Energy Biosciences Institute

Home
People
Research
News
Calendar
Resources
Employment
Contact

EBI Q&A

Answers to the most frequently asked questions about the EBI. Prepared by Beth Burnside, UC Berkeley Vice Chancellor for Research and Professor of Cell Developmental Biology, 4/12/07

The goal of the Energy Biosciences Institute (EBI) is to address the problem of greenhouse gas-induced global warming by developing environmentally sustainable and economically viable transportation fuels that are alternatives to high-carbon admission petroleum. The EBI's primary purpose is to make the scientific and technical breakthroughs that will make it possible to efficiently convert cellulose derived from non-food plants such as perennial grasses into carbon-neutral fuels. A $500 million, 10-year research contract from BP will support researchers from UC Berkeley, Lawrence Berkeley National Laboratory, the University of Illinois at Urbana-Champaign (UIUC), and BP in what is envisioned as a highly collaborative, intensely interactive research mission to help address one of the 21st century's greatest challenges. A core component of the project will be social science and public policy research into the economic, land-use, food security, social, and other implications of the introduction of new biofuels to determine the most constructive approaches and to anticipate, and thus be able to mitigate, any potential negative consequences.

Q: How was the BP proposal developed?

A: BP announced on June 14, 2006, its intention to invest $500 million in biofuels research, and asked for a "letter of intent to propose" from those universities it identified as the most promising. UC Berkeley administrators heard in early September that the University was among the five institutions invited to apply (the others were Cambridge, MIT, Imperial College London, and UCSD). Anticipating the arrival of a Request for Proposals (RFP), UCB administrators immediately began preparing to develop a proposal. Teams of senior administrators, faculty, and staff from UCB and LBNL met weekly to coordinate the proposal and plan the scientific program. On September 7, at the very outset of this preparation process, Deans, Directors, and Chairs were notified of the upcoming proposal and were asked to request faculty input to create an inventory of relevant research interests and capabilities on campus. Based on this request, word spread to the faculty, and more than 60 responses — from varied campus departments and divisions, including the social sciences — showing interest in participating in the EBI were received.

BP's formal RFP arrived October 16 with a submission deadline of November 27. A rigorous process of proposal preparation ensued in order to meet this deadline. A 90-page proposal was completed in the early hours of Thanksgiving Day and sent on Nov. 24. The award to UC Berkeley was announced on Feb. 1.

Q: Was the Academic Senate informed about the development of the EBI proposal?

A: Yes, throughout the development of the proposal to BP the University administration has consulted with faculty and the Academic Senate. As noted in the answer to Question 1, word of the upcoming RFP and a request for input was sent to faculty through their Deans and Chairs at the very outset of the proposal preparation process. In early September, also at the outset, Vice Chancellor for Research Beth Burnside alerted the Academic Senate leadership to the possible submission of a proposal and met with the Senate's Academic Planning and Resources Allocation (CAPRA) committee. She continued to meet with CAPRA every two weeks to keep them abreast of the developing proposal. Burnside, and/or Associate Vice Chancellor Price, likewise met on several occasions with the Senate Committee on

Research .

At these meetings, the outline of a Berkeley proposal to BP to create the Energy Biosciences Institute was met with general enthusiasm by the Senate leadership and by committee members. In a meeting with CAPRA on November 22, Burnside discussed the staffing aspects of the EBI initiative, indicating that the proposal would likely commit seven faculty FTEs to bioenergy. She also described a meeting she had with Science and Engineering Deans who strongly endorsed the idea. This group subsequently wrote a letter to Provost Breslauer indicating that the new positions would be in areas the departments had already targeted for future hires and that they strongly endorsed the commitment. Upon submission of the proposal on November 24, CAPRA was provided copies of the proposal.

Vice Chancellor Burnside, Provost Breslauer, and Vice Provost Jan de Vries met with the Budget Committee on February 13 to discuss management of the allocation of seven FTE to bioenergy (see Question 4).

Q: How are the mission and values of a public University protected in agreements (like the one proposed for the EBI) with industry sponsors?

A: Berkeley has extensive policies governing university-industry relations (http://www.ucop.edu/ott/genresources/unindrel.html). Eight core principles are set forth to safeguard academic values and address rights to future research results in contracts with external parties (http://www.ucop.edu/ott/genresources/principles.html). The core principles are:

- Open dissemination of research results and information
- Commitment to educate students
- Accessibility for research purposes
- Public benefit
- Informed participation
- Legal integrity and consistency
- Fair consideration for university research results
- Objective decision making

These principles preserve the education, research, and public-service mission of the University, while meeting the government's mandate under the Bayh-Dole Act to speed the application of basic research to the benefit of society. These principles have served UC Berkeley well through a long and productive history of collaboration with industry — most notably with the information technology and biotechnology industries — contributing enormously to the local, state, and national economies.

Q: Will "extra" FTE be provided for faculty hires in EBI areas?

A: No. The campus foresees a need for seven new FTE for the EBI, but these positions would count against units' target sizes, and they would be filled only through the normal review-and-appointment process. The areas for these FTE are already areas in which the relevant units would want to be searching. Now that this has been clarified, the Budget Committee is satisfied concerning the issue of allocating FTE.

Q: How will research projects be proposed and selected within the EBI?

A: Academic research directions and programs will be initiated by the EBI faculty and scientists. Processes for research funding will be designed to create a nimble research enterprise that will empower faculty researchers to follow promising emerging research directions and take advantage of breakthroughs and unforeseen opportunities. The details of the research project solicitation and selection processes are under development and will be finalized in the contract negotiation process. The EBI is expected to allocate financial support to faculty investigators at the three host institutions through a competitive peer-reviewed process each year.

Faculty investigators will be invited to submit a short preproposal that will be reviewed by the EBI Executive Committee for relevance to the EBI's research mission. Those whose preproposals are considered a good fit to the goals of the EBI will be invited to submit a more detailed proposal and proposed budget.

These proposals will be reviewed for technical merit by external colleagues with expertise in the relevant research areas. Proposals that are reviewed favorably will then be considered for funding by the EBI Executive Committee, which will then communicate the resulting annual research plan and annual budget to the Governing Board for final authorization of funding.

Preproposals will be evaluated on their relevance to the following areas of emphasis: 1) **biofuel feedstocks**, including feedstock production, feedstock genetics, biomass composition, biotic stress, environmental impact and sustainability, harvesting, transport and storage; 2) **socioeconomic issues associated with biofuels or sequestration**, including global socioeconomic impacts, next-generation assessment, biofuels evaluation and adoption, biofuels markets and networks, social interactions and risks; 3) **depolymerization of biomass**, including pretreatment technologies, enzyme discovery and evolution, integrated bioprocessing and industrial adaptation, development of novel catalysts; 4) **biofuel production**, including systems biology, pathway engineering, biofuel production systems; 5) **fossil fuel bioprocessing**; and 6) **microbially enhanced oil recovery**.

Q: Where will EBI research be conducted?

A: During approximately the first three years, the EBI will be located in interim space in Calvin and Hildebrand Halls. Most of this space will be University-occupied, but about 20% of the total EBI space will be leased to BP at local market rates. The BP portion will be located in Calvin Hall in space currently occupied by LBNL. The lease will be executed between the Berkeley campus and BP, and will comply with relevant UC policies. Similar leases already exist within the UC system at the UC Irvine and UC Santa Barbara campuses and at LBNL.

Over the next three years, UC Berkeley, and LBNL plan to construct the previously planned new "Helios building" on hill-area campus property to house research on alternative energy. The EBI will be housed in part of that building. The total cost of the Helios building is estimated at $159 million. Of this, $70 million

will come from state lease revenue bonds, $74 million from external financing in the form of UC bonds, and $15 million from private support.

Q: How will intellectual property be addressed in the EBI contract?

A: The ownership of inventions will follow U.S. patent law. Inventions made solely by BP employees in the rented space will be owned by BP, inventions made solely by UCB, LBNL, or the University of Illinois at Urbana-Champaign (UIUC) employees in their own space will be theirs. Inventions made by at least one inventor from BP and at least one inventor from UCB, UIUC, and/or LBNL will be jointly owned.

We proposed that BP have a time-limited first right to negotiate an exclusive license to IP arising from specific research scopes of work funded by BP through the EBI. This is standard practice for industry-sponsored research at research universities. Alternatively, BP could elect to obtain a nonexclusive license on a royalty-free basis. In either case, BP will be required to diligently develop and commercialize the licensed right to address the relevant market need. Any IP that BP does not license within the time-limited period may be offered to other companies.

Finally, even if IP rights are licensed to BP, the research universities will retain their usual “reserved rights” — namely, to use the results for their own purposes (to further the University’s mission of teach, research, and public service) and to transfer the rights to others in the nonprofit sector for their own purposes. These, too, are the standard policies for industry-sponsored research at research universities.

Q: How is academic freedom safeguarded in corporate-sponsored research agreements like EBI?

A: The Berkeley campus and the UC Office of the President have extensive policies in place to ensure the openness of the research enterprise and the freedom of UC faculty, post-grads, and students to publish their research results without restriction:

http://www.ucop.edu/ott/genresources/principles.html

http://www.ucop.edu/ott/genresources/unindrel.html

All industry research grants and contracts are reviewed by the Industry Alliances Office (IAO) of the Office of Intellectual Property and Industry Research Alliances (IPIRA) to ensure that they conform to the requirement that they do not carry restrictions on the freedom to publicly disseminate research results. The IAO has responsibility for identifying restrictive clauses suggested by external sponsors. If the external sponsor resists removal of restrictive clauses, the IAO, backed by the Vice Chancellor for Research, refuses to accept the grant or contract under consideration. (This has been necessary on occasion, not only with industry but also with federal- and foundation-sponsored research). Industry grants and contracts are also reviewed to ensure that their scope of work is not simply product development or product testing — this type of “work for hire” is not permitted by the UC system under a research grant or contract.

The following principles (among those listed at the link above) guide University openness and academic freedom:

- Researchers (PIs, postdoctoral fellows and students) decide for themselves whether or not they will participate in a given sponsored research project, regardless of the funding source.
- When Berkeley researchers choose to seek research funding from a company under a sponsored research agreement, they draft a proposed work plan describing research that is academically appropriate for University researchers to perform, the results of which will be published.
- Publication at the University is a fundamental right. In the typical corporate-sponsored research agreement, sponsors receive the right to review publications (and public presentations) before they are disseminated, but are not given editorial rights.

In the end, the most robust enforcer of academic freedom is the respect of Berkeley faculty for the academic tradition itself.

Q: How will the University safeguard against conflicts of interest with respect to BP?

A: The University of California and the Berkeley campus have extensive policies dealing with conflicts of interest in research (see, especially, http://researchcoi.berkeley.edu/coifaq.html). These policies will be applied to the EBI as they are applied to all other externally sponsored research awards. The conflict of interest policies are implemented by a seven-person committee, presently consisting of faculty members in engineering and in the physical, chemical, biological, and social sciences, plus the director of the campus’ Office of Technology Licensing.

Existing policies require University researchers who are awarded a grant or contract from an industry sponsor to disclose to the Conflict of Interest Committee (COI) whether they have any financial interest in the sponsor itself, a consulting relationship with the sponsor, or a financial interest in any other entity that might be significantly impacted financially by the research. The COI Committee reviews the disclosed financial interests and the scope of work contained in the research project with an eye to ensuring that the conduct of the sponsored research will not be distorted by the investigator’s financial interest, and that the research will lead to advancement of knowledge, rather than routine testing that is solely beneficial to the sponsor.

If the COI Committee determines that the external financial interest is significant and that the research at UCB might be affected by this financial interest, then a conflicted situation is considered to exist and this conflict must be managed. Management of conflict often involves establishing a management committee of faculty members who monitor the research to insure that the scope of University work remains distinct from any work done by the faculty investigator for the sponsor on a consulting basis, and that the work of graduate students is not influenced by the faculty investigator’s external interests. If the conflict is significant and management by other means is not practical or realistic, then the COI Committee may require termination of the external financial relationship between the faculty investigator and the external sponsor.

Q: Why will there be BP scientists on campus? What will their role be?

A: According to the RFP and the proposal, there ultimately may be up to 50 BP employees distributed between the two sites at Berkeley and UIUC. These employees will include BP senior scientists, engineers, and technicians, working in rented space on the Berkeley or UIUC campuses, in laboratories adjacent to (but separate from) those of the academic scientists. This model is similar to how Intel employees work with UC Berkeley faculty and students at the Intel Berkeley Laboratory immediately adjacent to campus, though in the case of BP, the BP rented labs will be located on campus property.

Such proximity encourages interaction between academic scientists and corporate researchers, who have greater experience with developing commercial products. Because the goal of EBI is to identify and create new technologies for making biofuels, this kind of close collaboration provides early feedback to researchers that can help them develop new technologies that will actually work in the marketplace and ultimately benefit society.

The contract will include provisions to keep the academic and proprietary sides separate, though BP researchers may be invited to collaborate on projects in UC Berkeley labs, attend seminars, provide invited lectures to classes, and generally participate in the campus's academic life.

Q: Will BP scientists have the rights of faculty? Will they mentor students or set the curriculum?

A: No. they will not have the rights of faculty. BP scientists will be granted Visiting Industrial Fellow (VIF) status. This type of status is frequently used in existing programs on campus and is equivalent to Visiting Scholar status. BP scientists will not advise graduate students. On an individual, informal basis, Berkeley faculty may ask a BP researcher to lecture to a class or to provide advice on the design of a course, as is permissible with any Visiting Scholar. Like other Visiting Scholars, BP researchers will be able to participate in the campus's academic life by attending lectures, colloquia, workshops, and seminars organized by departments or ORUs.

Q: How will students benefit from having the EBI on campus?

A: The goal of a graduate education program is to prepare students for careers in academia, industry, government, or non-government organizations.Key graduate education components expected to be developed under the EBI by EBI-affiliated faculty include:

- New graduate courses on current state-of-the-art issues, especially in evolving fields
- Shared courses and seminars across participating academic institutions using technology such as webcasting
- Opportunities for graduate students to rotate among laboratories across the disciplines and traditional department/college barriers
- Opportunities for graduate students to declare a Designated Emphasis (UCB) or Certificate in Energy Science and Technology (UIUC) in addition to the primary discipline in which they will receive their Ph.D.
- Seminar series in various areas related to the EBI mission
- Laboratory rotations across UCB, UIUC, and LBNL
- Programs to support student entrepreneurial interests in bioenergy
- Access to an intellectual community that will stimulate multidisciplinary interactions
- Support for student-run organizations such as the Berkeley Energy Resources Collaborative (BERC) and the Center for Energy Innovation

UCB graduates more undergraduates who go on to receive Ph.D.s than any other university in the United States. The EBI-affiliated faculty will develop new courses and research opportunities to stimulate undergraduates at UCB and UIUC to focus on global energy challenges. It will provide them with a myriad of career-building opportunities. To prepare undergraduates for a career in industry or a graduate program, the EBI can enrich the undergraduate experience by sponsoring:

Activities that will provide students the opportunities to talk with leading industry researchers from within and outside of the EBI

- Undergraduate energy-based student interest groups at UCB and UIUC
- Practical and field-training internships and practice at bioenergy plants, businesses, farms, and feedstock production facilities
- Technology to facilitate off-site high-school and undergraduate research projects
- Undergraduate research opportunities in EBI laboratories
- Undergraduate internships with BP labs worldwide

Q: What is the precedent for industry-funded research on campus?

A: The University of California and UCB actively encourage collaborative and sponsored research with industry, consistent with our educational mission and the principles of academic freedom. These partnerships give our faculty and students new ideas, increase the commercial impact of our research, and prepare our students for non-academic careers. In the last two years, UCB has entered into 198 new sponsored-research and collaboration agreements and 85 new affiliate-program contracts to support research by private industry on the UCB campus. The University has a number of master agreements with companies that streamline the manner in which it contracts for sponsored research, or obtains vital materials or other research tools to support campus research.

Selected examples of products invented at UCB under corporate-sponsored research agreements include: DNA sequencing reagents and DNA sequencers (sponsored by Molecular Dynamics and subsequently commercialized through Amersham and GE due to acquisition), drug development tools by KineMed, and an algorithm for scheduling information flow through network switches in Internet routers commercialized by Pacific Bell, Bellcore, and a microelectronics consortium.

Q: Will the research involve genetically modified organisms (GMOs)?

A: The EBI's main focus in regard to plants will be on identifying the most suitable species for use as energy crops; improving methods of conventional breeding, propagation, planting, harvesting, and storage; and ensuring that this is done in a sustainable way that does not adversely impact food production or create environmental damage here or in other countries. EBI scientists are expected to test

a variety of herbaceous perennials as potential feedstocks. It is anticipated that GMOs may be developed for research purposes but that the emphasis in plant improvement will be on conventional breeding of energy crops because the gains that may be obtained by this approach have not yet been realized for energy crops. Genetic modification of feedstocks by recombinant DNA technology may happen at some future point but would require a lengthy development time as they are subject to very detailed federal processes. As this lead time can be greater than 15 years, GMOs would are not expected to be a target of the EBI.

Microbes will be developed to convert lignocellulosic biomass into fuel. It is important to note that these genetically engineered microbes will be confined to reactors in a processing facility and designed so that they cannot survive outside the production process, in the same way that today's pharmaceutical, plant, and chemical industries safely use genetically engineered yeast and bacteria to produce medicines, food ingredients, and industrial chemicals.

Q: Will anything in the contract being negotiated with BP require an exception to UC policy?

A: The university anticipates nothing in the contract that is new to UC. Only in its size does the BP grant differ from other industry partnerships at UC Berkeley.

The contract with BP is anticipated to require two exceptions to UCOP standard policy; both of these are relatively common across the UC system. One exception will allow BP to elect to obtain a non-exclusive, royalty-free license to IP that is funded entirely by BP in an EBI project. UC currently allows this future granting of a non-exclusive, royalty free license (NERF) in research agreements for inventions made in UC Departments of Electrical Engineering and Computer Sciences across the system (http://patron.ucop.edu/ottmemos/docs/00-02-sup2.pdf). NERFs have become standard in many research arenas, such as information technology, and allow more than one company to license an invention with the understanding that all licensing companies will diligently develop the technology.

Another exception will be required to grant joint ownership of IP rights when both UC and BP inventors both contribute to a new invention. This represents an intermediate solution between the UC and the LBNL IP ownership policies which has been granted in many agreements throughout the UC system.

Q: Some have compared this to the deal with Novartis. What was the Novartis experience?

A: Both UCB's internal analysis of the project and the external study commissioned by UCB found that the negative impact some people had imagined the Novartis agreement would have on the University's academic mission did not materialize. To the contrary, the agreement significantly enhanced the research and teaching activity of the Department of Plant and Microbial Biology. For example:

- Compared with the preceding four-year period, the first four years of the Novartis agreement saw an increase of more than 119% in the number of non-Novartis research grants (an increase of nearly 100% in dollar terms).
- The number of competitive grants obtained from federal government agencies (NSF, NIH, USDA) doubled.
- $500,000 in graduate fellowships flowed to the Department, allowing it to double the size of its graduate student class.
- Novartis funding allowed the faculty to pursue more novel and innovative lines of inquiry than would have been possible with funding from the usual sources of extramural research funds, and the research funded was exactly what the faculty proposed; nothing was directed by Novartis.
- Core research facilities were improved through the purchase of scientific instruments.
- Faculty researchers gained access to advanced instrumentation owned by Novartis and unavailable on the UCB campus.

Q: Will BP use the University's name and reputation to enhance their image in ads and public relations efforts?

A: The agreement will contain a standard clause that requires either party to receive written approval prior to using the other party's names or trademarks in any advertisement, press release, or publicity that references the agreement or any product or service resulting from the agreement. This is a standard term included in university-industry agreements. The University does not typically receive or approve many such requests, but UCB would consider any requests it does receive on a case-by-case basis, in consultation with UC's Office of General Counsel, and would not permit a use that it deems would violate the University's integrity.

Q: How are the social implications of the research being considered?

A: A major challenge in making the transition to sustainable energy is the integration of individual technical solutions into an energy system that is consistent with natural cycles, the economy, society, transportation networks, the power grid, and urban infrastructures. Some of the key areas of research that are critical to providing an integrated and systems-oriented approach to the transition toward sustainable biofuels production and use globally are outlined below. The following areas (described in greater detail in the EBI proposal at www.ebiweb.org) illustrate the possible areas of consideration and are not meant to be all-inclusive:

- Global socioeconomic impacts
- Next-generation assessment
- Biofuels evaluation and adoption
- Biofuels markets and networks
- Social interactions and risks

Q: What are the research objectives of the EBI proposal?

A: The research objectives are described in detail in the proposal (www.ebiweb.org).