population and steady loss of both topsoil and fresh water, we must reduce use of non-renewable products, increase efficiency of nutrient use, and improve agronomic traits.

Genomics can "coordinate every gene with a function and put it to work in a more powerful way," said Kishore. Boll Gard cotton, for example, produces its own defenses against the bollworm, avoiding the use of over 4 million liters of insecticide annually since 1996. Other bioengineered crops are more resistant to cold, drought, and pests, or can withstand herbicides that are unable to distinguish between crops and weeds. Biotechnology will have a profound impact on food and feed, and on the production of green chemicals and green fuels.

Nanotechnologies. Dr. James Murday of the Interagency National Nanotechnology Initiative Coordinating Committee predicts, "Nanoscience is working towards a revolution." The ability to work at the molecular level, atom by atom, to create large structures with fundamentally new properties has huge implications for energy conversion and storage, agriculture, information technology, and other areas. Nanotechnologies are not limited to the far future, but are here now. "We're right at the foot of dramatic growth," proclaimed Murday. "The fields of physics, chemistry, and biology will all come together on the nanometer scale."

Internet Technology and Global Manufacturing. Dalibor Vrsalovic of Intel Corporation stated that the Internet has allowed the creation of a virtual factory. E-commerce has already dropped a person from one side of the traditional commerce picture as clients talk directly with servers. The vision of Internet manufacturing is to connect customers and suppliers to the equipment on the floor, so they can monitor and interface with their own parts of the manufacturing process. This will require standards, guidelines, security, and cooperation. The factory floor will have few people and lots of equipment, large servers, and a control center to manage the system.

Bill Choate (BCS, Inc.), Tom Manuel (Council for Chemical Research), Jack Solomon (Praxair) discussing partnership opportunities at Vision 2020 exhibit hall booth.

Dr. Fred Singer, President of the Science and Environmental Policy Project, declared, "Global warming is a myth." Conservation and energy efficiency make sense, however, because they can boost profits. According to Dr. Singer, the political agendas promoting non-voluntary reductions in fossil fuel use are unnecessary since new technologies, such as fuel cells and cogeneration, are already moving us in that direction.

While surface temperature records support warming, Dr. Singer has doubts about the accuracy of those records. Separate analyses of the same global historic data have reached different conclusions, and he asserts that the satellite and weather balloon data do not show a clear warming trend. According to theory, the atmosphere should be warming more rapidly than the surface, yet records indicate the surface is warming faster. While CO has increased in our atmosphere, Dr. Singer asserts it is not a pȯllutant–in fact, it should help plants grow faster.

Ed Mongan, Manager of Environmental Stewardship for DuPont, has helped his company minimize greenhouse gas emissions while supporting sustainable growth. This effort extends from production processes to the products (e.g., a home vapor barrier they manufacture saves energy in each installation).

DuPont exercises responsible care and openness with communities as a way to grow value while reducing the environmental footprint. To date, the company has reduced priority air emissions by 75%. This has been achieved by such changes as shifting the focus from volume to value. For example, efficiency improvements were realized by changing the base of payments for car paint used by Ford from gallons of paint used to number of vehicles painted.

Market Outlook for Basic Industries: Insights from leading analysts

Connie Holmes of the National Mining Association moderated as industry analysts provided their perspectives on the current and future states of several basic industries.

Petroleum. John Parry of the John S. Herold Company noted that oil and gas prices have recently become decoupled, with natural gas prices rising "out of whack" with oil and historical levels. A return to the traditional relationship is expected over the next year. Parry said the U.S. has "gone nowhere" in producing gas over the past five years, with deep water exploration in the Gulf of Mexico the only bright spot in the short-term picture. As a result, natural gas imports, especially from Canada, will continue to escalate.

Metals and Mining. Daniel Roling of Merrill Lynch noted the dependence of the "New Economy" upon the "Old Economy." Increases in computer use, for example, are fueling demand for copper and aluminum for circuitry and coal to generate electricity. Major growth in metals demand is seen in Asia, especially in China and the "Five Tigers," although worldwide and U.S. demand do not necessarily move in tandem.

Another trend to watch is the evolution from maintaining full inventories to practicing "just in time" and "on-time"delivery. Most metals and coal inventories are now at historically low levels, with the exception of steel mills. Roling also sees a trend toward more efficient and profitable mining operations in many commodities.

Forest Products. "We can go longer without food and water than we can without paper," asserted John Wissman of Jaakko Poyry Consulting, Nevertheless, with production outstripping demand, investors are avoiding many U.S. paper companies, causing unprecedented consolidation. With high costs of entry, most new mill capacity is being built outside of the U.S. However, this capacity is meeting mostly local needs. Regardless of falling prices, steady demand and solid earnings along with deflated stock prices make this a timely industry for investors to investigate.

Merrill Lynch's Dan Roling describes his outlook for metals and mining industries.

Global Markets and Industries: Export opportunities are abundant

Karen Walker, with the State Department's Office of Commercial and Business Affairs, moderated this highly informative session on conditions and outlooks in key overseas markets.

Europe. Frank Vargo, Vice President for International Economic Affairs at the National Association of Manufacturers, described Europe's unrealized potential for economic growth, which he attributes to a risk-averse citizenry and a regulatory system designed to maintain the status quo. U.S. exporters can look to Europe with optimism, however. Deregulation of telecommunications and energy systems is finally coming to Europe, and as information technology is adopted, European productivity will take off. Consumer demand and industrial output in Eastern Europe will also help make Europe a new growth engine after Asia and Latin America.

Asia. Ken Richeson, Executive Director of the US-ASEAN Business Council, made a clear case for the critical value of the Association of Southeastern Asian Nations (ASEAN) to U.S. trade. Representing a population of 500 million and $720 billion in two-way trade, ASEAN markets are large and growing, having overcome the 1997 monetary crisis. The growth rate of U.S. exports to ASEAN since 1990 has exceeded that of all other comparably sized markets except China. While growth may slow over the next two years, the region is still expected to grow faster than the U.S. and Europe.

ASEAN is strengthening its competitiveness by establishing an ASEAN Free Trade Area, streamlining customs procedures, expediting approval of investment projects, liberalizing trade in services within the region, and developing an ASEAN Investment Area to facilitate capital investment. Stronger U.S. involvement in ASEAN markets will support the emergence of market economies, continued democratization, and regional stability.

Energy-intensive Industries: What Wall Street looks for

How is heavy industry viewed by analysts and investors? Michael Greenman of the Glass Manufacturing Industry Council put the question to the panel: Robert Clark of the *Dow Jones Investment Advisor* and Cindy Werneth, Director of Corporate Bond Rating Services at Standard and Poors.

Clark believes that heavy industry needs to communicate better with Wall Street, saying, "Perception is very much a part of Wall Street reality." He suggests that companies pay attention to cycles in the stock market and avoid talking about technology when trying to raise R&D funds. "Financial people and venture capitalists are scared by change, and technology represents change."

Clark expects the current energy crisis to make an impact on Wall Street very soon. Rising energy costs "are going to make heroes of companies that are energy efficient. It may only be 15 minutes of fame, but it will be your 15 minutes," said Clark.

Werneth explained that bond rating agencies assess the likelihood of full and timely repayment of financial obligations. The ratings, from AAA down to D, are used as a benchmark of credit quality within and outside the debt market.

Werneth used the Forest Products and Chemicals industries as examples of cyclical, capital-intensive industries with low labor costs, global competition, and commodity products. She advises that companies within these cyclical industries position themselves as low-cost providers with some diversity in product lines, a consistent business strategy, and financial flexibility. Werneth says that for the heavy industries R&D investment is not a large part of the ratings–amounts are small relative to the pharmaceuticals industry and others.

Werneth hasn't seen investment in energy efficiency affect a company's bond rating one way or the other, but Clark suggests that companies position themselves as energy efficiency champions to garner notice from Wall Street.

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Latin America. Michael Magan, Managing Director for the Western Hemisphere with the U.S. Chamber of Commerce, said the flow of trade and investment between the U.S. and Latin America has never been greater. Two-way trade with Mexico is now triple pre-NAFTA levels–with over $250 billion in trade last year. The star economic performers in Central America, Mexico and the Dominican Republic are heavily dependent on the U.S. economy. The Caribbean basin has become the third largest U.S. export market. In South America, the outlook varies by country. Many Latin American countries are entering into free trade agreements with other nations, putting U.S. trade at a disadvantage. If President Bush pushes through the Free Trade for Americas Agreement (FTAA), Magan expects a re-energizing of U.S. trade and economic reforms throughout the region.

Workforce Development: "A severe shortage in skilled employees!"

Leo Reddy of the National Coalition for Advanced Manufacturing moderated a discussion on the shortage of skilled manufacturing workers by the panel: Mike Williams of General Motors Powertrain, John Rauschenberger of Ford Motor Company, Ben Walton of the Georgia Department of Technical and Adult Education, Stan Popeck of Great Basin College, and Donna Garcia of the Newmont Gold Company.

Leo Reddy observed that, "Two things enable a worker to be more productive—new technology and skills of knowledge." Panelists concurred that constantly evolving technology has made it difficult to find quality skilled workers.

Donna Garcia and Stan Popeck described a program they have developed for training future miners, manufacturers, etc. Since its inception, the program has expanded over three southwestern states. It gives individuals an opportunity to gain on-the-job work experience prior to entering the workforce and offers them placement services for high-paying, high-quality jobs.

Mr. Williams commented that something must be done at the high school level. Career counselors and parents should be guiding students and giving them information on various occupations that may be of interest. Career days are important—students who are able to see the everyday tasks required in a field they're considering are better able to make a wise career choice. They'll be aware of what is ahead and not be surprised. Panelists offered a number of additional solutions to help manufacturers meet this ongoing challenge:

- Institute in-depth training programs that will help employees gain new skills;
- Become more familiar with the basic concerns and desires of employees, including safety, fair wages, and clean facilities;
- Work with high school career counseling programs to help students select and prepare for realistic careers.

Engineers of the Future: "Are engineering curricula too strict or too lax?"

The Engineers of the Future panel discussed reasons for the drastic decrease in the pool of knowledgeable engineers in industry. Panelists included John Green of The Aluminum Association (moderator), Tom Danjczek of the Steel Manufacturers Association, Stanley Johnson of Iowa State University, and William Wulf of the National Academy of Engineering.

All of the panelists concurred that the engineering field is experiencing a high turnover rate. Many of the international students trained in a variety of engineering fields are returning to their homelands. In addition, many engineers never practice their profession in a manufacturing industry.

Panelists debated the issue of whether the curriculum and training for most engineering programs are too strict and intimidating to students or too lax to yield enough marketable engineers. Johnson suspects the programs are intimidating, saying, "Statistics demonstrate a drastic decline in female enrollment for engineering students." Danjczek offered his opinion that the engineering field doesn't exhibit enough benefits to high school students. Industry has actually become more marketable with the influx of new technologies. Wulf responded that, "Engineering programs in today's educational system *should be* tailored to become more challenging and rewarding than ever before."

Mentors were also mentioned as an important boon to engineering students. Students need the guidance and expertise of professionals in the field in order to better prepare for a career in engineering. Panel members agreed that engineering students may benefit from working in the field prior to continuing graduate work, rather than simply learning theoretical knowledge in the classroom. During the question and answer period, a student in the audience noted that many of the engineering instructors at his university have accents that are difficult to understand, creating frustration among students.

OIT's "Wall of Fame" recognizes outstanding partners

To recognize those whose leadership and activities have made the greatest contributions to OIT's Industry of the Future partnership strategy, OIT unveiled its Wall of Fame at Expo. The Wall of Fame acknowledged those people who have exhibited extraordinary commitment to insuring the success of industry-government partnerships. Nominated by OIT Team Leaders and staff, Wall of Fame honorees are the foundation of a successful national effort to improve industrial energy efficiency. Hats off to all our 2001 honorees! (For a list of OIT's Wall of Fame, visit www.oit.doe.gov/oittimes/)

OIT Award recipients for 2001 announced

In a special ceremony at the Expo, Denise Swink presented OIT's prestigious Partner of the Year, Technology of the Year, and Plant of the Year awards. These annual awards recognize the very best achievements selected from among thousands of partners, dozens of plants, and several hundred technologies. Congratulations to all our winners and finalists!

OIT's 2001 **Partner of the Year** is Dr. Caulton (Carl) Irwin. Dr. Irwin is the Director of Market Enhancement and Program Development at the National Research Center for Coal and Energy at West Virginia University in Morgantown, West Virginia. Dr. Irwin has shown outstanding leadership in developing and promoting the State IOF Program in West Virginia, where he enlisted strong support from prominent federal, state, and local officials.

Partner-of-the-Year runners-up were Mr. Michael Greenman, Executive Director of the Glass Manufacturing Industry Council in Westerville, Ohio, and Dr. Delmar Raymond, Director of Strategic Energy Alternatives for Weyerhaeuser Corp. in Federal Way, Washington.

OIT's 2001 **Plant of the Year** is USX Corporation. USX Corp. is comprised of the Edgar Thomson Plant, located in Braddock, Pennsylvania, and the Irvin Plant, located in West Mifflin, Pennsylvania. The Edgar Thomson Plant created an Energy Conservation Team to generate energy conservation ideas and implement activities with a cost- effective return on investment. The plant was also active in OIT's Pittsburgh Regional Steel Showcase.

Runners-up for Plant of the Year included Rohm & Haas Co. of Deer Park, Texas, the largest monomer manufacturer for key Rohm & Haas products, and Weirton Steel Corp. of Weirton, West Virginia, a steel mill committed to continuous technical improvement and innovation.

OIT's 2001 **Technology of the Year** is Polylactic Acid Polymers (PLA). Polylactic acid is a biodegradable polymer produced from sugar. Cargill Dow designed and formulated the Polylactic Acid Polymers project. Technology of the Year runners-up were the Infinity™ Nylon (Carpet) Renewal Process, invented by Honeywell, and Characterization Tool for the Wood and Pulp Industry, from NREL and Weyerhaeuser Corp.

High School Engineering Challenge winners

Ten student teams and their sponsors were honored for their winning solutions to the High School Engineering Challenge. This unique and exciting nationwide competition asks students to solve multi-disciplinary problems using team-development strategies and higher-order thinking skills. Approximately 2,000 teams of talented U.S. high school students from across the nation participate in the annual competition. Each team addresses real engineering problems in an open-book, open-discussion team environment. The winners were as follows:

Industry of the Future	*Winning High School*
Agriculture (tie)	Strath Haven High School, Wallingford, PA Wootton High School, Rockville, MD
Aluminum	Rehoboth Christian High School, Rehoboth, NM
Chemicals	Suncoast High School, Riviera Beach, FL
Forest Products	Central Academy, Des Moines, IA
Glass	Oklahoma School for Science & Mathematics, Oklahoma City, OK
Metal Casting	Arts and Sciences Academy, Saginaw, MI
Mining	Clayton High School, Clayton, MO
Petroleum	Washington High School, Cherokee, IA
Steel	Lake Mary High School, Lake Mary, FL

OIT's Denise Swink (left) and Sandy Glatt (right) congratulate OIT's Partner of the Year, Carl Irwin of West Virginia Univ.

Keynote Opening Address: Eamonn Fingleton

The U.S. manufacturing industry is crucial to the world economy, and it's in trouble. That was the key message of Eammon Fingleton, a former editor for *Financial Times* and *Forbes* magazines and the Tokyo-based author of *In Praise of Hard Industries.*

"We had an American trade deficit of 4.5% of gross domestic product last year," said Fingleton. "That's shocking. It's easily the worst trade deficit figure the United States has ever incurred." Fingleton sees that deficit directly tied to a decrease in manufacturing in the United States. "American manufacturing is in general decline, but the fault doesn't lie with manufacturers. Manufacturers are victims of trends beyond their control."

Fingleton believes that both the media and policymakers have had a hand in the decline of U.S. manufacturing. He sees the United States moving out of manufacturing and into post-industrial services, in part because the media has created the impression that manufacturing doesn't matter any more.

Manufacturing industries generate exports. While he acknowledges that we do enjoy our computers and the Internet, the problem is that these post-industrial services do not export. In terms of value added, Fingleton estimates that manufacturing industries in the United States generate about 11 times more exports than do services.

In addition, Fingleton believes that manufacturing more closely matches the employment needs of our society. Traditional manufacturing creates jobs for almost everyone, whereas the new economy creates jobs for only the intellectually elite. "Clearly a lot of people are left out in the cold by a movement of that sort," he said.

Fingleton also sees manufacturing as a key to a high wage economy. He explained that Japan, Switzerland, Germany, Denmark, Sweden, and Austria boast higher wages than the United States, and a higher proportion of their workforce is in manufacturing.

Role for policymakers. Fingleton believes policymakers have played a significant role in the current state of manufacturing. "Government helps in many ways – this gathering is certainly one example of a helpful role for government. But other policymakers have not done enough to level the playing field in world trade," said Fingleton. For decades the United States has been the victim of dumping and, in some cases, deliberately predatory tactics by foreign suppliers. Profit margins are depressed, so U.S. companies have less to reinvest.

In other countries, explained Fingleton, manufacturers work behind tariff barriers and can set prices in their home markets to recover full overheads. They can then sell to American markets at marginal cost. American companies become weakened and the media blame management for not reinvesting more. Fingleton believes this misplaces the blame. "Policy makers have applied Band-Aid solutions to the trade problem rather than looking at it in a more comprehensive and effective way."

Keynote Luncheon Address: Senator Jay Rockefeller

Senator Jay Rockefeller fairly bristled at the injustices foisted upon U.S. steel mills by a Federal government unwilling to enforce existing trade laws. "Like steel mills throughout the country, West Virginia mills have worked hard to modernize, improve energy efficiency, and decrease their environmental footprint, but they cannot compete against the artificially low prices of foreign steelmakers who receive heavy subsidies from their governments," he said.

"Why are foreign governments subsidizing their steel industries? Quite simply, steelmaking is vital to any modern nation. Unfortunately, subsidized industries have led to global overcapacity, with excess product sold cheaply to the United States. This uneven playing field has forced 16 U.S. steel mills to declare bankruptcy in the last three years."

"Both Vice President Cheney and Treasury Secretary O'Neill have voiced their support for steel, yet larger political agendas are preventing any real remedy. The effects are taking their toll in West Virginia, and on a national level we risk losing this invaluable industry. We must urge President Bush to keep his promise and ask the U.S. International Trade Commission, in accordance with Section 201 of the 1974 Trade Laws, to determine whether the practice has caused substantial injury to the industry. If the answer is affirmative, the President can then impose sanctions or other measures."

"Outside of enforcing trade laws, government must also work with industry to encourage investment in R&D and in the education of our next generation," said Rockefeller. This is why he fought for the Research Experimentation Tax Credit, which rewards private R&D investment. It is why he'll be fighting again this year to double federal R&D funding over the next 10 years. The Senator is deeply committed to partnership between government and industry. "Whether the issue is trade laws, R&D, or education, this type of partnership is essential to successfully navigate the new global economy," he said.

Closing Plenary Session: Are U.S. basic industries endangered?

Richard McCormack, publisher of *Manufacturing News*, moderated a somber discussion by respected industry statesmen. Hank Barnett, Chairman Emeritus of Bethlehem Steel, praised the technology progress already achieved through the IOF partnerships and underscored the need to continue incremental improvements. But he warned that the viability of U.S. steelmaking is in jeopardy unless existing trade laws are enforced. Barnett suggested that basic materials industries face a common risk from foreign dumping and should jointly press for enforcement and a Federal strategy that integrates energy, environmental, and trade issues.

On a brighter note, Pat Gruber of Cargill Dow, LLC spoke of the immediate global success of new products made with advanced technologies that use abundant, inexpensive, renewable materials. He indicated that further technology development in distributed generation, alternative materials, and use of biomass may help address many current industry challenges.

Paul Mikkola of Hitchiner Manufacturing noted that the metal casting industry faces increased offshore competition as well as energy and environmental issues. He believes industry will benefit from increased use of lean manufacturing, incremental technology improvements, and educational initiatives at the university level.

Richard Lawson (recently retired) from the National Mining Association said no new mine has opened in the U.S. in about seven years and exploration has dwindled. He remarked that increased domestic energy production requires a reordering of priorities on regulatory issues and a public education effort. He noted that voluntary partnerships have contributed to major advances in combustion efficiency and environmental performance, yet the public is largely unaware of these achievements. He sees a need for continued technology improvements and better public outreach.

Henson Moore of the American Forest and Paper Association commented that some paper mills are moving offshore and others can make more money by selling their energy contracts than by manufacturing paper. Through the IOF partnership, however, the industry is on the cusp of a major breakthrough in black liquor gasification. Pilot plants are under construction, and the technology could make the industry a net energy supplier.

***Manufacturing News* publisher Richard McCormack hosting Expo's wrap-up panel.**

Exhibit Hall: News among the views

Nearly 150 booths, displays, and poster sessions filled Expo's sharply expanded Exhibit Hall. Booths featured everything from engineering software to innovative uses for soybeans. A wide range of companies, trade associations, professional societies, universities, national labs, industry and government consortia, and DOE programs displayed their contributions and commitment to increased energy-efficiency. A small stage in the Exhibit Hall was also used to make several newsworthy announcements, including the following among others.

Concrete aims to become 'Industry of the Future'
Executives from the concrete, cement, and construction industries and other industry stakeholders have collaborated on the development of *Vision 2030: A Vision for the U.S. Concrete Industry.* The document identifies eight broad industry goals, including a 50-percent reduction in energy use. OIT and the concrete industry's Strategic Development Council will work closely to develop a roadmap aligned with the Vision goals. "We're very excited, and we hope it brings much needed integration to this industry," said Peter Emmons, Chairman of the Strategic Development Council.

New vision, roadmap planned for natural gas industry
The Gas Technology Institute is leading the development of a vision and roadmap for the natural gas industry. As an environmentally benign and secure fuel, natural gas offers numerous benefits to manufacturers. OIT and the natural gas industry plan to focus on developing technologies than can help make manufacturers more productive and efficient. The natural gas industry hopes to complete much of the industry vision sometime this Spring.

AIChE joins Allied Partnership with DOE
The American Institute of Chemical Engineers (AIChE) announced that it will be the first organization to take advantage of opportunities available through OIT's expanded Allied Partnership initiative. Organizations that sign up as Allied Partners with OIT gain access not only to best practices for industrial systems, but also information on emerging industrial technologies and the latest R&D to help improve industrial energy efficiency. "We believe this partnership fits our strategy to serve chemical engineers," said John Sofranko, Executive Director of AIChE.

Several new publications, other communication items unveiled at Expo 4

As a service to our readers, we've highlighted below a few of OIT's newest communications products that were unveiled at Expo. Many are posted on our website as PDF files and **you can request copies of all these items free of charge from OIT's Clearinghouse at 1-800-862-2086.**

OIT Corporate Brochure

The new OIT brochure provides an overview of the Industries of the Future partnership strategy, how it works, who is involved, and why. The growth and expansion of the partnership over the last six years have provided compelling examples of results and direct benefits to industry and the nation. The brochure explains the diverse OIT resources and services available to assist industrial plants in boosting energy efficiency and productivity now and in the future. Don't miss the project portfolios for each industry in the back pocket!

Profiles and Partnerships

This abundantly illustrated document describes OIT's Industries of the Future strategy and recounts the energy, economic, and environmental challenges faced by the nine participating industries. For each industry, it provides a profile of current status, highlights of vision and roadmapping efforts, and descriptions of collaborative activities and selected projects. OIT's crosscutting resources and programs are also summarized.

Impacts: Summary of Program Results

In 1999 alone, technologies developed with OIT assistance saved industry more than 185 trillion Btu and yielded even greater benefits in terms of increased productivity and reduced waste and emissions. OIT diligently tracks the energy savings and other benefits associated with successfully commercialized technologies resulting from its cost-shared research partnerships. The January 2001 edition of the annual *Impacts* report contains cumulative statistics, 107 full-page fact sheets on technologies currently in use, and briefer descriptions of another 121 technologies likely to be commercialized within the next two years.

Plant Profiles: Industrial Energy Management in Action

This full-color brochure explains some of the best energy management practices employed at the plants that were in the running for OIT's 2001 Plant of the Year award. Learn about the energy management strategies and activities of the six finalists and ten honorable mention plants, all of which are active participants in the Industries of the Future strategy. The award, which this year went to USX Corporation, is based on documented energy savings, adoption of emerging technologies, continuous improvement strategies, and corporate commitment, among other measures.

OIT Industry Team Brochures

New, eight-page brochures are available for each of the nine Industries of the Future and for the following OIT supporting team areas: Combustion, Best Practices, Financial Assistance, and Industrial Assessment Centers. Each brochure highlights the impressive technology successes and other achievements attained as a result of the industry-government partnerships as well as the new benefits and resources available to industry through OIT.

Partnership Tri-fold Brochures

The Aluminum, Chemicals, Forest Products, Glass, Metal Casting, and Steel Industries of the Future have each produced tri-fold pocket brochures describing their industrial partnerships. Each brochure profiles industry collaborations and other alliances, including those with universities, trade associations, and consortia. In addition, the brochures identify benefits of partnering and provide information on how to participate in the Industries of the Future. The brochures are available through the OIT Clearinghouse and are posted on the OIT Web site: http://www.oit.doe.gov/tools.shtml#pubs

R&D Project Fact Sheets

OIT has produced scores of new R&D project fact sheets that, when added to the existing fact sheet collection, cover most of the OIT project portfolio. Each fact sheet provides a general description of the R&D project, its status, energy savings potential, and contact information. The fact sheets cover projects in each of the Industries of the Future, the financial assistance programs (I&I and NICE^3), and the enabling technologies. The fact sheets are available in hard copy through the OIT Clearinghouse and are posted on the OIT Web site: http://www.oit.doe.gov/factsheets/

Best Practice Case Studies

A series of 12 new BestPractice Case Studies describe energy-saving practices and technologies that have been implemented in industrial settings. The two- to six-page case studies provide a project overview as well as background on the technology and company. Results and cost savings are typically included along with a brief description of lessons learned in the implementation of the technology. The case studies are available through the OIT Clearinghouse or on the OIT Web site: http://www.oit.doe.gov/bestpractices/explore_library/case_studies.shtml

To order copies of any of these items, call 1-800-862-2086.

States Industries of the Future Fact Sheet Book

The States Industries of the Future (IOF) Book - 2000 is a compilation of all the Office of Industrial Technologies activities in each state. The book describes various projects, industry partners, OIT contact information, State Energy Program information, and details the economic importance of IOF's in each state. For further information, please visit the States IOF Web site at www.oit.doe.gov/states/

Allied Partner Tri-fold Brochure

The Allied Partner program offered through OIT's BestPractice program is described in a tri-fold pocket brochure. The brochure explains how industrial associations, manufacturers, industrial service and equipment providers, utilities, and other organizations work with the Industries of the Future to promote increased energy efficiency and productivity. The brochure describes the benefits of Allied Partnerships and examples of partnerships in progress. A mail-back card for further information is included. The brochure is available through the OIT Clearinghouse or on the Web site: http://www.oit.doe.gov/bestpractices/explore_library/

Publications and Literature–2000 CD-ROM

The Office of Industrial Technologies Publication and Literature - 2000 CD-ROM contains electronic copies of hundreds of OIT publications, facts sheets, case studies, and other materials. The CD allows you to locate resources conveniently and efficiently through user-friendly search and retrieval features. The CD-ROM is an extension of our Information Resources Catalog - 2000.

Technical Reports–2000 CD-ROM

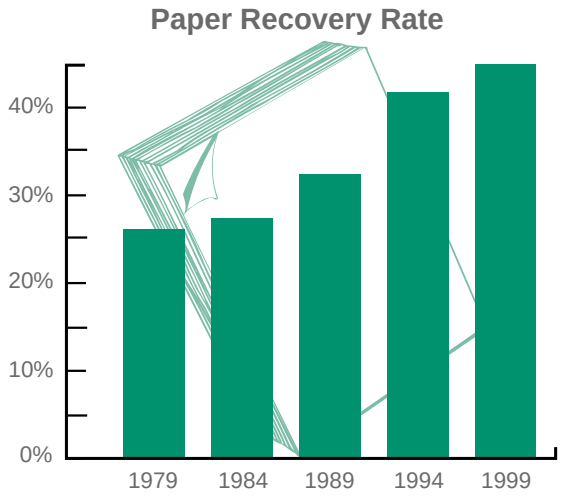
The Technical Reports CD-ROM contains OIT's technical reports and conference documents for 1999/2000. Many of the reports provide the results of R&D projects undertaken by OIT and its industry partners. If interested, you may order copies of the Technical Report CD-ROM 2000 from the National Technical Information Service (NTIS) in Springfield, VA, by calling 703-487-4650. Please refer to order #DE00765562.

Industrial Projects Locator–Version 4.0 CD-ROM

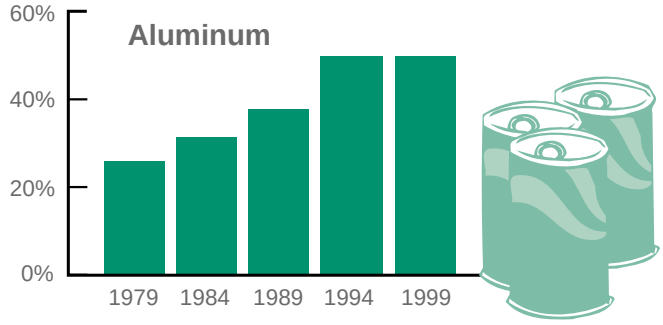
The Industrial Projects Locator CD-ROM contains a state-of-the-art, user-friendly database with the most recent information on more than 10,000 R&D projects relevant to business and industry. These are all federally sponsored R&D projects that are ongoing or recently completed. Project data can be accessed by searching key words which can indicate technologies, materials, or processes; the relevant industry; or the sponsoring agency. The IP Locator will then generate a report containing matching records. Each record, when viewed in its entirety, provides a full project profile (complete with title, participants, sponsoring agency or program, abstract, dates of activity, and funding information—when available).

Industry Trends

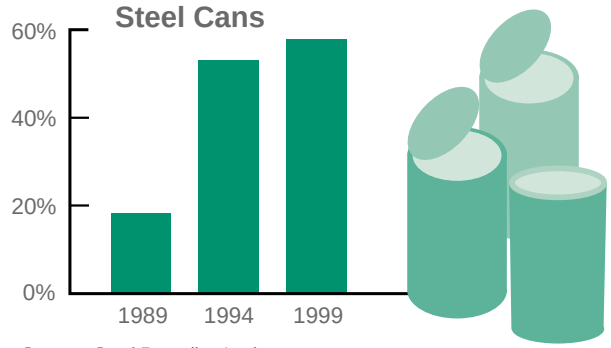
Recycling
(As a percent of production)



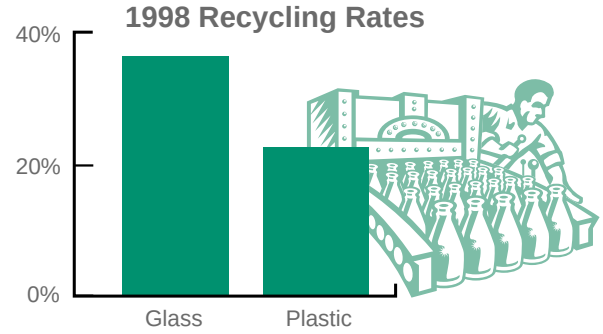
Source: American Forest and Paper Association



Source: Aluminum Association



Source: Steel Recycling Institute



Source: Glass Packaging Institute;
American Plastics Council

Guest Editorial

OIT's streamlined solicitations earn Hammer Award

by Theo Johnson
Office of Industrial Technologies

The National Partnership for Reinventing Government recently bestowed OIT and DOE's Idaho Operations Office with a "Hammer Award"–one of the highest honors a federal government program can receive.

The Hammer Award is given to teams that help create a government that works better, costs less, and gets results that Americans care about. Our team received this award for successfully streamlining the application process for financial assistance–making government work better and cost less.

Here in OIT, our #1 goal is to help improve our nation's industrial energy efficiency. But we can't achieve that goal without the active involvement of firms large and small, independent inventors, universities, labs, and many others. When we realized that burdensome, complex, unnecessary red tape was impeding this involvement, we took action.

We joined the Idaho Operations Office in a team effort to make the process of requesting financial assistance simpler, more accessible, and less expensive for our customers. We reduced the application for financial assistance from over 70 pages to 20 pages. We reduced the number of application forms from over ten to one. This cut the number of pages of forms that each partner must complete from 25 pages to one and helped greatly reduce costs and proposal preparation time for our customers. The annual savings to our customers in industry, labs, and universities is estimated in the millions of dollars.

The streamlined solicitation process is now standard for all of OIT's financial assistance awards. We think it will greatly increase the number and quality of proposals we receive for improving industrial energy efficiency. And this is just the beginning–we will continue to listen to our customers and respond.

(continued from page 1)

negative media perceptions, manufacturing has lost the respect it deserves, scaring away public support and many bright minds. Senator Jay Rockefeller (D-WV) was even more direct in pointing the finger during his luncheon speech. "The Federal government is destroying the steel industry," he said. "The history of steel is one of the failure of the U.S. government to uphold the law." He called on the Federal government to recognize that heavily-subsidized foreign steel companies are illegally dumping steel in the U.S., making it impossible for the U.S. steel industry–the most efficient in the world–to compete. He called on the new administration to uphold existing laws.

Other learning opportunities abound

Expo 4 featured nearly 150 booths, including many current OIT partners who provided information on emerging and new energy-saving technologies. "This was an excellent opportunity for people to get leads on technologies that could benefit them, and look for new partnering opportunities," said Swink. The Exhibit Hall also provided a forum for a number of exciting announcements, including formation of the new Concrete IOF and plans for a new natural gas industry roadmapping effort.

The hallways outside the exhibit hall were lined with much useful OIT literature. "Many new communication products were introduced at Expo," noted OIT's Expo Coordinator Lou Sousa (pages 12-14). "Attendees could pick up information about a wide variety of energy-saving technologies and other available resources. It was a useful adjunct to the Exhibit Hall." Also, several OIT software tools were available from the adjacent Cybercafe. Among products featured were software tools for motor management, insulation thickness calculation and steam system analysis.

Partners, students honored

"Our 'Industries of the Future' strategy is successful because of the commitment of our partners to working with us to find solutions," said Swink. This year's Expo featured a number of awards, including OIT's first-ever "Plant of the Year" Award, which, as Swink noted, was especially important because of the immediate and dramatic energy savings that plants can enjoy when partnering with OIT (page 9). Expo also featured OIT's inaugural "Wall of Fame" honoring OIT partners in industry and academia, as well as energy efficiency champions in the U.S. Congress. In addition, more than 100 high school student winners of this year's Junior Engineering and Technical Society academic contest (which OIT co-sponsored) received their awards at Expo.

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