

GREEN IMPERIALISM: POLLUTION, PENITENCE, PROFITS

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The more pressure that we put on ourselves, on Mexico and on every place else in the world to do something about the environment, the more they're going to reach out for environmental technology. And where are they going to get it? They're going to get it from us!

The late Ron Brown, US Secretary of Commerce. June 1993.

Introduction

That good money and a clear conscience can both be earned cleaning up the detritus, pollution and hazardous wastes generated by the global capitalist economy has never been plainer. If a rivalry over the market for environmental degradation seems a weak substitute for the older *inter-capitalist* struggles of the Cold War era, the production and marketing of 'green' technologies nevertheless represent major business for capital and state in North America, Western Europe and Japan. Increasingly, the demand for environmental technologies and services is coming from the so-called 'emerging markets' of Asia, Latin America and East Europe.

In the years since the 1972 United Nations Conference on the Environment in Stockholm, the advanced capitalist states have adopted (albeit with far too many steps backwards and with much procrastination) a major part of the agenda of the environmental movement. Concurrently, and virtually unremarked on the Left, a large pollution control and waste treatment and remediation industry has grown up in the Northern states in response to pressure from environmental groups and tough new regulations and enforcement. The clean-up thus far has involved enormous sums of money – \$2 trillion, it is estimated, to settle asbestos and hazardous waste claims in the United States alone. Indeed, the increasing awareness by industry of environmental liabilities is driving demand for new green technologies and services. Avoiding litigation through the use of hazardous waste treatment technologies is a good investment of corporate funds.

The environmental technology industry is still very much a dirty or

brown 'end-of-pipe' business involved in site clean-up, solid and hazardous waste management, water pollution control and **water** supply, air pollution control, and consulting and engineering services, but it has been profitable enough to attract some familiar corporate players with dubious environmental reputations. Mitsubishi, scourge of many of the world's greatest forests, has cornered the market on air pollution control equipment in Asia through its subsidiary, Mitsubishi Heavy Industries. In the United States, part of the environmental industry is drawn from the old **military-industrial complex**: corporations that once designed and manufactured weaponry for the Pentagon now work for contract on Superfund sites. Westinghouse, which once thrived on nuclear weapons contracts, now competes for Department of Energy bids to clean up the radioactive dumps the nuclear industry left behind. Several of General Electric's factories have been cited as dangerous sources of air pollution, but G.E. is now among the top manufacturers of air pollution equipment. Chemical giant **DuPont**, which produced some 350 million tons of waste in 1989, has developed its own toxic waste management business. The Swedish-Swiss engineering transnational, **ABB Asea Brown Boveri Corp.**, ranked the world's third largest environmental technology company in 1995, sells coal-fired boilers to Indonesia, already coping with serious air pollution, because the US utilities market has dropped due to a shift to low-sulphur coal. In June 1996, over objections of environmental advocacy groups, Malaysia awarded a contract to ABB to build the Bakun Dam deep in the rainforest of the state of Sarawak: the dam will flood 69,000 hectares of forest, dislocate 9,000 tribal people and vastly increase the risk of disease.' The situation is much the same in France, Britain, Canada and other developed capitalist states: many of the dominant firms in the environmental technologies industry are involved in the competition to clean up the hazardous wastes, control the pollution, repair the damage which as resource producers, chemical manufacturers and utilities they themselves created – **pollution**, penitence, profits.

However, this is an industry nearing maturation in the North. The heady days of hazardous waste clean-up are over. The global environmental industry generated more than \$400 billion in revenues in 1994, and these are expected to rise to \$600 billion by 2010. But our thesis is that the industry, especially in its classic end-of-pipe structures, faces rising costs and problems of overcapacity, and in order to maintain its growth it must export its technologies and services, together with Northern legislation and **regulations**, to the rapidly-industrializing emerging markets, particularly in Asia and parts of Latin America. Close to 90 percent of the environmental industry's revenues and profits are concentrated in North America, Western Europe and Japan, but recession, government cutbacks and right-wing attacks on major environmental statutes have slowed the industry's expansion. Threatened by

stagnation in the developed states and pulled by the competition for market opportunities overseas, the environmental industries entered the era of globalization in the early Nineties, moving to China, India, South Korea, Mexico, Brazil, Poland, the Czech Republic with the strong support of their home governments and multilateral development banks. The North American Free Trade Agreement, the prospect of a European Union incorporation of **post-Communist** states, such as Poland and the Czech Republic, and the advent of the World Trade Organization have accelerated capital's shift to environmental exports and the transfer of universal norms.

The following pages attempt to analyze the expansion of the Northern environmental industries and the growing technological and financial rivalry among the leading transnational environmental corporations of Japan, the US and Europe for world market share in the major sectors and regions. Our interest is in the political economy of green technology diffusion from the advanced centres of capitalism to East Asia, Southeast Asia, Central and Eastern Europe, and Latin America: what drives the market for these technologies, and what is the nature of this **oligopolistic rivalry** in which the capitalist state has such an interest? This is a highly **politicised** struggle for global market share in which the governments of advanced capitalism – supported by multilateral banks and, in some cases, prominent environmental groups – try to generate demand for environmental technologies by first exporting their laws and administrative capacity to emerging markets. Having exported models of industrial development via free trade and open markets, Western environmental norms are then offered to clean up the excesses of growth, and finally environmental equipment and services are sold to service the **regulations**.² 'Our ability to export environmental technology depends very much on our ability to export environmental legislation', noted a senior German official in June 1995,³ while a manager with the US Environmental Protection Agency has remarked that 'EPA can create a market for environmental technologies and services overseas by helping other countries develop their regulatory and enforcement capabilities that drive the demand for environmental **technology**'.⁴ As will be seen, the push to universalize Northern regulatory norms is abetted by some of the large and influential environmental non-governmental organizations. It is a good question whether the practice promotes the cause of transnational ecology or of transnational capital.

The United States and the Global Environmental Industry

The scope of the environmental industry is much less important to the present study than is the understanding of what the industry is – and is not. The industry, which is still primarily an American industry, is concentrated overwhelmingly in the regulated brown end-of-pipe activities of control,

clean-up, waste management and remediation rather than in pollution prevention and process innovation, which are riskier, more difficult to finance and have longer-term paybacks. The industry, as it has evolved historically from municipal waste hauling, specializes in solid and hazardous waste management, water quality treatment, the mitigation of air pollution, recycling, and so on. The global leaders of the end-of-pipe environmental industry do not prevent pollution; they collect the wastes of capitalist production and consumption, recycle it, destroy it, or not infrequently dump it in the neighbourhoods of the poor. It is a very profitable business.

The world's largest environmental services corporation, with 1994 revenues of \$10 billion and some 74,000 employees, is the US-owned Waste Management Technologies (WMX), which has grown from a collection of trash-hauling companies into North America's biggest solid waste company and a global corporation bigger than Lockheed. Through its subsidiaries, WMX provides high-technology waste treatment systems to countries such as **Spain**, the Netherlands, Hong Kong and Singapore; it is in engineering and consulting, site remediation, hazardous wastes, and much else. Its international activities account for about one-fifth of **WMX's** revenues. When in the early Nineties it decided to move to Asia, it took as its partner one of China's large state-owned investment companies and its first project a chemical waste treatment facility for Hong Kong's notoriously polluted harbour. In the United States, WMX has been attacked by Latino and African-American communities for locating hazardous waste sites near their communities, and the corporation's record of fines, penalties and out-of-court settlements was described by a San Diego District Attorney as 'a combination of environmental and anti-trust violations and public corruption cases which must be viewed with considerable concern'. An ecological critic of WMX adds:

The vast majority of [such] companies are not investing in clean technologies and products such as emissions free, hydrogen-powered cars; non-polluting, closed system industrial factories; or solar and wind energy plants. Instead they create substitutes for CFCs that are not ozone-friendly and that contribute to climate change; they spend billions of dollars on smokestack scrubbers instead of replacing the smokestack with a clean technology; they build toxic waste dumps which are delayed-action time-bombs because they will eventually leak into the groundwater; and they build hazardous waste incinerators that spew millions of pounds of poison into the air and leave behind a toxic by-product of dioxin-laden ash.⁴

The end-of-pipe structure of the US environmental industry is not an accident. It – and most of the legal and regulatory system that underpins it – evolved in the 1970s and 1980s because of concerted pressures from the oil, coal, chemical, auto, steel and utility industries to shape the legislative agenda on environmental reform. In 1974, **DuPont** and **Dow**, the two largest producers of toxic waste in America, argued against proposals that legislation should focus on the source of pollution and that industry should

be forced into a basic transformation toward clean production; granting Congress the authority 'to control production, composition, and distribution of products' would devastate free enterprise and trade.⁸ The corporate position prevailed and Congress proceeded to enact a broad range of statutes and regulations that over the next 20 years brought into being an industry of some 110,000 firms and 1.2 million employees to clean up toxic wastes and mitigate – but not prevent – pollution.

The environmental industry has been defined 'as all revenue generation associated with environmental assessment, compliance with environmental regulations, pollution control, waste management, remediation of contaminated property and the provision and delivery of environmental resources.' It can be divided into three categories: a) *Environmental services* – testing and analysis; water treatment; solid waste management; hazardous waste management; clean-up of contaminated sites; consulting and engineering; b) *Environmental equipment* – water and chemical equipment; instrument manufacturing; air pollution control; waste management technology; process and prevention technology; c) *Environmental resources* – water utilities; resource recovery; and alternative energy resources. The biggest revenue earners, as the following breakdown shows, are solid wastes and water-related activities; the smallest is pollution-prevention technology at half of one percent of industry revenues.

Table 1: US industry revenues by segment (1995)

<i>Segment</i>	<i>Revenue (%)</i>
1. Solid waste management	22
2. Water utilities	16
3. Water treatment works	15
4. Resource recovery	9
5. Water equipment	8
6. Consulting and engineering	7
7. Waste management equipment	6
8. Air pollution control equipment	6
9. Hazardous waste management	4
10. Remediation	3.6
11. Instruments & information	1
12. Environmental energy sources	1
13. Analytical services	0.8
14. Process & prevention technology	0.5

(Source: Environmental Business International.)

The leading 50 environmental corporations in the world are all North American, **West** European or **Japanese**. The top 50 firms represent close to \$75 billion in revenues or 18% of the market. There are 15 American firms in the list, mostly representing solid waste and engineering (led by WMX, Browning Ferris Industries and Bechtel); 12 German corporations, mostly involved in waste management, air pollution control, and engineering and consulting (RWE Enstorgung, **Noell**, Phillip Holzman, Alba, etc.); all of the Japanese firms in the leading 50 are high-technology companies (Mitsubishi Heavy Industries, Ebara Corp., Kurita, Hitachi Zozen and Kubota); and there are two French and seven British water companies, all privatized in the late Eighties and now operating internationally. France's leading water companies (Generale des Eaux and Lyonnaise des Eaux) and Britain's (such as Thames Water and Severn Trent) have become the most competitive exporters of the integrated package of designing, building and owning water infrastructure in the developing world, having won major projects in Brazil, Malaysia and Taiwan. There are a few other important transnationals to be noted: **Laidlaw**, a US-owned Canadian corporation specializing in solid and hazardous wastes; Asea Brown Boveri Corp., the **Swedish/Swiss** engineering and equipment operator; and the Dutch firm **Heidemij**, a consulting and engineering company.

Table 2: Revenues & Market Growth: 1993-4 (\$ bil)

	1993	Growth (%)	1994
USA	158.5	4.2	165.5
Canada	10.4	3.8	10.8
L. America	6.0	10.4	6.6
W. Europe	124.6	2.2	127.4
E. Eur./Rus	6.0	6.0	6.0
Japan	64.2	1.7	65.3
Rest of Asia	11.9	16.4	14.2
Oceania	5.9	5.6	6.2
M. East	3.6	4.0	3.8
Africa	1.7	8.0	1.8
TOTAL	392.8	3.9	408.0

(Source: Environmental Business International, 1995.)

As Table 2 illustrates, the United States is by far the largest market in the world and generates something like 40% of the industry's total revenues – an estimated \$170 billion out of a total \$408 billion in 1994, according to a major study of the industry.⁸ More interesting is the data on regional market growth: the industry is stagnating in the developed

capitalist states, booming in Asia-without-Japan, and growing in Latin America, Eastern Europe and Africa. Within Asia, the fastest-growing environmental markets are China, India, Thailand, Indonesia; in Latin America, Brazil, Mexico, Argentina. Between 1994 and 2000, **Asia-without-Japan**, it is estimated, will gain \$22 billion in environmental revenues, and Latin America markets to grow by \$6.5 billion.

Table 3: Hazardous Waste Management Spending (\$ mil)

<i>Market Area</i>	<i>1991</i>	<i>%</i>	<i>1995</i>	<i>%</i>
Superfund	2,350	19.0	2,888	17.0
Dept. of Defense	1,176	10.0	2,643	15.5
Dept. of Energy	1,610	13.0	3,567	21.0
State Gov'ts	932	8.0	948	5.5
Industry	3,940	32.0	4,620	27.0
Leaking storage tanks	2,211	18.0	2,352	14.0
TOTAL	12,219		16,998	

(Source: William T. Lorenz & Co., Concord, N.H. (1993))

The main 'market-driver' for this industry in the United States and elsewhere has been government legislation and enforcement. The market for environmental services and technologies is driven by political waves of environmentalism and the introduction of new, stringent regulations. The industry cannot thrive without a strong environmental movement; and the absence of such movements in many developing countries has been a barrier to the export of green technologies. Like the defence sector, the industry also benefits from large government expenditures. In the US, the Clean Water Act, the Clean Air Act, the Superfund legislation of 1980⁹, the Resource Conservation and Recovery Act, and subsequent amendments induced thousands of firms to bid for clean-up and other work from municipal, state and federal agencies. The environmental industry has also been targeted for federal monies designed to convert the US defence industry to civilian technology production; and California, the state most negatively affected by military cuts, is also the state with the largest environmental industry and has benefitted from spending by the Departments of Energy (DOE), Defense (DOD), and Superfund. DOE and DOD have emerged as two of the largest benefactors of the US environmental industry, in part because of their sponsorship of technology research but also because they control the funds and lands to contract for the huge environmental clean-up and restoration projects. A federal remediation market, in which public monies are committed to private contractors to restore contaminated sites to something approximating their original state,

has helped some military contractors offset losses from reduced defence spending. The Federal Defense Technology Conversion Reinvestment and Transition Act of 1993, which appropriated \$471 million to encourage the military and private industry to develop and share technology, led several members of the military-industrial complex, seeking compensation for the end of the Cold War, to go into the environmental clean-up **business**.¹⁰ Table 3 provides some estimates of the three big federal spenders in one key US environmental market – hazardous wastes.

The US environmental industry experienced its most rapid era of growth, ironically enough, in the late 1980s during the Reagan and Bush administrations. The industry tends to thrive when economic growth is rapid and environmental degradation has been at its worst, and these were the years of Bhopal, Chernobyl and sharp environmental conflicts in the US over issues surrounding hazardous wastes. The insurance industries made multi-billion dollar settlements of hazardous waste cases, and the environmental industry grew in excess of 15% per year. Though it was promoted as recession-proof on Wall Street, no sector of US capitalism was spared when the recession struck in the early Nineties. Many big environmental projects were cancelled as firms world-wide eliminated discretionary spending on clean-up and pollution control, and the Bush administration sought to appease business by gutting such measures as the 1990 Clean Air Act Amendments. Big cuts in appropriations for governmental programmes followed as the Right singled out key statutes such as the Clean Water Act, thereby threatening the erosion of environmental regulations as a market-driver for the industry. This was to be the cause of the industry's decision to globalize more of its operations in the early Nineties. More fundamentally, it can be argued that the environmental industries as traditionally organized have matured in the United States and much of the developed capitalist world, and that some of its big **revenue**-earning segments are unsustainable because capitalism in the developed North is finding it too costly to pay for the end-of-pipe treatment of waste and pollution. Profits in the regulatory-driven segments, such as hazardous waste management and pollution control, are expected to decline. As one study put it, 'these segments face the fundamental long-term challenge that the environmentally negligent and resource-rich environment will no longer exist. We are no longer creating Superfund sites at the rate we once did; we no longer use asbestos, each new manufacturing or industrial facility is now designed with material efficiency and pollution prevention in mind'. Many of the industry's clean-up and control sectors in services and equipment 'face a soberingly finite life cycle':

Faced with the significant costs associated with emissions reduction, resource intensive, waste and pollution producing industries have been seeking ever more efficient means of

conducting their operations. Unwanted environmental emissions are increasingly viewed not only as a potential liability but, more importantly, as a sign of economic and production inefficiency . . . This transition within industry has, in turn, begun to drive change within the environmental industry itself as traditional 'end-of-pipe' customers begin to demand more comprehensive and simultaneous solutions to both their economic and environmental problems."

The Germans take a very similar view of the industry's future. Spurred by public pressures and the strictest environmental laws in the world, in the 1980s Germany was able to 'decouple' economic growth from increased pollution flows. Chancellor Helmut Kohl has argued that traditional end-of-pipe environmental protection must give way to production-and-process oriented environmentalism, and that government must help lower capital's risk in making this transition. The Japanese, having made major reductions in pollution levels and created new markets for energy and environmental technologies, demonstrated that the states with the most rigorous anti-pollution limits and the most investment in green technology become more efficient and competitive, more likely to dominate the export market. Green technology development and diffusion would strengthen, not weaken, national competitiveness. The Clinton administration set out its Environmental Technology Initiative within weeks of taking office in early 1993; the initiative was designed to accelerate environmental protection while strengthening America's industrial base by increasing the export potential of US environmental technology. 'This investment will aid in the transition away from a defense-oriented economy, by stimulating the increased use of private sector R&D resources for environmental quality-related purposes.'¹¹

These ideas might be called the progressive conventional wisdom of the environmental industry since the Rio Earth Summit – the UN Conference of Environment and Development (UNCED) of 1992. The Rio summit, as Pratrapp Chatterjee and Matthias Finger argued in *The Earth Brokers*, was about Western science and technology, Western training, Western money and Western institutions – the very forces that have caused the environmental crisis now dominate the process that is expected to resolve it.¹⁴ There was a large turnout of transnationals at Rio, a veritable meeting-ground for penitent polluters, such as DuPont, the world's biggest producer of CFCs and now an environment protection company. They were eager to promote market forces, corporate self-regulation and full-cost pricing of resources, especially as an alternative to more radical solutions. The consensus view of big business at the Earth Summit was set out in Swiss billionaire Stephan Schmidheiny's influential book, *Changing Course*, written as head of a transnational advocacy group, the Business Council for Sustainable Development. A central idea of the study is that capitalism is moving into a stage of sustainable growth and 'eco-efficiency' – a term that

applies to a corporate strategy of adding value to the firm while reducing the use of resources and the creation of pollution. Science and technological change can prevent pollution or lower its costs to capital rather than simply clean it up. The other key idea in Schmidheiny's study is that green technologies must be diffused to the South via commercial markets; through the transnational corporation rather than as aid from governments. 'Technology cooperation' replaces technology transfer.¹⁵

These ideas were particularly addressed, it would seem, to US business. A vulnerability of the American environmental industry is that, unlike its Japanese and German counterparts, it has a weak record in exporting its technologies and services to the rapidly-growing emerging markets. In 1990, US exports of environmental protection equipment were less than one-half of one percent of all merchandise exports. The US environmental industry has made some progress internationally, yet it earns just 6% of its total revenues from offshore markets, whereas the Europeans, Japanese and Canadians earn between **15%** and **25%** of their revenues from sales and investments abroad. Germany, the leading exporter, has in some years earned 40% of its revenues from environmental technologies from markets abroad: it dominates most of Europe and its largest transnationals are active all over the world. Japan internationalized its pollution-control industry in the late Eighties and now dominates Asian markets. Since those who successfully make the strategic alliances and transfer the technologies are creating value in their companies and also positioning themselves for future opportunities, it would appear that the US industry has been insular in its attitude to trade and overseas investment. The huge size of the mostly-regulated US market made the idea of exports a luxury, and the environmental industries were not included in national export planning until the **Clinton/Gore** administration took office in 1993. This is an industry that thrives or dies according to the degree of state support it receives, and American free-trade ideology is frequently in conflict with what needs to be done in the real world to match the Germans and Japanese. The US environmental industry frequently complains that American firms, though competitive on price and quality, lose contracts because they cannot compete with the low-interest 'soft loans' offered by, say, the big Japanese trading companies in negotiating with countries such as China. Japan certainly combines green aid and financial incentives with its foreign investment—it is also highly flexible in adapting technologies to local needs – but US firms also have a very wide range of **export-promoting** and aid-dispensing agencies to draw upon, such as the US Export-Import Bank, US Aid, the Overseas Private Investment Corporation, the Environmental Protection Agency's Technology for International Solutions (US TIES) programme, and a number of multi-lateral development banks and regional **institutions**.¹⁶

Pollution and Inter-Capitalist Rivalry

"The Earth is one but the world is not." And nor, we might add, is transnational capital. The world of oligopolistic rivalry and international competition is with us still, though it is certainly veiled by the smog of liberal interdependence and co-operation ideology. It is the multinational corporation's drive for technological and capital accumulation, combined with the pressures to globalize in conditions of liberalized trade and financial markets, deregulation and privatization, that is at the core of the inter-capitalist rivalry over environmental markets in East Asia, Southeast Asia, East and Central Europe and parts of Latin America. Maturation of the industry and slower rates of GNP growth in the industrial countries weakened profits; deregulation removed some market-drivers; and privatization brought new corporate players – such as the French and British water companies – into the global industry as competitors. Returns (and risks) would be much higher in the emerging markets of, say, rapidly-growing Asia or Latin America than in Europe. Percy Barnevik, president of Geneva-based ABB, a company with heavy investments in India and other Asian markets, has noted that the emerging markets pose the single greatest challenge to the global environment. "These people see not only a dream of lifting living standards not 50 or 100 percent, but five or ten times. The question is will they [emerging markets] waste in industry as they build it up – like Eastern Europe?" Funds spent on fine-tuning emissions in developed countries should be diverted to address far worse pollution in developing countries like India:

What do we talk about in the developed world? We talk about if the ppms [parts per million] of coal-fired power plants in Germany should go down from 25 to 15, while we have 500ppms in India. It costs less to go from 500 to 50 than it does from 25 to 15.

An examination of the rivalry for environmental technology markets must begin with the real-world constraints; then we survey the competition for environmental exports and investments in some of the 'emerging markets' on which data is available. In all of the discussion, we will note the crucial role of the state – developed capitalist as well as developing capitalist – in the environmental industries as they have evolved. The state's role is basic at the international level as well, and this is partly because market forces cannot deliver the environmental goods, but also because national governments perceive that the conflict for market-share in the global environmental industries is part of a wider rivalry over who will shape and benefit from industrial development in the so-called emerging markets.

1) To begin with some of the barriers to green technology diffusion, there is first the question of capital markets and the financing of environmental

technologies. A technology exporter that does not offer a financing package to a developing country has little hope of making a sale. Asia (excepting Japan) needs to invest about \$1 trillion in its infrastructure by 2004, with **70%** of this in power and transport-related areas. Much of this will have to be raised from financial markets in the North. Most of the electricity to be generated in new power plants will be based on the cheapest energy source – coal with a high sulphur content. Will financial investments in the infrastructure requirements in the fastest growing region of the world be made conditional on better environmental practices? Some pressures might come from agencies such as the World Bank, but for private investors and bankers, who are competing with one another in this rich market, the answer is no: they will not impose such conditionality so long as the loans do not raise serious liability issues for banks or insurers. If anything, financial markets encourage a short-term outlook and the accelerated use of resources for higher growth-rates: they favour even faster growth as opposed to 'eco-efficient' technologies and development. With low resource prices, financial markets encourage the tendency of firms to externalize their polluting activities. Foreign portfolio investment is motivated by the need for short-term results, and this encourages it and the borrowers of the capital to undervalue common property resources, such as water, energy, air, and to use them up in an unsustainable manner: thus the globalization of investment flows has actually speeded up the destruction of the world's **forests**.¹⁹

2) Financial markets are not just excessively oriented to the short run, they are highly volatile as well; and this can be ruinous for any developing country planning major environmental investments. The market for environmental infrastructure projects in Mexico is estimated to exceed \$30 billion over the next decade, an estimate based on the high rate of discharged pollutants and the lack of adequate treatment **infrastructure**.²⁰ There is an enormous need for water, air, hazardous waste and solid waste projects in Mexico, yet many of the projects cannot be financed. In the early Nineties, Mexico's government was eager to obtain financing for environmental technologies, if only to placate the critics of the NAFTA pact and dispel the country's image as a haven for polluters. But US financial markets proved unwilling to accept the foreign-exchange risks after the huge currency devaluation in **1994-5** when portfolio capital fled Mexico in search of more stable currencies. The subsequent very high interest rates meant that no private sector capital became available for environmental projects. With lower government revenues, Mexico has forced local projects to operate on a stand-alone financial basis; but because residential users have low incomes, which places further constraints on financing, many badly-needed environmental projects are

not regarded as viable by investors. Yet, it is notable that while American corporations did not even bid on a **1993** tender to operate part of Mexico City's vast water supply system, a recently-privatized British water company, Severn Trent, formed a joint venture with a Mexican partner, SAMSA, and was a successful bidder, in part because it addressed the state's political interests in Mexican ownership. The Mexican state assumed much of the risk in constructing and financing the IASA system, which was taken in stages, and it was completed despite the peso crisis that **struck** in late **1994**. Strategic alliances with local capital and the state are **one** way of lowering risks and capital requirements while adding value through technology transfer.

3) Environmentally sustainable growth requires long-term investments in highly-populated poor countries, but there are high-risk premiums on such investments. Foreign direct investment via multinationals moves overwhelmingly toward the areas of higher growth and incomes, which in the case of the developing world means a handful of rapidly-growing countries. Environmental Business International, a leading industry consultant, writes off all of South Asia, with the exception of India, as 'pre-emerging markets' that are 'severely constricted by the lack of financial resources in the public and private sectors and the failure thus far of their governments to promote a larger role for private sector development of environmental infrastructures'.²¹ Environmental protection services do not flow toward the areas of worst degradation but to the most promising environmental markets, ie, where there are well-defined regulations, a capacity to enforce them, and the financial ability to pay for anti-pollution measures. There is an observed 'direct correlation between the size and robustness of individual environmental [economies] and their per [capita] income and capital in each country',²² and this is a key determinant for investments by the world environmental industry.

4) A further barrier to the diffusion of environmental technology and investments is political and administrative: many Southern governments lack an 'indigenous capacity' to assess their countries' conditions, to create institutions, and to enforce regulations. An important factor in the demand for the environmental industry's technology is tough legislation backed by stringent enforcement, and this entails the development of environmental protection agencies staffed by well-trained officials. The Germans believe that they may have to export their own strict ecology laws before Germany's environmental industry can win new overseas markets. Germany's drive for tighter environmental laws abroad complements its need for export markets for this highly competitive sector. Strict laws fostered a green technology sector in Germany; now the regulations must

be transferred abroad. 'Production,' states Germany's environment minister, 'often began to develop only after state requirements, norms and restrictions gave the orders and guaranteed a certain minimum need.'²³ US Commercial Officers in their reports from prospective markets complain that a market for environmental technology cannot develop in the absence of a framework of laws that are enforced. South Korea has such legislation, 'in many regards similar to US law', but:

Enforcement of environmental laws in Korea has been inconsistently applied across regions and industries and, in general, not carried out with sufficient rigor to ensure that compliance is achieved. Lack of enforcement is largely a function of insufficient technical and manpower resources (as well as insufficient authority to sanction) for those policing the standards, in addition to lingering national policies that continue to emphasize unhindered economic growth at the cost of the environment."

In 1993 President Clinton established the Environmental Technology Initiative (ETI) to increase the competitiveness of the US environmental technology industries; the international component of the initiative is known as US TIES – Technology for International Environmental Solutions. US TIES is designed to create demand for American technology via a 'market pull' approach by assisting foreign governments in developing environmental standards and norms, training technical staff and regulators in the US with American technology and solutions.

To say the least, the business and political elites of developing states, particularly in Asia, are suspicious of such strategies. Malaysia, Indonesia and China have warned that the Americans and Europeans want to impose costly environmental legislation on the Asian economies in order to slow the region's rapid growth. They are fearful that environmental **conditionality** agreements will be introduced into trade and financing **negotiations**,²⁴ and they resent the efforts of Northern environmental NGOs to use trade restrictions as a lever to force them to accept universal norms and standards. This 'green imperialism' has taken a number of forms, but a good example would be the efforts of one politically-active group, Earth Island Institute of San Francisco, to use American courts to require enforcement of US environmental statutes and to extend the extraterritorial reach of American environmental statutes to all who wish to have access to the US market. In one celebrated case, Earth Island litigated successfully (with domestic fishing interests) to prevent Mexican fishermen from fishing for tuna in Pacific waters because their drift-nets were destroying dolphins; GATT struck down the US ruling. In another case, Earth Island, supported once again by domestic fishing interests, obtained an order from the US Court of International Trade, pursuant to an amendment to the Endangered Species Act 1973, banning imports of all wild shrimp caught by fishing boats not equipped with technology to protect sea turtles (so-called turtle excluder devices): this extension of US conservation law

caught more than 50 countries in the legal drift-net, almost all developing nations: Thailand, India, Honduras prominent among them. The embargo protected the US shrimp industry from foreign competition while universalizing US environmental norms.²⁶ The point is not that sea turtles are undeserving of conservation efforts; rather, it is the combination of brazen protectionism and the unilateral imposition of American standards that belies the claim that Western environmentalism actually represents a form of global civil society.

Asia's Dirty Air

The real heart of the inter-capitalist competition for the global market in environmental services and technologies is in East Asia, and air pollution control (APC) is perhaps the most dynamic aspect of the rivalry. Asia has the world's most polluted air, and it contributes between a fifth and a quarter of the world's emissions of greenhouse gases. China alone does half the damage. Some of its cities are so blackened by air pollution that they cannot be seen by satellite. Among the causes: the massive use of indigenous high-sulphur coal for industrialization, the growth of enormous cities choking with automobile traffic, the high costs of installing efficient environmental technologies, the weakness of the environmental movement in Asia, the ubiquitous illusion of policy elites that rapid growth is a solvent for all problems. China's energy demands are increasing and the country, already the world's leading burner of coal, is expected to double its use in the next two decades in order to meet its ambitious economic growth targets. In its Ninth Five Year Plan (1996-2000), China has identified SO₂ emissions as a major environmental priority, with over 300 projects identified, many of them involving acid rain control (\$1.6 billion) and with APC in key cities (\$5.7 billion). If the worst of the air pollution is in the largest cities, this is also where the best sales prospects are for transnational green technology manufacturers, provided financing can be secured:

The sulphur dioxide created by Shanghai's coal burning power plants is now regarded as the most serious pollution problem in the city. The technology for desulphurization is also one of the most needed technologies in China. The central government will be forced to implement harsh controls on sulphur dioxide emissions in the future and plans to levy heavy fines on power plants that fail to meet the tougher standards. For example, under proposed regulations, a typical 300,000 kilowatt power plant operating without any pollution control measures would face an annual RMB 17 million (US\$ 2.04 million) in fines, high enough to force it to look for adequate equipment. . . . A complete set of desulphurization equipment for a 300,000 kilowatt power plant costs somewhere around US\$ 18 million to US\$ 20 million, equal to almost half the cost of the total investment in such a power plant. It is impossible at present for local power stations to afford such equipment The Mitsubishi company of Japan is interested in localizing the manufacture of this equipment and is seeking Japanese government funds to support such a project.²⁷

Asia is the world's leading regional market for APC equipment, with a 37% share of an estimated \$15 billion total and almost 60% of all sales of flue gas desulphurization equipment and electrostatic precipitators for new power plants and heavy industries.²⁹ Privatization has led to the rapid growth of independent power projects in many Asian countries, and this has pushed the market for APC technologies. Japan itself is by far the largest market in the region and it also has the strictest regulations. Japanese transnationals, such as Mitsubishi Heavy Industries, Hitachi and IHI, having developed their technologies in the domestic market, internationalized to protect their lead and today hold the major shares of the APC equipment market in China, South Korea and a number of other heavily-polluted Asian nations. If the enforcement of regulations improves and the lack of hard financing can be resolved, through a combination of local capital, multilateral bank lending, aid and foreign investment, India and China represent exceptionally large and lucrative markets for the environmental industry, albeit for the medium and longer term. Given the damage that their coal-fired generation of power from hundreds of plants can do to the global atmosphere and to human health well beyond their borders, it seems probable that international financing will be found. The threat posed to Japan by acid rain emanating from southern China in the early 1990s was one of the determinants in the decision of the Japanese state and its environmental technology sector to internationalize the industry: having developed the strictest standards in the region, it would use its technological advantage, supplemented by overseas aid, to become the dominant exporter of anti-pollution equipment and services. This would allow it to promote the continued rapid industrialization of China and the rest of Asia from which it draws such economic benefit, and without suffering from external damage.

Japanese APC companies now not only have a strong lead in China, they dominate the Asian APC market and stand to be beneficiaries of the adoption of anti-global warming plans. They are flexible on financing, willing to adapt costly technologies to local needs, and have long-established trade ties in Asia. Japan's Overseas Development Assistance for environment-related projects began in China in 1991 and has focussed on the transfer and commercialization of cleaner, more efficient technologies. MITI – Japan's Ministry of International Trade and Industry – operates a Green Aid Plan that funds joint research and development in such areas as clean-coal technology and energy efficiency. The projects benefit Japanese manufacturers because they lower the cost and risks of adapting technologies to the Chinese market, and they foster long-term joint ventures and licensing agreements with Chinese business. MITI involves Japan's major industry associations in the Green Aid Plan and in technology transfer arrangements. MITI's strategy (unlike that of the US)

emphasizes support for less costly, simplified technologies: for example, developing an affordable flue-gas desulphurization (FGD) technology for use on new coal-fired power plants. FGD technology reduces the incidence of respiratory disease and acid rain, but it can add up to 25% to the cost of a power plant – say an additional \$125 million to a \$500 million plant – and the Chinese, who plan to build 100 new power plants, have resisted fitting them with this environmental technology. As a way of preventing acid rain that could damage Japan, but also as a response to the obvious business opportunities, MITI and Mitsubishi Heavy Industries have worked with the Chinese to produce a simplified, cheaper desulphurization technology. Long-term, low-interest loans from Japan's Overseas Economic Cooperation Fund (OECF) can be used to finance the installation of such technology on a commercial scale.³⁰ Fifteen out of 40 of the projects in the first part of Japan's fourth five-year low-interest yen loan were environment-related, though the Chinese reportedly had to be persuaded to request the 15 projects." Japan's environmental ODA expenditures, which have become the dominant segment of its assistance overseas, focus on air pollution control in Asia; and since most of it is untied, it has become a key financing vehicle for Western multinationals financing projects in the region.

In China's largest city, Shanghai, where pollution is an undesirable companion to a 20% annual growth rate and to which much environmental technology is imported, the US lags well behind Japan and Germany. The Japanese have 37% of the import market share for Shanghai's environmental sector, the German's 34%, and the US just 5-7%. US firms, although competitive on quality and price, lose out, the Americans claim, because the governments of Germany and Japan have provided grants and 'soft' low-interest money, amounting to a 30-40% discount, in favour of their exporters. 'Government aid is a principal aspect of several countries' long-term market strategies. Japanese and German companies have become the most successful equipment suppliers to municipal infrastructure projects. They sell their wares at or below cost and train personnel to use their equipment . . . the investment may be viewed as an "entrance fee".³²

Japanese transnationals enjoy a similar market strength in all of South Korea's environmental sectors, and Germany is highly competitive there in solid waste management and air pollution control. With a total market of \$5 billion and an estimated annual real growth rate of 25%, the import market share in Korea stood in 1995 at: Japan: 42%; US: 20%; Germany: 18%; France: 12%; and others: 8%.³³ In Taiwan, where imports of anti-pollution equipment are expected to reach \$1.7 billion by 1997 and total environmental spending is growing at close to 12% per year, foreign suppliers control 80% of the market, but the US, with an import share of 27%, lags behind Japan.³⁴

But the **Japanese** face intense **competition** in the rest of the Asian market from **European** and American **manufacturers** of APC technology, notably from Swiss-based Asea Brown Boveri, **Noell** of Germany, Babcock and Wilcox of Ohio, and General Electric. These four, together with Mitsubishi Heavy Industries, dominate Asia's growing air pollution control market. And because some countries want to diversify supply sources and reduce their trade deficits with Japan, US and European transnationals are in a position to contest Japan's technological dominance. They are doing so by making strategic alliances with some of Asia's leading businesses and with the governments of the region; when Waste Management International, a subsidiary of WMX Technologies of Illinois, moved to Asia in the early Nineties it settled in Hong **Kong**, notorious for its polluting industries and chemical wastes; it made a partnership with one of China's state-owned investment agencies, China International Trust and Investment **Corp.** Ebara Corp., one of Japan's premier environmental corporations, has a **partnership** with AEA **Technology**, a huge and remarkable privatized British firm spun off from the Atomic Energy Agency that has 3,500 scientists and engineers and much of Britain's environmental expertise under its roof. Asea Brown Boveri, Bechtel, ERM and Heidemij NV, Western multinationals operating in Taiwan's environmental market, have all formed joint ventures with local firms in the interest of 'localization', while Babcock and Wilcox are partners with Hyundai in South Korea's **APC** market. India's environmental markets are characterized by collaborations between the country's technical firms and many of the transnationals already mentioned. **Flakt** India of Calcutta, an iron and steel concern, has a long-standing partnership with the ubiquitous **ABB**; these two could **emerge** as dominant in **India's environmental** technology market. **ABB** holds a 20% share of the global air pollution control market for power generation, and in the Asia-Pacific region, about 60-70% of its business is tilted towards new coal-fired power plants. Half its annual APC revenues of \$1 billion derive from its Asia operations. Another European transnational heavily investing in the Asian air pollution market is **Noell** of Germany, a subsidiary of the giant Preussag Group, with investments in Taiwan power plants and a hazardous waste facility in **Pusan**, South **Korea.** Asia, with its accelerating growth rates and environmental crises, is at the heart of inter-capitalist rivalry near century's end; and environmental technologies are **merely** one aspect of a struggle among the dominant groups of capital and their respective states for control of the world's fastest-growing markets.

Conclusion: Sustainable Hegemony

Vandana Shiva has noted that our conception of a 'global' environmental crisis, whose resolution can only come from the **North's** leadership, has

transformed the problem of ecology into a problem of technology transfer and finance. 'Since the North has abundant industrial technology and capital, if it has to provide a solution to environmental problems, they must be reduced to a currency that the North dominates.'" Thus, the financing that flows from Northern states for the technology for CFC substitutes ends up as subsidies to the same transnational chemical firms that developed and used the CFCs. The transnationals that manufacture Asia's new coal-fired power plants also produce the air pollution control equipment that limit the acid rain and respiratory disease caused by the use of coal as an energy source. In Shiva's framework – and ours – global ecology is about sustainable hegemony: Northern states over Southern; transnational capital over local initiative; green technologies as an alternative to the slowing of capitalist growth and consumption. The environmental technology industries of North America, Europe and Japan basically oil the global development machine by supplying the apolitical technical solutions that allow the huge industrial projects, the nuclear and coal-fuelled power plants, the vast clear-cuts of forests to proceed to the great benefit of transnational capital.

None of this obviates the need to address the environmental crisis of the South through means that do not reinforce the North's hegemony. Few would deny that cleaning up pollution and the toxic disasters created by, say, the maquiladoras on the US-Mexican border or by rapid growth in China or Poland is an important contribution to human health and development. Many cities in the South desperately require anti-pollution control and waste-disposal technologies. There is a critical need for potable water supplies and for waste water facilities in much of the developing world. But the South's environmental crisis is also a social crisis rooted in class exploitation, poverty and the unequal control of resources and political power. The growing involvement of the oligopolistic environmental industry in the ecological affairs of developing countries – at least those countries that can attract its investments – offers little more than the greening of global reach, a new colouration of the same old imperialism.

NOTES

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2. *Ibid.*
3. The speaker was Gerhard Gumbel, President of Germany's Envitec 95 Trade Fair, which is held in Dusseldorf every three years. Reported by Reuters, 19 June 1995.
4. Sarita Hoyt, 'EPA's US Ties Program Diffusing Technologies Overseas', *Business America*, (April 1996), p. 56.
5. Karliner, *op. cit.*

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23. Comments made at an environment trade fair at Dusseldorf in June 1995. Reported by Reuters, 19 June 1995.
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(Summer and Fall 1996). The founder of Earth Island Institute, David **Brower**, also founded Friends of the Earth, and was for many years Executive Director of the Sierra Club. The most potent and uncompromising leader in the American environmental movement, Brower has been called the 'Archdruid' – druids sacrifice people to save trees. See John **McPhee**, *Encounters with the Archdruid* (Toronto, Macarlane, Walter and Ross, 1971).

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36. *Ibid.*
37. Vandana Shiva, 'The Greening of Global Reach', in Wolfgang Sachs, ed., *Global Ecology: A New Arena of Political Conflict* (Halifax, Fernwood Books, 1993), p. 153.