

ENVIRONMENTAL TECHNOLOGY TRANSFER CHARRETTE

WHITE PAPER

Introduction

On December 4, 1997, the Environmental Finance Center for EPA Region IX (EFC9) held its first charrette which focused on the process of technology transfer between the National Laboratories located in East San Francisco Bay and small environmental technology entrepreneurs. Attendees at the charrette included representatives from all three Bay Area National Laboratories (Sandia, Lawrence Berkeley, and Lawrence Livermore), Stanford Office of Technology Transfer, EPA Region IX, Alameda Center for Environmental Technology, Bay Area Regional Technology Alliance, and various small environmental businesses.

The following is an overview of the charrette discussion. The transcripts of the “wall notes” (proceedings recorded on large “post-its” during the charrette) are also attached, as well as a complete list of attendees. We appreciate your participation. Your insights and observations were valuable and we look forward to working with you again in the future.

Issues Identified in The Technology Transfer Charrette

Small Business Issues

To start, each small environmental business representative described his experience with the technology transfer process. All agreed that patience and a clear understanding of the process was essential to successful interaction with the Labs. Also essential for successful technology transfer is “one on one” contact with Lab staff, and a strong understanding of the technology.

The small business representatives then shared their “technology transfer assistance wish list.” All expressed their desire for additional funding from “front money” to finance for testing, travel, commercialization and marketing. In addition, the small business representatives made the following suggestions which they believed would save them time and money.

- More “one on one” interaction. Personal relationships with Lab staff make the process run smoother.
- Better access to and information about available technology, including “dropped” technologies. Most small businesses do not know where to look for available Lab technologies, and too often the description of the technologies is vague.

- Better access to and information about Lab staff. Small businesses would like to know who at the Lab is working on what type of technologies.
- Better Lab access for the novice. Walking in the front door with no prior Lab experience has proven to be a formidable barrier to technology transfer.
- Better funding availability. Technology transfer takes time and money.

Lab Issues

Following the small business presentations, the Lab personnel were then allowed to question and respond to issues raised by the entrepreneurs. Many of the Lab personnel were concerned with the fact that small businesses were often not honest about their financial difficulties. They felt that business owners were naive about the technology transfer process, and that they had not “done their homework” before approaching the Labs. Lab staff expect businesses to conduct initial web searches to identify available Lab technologies. In addition, businesses should understand that Lab technology is extremely “raw” and that significant development and testing will be necessary before the technology is ready for commercialization.

Primary issues identified by Lab personnel included:

- Businesses should have a clear understanding of what they need before coming to the labs. Too many businesses show up with vague ideas and no identified technologies.
- Businesses should have a business plan in place before coming to the labs.
- Businesses must understand the time commitment and process of technology transfer before coming to the labs.
- Businesses need to be honest about their capabilities and financial status with the labs.
- It would be extremely helpful to the labs if there were a list of businesses which are available to receive information on technologies available for commercialization.

Suggested Roles for Third Party Organizations

Both the Labs and the small businesses saw significant roles for third parties. Business owners hoped to see more technology test sites established. They would also appreciate the assistance of third parties with basic businesses needs such as planning, marketing and finance. The Labs emphasized that a third-party organization which could help pre-qualify both businesses and technologies would be extremely valuable. Third-parties could “mine” the Laboratories and help match businesses to available technologies or they could license the technologies themselves. Outside organizations could help create networks among the Labs and between Labs and small businesses

Recommendations

Finally, the following are recommendations developed from the charrette discussion:

- A third-party organization should be sanctioned by the Labs to pre-qualify small businesses before they come to the Labs. Pre-qualification would include: guidance on the technology transfer process, business plan review, and financial review and assistance.
 - A third-party organization should be sanctioned by the Labs to provide information to small businesses on finance, marketing, commercialization, management, etc.
 - The Labs should be prepared to work closely with this third party. This would include regular meetings and keeping the third party apprised of changes in operation and policy, and personnel shifts.
 - The Labs need to provide better information on available technologies. (Currently, available technologies are presented on their web sites, but only in short one-page descriptions. In addition, many small businesses do not yet have World Wide Web access.)
 - A *Skills Bank* needs to be established which contains: a) a list of Lab personnel and their particular skills, and b) a list of small businesses and their area of expertise. The *Skills Bank* would allow greater and more informed interaction between the principle investigators at the Labs and small business owners.
 - The Lab may wish to consider forming their own list of volunteers and retired personnel who are interested in working with small businesses through the designated third-party organization.
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“WALL NOTES”

Information Shared by the Small Business Owners

- Patience Is Important
 - Many agencies are involved in the technology transfer process
 - Complex agreements and/or need for outside expertise adds time to the process
 - The transfer process is less frustrating if businesses understand it
 - Small Businesses should understand the process in advance of getting involved
 - Non-exclusive licenses may be easier to negotiate than non-exclusive licenses
- Understanding the technology makes performing due diligence easier
- Personal relationships with the scientists and technology transfer process make it work more smoothly ("informal relations" help)
 - The Lab's technology transfer specialist makes a difference
 - One-on-one contact with Lab staff is important
 - Lab staff support is invaluable
- License fees are structured to consider small business' needs--"all is negotiable"
- Developing markets is challenging
 - Determining the commercial feasibility of the technology is challenging
 - Most venture capital staff lack environmental technology expertise and small business owners distrust venture capitalists
 - It may be easier to partner with labs and other companies, thereby
 - "sharing technologies" via LLC; this is easier than tracking royalties
 - Interface between the labs and private firms is important

Small Business Owners Dream about:

- Help negotiating government contracts
- Help locating "front" money to meet contracts
- Help identifying and evaluating Lab technologies
 - Response: check Lab websites and their "opportunity pages" and contact the technology transfer office identified on those pages on the name on the page
- Help testing commercial feasibility of technologies
- Opportunities for one-on-one contacts with Lab staff, possibly by having space at labs with phone and copy machine, and an opportunity to "check out" technologies
 - Response: this exists--labs have guest space, so long as the guest meets the Lab's mission.

- Funding for testing technologies
- Funding for travel & market development
 - Response: try Tim Conlon of the Technology Venture Corporation, (510-376-5733) associated with Sandia, to help find appropriate technology, funding and other business assistance services. He works with the TriValley Business Council. TVC's long-term goal is an incubator in Livermore.
 - Kathy Kaufman has information on networks. The labs have a small business program which provides \$5,000/shot for a service not available in the private sector. The labs provide a Technical Assistance Program
- A “who does what” directory for the labs and a skills bank directory among small businesses, so they can use each other's services
- Opportunities to pick scientists' brains
 - Response: this is currently available
- Database of technologies and potential application, including "dropped" technologies

Laboratory and University Representatives Comment:

- The environmental technology market is fragmented. There needs to be a more predictable regulatory process.
- The young entrepreneur is missing from the environmental technology arena.
- Need to determine how to translate environmental services and products into "scaleable" businesses
- Franchising and training are ways for service-oriented businesses to penetrate markets
- Businesses need to be more willing to acknowledge their business problems to the labs
 - Acquiring knowledge costs time and money, it is best to start with web searches before initiating one-on-one contact
 - Lab technologies are VERY raw (i.e. they need significant of development to be commercialized) and entrepreneurs need to learn this
 - Lab internal politics can "kill" a technology, small businesses need to try and understand the laboratory's politics
 - It can be difficult for Lab scientists to find funding for their projects within the labs; in spite of best efforts, there is no guarantee of following-on funding for Lab projects
- The labs are run by many players (university, Lab & DOE) with differing agendas
 - All technologies need a "champion"; generally it's the PI
 - PI rewards don't necessarily correspond to his/her output
 - Recent cuts in labs' budgets have hurt

- Small businesses can't necessarily afford permits
 - Small businesses need to further develop technology, but don't necessarily have in-house capability
 - SBIR money can be useful in technology development; fewer qualified companies are applying for SBIR funds now
 - There are many market barriers to introducing new technologies
 - There can be a long learning curve to technology development

- Where To Find Help
 - ATP, a Department of Commerce program, has funding
 - Visit the Federal Lab Consortium (FLC) web site to learn about available technologies (try <http://www.zyn.com/flc/flclocat.htm>)
 - BARTA & SBDC are good resources for business assistance services
 - Consider using student labor ; business students can be used to prepare business plans and engineering students can help with technology commercialization
 - A contract with LLNL is also a contact with DOE. work performed by the Lab must relate to the Lab's mission and requires approval by all involved parties.

Suggested Roles for Third Party Organizations:

Note: for a technology to succeed, it needs a technology transfer champion, a scientist champion and a business champion

- Provide or arrange for technology test sites
- Publicize TVC
- Put energy into de-funded technologies
- Pre-qualify businesses
- Help businesses develop clear problem definition, fully fleshed out business plan, good understanding of their industry, timeliness, willingness to reveal financing status
- Pre-qualify technologies
- Provide information on business assistance resources including licensing review, volunteer advisors (like the Business Enterprise Network)
- "Mine" technologies by visiting PIs & labs
- Create networks among the labs, and between the labs and businesses
- Consider licensing technologies directly to 3rd parties
- Match companies' needs with students' skills and abilities

- Provide information to help overcome regulatory hurdles, such as who to talk to, expertise and guidance with government, checklist of what to do - re: permits, etc.
- Provide information on how to get government to approve novel technologies; this may include proposing criteria to the government
- Incubators could invite interested PIs from the labs to visit
- Can help apply for joint research grants (private-public); DOE prefers joint ventures
- Can help labs market technologies

More Information from Labs & Universities:

- Stanford has a Research Participation Agreement through which space & equipment is available for a fee
- LLNL has a Participating Guest Program available to CRADA and licensee folk. This includes offices with phones and copy machines. Lab space is harder to find. All this requires cash up-front and depends on the project. Security is also a concern.
- LBL has a Participating Guest Program. A joint publication between guest and Lab staff would be a product of the guest's stay and would help meet program requirements.
- Sandia has a Personnel Exchange Program in which a small business employee can visit the Lab or a Lab employee can visit the small business. It is not often used. There is also a User Facility Agreement available to small businesses, which is full-cost recovery program and requires payment up-front.
- Sandia, LLNL, Los Alamos, Oak Ridge, etc. allow a scientist to be paid up to \$5,000 to help a small business (about one week of a scientist's time). More help can be provided if there is synergy between the request and the scientist's work. A small business has fewer than 500 employees and is at least 50% US owned. A business is allowed this once per fiscal year per Lab. This program has a budget of \$1 million/year/Lab
- LBL has a similar program, but the budget is \$20,000/year.
- A relationship with a national laboratory adds glitter to a business
- Laboratory assistance can help leverage angel funding
- A not-yet funded program through the labs may provide \$50,000 for small business needs, but will require a match
- A good relationship between a business and PI can help the PI with his/her funding

- Incentives to partner with private sector and Lab staff are changing
- Open literature is not enough for tech transfer; formal agreements are necessary
- LLNL allows technology to be transferred through the tech transfer office and/or from the directors (departments)

Questions

Q: How to navigate internal Lab politics?

A: Use technology transfer office staff

Q: How to perform due diligence on an unfamiliar technology developed by the Lab?

A: Acquire the technology under a 90 day trial purchase option (this is good for up to 1 year)

Q: Whether to acquire an exclusive or a non-exclusive license?

A: Labs need a good rationale for exclusivity. LLNL starts with non-exclusive license. All labs retain right to use technology or intellectual property for their internal needs. May be willing to grant exclusivity for one area of use. Stanford offers both types of licenses, but wants to license as broadly as possible to maximize income.

At Sandia non-payment of royalties may result in termination of agreement. LLNL has "marching rights" which means that if a company does not use a licensed technology, it can be taken back. This rarely happens. Sometimes diligence requirements are renegotiated or a license may be converted from exclusive to non-exclusive. Stanford may renegotiate, if there are problems. But in general, small businesses are seen as "partners" and Stanford can take an equity interest in a company in lieu of payment. LLNL can do this too, Sandia can't.

Q: Who owns derivative patents?

A: The company who develops it.

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