

industrial & environmental

science

advocacy

health

business support

synergy

food & agriculture

public outreach

emerging companies

solutions

industrial & environmental section

Industrial and Environmental (I&E) biotechnology is increasingly crucial to the responsible stewardship of our planet. That's why the Biotechnology Industry Organization (BIO) is the world's strongest advocate for the transformative and sustainable innovations championed by our I&E Section members.

I&E biotechnology provides a vital set of tools to address climate change and a range of other pressing global challenges. By making manufacturing processes cleaner and more efficient; creating new materials, food ingredients and other products; unlocking cleaner and greener sources of energy; and reducing industrial waste, I&E biotechnology is at the forefront of the cleantech revolution. For example, biotech enzymes are used in such wide-ranging products as cheese, detergents, environmentally-friendly plastics and renewable fuels like cellulosic ethanol. Our members are also developing microorganisms that help manufacturers streamline their operations with biotech chemicals that are cheaper and less polluting than conventionally produced chemicals.

BIO's I&E Section members include Fortune 500 corporations, as well as emerging companies developing exciting new technologies. The I&E Section works to ensure these new applications gain the widest possible acceptance and use, while helping open doors for visionary entrepreneurs and innovative companies to business development and investment opportunities.



About the Biotechnology Industry Organization

BIO represents more than 1,200 biotechnology companies, academic institutions, state biotechnology centers and related organizations across the United States and in over 30 other nations. BIO members are involved in the research and development of innovative health care, agricultural, industrial and environmental biotechnology products. BIO also produces the BIO International Convention, the world's largest gathering of the biotechnology community, and industry-leading conferences held around the world.



BIO's I&E Section advocates for policy solutions to take industrial and environmental biotechnology to the next level. Over the last decade, we have built Washington's most effective advocacy team for industrial biotech.

Biotechnology solutions for manufacturing, environmental cleanup and energy production are attractive to government officials and other policymakers because they are cleaner and more efficient than existing technologies. The I&E Section has made biofuels, such as cellulosic ethanol and biodiesel, one of its top advocacy priorities. Our efforts have ensured that biofuels are included in legislative plans to increase renewable energy supplies and reduce greenhouse gases. The results have been overwhelming.

□ **Energy legislation.** Through our advocacy, the Energy Independence and Security Act of 2007 mandates a new renewable fuel standard (RFS) that calls for 21 billion gallons of cellulosic ethanol or other advanced biofuels to be produced annually by 2022. This BIO-negotiated provision could mean up to \$170 billion for biotech companies, farmers and fuel producers alike.

The RFS victory builds on policies the I&E Section fought for in the Energy Policy Act of 2005, which authorized \$3.6 billion in industrial biotech funding. We continue our advocacy efforts to ensure annual appropriations live up to that commitment. In February 2007 alone, \$385 million in integrated biorefinery demonstration grants were awarded to cutting-edge companies; these biorefineries will be capable of making products from cellulosic feedstock with multiple applications for industry and the environment.

- **Biomass Research and Development Act.** We helped achieve passage of this measure, which promotes biotechnology-based industrial products made from renewable organic matter, or biomass, such as aquatic plants, grasses, crop waste, wood-processing residues, and animal and municipal wastes. Biotechnology applications utilize biomass feedstocks to produce chemicals, materials, polymers and energy. The act, passed in 2000, funded \$50 million in R&D and helped establish a higher profile for biomass technologies at the federal level.
- **Farm legislation.** BIO added to its energy bill success by securing over \$1 billion in mandatory funding for renewable energy programs and technologies in the 2008 farm bill. The bill includes a critical new production tax incentive for cellulosic biofuels, assistance to help farmers plant and harvest new advanced energy crops, increased funding for biomass R&D, an expanded biobased products markets program, and new grants and loans for the construction of next generation biorefineries. These provisions expand the pioneering incentives for biofuels and biobased products BIO fought for in the farm bill's last re-authorization in 2002.



- **International representation.** Our advocacy extends to international bodies such as the Organisation for Economic Cooperation and Development. Our Executive Vice President for Industrial & Environmental Biotechnology co-chaired the Task Force on Biotechnology for Sustainable Industrial Development. This panel's accomplishments included producing the first-ever study of companies using industrial biotechnology commercially. The resulting report, *The Application of Biotechnology to Industrial Sustainability*, analyzed 21 case studies, ranging from Vitamin B-2 production to zinc refining.
- **Alliance development.** The I&E Section has established partnerships and advocacy coalitions with professional societies and associations to educate their members about industrial biotechnology and enlist their support. The fruits of this outreach include the World Congress on Industrial Biotechnology & Bioprocessing, an event we launched in partnership with the American Chemical Society and the National Agricultural Biotechnology Council. The I&E Section also participates in the Energy Future Coalition, a nonpartisan alliance that seeks to bridge differences among business, labor and environmental groups and identify energy policy options with broad political support.

I&E biotech growth areas

Using techniques perfected for medicine and crops, I&E biotechnology has been called biotech's third wave, resulting in dramatic discoveries and the development of new markets. The future remains promising for I&E biotech with advances in the following areas:

- Fine chemicals
- Advanced biofuels
- Synthetic biology
- Carbon capture and sequestration
- Food ingredients
- Pharmaceutical manufacturing
- Cellulosic ethanol
- Renewable chemical platforms
- Chiral compound synthesis
- Green plastics
- Synthesized food flavor agents
- Biopolymers/plastics
- Nanotech-biotech interface
- Enhanced oil recovery
- Leather degreasing
- Control of biofilms
- Biohydrogen production
- Pulp and paper bleaching
- Biopulping
- Antibiotic production
- Rayon production
- Metal refining
- Vitamin production
- Sweetener production

signature events



I&E Section conferences are the best opportunities in industrial and environmental biotech to learn, network and gain exposure. We host the world's signature events for industrial and environmental biotechnology, bringing together the leaders in this fast-growing industry. We connect our members with the financial community, potential industry partners, corporations, scientists, government officials and journalists.

I&E Section members have access to all of these events, including opportunities to speak on panels and give company presentations. I&E Section members receive registration discounts and preference for speaking opportunities at our conferences. Each BIO and I&E Section event features partnering services for attendees to make connections and meet on-site in space provided by BIO.

The I&E Section's signature events include:

- **The World Congress on Industrial Biotechnology & Bioprocessing.** This annual event defines trends, introduces new discoveries and technologies, and offers the year's best opportunity for networking and business partnering. The quality of the program and services has made the World Congress the signature event in this sector, with more than 1,200 attendees from around the globe.
- **The Pacific Rim Summit on Industrial Biotechnology & Bioenergy.** Focused on the fast-growing economies of Asia and the Pacific Rim, this conference links member companies with potential business and academic partners throughout the region. The program features business partnering services, plenary sessions featuring thought leaders, program sessions in several tracks, and evening receptions.

- **BIO International Convention.** We host the biotech industry's largest annual event, the BIO International Convention, which attracts more than 20,000 life sciences executives, scientists and policymakers, as well as 500 mainstream and trade journalists. Industrial biotech breakthroughs are showcased in media events and a three-day session track featuring I&E member companies. In addition, we host the Leadership Summit on Biofuels & Cleantech to discuss how these technologies are offering competitive returns for investors and customers while providing solutions to global energy and environmental challenges.



I&E Biotech Facts—Biofuels

- U.S. gasoline demand in 2030 that could be replaced by cellulosic ethanol or other advanced biofuels without harming food, feed or fiber production: 30%
- Reduction in greenhouse gas emissions by substituting cellulosic ethanol for gasoline: 85% or greater
- Estimated cost to produce a gallon of bioethanol by 2020, according to the National Commission on Energy Policy: 80 cents
- Reduction in the cost of enzymes needed to make bioethanol since 2001: 30 times (down from more than \$5 per gallon of ethanol to under 20 cents.)
- Americans in favor of government support for the development of biofuels: 82%
- Americans who feel that federal and state governments are not doing enough to promote the production of biofuels: 80%



research and publications

BIO's I&E Section regularly commissions and publishes research

on industrial biotechnology and public opinion to give our member companies the in-depth information they need to make informed decisions in this fast-paced industry. Some examples of recent research are listed below.

- **Sustainable agricultural biomass for biorefinery feedstock.** Can farmers raise enough crops to meet soaring demand for ethanol while continuing to feed the world? Cellulosic ethanol is made without using grain, thus allowing farmers to reap two crops—grain that can be used for food, and the rest of the plant, which can be transformed into ethanol using biotechnology enzymes. According to BIO's report, *Achieving Sustainable Production of Agricultural Biomass for Biorefinery Feedstock*, collecting 30 percent of current annual corn stover production would yield more than 5 billion gallons of ethanol and reduce net U.S. greenhouse gas emissions by up to 150 million metric tons of carbon dioxide.
- **New biotech tools for a cleaner environment.** Another groundbreaking report, *New Biotech Tools for a Cleaner Environment*, is the first to present national data projections for the environmental and energy-saving impact of industrial biotechnology, and highlights benefits already being realized in several major industrial sectors, including paper, textiles and vitamin production.
- **Harris Interactive survey.** A BIO-commissioned Harris Interactive survey found that 82 percent of Americans are in favor of government support for the development of biofuels. In addition, the I&E Section from time to time conducts in-depth opinion polling and focus group testing, and shares the results with member companies.



I&E Biotech Facts—Industrial Products

- Sales growth between 2004 and 2009 in food ingredients expected to come from industrial biotech: 35% (\$3 billion)
- Potential reduction of chlorine use, if biotech processes were used industry-wide in the paper industry: 10-15%
- Potential reduction in energy costs related to bleaching: 40%
- Petroleum savings when plastics production shifts to bioprocesses: Up to 80%
- Barrels of petroleum used for organic chemical production that could be replaced each year with biofuel produced from agricultural crop residue: 700 million
- Food ingredient sales from industrial biotech: 24% (\$8.5 billion)

governance & structure



The I&E Section is one of four BIO Sections. The others are Food & Agriculture, Health, and Emerging Companies. BIO member companies may belong to one or more Sections depending on their size and use of technology. A separate I&E Section membership plan is available.

The I&E Governing Board provides oversight and policy direction for the Section's activities. The Governing Board consists of between seven and 19 executives from member companies. The members of the I&E Governing Board also serve on the BIO Board of Directors—commonly referred to as the Full Board. The Full Board is comprised of all of the Members elected to each of BIO's four Section Governing Boards.

The Governing Board acts as the nominating committee, developing a slate of candidates for the Governing Board each year to be voted on at the Section's annual meeting, with elected members serving two-year terms. The Governing Board meets quarterly, usually in conjunction with meetings of other BIO Sections and the Full BIO Board.

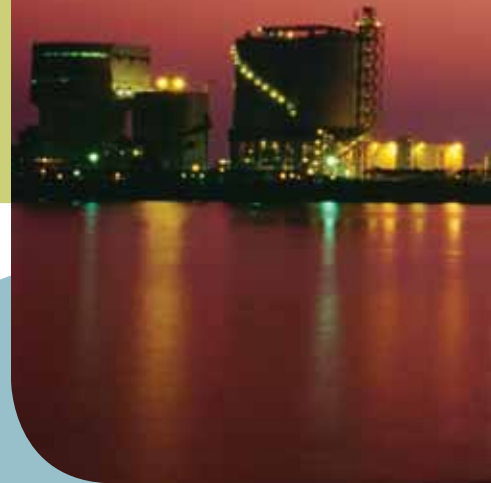
The I&E Section offers a number of committees on which Governing Board members—as well as other member company staff—may serve:

- Communications Committee
- Government Relations Committee
- Policy & Initiatives Committee*
- Regulatory & Product Stewardship Committee

Several working groups operate within the Policy & Initiatives Committee:

- Biofuels
- Biobased products
- Pharmaceuticals, fine chemicals & food ingredients
- Sustainability & climate change
- Synthetic biology

* This Committee only open to Governing Board Members.



BIO's I&E Section represents life sciences, biotechnology and industrial companies that create solutions for manufacturing, energy production and environmental performance. We aid our members in every aspect of their business, leveraging the power of BIO and our staff to assist companies on everything from communications to a cost-savings program.

BIO member benefits are designed to help our members achieve their business objectives. As a member of the I&E Section, your company will enjoy:

- **On-call expertise.** Our I&E team includes global experts on biotechnology policy and the uses of biotechnology in manufacturing and energy. As an I&E Section member, you are never more than a phone call or an e-mail away from the industry's collective expertise.
- **Intelligence.** As part of our commitment to advancing our members' interests, we monitor and analyze legislation, regulatory activity, news reports and academic studies. You'll receive strategic intelligence through a suite of award-winning publications, a members-only Web site, an I&E newsletter and other resources.
- **Exposure.** The I&E Section has garnered coverage of member companies in such outlets as *The Washington Post*, CBS News, *Business Week*, *The Economist* and *Forbes*. We have also featured our members at the National Press Club and at our conferences that have attracted as many as 500 top journalists. Plus, every BIO member is listed on bio.org, which generates in excess of 400,000 hits per month.
- **BIO Business SolutionsSM.** I&E Section members can also benefit from BIO's scale by participating in BIO Business SolutionsSM, the largest cost-savings program for the life sciences industry. Savings include up to 75 percent off certain laboratory and office supplies. Visit biobusinessolutions.com for program details.

Media outreach

Our media outreach has dramatically increased coverage of industrial biotechnology advances in both the mainstream and trade press, generating hundreds of news stories and feature articles.

In recent years industrial biotech has been featured in cover stories in *Forbes*, *The Economist*, *Industry Week* and *The Washington Post's* Business Section. We also regularly host media events at the National Press Club and on Capitol Hill.

We are creative in our appeals to the media, with a typical example being a fashion show at the BIO International Convention featuring high-fashion clothes made from biopolymers. Our events attract journalists from the Associated Press, *Newsweek*, *The New York Times*, PBS Nightly Business Report, the *Chicago Tribune*, *The Wall Street Journal*, *The Washington Post* and *Women's Wear Daily*.

for more information



Industrial & Environmental Biotechnology. Visit bio.org for a wealth of material on industrial and environmental biotechnology, including special reports, press releases, fact sheets, videos and more. BIO also publishes a comprehensive online reference work on biotechnology, the *Guide to Biotechnology*.

Joining the I&E Section. If you are interested in joining the I&E Section, call the Membership Department at 202.962.9200 or visit bio.org/join for membership information, including an application and dues schedule. Eligible companies are those pursuing biotechnology research and development in industrial or environmental biotechnology.

I&E Section-only membership is affordable and starts at \$1,000 for companies with up to 13 employees. All employees of BIO member companies are eligible to participate in BIO activities and receive discounts on conference registration.



Contacting the I&E Section. BIO's Industrial & Environmental Section is located at:
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Call us at 202.962.9200 or visit us on the Web at bio.org.

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