

Building an Environmental Economy

A Strategy for “Environmental Business” Economic Development for the City of Berkeley

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EXECUTIVE SUMMARY

The purpose of this report is to identify opportunities for the City of Berkeley in the emerging "environmental business sector" (as defined below), and to identify strategies that city government may use to support development of that sector through a mix of attraction, retention and other economic development strategies. The goals guiding this effort are:

- Expand the Berkeley economy in directions consistent with the City's values and social goals;
- Expand Berkeley job base, with special attention to blue collar and entry level opportunities;
- Improve quality of life—both environmental quality and community experience; and
- Set an example of environmentally appropriate economic development that other cities can emulate.

Business / Environment Trends

There is widespread agreement that major economic growth will occur in the next decades across a wide spectrum of environmentally related businesses. These include what has traditionally been defined as the environmental industry (mostly technical, compliance driven activity), as well as a broader definition that includes innovations in energy, transportation and production process efficiencies, and a wide variety of consumer products and services. Many analysts call the emerging environmental market the most significant business opportunity of the next twenty years.

Governmental agencies at every level are taking account of this major economic development opportunity in environmental business. A vibrant environmental business sector has emerged in the Bay Area. The impending military base closures have focused new attention on how to best channel the region's resources, with particular attention to conversion of military and aerospace resources, the role of the Federal labs and the possibilities of an Alameda County scale "Green Valley" strategy to echo the prosperity of the "Silicon Valley" across the Bay.

This is what has emerged spontaneously. Now is the time for focused support—new resources are available, there is a new level of market maturity, and there is new competition from other jurisdictions. And there is a unique role for the city and business community of Berkeley.

Berkeley's Environmental Economy

Berkeley has long been a national leader in environmental business development, and has been home to pioneering efforts in many sectors of the environmental business universe. This has been assisted with some encouragement from city government, but is largely a result of indigenous factors, including both the intellectual resources and environmental motivation of its citizens.

In addition to business specifically characterized as environmental business, increased environmental efficiency can increase viability of all Berkeley businesses by reducing wasteful utility expenses; money saved is freed for wages, purchases and investment—some of which may have local multiplier impact. In serving these efficiency needs Berkeley can develop business capability that can be "exported" to other jurisdictions.

Strategic Opportunities: The "Environmental Business" Universe

Traditional definitions of the "Environmental Business" universe have been rather narrow, initially focusing on regulatory-related activity like pollution control and waste management; this has been reflected in the scope of some of the early "environmental investment" funds, many of which focused on resource recovery and hazardous waste management companies. The definition has been steadily extended to include a broad range of environmental quality and efficiency focused activities; even so, estimates of a \$120 billion per year US environmental industry may well understate actual market size.

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Key environmental business sectors which can expect significant growth include:

- **Energy**, including renewable energy, energy efficiency, energy storage
- **Air quality**, including both pollution control equipment and process efficiency improvements
- **Consulting**, especially "integrative" consulting focusing on process, efficiency and quality improvement in context of strategic environment management
- **Resource recovery**, including recycling, manufacturing with recycled materials, "reverse manufacturing" (disassembly of products down to recyclable components), and resource mining ("high-grading");
- **Instruments & control equipment**, including both pollution control and manufacturing efficiency equipment
- **Water efficiency**, including both water efficiency/conservation and water quality/reclamation technologies

A review of an expanded "taxonomy" of the environmental business universe and these key sectors, filtered through a lens of Berkeley's distinctive resources, suggests special attention to significant opportunities in:

- Bioremediation
- Pollution prevention
- Analytic & pollution control equipment
- Consulting services
- Manufacturing monitoring, modeling and control
- Energy storage
- Transportation-related products and services
- Environmental restoration

A municipal environmental business strategy

An environmental business development strategy for Berkeley will make the most sense as part of a coherent strategy that integrates attraction, retention and business development strategies, with all of them founded on Berkeley's distinctive strengths and resources—including its business mix, intellectual capital (both private and University), social vision and quality of life, its suitability as a base for operating in the California market and the Pacific rim, and its national image as an environmental leader. The essence of this strategy:

- Target key environmental business sectors for CDD support
- Create strong public/private partnerships to rapidly mobilize economic, intellectual, and technical resources.
- Build a new generative relationship with the University of California and its associated Federal Labs to insure local businesses access to emerging technologies and skilled employees/entrepreneurs.
- Leverage public resources through full engagement of the private sector.
- Develop an environmental business incubator.
- Balance growing new businesses locally with attracting them from elsewhere; target both global and local markets; and seek job development for blue collar as well as more highly skilled workers.

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The specific elements of this plan (detailed in this report) include:

Positioning

Target cutting-edge sectors of the environmental industry
Position Berkeley as a business incubator and environmental innovator

Collaboration & Alliances

Green Business Task Force
Regional alliances
Build partnership with the University of California
Incubators and entrepreneurial networks
Regulatory streamlining

Business and Market Development

Integrate "gardening" and "hunting" strategies
Integrate global market / local market strategies
Financing strategies
Product Development and Technology Licensing
Siting
Procurement
Extend the RMDZ Model

Information and Training Services

Expand CDD role as information broker
Provide cooperative training and support services
Export services
Environmental efficiency
Saturation Program of energy efficiency improvement
Product and process efficiency improvement

Outreach

Berkeley Environmental Business Directory
Export Trade Shows
Marketing and communications strategies

Policy Implications and Next Steps

This program for an environmental economy should integrate well with existing City of Berkeley economic development goals and strategies, including manufacturing revitalization and job development. Entry level jobs are most likely in recycling, bioremediation and environmental restoration, while other highlighted sectors may require a higher skill base. In all cases, job access for new and low skill workers will be greatly supported by effective collaborative training programs.

The viability of Berkeley's environmental economy will depend, like many other business development issues, on continuing reduction of bureaucratic—as opposed to regulatory—constraints.

To begin implementing this strategy, CDD should:

- convene, at the earliest opportunity, a series of meetings with key potential collaborators to review, critique, modify and endorse this strategy, and develop a plan of action;
- follow up on the connections that have been opened at UCB for possible collaboration in development of Berkeley's environmental economy, including the Consortium on Green Design and Manufacturing, the Office of Technology Licensing and entrepreneurial programs at the Haas School;
- immediately contact the California Environmental Technology Partnership, to develop links between state and local initiatives;
- put the environmental economy on the agenda at the Economic Development Advisory Board and the Base Closures process.

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INTRODUCTION

The purpose of this report is to identify opportunities for the City of Berkeley in the emerging "environmental business sector" (as defined below), and to identify strategies that city government may use to support development of that sector through a mix of attraction, retention and other economic development strategies.

This report builds on explorations conducted over the past several years by CDD, the City Council and Berkeley citizens, and attempts to provide a coherent focus for the development of Berkeley's "environmental economy," as well as strategies for using the environmental economy as a cornerstone of the City's business development, retention and attraction efforts.

The goals guiding this effort are:

- Expand the Berkeley economy in directions consistent with the City's values and social goals;
- Expand Berkeley's job base, with special attention to blue collar and entry level opportunities;
- Improve quality of life—both environmental quality and community experience; and
- Set an example of environmentally appropriate economic development that other cities can emulate.

There is widespread agreement that major economic growth will occur in the next decades across a wide spectrum of environmentally related businesses. These include what has traditionally been defined as the environmental industry (mostly technical, compliance driven activity), as well as a broader definition that includes innovations in energy, transportation and production process efficiencies, and a wide variety of consumer products and services. Many analysts call the emerging environmental market the most significant business opportunity of the next twenty years.

Precision in projection is an illusion in a rapidly changing time like this. Projecting current trends must be tempered by awareness of the depth of discontinuous change we are in. The sudden end of the Cold War combined with other major shifts creates a more chaotic, less predictable world for planning. Profound geopolitical and macroeconomic changes that have strong implications for a local business development program include:

- the shift from the Cold War as a global organizing principle to, perhaps, Vice President Gore's vision of environmental recovery in that role;
- the shift from centralized to distributed information systems, and parallel shifts in organizational structures;
- globalization of economy with simultaneous intensification of local centers of economic and technical innovation;
- distribution of innovation across local/regional levels while the national center dithers;
- socio-economic triage, shredding the safety net for the poor and dumping many of the middle into poverty;
- productivity growing as ability to consume declines. (Who will buy the products in an economy that keeps laying off the workers?)

Business development in a time like this will seem like surfing in a typhoon for anyone not working with highly creative and dynamic strategies.

BUSINESS AND ENVIRONMENT TRENDS

"Environmental business" is a fuzzy identity that people have used to label a bewildering spectrum of companies, ranging from cloth diaper services to huge engineering conglomerates.

The "core" environmental industry itself primarily serves business and government with a wide variety of services and equipment. It emerged out of the regulatory drive of the 70s, with the bulk of its resources supporting regulatory compliance, cleanup of past pollution, and associated information needs. This is the element most commonly included in economic analyses of industry size and trends.

The softer end of the spectrum includes educational and informational media, consumer products/services, home energy products/services, and eco-tourism. Consumer demand is growing for means of changing one's lifestyle to lessen personal impact on the environment. This implies continued growth for niche businesses (The Nature Company, Earthsake) as well as continuing pressure on traditional companies to clean up their act and develop "greener products". This is the element perhaps most familiar to consumers.

A significant intermediate is services, products—and intra-company activities—aimed at improving efficiency of resource utilization (of energy, water, raw materials), increasing environmental and product quality, and reducing environmental burdens (increasingly by pollution prevention and intelligent design rather than "end-of-pipe" clean-up). This last element holds enormous strategic significance, for both policy makers and entrepreneurs; yet it is perhaps most difficult to accurately reflect in any industry trend analysis.

(See page 13ff and Appendix A for a classification of environmental businesses.)

Global and National Trends

The environmental industry is in major transition, driven by multiple factors:

- Heightened public and business awareness of the need for much more effective handling of environmental concerns;
- Increasing impact of environmental considerations in trade decisions;
- More stringent regulations in developed countries—driven especially by the European Community—and in developing countries, raising the threshold for effective competition in international markets;
- Increasingly tough competition in the global marketplace, with Japan and Germany moving ahead of the US in some technologies (driven by both regulatory environment and innovative business response);
- Industrialization in the developing world representing a vast demand for clean and efficient industrial technologies;
- Rapidly evolving technologies in many fields;
- Environmental management innovations in many leading companies that emphasize prevention of pollution/waste;
- Growing recognition of efficiency gains possible with environmental quality improvements;
- Emerging shift in regulatory policy substituting pollution prevention for command and control.

These factors, plus the larger field of turbulence described above, suggest a wealth of opportunity for new businesses—and new opportunities in existing businesses—working on the cutting edge of the industry. This is particularly true in a time when companies must simultaneously cut costs and improve environmental performance. The rapid growth of this industry will create openings for new businesses able to better meet this need.

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Most analysts project continued high growth rates—and large numbers of start-up ventures—in both the US and worldwide environmental industry in the next decade:

- "The global market for environmental goods and services, currently estimated at \$200 billion, is estimated to grow to \$300 billion by the year 2000.... An industry analyst estimates that by 1997 the U.S. environmental industry will have created 312,000 new jobs based on increased market share of the global market, if an effective government-business partnership is implemented.... The envirotech industry will, by most estimates, be one of the world's fastest growing industries over the next 20 years." (Environmental Business Council of the United States, Inc.)
- Worldwide markets for environmental technology will grow from \$300 billion to \$600 billion in the next eight years, according to the World Bank.
- "Banque Paribas sizes the market for environmental goods and services at more than \$700 billion/year in OECD countries." [Green Market Alert]
- "In 1991, the United States environmental industry contributed nearly \$130 billion to the U.S. economy and \$76 billion in federal, state and local taxes and employed an estimated 2-3.5 million people in 65,000-70,000 businesses across the country.... According to recent estimates, the U.S. environmental market is expected to grow to \$160 billion by 1995, \$195 billion by 2000 and \$239 billion by 2005.... OECD has recently reported that the current global market for environmental goods and services stands at \$200 billion and the Office of Technology Assessment predicts that the market will grow to nearly \$300 billion by the year 2000.... Large scale investments in environmental infrastructure by countries such as Taiwan, Spain and Mexico offer unique business opportunities for American firms. Increasing demand for environmental goods and services provides existing companies with the chance to expand and offers newly formed companies an increasing number of customers to sell their products." (Massachusetts Governor's Office)

A growing spectrum of businesses is discovering strategic advantage in the pursuit of significant improvements in environmental quality. While "greenwashing" remains a risk, and while some firms may be essentially opportunistic in their pursuit of greening, many are making serious commitment to radical changes in operations.

Success in the coming years, and perhaps survival, will demand that more and more businesses follow the lead of corporations like 3M and Xerox in innovative, company-wide approaches to environmental management and pollution prevention. As companies take a more systemic approach to materials use, waste and pollution, they may "design out" much of their longer-term need for external environmental services and control equipment; in other words, one end result of growing adoption of Pollution Prevention (P2) and Design For Environment (DFE) strategies may be intrinsically cleaner production processes and hence reduced demand for pollution control equipment . But they will need a great deal of support to get to this state.

Governmental response - Federal and State

Governmental agencies at every level are taking account of this major economic development opportunity in environmental business. It was a keynote of the Clinton/Gore campaign and has been incorporated in Federal programs like the multi-agency Environmental Technology Initiative (which includes funding for projects for small business). The Federal Labs responsible to DOE are searching for their piece of the action. The Environmental Protection Administration (EPA), Department of Energy (DOE) and Department of Commerce (DOC) are working to coordinate their support for business development in environmental technology. And the Federal environmental regulatory apparatus is beginning to shift from the traditional "command and control" model to a more proactive, and effective "pollution prevention" model.

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A number of states and cities are also quite active in supporting local development of green businesses. Several have set the ambitious goal of becoming "the leader in environmental business/technology." While only a few may succeed in remaining leaders, in fact all are leaders today, inspiring a healthy competition that will encourage public agencies and private enterprise to pay more attention to these opportunities.

- The California Environmental Technology Partnership (CETP), a joint initiative of Cal EPA and the Trade and Commerce Agency, is an ambitious program to build and promote California's leadership in the environmental industry. According to CETP's draft Strategic Plan, released September 1993, the Partnership (see Appendix C for detail) will emphasize four primary areas of activity:
 - export promotion, which will include reverse trade delegations, a May 1994 international exposition in San Diego concurrent with the Responsible Energy Technology Symposium and International Exchange (RETSIE) conference, and possibly direct mail promotion and subsidies for smaller companies;
 - overcoming financial barriers, including identification of funding resources, coordinating looking for federal funding, and possible development of State funding;
 - regulatory reform, including permit streamlining process, and exploration of evaluation, testing, commercialization and demonstration issues relating to environmental technology development;
 - needs assessment, including serving as a clearing house of opportunities and needs; technology evaluation, demonstration and "certification"; and possibly a test center for environmental technology and a "permanent trade fair" (à la PG&E's Pacific Energy Center).
- The Massachusetts Governor's office released a forward looking report—*Green Business: a Profile of the Massachusetts Environmental Industry*—in Spring 1993. This includes a powerful set of policy recommendations for supporting the growth of the industry, including action in financing; market development through state purchasing and export services; training; R & D; regulatory reform; site finding; and technical support.
- In Oregon the State Office of Economic Development has selected environmental business as a key industry and works closely with the Oregon Environmental Technology Association and the Association of Environmental Professionals to support growth of an already viable sector.
- Minnesota's Sustainable Development Initiative has been charged to "design new policies to support sustainable development, and build partnerships among Minnesota's business, environmental and regulatory communities to carry them out." Initiative teams appointed by the Governor and the Environmental Quality Board, focused on agriculture, energy, forestry, manufacturing, materials, recreation and settlement, are expected to issue their recommendations in November 1993, with a Congress on Sustainable Development scheduled for February 1994.
- New Jersey Governor Florio announced, in his 1993 State of the State address, a seven point plan—including funding for entrepreneurs, job training grants, tax incentives, a state technology transfer agency, export finance program, site finding services and grants for "invention factories" at colleges and universities—to turn New Jersey into a world center for environmental technology.
- "Washington state Senator Alan Bluechel, who has spearheaded the Pacific Northwest's economic alliance, said its goal is world domination of the environmental industry. 'Our goal in this region is to become the No. 1 supplier of environmental and pollution cleanup technology for the world.'" [Seattle Post-Intelligencer]

Note that Japan has also declared the same goal of becoming "the leader in environmental business/technology," and has already made significant strides in sectors ranging from photovoltaics to waste treatment.

Governmental response - Cities

At the municipal level, several cities have undertaken or are considering concerted efforts to link economic development and environmental goals.

- Boston's Economic Development Agency has set out to add 10,000 environmental jobs to the 20,000 already in existence over a five year period. The chief focus: solid waste handling, and management and cleanup of environmental hazards. Resources to support environmental industry development include working capital and other loans from Boston Local Development Corporation; tax-exempt bond financing for facilities, and space in three EDIC owned industrial parks, including an Environmental Innovation Center for startup companies. The plan also calls for creation of a Municipal Recycling Facility, which will generate materials to support an array of secondary recycling, refining and manufacturing companies.
- Chattanooga TN has developed a concerted program to clean up the toxic history of a century and a half of heavy industry, build business capability in the process, and to make their city a national center for fresh water science and technology, and transportation and fuels alternatives.
- St. Paul MN's efforts to build a "homegrown economy" has had a substantial environmental component, with an emphasis on energy efficiency—including all city facilities—and, more recently, biofuels.
- Littleton CO has developed an interesting "gardening" approach to cultivation of local businesses. While not specifically emphasizing environmental industry, their innovative use of information resources has great applicability to the environmental economy.
- The Cambridge MA Sustainable Cambridge Coalition has developed a preliminary "sustainability profile," essentially quantifying the city's resource inputs and outputs.

Note that many municipal-level "sustainable development" projects give little if any attention to the economic development side of sustainability. A Sarasota Florida city and county design charette on "sustainable cities", for instance, contains only a few passing references to business and job development. A Puget Sound Council of Governments 2020 Vision project has no major category for industrial or business development or redevelopment in its view of urban planning. In fact, much of the "eco-city" discussion of the past decade has focused on built environmental and infrastructure issues (with occasional forays into boutique economic development), with little attention to the primary economic life that must sustain a city. Even the ecologically sophisticated Cambridge approach did little to integrate economic development issues with environmental sustainability.

Berkeley would be wise to maintain the integrity of the concept of sustainable development in its approach to business development, as have cities like Chattanooga.

Regional and Local Trends

Berkeley, the Bay Area and California are again displaying the innovative role they have played in many other trends. Environmental consciousness—displayed in consumer practices, political action and business activity—has traditionally been high.

State programs like the Recycling Market Development Zone and the California Environmental Technology Partnership aim to leverage public resources to grow environmental business, and perhaps to claim leadership in the emerging environmental industry (a claim that many other cities and states are attempting to make).

The City of San Jose has designated an Economic Development Department staff person to focus on the development and attraction of recycling-related businesses. The effort appears to be energetic—identifying emerging technologies, approaching firms to develop interest in siting in San Jose, providing "full-service locational assistance"—and is backed by \$800,000 in general fund monies for incentives; they are currently working with 20-30 different companies at different stages in the process," according to specialist Rich Rosenberg. San Jose's "recycling" focus, however, is considerably narrower than that being considered here.

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San Francisco's waste management program coordinates a consulting service of retired engineers to assist small business with waste management problems. Similarly, Berkeley's toxics program attempts to harmonize environmental quality goals and business development goals with a "coaching" rather than policing approach to toxics management, and innovative use of computer software for toxics management.

The Silicon Valley Environmental Partnership (a Joint Venture: Silicon Valley initiative), which has declared a mission to "grow jobs and trees," proposes to involve industry, government, environmental groups and research institutions in four activities: collaborative problem solving; environmental technology brokering; new business support through an Environmental Technology Center; and communications and education.

Los Angeles was recently awarded a \$125,000 Green Cities Grant from the US EPA to "foster the creation of permanent environmentally related jobs and businesses in the community... [and] for a wide variety of projects to meet the goals of linking environmental protection and economic development."

A vibrant environmental business sector has emerged in the Bay Area. The impending military base closures have focused new attention on how to best channel the region's resources, with particular attention to conversion of military and aerospace resources, the role of the Federal labs and the possibilities of an Alameda County scale "Green Valley" strategy to echo the prosperity of the "Silicon Valley" across the Bay.

This is what has emerged spontaneously. Now is the time for focused support—new resources are available, there is a new level of market maturity, and there is new competition from other jurisdictions. And there is a unique role for the city and business community of Berkeley.

BERKELEY'S EMERGING ENVIRONMENTAL ECONOMY

Distinctive Berkeley Resources

Many distinctive resources position Berkeley to continue a tradition of innovation with a strategic focus on the emerging environmental economy.

Berkeley's history and culture emphasize an activist citizenry, committed to quality of life, environmental quality, social justice—and social innovation. Berkeley's citizenry is environmentally sophisticated, has supported innovative businesses and public programs, and has long been willing to "vote" at the checkout register as well as at the voting booth.

The city has set and maintained high standards for environmental quality (despite persistent problems), and has been a national innovator in recycling and toxics management, to name just a few. With the Miles-Cutter development agreement, Berkeley has set an example for a development process that is committed to public participation, rigorous environmental standards, as well as jobs and business practicality. The Berkeley-Oakland Recycling Market Development Zone (RMDZ) may set another such example.

The University of California, a major intellectual and cultural resource, has also been a significant source of creativity and initiative in local business development, though the relationship has clearly not developed its full potential.

Berkeley NGOs, ranging from Urban Ecology to Local Solutions to Global Pollution, have been innovators in national and international environmental education and policy development.

Berkeley's innovative city policies and its cultural image, though often misunderstood, continue to have influence far beyond the city's borders.

Business Spectrum

Berkeley's national—and local—reputation tends to revolve around its academic and cultural identity, rather than its economic identity. But Berkeley has exercised economic leadership as well, with a national role in some sectors, and in international markets in others.

"Berkeley company products are nationally recognized for excellent quality and innovation. Berkeley is recognized nationally, for example, for its food industry, for high technology products and also for the backpacking industry which for the most part began here. Berkeley companies include the sole producer of metal lawn sprinklers and plastic parts for [mammography equipment] in the US. A Berkeley firm produces the only electronic pipette in the world. Our city is home to the largest stocking steel plate distribution warehouse in the western US, and also to the world's largest publisher of hiking guide books.

"Survey companies serve customers throughout the US and the world. Nearly half primarily distribute nationally, 23% sell to overseas customers and 20% sell primarily statewide.... Sixty-three percent of survey companies sell products to the government."

(Business Retention and Expansion Program Summary Report, May 1990)

On the other hand, Berkeley has repeatedly faced the challenge of the exodus of some of its most successful hatchlings as they have outgrown physical resources.

Environmental Business in Berkeley

Berkeley has long been a national leader in environmental business development. This has been assisted with some encouragement from city government, but is largely a result of indigenous factors, including both the intellectual resources and environmental motivation of its citizens.

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Berkeley has been home to pioneering efforts in many sectors of the environmental business universe. Examples include:

Energy efficient and solar architecture and software	Berkeley Solar Group, Community Energy Service Corporation, Lawrence Berkeley Laboratory, Energy Auditor & Retrofitter
Outdoor recreation	North Face, Backroads
Green retail	Whole Earth Access, Nature Company
Recycling and Salvage	Ecology Center, Urban Ore
Instruments	Andros, Ion Systems
Consulting	Restoring the Earth, Safe Environments
NGOs	Urban Ecology, Local Solutions to Global Pollution, International Rivers Network
Organic food and agriculture	American Soil Products, Kona Kai Farms, Chez Panisse, Whole Foods
Publishing	Wilderness Press, Earthworks Press
Transport alternatives	Berkeley TRIP

Berkeley's Community Development Department (CDD) has assembled a preliminary database identifying some 114 existing "environmental businesses" in Berkeley, including enterprises involved in manufacturing, retail, consulting, research, etc. These businesses represent about 2,000 jobs (or about 3-5% of Berkeley's total job base of some 40,000 private sector jobs 60,000 total); but they do not represent a complete scan of the Berkeley environmental business universe, and as such may provide too narrow a sketch of strategic possibilities.

The broader definitions we propose would both add categories to the database, and surface additional listings within existing categories. In addition, the rapid evolution of this field calls for frequent updating of this database through other sources (such as business license data, media scans, etc.).

Environmental Efficiency

In addition to business specifically characterized as environmental business, it is essential to consider the environment efficiency, impact and opportunity of all businesses in the city.

All businesses are affected by environmental costs: utility expenditures, waste management fees, regulatory compliance, etc—which can be reduced (in some cases significantly reduced) by environmental quality strategies. The city recognized this opportunity in establishing the Community Energy Services Corporation.

All businesses generate some degree of environmental impact—in wastes and emissions, in environmental impact of inputs they use, and in the use of the products they generate. These impacts affect quality of life in Berkeley and beyond. According to a two year international research project of the International Council for Local Environmental Initiatives, municipalities have a major role to play in determining energy use patterns and the future of the world's climate.

Improving the environmental efficiency of Berkeley businesses offers multiple benefits.

- Increased environmental efficiency can increase viability of Berkeley's existing businesses by reducing wasteful utility expenses; money saved is freed for wages, purchases, investment, some of which may have local multiplier impact.
- Reductions in, for example, energy use, reduce the environmental burdens associated with energy use.
- In serving these efficiency needs Berkeley can develop business capability that can be "exported" to other jurisdictions.

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To date, though, only a small fraction of the opportunity has been realized, since the "penetration" achieved by CESC and by PG&E commercial rebate programs has just scratched the surface. The potential is significant, since each 10% improvement in energy efficiency in Berkeley's commercial and industrial companies could save the Berkeley economy an estimated \$6.8 million a year.

This perspective significantly expands the scope of the environmental economy in Berkeley, and suggests a broader focus for CDD strategy.

Building/Land Resources and Availability

Environmental businesses generally face the same space constraints as do other Berkeley businesses. Space needs for many environmental business are no different than those of the general business community, including offices, labs and light manufacturing. For some categories of activity, however—like recycling—space constraints may be particularly severe. Environmental incubators and business clusters (see below) may also require a scale and flexibility of site that could be more challenging.

Space constraints have been a traditional barrier to Berkeley economic development strategies. As a fairly built-up city, with little undeveloped land, Berkeley has found it difficult to accommodate growth needs of successful Berkeley-based companies. Political constraints, such as neighborhood concerns about growth, have exacerbated the problem.

As a result, despite Berkeley's strength as an incubator city, it has been less successful at harvesting the long-term output of that incubation. Such successful companies as Sybase and 800-Software, which were born in Berkeley, have moved on.

Several alternative responses are possible:

- over-ride traditional concerns in favor of a growth-at-any-cost land-use and zoning policy—neither feasible nor desirable;
- improve efforts to both retain existing businesses and attract new businesses to replace the departures;
- accept that some companies will outgrow Berkeley's space constraints, and emphasize vitality of Berkeley as an incubator and smaller business city. (See "City as Incubator", page 22.)

STRATEGIC OPPORTUNITIES

The Environmental Business Universe

Analysts have developed a host of "taxonomies" for tracking the emerging of the environmental business universe.

Traditionally the definitions have been rather narrow, initially focusing on regulatory-related activity like pollution control and waste management. This has been reflected in the scope of some of the early "environmental investment" funds, many of which focused on resource recovery and hazardous waste management companies; it has been broadening recently in response to work of more inspired investment groups like Oakland's Progressive Asset Management and the Global Environmental Fund. These broader definitions go beyond clean-up to include a range of more quality and efficiency focused activities.

It is difficult to come up with precise scale of such a rapidly evolving industry, especially one with shifting definitions of what it is. Environmental Business Journal (EBJ), which provides some of the most comprehensive and ongoing tracking of the environmental industry, estimates a total US volume of \$120 billion in 1991. Even EBJ however may be undervaluing the significance of some sectors in the narrowness of its definitions. For example, while the EBJ analysis pegs "environmental energy sources" at \$2.2 billion in 1992, the utility industry's 1992 Demand Side Management (DSM) expenditures alone are estimated at \$2-3 billion.

A Taxonomy of the Environmental Industry

In order to provide a more comprehensive taxonomy that accounts for such under-represented sectors and the economic potential they could represent, we have both added some categories, and increased the resolution within several others.

We offer three views of this taxonomy: an overview, followed by the key sectors where we anticipate the greatest growth, and finally by a selection of business and technology focuses that provide special opportunity for Berkeley (see summary table, Appendix A). Note that, as with most taxonomies, there is some subjectivity in drawing the boundaries, and consequently some overlap between the sectors.

Overview

- **Environmental/renewable energy sources**

This includes both generation of energy from renewable sources such as solar, wind and biomass, as well as a broad range of energy conservation and efficiency products and services (which Amory Lovins cleverly calls "negawatts"—the avoidance of the need for megawatts).

- **Biology, ecosystems, agriculture**

The technologies to improve agricultural efficiency and environmental quality—biotechnology, precision application and management techniques, "low input agriculture" (including organic agriculture)— depend on basic and applied biological sciences. Other elements in this sector include: biological/microbial manufacturing, bioremediation, water/estuary/bay cleanup/ research, ecosystem restoration.

- **Water**

In addition to the classic role of water supply, there is substantial activity in water quality and purification, and growing activity (paralleling energy Demand Side Management practices) in water conservation and efficiency.

- **Environmental consulting**

This category covers a broad range of services, the largest component of which is related to hazardous waste management, including hydrogeology, regulatory compliance, etc. While "integrative" approaches, including strategic environmental management, industrial ecology,

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and pollution prevention, currently account for only 5% of this sector, they are rapidly rising in significance, with an estimated 14-16% annual growth rate (EBJ 8/93).

- **Equipment manufacturing**
This includes manufacture of: instruments, monitoring and analytic equipment; equipment for pollution control, prevention and cleanup; equipment for waste management, recycling, energy, process control and process efficiency improvement; information systems and software.
- **The built environment**
Architecture, design & deployment of energy efficient structures; environmentally sensitive urban planning and design.
- **Transportation and infrastructure**
Energy conserving transportation systems, infrastructure and vehicles.
- **End user products & services**
A catch-all category for the broad array of "green" consumer (as opposed to business-to-business) products, ranging from cleaning products and outdoor equipment to recycling bins.
- **Waste management & control**
Pollution control; solid waste management (collection and disposal); hazardous waste collection, treatment and disposal; asbestos abatement.
- **Resource recovery**
Recycling in all its variations, from collection to waste exchanges and manufacturing with recycled materials.
- **Remediation/restoration**
Hazardous waste cleanup to environmental restoration, including bioremediation and ecosystem restoration.

We recommend that CDD re-scan the Berkeley environmental business universe, in view of this expanded taxonomy, to develop a more comprehensive database, and survey those businesses and identify their perceived priorities and needs. In collaboration with the Berkeley Chamber of Commerce, host a series of informal events at which Berkeley's environmental economy can begin to recognize itself.

Key Sectors

Based on published projections by industry watchers, our ongoing analyses and conversations with seasoned watchers of environmental business trends, we expect the most significant growth in coming years in these sectors, and for these reasons:

Energy

renewable energy, energy efficiency, energy storage

Energy infrastructure and use provides a "driving force" that organizes an economy and determines its overall efficiency. Energy efficiency can translate directly into reduced costs, increased profits and greater price competitiveness, and can provide unmatched return on investment. (EBJ projects 14% per annum growth—even without complete spectrum of activity noted above.)

Air quality

both pollution control equipment and process efficiency improvements

The Clean Air Act is a powerful and legally compelling driver of activity in this sector. (EBJ projected growth, 10% per annum.)

Consulting

especially "integrative" consulting focusing on process, efficiency and quality improvement in context of strategic environment management

HazMat cleanup plus the complexity of regulatory requirements has fueled this sector and will keep it healthy. The combination of the emerging business/environment trend, corporate downsizings, competitive and marketplace pressures for greater resource efficiency and the steady emergence of pollution prevention (P2) and total quality environmental management (TQEM) will particularly expand demand for integrative / strategic environmental management. (EBJ projected growth, 7-8% per annum.)

Resource recovery

recycling, manufacturing with recycled materials, "reverse manufacturing" (disassembly of products down to recyclable components), resource mining ("high-grading"), etc

Regulatory and consumer pressure will be increasingly supplemented by marketplace, efficiency and internal concerns. Legal mandates for waste reduction (such as packaging "take-back laws" now in effect in Germany and under consideration in the US) will demand creative marketplace and technical solutions. (EBJ projected growth, 7-8% per annum.)

Instruments & control equipment

both pollution control and manufacturing efficiency equipment

Regulatory requirements will provide basic driving force. Growth in both pollution prevention and sophisticated process efficiency improvements will keep this sector robust for some time to come. (EBJ projected growth, 7-8% per annum.)

Water efficiency

both water efficiency/conservation and water quality/reclamation technologies

This regionally significant segment is especially relevant for California and the West, where chronic water supply pressures will reappear, despite the current "end of the drought"; there could be significant export potential to Middle East and desert/coastal regions worldwide.

Target Business and Technology Opportunities for Berkeley

Within these domains, we are flagging several specific business and technology areas for special attention, because of the significant opportunity they can present for Berkeley.

These selections are based on both the sectoral growth trends identified above, and the particular economic strengths represented by the business mix and intellectual resources of this city. This is not intended to be an exclusive list, but suggestions for high-opportunity strategic focus by CDD that could effectively leverage local resources and strengths. They include:

Bioremediation

Remediation will be a steadily growing field of environmental business employing semi-skilled as well as skilled workforce, because of backlog of polluted sites that must be cleaned up. Ground cleanup will broaden to ground and water, with water growing in significance. Technical innovation, including microbial reactors, ecological engineering (especially for water treatment) and biotechnology will drive a significant shift from brute force techniques like bulldozing and landfilling, and reduce transporting of hazardous materials.

Berkeley advantage: business community and UCB strengths in engineering and biotechnology; long history of grass roots activity in biology-based business (e.g. Bio-Integral Resource Center); major local markets in base closures and San Francisco Bay cleanup.

Pollution prevention

Pollution prevention is a broadly significant category, gaining the focus of the US EPA and other Federal agencies in a shift from the "command and control" approach of previous decades. It is an organizing theme running through many programs—with funding possibilities for Berkeley businesses—and an opportunity for both technical innovation and consulting in process re-engineering.

Berkeley advantage: strong engineering resources in private sector and UCB; cultural and physical resources ideal for consulting businesses, and strong existing consulting community, both in Berkeley and Bay Area; substantial tradition of "whole systems" thinking.

Analytic & pollution control equipment

Rising environmental quality standards in the US and worldwide will require a wide range of both analytical equipment to monitor pollution as well as pollution control equipment.

Berkeley advantage: existing successes in these fields, and the technical resources for more; strong engineering resources in private sector and UCB.

Consulting services

Continued demand for hazardous materials related consulting (e.g., siting, compliance, remediation), trend of corporate downsizing and "outsourcing" pushing work out to consultants, and the growing demand for integrative environmental consulting fit well with Berkeley's skill base and intellectual and cultural reputation.

Berkeley advantage: cultural and physical resources ideal for consulting businesses; space needs relatively simple; strong existing consulting community, both in Berkeley and Bay Area; strong engineering resources in private sector and UCB; Berkeley's skill base and intellectual and cultural reputation.

Manufacturing monitoring, modeling and control

The demand for radically more efficient production processes—in terms of both resource productivity and net environmental burden—will fuel a demand for electronic equipment and software—both strong suits in Berkeley—and expertise in process re-engineering.

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Berkeley advantage: strong engineering resources in private sector and UCB, including for example the Consortium on Green Design and Manufacturing; existing strengths in electronics, computer peripherals, control equipment and software.

Energy storage

Long a constraining issue in renewable energy development, energy storage technologies—including batteries, fuel cells, flywheels, etc.—take on even greater significance with the impending appearance of electric vehicles.

Berkeley advantage: history of leadership in the energy field; existing and historic companies; LBL.

Transportation-related products and services

While Berkeley is not likely to be a manufacturer of complete vehicles, the emerging electric vehicle industry, and the continuing revitalization of America's railroads will create substantial demand for controllers & other components. If CalStart succeeds in birthing an electric vehicle industry in California, Berkeley companies should see a piece of the subcontracting action. (Perhaps more: a new report from the Rocky Mountain Institute hints at a "desktop publishing"-like breakthrough in economy of scale for electric vehicle manufacture.)

Berkeley advantage: existing strengths in electronics, computer peripherals, control equipment and software; strong engineering resources in private sector and UCB; long-standing community focus on transportation alternatives.

Environmental restoration

This is a trickier call than some of the others, since it's an area where Berkeley resources meet a real world need with still uncertain effective market demand. While some environmental restoration work will be built into the economics of hazardous materials remediation work—especially, locally, in connection with base closures—the opportunity we see here for building restoration know-how focused on bays, streams and coastal regions will have an uphill challenge of matching financing to need. (Note that this is a target that could increase the local political appeal of the environmental economy program.)

Berkeley advantage: strong landscaping and gardening tradition, substantial grass-roots environmental restoration activity (Restoring the Earth, Urban Ecology, etc.), UCB biological/ecological sciences resources.

End user products & services

This category includes educational and informational media, consumer products/services, home energy and water efficiency products/services, as well as outdoor equipment and eco-tourism—and the retail channels that distribute them. Growing consumer demand nationally, and traditionally strong demand locally, suggest significant opportunities here. On the other hand, the continuing adoption of green products by traditional consumer channels suggest a challenging future for speciality green retail.

Berkeley advantage: exceptionally strong local demand, an already robust local green retail trade, a history of innovation in green products and services as well as policy—and the Berkeley name.

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Targeting criteria

Specific opportunities for Berkeley businesses exist in all these key realms; but perhaps the real challenge for CDD is not so much to attempt to "pick winners" as it is to provide fertile ground for the emergence of winners.

CDD should use a set of multiple filters to assist in ongoing and more specific targeting of its resources and outreach efforts. These criteria—which must be weighted by the city to reflect its values and priorities—could include:

Fits "environmental business" targets	Fills empty niche in local economy
Uses distinctive Berkeley resources	Builds on indigenous business activity
Fills present or emerging market need	Support from existing research institutions
Employs blue collar labor	Offers upward mobility to employees
Synergy with existing businesses	Appropriate space needs
Zero or low pollution	Efficient use of natural resources
Fast growing (hi 3-5 year growth)	Builds lasting value for Berkeley

This targeting can also provide the basis for attraction strategies. Similar tracking of local firms can provide key targets for City retention efforts as well.

Robert Ross of Clarke University and the New England Center for Jobs and the Environment, suggests a strategy based on:

- tracking these targets, using online databases, SEC reports, other public documents, trade journal sources, etc;
- find young, fast growing firms in these sectors that may be about to outgrow or branch (e.g., with very high 3-5 year rates of sales growth);
- visit them to sell them on the merits of relocation to Berkeley;

Ross observes that "you only need one hit or so per year" to support a professional person to do that traveling. (If Berkeley is unwilling or unable to invest in such a position, it could alternately be developed as a cooperative function at Berkeley/Oakland or Alameda County level.)

Keep in mind that some of the criteria may not be precisely definable. "How do you find—or pick—the 'gazelles'?" asks Stephanie Neumann of Littleton CO Economic Development—referring to that small percentage of companies that will generate most of the job growth. "You don't get your phone call returned. You can feel the intensity. You look for growth rates, for national marketing and high technology. You sense it in the people, and in the personality of the owners. It's ultimately intuitive."

BUILDING AN ENVIRONMENTAL ECONOMY

An environmental business development strategy for Berkeley can build economic strength while restoring the national leadership role this city has often played since the early 60s. Based on the national and international trends noted above, an institutionalized environmental business development strategy, with strong University involvement, will itself be a prime attractor.

Berkeley's business attraction strategy will make the most sense as part of a coherent strategy that integrates attraction, retention and business development strategies, with all of them founded on Berkeley's distinctive strengths and resources—including its business mix, intellectual capital (both private and University), social vision and quality of life, its suitability as a base for operating in the California market and the Pacific rim, and its national image as an environmental leader.

Fundamental to all is what the Center for the New West describes as a "gardening" strategy for economic development—cultivating indigenous resources, both as a fundamental economic development strategy and as the strongest possible attractor.

A municipal environmental business strategy

Berkeley's economic and cultural resources, seen in light of the trends described above, suggest a broad strategy for environmental business development here. The essence of this strategy:

- Target key environmental business sectors for CDD support, based on systemic criteria reflecting
 - Berkeley's unique strengths and constraints,
 - emerging market needs, and
 - long-term sustainable development needs of Berkeley in its larger region.
- Create strong public/private partnerships to rapidly mobilize economic, intellectual, and technical resources.
- Build a new generative relationship with the University of California and its associated Federal Labs to insure local businesses access to emerging technologies and skilled employees/entrepreneurs.
- Leverage public resources through full engagement of private sector resources.
- Balance growing new businesses locally with attracting them from elsewhere; target both global and local markets; and seek job development for blue collar as well as more highly skilled workers.

Creation of this green economic development strategy merges naturally into the larger Berkeley city plan aiming for sustainable development. Some targets for business creation—e.g., ecorestoration and recycling—will directly benefit from and serve objectives of the General Plan.

The specific elements of this strategy include:

Positioning

Collaboration & Alliances

Business and Market Development

Information services

Outreach

Positioning

Target cutting-edge sectors of the environmental industry

Target cutting-edge sectors of the environmental industry for development/attraction.

Given the rapid change in these fields targeting relatively new and emerging business opportunities appears to be a wise course. While CDD must be available to serve the full range of Berkeley's economy, active outreach should be focused on areas of greatest potential opportunity.

These will include some innovations in established areas, i.e. biological engineering approaches in remediation. Assuming the University of California can be well integrated into the overall initiative, it could offer abundant resources for staking territory in rapid growth areas.

Target CDD's traditional facilitative role for outreach to environmental business (while of course preserving responsiveness to businesses of all types), and enhance its role as an information resource for businesses in the city. Pursue funding opportunities, weave together flexible networks, and collaborative bidding networks.

In the broader green business arena, Berkeley's long-time role as cultural leader gives it special strength in recognizing and capitalizing on the shifts in lifestyle demanded by sustainability. The transformation from an economy dependent upon increasing quantity of material consumption to one based on enhancing quality of life will redefine the terms of business. Many Berkeley citizens have been pioneering this transformation and offer an intellectual and economic context for ventures on this part of the cutting-edge. Examples of ventures in this niche range from landscaping companies specializing in dry garden, native plantings to ecotourist agencies.

Position Berkeley as a business incubator and environmental innovator

Could Berkeley be the Silicon Valley of the environmental industry?

Identify Berkeley as a natural business incubator for the entire East Bay, taking advantage of its intellectual capital and relative lack of available space for development. Use this identity as a major attractor for new or established businesses to locate here.

A vibrant environmental industry, coupled with the resources of UCB and access to Pacific Rim and California markets, make Berkeley a natural spawning ground for new businesses. These benefits are strong attractors in themselves, offset the higher costs-of-living and doing business in the Bay Area, and support a green retention/development strategy that must provide the core of any attraction strategy.

Collaboration & Alliances

Green Business Task Force

Create an effective partnership between the city, the university/college systems, community interests, labor and existing business

Well-conceived public/private partnerships can be an effective tool for leveraging limited public funds through involvement of business and other institutions. Organizational and technical innovations in the university and Federal labs must be brought to market quickly. Education and training must match the emerging needs of business, not just the past needs. And all of this activity must build a coherent initiative.

Public/private partnership is a given in environmental business development plans around the country.

- The State of Massachusetts has created a Green Business Working Group.
- The Oregon Economic Development Department has identified Environmental Services as a Key Industry and supports the work of the Oregon Environmental Technology Association and the Oregon Association of Environmental Professionals.

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- Chattanooga TN's sustainable city program has been substantially funded with private rather than municipal dollars.

Such public/private alliances can be mobilized to support development of green business in Berkeley—and the environmental business opportunity may provide a magnet to bring together participants that have been hard to attract in the past. With CDD coordinating a network of resources, new entrepreneurs could

- benefit from the working experience of seasoned business people;
- gain valuable support from UCB and Peralta District students;
- uncover new business opportunities and technologies;
- open easier access to venture financing; and
- negotiate city and county licensing and permitting more easily.

A first step in forming such an alliance would be creating a Green Business Task Force to design an ongoing alliance for evolving and realizing the strategy outlined in this report. This design would leverage City resources by optimizing participation of other interests, all of whom would benefit from participation.

The task force would reflect a government, business, labor, community and university collaboration. Its mission: recruit the players necessary to build vision, work plan and implementation of a green business development strategy. Berkeley CDD is an ideal convenor of the task force, and should insist on entrepreneurial leadership to make the task force an action organization rather than just another committee. CDD would also serve as hub to the larger set of networks needed for implementation. (Suggested participants listed in Appendix B.)

Regional alliances

Develop collaborative strategies with the county and other municipalities to help create Alameda county as a Green Valley—with Berkeley as "sparkplug".

Many economic development issues—and business attraction factors—don't fall neatly within an individual city's physical boundaries or political scope of action. Attraction to Berkeley specifically may be less feasible than to Alameda County or the Bay Area as a whole. Therefore it is essential to build effective collaboration with other local jurisdictions for mutually reinforcing strategies and programs.

Berkeley can play a central role in the gestating discussions of an Alameda County "Green Valley" to parallel the *Silicon* Valley across the Bay.

Specifically, Berkeley should:

- acknowledge and pursue its "natural" role as an intellectual "spark plug" for Oakland, Emeryville and Alameda county;
- build other Berkeley/Oakland collaborations on the model of the RMDZ;
- take an active leadership role in the EDAB as it addresses the base closures and related issues;
- develop multi-city and county-level business attraction/development programs that complement Berkeley's distinctive strengths;
- open dialog between the Alameda County alliances and the emerging Silicon Valley "green business" alliances.

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Build partnership with the University of California

Creating an effective collaboration with the University of California is a central element in Berkeley environmental business development. Both formal and informal channels should be used, in order for this to move forward in a timely way.

The University offers powerful resources for Berkeley's program of green business development. These include organizations such as the Engineering School (and its new Green Manufacturing Consortium), Haas School of Business, School of Environmental Design, the University and the Lawrence Berkeley Lab Offices of Technology Licensing (see pg. 26), Energy and Resources Group, and University Extension, as well as informal channels noted below. (See Appendix B for program descriptions and contacts.)

The current financial turmoil at the University actually increases the motivation to partner in economic development. We have interviewed a number of people in the Schools of Engineering, Business and Environmental Design and in the Energy & Resources Group who are eager to work with Berkeley CDD to support green business development. Of particular note are the Engineering School's Consortium on Green Design and Manufacturing, and the Business School's Lester Center for Entrepreneurship and Minority Outreach Program. (See Appendix B for summaries of these resources, listings of relevant programs, and other contacts interviewees have suggested.)

Formal channels

Formal channels for cooperation include the technology transfer offices (both UCB and Systemwide), public/private collaborative research programs (such as the Consortium on Green Design and Manufacturing), University Extension, and internship programs in the Schools of Business and Engineering, among others. One or more members of the Task Force should be recruited from these programs. In addition, a concerted effort—from the Chancellor's Office on down—should inform the UC community of Berkeley's Environmental Economy focus, and encourage UC to "think Berkeley".

For example, Scott Taper (in the Berkeley campus Office of Technology Licensing) indicated that his office could work with CDD and the Task Force to identify environmental technology research projects ready for transfer to commercial development from UC Berkeley, and other UC campuses and Labs. The office could also support CDD in applying for government funds for technology transfer and continuing research on the commercialization of the technologies. Taper cited a number of current prospects in waste management, remediation, energy efficiency, and pollution prevention.

The City of Berkeley should also explore opening formal negotiations around the UC plan to make the Richmond Field Station an "Environmental Business Park and Knowledge Transfer Station". This project is working on site-preparation, permitting, and wooing light industry and environmentally conscious companies.

Informal channels

A dozen or more calls in process of researching this report indicate it is also possible to build a more informal network of key administrators, faculty and student organizations willing to support this initiative. Both faculty and students are dismayed at the number of graduates unable to get job interviews, much less jobs. There is strong motivation to become involved in local businesses in order to open opportunities for future jobs.

Students can be recruited as resources to support new businesses being incubated in Berkeley or to themselves become student entrepreneurs. MBA students, for instance, can help entrepreneurs get off the ground by doing market research and writing business plans. Advanced engineering students are often in touch with technical innovations nearing ripeness for commercial development; they can provide early alerts of technical innovations, nearing ripeness for commercial development, which could benefit from CDD assist in siting emerging businesses in Berkeley, and can also be a useful source of information to local businesses. An intern managing information flows and searches for particular resources would facilitate the city/campus relationship significantly.

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Students and recent graduates are also potential entrepreneurs. What they lack in business experience may be balanced by the currency of their knowledge, their campus networks, and support from incubators, value adding networks, and other business support networks. One example: an MBA graduate, now in the doctoral program of the Energy and Resources Group, started a small company—Commercial Lighting Solutions—which retrofits commercial businesses, homes and apartments with energy efficient lighting.

Faculty members seeking to take a technological innovation to market are the more significant group of potential campus entrepreneurs. They often need the sort of management, financial and administrative support a Berkeley incubator would offer to their startup businesses. (Note that there may in some cases be code of ethics constraints in faculty member's relationship to outside companies, according to Scott Taper of UC Berkeley's Office of Technology Licensing.)

Faculty/student teams can also offer strong support to commercial R & D processes at existing Berkeley companies. A classic pattern in microchip design, for instance, is for an engineering class to do multiple designs, following the professor's technical lead, in order to develop working prototypes. The class work is closely coordinated with the work of a design team at the electronics firm seeking the new design. This model of technical development could be adapted to environmental technologies, e.g. uses of specific, high surplus recycled materials.

Incubators and entrepreneurial networks

Set up one or more incubators and entrepreneurial networks through public/private collaboration

An incubator for environmental business development in Berkeley would support fledgling businesses in their startup period in several areas:

- Support in venture financing, marketing, accounting, organization design and other business capabilities;
- Access to common secretarial, bookkeeping and information services and office equipment;
- Collaboration among businesses in a shared facility;
- Access to emerging technical opportunities.

Potential investors see participation in an effective incubator as a factor increasing ventures' success rate. The broader business development strategy outlined here would enhance the appeal still further.

Incubators range from profit-making entities allied with venture capital funds to public institutions with no financial interest in businesses incubated. A public/private model would probably be the most effective choice for Berkeley, given the community culture.

CDD's Role in Incubator Development

Jim Robbins, a developer of incubators for Joint Venture: Silicon Valley and the Peninsula Conservation Center, suggests that a city's economic development office play the coordinating role in recruiting other public and business sponsors. This role would be a natural component of the CDD's leadership in creating the Green Business Task Force. (He has contracted directly with the City of Mountain View in creating one of the JV:SV incubators. In another case, he is creating a green business incubator with Peninsula Conservation Center as the lead sponsor and 501(c)(3) non-profit. See Appendix A for more detail on the latter.)

Robbins stresses the importance of getting business, government, and community (especially environmental and labor) sponsors engaged together in the incubator planning. Too much pre-planning by the city alone makes it difficult for other sponsors to "own" it and may provoke resistance.

He also suggests that startup funding is best raised from private businesses. The incubator developer (an entrepreneur on contract to raise funds and organize the institution) works either on an initial fee-for-service contract with seed money from sponsors or with a more generous contingency contract where s/he raises all funds. (PG&E and Bank of America provided the majority of cash for the PCC incubator, with Hewlett-Packard providing the space.)

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In parallel, the City should pursue longer-term State and Federal economic development funding and defense conversion funds reportedly only available to cities. The City would also seek community reinvestment funds from local banks. By closely coordinating with the Alameda County base closure process, a Berkeley incubator could generate jobs for City residents while creating companies to move onto the bases as they outgrow space available in Berkeley.

The National Business Incubation Association and its California affiliate offer extensive informational and networking resources. (See trade associations in Appendix.)

City as Incubator

In a way, Berkeley itself has long served as an incubator, with many firms outgrowing space resources and moving to Emeryville, Alameda or elsewhere. This trend is reinforced by the relatively low availability of industrial space for expansion in Berkeley.

This reality need not necessarily be a problem. The regional focus discussed above suggests acknowledging that Berkeley will periodically experience a "natural" exodus of firms that outgrow local resources. CDD should respond to this flow by:

- providing business development, siting and other assistance to support retention wherever possible;
- using proposed regional collaborations, where relocation is unavoidable, to support relocation within the region, wherever possible, in the interests of keeping the greatest percentage of jobs in Berkeley;
- making guaranteed job slots for Berkeley residents a condition of receiving development support;
- considering other contractual financial linkage that provides continuing benefit to the City in the event firms leave the region. (For example, take an equity share of ventures in the environmental incubator, either in return for incubator benefits (not easily done at entry point), or only in return for assistance beyond the basic incubator services).

In addition, the proposed environmental incubator should be located in a site with enough space for both the incubator as well as a "mezzanine" for companies that graduate from the incubator and other existing businesses. This depends upon striking a deal with a developer or property owner experiencing trouble completing or filling a project, who can benefit from a higher occupancy.

Value Adding Networks (a/k/a Flexible Networks)

Environmental business networks offer vital support to the work of incubators. An advanced concept of business networks called Value Adding Partnerships or Flexible Networks should be considered for Berkeley. With this model, several businesses cluster (physically or "virtually") around a broker/coordinator company in order to leverage resources. This collaboration enables the cluster to compete more effectively with much larger companies in national and global markets. The network may also conduct joint R & D or act as purchasing agent for common goods and services.

Oregon's Office of Economic Development program has created a training program for Network "brokers" and offers grants supporting development of Flexible Networks. Several function in environmentally related fields. In Berkeley, UC Extension could be a likely provider of such a training, with the City's CDD facilitating actual development of the networks.

Regulatory streamlining

Redesign processes to improve certainty and timeliness

It is an often-heard perception that the permitting and regulatory process in Berkeley is burdensome. While it is not at all clear that the problem in Berkeley is worse than in other jurisdictions—these complaints are widespread throughout the state and across the country—it is clear that business people feel a real concern. And it is a perception that, echoed in the media, can impact attraction strategies through word of mouth. On the other hand, the existence of this perception provides a rich opportunity

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for Berkeley to gain strategic advantage through further streamlining of that process, building on the facilitative work of CDD.

Businesses need two things from governmental regulatory and permitting processes: certainty, and timeliness. While some have proposed weakening environmental regulation to "improve the business climate"—despite evidence that sound environmental regulation is actually economically neutral or beneficial—Berkeley would do better to improve on both these criteria while preserving values of environmental quality and public participation that Berkeley holds dear, and once again create a model for other jurisdictions to emulate.

In addition to existing initiatives now underway to streamline codes, enforcement, permitting and zoning, additional measures the City might consider include:

- a moratorium on selected impact fees for targeted areas/industries;
- exploring alternatives for minimizing project EIR requirements for projects consistent with certified area plan EIRs (at least for targeted sectors and areas);
- separate boards for commercial/industrial vs. residential permitting;
- publishing compliance standards—and City performance standards—wherever feasible;
- instituting a total quality management (TQM) process for City Hall, to improve quality and productivity and as well as citizen and employee satisfaction (and a spin-off workshop for local companies);
- approach future regulatory needs with a blank sheet of paper, and drive 'backwards' from intended result to regulatory design.

Business and Market Development

Integrate "gardening" and "hunting" strategies

Balance growing new businesses in Berkeley and hunting for businesses to relocate here

Retention and development of indigenous business—what the Center for the New West calls a "gardening" strategy of economic development—must underlie any attraction or "hunting" strategies. The same active participation in information and physical networks that will support business development and retention efforts will naturally provide connections, relationships and opportunities for business attraction.

The research for this report has uncovered significant questions concerning business attraction strategies. Massachusetts' and Oregon's green business development strategies focus more on developing local businesses and serving existing ones than trying to induce them to move there. Similarly, Littleton Colorado's imaginative economic development program has emphasized "gardening" over "hunting".

Berkeley's regulatory standards and high cost of living make it difficult to compete economically with lower cost, lower standard localities that are willing to offer land, deep tax breaks, and financing. Berkeley has neither experience with this strategic approach nor the budget—or inclination—for it. Moreover, there is a growing body of research challenging the effectiveness of attraction efforts. Just as many companies are moving to a quality-based strategy, Berkeley's strongest competitive advantage will have to be based on a quality-based strategy as well. Perhaps the competitive advantage for Berkeley will come from building on its national reputation as an environmentally committed and innovative community, by having a coherent green business development program, with a robust public/private partnership and excellent access to University resources. Being the brains of an emerging East Bay "Green Valley" will be a powerful attractor for businesses to locate here, to start their own new ventures here, or to partner with companies starting here. Foreign as well as US companies could be motivated to form Berkeley connections.

Integrate global market / local market strategies

Develop symbiosis between positioning Berkeley businesses for the global market and supporting businesses addressing local markets.

Sanford Lewis of Partnerships for Sustainable Community suggests targeting cutting-edge businesses as a means of "creating an advanced industry—one which finds sufficient demand in local, state or regional markets to jump start production ahead of the pace at which global market demands grow." In this way, serving local markets can serve as a testbed and "nest" for growing exportable global competitors.

Several potential business targets for Berkeley—for example, bond-financed remediation and restoration of creeks and waterfronts—could lend themselves to this approach. Ventures evolving the technologies, socio-political methods and financing strategies for local restoration could find early markets around the Bay. Their track record and capabilities would position them for entering overseas markets, especially in the Pacific Rim and Latin America. Berkeley itself would enjoy higher quality of life and a healthier environment.

The city can support this sort of positioning through:

- outreach to California and Federal export agencies;
- facilitation or development of value adding partnerships or flexible networks as marketing units;
- creation of an information clearinghouse/computer network with content on green business market opportunities (see below);
- coordination with training institutions.

Waste management and resource reuse/recycling firms handling large flows of materials are a good example of 'naturally local' businesses. Although the trend has been to absorption of local companies into a few major waste handlers, Berkeley has bucked this trend by designating the Ecology Center as the curbside pick up service.

The Oakland/Berkeley Recycling Market Development Zone is an example of moving out from local to wider markets. Since the goal is highest use of recycled materials, this is an area where University research could help both established and developing businesses stay on the cutting-edge. Another example of 'naturally local' business with wider implications is environmental efficiency services.

These and other examples can build capability and momentum serving local markets, and then use that position to offer their goods and services more widely, whether through export, branching, franchising or other means.

Financing strategies

Support development of innovative strategies for financing ventures

This business development initiative can pursue a robust mix of strategies for financing Berkeley's new green ventures from both public and private sources. The overall development strategy should strengthen the viability of Berkeley green ventures in the eyes of funding sources. Investors will be attracted by the combination of strong ties with the University, environmental incubators, strong support from CDD, links into a county-wide initiative, and the integrating Task Force.

Public financing can come from both general business development programs and an increasing number of programs specifically supporting green business. Programs such as the federal Small Business Innovation Research grants, or the California Environmental Technology Partnership reflect two examples of public support.

Private financing sources include both dedicated environmental capital and conventional financing. Seven years ago social investment was developing on the fringes of the financial community. Now major brokerages such as Merrill Lynch and Vanguard operate environmental mutual funds. Liberty Venture Group and Hambrecht & Quist's Environmental Technology Fund are two large

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environmental venture funds located in San Francisco. Other environmental and social venture funds are being developed. Progressive Assets Management in Oakland is one of the leading social investment firms in the country.

More traditional sources of private funding are likely to show increasing interest in green business development. Sound ventures will be able to draw on conventional bank loans and lines of credit and general venture funds.

Don Hitchens at Liberty Venture Group said that his company is looking for ventures with fully commercialized technology that have been in business for a year or more. He also stressed that Liberty will work with ventures in an earlier stage of development than most other environmental VC funds. This suggests that CDD and the Task Force will need to focus strongly on developing non-VC financing for the ventures in initial startup phase.

CDD's Role in Financing Environmental Ventures

A precise division of labor between CDD and private financial resources in financing ventures needs to come out of the process for forming the Task Force and incubator. Both the Task Force and the incubator *could* take a strong role in funding ventures. Firm definition of the City's role would be a mistake at this point. Generally, the City should develop longer-term Federal and State financing sources for ventures and for the incubator; and work more in a facilitative and promotional role with private financing sources in the short-term.

Develop finance data base. Maintain up-to-date information on State, Federal, foundation and investment fund financing resources in a data base available to the Task Force, local businesses and entrepreneurs. This information system should also include local resources to support entrepreneurs in such things as creating business plans and investment offerings, or to perform due diligence on a venture (services provided by investment firms such as Progressive Assets Management in Oakland).

(See listing of environmental funding sources compiled by CETP in Appendix C.)

Target support for collaborative proposals and packaging. Assist businesses in developing collaborative proposals and financing packages where appropriate. The Recycling Market Development Zone offers one tested model for this support.

In a more direct role, Berkeley can target existing financial resources—such as the revolving loan program, and the City's revenue bond capability—at green business development.

Target communications to the social and environmental investment community. From the beginning, Berkeley should publicize the green business initiative in the investment community and open conversations with key networks of influence (emphasizing City's strong support for creating successful ventures). Invite the Social Venture Network, to meet in Berkeley again (its semi-annual conference was at the Claremont in 1989). A representative of the City could appear at the Social Investment Forum taking place in November in New York. Progressive Assets Management (based in Oakland) provides services to many other investment firms and could assist in getting the word out.

Other options for financing ventures:

- Bank of America has expressed strong corporate commitments to both job creation and to environmental quality. Berkeley programs could invite B of A support in projects that meet both goals. With a bankable loan, any bank would be likely to lend, especially with the combination of University and City involvement.
- The MIT Forum provides a productive model of informal luncheon and dinner gatherings of inventors, entrepreneurs and investors for information exchange and networking. The model has gradually spread west from Cambridge; the Green Business Task Force would be an ideal convener of such gatherings in this region.
- Support development of employee ownership plans and seek financing for employee buy-outs. A number of local firms provide technical and financing assistance.

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- Insurance companies are also recognizing self-interest in environmental venture investment, because of the potential for improved environmental practices to reduce their exposure. For example, Am-Re in New Jersey is an environmental venture capital fund set up by American Reinsurance. Even more surprising, the insurance industry recently co-sponsored a conference with Greenpeace exploring this possible common interest.

Product Development and Technology Licensing

Build a "technology pipeline" from the University—and the home office—to the Berkeley economy.

There is substantial creativity in Berkeley. The challenge is finding and matching innovative ideas with business capability needed to generate successful businesses.

Formal channels for cooperation include the technology transfer offices of both UCB and LBL, and existing firms like Teknekron. Scott Taper of the UCB Office of Technology Licensing (OTL) indicated his office could work with CDD and the Green Task Force to identify environmental technology research projects ready for transfer to commercial development from Berkeley and other UC campuses and Labs. OTL could also support CDD in applying for government funds for transfer and continuing research on the commercialization of the technologies. Taper cited a number of current prospects in waste management, remediation, energy efficiency, and pollution prevention.

The section on UCB above suggests using informal as well as formal channels to connect emerging business opportunities on campus and at the Federal Labs in close connection with Berkeley's environmental business development initiatives. CDD will be able to move rapidly on these opportunities through the "early warning" system built by faculty and student networks; Berkeley companies will then be in a better position to compete with other potential licensees.

Consider also a clever approach used by St. Paul MN to identify local ingenuity. The city searched commercial databases (Pergamon's contains zip code data lacking in the Patent Office database) for unassigned patents issued to its residents. Berkeley could run such a search, filter the results against identified strategic targets, and open conversation with the inventors about commercialization, licensing and business development needs.

Siting

In addition to traditional siting assistance, actively explore opportunities for environmental incubator and environmental business clusters

Space availability is an ever-present concern in a largely built up city like Berkeley. Though downtown office space is currently in surplus, due to the recent departure of TRW, light industrial space and low cost office space remain a challenge, both for startup companies and for successful Berkeley companies that need to grow, and prefer to do so without leaving town.

CDD's database of available real estate resources identifies some 60 locations of vacant space, vacant land and candidates for redevelopment. It is difficult to develop specific recommendations for classes of tenants at each site, and certainly difficult to suggest development opportunities, especially for the vacant land, in the current economic climate. Rather than suggest specific uses for sites, it may be more useful to suggest areas suitable for different classes of activity.

Bioremediation	Gilman area
Pollution prevention	West Berkeley, Downtown
Analytic and pollution control equipment	West Berkeley, Gilman
Consulting services	West Berkeley, Downtown
Manufacturing monitoring, modeling and control	West Berkeley, Gilman
Energy storage	West Berkeley, Gilman
Transport components	West Berkeley, Gilman

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Environmental restoration

Gilman area

Green products and retail

Main or neighborhood shopping districts

Incubators and environmental clusters are most likely to be sited in West Berkeley or the Gilman area; a more mature environmental cluster may be viable Downtown.

South Berkeley sites should be considered for many of these uses, but may be constrained by lack of shipping access, and restricted by zoning to modest scale retail with the exception of the Ashby BART area. Also, these uses may need to follow rather than lead other economic development progress in that area.

Procurement

Incorporate environmental criteria and local linkage in City procurement strategies to encourage development of skills/knowledge base.

City decisions have direct environmental impact in many domains, including the quality and specifications of city purchases, and the performance of city programs.

In addition to obvious steps, like specifying recycled content for paper purchases (and joining major regional companies in the Buy Recycled Alliance), the city should aggressively pursue energy efficiency in all buildings and fleets. On a more ambitious scale, it could look at installation of renewable energy systems or building scale cogeneration systems in city facilities.

Berkeley can also convene or participate in collaborative purchasing programs that build viability of environmental market sectors:

- Architect Bill McDonough has designed a city/major manufacturer joint venture strategy to retrofit every window in a major city. The mix includes city industrial development bonds for initial financing; a mobile factory; job training program; manufacturing of energy efficient windows, and recycling of old windows into new glass and frames; cash rebates to residents, who then pay for the windows in utility or tax bill; millions of dollars annual savings on utility bills; and, as the mobile factory moves on to the next city, the first city in the program retains an equity interest in the business. McDonough is prepared to explore this strategy with the City of Berkeley if there is serious interest.
- A comparable model for a multi-city program to commercialize photovoltaic electricity through a contracted purchase program was proposed nearly 20 years ago by David Morris. The initiative is fortunately still workable and, sadly, still needed.

Extend the RMDZ Model

Capitalize on the RMDZ experience to develop other joint Berkeley/Oakland programs

Use the model of collaboration exemplified with the RMDZ to forge cooperative development programs in other key environmental business sectors. Jointly lobby for State or Federal support, and pursue foundation funding for other pilot programs that capitalize on the RMDZ experience.

Since recycling will be a growing activity for decades, CDD should also consider options for enhancing the activities of the RMDZ itself. For instance, a three-way linkage between the RMDZ, the environmental incubator and University researchers could search for higher level uses for specific recycled materials that are commercially viable. (One example of higher level: Odwalla, a regional juice company, generates five human-grade products out of waste orange peel.)

Information and Training Services

Stephanie Neumann, Economic Intelligence Specialist for Littleton CO, observes that:

"Most economic development professionals spend most of their time chasing "deals" from other cities. Research consistently shows that local growth accounts for 90-99% of the jobs in any given area. We are more interested in growing jobs (the gardening principle),

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than in shuffling them between various cities.... Innovation seems to be tied somehow to communication and knowledge density."

Littleton's strategy focuses on increasing that "knowledge density." It's an equally necessary element for building Berkeley's environmental economy.

Expand CDD role as information broker

Provide critical information support services for Berkeley businesses

Two of the most relevant tools for any business today are information and speed. While true for any business, timely and accurate information is essential in the rapidly developing environmental economy.

Keeping abreast of relevant information is a challenge for any business, and especially difficult for small businesses, which may not have the time, funds or technical expertise to effectively use available information resources. CDD can play a useful and high leverage role, by providing an "economic intelligence" cooperative service for small Berkeley businesses.

It may be useful to model the approach of the Littleton CO Business/Industry Affairs department, which subscribes to seven commercial database services (including Dialog, Newsnet, Datatimes and others) covering nearly a thousand databases and hundreds of thousands of publications. Their initial information efforts were focused on strategic issues (industry trends, social and technological changes, etc.), and changed as the "market demand" evolved. They now use these on behalf of the smaller businesses to identify marketing lists, track industry trends, do competitor intelligence and run financial backgrounds on potential partners and customers. "Several times we have helped companies avoid disastrous relationships," according to Stephanie Neumann, Economic Intelligence Specialist.

Recommended actions:

- designate a CDD staff person as information specialist (and forge cooperative agreements with the Berkeley Public Library and/or UCB library);
- subscribe to relevant online services—including Commerce Business Daily—and use these to stay abreast of trends, events and contract opportunities;
- actively inform local business community of relevant opportunities—and support collaborative pursuit of those opportunities;
- respond to and service small business requests for information and research;
- pilot this service by selective publicity to targeted environmental business sectors and development areas; extend more generally in future if viable and as resources allow.

Provide cooperative training and support services

Help local businesses improve overall effectiveness through focused training programs

Convene, provide or broker focused set of trainings and seminars to help local business build critical skills, ranging from management and marketing to navigating the emerging information superhighway.

Once again, Littleton's model may be a useful starting point.

"Littleton's seminar series focuses on an interlocking set of 'best ideas, best practices, best technologies' for the participating companies. We argue that running a business is like a mid-air refueling. It requires a great amount of detailed information about the customer (location, direction, speed, altitude, attitude) and the company must go to the customer not vice versa. That singular connection with the customer is what business is all about. Everything else is to support that connection. A company must also watch for storms (operating environment) and connect before competitors do."

Work with Berkeley Chamber of Commerce to survey and evaluate key training needs in target sectors, and with UC Extension and the Peralta College District in design and delivery of trainings. Emphasize peer-to-peer trainings, and sharing of best practices.

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Export services

Facilitate Berkeley firms' participation in the growing environmental export market

Use CDD's proposed "information broker" function to identify Berkeley firms with significant export potential or support needs, and to identify export support programs. Begin with the information being compiled by CTEP.

Ensure that local firms are aware of support programs, trade fairs and other events. (See Export Trade Shows, below.) Explore development of shared exhibit space, as appropriate.

Environmental efficiency

Environmental efficiency strategies offer multiple benefits:

- increasing the profitability of Berkeley's existing businesses by reducing unnecessary resource expenditures;
- increasing business funds that could be available for local wages and investment;
- developing business capability that can be 'exported' to other jurisdictions; and
- reducing the environmental impact of Berkeley's economic activity.

It can simultaneously serve as both a business retention strategy and a new business development opportunity.

Saturation Program of energy efficiency improvement

Develop a "saturation" environmental efficiency program for Berkeley businesses.

Start with energy efficiency, and go beyond that to include water and resource efficiency, pollution prevention, etc—with several interrelated goals:

- increase the environmental efficiency of city operations and local business
- in so doing, reduce operating costs and export of funds
- reduce environmental burdens generated by Berkeley activities
- provide a "captive" market for support growth of an environmental efficiency service sector
- provide a launching pad for that service sector to export its expertise to other regional and national markets

Some specific steps include:

- Develop a "map" of Berkeley's "metabolism", quantifying all primary resource flows into and out of the city, to identify opportunities and priorities, and to provide a baseline for assessing benefits and future progress (on the model of the Sustainable Cambridge Project).
- Encourage sustainable industry "audits" for businesses, with community participation; use these both to highlight potential cost savings and to uncover signs of running a plant into the ground before flight (Sanford Lewis).
- Determine (from PG&E and CESC) the extent of coverage to date of energy efficiency services. (Compare PG&E coverage, residential and business, with SoCal Edison's; use that data, if supportive, to jawbone PG&E for greater outreach.)
- Develop targeting of PG&E/CESC (and other energy service company) services consistent with area plans and environmental-business targeting.
- Complete saturation coverage of utility efficiency of all city facilities, (e.g., ensure that all city facilities are audited; implement audit recommendations for all facilities with less than 10 year payback) Examples: Toronto's \$4.5 million dollar retrofit of over 250 city-owned buildings, using innovative private sector financing, or St. Paul's program, coordinated by Mayor's office and the Planning and Economic Development Department.

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- Work with CESC, private local firms, neighborhood organizations, PG&E, etc to provide saturation coverage of efficiency services for local firms (and residences).
- Work with Berkeley-based service companies, PG&E, state agencies and financial institutions to develop financing packages, marketing strategies, and access to existing and new public/private programs.

Product and process efficiency improvement

Support process efficiency improvement in targeted (and key polluter) industries.

Identify and broker support for "sustainability audits" for Berkeley businesses, going beyond energy efficiency to include water conservation, pollution prevention, process re-engineering, etc.

Work with Chamber of Commerce to arrange delivery of "bulk rate" services at reduced rates to local businesses.

Work with local consultants, UCB Engineering, Cal EPA and PG&E to provide saturation coverage of efficiency services for local firms (and residences), and to assist local firms in Total Quality Management, Total Quality Environmental Management, Design for Environment, and Pollution Prevention programs.

Outreach

Berkeley Environmental Business Directory

Publish expanded CDD database as both local directory and marketing tool

Once the CDD database of green businesses is expanded, publish as community resources and CDD attraction tool. Make it something that local businesses want to be in, and that depicts a city that relocating businesses want to be in. (This could be published in collaboration with Green Pages, a Berkeley-based business that published a regional green business guide several years ago.)

Export Trade Shows

Develop active Berkeley presence at CETP and other environmental trade fairs

CDD should spearhead efforts for maximum Berkeley (and Alameda County) representation in this upcoming event sponsored by the California Environmental Technology Partnership, currently scheduled for May 1994 in San Diego. In fact, early initiative by Berkeley CDD to develop other linkages to CETP programs would be very advisable. (See Appendix C.)

Consider development of a regional trade fair (focused on domestic, Pacific, and Latin American markets).

A growing number of export-related programs are addressing the international environmental market. These include activities as diverse as an OPIC-sponsored environmental business mission to Argentina, Brazil and Chile in November, and the US Department of Commerce Export Trading Company Contact Facilitation Database. While it may not be cost-effective to develop a CDD presence at international events, it would be worthwhile to:

- consider development of a cooperative Berkeley presence through collaboration of CDD, the Chamber and local businesses;
- participate actively through CETP efforts;
- keep Berkeley companies informed of these opportunities through CDD's information broker role (see Export Services, above).

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Marketing and communications strategies

Environmental business? In Berkeley?

Develop effective communications strategies to ensure that Berkeley comes naturally to mind as a regional and national leader in development of the environmental economy.

Among other things, ensure that City of Berkeley is included in all relevant regional meetings, task forces, etc, whether convened by UCB or other jurisdictions. Case in point: UCB Engineering Department's "Green Manufacturing Consortium" sponsored a day-long event this Spring that included a panelist from the City/County of San Francisco, but that didn't even include notice to the Berkeley CDD. Fortunately, CDD staff learned of the event and attended, but future oversights should be prevented with an effective (and relationship building) communications program.

Media strategies

Advertising should be targeted at the general business press, trade press for targeted business sectors, and environmental press in general (see appendix), with a dual focus of awareness building and lead generation. Consider investing in a toll-free 800 number (like 1-800-GREEN-CITY) to "show you're serious." Keep the message consistent with the "positioning" described above:

- Berkeley as a leading center in the emerging environmental economy;
- "critical mass" of diverse environmental businesses already here;
- focused and committed CDD;
- next step in long history of business and environmental policy innovation;
- new climate for new kind of business (play off regulatory streamlining, Miles-Cutter deal).

Effective public relations may be a more cost-effective key to effective communication than advertising. A series of well-written articles on the environmental economy, exemplary companies and CDD initiatives could help dispel obsolete media images of Berkeley, as well as provide a magnet for attention. Stories can be suggested to a rich local community of creative and successful free-lance writers, and can be "broadcast" economically through a service like PR Newswire, and/or with the assistance of a professional publicist, as well as targeted to environmental and general business publications. In addition, key business/environment newsletters should be included in all distribution efforts; their reach is small, but leading edge. And stories should be cultivated with both environmental and business reporters in Bay Area and national media.

Consider developing a newsletter featuring players and developments in Berkeley's environmental economy. A typical issue could have an article about a program/policy initiative, profile one or more local environmental firms, describe various CDD services, offer a matching service highlighting "needs" and "offerings", and an ad for the Berkeley Environmental Business Directory. Distribute locally through the Green Task Force and the Chamber of Commerce, and nationally to trade associations and key media contacts.

Events

CDD should develop and maintain a database that includes a forward scan of relevant events, garnered from ongoing scan of online and print resources—as an example of "CDD as information broker" support to the local business community. (This is an area of exploding activity that is frankly difficult to keep up with. An initial list of events and sources is included in Appendix B.)

Develop a simple yet professional booth—equipped with information kit, Directory, and perhaps the Berkeley environmental business database—to "show the flag" at key events:

- industry specific trade shows, especially for targeted sectors identified above;
- regional "Eco-fairs" like Eco-Expo, Envirosiences Expo '93,
- investment community conferences like Environmental Investing Conference, etc.

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Based on budget constraints, select participation either by: booth; CDD staff walking the floor, packets in hand; ad in conference directory. (Obtain exhibitor lists wherever possible; scan against targeting criteria for possible direct mail or telephone follow-up.)

Associations

Develop modest multi-step mailing and phone strategy to key industry associations. (See Appendix B for partial list). An initial mailing could include a letter from the Mayor or the Director of Community Development, with a simple brochure. Where interest or targeting warrants, a next step could be more substantial mailing and/or calls from the CDD director or staff.

All mailings should include clear reply device. Provide articles and press releases (see "Media Strategies" above) that they can use in their publications. Some association publications may be suitable for more direct advertising as well.

Test Berkeley/CDD participation at select association conferences and events, and evaluate their lead generation effectiveness in comparison with other outreach methods.

Welcome mat

This may go without saying, but we will say it anyway:

Responsiveness may ultimately be a more important part of a business attraction strategy than financial incentives. Ensure that CDD delivers prompt and effective response, and that staff has tools to track their own effectiveness. Encourage the availability of the Mayor, Chamber of Commerce president, UCB officials and others—both to demonstrate symbolic commitment to business attraction, and to provide quick, high-level problem solving team.

POLICY IMPLICATIONS AND NEXT STEPS

Policy Implications

This program for an environmental economy should integrate well with existing City of Berkeley economic development goals and strategies.

First and foremost, a strategic focus on the environmental economy, and development of Berkeley's reputation as a leader should provide a powerful magnet for business retention and attraction, including for light manufacturing sectors of the environmental industry.

The environmental economy includes significant high-tech components, and emphasizes manufacturing and service sectors that should be both economically robust and suited to local resources and skills base. Entry level jobs are most likely in recycling, bioremediation and environmental restoration, while other highlighted sectors may require a higher skill base. In all cases, job access for new and low skill workers will be greatly supported by effective collaborative training programs.

The viability of Berkeley's environmental economy will depend, like many other business development issues, on reducing bureaucratic—as opposed to regulatory—constraints. But because of the environmental industry's intrinsic commitment to environmental quality, it should have strong interest in supporting a regulatory reform process that streamlines bureaucracy while keeping environmental standards high.

In addition, the quality innovations developed by the environment industry can in many cases help business in general meet and exceed regulatory standards while preserving or improving profitability.

Next steps

There are several key "starting points" that should be pursued soon to begin implementing this strategy. CDD should:

- convene, at the earliest opportunity, a series of meetings with key potential collaborators to review, critique, modify and endorse this strategy, and develop a plan of action;
- follow up on the connections that have been opened at UCB for possible collaboration in development of Berkeley's environmental economy, including the Consortium on Green Design and Manufacturing, the Office of Technology Licensing and entrepreneurial programs at the Haas School;
- immediately contact the California Environmental Technology Partnership, to develop links between state and local initiatives;
- put the environmental economy on the agenda at the Economic Development Advisory Board and the Base Closures process.

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CONCLUSION

Berkeley is uniquely positioned to benefit from what many analysts have called the greatest business opportunity of the next twenty years—the worldwide growth of the environmental industry.

This focus for economic development should enable the city to harvest that opportunity, support "clean" economic development, reduce the environmental impact of Berkeley's economic life, and enlist or at least lessen the impact of the traditional anti-development forces here. It is aligned with Berkeley's history of leadership and innovation. And the absolute economic and ecological need for this development is profound.

Key strategic needs of this program include:

- generating a very active public/private alliance to realize the vision;
- building a strong, mutually rewarding relationship with UCB and community colleges;
- developing innovative means of financing new ventures;
- assuring sufficient development of blue-collar jobs to meet the needs of Berkeley's citizens;
- maintaining momentum in a highly uncertain economy.

This report is a first step, intended to stimulate discussion and understanding of the opportunity of the environmental economy—and the means of realizing that opportunity.