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New England Green Technology Project

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**NEW ENGLAND
GREEN TECHNOLOGY PROJECT**

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1. Definition

Due to the diversity of technologies, services, and equipment that make up "green technology" it is extremely difficult to define the market. For purposes of this studio team green technology is defined as the processes used to develop and market products, equipment, or services that have environmental improvement as a primary or significant secondary benefit. There are two types of green technology, light green and dark green. Light green are those technologies designed to achieve waste minimization and pollution prevention objectives and dark green involve the use of traditional end-of-pipe technologies that control or eliminate waste after it is created.

Examples of some green technologies include but are not limited to air and water pollution abatement, sanitation, waste water treatment, cleaner metal extracting and processing procedures, landfills, water resource management, air emissions, drinking water treatment, cleaner burning fuels and processes, water recycling in arid countries, improved forest management, improved agricultural practices, and generally cleaner production technologies.

2. The Global Market

Due to the lack of a precise statistical definition information regarding the Green Technology market is varied. The only comprehensive study for the industry was done by the Organization for Economic Cooperation and Development (OECD) and published in 1992. The OECD estimated that there was a \$200 billion world market in 1990 which would increase to \$300 billion

by the year 2000. However, according to the Office of Technology Assessment in 1992 the global market for environmental technology was already a \$295 billion market.

It is predicted that the international market for green technology will expand in the future in both industrialized and newly industrializing nations due to more stringent laws being enacted as environmental awareness becomes a global concern. World demand for environmental technology, goods and services (ETGS) is projected to increase at the rate of 15% per year due to several factors including: the growing awareness of limited natural resources; the environmental decay of the former Soviet Union; an expanding population and economic activity which uses more resources and creates more pollution and waste; increasing public awareness of environmental issues and demands for environmental quality; heightened business concerns about environmental liability; corporate image and pressure from investors; and the linkage of trade and the environment, such as that occurring with the North American Free Trade Agreement (NAFTA).

The largest markets for green technologies are in the industrialized nations. For example, the U.S., Japan, and Germany have the most stringent environmental regulations and as a result have been the leading developers of green technologies. However, other industrialized nations are trying to catch up.

Newly industrialized countries such as South Korea, Taiwan, Singapore, and Hong Kong along with countries in Asia and Latin America, especially Brazil and Mexico, have recently made the environment a prominent feature of

government attention and national investment. The more prosperous nations have the resources to expend funds on the environment and are expected to continue to do so through the next decade increasing the demand for green technology. Less prosperous nations such as China, Indonesia, and India are potential markets for green technology. However their ability to spend money on green technology is limited.

An overview of the various world markets for Green Technology have been compiled in the Best Markets Report (BMR), based on information reported by 62 United States and Foreign Commercial Service (U.S. & FCS) posts abroad in their 1994 Fiscal Year Country Marketing Plans (CMPs). Identified in this report are the foreign Green Technology markets which the U.S. & FCS believe are promising for U.S. exporters because of either near-term growth potential or a large market receptivity to additional U.S. products.

Six tables represent the top ten nations in largest markets for pollution control equipment and largest import markets for pollution control equipment. In the next section additional information is provided on each of the countries listed in the following tables.

Table 1 represents the top ten nations with largest total markets in 1993.

**Table 1: Largest Total Markets (1993) for
Pollution Control Equipment**

<u>Top 10</u>	<u>U.S. \$ in millions</u>
Germany	28,000
France	12,000
Japan	8,000
Canada	4,140
United Kingdom	4,000
Austria	3,978
Italy	3,770
Mexico	2,000
Australia	1,300
Spain	1,250

Source: Best Markets Report: Pollution Control Equipment

Table 2 represents the top ten nations with the largest import markets for pollution control equipment in 1993. Not surprisingly, Germany which has the largest total market also has the largest import market. However, as you can see in Table 3, Germany is not the largest market for U.S. exports of pollution control equipment.

**Table 2: Largest Import Markets (1993) for
Pollution Control Equipment**

<u>Top Ten</u>	<u>U.S. \$ in millions</u>
Germany	7,150
France	2,950
Mexico	1,700
Canada	1,517
United Kingdom	1,000
Taiwan	940
Austria	781
Italy	780
Australia	773
Singapore	693

Source: Best Markets Report: Pollution Control Equipment

Table 3 represents the top ten nations with the largest import markets for U.S. pollution control equipment in 1993. Due to the high technological level of U.S. pollution control equipment, and the geographical proximity U.S. exports of pollution control equipment are demand in Canada, making that country the largest market for U.S. imports of pollution control equipment. With a preference for U.S. products, a growing population, and the recent NAFTA treaty Mexico is a close second behind Canada. The NAFTA treaty made Canada, Mexico, and the U.S. the largest market in the world.

Table 3: Largest Markets for Imports from the U.S. (1993) for Pollution Control Equipment

<u>Top Ten</u>	<u>U.S. \$ in millions</u>
Canada	1,238
Mexico	1,000
Germany	710
Singapore	303
United Kingdom	300
Italy	290
Taiwan	255
France	230
Australia	121
Chile	120

Source: Best Markets Report: Pollution Control Equipment

Table 4 represents the top ten nations with the fastest growing total markets for pollution control equipment from 1993 to 1995. Chile is the fastest growing total market for pollution control equipment because the country has become increasingly concerned with the environment, yet manufactures no pollution control equipment.

**Table 4: Fastest Growing Total Markets (1993 - 1995) for
Pollution Control Equipment**

<u>Top Ten</u>	<u>Average Annual Growth (%)</u>
Chile	50%
Czech Republic	40%
Egypt	40%
Greece	35%
Poland	30%
Turkey	30%
Taiwan	28%
Malaysia	27%
Bulgaria	25%
India	23%

Source: Best Markets Report: Pollution Control Equipment

Table 5 represents the top ten nations with the fastest growing import markets for pollution control equipment from 1993 to 1995 (see table 5). Poland is the fastest growing import market because Polish manufacturers of pollution control equipment can no longer compete with western imports.

**Table 5: Fastest Growing Import Markets (1993 - 1995) for
Pollution Control Equipment**

<u>Top Ten</u>	<u>Average Annual Growth (%)</u>
Poland	80%
Chile	40%
Egypt	40%
Malaysia	30%
Philippines	30%
Taiwan	28%
Bulgaria	25%
Czech Republic	25%
Turkey	25%
Pakistan	23%

Source: Best Markets Report: Pollution Control Equipment

Table 6 represents the top ten nations with the fastest growing markets for pollution control equipment imported from the U.S. from 1993 to 1995. Due

to new environmental regulations and allocation of funds Egypt has become the fastest growing market for U.S. imports of pollution control equipment.

Table 6: Fastest Growing Markets for Imports from the U.S. (1993 - 1995) for Pollution Control Equipment

<u>Top Ten</u>	<u>Average Annual Growth (%)</u>
Egypt	40%
Chile	35%
Taiwan	27%
Hong Kong	25%
Pakistan	23%
Argentina	20%
Bulgaria	20%
Czech Republic	20%
Morocco	20%
Poland	20%

Source: Best Markets Report: Pollution Control Equipment

The following section provides additional information on all of the countries which have been listed in the preceding tables and, in addition, include Russia and China, which are important but have not yet been mentioned. For convenience the countries have been grouped into basic geographical regions.

2.1 The African Markets

Africa is the poorest group of nations. Any environmental technological assistance to African countries will have a distinctive nature, being directed at health issues and sustainable development.

Egypt. A new law for environmental protection applicable to all industries was enacted recently. Factories have three years to comply with the law. In its five year plan (1992 - 1997), the Egyptian government has allocated U.S.

\$120 million for the Egyptian environmental protection program. Most promising subsectors are solid waste management equipment (\$1.5 U.S. million) and air pollution control equipment (\$1 U.S. million).

Morocco. The City of Casablanca is looking for foreign expertise in municipal water sanitation projects and solid waste management. Most promising subsectors are water pollution control equipment (\$48 U.S. million), industrial air pollution control equipment (\$35 U.S. million), and solid waste control equipment (\$20 U.S. million).

2.2 The Asian and Pacific Market including Australia

The Asian environmental market is growing rapidly. Non-communist Asia is estimated to expend over \$30 billion for environmental technologies. Hong Kong plans to spend \$20 billion on greentech. Hong Kong has favorable markets and procurement policies for the U.S. goods and services. Taiwan plans to spend \$12 billion for environmental technologies by 1998. Currently, the U.S. supplies 25% of environmental technology imports to Taiwan. In addition, South Korea also has strong environmental market.

Japan, having decided that environmental technology is going to drive the future economic growth of the world, is pouring hundreds of millions of dollars into environmental technology in an effort to establish themselves as first in the field. Japan has already developed a 100 year plan to promote the development of the industry which is evidence of their commitment to the environmental technology market. Japan currently has a strong presence in

the Asian market, and is a major exporter of air pollution control technologies throughout the world.

Communist Asia is also a potentially strong market for Green Technology. The Peoples Republic of China currently has abundant resources of coal and few environmental protection restrictions. They will need assistance in the future to maximize the value and minimize the negative impacts of coal mining and use.

Australia. Pollution control equipment has become an integral part of the workplace. Pollution control equipment needs have expanded rapidly in the last three years and should continue to grow. Most promising subsectors are industrial fans (\$200 U.S. millions); filters, purifiers, and related parts for gases (\$88 U.S. millions); water and drink purifiers (\$25 U.S. millions); artificial respirators, masks, breathing apparatus, etc. (\$23 U.S. millions).

China. China has a major problem with acid rain. China has become increasingly concerned with the pollution problem, as did Los Angeles, because of their bid for the 2000 Olympics. There is increasing concern about their bid for the 2000 Olympics. Eighty-two percent of the rivers and lakes are polluted to some degree. An estimated 2000 tons of fish, shrimp, and shellfish die from polluted water every year. Most promising subsector are clean coal equipment (\$30 U.S. millions).

Hong Kong. The Hong Kong government is now trying very hard to improve environmental conditions. Many projects on environmental protection are under way, especially for state-of-the-art (U.S. \$ 2 billion in the

next 3 years) and sewage disposal (U.S. \$3 billion over the same period). There are also niche markets for biomedical waste disposal, radioactive waste storage, the treatment of toxic metals in sludge and mud dredged from the harbor, etc. Most promising subsectors are water pollution control equipment (\$204 U.S. millions) and landfill pollution control equipment (\$140 U.S. millions).

Japan. The market for pollution control and environmental protection equipment in Japan is expected to expand markedly when the nation recovers from its economic recession and investment again starts to increase. The Japanese market in this section is highly competitive. Japan is the third largest exporter of equipment behind Germany and the United States and is especially strong in recycling equipment. Most promising subsectors are soil and ground water remediation/contamination (\$2,000 U.S. millions) and equipment and systems to recover and recycle freon (\$350 U.S. millions).

Malaysia. As the Malaysian government tightens its enforcement of pollution control regulations, the market for related products and services will grow rapidly. Currently, pollution control equipment and services center on air and water pollution as well as the disposal of solid and hazardous waste. This industry is heavily dependent on imported component parts. Some imports are re-exported. Most promising subsectors are air pollution control equipment (\$25 U.S. millions), water pollution control equipment (\$25 U.S. millions), and solid waste control equipment (\$13 U.S. millions).

Philippines. In the last few years, the Philippine government has started paying serious attention to the environment. This is evidenced in the

country's Medium Term Development Plan (1987 - 1992), which explicitly states government environmental policies, and the recent Philippines Strategy for Sustainable Development, which stresses the need to view economic growth and environmental protection as interdependent and mutually compatible.

Although there are a number of Philippine government agencies involved in environmental protection, the level of compliance with environmental regulations remains low and these agencies are overextended. This deficiency has led to the rapid growth of non-governmental organizations (NGOs) concerned with the environment in the Philippines. These NGOs have been very active in bringing up environmental issues, leading protests against polluting firms and planned projects with polluting effects, and monitoring the environmental impacts of projects. Most promising subsectors are filters and purifying machinery and apparatus for gases (\$4.6 U.S. millions) and filters and purifying apparatus for water (\$2.5 U.S. millions).

Singapore. Although environmental awareness is prevalent in the market, Singapore is still at least five years behind the U.S. in the area of environmental technology. Thus, significant growth is foreseen, both in Singapore and through the Singapore gateway to the region. Most promising subsectors are pollution control equipment (\$50 U.S. millions), solid waste management equipment (\$40 U.S. millions), and filters (\$25 U.S. millions).

2.3 The European Market and Russia

The European market has the necessary resources to create a demand for pollution control equipment. However, there is a great deal of competition in the European market from countries such as Germany and France. Eastern Europe can become a growth area because of the environmental degradation typical of the Warsaw pact countries. However, the lack of resources to spend on Green Technology and the proximity of European suppliers makes Eastern Europe a marginal market for U.S. exporters. Western Europe, on the other hand, has the largest environmental technology market at \$68 billion. However, there is strong competition for this market.

Austria. The U.S. import share amounted to only 1% of this nation's market because West European environmental technology firms are more advanced and better adapted to European demands. Market opportunities do exist for pollution measurement instruments.

Bulgaria. The government of Bulgaria has made its serious environmental problems a priority area. International financial institutions support a number of major projects such as the Sofia Water Supply and Waste Water Project, Port of Varna, Black Sea Environmental Project, Danube River Clean-up, Environmental Energy Projects. However the country's economic situation has impeded their ability to take advantage of the U.S. advanced technology and innovation, but increasing consulting activity from U.S. firms is noticeable. Most promising subsectors are industrial waste treatment equipment (\$10 U.S. millions), municipal waste water and water treatment programs (\$5 U.S. millions), consulting on water and air pollution projects (\$5 U.S. millions), toxic and hazardous waste treatment materials and

equipment (\$2 U.S. millions), and solid waste and landfill treatment clean-up (\$2 U.S. millions).

Czech Republic. The Czech government has given priority to reducing serious air pollution, water pollution, and solid waste problems. European competition comes primarily from Great Britain, France, and Germany. Financing remains the key obstacle, but some money originates from domestic and international sources. Most promising subsectors are air pollution control equipment (e.g. desulfurization) (n/a).

France. The French market for pollution control equipment is expanding dramatically, and this trend will continue during the next decade. Until 1989, total public and private budgets spent on environmental protection only represented 0.9% of the French GNP. This figure is about half of the efforts made by other industrialized countries such as the United States, Germany, and the United Kingdom. As a result of directives from the European Council as well as the strong political pressures made by various environmentalist groups, French authorities have developed a long term plan to bring France's environmental protection up to a level comparable to those enforced in other countries. Massive investment programs in infrastructure, equipment and services will be undertaken over the next ten years. Worthy of note, some 20% of these expenditures will consist of investments in equipment.

The pollution control equipment sector includes the production of goods and services for measuring, preventing, limiting, or treating environmental damage including the pollution of water, air, land, as well as noise pollution,

and waste. Most promising subsectors are air pollution control equipment (\$500 U.S. millions), water treatment chemicals (\$355 U.S. millions), solid waste disposal (\$170 U.S. millions), and air treatment chemicals (\$170 U.S. millions).

Germany. Environmental products will make increasing use of new technologies. For example, there is enormous need for microelectronics equipment in environmental protection technology. This should present an outstanding opportunity for U.S. industry, particularly those companies supplying measurement and control instrumentation and equipment. The need to correct environmental damages in Eastern Germany provides an additional component in market growth. Most promising subsectors are microelectronics measurement and control equipment (\$5,000 U.S. millions) and emission measuring and monitoring equipment (\$175 U.S. millions).

Greece. The market for pollution control and waste management systems and equipment will have excellent growth potential. Urbanization, increasing industrial pollution, inefficient sewage collection, and insufficient solid waste treatment systems are the main reasons for the country's increasing pollution problems. Most of the major municipalities are presently facing a severe waste disposal problem and are actively seeking solutions. In response to the crisis, the EC has earmarked over U.S. \$ 350 million to Greece to be spent on waste management projects over the next five years. At the same time in the last two years, the larger municipalities began allocating a bigger portion of their budgets to waste management activities. U.S. manufacturers of pollution control and waste management systems and equipment, as well as engineering and management firms,

enjoy a very good reputation for their expertise and superior technical quality and reliability. Competition from European suppliers, however, is substantial. In addition, major U.S. firms enter the market through their European subsidiaries, which explains the smaller rate of growth in direct imports from the U.S. However, Greece will not increase its own expenditure and that is why we estimate moderate growth figures. To conclude, the Greek market in this sector will only have a temporary 2 -3 years increase which is a result of the EC support funds and then it is expected to drop. Most promising subsectors are recycling process machinery (\$15 U.S. millions) and landfill equipment (n/a)

Italy. The Italian pollution control industry continues to enjoy considerable growth, with environmental services becoming increasingly important. The treatment and management of urban and industrial wastes is one of the most serious problems facing Italy. The market is largely dependent on foreign expertise, equipment, and instrumentation. U.S. technology and standards are highly regarded and recognized. Good business opportunities exist for experienced American firms offering safe and innovative solutions, willing to work closely with Italian partners, who can help them in understanding local legislation and procedures. Most promising subsectors are hazardous waste management equipment and services (\$1,450 U.S. millions).

Poland. The market for goods and services in this sector has grown dramatically over the past two years and will continue to increase over the next several years. Most expenditures will be directed at air and water pollution control. U.S. equipment, though respected, surprisingly does not

have a significant presence in Poland compared to European manufacturers. For the most part, Polish production of equipment in this sector is declining, because it cannot compete with imports of western technology. End-users state that U.S. firms are too distant to provide adequate maintenance and servicing of equipment. U.S. consultants (and their subsequent studies) abound, but U.S. manufacturers are missing a tremendous opportunity in this sector. Major annual trade event: Poleko (November). Most promising subsectors are filtering/purifying equipment other liquids (\$60 U.S. millions), filtering/purifying equipment for gases (\$50 U.S. millions), and filtering/purifying equipment for water (\$45 U.S. millions).

Russia. Although an estimated 70% of Russian industrial enterprises either have completely outdated and non-efficient pollution control equipment or do not have any at all, the lack of financing still prevents Russian enterprises from purchasing necessary pollution control equipment on a major scale. Only a few major industrial modernization projects contemplate including comprehensive modern pollution control technologies, and only once financing is provided and guaranteed. Because Russian end-users have little experience or familiarity with state-of-the-art Western pollution control equipment, we believe that all major Western suppliers face more or less equal receptivity to their products in Russia. Most promising subsectors are industrial waste treatment equipment (\$10 U.S. millions), water and waste water control equipment (\$4 U.S. millions), and air pollution control equipment (\$2.5 U.S. millions).

Spain. The government estimates that Spanish industry must invest U.S. \$ 10 billion during the 1990's in order to meet environmental requirements.

Most of this investment will go into air and water pollution control equipment. New infrastructure projects require the installation of "cleaner" equipment, while mounting public pressure is forcing old industries to acquire pollution control equipment to "clean up" their industrial processes. The growth potential is even higher if, as expected, the EC comes up with tougher environmental regulations. Most promising subsectors are industrial waste disposal systems (\$350 U.S. millions), water pollution control equipment (\$300 U.S. millions), and air pollution control equipment (\$250 U.S. millions).

2.4 North and South American Markets

Argentina. One source reports Argentina is the third fastest growing country in the world in the for the last three years and one of the fastest growing markets for U.S. exports. The transformation of the Argentine market reflects the policy changes introduced since 1989. These economic policies have increasingly opened a closed Argentine market to international competition. Argentine market has the highest per capita income in Latin America, a strong agricultural base, and strong natural resource base, all of which represent an opportunity for U.S. firms. In addition, the combining of the Argentine, Brazil, Paraguay, and Uruguay economies into the Southern Common Market" by 1995-1996 will create a larger potential market. Even considering the positive economic policy changes of the government to open the Argentine market, its economy is still a fairly closed compared to similar countries. This suggests that Argentina represents a major potential market for U.S. exports. The restructuring of Argentina's industrial base and the potential development of a major natural resource based industry will attract

major investments in infrastructure, energy, transport, and environmentally sound production processes. Major export opportunities for greentech include potable water systems and industrial pollution equipment.

Canada. Many Canadian firms have allocated substantial budgets to purchase air and water pollution equipment in order to meet legislative requirements. The primary Canadian end-users are the pulp and paper, chemicals, metallurgy, and textiles industry. All of them will be adding pollution control equipment over the next three years. U.S. made equipment has the competitive advantages of technological advances to meet Environmental Protection Agency (EPA) requirements and geographical proximity to the market. Most promising subsectors are filtering or purifying machinery and apparatus for gases and scrubbers (\$440 U.S. millions) and filtering or purifying machinery and apparatus for liquids (\$170 U.S. millions).

Chile. Chile does not manufacture any pollution control equipment. A new law, and will establish tougher standards and regulations for polluters. The market demand for pollution control equipment should expand to \$ 4 U.S. billion during the next ten years. Many companies have begun to buy the necessary equipment. Under the new environmental law, all polluters (government and private) could be fined for environmental damage. Most promising subsectors are air pollution control and measures equipment (\$50 U.S. millions), water pollution control equipment (\$42 U.S. millions), and solid waste recycling equipment (\$18 U.S. millions).

Mexico. According to preliminary estimates, Mexico bought nearly \$ 1.1 U.S. billion worth of environmental technology, equipment, and services in 1992. The Mexican government has demonstrated a strong and increasing commitment to environmental protection. In 1992, the Mexican environmental enforcement agency, performed 4,584 plant inspections, resulting in 714 partial plant closures and 105 total plant closures. In the first 3 months of 1993, 2,496 inspections were performed, resulting in 102 partial plant closures and 9 total closures. The companies affected are seeking advice from government authorities, trade associations, commercial and development banks, and foreign firms to help them get the proper advice with regard to services, machinery, and technology to comply with Mexican environmental regulations. Many Mexican manufacturing companies are very optimistic about the NAFTA side agreement on the environment, because they know that more funds and more environmental companies will come to Mexico. Most promising subsectors are waste water treatment equipment (\$600 U.S. millions), inorganic wastes treatment plants (\$300 U.S. millions), incinerator plants (\$260 U.S. millions), trucks for garbage collection (\$200 U.S. millions), organic wastes treatment plants (\$200 U.S. millions), and water purification protection (n/a).

2.5 The Middle East and Central Asia

This is a less significant market for U.S. green technology, but some countries stand out.

India. The current liberalized import policy is expected to support an import market growth rate of about 15%. The U.S., Sweden, Germany, United

Kingdom, Switzerland, Holland, and Japan are the major sources of equipment and technology for Indian firms. Most promising subsectors are air pollution (\$65 U.S. millions), water pollution(\$40 U.S. millions), and dust collection and purification system (\$30 U.S. millions).

Pakistan. The Pakistan market for pollution control equipment is expected to grow rapidly over the next 3 - 5 years. The Pakistani government's environmental agency estimates that the introduction of the emission standards will create a market for catalytic converters and other equipment.

3. The U.S. Market

The U.S. is the world's largest producer and consumer of environmental goods and services, accounting for 40% (\$80 billion) of the world's market. According to the U.S. Department of Commerce, there are between 7,000 to 10,000 U.S. companies involved in international environmental markets. A July 1993 Environmental Protection Agency (EPA) report showed the U.S. with a positive trade balance in this industry of \$1.1 billion in 1991, which is the latest year for available statistics. Between the years 1989 to 1991, U.S. exports increased by 70%, while U.S. imports increased by 45%.

Domestically there are nearly 60,000 envirotech companies in the U.S. with combined revenues of \$120 billion (1991). The U.S. envirotech industry employs nearly 1 million people and is projected to jump to over one and one quarter million by 1996. The U.S. has some of the best environmental expertise in the world, but our lack of presence in the global market place has caused the U.S. to lose share of the global environmental technology market

to nations that have been supporting and vigorously promoting their own environmental technology capabilities. For example, less than 6% of the environmental consulting businesses conducted by U.S. firms in 1990 was done internationally. By comparison, German industry exports accounted for about 40% of their gross sales.

4. The Environmental Technology Industry in the Six State New England Region

The six state New England Region (Connecticut, Rhode Island, Massachusetts, Maine, New Hampshire and Vermont) is considered a leader in environmental technology and will be a key player in the future growth of the industry. The region's history, aggressive regulations, institutions of higher education and tourism industry are driving forces that have fostered the development of the Envirotech industry.

4.1 History

The rich industrial heritage of New England, particularly Massachusetts has resulted in the region being home to more polluted and hazardous waste sites than almost anywhere in the nation. The region's serious environmental problems have generated concern from prominent political figures and from local communities and has resulted in a regional effort in promoting the growth of the environmental technology industry. Unfortunately, it wasn't until recently that resources were made available to assist the growth of the envirotech industry and much still needs to be done if the region wants to take full advantage of the market potential of the industry.

4.2 Driving Forces

Aggressive Regulations

As the region is a leader in environmental problems, it is also at the forefront of developing regulations to address these problems. The New England region was the first to adopt policies addressing hazardous waste site assessment, air and water pollution abatement and pollution prevention. The aggressive regulations of the region has created a demand for industry goods and services, as well as innovation and has resulted in there being more innovation in the areas of pollution prevention and waste minimization in New England than anywhere else in the U.S., except California. In 1992, New England received one out of four Environmental Protection Agency pollution preventive incentive grants awarded.

Institutions of Higher Education

New England is home to the greatest concentration of higher education institutions than any region in the nation. Institutions such as the Massachusetts Institute of Technology, Harvard, Boston University and the University of Massachusetts provide the knowledge and talent base that fuses into industrial innovation. Research and development expenditures in the environmental sciences by New England colleges and universities totaled \$110.6 million in 1988. In addition to its significant economic contribution, the higher education institutions of the region produce a highly skilled work force that is able to support technologically based industries.

Tourism Industry

The scenic beauty of New England with its mountain, lakes, forest and natural scenery are natural resources that contribute to New England's strong tourism industry. The region has recognized the economic vitality of its natural resources and has placed environmental clean-up near the top of public policy goals.

New England's aggressive regulations, vast number of educational institutions, and tourism industry, makes the region an attractive home for envirotech industries and warrants the allocation of public resources towards assisting the development and growth of the industry. As the envirotech industry prospers it will stimulate economic growth for the region. New jobs will be created and revenues will be generated. To understand the economic opportunities that exist in the envirotech industry one only has to look at the current contribution that the industry is making to the region.

4.3 Scale of the Envirotech Industry in New England

Size of Industry

There are an estimated total of 2,275 environmental technology companies in the six state New England Region (Environmental Business Council, 1992).

Table 7 provides estimated data on the number of envirotech companies located in each state (Environmental Business Council, 1992).

Table 7: Number of Envirotech Companies Per State, New England Region (1992)

<u>State</u>	<u># of Envirotech Companies</u>
Massachusetts	1100
Connecticut	600
New Hampshire	200
Maine	150
Rhode Island	125
Vermont	100
Total	2,275

Although it appears that Massachusetts is far more advanced in envirotech industries than the other five states, this should be put in perspective. If you compare the number of total establishments in each state by the number of environmental companies located in each state one finds that the envirotech industry accounts for between .4 to .6 percent of all establishments for all states. This illustrates that the envirotech industry is almost equally distributed throughout the states.

Nature of Envirotech Industry

Due to the lack of support services for the envirotech industry in the five states of NH, CT, VT, ME and RI, specific data on the nature of the industry are not readily available. However, it should be mentioned that the states have recently taken an interest in studying the envirotech industry and data will become easier to obtain as the industry continues to gain support. Of the total number of envirotech companies in Massachusetts alone, two-thirds are believed to be in the service sector accounting for approximately \$7.5 billion

or 84% of industry sales in 1990. Manufacturers are estimated to represent 12% or \$1.1 billion of the total sales market for Massachusetts and the remaining is attributed to other industries including sales and distribution, making up approximately 4 percent or \$356 million in industry sales (The Minuteman Regional Science-Technology Environmental Task Force, 1993).

Massachusetts environmental companies sell their products to a wide ranging customer base. According to a survey conducted by the Office of Environmental Affairs, 90% of the companies did business with other private sector firms, more than 505 sold products to governmental agencies, and approximately 255 had non-profit clients such as universities and hospitals (Office of Environmental Affairs, 1993).

A relatively large share (approximately 39%) of Massachusetts firms export goods and services outside the New England region. However, only 5% participate in the global market. Massachusetts has been making headway in the global market for environmental, in 1990 it was estimated that there were over 250 offices overseas in Europe and Asia that were established by Massachusetts firms. See Table 8 for leading international locations for Massachusetts environmental companies (Office of Environmental Affairs, 1993).

Table 8: Leading International Locations for Massachusetts Environmental Companies

<u>Continent</u>	<u>Number of Firms Located There</u>	<u>Country</u>	<u>Number of Firms Located There</u>
Europe	115	United Kingdom	43
Asia	38	Canada	25
North America	38	France	12
Australia	11	Australia	11
Africa	10	Italy	11
South America	9	Netherlands	10
		Germany	8
		Belgium	5
		China	5
		Japan	5
		Switzerland	5

Source: Office of Environmental Affairs, 1993

Massachusetts firms, specializing in engineering, consulting services and equipment have been quite successful in competing internationally. Firms such as Arthur. D. Little (Cambridge) in environmental audits, HNU Systems (Newton) in monitoring instruments, and Ground Water Technology, Inc. (Norwood) in underground storage tank remediation are considered international leaders in their respective fields. Currently, the Massachusetts Office of International Trade (MOITI) provides support services to Massachusetts firms who want to participate internationally and have organized missions to Asia and western and eastern Europe (Office of Environment Affairs, 1993).

4.4 Economic Contribution of the Envirotech Industry

Revenues

The economic contribution of the envirotech industry in New England totaled over \$7 billion dollars in 1992, accounting for a little over 5 percent of total U.S. envirotech sales. Massachusetts accounts for the largest share of revenues of the six states with over \$2.26 billion in sales in 1992. Connecticut and Massachusetts account for approximately 75% of the six state sales with \$3.74 billion. Table 9 provides revenue data by state for the New England region (For a comparison of companies per state, nation-wide refer to figure 1). The two envirotech industry groups of storm water management and water utilities account for the largest percent of sales, totaling over \$2.5 billion (Environmental Business International, Inc., 1992). For a complete breakdown of sales by industry sector per state refer to Table 10.

Table 9: Environmental Industry Revenues (1992) for the Six State New England Region

<u>State</u>	<u>U.S. Revenues (Billions)</u>	<u>% of Total U.S Revenues</u>
Massachusetts	3.021	2.26
Connecticut	1.973	1.48
Maine	.729	.54
New Hampshire	.693	.52
Rhode Island	.486	.36
Vermont	.337	.25
Total	7.239	5.41

Source: Environmental Business International Inc., 1992

Table 10: Environmental Industry Revenues (1992) by Sector by State

State		US Revs (\$Bil)	Analytical Services	SW Mgmt	HW Mgmt	Asbestos Abatement	Water Equip	Water Util	Env C&E	Res. Rec.	Instrume nt	APC Equip	Waste Mgt Equip	Env. Energy
Totals	100%	133.7	1800	28200	14600	3100	13000	21800	14200	16100	1800	5400	11500	2200
Alabama	1.49%	1.999	26.82	420.18	217.54	46.19	193.70	324.82	211.58	239.89	26.82	80.46	171.35	32.78
Alaska	0.34%	0.457	6.12	95.88	49.64	10.54	44.20	74.12	48.28	54.74	6.12	18.36	39.10	7.48
Arizona	1.13%	1.514	20.34	318.66	164.98	35.03	146.90	246.34	160.46	181.93	20.34	61.02	129.95	24.86
Arkansas	0.70%	0.940	12.60	197.40	102.20	21.70	91.00	152.60	99.40	112.70	12.60	37.80	80.50	15.40
California	13.14%	17.573	236.52	3,705.48	1,918.44	407.34	1,708.20	2,864.52	1,865.88	2,115.54	236.52	709.56	1,511.10	289.08
Colorado	1.37%	1.831	24.66	385.34	200.02	42.47	178.10	298.66	194.54	220.57	24.66	73.98	157.55	30.14
Connecticut	1.48%	1.973	26.64	417.36	216.08	45.88	192.40	322.64	210.16	238.28	26.64	79.92	170.20	32.56
Delaware	0.51%	0.676	9.18	143.82	74.46	15.81	66.30	111.18	72.42	82.11	9.18	27.54	58.65	11.22
District of Columbia	0.60%	0.802	10.80	169.20	87.60	18.60	78.00	130.80	85.20	96.60	10.80	32.40	69.00	13.20
Florida	4.33%	5.792	77.94	1,221.06	632.18	134.23	562.90	943.94	614.86	697.13	77.94	233.82	497.95	95.26
Georgia	2.05%	2.738	36.90	578.10	299.30	63.55	266.50	446.90	291.10	330.05	36.90	110.70	235.75	45.10
Hawaii	0.28%	0.379	5.04	78.96	40.88	8.68	36.40	61.04	39.76	45.08	5.04	15.12	32.20	6.16
Idaho	0.38%	0.510	6.84	107.16	55.40	11.78	49.40	82.84	53.96	61.18	6.84	20.52	43.70	8.36
Illinois	3.81%	5.099	68.58	1,074.42	556.26	118.11	495.30	830.58	541.02	613.41	68.58	205.74	438.15	83.82
Indiana	2.46%	3.287	44.28	693.72	359.16	76.26	319.80	536.28	349.32	396.06	44.28	132.84	282.90	54.12
Iowa	1.02%	1.364	18.36	287.64	148.92	31.62	132.60	222.36	144.84	164.22	18.36	55.08	117.30	22.44
Kansas	0.89%	1.192	16.02	250.98	129.94	27.59	115.70	194.02	126.38	143.29	16.02	48.06	102.35	19.58
Kentucky	1.23%	1.651	22.14	346.86	179.58	38.13	159.90	268.14	174.66	198.03	22.14	66.42	141.45	27.06
Louisiana	2.64%	3.534	47.52	744.48	385.44	81.84	343.20	575.52	374.88	425.04	47.52	142.55	303.60	58.08
Maine	0.54%	0.729	9.72	152.28	78.84	16.74	70.20	117.72	76.68	85.94	9.72	29.16	62.10	11.88
Maryland	1.53%	2.060	27.54	431.46	223.38	47.43	198.90	333.54	217.26	246.33	27.54	82.62	175.95	33.66
Massachusetts	2.26%	3.021	40.68	637.32	329.96	70.06	293.80	492.68	320.92	363.86	40.68	122.04	259.90	49.72
Michigan	4.40%	5.887	79.20	1,240.80	642.40	136.40	572.00	959.20	624.80	708.40	79.20	237.60	506.00	96.80
Minnesota	1.00%	2.409	32.40	507.60	262.80	55.80	234.00	392.40	255.60	289.80	32.40	97.20	207.00	39.60
Mississippi	0.73%	0.970	13.14	205.86	106.58	22.63	94.90	159.14	103.66	117.53	13.14	39.42	83.96	16.06
Missouri	1.66%	2.219	29.88	468.12	242.36	51.46	215.80	361.88	235.72	267.26	29.88	89.64	190.90	36.52
Montana	0.32%	0.424	5.76	90.24	46.72	9.92	41.60	69.76	45.44	51.52	5.76	17.28	36.80	7.04
Nebraska	0.40%	0.540	7.20	112.80	58.40	12.40	52.00	87.20	56.80	64.40	7.20	21.60	46.00	8.80
Nevada	0.26%	0.345	4.68	73.32	37.96	8.06	33.80	56.68	36.92	41.85	4.68	14.04	29.90	5.72
New Hampshire	0.52%	0.693	9.36	146.64	75.92	16.12	67.60	113.36	73.84	83.72	9.36	28.08	59.80	11.44
New Jersey	5.12%	6.841	92.16	1,443.84	747.52	158.72	665.60	1,116.16	727.04	824.32	92.16	276.48	588.80	112.64
New Mexico	0.48%	0.645	8.64	135.36	70.08	14.88	62.40	104.64	68.16	77.28	8.64	25.92	55.20	10.56
New York	6.10%	8.156	109.80	1,720.20	890.60	189.10	793.00	1,329.80	866.20	982.10	109.80	329.40	701.50	134.20
North Carolina	2.20%	2.947	39.60	620.40	321.20	68.20	286.00	479.60	312.40	354.20	39.60	118.80	253.00	48.40
North Dakota	0.13%	0.180	2.34	36.66	18.98	4.03	16.90	28.34	18.46	20.93	2.34	7.02	14.95	2.86
Ohio	4.14%	5.539	74.52	1,167.48	604.44	128.34	538.20	902.52	587.88	666.54	74.52	223.56	476.10	91.08
Oklahoma	0.97%	1.302	17.46	273.54	141.62	30.07	126.10	211.46	137.74	156.17	17.46	52.38	111.55	21.34
Oregon	1.02%	1.364	18.36	287.64	148.92	31.62	132.60	222.36	144.84	164.22	18.36	55.08	117.30	22.44
Pennsylvania	4.99%	6.677	89.82	1,407.18	728.54	154.69	648.70	1,087.82	708.58	803.39	89.82	269.46	573.85	109.78
Rhode Island	0.36%	0.486	6.48	101.52	52.56	11.16	46.80	78.48	51.12	57.96	6.48	19.44	41.40	7.92
South Carolina	1.31%	1.753	23.58	369.42	191.26	40.61	170.30	285.58	186.02	210.91	23.58	70.74	150.65	28.82
South Dakota	0.13%	0.179	2.34	36.66	18.98	4.03	16.90	28.34	18.46	20.93	2.34	7.02	14.95	2.86

Source: Environmental Business International Inc. (San Diego, California)
 Note: All figures are in millions of dollars unless otherwise specified.

State		US Revs (\$Bil)	Analytical Services	SW Mgmt	HW Mgmt	Asbestos Abatement	Water Equip	Water Util	Env C&E	Res. Rec.	Instrume: nt	APC Equip	Waste Mgt Equip	Env. Energy
Totals	100%	133.7	1800	28200	14600	3100	13000	21800	14200	16100	1800	5400	11500	2200
Tennessee	1.96%	2.625	35.28	552.72	285.16	60.76	254.80	427.28	278.32	315.56	35.28	105.84	225.40	43.12
Texas	8.09%	10.812	145.62	2,281.38	1,181.14	250.79	1,051.70	1,763.62	1,148.78	1,302.49	145.62	436.86	930.35	177.98
Utah	0.71%	0.954	12.78	200.22	103.66	22.01	92.30	154.78	100.82	114.31	12.78	38.34	81.65	15.62
Vermont	0.25%	0.337	4.50	70.50	36.50	7.75	32.50	54.50	35.50	40.25	4.50	13.50	28.75	5.50
Virginia	2.01%	2.681	36.18	566.82	293.46	62.31	261.30	438.18	285.42	323.61	36.18	108.54	231.15	44.22
Washington	2.58%	3.449	46.44	727.56	376.68	79.98	335.40	562.44	366.36	415.38	46.44	139.32	296.70	56.76
West Virginia	0.88%	1.170	15.84	248.16	128.48	27.28	114.40	191.84	124.96	141.68	15.84	47.52	101.20	19.36
Wisconsin	2.04%	2.728	36.72	575.28	297.84	63.24	265.20	444.72	289.68	328.44	36.72	110.16	234.60	44.88
Wyoming	0.21%	0.275	3.78	59.22	30.66	6.51	27.30	45.78	29.82	33.81	3.78	11.34	24.15	4.62
TOTAL US	100%	133.7	\$1,799	\$28,186	\$14,593	\$3,098	\$12,994	\$21,789	\$14,193	\$16,092	\$1,799	\$5,397	\$11,494	\$2,199

Source: Environmental Business International Inc. (San Diego, California)
Note: All Sector Revenue Figures are \$ Millions

Employment

In 1992 the envirotech industry was responsible for over 59,000 jobs in the New England region, accounting for over 5% of the total U.S.. market.

Massachusetts and Connecticut accounted for 3.74% of the total U.S.. Market or 40,145 jobs. For a breakdown of jobs by state refer to Table 11.

Table 11: Environmental Industry Employment (1992) for the Six State New England Region

<u>State</u>	<u>Total U.S. Jobs</u>	<u>% of Total US Market</u>
Massachusetts	25,259	2.26
Connecticut	15,886	1.48
Maine	5,796	.54
New Hampshire	5,582	.52
Rhode Island	3,864	.36
Vermont	2,683	.25
Total	59,070	5.41

Source: Environmental Business International Inc., 1992

As indicated in Table 11, Analytical Services along with Utility and Environmental Consulting and Engineering industry groups account for the largest number of jobs with 21,249 jobs or 36% percent of the total environmental jobs in the six state region (Environmental Business International Inc., 1992). Table 12 provides a breakout of jobs by sector per state for the nation.

Table 12: Environmental Industry Employment (1992) by Sector by State

State	% of Total US Market	Total US Jobs	Analytical Services	SW Mgmt	HW Mgmt	Asbestos Abatement	Water Equip	Water Util	Env C&E	Res. Rec.	Instruments	APC Equip	Waste Mgt Equip	Env. Energy
Totals	100%	1,072,862	19,556	235,000	126,957	28,182	100,000	136,250	157,778	107,333	15,167	38,714	88,462	20,000
Alabama	1.49%	15,994	291	3,502	1,892	420	1,490	2,030	2,351	1,599	226	577	1,318	298
Alaska	0.34%	3,650	66	799	432	96	340	463	536	365	52	132	301	68
Arizona	1.13%	12,129	221	2,656	1,435	318	1,130	1,540	1,783	1,213	171	437	1,000	226
Arkansas	0.70%	7,514	137	1,645	889	197	700	954	1,104	751	106	271	619	140
California	13.14%	141,045	2,570	30,879	16,682	3,703	13,140	17,903	20,732	14,104	1,993	5,087	11,624	2,628
Colorado	1.37%	14,706	268	3,220	1,739	385	1,370	1,867	2,162	1,470	208	530	1,212	274
Connecticut	1.48%	15,886	289	3,478	1,879	417	1,480	2,017	2,335	1,589	224	573	1,309	256
Delaware	0.51%	5,474	100	1,199	647	144	510	695	805	547	77	197	451	102
District of Columbia	0.60%	6,440	117	1,410	762	169	600	818	947	644	91	232	531	120
Florida	4.33%	46,478	847	10,176	5,497	1,220	4,330	5,900	6,832	4,648	657	1,676	3,830	866
Georgia	2.05%	22,005	401	4,818	2,603	578	2,050	2,793	3,234	2,200	311	794	1,813	410
Hawaii	0.28%	3,006	55	658	355	79	280	382	442	301	42	108	248	56
Idaho	0.38%	4,079	74	893	482	107	380	518	600	408	58	147	336	76
Illinois	3.81%	40,897	745	8,954	4,837	1,074	3,810	5,191	6,011	4,089	578	1,475	3,370	762
Indiana	2.45%	26,406	481	5,781	3,123	693	2,450	3,352	3,881	2,640	373	952	2,176	492
Iowa	1.02%	10,940	199	2,397	1,295	287	1,020	1,390	1,609	1,095	155	395	902	204
Kansas	0.89%	9,553	174	2,092	1,130	251	890	1,213	1,404	955	135	345	787	178
Kentucky	1.23%	13,203	241	2,891	1,562	347	1,230	1,676	1,941	1,320	187	476	1,088	246
Louisiana	2.64%	28,338	516	6,204	3,352	744	2,640	3,597	4,165	2,834	400	1,022	2,335	528
Maine	0.54%	5,756	106	1,269	686	152	540	736	852	580	82	209	478	108
Maryland	1.53%	16,423	299	3,596	1,942	431	1,530	2,085	2,414	1,642	232	562	1,351	306
Massachusetts	2.26%	24,259	442	5,311	2,869	637	2,260	3,079	3,566	2,426	343	875	1,999	452
Michigan	4.40%	47,230	860	10,340	5,586	1,240	4,400	5,995	6,942	4,723	667	1,703	3,892	880
Minnesota	1.80%	19,321	352	4,230	2,285	507	1,800	2,453	2,843	1,932	273	697	1,592	360
Mississippi	0.73%	7,836	143	1,716	927	206	730	995	1,152	784	111	283	646	146
Missouri	1.66%	17,818	325	3,931	2,107	458	1,660	2,262	2,619	1,782	252	643	1,468	332
Montana	0.32%	3,435	63	752	406	90	320	436	505	343	49	124	283	64
Nebraska	0.40%	4,294	78	940	508	113	400	545	631	429	61	155	354	80
Nevada	0.26%	2,791	51	611	330	73	260	354	410	279	39	101	230	52
New Hampshire	0.52%	5,582	102	1,222	660	147	520	709	820	558	79	201	460	104
New Jersey	5.12%	54,958	1,001	12,032	6,500	1,443	5,120	6,976	8,078	5,495	777	1,982	4,529	1,024
New Mexico	0.48%	5,152	94	1,128	609	135	480	654	757	515	73	186	425	96
New York	6.10%	65,477	1,193	14,335	7,744	1,719	6,100	8,311	9,624	6,547	925	2,362	5,396	1,220
North Carolina	2.20%	23,615	430	5,170	2,793	620	2,200	2,998	3,471	2,361	334	852	1,946	440
North Dakota	0.13%	1,395	25	306	165	37	130	177	205	140	20	50	115	26
Ohio	4.14%	44,439	810	9,729	5,256	1,167	4,140	5,641	6,532	4,444	628	1,603	3,662	828
Oklahoma	0.97%	10,412	190	2,280	1,231	273	970	1,322	1,530	1,041	147	376	858	194
Oregon	1.02%	10,949	199	2,397	1,295	287	1,020	1,390	1,609	1,095	155	395	902	204
Pennsylvania	4.99%	53,563	976	11,727	6,335	1,406	4,990	6,799	7,873	5,356	757	1,932	4,414	998
Rhode Island	0.36%	3,864	70	846	457	101	360	491	568	386	55	139	318	72
South Carolina	1.31%	14,062	256	3,079	1,663	369	1,310	1,785	2,067	1,406	199	507	1,159	262
South Dakota	0.13%	1,395	25	306	165	37	130	177	205	140	20	50	115	26
Tennessee	1.96%	21,039	383	4,606	2,488	552	1,960	2,671	3,092	2,104	297	759	1,734	392
Texas	8.09%	86,838	1,582	19,012	10,271	2,280	8,090	11,023	12,764	8,683	1,227	3,132	7,157	1,618

State	% of Total US Market	Total US Jobs	Analytical Services	SW Mgmt	HW Mgmt	Asbestos Abatement	Water Equip	Water Util	Env C&E	Res. Rec.	Instruments	APC Equip	Waste Mgt. Equip	Env. Energy
Totals	100%	1,072,862	19,556	235,000	126,957	28,182	100,000	136,250	157,778	107,333	15,167	38,714	88,462	20,000
Utah	0.71%	7,621	139	1,669	901	200	710	967	1,120	762	103	275	628	142
Virginia	0.25%	2,683	49	588	317	70	250	341	394	268	38	97	221	50
Washington	2.58%	21,575	393	4,724	2,552	566	2,010	2,739	3,171	2,157	305	778	1,778	402
West Virginia	2.01%	27,694	505	6,063	3,275	727	2,580	3,515	4,071	2,769	391	999	2,282	516
Wisconsin	0.88%	9,446	172	2,063	1,117	248	880	1,199	1,388	945	133	341	778	176
Wyoming	2.04%	21,897	399	4,794	2,590	575	2,040	2,780	3,219	2,190	309	790	1,805	408
TOTAL US	0.21%	2,254	41	494	267	59	210	286	331	225	32	81	186	42
	100%	1,072,862	19,546	234,883	126,894	28,168	99,950	136,182	157,699	107,279	15,159	38,695	88,418	19,990

4.5 Diversification Opportunities For New England Defense Companies

Massachusetts has been among the most defense-dependent states in the nation, both in actual defense contract dollars and in defense-related employment. Consequently, the reduction in defense spending associated with the end of the Cold War has created significant economic damage to New England. In federal fiscal year 1991 \$6.93 billion in Department of Defense (DOD) prime contracts were awarded compared to \$8.75 billion in 1989 (Bay State Skills Corporation, 1993). In addition, Massachusetts is third, behind Connecticut and Virginia in the proportion of total private sector jobs in the state economy that are reliant on defense dollars. The Defense Conversion Commission estimates that as many as 46,000 defense jobs will be lost in Massachusetts alone between 1991 and 1997 (Bay State Skills Corporation, 1993).

The recent decline of the defense industry in the region creates an opportunity for the conversion of defense companies' advanced technology and highly skilled labor force to commercial environmental technology markets, both domestically and internationally. As stated by the Governor's Task Force on Defense Industry and Technology, "Defense firms in Massachusetts possess technical capabilities that may be especially suited or capable of adaptation for application to environmental needs and problems. These include in particular sensor technology, along with formal tools of systems analysis and engineering such as risk analysis, simulation, strategic planning and program analysis and application of computer systems for tracking/manifesting, systems analysis, and process performance simulations. The technical capacity of defense firms also make them valuable partners of

envirotech companies in the assessment and development of particular remediation technologies" (Bay State Skills Corporation, 1993). The diversification or conversion of defense firms into the envirotech sector is feasible and carries great economic potential for the region. However, there are several barriers that defense companies seeking to enter into the environmental field must face before diversification can be successful.

Central among the obstacles that exist for defense firms interested in participating in the envirotech field is aggressive regulation. The envirotech industry is considered to be born out of regulation and because of that the industry has developed its own distinct culture and language and before defense companies can become a part of the envirotech market they must learn and embrace the language, culture and its regulatory roots. The term culture refers to how different industries perceive markets, how problems are defined, how forecasts are made, what levels of business risk are tolerable and the duration of product development and marketing time horizon. In addition, defense companies unfamiliarity with commercial markets, lack of competition experience, lack of financing, and the fact that defense firms emphasize performance for extreme conditions, rather than cost, timeliness and simplicity all are obstacles facing defense firms seeking entrance into the environmental field (Bay State Skills Corporation, 1993).

The 1993 New England Environmental Expo included a workshop addressing diversification opportunities for defense companies. The session examined the obstacles discussed above and identified potential actions that could be taken by both defense dependent companies and the public sector to assist in the diversification of defense companies into the envirotech field. These

recommendations included: the formation of partnerships between defense firms and envirotech firms to pool technical expertise, creation of joint purchasing or sales channels and development of joint export potential; expansion of federal programs which promote defense conversion; networking between the envirotech field and the defense field, to assist defense companies; and public sector education of the defense industry on envirotech issues through publications, conferences and meeting.

Overall, there exists a potential for defense firms to play a role in the commercialization and export of environmental goods and services. The defense companies have unique strengths, including engineering expertise, advanced technologies, and a commitment to quality unmatched by many non-defense firms (Bay State Skills Corporation, 1993). The diversification of defense companies is a time-consuming process and the obstacles facing the industry must be addressed if diversification is to occur at all. The ill-fated experiences of the giant aerospace firms in the 1970s as they diversified into the field of mass transit are illustrative of the complexity of diversification and warrant the allocation of resources, both public and private, to assist defense companies in making a strong entrance into the field of environmental technology.

5. Obstacles to Successful Global Marketing of the U.S.. Envirotech Industry

Thus far we have determined two important facts about the exporting of environmental technology products. The first is that global markets for the envirotech industry exist and that the United States is currently the largest exporter of green technology in the world. But we have also learned that the

United States exports less than 10% of the products and services it develops for this industry and is in danger of losing its position in the hierarchy of leading exporting countries.

There are four major obstacles that hinder the competitiveness of the U. S. envirotech industry around the world. Briefly stated they are: a lack of capital, permit process problems, inexperience in the global market, and the lack of intergovernmental coordination regarding the development, commercialization, and marketing of environmental technologies.

5.1 The Lack of Capital

The envirotech industry requires vast sums of capital to insure its viability. It is an industry that has grown as a direct result of government directed regulations to protect the environment and relies on public as well as private funding.

Capital is needed for research and development. Once created, new innovative technologies must be tested, produced, and marketed. Scientific products and processes require laboratories, facilities and test sites, in addition to well trained, highly skilled engineers and scientists.

From the perspective of the venture capitalist to whom many small and medium sized green companies turn for capital, environmental technology offers many financial risks. In addition to the traditional risk of uncertainty associated with bringing technology to development, the envirotech industry must address the challenge of meeting regulatory standards that are

constantly evolving or changing. This additional uncertainty makes it difficult for the financial community to predict the performance of a particular technology.

Standards change not only at the federal level within the Environmental Protection Agency, but among the different states. A technology may need to be altered several times to accommodate different regions or states within this country, adding to the cost of development. According to Donald Connors of the Environmental Business Council of the United States, there are 51 different regulatory programs in this country (House of Representatives Hearing on Green Technology Initiatives). The possibility of unknown costs due to the unpredictability of standards contributes to the risks of the project which may scare away potential investors. When an innovative technology is deemed too risky to finance in this country it may be sold to a foreign competitor for development overseas (U.S.. Interagency Environmental Technologies Export Working Group, 1993, 16).

Public funding at the national level for pollution control research and development was lower in the 1980's than in the 1970's. This may have contributed to the United States losing its lead in certain global technologies such as the smokestack-scrubber market (U.S.. News and World Report, 50).

But a lack of capital inhibits the importing country as well as the United States companies who wish to export their technologies. Without capital, other countries, particularly developing countries, are unable to purchase the environmental remediation and prevention technology necessary to improve or prevent hazards to the environment in their respective

homelands. The lack of capital for potential buyers to purchase technology subsequently inhibits the potential marketability of U.S.. envirotech firms.

Speaking before the House of Representatives in the summer of 1993, a number of business and government leaders suggested areas of the environment technology industry where increased funding was needed. They included: greater financial assistance with research and development; seed money for small companies; funding to perform technical assessments of new technologies; financial assistance for foreign aid; and improved access to effective sources of government and private financing (House of Representatives, Committee on Science, Space, and Technology, July 1993).

Private investment in the envirotech industry is unlikely to increase until the expectations for success outweigh the perceived risks by potential investors. In 1991, according to Fortune Magazine, pollution-control stock accounted for 1.3% of the total value of Standard and Poor's 500 stocks, up from 0.7% in 1987 (Fortune, 1991, 146). In September of this year, however, Grant Ferrier of the Environmental Business Journal stated that venture capital investment in environmental technology was dropping because "technology is not proprietary and companies lack good management and business strategies" (Ferrier, Environmental Industry Summit, September 1994).

Private funding for research, development and demonstration is more difficult to track than capital investment primarily because of the difficulty that exists with defining environmental technology. The Office of Technology Assessment "estimates" that the environmental industry sector

spends \$750 million to \$870 million per year on R&D (Office of Technology Assessment, 1994, 310). An important fact to note is that more than half of private environmental R&D in this country is conducted by regulated industry rather than by environmental firms (Office of Technology Assessment, 1994, 309).

Public spending on environmental technologies is more than double the amount spent by the private sector and is currently estimated to be \$1.8 billion, with \$1 billion devoted to cleaner energy technologies and \$650 million for hazardous waste remediation. Pollution prevention and end-of-pipe technology account for the remainder of the funding (U.S.. Office of Technology Assessment, 1994, 294).

Funding for government support of environmental R&D comes primarily from the Department of Energy (\$1.3 billion). The Department of Defense is the next highest contributor (\$230 million) and the EPA contributes \$94 million (U.S.. Congress, Office of Technology Assessment, 1994, 301). Currently, more funding for R&D under the 1992 Energy Policy Act is anticipated. In addition, over the next nine years, \$1.85 billion is expected to fund the EPA's involvement in environmental systems and treatment techniques that will benefit environmental technology exports (U.S.. Congress, Office of Technology Assessment, 1994, 46).

At the other end of the spectrum from R&D, the government also provides funding to support export promotion of environmental technology. In 1990, the federal government established the interagency Trade Promotion Coordinating Committee (TPCC) to consolidate and streamline export

promotion activities (U.S.. Congress, Office of Technology Assessment, 1994, 157). In 1992 the Environmental Trade Promotion Working Group was formed as part of the TPCC to target trade promotion places for the environmental technology industry. In November of 1993 an interagency working group published its strategy including a commitment to "market Export-Import Bank (Eximbank) and the Overseas Private Investment Corporation (OPIC) programs among environmental technologies firms, especially small and medium-sized firms" (Interagency Environmental Technologies Exports Working Group, 1993, 26). It also pledged to increase funding for pre-feasibility and feasibility studies.

The Eximbank funded by the federal government supports the sale of U.S.. goods abroad by offering loans, guarantees and insurance to companies in need of short-term financing. This assistance helps companies, especially smaller ones, through the period between the time that goods are shipped and payment is received. The Export Enhancement Act of 1992 requires the Eximbank to support the exporting of goods and services related to the environment, but it is not known what proportion of their budget is spent to bolster exports in the envirotech industry. Eximbank's export coverage, however, is reported to be limited and the processing of applications has been slow (U.S.. Congress, Office of Technological Assessment, 1994, 179-180).

The Overseas Private Investment Corporation (OPIC) provides similar services (loans, guarantees, and insurance) "to support U.S.. foreign direct investment in developing countries and other emerging markets" (Environmental Protection Agency, Exports Working Group, 1993, 31). The Small Business Administration (SBA) funds less than \$100 million per year

for export financing and does not view this type of financing as a priority (U.S.. Congress, Office of Technology Assessment, 1994, 180).

The funding of feasibility studies for capital projects in developing countries by the U.S.. Trade and Development Agency (TDA) is another way that the government tries to promote the U.S.. environmental technology industry. The TDA spends approximately \$40 billion per year funding studies that U.S.. firms conduct in developing countries to see if projects targeted to protect the environment are feasible. The U.S.. government hopes to increase its funding of feasibility studies, nonetheless, this increased amount would be one-fifth the amount that Japan budgets for similar studies (U.S.. Congress, Office of Technology Assessment, 1994, 35).

It remains to be seen if additional funding and added support for existing programs will be able to provide the stimulus needed to help make U.S.. envirotech firms globally competitive.

In addition to the federal government, 20 states provide some type of export loans and/or loan guarantees or insurance.

In Massachusetts, the Forum for Innovative and Alternative Technologies solicited opinions from developers of innovative technology, environmental technology companies, state agency representatives and other related groups regarding their interest in alternative tax credit proposals as a means of accelerating the development and promotion of the Massachusetts envirotech industry. The results of their survey showed that there was little interest in investor tax credits as a method of enhancing the development of

innovative technologies. Those surveyed, instead, recommended a Public Venture Capital Fund which, unlike the tax credits, "allows the state to control the amount of public dollars expended." It was felt that a fund which targeted the development of environmental technology innovations, combined with efforts to reduce regulatory and business uncertainty, would be most beneficial. As a result, Massachusetts plans to fund \$5 million for this purpose (The Forum for Innovative and Alternative Technologies, 1994: 20-21). This fund could prove to be a model for other private and governmental funding sources if successful.

5.2 The Permitting Process

Uncertainty concerning the permitting process not only contributes to investor timidity, but affects the development and commercialization of innovative technologies in other ways as well. The inability to move quickly from the idea stage to the product stage in the permitting process makes it difficult to maintain a competitive edge. Governmental requirements "trigger and define the environmental marketplace" (Technology Innovation and Economic Committee, EPA, 1991).

In a study conducted by the Technology Innovation and Economic Committee (TIE) of the Environmental Protection Agency (EPA), it was determined that:

... administrative complexity, high cost, duplication, and layering ... create a severe dysfunction in environmental technology markets. These problems, generally present in all environmental programs in the United States, are especially damaging to technology innovation for environmental purposes (TIE 1991, 28).

It is necessary to protect human health and the environment while testing and demonstrating the use of new technology. But excessive costs and delays related to the drafting of applications for testing, negotiation of permit terms and pre-permit data gathering actually discourage the development of new technologies and their delivery to market. In fact, costs related to the permitting process in some instances have exceeded the cost of the technology (TIE 1991, 30). Permitting and compliance has been affected, also, by excessive turnover in personnel fueled, in part, by insufficient training and a lack of support. Insufficient personnel delays the permitting of new innovations in green technology.

The permitting process currently lacks a multi-media (e.g. air and water) approach to testing of new technologies and review of permit applications. A shortage of acknowledged centers for testing and demonstrations currently exists. In addition:

... permits for the use of new technologies are currently difficult to obtain because responsible government officials favor technologies with assured performance standards over new and innovative alternatives (Interagency Environmental Technologies Exports Working Group 1993, 16).

In response to the concern that delays and complicated procedures related to the permitting process are inhibiting the successful development of innovative environmental technologies, the Technology Innovation and Economics (TIE) Committee, a part of the Environmental Protection Agency, has made recommendations in the improvement of the permitting and compliance process.

They recommend that systems be instituted to specialize permits, provide dedicated test centers and coordination of permit applications to accelerate the demonstrations of innovative environmental technologies. Similarly, they felt that the government should increase the flexibility of permitting processes, streamline the process of permit applications and assure national consistency in introducing new technologies. They also requested a review of all regulatory obstacles which create unnecessary inflexibility and uncertainty or otherwise inhibit environmental technology innovation (National Advisory Council for Environmental Policy and Technology, Technology Innovation and Economics Committee, EPA, 1991, 51-).

5.3 Lack of Experience in the Global Market

A third obstacle that the U.S.. environmental technology industry must overcome in order to succeed as a major exporter is their lack of experience operating in international markets.

The American envirotech industry developed as a direct result of regulations imposed on private and public enterprises operating in a highly developed, open society whose citizens and government representatives vigorously expressed their concern for the safety and well-being of their environment. The United States is endowed with the resources and the collective will to improve the environment, although most of its experience with protecting the environment has been in the domestic market. The United states is estimated to spend between 2% and 3% of its gross domestic product on environmental goods and services, an amount unsurpassed by other

countries (U.S.. House of Representatives, Hearings on Green Technology Initiatives, 1993, 165).

Companies wishing to export their products and services confront different environmental laws and regulations when dealing outside of the domestic realm. In addition, they have to deal with different social, political, and economic systems operating in foreign countries. Some countries may have nationalized enterprises, or cartel-like organizations. Some may have strong labor union participation who operate to protect and advance their interests. U.S.. companies may have to deal with political and governmental structures who influence the types of purchases that are made. And, when United States companies seek financial assistance from state agencies that encourage trade with other countries, such as USAID, EPA, and the Export-Import Bank, they face a myriad of options that are difficult to comprehend or distinguish from each other. As a result, they are often reluctant to explore global markets because of perceived risk and limited profitability (U. S. House of Representatives, Hearings on Green Technology Initiatives, 1993, 165-166).

Perhaps the greatest challenges for individual entrepreneurs and small institutions within the industry is to determine where the markets are, requiring the requisite data at their disposal to make those determinations, and how to gain access to those markets.

Identifying the decision makers (those who can approve supplier selection and funding) and gaining access to those persons may often require social, commercial, political, and personal contacts which new American entrants in foreign markets lack (Connors, 1993, 2).

In addition, United States envirotech companies are not only competing with each other, but with foreign companies who may be receiving official governmental support for, and assistance with, their endeavors.

Another consideration to be made, according to a trade association representative, is that foreign buyers of green technology seek comprehensive services to accompany products, equipment, and services that protect the environment. They are looking for education and training packages to accompany their purchases. This packaging will require coordinated programs. But currently, the U.S.. envirotech industry is fragmented both by sector and by geography. Entrepreneurs concerned with waste water treatment or clean air technology are not working together to promote the exporting of their various inventions or area of expertise as well as by the area where their industry is clustered (U. S. House of Representatives, Hearings on Green Technology Initiatives, 1993, 151-152).

One of the most frequently heard recommendations for help in navigating the global marketplace is the request for "one-stop shops" to facilitate access to programs that will accelerate participation in the international sphere. Other recommendations include public/private partnerships such as the TPCC Latin American Environmental Initiative in which the federal government will provide information to U.S.. companies regarding opportunities in Latin America in addition to acting as an advocate for U.S.. Products, projects and services in Mexico (Interagency Environmental Technologies Exports Working Group, 1993, 24).

5.4 Lack of Coordination Among Government Agencies

A fourth obstacle related to the difficulty of United States companies operating in foreign markets is that "current federal programs supporting environmental technology suffer from diffuseness and lack of coordination" (U. S. House of Representatives, Hearings on Green Technology Initiatives, 1993, 173). Within the department of Environmental Protection there are programs like the U.S. TIES program (U.S. Technology for International Environmental Solutions) which encourages export initiatives. The government also has many programs that specifically support the exporting of energy technologies. They can be found in the Department of Energy, the Trade and Development Agency, and the Department of Commerce. There are programs that help U.S. companies manage the risk involved with exporting goods and services such as the Export-Import Bank and the Overseas Private Investment Corporation (OPIC). And there are programs like the U.S.-Asia Environmental Partnership Act which cooperates with other agencies to secure a place for green technologies in the Asian market (U. S. House of Representatives, Hearings on Green Technology Initiatives, 1993, 173-174). But little coordination exists between the wide range of agencies and policies.

The Clinton Administration, through the Interagency Environmental Technologies Exports Working Group (the Department of Commerce, the Department of Energy, and the Environmental Protection Agency), has developed recommendations to improve governmental coordination of environmental technologies export efforts. The broadly stated goals of the "Strategic Framework for U.S. Leadership" call for: partnership between government and business to enhance technologies; and improved

coordination of government export programs and resources (Interagency Environmental Technologies Exports Working Group 1993, 35-36). Within each goal, actions have been formulated for the purpose of achieving the appropriate goals.

Navigating the maze of departments, agencies and programs of the federal and state governments is a monumental task. The Trade Promotion Coordinating Committee that was established in 1990 to streamline federal export promotion activities, consists of 12 departments of the government that are outlined in the table below. This table illustrates the extensive overlap that exists (Export Enhancement Act of 1992, Public Law 102-429, Section 201).

Table 13 - Members of the TPCC

The Department of Commerce
The Department of State
The Department of the Treasury
The Department of Energy
The Department of Agriculture
The Department of Transportation
The Office of the United States Trade Representative
The Small Business Administration
The Agency for International Development
The Trade and Development Agency
The Overseas Private Investment Corporation
The Export-Import Bank of the United States
and other agencies at the discretion of the President

The TPCC also set up a one-stop information center which refers interested individuals, agencies and companies to the appropriate program that they need. But as yet there is still not one place that environmental entrepreneurs and innovators may go to receive comprehensive foreign marketing support.

The EPA is conspicuously absent from this group, but is mandated to be part of yet another group that includes all of the departments mentioned above and was created specifically to facilitate the expansion of U.S. environmental technology exports--The Environmental Trade Working Group.

In addition the Department of Commerce, the Department of Energy and EPA have come together as the Interagency Working Group on Environmental Technology to create a strategic plan on behalf of environmental trade (U.S. Congress, Office of Technology Assessment, 1993, 83).

The private sector also attempts to coordinate services. One of the oldest and best known is the Environmental Business Council of the United States which began as a regional trade organization in New England. A more recently organized nonprofit business association is The Environment Technology Export Council.

Until there is truly one-stop shopping, however, confusion will continue to impede the pace of development.

To date, the major obstacles to a strong envirotech export industry have been stated and goals have been formulated to overcome those obstacles. It remains to be seen if the problems generated by a complicated permitting process, inexperience in the global marketplace and a lack of program coordination can be addressed so that the necessary public and private capital can be harnessed to advance United States prospects for marketing environmental technology abroad.

6. Justification

In September 1994, the Department of Landscape Architecture and Regional Planning launched the Center for Green Technology (CGT). The CGT is dedicated to the implementation of strategies to promote the development, commercialization, and export of U.S. environmental technology, goods, and services from the six state New England region (Massachusetts, Connecticut, Rhode Island, Vermont, Maine, and New Hampshire).

The CGT is important to the New England because although the recession of the United States economy has been difficult for the entire nation the New England region, which has traditionally had high concentrations of manufacturing jobs, was hit especially hard and for a longer period of time than other regions of the nation. The economic problems of the New England region are complicated further due to the fact that the region has the highest concentration of defense related industries which are feeling the impacts of decreasing Federal defense spending. The New England region is in need of a strong industry to take the place of the lost manufacturing and defense related jobs and revenues.

An industry which could fill this void in the New England economy is Green Technology. The Green Technology industry represents a growing, profitable, and environmentally important market which is expected to continue to expand in the near future. The OECD estimated that in 1990 Green Technology was a \$200 billion world market which would increase to \$300 billion by the year 2000. Currently, the U.S. is the world's largest producer and consumer of environmental goods and services, accounting for 40% (\$80

billion) of the world's market. The U.S. Department of Commerce estimates that there are between 7,000 and 10,000 U.S. companies involved in international environmental technology markets and a July 1993 EPA report showed that those companies exporting Green Technology were responsible for providing the U.S. with a positive trade balance in this industry of \$1.1 billion in 1991.

Domestically, the U.S. has approximately 60,000 companies, concentrated in 15 clusters throughout the country, involved in the Green technology industry with combined revenues of \$120 billion in 1991. The New England Region is considered a leader in environmental technology and will be a key player in the future growth of the Industry. The region is home to over 2,000 companies that were responsible for almost 60,000 jobs and accounted for over \$7 billion in revenues in 1992. Massachusetts alone accounts for the largest share of revenues of the region with over \$2 million in sales in 1992.

The Green Technology industry also offers an excellent opportunity for the conversion of defense industry technology and skilled work force to the production and commercialization of Green Technology. Massachusetts has been among the most defense-dependent states in the country and the reduction in defense spending associated with the Cold War has created an opportunity for the technical know-how and innovation of the defense industry to be converted to, or applied to, the envirotech industry. The technical capacities and the technological sophistication, as well as the defense industry's commitment to quality can play a vital role in the growth of New England's Green Technology industry if the necessary resources are available for the transition to take place. Defense companies need to understand the

regulatory, technological, and business context into which they will be moving.

Despite the fact that the U.S. and specifically New England currently has a strong Green Technology industry the U.S. is facing increasing competition in the global Green Technology market. Even though the U.S. has some of the best environmental expertise in the world our lack of presence in the global market place has caused the U.S. to loose its share of the global environmental technology market to nations that have been supporting and vigorously promoting their own environmental technology capabilities such as Germany and Japan. In addition, the U.S. Green Technology industry is further inhibited by the policies and regulations of the Federal government.

The CGT is in a position to be more successful at accomplishing its goals of promoting the export of U.S. and, particularly New England Green Technology, because of its affiliation with the University of Massachusetts. The CGT will have access to the knowledge and experience of the faculty, staff, and students of the university as well as the existing university system resources most suitable and readily available for implementation in the furtherance of the objectives of the CGT. In addition the CGT will have the opportunity to seek opportunities for joint research and development with the private sector.

The Department of Landscape Architecture and Regional Planning in which the CGT is located is exceptionally qualified to successfully obtain the Center's objectives. The Department has been responsible for numerous externally funded studies, reports, and projects related to environmental planning,

environmental protection, and economic development. The Department is currently home to the newly formed Center for Green Technology (CGT), Center for Rural Massachusetts (CRM), METLAND Research group for land assessment and planning, and the Center for Economic Development (CED).

7. List of Foundations

The research done to compile the list of foundations included the two most apropos subject headings of Environment and Science and Technology. The funding sources that were located in or directed specifically to the six state New England region are highlighted by a bullet (•). Hundreds of foundations were reviewed. The following are those that most closely meet the criteria set forth by the director of the Center for Green Technology, Professor Sidney Wolf.

The criteria included the following four areas of concentration:

1. Foundations capable of funding projects over \$50,000.
2. Foundations specific to environmental issues.
3. Foundations specific to economic development.
4. Foundations which are national and New England regional which satisfy the first three criteria.

7.1 The Foundations: Focus on Environment

California

- 133 **American Honda Foundation** Tel. (310) 781-4090
P.O. Box 2205 Fax:
Torrance 90509-2205
Contact: Kathryn A. Carey, Mgr.
Financial data 1993: \$1,189,481 for 23 grants.
Average grant \$10,000 to \$100,000. High \$100,000
Fields of interest: Education, science and technology, youth, physical sciences, higher education.
Types of support: Scholarship funds, fellowships, special projects, operating budgets, continuing support, seed money, matching funds, general purposes.
Application information:
 Initial approach : Letter or telephone
 Copies of proposal : 1
 Deadline(s) : Nov. 1, Feb. 1, May 1, Aug. 1
Sample grants: N/A
- 235 **Compton Foundation** Tel. (415) 328-0101
545 Middlefield Road, Suite 178 Fax:
Menlo Park, 94025
Contact: Edith T. Eddy, Exec. Dir.
Financial Data 1992: \$3,612,020 for 411 grants.
Average \$500 - \$40,000. High \$199,000. In 1991 the range was \$50,000 - \$353,000.
Fields of interest: Family planning, population studies, peace, foreign policy, conservation, environment, arms control.
Types of support: Endowment funds, fellowships, general purposes, matching funds, operating budgets, continuing support, annual campaigns, special projects, consulting services, land acquisition, capital campaigns.
Application information:
 Initial approach : 3-4 page proposal
 Copies of proposal : 1
 Deadline(s) : May 1 and October 1
Sample grants: N/A
- 283 **Energy Foundation** Tel. (415) 546-7400
75 Federal Street Fax: (415) 546-1794
San Francisco 94107
Contact: Hal Harvey, Exec. Dir.
Financial data 1992: \$6,079,985 for 56 grants.
Average \$10,000 to \$250,000. High \$300,000.

283 (Cont'd)

Fields of interest: Energy, environment, and transportation.

Types of support: Special projects

Application information:

Initial approach: Letter of inquiry

Copies of proposal: 1

Deadline(s): None

Sample grants: N/A

- 306 Foundation for Deep Ecology** Tel. (415) 771-1102
(Formerly Ira-Hiti) Fax:
950 Lombard Street
San Francisco 94133
Contact: Quincey Tompkins, Exec. Dir.
Financial data 1992: 2,981,491 for 193 grants.
Average \$10,000-\$75000. **High** \$100,000.
Fields of interest: Ecology, international affairs, public policy, family planning, environment, and conservation.
Types of support: Special projects, publications, conferences and seminars, continuing support, general purposes, operating budgets, grants to individuals.
Application information: Application form required.
Initial approach: Proposal
Copies of proposal: 1
Deadlines: None
Sample grants:
\$200,000 to Foundation on Economic Trends, DC; 2 grants of \$100,000, one for general support, one for genetic engineering.

\$50,000 to Gwichin Steering Committee, Anchorage, AK for public education campaign.

\$50,000 for Public Spaces, New York City, NY for Ladakh Project.

- 402 The Homeland Foundation** Tel. N/A
412 North Pacific Coast Highway Fax:
Laguna Beach 92651-1381
Contact: Glenda Menges
Financial data 1991: \$1,360,000 for 125 grants.
Average \$5,000 to \$25,000. **High** \$141,000.
Fields of interest: Conservation, environment, women.
Types of support: Special projects, general purposes.
Limitations: Giving primarily on West Coast; have donated to D.C. and N.Y.

402 (Cont'd)

Application information: No application form required.

Initial approach: Proposal, not to exceed 4 pages.

Copies of proposal:

Deadline(s): Mar. 1, June 1, Sept. 1, and Dec. 1.

Sample grants:

\$141,000 to World Wildlife Fund/Conservation Foundation, DC.

\$100,000 to Natural Resources Defense Council, Los Angeles, CA.

\$23,370 to Partners of the Americas, DC.

- 515 **Giles W. and Elise G. Mead Foundation** Tel. (707) 257-8737
 P.O. Box 2218 Fax:
 Napa 94558

Contact: Suzanne Easton, Exec. Admin.

Financial data 1992: \$489,000 for 21 grants.

Average \$2000 - \$25,000. High \$125,000.

Fields of interest: Environment, conservation, ecology.

Types of support: Seed money, land acquisition, research, matching funds, equipment, special projects, conferences, and seminars.

Limitations: Given primarily in Western U.S.

Application information: Application form not required.

Initial approach: Letter or telephone

Copies of proposal: 1

Deadline: None

Sample grants: N/A

- 745 **Warsh-Mott Legacy** Tel. (707) 874-2942
 469 Bohemian Highway Fax:
 Freestone 95472-9579

Contact: Martin Teitel, Exec. Dir.

Financial data 1992: \$293,000 for 8 grants.

Average \$15,000 - \$25,000. High \$163,900

Fields of interest: Environment, conservation, public policy.

Types of support: Continuing support, matching funds operating budgets.

Application information: Application form not required

Initial approach: Proposal

Copies of proposal: 1

Deadline(s): Jan. 15, May 15, Sept. 15.

745 (Cont'd)

Sample grants:

\$163,950 to C.S. Fund, Freestone, CA

\$40,000 to Children's TV Research and Education Center, San Francisco, CA.

Colorado

807

General Service Foundation

Tel. (303) 920-2953

411 Main Street, Suite 205

Fax: (303) 920 4578

Aspen 61611-2953

Contact: Robert W. Musser, Pres.

Financial Data 1992: \$1,656,750 for 92 grants.

Average \$10,000 to \$35,000. High N/A

Fields of interest: Population studies, conservation, environment, international studies, international affairs, and public policy.

Types of Support: Special projects, general purposes, seed money, operating budgets, emergency funds.

Application information: Application form required.

Initial approach:: Letter of inquiry

Copies of proposal:: 1

Deadline(s) : February 1 and September 1

Sample grants:

\$150,000 to Yale University, School of Foreign and Environmental Studies, New Haven, CT. Created fellowship in Population and Environment for women and minority students to study the relationship between human population and issue of management of environment.

\$50,000 to the Northwest Research Information Center, Eagle, ID. For Columbia River Basin Project to prevent extinction of Snake River Basin wild salmon and its dependent economies and to facilitate changes in land , water, and energy policies which affect them.

Connecticut

- 875 **Barnes Group Foundation, Inc.** Tel.: N/A
123 Main Street Fax:
Bristol 06010
Contact: none
Financial data 1992: \$438,329 available for grants.
Fields of interest: Higher education, community funds, and environment.
Types of support: Employment related scholarships, general purposes, capital and campaigns. Some emphasis on Connecticut and the New England region.
Application information: Application form required.
Initial approach: N/A
Copies of Proposal: N/A
Deadline: March 1
Sample grants:
\$115,187 to Citizens Scholarship Foundation.

\$10,000 to Wadsworth Athenaeum, Hartford, CT.
- 910 **The Educational Foundation of America** Tel. (203) 226-6498
35 Church Lane Fax: (203) 227-0424
Westport 06880-3589
Contact: Diane M. Allison, Exec. Dir.
Financial data 1992: \$5,153,611 for 132 grants.
Average \$10,000 - \$50,000. High \$375,000
Fields of interest: Family planning, arts, environment, Native Americans, education.
Types of support: General purposes.
Application information: Application form not required.
Initial approach: Letter of inquiry only.
Copies of proposal: 6
Deadline(s): None
Sample grants paid in 1992:
\$200,000 awarded to Woods Hole Research Center, Woods Hole, MA for project, sustainable harvests from tropical forests.

\$150,000 award to Southern Environmental Law Center, Charlottesville, VA for energy project.

\$122,000 to Seed Savers Exchange, Decorah, IA for maximizing publications and projects.

- 963 The Frederick H. Leonhardt
Foundation, Inc.
c/o Berry & Howard
One Canterbury Green
Stamford 06901
Tel. (203)323-7410
Fax:
Contact: Betsy Rich, Spec. Advisor
Application address:
c/o Fairfield County Cooperative Foundation
Five Landmark Square
Stamford 06901
Financial data 1991: \$355,287 for 31 grants.
Average N/A. High \$145,287.
Fields of interest: Education, environment, family services,
social services.
Types of support: General purposes, matching funds.
Application information: N/A
 Initial approach : Letter
 Copies of proposal : N/A
 Deadline(s) : None
Sample grants: N/A

- 1024 Lawson Valentine Foundation
998 Farmington Ave., Suite 123
West Hartford 06107
Tel. (203) 521-3108
Fax:
Contact: Alice P. Doyle, Trustee
Financial data 1992: \$266,278 for \$104 grants.
Average N/A. High \$60,000.
Fields of interest: Higher education, environment, wildlife, civil
rights, peace, human rights.
Types of support: General purposes.
Application information:
 Initial approach : Letter
 Copies of proposal : 6
 Deadline(s) : None
Sample grants 1992:
\$60,000 to Bennington College, Bennington, VT.

\$25,000 to University of Pennsylvania, Philadelphia, PA.

Washington, D.C.

- 1141 Charles E. Koch Charitable Foundation Tel. (202) 842-4616
1401 I Street, N.W., Suite 300 Fax: (202) 842-4667
Washington 20005
Contact: Lynn Taylor, Managing Dir.
Financial data 1991: \$633,300 for 24 grants.
Average N/A. **High** \$300,000.
Fields of interest: Higher education, social sciences, public policy, crime and law enforcement, drug abuse, environment.
Types of support: General purposes, scholarship funds.
Application information:
Initial approach: Letter, no more than three pages
Copies of proposal: 1
Deadline(s): None
Sample grants: N/A

Georgia

- 1559 Turner Foundation, Inc. Tel. (404) 681-990
P.O. Box 550026 Fax:
Atlanta 30355
Contact: Edward C. Harris, Treas.
Financial data 1990: Initial year of operation 1990, no information available
Fields of interest: Environment
Types of support:
Application information:
Initial approach: Letter
Copies of proposal: 1
Deadline(s): May 1, Nov. 1
Sample grants: N/A

Illinois

- 1842 J. Roderick MacArthur Foundation Tel. (708) 966-0143
9333 North Milwaukee Avenue Fax:
Niles 60714
Contact: N/A
Financial data 1993: \$1,607,714 for 60 grants.
Average \$8,000 - \$20,000. **High** \$400,000.
Fields of interest: Civil rights, law and justice, international affairs, freedom, public policy, human rights.
Types of support: Seed money, publications, special projects.

1842 (Cont'd)

Application information: Form not required.

Initial approach: Letter

Copies of proposal: 1

Deadline(s): None

Sample grants:

\$512,000 to Fund for Free Expression, DC.

1843 **John D. and Catherine T. MacArthur
Foundation**

Tel. (312) 726-8000

Fax:

140 South Dearborn Street

Chicago 60603

Contact: Richard Kaplan,

Dir., Grants Mgt., Research, & Information

Financial data 1992: \$137 million for 804 grants.

Average N/A. High N/A.

Fields of interest: Health, mental health, cultural programs, community development, foreign policy, public policy, international affairs, government law and justice, conservation, ecology, environment, education.

Types of support: Matching funds, general purposes, operating budgets, special projects, research, fellowships.

Application information: Grants increasingly initiated by the board.

Initial approach: Letter

Copies of proposal: 1

Deadline(s): Feb. 1, Aug. 1

Sample grants:

\$1,100,000 to Smithsonian Tropical Research Institute, Panama for new Center for Tropical Science and Forest.

\$1,000,000 to Museum of science and Industry, Chicago, IL, for capital campaign to establish Omnifax Film Production Fund.

Massachusetts

•2456 **Azadoutioun Foundation**

Tel. (617) 229-2111

c/o Mugar Group, Inc.

Fax:

Two Burlington Drive

Burlington 01803-4538

Contact: Carolyn Mugar

Financial data 1991: \$115,000 for 6 grants.

Average N/A. High \$70,000

Fields of interest: Environment, social services, international development.

Types of support: General purposes, special projects.

2456 (Cont'd)

Application information: Form not required.

Initial approach: N/A

Copies of proposal: N/A

Deadline(s): None

Sample grants: N/A

•2493 Alice P. Chase Trust

Tel. (617) 722-7340

c/o Boston Safe Deposit and Trust Co.

Fax:

One Boston Place

Boston 02108

Contact: Ms. Sylvia Salas, Trust Officer.

Financial data: Average N/A. High \$50,000.

Fields of interest: Music, recreation, education, environment, youth, social services, history.

Types of support: capital campaigns, equipment, general purposes, renovation projects, special projects, technical assistance.

Application information: Application form not required.

Initial approach: Letter requesting guidelines.

Copies of proposal: 1

Deadline(s): Feb. 1, May 1, Aug. 1, Nov. 1

Sample grants: N/A

•2503 Jessie B. Cox Charitable Trust

Tel. (617) 426-7172

c/o Grants Management Associates

Fax:

230 Congress Street, 3d Floor

Boston 02110

Contact: Michaelle Larkins, Foundation Assistant

Financial data 1991: \$3,059,230 for 85 grants.

Average \$20,00 - \$50,000. High \$105,000.

Fields of interest: Education, higher education, environment, conservation, health, New England region.

Types of support: Seed money special projects.

Application information: Application form not required.

Initial approach: Brief concept paper

Copies of proposal: 1

Deadline(s): January 15, April 15, July 15, Oct. 15

Sample grants:

\$100,000 to Natural Resources Council of Maine, Augusta, ME, toward air pollution initiative to reduce ground-level ozone and greenhouse gases in Maine.

2503 (Cont'd)

\$50,000 to Appalachian Mountain Club, Boston, MA for second grant support of northern Forest Lands Project, an effort to develop a site-specific strategy for long-term protection of New England's northern forests

\$50,000 to 1000 friends of Massachusetts, Lincoln Center, MA for continued support for start-up.

- 2550 **G. Peabody and Rose Gardner Charitable Trust** Tel. (617) 951-2777
Fax:
c/o Taylor, Ganson and Perrin
160 Federal Street, 16th Floor
Boston 02110
Contact: Bradley Ridgway Cook, Esq., Trustee
Financial data 1992: \$193,000 for 2 grants.
Average N/A. High \$183,000.
Fields of interest: History, education, community development, environment, international affairs.
Types of support: N/A
Purposes and activities: Environmental studies and programs in New England and promotion of international understanding.
Application information: Application form not required.
Initial approach: Letter
Copies of proposal: 1
Deadline(s): None.
Sample grants: N/A

- 2591 **Edward R. Johnson Fund** Tel. (617) 570- 6806
82 Devonshire St., Suite 3 Fax:
Boston 02109-3614
Contact: Anne-Marie Soulliere, Foundation Dir.
Financial data 1992: \$2,434,067 for grants. High \$739,486.
Fields of interest: Museums, historical preservation, cultural programs, fine arts, youth, environment, environmental organizations.
Types of support: Endowment funds, building funds, special projects.
Application information:
Initial approach: Request guidelines
Copies of proposal: N/A
Deadline(s): Mar. 30 and Oct. 30.
Sample grants:
\$300,000 to Bradford College, Bradford, MA.

2591 (Cont'd)

\$85,000 to Bourne Conservation Trust, Cataumet, MA.

•2594 The Henry P. Kendall Foundation

Tel. (617) 951-2525

176 Federal Street

Fax:

Boston 02110

Contact: Salvatore F. Battinelli

Financial data 1991: \$1,125,419 for 6 grants.

Average \$5000 - \$100,000. **High** \$801,019.

Fields of interest: Conservation, environment, public policy, arms control, peace, museums.

Types of support: Operating budgets, seed money, emergency funds, research, special projects, publications, conferences and seminars, loans, continuing support.

Application information: Application form not required.

Initial approach: Brief proposal

Copies of proposal: 1

Deadline(s): Feb. 15, May 15, Aug. 15, Nov. 15

Sample grants:

\$260,000 to Environmental Preservation Support Trust, Boston, MA.

\$160,000 to Environmental Policy Institute (EPI), Washington, DC.

•2606 The Arthur D. Little Foundation

Tel. (617) 498-5524

25 Acorn Park

Fax:

Cambridge 02140

Contact: Ann Farrington, Sec'y.

Financial data 1991: \$38868,474 for 70 grants.

Average \$2000 - \$3000. **High** \$122,500.

Fields of interest: Education, higher education, vocational education, science and other research, science and technology, environment.

Types of support: Seed money, special projects, conferences and seminars, general purposes, lectureships, fellowships, operating budgets.

Application information: Application form not required

Initial approach: Letter

Copies of proposal: 1

Deadline(s): None

Sample grants:

\$122,500 to Museum of Science, Boston for corporate membership and renovation of Discovery Room.

2606 (Cont'd)

\$12,500 to European Institute of Business Administration (INSEAD), Fountainebleau, France.

- 2634 **The Orchard Foundation** Tel.: None
c/o Gordon Erlich, Bingham, Dana and Fax:
Gould
150 Federal Street
Boston 02110
Contact: Brigitte L. Kingsbury, Exec. Dir.
Application address: P.O. Box 2587, South Portland, ME 04116
Financial data 1992: \$393,950 for 53 grants.
Average \$3000 - \$20,000. **High** \$90,000.
Fields of interest: Child Welfare, family planning,
environment, conservation, ecology, wildlife, family services,
population studies, marine science.
Types of support: General purposes, operating budgets, seed
money, special programs.
Application information:
Initial approach: Letter requesting guidelines, and a
one page summary of a proposal.
Copies of proposal: 1
Deadline(s): Preferably mid-April to June; letters
accepted through late August.
Sample grants:
\$50,000 to Harvard University, Harvard College Fund, Boston,
MA.

\$50,000 to Massachusetts Institute of Technology, Cambridge,
MA.

\$20,000 to Smith College, Northampton, MA for alumni fund
and capital campaign.

- 2636 **The Ottinger Foundation** Tel. (413) 256-0349
256 North Pleasant Street Fax:
Amherst 01002
Contact: Margaret E. Gage, Exec. Dir.
Financial data 1992: \$293,000 for 24 grants.
High \$25,000; **low** \$3000.
Fields of interest: Law and justice, civil rights, environment,
peace, energy, foreign policy, public policy, disadvantaged,
women.
Types of support: Seed money, special projects, general
purposes.

2636 (Cont'd)

Application information: Application form not required.

Initial approach: Proposal

Copies of proposal: 1

Deadline(s): None

Sample grants: N/A

- 2641 **Amelia Peabody Charitable Foundation** Tel. (617) 451-6178
201 Devonshire Street Fax:
Boston 02110-1401

Contact: JoAnne Borek, Exec. Dir.

Financial data 1992: 110 grants. Average \$5000 - \$25,000

High \$1,000,000

Fields of interest: Education, higher education, environment, conservation, medical research, health services, cultural programs, general charitable giving.

Types of support: Building funds, endowment funds, capital campaigns, renovation projects, equipment, research.

Application information:

Initial approach: Letter with proposal

Copies of proposal: 1

Deadline(s): In 1993 Mar. 10, June 10, Sept. 10, and Friday before Thanksgiving Day.

Sample grants:

\$1,000,000 to New England Deaconess Hospital, Boston, MA.

\$300,000 to Boston Biomedical Research Institute, Boston, MA.

\$200,000 to Northeast University, Boston, MA

\$100,000 to Manumit Bird Observatory, Manumit, MA

- 2656 **Harold Whitworth Pierce Charitable Trust** Tel. (617) 523-6800
c/o Nichols and Pratt Fax:
50 Congress Street
Boston 02109

Contact: Elizabeth D. Nichols, Grant Administrator

Financial data 1992: \$593,771 for 30 grants.

High \$149,804; low \$1000.

Fields of interest: Medical research, education, youth, museums cultural programs, environment.

Types of support: N/A

2656 (Cont'd)

Application information: Application form not required.

Initial approach : Letter or telephone

Copies of proposal : 1

Deadline(s) : May 1 and Nov. 1

Sample grants : N/A

•2698 **Anna B. Stearns Charitable Foundation, Inc.** Tel. (617) 426-7172

c/o Grants Management Associates, Inc. Fax:

230 Congress Street

Boston 02210

Contact: Laura Henze, Admin., or Philip Hall, Fdn. Asst.

Financial data 1992: \$588,071 for 29 grants.

Average \$5000 - \$15,000. High \$324,071.

Fields of interest: Youth, child welfare, family services, women, environment.

Types of support: Continuing support, technical assistance, operating budgets, special projects.

Application information: Application form not required.

Initial approach : Letter or telephone

Copies of proposal : 1

Deadline(s) : May 1, Nov. 1

Sample grants : N/A

•2704 **The Stoddard Charitable Trust**

Tel. (508) 798-8621

370 Main Street, 12th Floor

Fax:

Worcester 01608

Contact: Warner S. Fletcher, Chair.

Financial data 1991: 70 grants.

Average \$5000 - \$30,000. High \$325,000.

Fields of interest: Education, cultural programs, youth, environment, health associations.

Types of support: Annual campaigns, seed money, emergency funds, equipment, building funds, research, scholarship funds, fellowships, professorships, internships, matching funds, general purposes, continuing support.

Limitations: Giving primarily in Worcester, MA.

Application information: Application form not required.

Initial approach : Proposal

Copies of proposal : 5

Deadline(s) : Submit proposal between January and November; no set deadlines.

2704 (Cont'd)

Sample grants :

\$325,000 to Worcester Polytechnic Institute, Worcester, MA.

\$150,000 to New England Science Center, Worcester, MA.

\$100,00 to Clark University, Worcester, MA

\$75,000 to Nichols College, Dudley, MA.

Michigan

2848 The Kresge Foundation

3215 Big Beaver Road

P.O. Box 3151

Troy 48007-3151

Contact: Alfred H. Taylor, Jr.

Financial data 1992: 178 grants.

Average \$100,000 - \$500,000. High \$3,278,400.

Fields of interest: Higher education, health services, environment, arts, humanities, science and technology, public affairs.

Types of support: Building funds, equipment, matching funds, renovation projects.

Application information: Application form required.

Initial approach : Letter or telephone

Copies of proposal : 1

Deadline(s) : None

Sample grants :

\$1,000,000 to Franklin Institute Science Museum and Planetarium, Philadelphia, PA, toward construction of Futures Center and renovation of museum facilities.

\$1,000,000 to Stanford University, Stanford, CA. Toward construction of Green Earth Sciences building.

**3060 Minnesota Mining and Manufacturing
Foundation, Inc.**

3 M Center Building 591-30-02

St. Paul 55144-1000

Contact: Richard E. Hanson, V.P.

Financial data 1992: \$9,250,445 for 579 grants.

Average \$500 - \$25,000. High \$1,403,940.

Fields of interest: Community funds, education, vocational education, business education, environment.

Tel. (313) 643-9630

Fax: (313) 643 0588

Tel.

Fax:

3060 (Cont'd)

Types of support: Operating budgets, annual campaigns, matching funds, scholarship funds, internships, fellowships, special projects, research.

Application information: Application form required.

Initial approach: Letter or personal visit by appointment.

Copies of proposal: 1

Deadline(s): At least 8 weeks prior to month in which board meets: March, August, December.

Sample grants:

\$355,000 to Science Museum of Minnesota, St. Paul, MN.

\$137,000 to Minnesota Institute of the Arts, Minneapolis, MN

Nevada

3359 **Robert M. Lee Foundation**

117 Gator Way

Sparks 89431

Contact: James Crispino, Treas.

Financial data 1991: \$209,500 for 22 grants.

High \$100,000; low \$500.

Fields of interest: Environment, conservation, wildlife.

Types of support: N/A

Application information: N/A

Initial approach: N/A

Copies of proposal: N/

Deadline(s): N/

Sample grants:

\$100,000 to National Audubon Society, DC.

\$10,000 to Inland Empire Public Lands, Spokane, WA.

Tel. (702) 356-7222

Fax:

New Hampshire

•3387 **The New Hampshire Charitable Foundation** Tel. (603) 225-6641

37 Pleasant Street

Fax:

P.O. Box 1335

Concord 03302-1335

Contact: Deborah Cowan, Assoc. Dir.

Financial data 1992: \$3,248,829 for 813 grants.

Average \$1000 - \$5000. High \$50,000.

Purpose and Activities: Giving for charitable and educational purposes including grants to primarily inaugurate new programs and strengthen existing charitable organizations.

Fields of interest: Education, art, humanities, environment, conservation, health, social services.

3387 (Cont'd)

Types of support: Seed money, loans, student aid, fellowships, scholarship funds, general purposes, special projects, consulting services, technical assistance.

Limitations: giving limited to New Hampshire.

Application information: Application form not required.

Initial approach: Telephone or letter.

Copies of proposal: 1

Deadline(s): April 1, Sept. 1, Dec. 1

Sample grants:

\$35,000 to Antioch/New England Graduate School, Keene, NH for staff support to Corporate Fund grant and training programs.

\$24,000 to Conservation Law Foundation, Boston, MA for one-year residency for scientists.

New Jersey

3440 Geraldine R. Dodge Foundation, Inc.
163 Madison Avenue, 6th Floor
P.O. Box 1239

Tel. (201) 540-8442

Fax:

Morristown 07962-1239

Contact: Scott McVay, Exec. Dir.

Financial data 1992: \$6,078,115 for 344 grants.

Average \$15,000 - \$25,000. High \$241,000.

Fields of interest: Education, humanities, leadership development, conservation, environment, energy, public policy, wildlife, women, family planning.

Types of support: Seed money, conferences and seminars, special projects, seminars, publications, continuing support, research, operating budgets, fellowships.

Limitations: Primarily giving in New Jersey with some giving in New England.

Application information: Applications limited to 6 pages; binders not accepted.

Initial approach: Letter or proposal

Copies of proposal: 1

Deadline(s): Submit proposal preferably in Mar., June, Sept. or December. Dec. 15 for education; March 15, arts; June 15, for welfare of animals and local projects; September 15 for public issues

Sample grants:

\$193,488 University of North Carolina for Clinical Center for Developmental Learning, Chapel Hill, NC for Schools Attuned Project.

3440 (Cont'd)

\$100,000 to Liberty Science Center and Hall of Technology, Jersey City, NJ for fourth grant development of education programs.

- 3484 **Johnson & Johnson Family of Companies** Tel. (908) 524-3255
Contribution Fund Fax:
One Johnson & Johnson Plaza
New Brunswick 08933
Contact: Helen M. Hughes, Mgr., Corp. Contributions
Financial data 1992: \$657,072 for 320 grants.
Average \$2000 - \$20,000. **High** \$320,000.
Fields of interest: Health services, science and technology, medical research, education, arts community development, urban development, disadvantaged, employment, environment.
Types of support: General purposes, operating continuing support, annual campaigns, matching funds, fellowships, research, technical assistance, special projects, seed money, conferences and seminars.
Application information: Application form not required.
Initial approach: Letter.
Copies of proposal: 1
Deadline(s): None
Sample grants:
\$1,202,000 to WGBH Education Foundation, Boston, MA for health care public information in 1991.

\$300,000 to Harvard University, Division of Health Sciences and Technology, Cambridge, MA for a grant shared with MIT.

- 3558 **The Florence and John Schumann** Tel. (201) 783-6660
Foundation Fax:
33 Park Street
Montclair 07042
Contact: Patricia A. McCarthy, V.P., Admin.
Financial data 1992: Average \$10,000 - \$50,000. **High** \$1,000,000.
Fields of interest: Education, environment, foreign policy, public policy, citizenship.
Types of support: Operating budgets, continuing support, seed money, matching funds, special projects.
Application information: Application form not required.
Initial approach: Letter (1 or 2 pages)
Copies of proposal: 1
Deadline(s): Jan. 15, April 15, Aug. 15.

3558 (Cont'd)

Sample grants :

\$350,000 to Columbia University, School of Journalism, New York

City, NY for four seminars on Media and Society specials on PBS.

\$300,000 to the Environmental Defense Fund, New York City, NY for expansion of the Environmental Information Exchange Program.

\$300,000 to Rutgers, the State University of New Jersey Foundation, New Brunswick, NJ for activities of the Journalism Resources Institute helping newly freed European countries develop independent print and broadcast journalism.

\$268,000 to National Public Radio, DC for a full-time reporter for increased domestic environmental coverage.

New York

3846

The Nathan Cummings Foundation, Inc.

Tel. (212) 787-7300

1926 Broadway, Suite 600

Fax:

New York 10023

Contact: Charles R. Hakem, Pres.

Financial data 1992: \$10,995,009 for 304 grants. Average \$10,000 - \$75,000. High \$200,000

Fields of interest: Environment, cultural programs, art, health, Jewish giving, Israel, Jewish welfare.

Types of support: Annual campaigns, building funds, capital campaigns, consulting services, general purposes, lectureships special projects.

Application information: Application form required.

Initial approach: Letter

Copies of proposal: N/A

Deadline(s): None

Sample grants :

\$200,000 to Natural Resources Defense Council, N.Y.C., NY for Energy and Transportation Project.

\$150,000 to Harvard University, Cambridge, MA for Harvard Project Zero to design and implement Project Co-Arts, national study to better analyze and evaluate effectiveness of community arts education programs.

3846 (Cont'd)
\$100,000 to Center for Policy Alternatives, DC for Collaborative
Project on Reproductive Health project

Tel. (212) 573-5000

Fax:

3956 The Ford Foundation
32 East 43rd Street
New York 10017

Contact: Barron M. Tenney, Sec'y.

Financial data 1992: \$259,966,848 for 1482 grants.

Average \$15,000 - \$1,500,000. High \$5,3000,000.

Fields of interest: Urban development, community
development, environment, government, public policy, higher
education, international affairs, foreign policy, Eastern Europe

Types of support: Conferences and seminars, consulting
services, exchange programs, general purposes, matching funds,
professorships, publications, research, seed money, special
projects, technical assistance, fellowships.

Purpose and activities: To advance the public well-being by
identifying and contributing to the solution of problems of
national and international importance. Grants primarily to
institutions for experimental, demonstration and development
efforts that are likely to produce significant advances within the
foundation's field of interest: Urban poverty, rural poverty and
resources, rights and social justice, governance and public policy,
education and culture, international affairs.

Application information: Application form not required.

Initial approach: Letter, proposal, or telephone.

Copies of proposal: 1

Deadline(s): None

Sample grants:

\$2,050,000 to Rand Corp., Santa Monica, CA for drug policy
research center.

\$2,000,000 to Joint Center for Political and economic studies, DC
for general support for research, analysis and dissemination
activities on public policies affecting blacks in the U.S.

4023 Gordon/Rousmaniere/Roberts Fund
10 Hanover Square
New York 10005

Tel. N/A

Fax:

Contact: William N. Loverd

Financial data 1991: \$3,106,650 for 88 grants.

Average \$5000 - \$100,000. High \$600,000.

Fields of interest: Higher education, international affairs,
environment.

4023 (Cont'd)

Types of support: N/A

Application information:

Initial approach: Proposal

Copies of proposal: N/A

Deadline(s): None

Sample grants:

\$600,000 to Harvard University, Cambridge, MA.

\$100,000 to Smith College, Northampton, MA.

4041 William and Mary Greve Foundation, Inc. Tel. (212) 758-8032
630 Fifth Avenue Fax:
New York 10005

Contact: Anthony C. M. Kiser, Pres.

Financial data 1992: \$910,658 available for 51 grants.

Average N/A. High \$95,000.

Fields of interest: Education, international affairs, arms control, intercultural relationships, environment (U.S., Eastern Europe relations).

Types of support: Seed money, endowment funds, matching funds, general purposes, continuing support.

Application information: Application form not required.

Initial approach: Letter

Copies of proposal: 1

Deadline(s): None

Sample grants: N/A

•4311 Helen Mayer Charitable Trust Tel. (716) 546-9105
c/o Fleet Bank, N.A. Fax:
One East Avenue
Rochester 14638

Contact: Jack Murphy, Trust Ofcr.

Financial data 1992: \$208,750 available for 19 grants.

Average none. High \$85,000.

Fields of interest: Environment, conservation, historical preservation, cancer, hospitals.

Types of support: N/A

Limitations: Giving primarily in New England states.

Application information: Application form not required.

Initial approach: N/A

Copies of proposal: N/A

Deadline(s):

Sample grants: N/A

934 (Cont'd)

Sample grants :

\$1,699,732 to Community Public Broadcasting, Hartford, CT.

\$195,000 to Hillsborough Education Partnership Foundation,
Tampa FL.

\$105,000 to United Way of Massachusetts Bay, Boston, MA.

985 Olin Corporation Charitable Trust

Tel. (203) 356-3301

120 Long Ridge RoadFax:

Stamford 06904

Contact: Carmella V. Piacentini, Admin.

Financial data 1991: \$ 2,064,702 for grants.

Average N/A. High N/A

Fields of interest: Higher education, science and technology, engineering, economics, education - minorities, environment, wildlife, community funds, health services, hospices, women, freedom, South Pacific, safety.

Types of support: General purposes, operating budgets, continuing support, annual campaigns, seed money, equipment, special projects, research, publications, conferences and seminars, internships, scholarship funds, fellowships.

Application information: Application form not required.

Initial approach: Letter or proposal

Copies of proposal: 1

Deadline(s) : Submit proposal preferably between Jan. and Aug.; no set deadline.

Sample grants : N/A

1034 The Xerox Foundation

Tel. (203) 968-3306

P.O. Box 1600

Fax:

Stamford 06904

Contact: Robert H. Gudger, V.P.

Financial data 1991: \$7,970,685 for 1298 grants.

Average \$2000 - \$20,000. High \$1,000,000.

Fields of interest: Higher education, science and technology, social services, rural development, drug abuse, community funds, public policy, international affairs, foreign policy, South Africa, Asia, Canada, Latin America, Caribbean, Middle East, leprosy.

Types of support: Operating budgets, general purposes, annual campaigns, seed money, research, conferences and seminars, scholarship funds, professorships, internships, exchange programs, program-related investing, consulting services, publications.

1034 (Cont'd)

Application information: Application form not required.

Initial approach: Brief proposal.

Copies of proposal: 1

Deadline(s): None

Sample grants: N/A

Illinois

1933 **Dr. Schol**

Tel. (312) 782-5210

11 South Lasalle Street, Suite 2100

Fax:

Chicago 60603

Contact: Jack E. School, Esec. Dir.

Financial data 1992: \$8,437,075 for 348 grants.

Average \$10,000 - \$50,000. High \$500,000.

Fields of interest: Higher education, medical education, hospitals, community development, civic affairs, economics, science and technology, social services, religion.

Types of support: Equipment, conferences and seminars, special projects, endowment funds, fellowships, research.

Application information: Application form required.

Initial approach: N/A

Copies of proposal: 1

Deadline(s): May 15.

Sample grants: N/A

1973 **Technical Foundation of America**

Tel. N/A

P.O. Box 168

Fax:

Glen Ellyn 60138

Contact: David E. Hall, Exec. Dir.

Chartered in 1898 in Massachusetts as American Technology Society, incorporated in Illinois in 1980 under its current name.

Financial data 1993: \$156,998 for 18 grants.

Average \$4000 - \$30,000. High \$50,000.

Fields of interest: Science and technology, vocational education, leadership development.

Types of support: Seed money, consulting services, special projects, research, publications, conferences and seminars.

Application information: Application form not required.

Initial approach: Letter or proposal

Copies of proposal: 2

Deadline(s): Dec. 1

Sample grants: N/A

Massachusetts

•2606 The Arthur D. Little Foundation

25 Acorn Park
Cambridge 02140

Tel. (617) 498-5524

Fax:

Contact: Ann Farrington, Sec'y.

Financial data 1991: \$38868,474 for 70 grants.

Average \$2000 - \$3000. High \$122,500.

Fields of interest: Education, higher education, vocational education, science and other research, science and technology, environment.

Types of support: Seed money, special projects, conferences and seminars, general purposes, lectureships, fellowships, operating budgets.

Application information: Application form not required

Initial approach : Letter

Copies of proposal : 1

Deadline(s) : None

Sample grants :

\$122,500 to Museum of Science, Boston for corporate membership and renovation of Discovery Room.

\$12,500 to European Institute of Business Administration (INSEAD), Fountainebleau, France.

New Jersey

3484 Johnson & Johnson Family of Companies Contribution Fund

Tel. (908) 524-3255

Fax:

One Johnson & Johnson Plaza
New Brunswick 08933

Contact: Helen M. Hughes, Mgr., Corp. Contributions

Financial data 1992: \$657,072 for 320 grants.

Average \$2000 - \$20,000. High \$320,000.

Fields of interest: Health services, science and technology, medical research, education, arts community development, urban development, disadvantaged, employment, environment.

Types of support: General purposes, operating continuing support, annual campaigns, matching funds, fellowships, research, technical assistance, special projects, seed money, conferences and seminars.

Application information: Application form not required.

Initial approach : Letter.

Copies of proposal : 1

Deadline(s) : None

3484 (Cont'd)

Sample grants :

\$1,202,000 to WGBH Education Foundation, Boston, MA for health care public information in 1991.

\$300,000 to Harvard University, Division of Health Sciences and Technology, Cambridge, MA for a grant shared with M.I.T.

New Jersey

3660 Atran Foundation, Inc. Tel. (212) 505-9677
23 - 25 East 21st Street, 3rd Floor Fax:
New York 10010
Contact: Diane Fischer, Corp. Sec'y.
Financial data 1992: \$685,350 available for grants.
Average N/A. High N/A
Fields of interest: Labor, arts, science and technology, language, literature, economics, sociology.
Types of support: Continuing support, annual campaigns, seed money, emergency funds, endowment funds, research, publications, conferences and seminars, scholarship funds, professorships, exchange programs, matching funds, special programs, general purposes.
Application information: Application form not required.
Initial approach : Proposal
Copies of proposal : 4
Deadline(s) : September 30.
Sample grants : N/A

3768 Carnegie Corporation of New York Tel. (212) 371-3200
437 Madison Avenue Fax:
New York 10022
Contact: Dorothy Wills Knapp, Sec'y.
Financial data 1992: \$43,892,989 available for grants.
Average N/A. High N/A
Fields of interest: Child development, minorities, educational associations, education research, science and technology, foreign policy, international development. Focus on Africa.
Types of support: Seed money, continuing support, special projects, research, publications, conferences and seminars, exchange programs, general purposes.
Application information: Application form not required.
Initial approach : Letter
Copies of proposal : 1
Deadline(s) : None

3768 9 (Cont'd)

Sample grants :

\$1,350,000 to M.I.T., Cambridge, MA toward Defense and Arms Control Studies Program.

4631 Alfred P. Sloan Foundation

Tel. (212) 649-1649

630 Fifth Avenue, Suite 2550

Fax:

New York 10111-0242

Contact: Stewart F. Campbell, V.P.

Financial data 1992: \$28,622,466 for 207 grants.

Average \$15,000 - \$100,000. High \$3,500,000.

Fields of interest: Science and technology, education in science, technology, and management, economic growth and industrial competitiveness, selected national issues.

Types of support: Research, fellowships, conferences and seminars, special programs.

Application information: Application from not required.

Initial approach : Letter

Copies of proposal : 1

Deadline(s) : September 15 for fellowship program, no deadline for others.

Sample grants : N/A

4648 The Soros Foundations for the Former

Tel. (212) 757-2323

Soviet Union and the Baltic States

Fax:

888 Seventh Avenue

New York 10106

Contact: Jody Spiro, Exec. Dir.

Financial data 1992: \$19,666,112 for 109 grants.

Average \$150 - \$2000. High \$115,000.

Fields of interest: Eastern Europe, international affairs, international studies, international development, international law, economics, education, science and technology, environment.

Types of support: Conferences and seminars, research, exchange programs, fellowships, internships, matching funds, publications, seed money, technical assistance, operating budgets, equipment, student aid.

Application information:

Initial approach : Telephone or letter.

Copies of proposal : N/A

Deadline(s) : None

Sample grants : N/A

44745 The G. Unger Foundation
c/o Fulton, Duncombe, and Rowe
30 Rockefeller Plaza
New York 10112

Tel. (212) 586-0700
Fax:

Contact: George Rowe, Jr., Pres.

Financial data 1992: \$2,413,818 for 22 grants.

Average \$15,000 - \$100,000. High \$500,000.

Fields of interest: Physical sciences, biological sciences, marine sciences, environment, science and technology, public policy.

Types of support: Special projects, general purposes.

Application information: Information not available.

Initial approach:

Copies of proposal:

Deadline(s):

Sample grants: N/A

Pennsylvania

5692 The Pew Charitable Trusts
One Commerce Square
2005 Market Street, Suite 1700

Tel. (215) 575-9050
Fax:

Contact: Philadelphia 19103-7017

Financial data 1992: \$143,537,605 for grants.

Average \$50,000 - \$200,000. High \$2,250,000.

Fields of interest: Conservation, environment, religion, international affairs, public affairs, social services, employment, higher education.

Types of support: Matching funds, research.

Application information: Application form not required.

Initial approach: Letter of inquiry 2-3 pages.

Copies of proposal: 1

Deadline(s): N/A

Sample grants:

\$5,500,000 to the University of Pittsburgh, Pittsburgh, PA toward a matching grant Learning, Resource and Development Center for New Standards Project.

\$3,500,000 to Aspen Institute, Queenstown, MD for Pew Global Stewardship Initiative to establish and administer programs to raise awareness of environmental, human and international security, consequences of population growth and unsustainable consumption of world resources.

Texas

- 6078 Exxon Education Foundation Tel. (214) 444-1104
225 East John W. Carpenter Freeway Fax:
Irving 75062-2298
Contact: E.F. Ahnert, Exec. Dir.
Financial data 1992: \$9,816,753 for 193 grants.
Average \$5000 - \$50,000. High \$1,200,000.
Fields of interest: Education, higher education, science and
technology, mathematics, education associations.
Types of support: Employee matching gifts, general purposes,
special projects.
Application information: Applications are not encouraged. The
foundation will accept two-page letters of inquiry relating to
project ideas consonant with the goals of its Mathematics,
Education, or Elementary and Secondary School Improvement
Program.
Initial approach : Request for the Foundation's guidelines
for letters of inquiry before requesting any
information.
Copies of proposal : N/A
Deadline(s) : N/A
Sample grants :
\$400,000 to Florida A&M University, School for Business and
Industry, Tallahassee, FL for programs.

\$215,000 to M.I.T., Cambridge, MA for a Research and Training
Program which primarily helps to underwrite University-based
research activities in the science and engineering fields.

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