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REGULATORY DIVERSIFICATION AND THE MONITORING STATE: THE DIRECTION OF ENVIRONMENTAL REGULATION IN TAIWAN

Beth E. Kinne[†]

Abstract: Rapid industrialization in Taiwan in the latter half of the twentieth century resulted in dramatic increases in industrial pollution and municipal waste, leaving few places on the small island spared from severe pollution. Public pollution protests in the 1970s and 1980s both contributed to and increased with the liberalization of Taiwanese society. With the end of martial law in 1987 and subsequent creation of the Environmental Protection Agency, Taiwan adopted a command and control regulatory scheme that achieved limited success. From the 1980s onward, the Taiwanese government came to rely upon the participation of a greater number and variety of stakeholders in the pollution regulation process; a trend made necessary by the economic realities of environmental regulation in an economy dominated by small and medium sized enterprises. As a result, Taiwan's environmental regulatory regime is characterized by shared responsibility for environmental regulation across government sectors, between central and local governments, and between the public and private sectors.

Diversification of regulation, supplemented with moderate government intervention, will be most likely to increase effectiveness of pollution regulation. The benefits of this approach include potential reductions in the cost of regulation and compliance, increased data collection and distribution, and cultivation of more collaborative relationships among industry, regulators, and the public. In contrast, the greater number and variety of stakeholders participating in environmental regulation introduces potential conflicts of interest, resulting in new inefficiencies, and requiring continued government interference in the role of auditor and coordinator. Nevertheless, the Taiwanese have embraced democracy and the involvement of a diverse array of interest organizations. This, coupled with the expense of pollution regulation, leads to the conclusion that Taiwan's practice of distributing responsibilities for pollution regulation across multiple stakeholders will be the norm for the foreseeable future.

I. INTRODUCTION

Imagine Vancouver Island, British Columbia.¹ Now imagine that almost seventy-seven percent of the population of Canada,² or twenty-three

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¹ Vancouver island is located off the western coast of British Columbia, Canada, has an area of 32,134 square kilometers (12,408 square miles), and a population of less than 700,000 people. MINISTRY OF MANAGEMENT SERVICES, GOVERNMENT OF BRITISH COLUMBIA, BRITISH COLUMBIA DEVELOPMENT REGION POPULATION ESTIMATES, 1996-2002, available at <http://www.bcstats.gov.bc.ca/data/pop/pop/DR/DR9602.htm> (last visited Oct. 15, 2003). The area of Taiwan, including Pescadores, Matsu, and Quemoy Islands, is 35,980 square kilometers, and without the

million people, live there. Add three nuclear power plants, over 97,000 factories,³ including large cement and petrochemical industries, and one of the largest computer and peripheral manufacturing centers in the world.⁴ Include a sub-tropical climate, history of martial law, and an ambiguous international political status and you have a situation similar to Taiwan's.

Rapid industrialization during the latter half of the twentieth century resulted in large amounts of unmanaged industrial pollution in Taiwan.⁵ The contemporaneous increase in per capita income and domestic consumption resulted in dramatic increases in municipal waste.⁶ The "Ihla Formosa"⁷ is now suffering from the byproducts of development; few places on the small island have been spared the legacy of pollution from the industrialization era,⁸ and decades later, Taiwan has just begun to address many of its pollution problems.⁹ As Taiwan moved from governance by martial law to a representative democracy, the central government increased efforts to incorporate effective pollution regulation across industry sectors, first in response to domestic demand,¹⁰ and later in response to international pressure.¹¹ In its determination to make the island green again without

small islands is 32,260 square kilometers. *Taiwan*, CIA WORLD FACTBOOK (2002), available at <http://www.cia.gov/cia/publications/factbook/geos/tw.html#Geo> (last visited Oct. 15, 2003).

² The population of Canada is approximately 30,000,000 people. Statistics Canada, *2001 Census of Canada*, <http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm> (last modified July 16, 2002).

³ INDUSTRIAL DEVELOPMENT BUREAU, MINISTRY OF ECONOMIC AFFAIRS, 2002 DEVELOPMENT OF INDUSTRIES IN TAIWAN 14, at <http://www.moeaidb.gov.tw/idy/idb/pdf/e01.pdf> (last visited May 9, 2003).

⁴ In 2002-2003 Taiwan held 70% of the motherboard production market. Global Sources, *PC Product Lines to Improve for the 2003 Market*, Nov. 4, 2002, <http://www.globalsources.com/MAGAZINE/CP/0212/OUTCPTW.HTM>. Taiwan's production share of computer components like motherboards, mice, and keyboards ranged from 64-72% of the world market in 1995. WILLIAM BOLTON ET AL., WORLD TECHNOLOGY EVALUATION CENTER PANEL REPORT ON ELECTRONICS MANUFACTURING IN THE PACIFIC RIM (1997), <http://www.wtec.org/loyola/em/> (last visited June 5, 2003).

⁵ Sean Gilbert, *A Survey of Pollution and Resource Intensity Indicator Research in Taiwan*, http://www.usaep.org/programs/policy/papers/pol_surpolres.doc (last visited Oct. 15, 2003).

⁶ Ouyang Chiao-Hui, *Sustainable Development and Our Living Environment*, in QUIET REVOLUTIONS ON TAIWAN, REPUBLIC OF CHINA 186, 190 (J. C. Hu ed., 1994).

⁷ *Ihla Formosa*, beautiful island, is the name the Portuguese and Dutch explorers dubbed Taiwan in the late 1500s. The title Formosa was commonly used to refer to Taiwan until after the second World War.

⁸ See Chiu Yu-Tzu, *Taiwan: The "Island of Poison"*, TAIPEI TIMES, Dec. 4, 1999, at 3, available at <http://www.taipetimes.com/News/archives/1999/12/04/0000013515> (last visited Oct. 15, 2003).

⁹ *Id.*

¹⁰ Since the 1980s, the Taiwanese have shown consistent concern for the environment to the extent that it influences their voting patterns. See Hsin Huang et al., *Taiwan Environmental Consciousness: Indicators of Collective Mind Towards Sustainable Development*, <http://sdkb.stin.org.tw/foresight/Newsletter/4-2/IS3-1.pdf> (last visited Oct. 15, 2003).

¹¹ See Industrial Technology Research Institute, *Sustainability Report in Taiwan: Report to Rio +5*, Feb. 1997, <http://www.ecouncil.ac.cr/rio/national/reports/asia/taiwan.htm> (last visited Oct. 15, 2003).

losing economic stability, the government has gradually recruited more stakeholders to assist in the process.¹²

Following a global trend of diversification in environmental regulatory approaches, the Taiwanese government is depending on non-government actors to play increasingly significant roles in addressing the island's severe industrial pollution problems. There are benefits to this approach. Industry associations, environmental non-governmental organizations ("ENGOS") and internal and independent auditors currently monitor industrial pollution.¹³ Additionally, the Taiwanese government has zealously promoted certification of individual environmental management systems ("EMSs"),¹⁴ and introduced information-based regulatory schemes — in the form of required or voluntary reporting — into Environmental Protection Administration ("EPA") regulations.¹⁵ These mechanisms promote the collection of large amounts of data, which are then available for use in environmental decision making processes by individual industries and government agencies, allowing the use of private resources to improve monitoring of industrial pollution. Where this information is publicly accessible, it enables third-party participation in the regulatory process.¹⁶

Diversification in Taiwan's regulatory scheme substantially changes the way industries approach environmental compliance.¹⁷ The introduction of multiple financially interested players, such as certification companies and private auditors, into the regulatory process may introduce unpredictable conflicts of interest and contribute to a lack of consistency in or control over the regulatory scheme.¹⁸ Designing and implementing reporting and monitoring requirements for any industry is an ongoing process that requires dedication of significant financial and human resources.¹⁹ Finally, the integration of third parties such as non-governmental organizations

¹² See *infra* Parts III & IV.

¹³ Interview with employees at the Hsinchu Environmental Testing Company, in Hsinchu, Taiwan (Apr. 12, 2001).

¹⁴ See Shen-yan Chiu & Yi-Zong Yang, Taiwan's Experiences in Promotion of ISO 14000, Presentation at the World Bank Environmental Forum: Challenges and Strategies for Environmental Management in Asia, Cheju Island, Korea (Feb. 8-10, 2001), available at http://www.inem.org/htdocs/iso/iso_taiwan.html (last updated Apr. 6, 2001) [hereinafter ISO 14000 in Taiwan].

¹⁵ *Id.*

¹⁶ The degree to which environmental audits contribute to accountability and empower external parties is uncertain. See MICHAEL POWER, *THE AUDIT SOCIETY* 127-28 (1997).

¹⁷ Industries in Taiwan depend greatly on private companies for environmental certification and have spent thousands of dollars to implement environmental management systems. CHIU & YANG, *supra* note 14.

¹⁸ See *infra* Part VI.

¹⁹ An entire industry has built up around the business of auditing and reporting worldwide. See generally POWER, *supra* note 16, at 1-14.

("NGOs") and citizen groups into the regulatory process via public access to pollution data brings its own set of political and practical problems.²⁰ While distributing responsibilities across multiple sectors, the state must still play an important role as coordinator and monitor of the private initiatives in order to preserve the successes of Taiwan's diversification approach to environmental regulation.

Part II of this Comment provides a synopsis and historical explanation of the industrial pollution problem in Taiwan. Part III explores the evolution of pollution control from direct regulation to a diverse mix of regulatory frameworks with increasing dependence on the regulatory functions of non-governmental bodies. Part IV analyzes the diversification of regulators, from government to private sector to third sector parties,²¹ and the supporting role of transparency and information access. Part V articulates the benefits of diversification, such as: (1) spreading the cost of regulation across many sectors, (2) allowing localized approaches to pollution control, (3) increasing production of data for use in environmental decision making, and (4) creating more avenues for exchange of information among industry, regulators and third parties. Part VI explains how fragmentation of control among parties with diverse interests introduces new inefficiencies, requiring continuing intervention and coordination by the state. Part VII argues that in spite of the continued need for state monitoring, the spread of environmental regulatory responsibility among multiple stakeholders allows more diverse input into the process, promotes a system of ad hoc checks and balances, and increases diversity in regulatory approaches.

II. ENVIRONMENTAL POLLUTION IN TAIWAN: SOURCES AND CONSEQUENCES

Rapid economic development and transition from an agrarian to an industrial society in the latter half of the twentieth century led to Taiwan's status as one of the four "dragon economies" of Asia.²² Combined with a history of martial law and an ambiguous international political status,²³

²⁰ See generally, Lindsay Stirton & Martin Lodge, *Transparency Mechanisms: Building Publicness into Public Services*, 28 J. L. & SOC'Y 4, 471, 480-85 (2001).

²¹ See *infra* note 134 and accompanying text.

²² Richard J. Ferris Jr., *Aspiration and Reality in Taiwan, Hong Kong, South Korea and Singapore: An Introduction to the Environmental Regulatory System of Asia's Four New Dragons*, 4 DUKE J. COMP. & INTL. L. 125-26 (1993). These four economies are often referred to as the "four little dragon" economies in recognition of their rapid development during the latter half of the twentieth century. *Id.*

²³ See Ralph N. Clough, *The Enduring Influence of the Republic of China on Taiwan Today*, in CONTEMP. TAIWAN 25 (David Shambaugh ed., 1998).

industrialization and economic growth is often blamed for Taiwan's serious environmental pollution problems.²⁴

A. *The Impact of Martial Law and Taiwan's International Status on Pollution Regulation*

When the Kuoming Tang²⁵ ("KMT") came to Taiwan in 1949 after ruling China for twenty years,²⁶ they brought 800,000 soldiers,²⁷ China's store of gold,²⁸ and their constitution, laws, and government structure of democratic centralism.²⁹ The Republic of China ("ROC") Constitution provided for a democratic society complete with freedom of speech, teaching, writing and publication,³⁰ assembly and association,³¹ freedom to lodge complaints and file petitions,³² and right of election, recall, and referendum.³³ Article 23 of the Constitution, however, allowed these rights to be suspended when necessary to avert imminent danger or maintain social order.³⁴ Between 1950 and 1987 the KMT utilized this provision to impose temporary measures that suspended constitutional rights and imposed martial law,³⁵ granting emergency powers to then President, Chiang Kai-shek.³⁶

²⁴ Dennis Te-Chung Tang, *New Developments in Environmental Law and Policy in Taiwan*, 6 PAC. RIM L. & POL. J. 245-46 (1997).

²⁵ The first Republic of China government was the Chinese Nationalist Government, or Kuoming Tang ("KMT"), which ruled significant portions of mainland China from 1912 to 1949 and then fled to Taiwan at the end of World War II. Christian Aspalter, *The Taiwanese Economic Miracle: From Sugarcane to High-Technology*, in UNDERSTANDING MODERN TAIWAN 1, 4-6 (Christian Aspalter ed., 2001).

²⁶ Clough, *supra* note 23, at 20.

²⁷ *Id.* at 17.

²⁸ *Id.*

²⁹ The government of Taiwan under the KMT was a highly-centralized one party system, but subscribing to a capitalist economic system. *Id.* at 10, 13.

³⁰ ROC CONST. art. 11 (English translation), available at http://www.oefre.unibe.ch/law/icl/tw00000_.html (last visited Oct. 15, 2003).

³¹ *Id.* art. 14.

³² *Id.* art. 16.

³³ *Id.* art. 17.

³⁴ *Id.* art. 23. See also Clough, *supra* note 23, at 10 & 13. Martial law was first promulgated by the KMT in mainland China on November 29, 1934, and allowed suspension of rights of assembly and curtailing of media in combat and security areas. CHRISTIAN SCHAFFERER, THE POWER OF THE BALLOT BOX 5 (2003). The 1948 amendments broadened the restrictions to include suppression of religious activities and protests. *Id.* In 1949, Taiwan was declared a security area. *Id.*

³⁵ Officially known as the Provisional Amendments of the Suppression of Communist Rebellion, these were already implemented in 1948 when the KMT was still in Mainland China. In January 1950, they were applied to Taiwan via a presidential decree by Chiang Kai-Shek. Hung-mao Tien, *Taiwan's Evolution Toward Democracy: A Historical Perspective*, in TAIWAN: BEYOND THE ECONOMIC MIRACLE 3, 7 (Denis Fred Simon & Michael Y.M. Kau eds., 1992).

³⁶ *Id.* at 6.

When the KMT government took over economically undeveloped Taiwan at the end of World War II, it made a concerted effort to spur economic growth in order to win the trust of the Taiwanese people and maintain legitimacy.³⁷ The KMT was successful in increasing the economic wealth of the island in a relatively short period of time.³⁸ The KMT, however, invested heavily in profitable but environmentally damaging industries, such as petrochemical facilities, while neglecting to invest in pollution management infrastructure such as sewers and wastewater treatment facilities.³⁹ As of 2000, only a little over seven percent of Taiwanese households were connected to a sewer, and the overwhelming majority of municipal waste flowed directly into rivers and out into the ocean.⁴⁰ Taiwan continues to face shortages of waste disposal options for everything from municipal garbage to industrial effluent to toxic and nuclear waste.⁴¹

In 1971, United Nations Resolution 2758 (XXVI) formally replaced Taiwan with Beijing as the diplomatic head of China.⁴² Due to this change, Taiwan now occupies a unique political position. According to the official stance of the United Nations ("U.N."), it is officially a province of mainland China with a status of *non sui juris*.⁴³ In reality, Taiwan operates as a nation state, with its own independent political system, and maintains informal or

³⁷ Jack F. Williams, *Environmentalism in Taiwan*, in TAIWAN: BEYOND THE ECONOMIC MIRACLE 194 (Denis Fred Simon & Michael Y. M. Kau eds., 1992).

³⁸ Tien, *supra* note 34, at 7.

³⁹ By 1994, Taiwan was building its sixth naphtha cracking plant, had forty-two petrochemical firms, and eleven auto manufacturing firms. THE REPUBLIC OF CHINA YEARBOOK 1996, at http://www.taiwaninfo.org/info/yb96/f_html/ch10_5.html (last visited Oct. 15, 2003). In 1999, Tuntex and Jielung faced public opposition to construction of an eighth naphtha cracker. See Department of Landscape Architecture and Environmental Planning, University of California, Berkeley, *The Future of Coastal Tainan: A Summary of Research and Alternative Proposals for Coastal Tainan County, Taiwan* (1999) (on file with author) [hereinafter *Future of Coastal Tainan*].

⁴⁰ Taiwan's average sewer hook-up was only 7.2% in 2000. *Taiwan on Stage at Water Forum*, *TAIPEI TIMES*, March 13, 2003, available at <http://www.taiwanheadlines.gov.tw/20030319/20030319s1.html> (last visited Oct. 15, 2003).

⁴¹ See Taiwan Gov. Info. Office, *Quantifying Quality*, <http://www.gio.gov.tw/info/taiwan-story/society/edown/3-4.htm> (last visited May 23, 2003) [hereinafter *Quantifying Quality*].

⁴² ALEXANDER BOLLA & TED L. McDORMAN, *COMPARATIVE ASIAN ENVIRONMENTAL LAW ANTHOLOGY* 381 (1999). G.A. RES. 2758, *Resolution on the Restoration of the Lawful Rights of the People's Republic of China in the United Nations*, U.N. Doc. A/RES/2758, (1971), available at <http://www.taiwandocuments.org/un2758-XXVI.htm> (last visited Oct. 15, 2003) [hereinafter *Resolution 2758 (XXVI)*].

⁴³ William Beardslee, *International Law & the Environment: The Need for an Aggregate Organization*, 5 J. INT'L L. & PRAC. 379 (1996), reprinted in *COMPARATIVE ASIAN ENVIRONMENTAL LAW ANTHOLOGY* (Alexander J. Bolla & Ted L. Macdorman eds., 1999). *Non sui juris* means "without legal status."

formal diplomatic relationships with several countries, including fourteen in Central and South America, eight in Africa, and four in the Pacific.⁴⁴

Taiwan's ambiguous political status affects the development of its environmental policy at home and abroad. Lack of nation state status forces delegates from the EPA and other Taiwanese government bodies to participate in international environmental meetings and summits only as observers.⁴⁵ Such participation is important for two reasons. First, Taiwan does not want to be seen as an international polluter,⁴⁶ but rather as a progressive modern nation.⁴⁷ Second, Taiwan does not want to find itself behind the current global standards in pollution enforcement because this would prevent it from participating in international organizations such as the World Trade Organization.⁴⁸

Because Taiwan is counted along with China for the purposes of U.N. resolutions and other international treaties, it is held to the standards of a lesser-developed country, although in actuality it is a newly industrialized country ("NIC").⁴⁹ This designation allows Taiwan to be held to less-stringent environmental standards, but also requires it to comply with treaties entered into by China in spite of the fact that it has no political voice in China's dealings with the international community.⁵⁰ Reciprocally, China has no access to statistical or pollution data on Taiwan, and no power to enforce Taiwan's compliance with international agreements to which it is a party.⁵¹

This anomaly requires Taiwan to walk the political tightrope with regard to environmental standards and international politics.⁵² Taiwan is left with conflicting incentives and high risks associated with alternative

⁴⁴ Resolution 2758 (XXVI), *supra* note 42.

⁴⁵ ROC EPA, *Taiwan Employs Green Diplomacy at World Summit*, 5 ENVTL. POL'Y MONTHLY 9 (2002), available at <http://www.epa.gov.tw/english/EPM/issue0209.htm> (last visited Apr. 20, 2003); ROC EPA, *EPA Responds to Kyoto Climate Change Convention*, 1 ENVTL. POL'Y MONTHLY 7 (1998), available at <http://www.epa.gov.tw/english/EPM/issue9801.htm> (last visited Oct. 15, 2003).

⁴⁶ Dennis Te-Chung Tang, *The Environmental Laws and Policy of Taiwan: A Comparative Law Perspective*, 3 PAC. RIM L. & POL. J. SPECIAL EDITION S-89 (1993).

⁴⁷ *Id.* See also Chiu Yu-Tzu, *Taiwan Groups Heading to U.N. World Summit on Sustainable Development*, TAIPEI TIMES, June 4, 2002.

⁴⁸ Taiwan was admitted to the WTO in January of 2002 under the name Chinese Taipei. WTO, *Separate Customs Area of Taiwan, Penghu, Kimmen, and Matsu (Chinese Taipei) and the WTO*, http://www.wto.org/english/thewto_e/countries_e/chinese_taipei_e.htm (last visited Apr. 20, 2003).

⁴⁹ Daniel C.K. Chow, *Recognizing the Environmental Costs of the Recognition Problem: The Advantages of Taiwan's Direct Participation in International Environmental Law Treaties*, 14 STAN. ENVTL. L. J. 256, 281-82 (1995).

⁵⁰ *Id.* at 282.

⁵¹ *Id.*

⁵² *Id.* at 286.

modes of conduct that impede progressive environmental regulation.⁵³ Implementation of regulations as stringent as those of highly developed Western countries might help to distinguish Taiwan from China.⁵⁴ Voluntary compliance with these stringent regulations, however, risks raising international expectations for Taiwanese compliance without a corresponding increase in Taiwan's political representation in the treaty making process. In the words of Taiwan scholar Daniel Chow, "Taiwan faces the conundrum that it can be penalized by trade sanctions imposed by its major trading partners for not having acceded to a treaty that the United Nations does not permit it to enter."⁵⁵

B. *Rapid Intensive Development and Environmental Pollution*

Taiwan's pollution problems stem from its rapid development into an industrial economy without corresponding development of pollution monitoring and prevention.⁵⁶ Fifty years ago, Taiwan was an agrarian society with a population of eight million⁵⁷ and an annual per capita income of less than US\$ 200.⁵⁸ Today, at twenty-three million people and over 600 people per square kilometer,⁵⁹ Taiwan has one of the highest population densities in the world.⁶⁰ The current per capita income is between US\$ 13,000 and US\$ 14,000.⁶¹ Taiwan had the third largest foreign currency reserves in 2000⁶² and was the sixteenth largest trading economy in 2002.⁶³

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.* at 285.

⁵⁶ Jack F. Williams, *Paying the Price of Economic Development: Environmental Degradation, in THE OTHER TAIWAN: 1945 TO THE PRESENT* 244 (Murray A. Reubinstein ed., 1994).

⁵⁷ Press Release, MOEA Industrial Development and Investment Center, Invest in Taiwan: Message from President Chen, <http://investintaiwan.nat.gov.tw/moea-web/PresMsg/PresMsg.htm> (last visited Oct. 15, 2003) [hereinafter Message from President Chen].

⁵⁸ *Id.*

⁵⁹ ROC EPA, *Heavily Over Loading in the Environment*, <http://www.epa.gov.tw/english/offices/f/bluesky/bluesky2.htm> (last visited Oct. 15, 2003) [hereinafter *Heavily Over Loading in the Environment*].

⁶⁰ *Id.*

⁶¹ In 2000, the per capita GNP was US\$ 14,188. The per capita GNP dropped to US\$ 12,916 in 2002. Taiwan National Statistics Center, <http://www.dgbas.gov.tw/dgbas03/english/key/kesi.xls> (last visited Mar. 31, 2003). Purchasing power parity of per capita income in Taiwan in 2002 was US\$ 23,527. *Taiwan Fact Sheet*, ECONOMIST, <http://www.economist.com/countries/Taiwan/profile.cfm?folder=Profile-FactSheet> (last visited Oct. 15, 2003).

⁶² Taiwan's foreign currency reserves reached a record high of US\$ 161.6 billion in 2002. *Business Briefs*, TAIPEI TIMES, Jan. 4, 2003, at 11, at

<http://www.taipetimes.com/News/biz/archives/2003/01/04/189791> (last visited Oct. 15, 2003).

⁶³ Message from President Chen, *supra* note 57.

At less than 36,000 square kilometers,⁶⁴ the island is densely developed, with an average of almost three factories and 453 vehicles per square kilometer.⁶⁵

Under the KMT, Taiwan's economy took on the shape of command capitalism common to almost all of the so-called Asian dragons.⁶⁶ Economic development was centrally planned and markets were highly regulated and subsidized.⁶⁷ During this industrialization phase Taiwan routinely accepted "dirty" production industries such as battery recycling,⁶⁸ petrochemicals, leather goods,⁶⁹ pesticides,⁷⁰ electroplating,⁷¹ and shipwrecking.⁷² More recently, the government promoted development of high volume microchip, computer component, and electronics industries.⁷³ Taiwan's environmental regulatory agencies now struggle to manage the legacy of old pollution from these industries while new sources such as effluent from the high-tech industry continue to develop.⁷⁴

Taiwan's industrial sector is dominated by small and medium-sized enterprises ("SMEs"), lauded for their flexibility and credited with Taiwan's economic miracle of growth with equity.⁷⁵ Many small factories resulted from the "make your living room a factory" campaign of the 1960s, which

⁶⁴ This includes the area of the Pescadores, Matsu, and Quemoy islands. CIA WORLD FACTBOOK, *supra* note 1.

⁶⁵ *Heavily Over Loading in the Environment*, *supra* note 59.

⁶⁶ *The Rise and Crisis of the Dragon Economies*, in DRAGONS IN DISTRESS: ASIA'S MIRACLE ECONOMIES IN CRISIS 7 (Waldo Bello & Stephanie Rosenfeld eds., 1990). Hong Kong was the only dragon economy that developed outside of the command capitalism model. *Id.*

⁶⁷ *Id.*

⁶⁸ See Center for Investigative Reporting with Bill Moyers, GLOBAL DUMPING GROUND: THE INTERNATIONAL TRAFFIC IN HAZARDOUS WASTE (1990); American University, *Trade and Environment Database*, at <http://www.american.edu/projects/mandala/TED/TAIWGAR.htm> (last visited Oct. 15, 2003).

⁶⁹ GILBERT, *supra* note 5, at 3.

⁷⁰ Chow, *supra* note 49, at 269. See also Richard Louis Edmonds, *Taiwan's Environment Today*, in CONTEMPORARY TAIWAN 180 (David Shambaugh ed., 1998).

⁷¹ Chow, *supra* note 49, at 269.

⁷² Taiwan was the world center of the shipwrecking industry from 1969 to 1988. ROC EPA, *Global Environmental Issues in Taiwan: Transboundary Movement of Hazardous Waste*, <http://ivy2.epa.gov.tw/gepp/english/page05e.htm> (last visited Oct. 15, 2003).

⁷³ Taiwan Semiconductor Manufacturing Company ("TSMC") had five microchip manufacturing centers in Taiwan in 1995 and plans to construct six more by 2008. JAN MAZUREK, MAKING MICROCHIPS 127 (1999). Machinery and electrical equipment made up fifty-five percent of the total exports from Taiwan in 2001. *Taiwan Factsheet*, *supra* note 61.

⁷⁴ The high tech industry has been billed as a "clean industry" around the globe, but literally thousands of chemicals are used to make microchips, motherboards contain heavy metals, and computer monitors use large amounts of lead. See MAZUREK, *supra* note 72, at 109.

⁷⁵ Taiwan has been lauded for rapid economic growth accompanied by relatively equal distribution of wealth compared to other industrialized countries. Christian Aspalter, *The Taiwanese Economic Miracle: From Sugarcane to High-Technology*, in UNDERSTANDING MODERN TAIWAN: ESSAYS IN ECONOMICS, POLITICS AND SOCIAL POLICY 1, 13 (Christian Aspalter ed., 2001).

was designed to increase light industry production.⁷⁶ In 2000, ninety-six percent of enterprises were SMEs.⁷⁷ Taiwan's development scheme based on SMEs quickly raised the standard of living in Taiwan. But the consequences of this approach include high rates of pollution from difficult-to-identify sources, which have compromised the quality of life enabled by Taiwan's impressive economic gains.

III. THE LIBERALIZATION OF TAIWANESE SOCIETY AND THE EVOLUTION OF ENVIRONMENTAL REGULATION

The economic and industrial development that transformed Taiwan into a prosperous industrial nation between the 1960s and the 1990s was accompanied by the liberalization of society⁷⁸ and increasing public outrage over environmental degradation.⁷⁹ In response to public concerns, the government enacted pollution laws throughout the 1970s⁸⁰ and formed the EPA in 1987.⁸¹ Taiwan's regulatory approach has since evolved in a pattern common to nations around the world — starting with direct regulation of end-of-pipe pollution and moving toward more complex regulation strategies characterized by increasing dependence on cooperative relationships among industry, government, and third parties.⁸²

⁷⁶ Ouyang, *supra* note 6, at 198

⁷⁷ Meng-Shiun Wei & Kuo-Hei Huang, *Recycling and Reuse of Industrial Wastes in Taiwan*, 21 WASTE MGMT. 93 (2001).

⁷⁸ The KMT gradually removed restrictions on Taiwanese individuals throughout the 1980s. See *infra* Part III.A.

⁷⁹ See Williams, *supra* note 37, at 197-99.

⁸⁰ The first versions of the Drinking Water Management Act [yinyong shui guanli tiaolie] (Nov. 10, 1972, amended May 21, 1997); the Water Pollution Control Act [shui wuran fanzhi fa] (May 23, 1975, amended May 16, 1991); and the Air Pollution Control Act [kongqi wuran fangce fa] (May 23, 1975, amended Jan 20, 1999) were passed in the 1970s. ROC EPA, <http://www.epa.gov.tw/english/LAWS/> (last visited Nov. 10, 2003).

⁸¹ Organic Act Establishing the Environmental Protection Agency of the Executive Yuan (English translation), available at <http://www.epa.gov.tw/english/LAWS/organic.htm> (last visited Oct. 15, 2003).

⁸² See generally DANIEL MAZMANIAN & MICHAEL KRAFT, TOWARD SUSTAINABLE COMMUNITIES: TRANSITION AND TRANSFORMATION IN ENVIRONMENTAL POLICY (1999). For a summary of the evolution of the U.S. environmental regulatory system, see KARL HAUSKER, THE CONVERGENCE OF IDEAS ON IMPROVING THE ENVIRONMENTAL PROTECTION SYSTEM 11 (1999), at http://www.csis.org/pubs/wr_EnvironPSintro.html (last visited Oct. 15, 2003).

A. *The Restoration of Individual Rights and the Growth of Taiwan's Environmental Movement*

Although Taiwan's transition from martial law to a democracy was relatively uneventful from a global perspective,⁸³ within Taiwan it opened up a whole new world of political opportunity that enabled the environmental movement to quickly gain ground. While Taiwan was still under martial law, its second president, Chiang Ching-kuo,⁸⁴ laid much of the groundwork for the transition to a democratic society that would eventually fulfill the mandate of the ROC Constitution.⁸⁵ In the 1970s, increased standards of living and leisure time resulting from economic growth allowed people to travel more extensively abroad and within Taiwan, sparking an increase in appreciation for the rural environment, particularly the mountains and the seashore.⁸⁶ In the 1980s, manufacturing reached a level at which the resultant rapid environmental degradation was impossible to ignore,⁸⁷ and many development projects proposed by the Taiwanese government were vehemently opposed by the Taiwanese public.⁸⁸

Martial law was lifted in 1987,⁸⁹ and the competitive political process that ensued revitalized local politics.⁹⁰ In 1991, President Lee Teng-hui terminated the Period of National Mobilization for Suppression of the Communist Rebellion and the accompanying Temporary Provisions,⁹¹ which had been in effect since the KMT arrived.⁹² Under martial law, environmental protests were tolerated,⁹³ but as Taiwan's society liberalized

⁸³ Christian Aspalter, *supra* note 75, at 5.

⁸⁴ Chiang Ching-Kuo took over Taiwan in 1975 when his father, Chiang Kai-Shek, passed away. Chiang Ching-kuo died in 1988, just after the lifting of martial law. See JAY TAYLOR, *THE GENERALISSIMO'S SON: CHIANG CHING-KUO AND REVOLUTIONS IN CHINA AND TAIWAN* 147-49, 421-22 (2000).

⁸⁵ *See id.* at 405-30.

⁸⁶ Williams, *supra* note 37, at 197.

⁸⁷ *See id.*

⁸⁸ Some of these activities included plans by the Water Conservancy Bureau to develop part of the Tanshui River, estuary, the Provincial Highway Bureau's proposed road around Yushan and through the largest remaining tract of wilderness, and the efforts in 1980 by the Taiwan Power Company and Formosa Plastics Company to dam the Taroko Gorge and build a cement plant beside it. Williams, *supra* note 37, at 197-200.

⁸⁹ WEN-HUI TSAI, *IN MAKING CHINA MODERNIZED: COMPARATIVE MODERNIZATION BETWEEN MAINLAND CHINA AND TAIWAN* 145 (2d. ed. 1996).

⁹⁰ Xiaoming Huang, *Contested State and Competitive State: Managing the Economy in a Democratic Taiwan*, at 7, 8, <http://www.ciaonet.org/conf/hux01/> (last visited Oct. 15, 2003).

⁹¹ TSAI, *supra* note 89, at 146.

⁹² *Id.*

⁹³ *See, e.g.*, JAMES ANDERSON REARDON, *POLLUTION, POLITICS, AND FOREIGN INVESTMENT IN TAIWAN: THE LUKANG REBELLION* (1992). The Lukang Rebellion was a series of well-organized mass uprising by Taiwanese farmers against a Dupont factory in Changhua province.

and the government allowed an increase in public commentary, environmental issues came to the forefront of political discourse.⁹⁴ The political importance of the environmental movement peaked in 2000, when the newly elected president, Chen Shui-bian, announced the goal of creating a “green silicon island.”⁹⁵

Environmental protests became more common with the liberalization of society and the involvement of professional activists and scholars.⁹⁶ Prominent Taiwanese sociologist Michael Hsiao has divided the environmental movement into three separate categories: (1) the anti-pollution movement, (2) the conservation movement, and (3) the anti-nuclear movement.⁹⁷ The lifting of martial law in 1987 encouraged the first two movements, and gave rise to the popular version of the anti-nuclear movement, which began in 1988.⁹⁸ The anti-pollution movement of the 1980s was overwhelmingly characterized by victim activism — reactions to a present or impending threat that die down when the threat ceases.⁹⁹ The conservation and anti-nuclear movements, however, have been more consistent over time.¹⁰⁰ Protests around environmental issues were second only to those concerning economic issues.¹⁰¹ A total of 1211 local protests against air pollution occurred between 1980 and 1996, and ninety percent took place after the lifting of martial law in 1987.¹⁰² Of these, eighty-four percent were reactive, as opposed to preemptive or preventive.¹⁰³ In contrast to the conservation and the anti-nuclear movements, few of these protests resulted in lasting social organizations.¹⁰⁴ Over time, the environmental

⁹⁴ The end of martial law has been described as a “watershed” for environmental organizations. Robert P. Weller & Hsin-Huang Hsiao, *Culture, Gender and Community in Taiwan's Environmental Movement*, in ENVIRONMENTAL MOVEMENTS IN ASIA (Arne Kalland & Gerard Persoon eds., 1998).

⁹⁵ See Randall Martin, *Towards President Chen's "Green Silicon Island": Environmental Protection Experiences Steady Growth*, TAIWAN FORMULA 2, 6 (2000). See also *The "Green Silicon Island,"* <http://www.gio.gov.tw/taiwan-website/a1/win/012/html/silicon.htm> (last visited Oct. 15, 2003).

⁹⁶ Jeffrey Hou, *Cultural Production of Environmental Actions in Taiwan: Cases from the 1990s*, Presentation at the North American Taiwan Studies Association Annual Meeting, University of Washington, Seattle (June 23-25, 2001) (on file with author).

⁹⁷ MICHAEL HSIAO, *Environmental Movements in Taiwan*, in ASIA'S ENVIRONMENTAL MOVEMENTS 32, 33 (Yok shui F. Lee & Alvin Y. So eds., 1999).

⁹⁸ *Id.* at 40. Scientists and scholars had voiced opposition to the nuclear movement as early as the 1960s. Chen, *supra* note 153, at 259.

⁹⁹ Hsiao, *supra* note 97, at 34.

¹⁰⁰ Hsiao, *supra* note 97, at 36-38.

¹⁰¹ Yun-han Chu, *Social Protests and Political Democratization in Taiwan*, in THE OTHER TAIWAN: 1945 TO THE PRESENT 99-100 (Murray A. Rubinstein, ed., 1994).

¹⁰² Hsiao, *supra* note 97, at 34.

¹⁰³ *Id.*

¹⁰⁴ *Id.* at 39-40.

movement diversified and national environmental organizations developed with longer tenure and greater scope of purpose.¹⁰⁵

B. Government Response to Public Concern: Environmental Regulation

In response to the early environmental protests tolerated under martial law, the KMT passed a number of pollution statutes in the 1970s.¹⁰⁶ These statutes were fairly unsophisticated and depended on the Bureau of Environmental Protection — precursor to the modern EPA — and then on the weak EPA to create and enforce effluent limits, which it often failed to do.¹⁰⁷ Given the large numbers of polluters and the small budget of the young, comparatively unsophisticated Bureau of Environmental Protection, this early legislative scheme was not particularly effective.¹⁰⁸

Environmental protection continued to evolve throughout the 1980s and 1990s. In 1987, Taiwan's Guidelines for Environmental Protection Policy at the Present Stage were promulgated and its modern EPA was established,¹⁰⁹ elevating Taiwan's environmental regulatory body to a cabinet-level status with added legitimacy. From 1988 through the early 1990s, the Taiwan EPA continued primarily on a command and control regulatory approach.¹¹⁰ New pollution laws were added and old laws were revised to reflect increased concern with environmental protection.¹¹¹ In response to the increase in anti-pollution movements in the late 1980s,¹¹² the EPA took on a harsh policing role with respect to industry.¹¹³ The EPA instigated a long list of surveillance projects with names sounding more like

¹⁰⁵ See discussion *infra* Part IV.B.

¹⁰⁶ The Drinking Water Management Act was passed in 1972; The Air Pollution Control Act was passed in 1975. For modern versions of Taiwan's environmental laws in English translation see ROC EPA, <http://www.epa.gov.tw/english/LAWS/> (last visited Oct. 15, 2003).

¹⁰⁷ See Bello & Rosenthal, *supra* note 66, at 212-13.

¹⁰⁸ See generally J.C.S. Wang, *Economic Growth with Pollution: The Taiwan Experience*, in *ECOLOGICAL POLICY AND POLITICS IN DEVELOPING COUNTRIES* (Uday Desai ed., 1998).

¹⁰⁹ Ouyang, *supra* note 6, at 193-94.

¹¹⁰ GILBERT, *supra* note 5, at 7.

¹¹¹ See *supra* note 106.

¹¹² See *supra* Part III.A.

¹¹³ See Williams, *supra* note 37, at 202-03.

military operations, such as Project Bluesky,¹¹⁴ Project Eagle,¹¹⁵ Project Rambo,¹¹⁶ and Project Nightingale.¹¹⁷

The 1990s saw rapid development of democracy and the realization of the economic benefits of the high-tech industry investment initiated in the previous decade.¹¹⁸ In 1992, Taiwan held its first free elections for representatives to the National Assembly.¹¹⁹ In 1996, Taiwan held its first free presidential election.¹²⁰ With the increase in affluence and political freedom, the focus of public sentiment gradually broadened to include environmental issues. In response, the government passed further legislation to improve environmental regulations.¹²¹ Many of the new and revised acts stressed pollution prevention in addition to regulation.¹²² For instance, Taiwan's 1994 Environmental Impact Assessment Act allowed for public commentary and for public meetings to explain EPA decisions relating to Environmental Impact Assessment approval.¹²³ In attempts to respond to the alternating demands of public interest environmental groups and industry, however, the EPA altered legal pollution limits and regulatory procedures frequently,¹²⁴ resulting in requirements that were difficult to comply with.

¹¹⁴ Project Bluesky is focused on reduction of air pollution and includes a toll free number for reporting polluting factories, construction sites, and vehicles with black emissions. ROC EPA, *Create a Clean Air Environment*, at <http://www.epa.gov.tw/english/offices/f/bluesky/bluesky19.htm> (last visited May 22, 2003).

¹¹⁵ Project Eagle involved environmental police helicopters equipped with infrared sensors to locate polluters and fine guilty parties. Williams, *supra* note 37, at 203.

¹¹⁶ Project Rambo targeted midnight dumpers of toxic waste. *Id.*

¹¹⁷ Project Nightingale was designed to locate perpetrators of noise pollution. *Id.*

¹¹⁸ The Hsinchu Science-based Technology Park was initiated in the 1980s, and by 2000 was a major source of export profits for Taiwan. See SCIENCE-BASED INDUSTRIAL PARK ADMINISTRATION, <http://www.sipa.gov.tw/en/seconde/indus-e/indus-e.htm#Anchor01> (last visited Apr. 20, 2003).

¹¹⁹ JOHN F. COPPER, TAIWAN'S MID-1990'S ELECTIONS: TAKING THE FINAL STEPS TO DEMOCRACY (1998).

¹²⁰ *Id.*

¹²¹ Of all acts passed in the 1990s, the Environmental Impact Assessment Act was particularly important because it introduced a preemptive mechanism into environmental regulation. ROC Environmental Impact Assessment Act [huanjing yinxiang pinggu fa] (Dec 30, 1994), <http://www.epa.gov.tw/english/LAWS/eiaact2.doc> (last visited Oct. 15, 2003) [hereinafter ROC Environmental Impact Assessment Act].

¹²² See, e.g., ROC Air Pollution Control Act, arts. 5, 7, & 12 [kongqi wuran fangce fa] (May 23, 1975) (amended Feb. 1, 1992) (requiring public announcement of air pollution control regions, periodic results of pollution monitoring, and public designation of public and private stationary regulated sources of air pollution); ROC Soil and Groundwater Pollution Mediation Act, art. 6 [turang ji dixia shui zheng zhi fa] (Dec. 15, 1999) (requiring all users, owners or managers of land to report soil or groundwater contamination, and allowing any citizen to report contamination). English translations are available at <http://www.epa.gov.tw/english/LAWS> (last visited Oct. 15, 2003).

¹²³ ROC Environmental Impact Assessment Act, *supra* note 121, art. IX.

¹²⁴ See, e.g., *Several Environmental Regulations to be Relaxed*, 1 ENVTL. POL'Y MONTHLY 10 (1998); EPA, *Water Pollution Fee to be Postponed*, <http://www.epa.gov.tw/english/EPM/issue9804.htm> (last visited Oct. 15, 2003).

As the EPA matured and came to terms with limited funding and staff, the Industrial Development Bureau ("IDB") and EPA began to initiate alternatives to direct regulation by the central government.¹²⁵ By the late 1990s, industries wishing to develop environmental management systems could apply for funding from the IDB,¹²⁶ and the EPA was beginning to offer similar financial support.¹²⁷ The later environmental acts shifted responsibility to the polluter to prevent, monitor, and clean up the pollution they caused.¹²⁸ Enforcement of environmental legislation, however, continues to be an issue.¹²⁹

Taiwan's shift from command and control regulation to a multi-faceted approach reflects a progression of pollution laws similar to those in countries that industrialized ahead of Taiwan. Command and control regulation is gradually replaced with a mosaic of regulatory schemes, including market incentives, industry group self-regulation, management-based approaches, voluntary disclosure schemes, and audit requirements designed to increase transparency and accountability of industry and regulators.¹³⁰

Overall, the environmental movement both contributed to and benefited from the liberalization of Taiwanese society over the last half-century. In particular, the end of martial law allowed for increased public dissent with respect to environmental concerns, and the establishment of the EPA legitimized these concerns and provided a government agency to address them. Although pollution sources continued to multiply while environmental regulatory system progressed, the environment became a more significant political issue, drawing increased attention and commitment of government resources.

IV. MODERN ENVIRONMENTAL REGULATION IN TAIWAN: A COLLABORATIVE EFFORT

With the legitimization of the EPA and increased attention to environmental pollution,¹³¹ many pollution sources were identified as

¹²⁵ ISO 14000 in Taiwan, *supra* note 14, at 1.

¹²⁶ Chiu & Yang, *supra* note 15.

¹²⁷ ISO 14000 in Taiwan, *supra* note 14, at 6.

¹²⁸ See Taiwan Waste Disposal Act, [chs. 2 & 3, (Oct. 24, 2001), *English translation at* <http://www.epa.gov.tw/english/LAWS/wasteact.doc> (last visited Nov. 15, 2003).

¹²⁹ AMERICAN CHAMBER OF COMMERCE IN TAIPEI, 2002 TAIWAN WHITE PAPER: ENVIRONMENTAL PROTECTION, http://www.washingtonstate.org.tw/English/taiwan_trade_economy/amcham_white_paper/environmental-protection.htm (last visited Apr. 14, 2003).

¹³⁰ See generally NEIL GUNNINGHAM ET AL., *SMART REGULATION* (1998).

¹³¹ Williams, *supra* note 56, at 249.

needing remedy and regulation. Due partly to the structure of the industrial economy,¹³² and partly to a lack of records,¹³³ the government's realization of the extent of pollution and the attendant expenses associated with monitoring and cleanup, led to an approach to environmental regulation that incorporates public, private, and third sector¹³⁴ actors.

A. Obstacles to Effective Environmental Regulation: Diffuse Pollution Sources and Diffuse Regulatory Authority

Taiwan's large number of unregistered SMEs results in a wide range of pollution problems, and the geographically diffuse nature of the sector makes them difficult and expensive to regulate. Taiwan's economy is heavily dependent on a large number of SMEs that function alone or as suppliers for larger companies.¹³⁵ The extremely successful, centrally planned high-tech sector¹³⁶ also relies heavily on upstream SMEs to function as suppliers of small components.¹³⁷ The SME-dominated economy increases the difficulty of industrial pollution regulation.¹³⁸ Their low rate of connection to sewers and sewage treatment facilities means there is little opportunity to mitigate water pollution once it leaves a manufacturing facility.¹³⁹ A significant number of these neighborhood factories are unregistered and have no pollution management or reporting systems.¹⁴⁰ Most SMEs are undercapitalized, thus requiring them to install pollution management systems is cost prohibitive.¹⁴¹

In addition to the range of problems associated with locating polluters, Taiwan also struggles to coordinate its regulators. At the national level, responsibility for environmental regulation in Taiwan is shared among

¹³² This statement refers to the diffuse industrial development throughout the country as opposed to centralized industrial development in or around cities.

¹³³ For example, the Environmental Quality Protection Foundation released a report in 1999 admitting that it could not account for approximately 100,000 tons of mercury-contaminated waste over the past decade. Chiu, *supra* note 8.

¹³⁴ The third sector comprises non-government and non-private actors, such as NGOs, citizen organizations, religious organizations, etc. See INTERNATIONAL SOCIETY FOR THIRD SECTOR RESEARCH, <http://www.jhu.edu/~istr/> (last visited May 3, 2003).

¹³⁵ Aspalter, *supra* note 25, at 13.

¹³⁶ The Hsinchu Science-based Technology Park, Taiwan's premier high tech park, brought in over 7,000 hundred million New Taiwanese Dollars in sales in 2002 (1 NT\$ = 0.0033 US\$). *Hsinchu Science-based Industrial Park Statistics*, http://www.sipa.gov.tw/en/seconde/hsip/hsi11000_01.htm (last visited June 5, 2003).

¹³⁷ Edmonds, *supra* note 70.

¹³⁸ Wei and Huang, *supra* note 76; Williams, *supra* note 37, at 195.

¹³⁹ See *Quantifying Quality*, *supra* note 41.

¹⁴⁰ Edmonds, *supra* note 69.

¹⁴¹ Williams, *supra* note 37, at 195.

several government ministries with various mandates.¹⁴² The most influential of these is the Ministry of Economic Affairs ("MOEA"). The MOEA governs water resource distribution, energy production,¹⁴³ and mineral extraction.¹⁴⁴ Although the majority of environmental regulatory responsibility is divided between the EPA and the IDB,¹⁴⁵ the MOEA makes many significant decisions concerning the environment.¹⁴⁶

Environmental regulation is also shared between the national and local levels of government. The EPA directs many, but not all, of the projects undertaken by the twenty-four local Environmental Protection Bureaus ("EPBs").¹⁴⁷ Projects that are high priority at the national level may be lower priority to the local EPB. As a result, environmental regulation is a source of many compromises among parties with different interests. Furthermore, the overlap of control over natural resources and pollution data among multiple ministries and sub-ministries often leads to a situation where no agency has complete responsibility, nor can any one ministry take the initiative to protect a resource without the support of other entities with concurrent jurisdiction.¹⁴⁸

B. *Non-Government Sources of Regulation: Private Companies and the Third Sector*

In the 1990s, the diversification of regulatory strategies in Taiwan led to the incorporation of private sector participants and NGOs in the regulation of pollution. Taiwanese companies are now active participants in industry

¹⁴² For example, the Industrial Development Bureau, the Environmental Protection Administration, and the Water Resource Conservation Agency all have input into the final use of water resources. Beth Kinne, *Institutional Barriers to Effective Water Pollution Policy in Taiwan*, Master's Thesis, University of British Columbia, 56-57 (2001).

¹⁴³ The Energy Commission is under the MOEA. MINISTRY OF ECONOMIC AFFAIRS, SUBORDINATE UNITS, <http://www.moea.gov.tw/english/eunit/index.html> (last visited Oct. 15, 2003).

¹⁴⁴ The Industrial Development Bureau ("IDB"), Bureau of Mines ("BOM"), Water Resources Bureau ("WRB") and the Water Conservation Agency ("WCA") are under the MOEA. *Id.*

¹⁴⁵ GILBERT, *supra* note 5, at 4.

¹⁴⁶ The MOEA and the Justice Department dedicate significant portions of their funding to the "environment." Chen, *infra* note 153, at 270. In 1987 Taiwanese residents protesting Chinese Petroleum Company's plans to add a fifth naphtha cracker to their facility in Houchin went to Taipei to protest in front of the MOEA. See Williams, *supra* note 56, at 247.

¹⁴⁷ Interview with the Hsinchu City Environmental Protection Bureau in Hsinchu, Taiwan (Apr. 4, 2001).

¹⁴⁸ This is a common problem in environmental regulation. For commentary on this issue in environmental regulation in the People's Republic of China, see Philip Andrews-Speed & Stephen Dow, *Regulating Energy in Federal Transition Economies: The Case of China*, in THE INTERNATIONAL ENERGY EXPERIENCE: MARKETS, REGULATION AND THE ENVIRONMENT 99 (MacKerron & Pearson eds., 2000).

associations and private certification programs.¹⁴⁹ As reporting requirements have increased, public access to information allows citizens outside of industry and government to play a role in the enforcement of regulatory law.

Non-government sources of environmental regulation include individual corporate standards emanating from corporate leadership, industry associations that set standards for their members, and certification of firms by private associations. NGOs also play a regulatory role in Taiwan by educating political leaders and the public about the consequences of non-compliance via lobbying, communication with the press, and commenting on proposed bills.¹⁵⁰ Since Taiwan is still heavily dependent on an export economy, international standards may serve a regulatory function in pollution management as well.

The EPA, MOEA, and representative industry groups work together to decide on effluent standards for various industries.¹⁵¹ The benefit of self-regulation by industry associations is in the ability of an association to keep abreast of current pollution issues and to require a degree of compliance from its members.¹⁵² Requirements by industry organizations, the IDB, or national or international standards, for example, may encourage firms to implement environmental management systems.

In addition to involving private firms in the regulation design process, Taiwan's EPA has structured regulations to use the power of the market, such that environmental compliance has become a source of profit.¹⁵³ One successful example is the growing popularity of Environmental Management Systems ("EMS"s). EMS approaches can be categorized as voluntary process-based regulation,¹⁵⁴ which is "primarily a management tool with regulatory spin-offs."¹⁵⁵ An EMS is an internal plan that maps out stages of planning, implementation, assessment, and integration of the results of assessment back into the planning process.¹⁵⁶ EMSs are effective to the extent that they force a company to think through an implementation

¹⁴⁹ Taiwan has both county-level and national industry associations. See *ROC to Meet the Y2K Challenge*, http://www.year2000.gov.tw/data/e_right.htm (last visited Oct. 15, 2003).

¹⁵⁰ Dennis Te-Cheng Tang, *Taiwan*, in ENVIRONMENTAL LAW AND ENFORCEMENT IN THE ASIA PACIFIC RIM 435, 446 (Terri Mottershead ed., 2002).

¹⁵¹ See *Dyeing Industry Effluent Standards Put in Line with EDAC Resolutions*, 4 ENVTL. POL'Y MONTHLY 10 (2001), available at <http://www.epa.gov.tw/english/EPM/issue0110.htm> (last visited Oct. 15, 2003).

¹⁵² GUNNINGHAM ET AL., *supra* note 130, at 50-56.

¹⁵³ David Chen, *The Emergence of an Environmental Consciousness in Taiwan*, in THE OTHER TAIWAN 257, 265 (Murray A. Rubenstein ed., 1996).

¹⁵⁴ GUNNINGHAM ET AL., *supra* note 130, at 187.

¹⁵⁵ POWER, *supra* note 16, at 25.

¹⁵⁶ See GUNNINGHAM ET AL., *supra* note 130, at 173-95.

process, but since no external audit or measurement of environmental improvement is required for such certification, the impact of EMSs on actual pollution reduction is dependent on corporate leadership.¹⁵⁷ EMS certification programs have received significant attention as a potential improvement of environmental pollution in Taiwan. For example, the IDB implemented an International Standards Organisation 14001 ("ISO 14001") EMS certification program between September 1997 and May 1998.¹⁵⁸ Becoming certified may be useful as a corporate image enhancement and also may have the effect of utilizing the market to encourage self-regulation of environmental performance by firms.

Taiwan's grass-roots environmental movement is gradually being institutionalized by increasing numbers of ENGOs.¹⁵⁹ ENGOs play an important part in information collection and dissemination. Some organizations, such as the Taiwan Environmental Action Network and the Spoonbill Action Voluntary Echo even have international constituents.¹⁶⁰ Local ENGOs reacting to local pollution sources have institutionalized some of the original victim-centered qualities of the early pollution protests,¹⁶¹ but are beginning to harness significant scholarly input, as evidenced by the many university and research professors who are active in the anti-pollution discourse.¹⁶² Scarce funding, unsophisticated leadership, and lack of expertise, however, often limit their political influence.¹⁶³

Non-government sources of regulation are not necessarily devoid of government influence. The government sponsors some NGOs in whole or in part.¹⁶⁴ The IDB counsels industry associations on improving environmental

¹⁵⁷ Europe Information Service, *Environment: EMAS and ISO 14000 Certification Systems Challenged*, in EUROPEAN REPORT 479 (2003) (on file with author).

¹⁵⁸ ISO 14000 in Taiwan, *supra* note 14. As of March 2000, there were 714 certified firms in Taiwan. *Id.* at 2.

¹⁵⁹ For a list of environmental NGOs involved in anti-nuclear activism in Taiwan, see Linda Gail Arrigo, *Indigenous People and Anti Nuclear Activism* (1998) (on file with author).

¹⁶⁰ TEAN is primarily composed of overseas Taiwanese graduate students and professors. TEAN, <http://tean.formosa.org> (last visited Apr. 4, 2003). SAVE recruited bird conservationists worldwide to oppose the building of the Binnan industrial complex on Taiwan's Chiku lagoon, which was critical habitat to the endangered Blackfaced Spoonbill, see SAVE International, <http://www.earthisland.org/project/viewProject.cfm?subSiteID=25> (last visited Oct. 15, 2003).

¹⁶¹ The Hsinchu Environmental Protection Organization and the Meinong People's Association were formed in response to the pollution from the Hsinchu Science-Based Technology Park and the Meinong dam, respectively. Hou, *supra* note 96, at 203.

¹⁶² See ISO 14000 in Taiwan, *supra* note 14.

¹⁶³ Tang, *supra* note 150, at 146.

¹⁶⁴ For example, the Taiwan Green Productivity Foundation began as a government sponsored NGO, and now receives funding from government, state owned enterprises, and private firms. TAIWAN GREEN PRODUCTIVITY FOUNDATION, <http://www.tgpf.org.tw/english.htm> (last visited Oct. 15, 2003). The Environmental Management Association was established in 1998 under the IDB to serve as a bridge between industry and government agencies and to promote environmental management systems,

performance by creating industry-wide standards, and aids industry in finding and applying appropriate pollution control technology.¹⁶⁵ Both the EPA and the IDB have actively promoted ISO certification for Taiwanese companies.¹⁶⁶ The National Institute of Environmental Training of the EPA trains and certifies environmental specialists to be technicians in waste management and cleanup, air and water pollution cleanup, and toxic substances pollution control, among other specialties.¹⁶⁷ In each category of specialists, licensees have increased by up to 1000 individuals per year in recent years.¹⁶⁸ Maintaining a degree of involvement through licensing, training, and consulting helps the government to promote consistency between national policy goals and the activities of participants in the environmental regulatory process.

C. *Involving the Public: Providing Access to Information and Mechanisms for Feedback*

After years of centrally dominated, top-down environmental regulation, Taiwan's government is now reaching back to the pollution movement's grass roots origins¹⁶⁹ to solicit public participation. Taiwanese citizens may be involved in environmental regulation in several ways: as voters,¹⁷⁰ consumers, and commentators on environmental policies.¹⁷¹ The government's support of public participation and increasing willingness to allow access to environmental data is consistent with the recent increase in transparency across government sectors in Taiwan.¹⁷²

particularly ISO 14000. NATIONAL CENTER FOR CLEANER PRODUCTION, ENVIRONMENTAL MANAGEMENT SYSTEM ESTABLISHED IN TAIWAN, <http://nccp.org.tw/cpnews/cpnew41i.pdf> (last visited Oct. 15, 2003).

¹⁶⁵ See INDUSTRIAL DEVELOPMENT BUREAU, MINISTRY OF ECONOMIC AFFAIRS, available at <http://www.moeaidb.tw.gov> (last visited Oct. 15, 2003).

¹⁶⁶ See generally ISO 14000 in Taiwan, *supra* note 14.

¹⁶⁷ See ROC EPA, *Statistics*, <http://210.69.101.51/eng/webez1/images/product/c6090.htm> (last visited Oct. 15, 2003).

¹⁶⁸ *Id.*

¹⁶⁹ See discussion *infra* Part III.B. See also David W. Chen, *The Emergence of an Environmental Consciousness in Taiwan*, in *THE OTHER TAIWAN* 257, 261-63 (1994).

¹⁷⁰ In the 2000 presidential elections, Chen Shui-bian's stance on eradicating "black gold" won him many votes. John F. Copper, *Taiwan's 2000 Presidential and Vice Presidential Election: Consolidating Democracy and Creating a New Era of Politics* 55, in 2 MD SERIES IN CONTEMP. ASIAN STUD. 157 (2000).

¹⁷¹ ROC EPA, *Environmental Protection Policies Accept On-line Challenges*, 3 ENVTL. POL'Y MONTHLY 10 (2000), available at <http://www.epa.gov.tw/English/EPM/issue0004.htm> (last visited Oct. 15, 2003).

¹⁷² ROC EPA, *Edgar Lin Stresses New Gov't to be Transparent and Efficient*, 3 ENVTL. POL'Y MONTHLY 13 (2000), available at <http://www.epa.gov.tw/English/EPM/issue0007.htm> (last visited Oct. 15, 2003).

Despite difficulty defining the concept, transparency is considered a key component of good governance and responsible policy-making.¹⁷³ The government-led Taiwanese transparency movement plays a supporting role in increasing private sector and public interest group participation in regulatory design and enforcement. The environmental transparency movement serves to inform foreign investors in Taiwan of environmental compliance expectations for their facilities on the island.¹⁷⁴ Foreign investors want predictable laws on project approval processes and regulation of pollution to avoid situations where their investment capital is tied up in a project that may never make a profit, or where their manufacturing facilities are fined for breaking the law. Transparency also enables domestic industry to be measured against international standards, promoting integration of these standards into the domestic regulatory regime.

Taiwanese citizens are demanding increased transparency in government actions at all levels, including environmental impact assessment approval,¹⁷⁵ appointment of public officials,¹⁷⁶ setting of content and concentrations of allowable industrial effluent,¹⁷⁷ and decisions to build nuclear power plants.¹⁷⁸ Over the past few years, the Executive Yuan¹⁷⁹ has increasingly supported transparency, culminating in the Fall 2002 acceptance of a draft form of the Law on Opening Government Information.¹⁸⁰

¹⁷³ Leo Van Houtven, *Governance of the IMF: Decision Making, Institutional Oversight, Transparency, and Accountability*, International Monetary Fund, P19 no. 53 (2002). See also TRANSPARENCY INTERNATIONAL, http://www.transparency.org/about_ti/index.html (last visited Oct. 15, 2003). See also Convention On Access To Information, Public Participation In Decision Making And Access To Justice In Environmental Matters, reprinted in 7 D.C.L. J. INT'L. L. & PRAC. 291 (1998) available at

<http://www.unecp.org/env/pp/documents/cep43e.pdf> (last visited Oct. 15, 2003).

¹⁷⁴ ROC EPA, *Environmental Policy Monthly Completes First Year of Circulation: A Word from the Editor in Chief*, 2 ENVTL. POL'Y MONTHLY 1 (1998), available at <http://www.epa.gov.tw/english/EPM/issue9807.htm> (last visited Oct. 15, 2003).

¹⁷⁵ Citizen groups have access to information on attendance of EIA review committee members. See *Reasoning and Resolutions from the Binnan Industrial Park EIA Review 01/2000*, <http://www.epa.gov.tw/english/offices/binnan.htm> (last visited Oct. 15, 2003).

¹⁷⁶ Ming-Teh Shih, *Appointments Need Transparency*, *TAIPEI TIMES*, April 1, 2002, at 8, available at <http://www.taipetimes.com/News/edit/archives/2002/04/01/130081> (last visited Oct. 15, 2003).

¹⁷⁷ See Hsinchu Foundation, [caituan faren jingzhu wenjiao jijing hui], www.hsinchu.org.tw (last visited Oct. 15, 2003).

¹⁷⁸ Johnathan Dushoff, *Taiwan's Power Struggle*, 22 MULTINAT'L MONITOR 3, 6 (2001). In May of 2003, the Legislative Yuan passed a draft law to phase out all nuclear production on Taiwan. Dennis Engbarth, *Cabinet Okays Law to Phase Out Nuclear Power*, *TAIWAN NEWS*, May 8, 2003, <http://www.etaiwannews.com/Taiwan/2003/05/08/1052356553.htm> (last visited Oct. 15, 2003).

¹⁷⁹ The Taiwanese government is made up of five Yuans, or divisions: the Executive Yuan, Legislative Yuan, Control Yuan, Judicial Yuan and the Examination Yuan.

¹⁸⁰ *Executive Yuan Approves Bill to Boost Transparency*, *TAIPEI TIMES*, Sept. 5, 2002, available at http://th.gio.gov.tw/show.cfm?news_id=15283 (last visited Oct. 15, 2003).

Access to credible information is necessary for effective public participation in the regulatory process, and established mechanisms for utilizing public efforts enhance the ability of the government to harness this diffuse but powerful force to aid in regulation. In the late 1990s, the EPA initiated the ROC Environmental Laws and Regulations Transparency Project. The project had three goals: (1) increasing opportunities for exchanges of innovative environmental protection methods; (2) encouraging the internationalization of the ROC environmental protection regime; and (3) promoting increased access to English language versions of key laws and regulations as a means for improving regulation and building relationships with the English-speaking regulated community.¹⁸¹

The Transparency Project has resulted in multi-media distribution of information on the activities of the EPA and the current state of the environment. Hard copy reporting on environmental data is produced by the EPA in the form of environmental newsletters and announcements. Searchable electronic websites increase access to this data. Taiwan's Greenmark program informs consumers of the environmental integrity of manufacturers, allowing them to choose cleaner products.¹⁸² Interactive websites offer opportunities for individuals to comment on proposed legislation and file complaints about pollution. For example, the Electronic Environmental Forum on the EPA website provides opportunities for the public to express opinions openly on environmental affairs.¹⁸³ Local Environmental Protection Bureaus are also required to receive complaints from residents,¹⁸⁴ although staff and resources available for addressing reported problems may be limited.¹⁸⁵

Paper publications and electronic media are supplemented by video documentaries.¹⁸⁶ A water quality screen in the main subway station in Taipei displays water quality data for all of the major cities in Taiwan, informing any passersby who glance at it during the daily commute.¹⁸⁷ The EPA also maintains an air quality monitoring network with air quality

¹⁸¹ ROC EPA, *ROC Environmental Laws and Regulations Transparency Project*, <http://www.epa.gov.tw/english/LAWS/introduction.htm> (last visited Oct. 15, 2003).

¹⁸² Taiwan Greenmark Program, <http://greenmark.epa.gov.tw/english/index.asp> (last visited May 20, 2003).

¹⁸³ Bureau of Environmental Monitoring and Data Processing, <http://www.epa.gov.tw/english/offices/brief/1.htm> (last visited Oct. 15, 2003).

¹⁸⁴ See, e.g., ROC Soil Groundwater Pollution Act, *supra* note 122, art. 6.

¹⁸⁵ Interview with the Hsinchu City Environmental Protection Bureau (Apr. 2001).

¹⁸⁶ For example, documentaries on the Formosa Landlocked Salmon raised awareness and contributed to the conservation movement for this species. See *Troubled Water*, TAIPEI REV. (2000), available at <http://www.taiwanheadlines.gov.tw/20000627/20000627f2.html> (last visited Oct. 15, 2003).

¹⁸⁷ Author's observation (Apr. 2001).

stations throughout the country that measure ambient conditions, traffic concentrations, and air quality in industrial areas and national parks.¹⁸⁸ Finally, public polls track citizen satisfaction with the environment,¹⁸⁹ which in turn influences government decisions.

Demand for transparency from multiple socioeconomic actors has led Taiwan to implement initiatives aimed at both local and foreign audiences. The American Chamber of Commerce in Taipei stays abreast of the advances in environmental regulation in Taiwan and frequently offers comment, usually positive, on the adequacy of the EPA's efforts to streamline pollution regulation and project approval while protecting the environment.¹⁹⁰ Domestically, Taiwanese public opinion has a significant impact on the regulatory regime. The Taiwanese population is very politically active, with voter participation rates in the 2000 presidential and local elections at eighty-three and sixty-six percent respectively.¹⁹¹

Since the mid-1990s, the Taiwanese government has been aware of the importance of working with the private sector and individual citizens to aid in the modernization of the nation.¹⁹² Taiwan's environmental regulatory system is gradually incorporating more players, who bring with them their varied expertise, political power, and financial resources. Many of these activities involve the public in the environmental cleanup process. For example, the Nationwide Coastal Cleanup plan, initiated in 1997,¹⁹³ enlists volunteer beachcombers, including citizen groups, schools, and employee groups to remove refuse from the beaches. The first nine months of the project resulted in 4072 metric tons of refuse collection from Taiwan's beaches.¹⁹⁴ The provisions for public participation in air pollution monitoring are a second example. Citizens have long been encouraged to report vehicles that appear to be burning oil. Starting at the end of 1999, reporters could check the status of the EPA follow-up on the report within

¹⁸⁸ ROC EPA, *Air Quality Protection: Major Tasks and Accomplishments*, at http://www.epa.gov.tw/english/offices/f/recent_tasks.htm (last visited Oct. 15, 2003).

¹⁸⁹ ROC EPA, *Industrial Pollution Leading Cause of Public Complaints in 1999*, 3 ENVTL. POL'Y MONTHLY 15 (2000), available at <http://www.epa.gov.tw/english/EPM/issue0009.htm> (last visited Oct 15, 2003).

¹⁹⁰ See ROC EPA, *Executive Yuan Opposes Environmental Plan*, 2 ENVTL. POL'Y MONTHLY 2 (1998), available at <http://www.epa.gov.tw/english/EPM/issue9809.doc> (last visited Oct. 15, 2003). See also ROC EPA, *EPA Appreciates AmCham Environmental Concerns*. *Id.*

¹⁹¹ Democratic Electoral System, TAIWAN YEARBOOK 2003, available at <http://www.gio.gov.tw/taiwan-website/5-gp/yearbook/chpt05.htm> (last visited Oct. 27, 2003).

¹⁹² TSAI, *supra* note 89, at 158.

¹⁹³ ROC EPA, *Nationwide Coastal Cleanup Plan*, <http://www.epa.gov.tw/english/offices/j/es2.htm> (last visited Oct. 15, 2003).

¹⁹⁴ *Id.*

twenty-four hours after filing.¹⁹⁵ In addition to contributing to the physical management of waste, these types of programs increase public awareness of Taiwan's environmental problems, and create greater demand for aggressive environmental regulations.

The Taiwanese government has implemented many mechanisms to encourage participation of multiple parties in its environmental regulatory regime. This mirrors the approaches of other developed countries, like those of the United States.¹⁹⁶ Allowing multiple stakeholders to participate in environmental regulation effectively spreads the work of regulation among many actors and multiple sectors. The next two parts of this Comment explore the benefits and drawbacks of this approach.

V. THE BENEFITS OF SHARING REGULATORY RESPONSIBILITY

Incorporating multiple stakeholders into the regulatory process is one way of creating adaptable, industry-appropriate regulatory schemes that maintain an acceptable degree of accountability while reducing regulatory costs to an acceptable level. The benefits of this approach include increasing production of data for use in environmental decision making, increasing participation by local governments and communities to create localized approaches to pollution control, shifting part of the cost of regulation from the public to the private sectors, and creating more avenues for exchange of information among industry, regulators, and third parties. This approach has allowed Taiwan's under-funded, historically weak EPA to tackle the island's sizeable pollution problems at a faster rate than otherwise might have been possible.

A. *Increasing Information Collection and Information Flow*

Environmental laws that require the collection of more pollution data facilitate the diversification of pollution management. The early pollution management efforts of the EPA were hindered by a lack of pollution data. Collection of data is expensive and time-consuming, especially for the external regulator. Governments worldwide are turning to voluntary disclosure schemes to decrease the financial burden of centrally-levied

¹⁹⁵ ROC EPA, *Air Quality Protection: Major Tasks and Accomplishments*, *supra* note 188.

¹⁹⁶ See Karl Hausker, *The Convergence of Ideas on Improving the Environmental Protection System*, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (1999), available at http://www.csis.org/pubs/wr_EnvironPSintro.html (last visited Oct. 15, 2003).

pollution enforcement.¹⁹⁷ Disclosure strategies have been called the third wave in pollution control, following direct regulation and market-based instruments.¹⁹⁸ The number of disclosure strategies used in combating pollution control is increasing in developing countries as well.¹⁹⁹

The availability of pollution and ecological data is critical to assessing the need for and success of pollution abatement strategies. Taiwan has encouraged collection of pollution data in several ways. The IDB and the EPA offer financial assistance to firms wishing to invest in gaining ISO 14001 EMS certification.²⁰⁰ The EPA requires water and soil quality and industrial effluent audits conducted by EPA-licensed independent laboratories.²⁰¹ Taiwan implemented the Taiwan Toxic Chemical Substances Control Act in 1986, which includes a form of the Toxics Relief Inventory, a voluntary pollution release database used in the United States to track large chemical releases and transfers.²⁰²

B. *Increasing Participation by Local Governments and Communities*

The diversification of players in environmental regulation is increasing cooperative participation by local government and communities. The environmental movement of the 1990s in Taiwan included “a combination of grassroots mobilization, increasing involvement of professional activists and scholars, linkage between environmental and social issues, entrepreneurial politics . . . and the articulation of alternative forms of development.”²⁰³

Participation of local governments is critical to pollution regulation. Participation of communities in the regulatory process has become increasingly welcome as governments realize the inadequacy of government staff and budgets to manage the job of pollution regulation.²⁰⁴ Many of Taiwan’s pollution laws delegate the responsibility of monitoring ambient pollution in air, water, and soil to local authorities. For example, Article 5 of the Soil Pollution Control Act gives local authorities the responsibility of

¹⁹⁷ See GUNNINGHAM ET AL., *supra* note 130, at 56-57.

¹⁹⁸ Tom Tietenberg & David Wheeler, *Empowering the Community: Information Strategies for Pollution Control*, Presentation at the Frontiers of Environmental Economics Conference, Airlie House, Virginia (Oct. 23-25, 1998), <http://www.colby.edu/personal/t/ttieten/front.pdf> (last visited Oct 15, 2003).

¹⁹⁹ *Id.* at 2.

²⁰⁰ Chiu & Yang, *supra* note 14, at 6, 8.

²⁰¹ Kinne, *supra* note 142, at 60.

²⁰² ROC Toxic Chemical Substances Control Act [duxing huaxue wuzhi guanli fa] (Dec. 22, 1999), English translation, at <http://www.epa.gov.tw/English/LAWS/> (last visited Oct. 15, 2003).

²⁰³ Hou, *supra* note 96.

²⁰⁴ Tietenberg & Wheeler, *supra* note 198, at 1.

monitoring and reporting results to the EPA.²⁰⁵ Article 6 outlines the duties of citizens to notify authorities of environmental pollution and the duty of local authorities to act on the information.²⁰⁶

Awareness of policy decisions is ineffective if there is no mechanism by which the public can influence those policy decisions, or if polluters are unwilling or unable to comply with policy goals. The Taiwanese environmental regulatory structure is gradually evolving to include incentives and mechanisms for community participation. For example, many government regulatory agencies keep websites with up to date pollution information,²⁰⁷ and newer environmental acts provide for public input into large development projects.²⁰⁸

VI. THE RISK OF MULTIPLE PLAYERS: CONFLICTS OF INTEREST AND LIMITED ACCOUNTABILITY

Taiwan's utilization of multiple stakeholders in the regulatory process has certainly met with many successes. Nevertheless, Taiwan has not yet effectively managed chronic problems such as extra-legal and potentially illegal arrangements that occur when the interests of one or more parties in the regulatory process are not aligned with regulatory policy goals. Since each institutional or individual player in the regulatory scheme has some interests in common with others and some interests of its own, increasing the number of players naturally increases opportunities for conflicts. In Taiwan's case, these conflicts occur at several levels: (1) at the international level when international norms and expectations do not correspond with domestic priorities; (2) at the national level when multiple domestic government agencies must negotiate and compromise on their respective goals for the economy and the environment; and (3) at the local level when management is shared between the central and local governments, whose respective interests may not be aligned. Multiple players increase the complexity of the regulatory web and conflicts of interest between these players potentially reduce the net effectiveness of Taiwan's progressive approaches towards environmental regulation.

²⁰⁵ ROC Soil and Groundwater Pollution Remediation Act, *supra* note 122.

²⁰⁶ *Id.*

²⁰⁷ See, e.g., ROC EPA, *Drinking Water Safety Promoted On-line*, <http://www.epa.gov.tw/english/offices/j/es4.htm> (last visited Oct. 15, 2003).

²⁰⁸ ROC Environmental Impact Assessment Act, *supra* note 121, art. X.

A. *International Expectations and Domestic Goals*

Taiwan's political status sometimes requires dedication of resources to international compliance that otherwise might be dedicated to domestic issues.²⁰⁹ Taiwan is expected to comply with U.N. treaties to which China is a signatory,²¹⁰ but all meaningful international agreements on environmental and development issues must be bilateral.²¹¹ Taiwan's management of hazardous waste provides one example of the impact that international environmental regulations have on domestic policy. For many years the island accepted other countries' hazardous waste for recycling,²¹² and only recently passed a law banning the import of "scrap metal," a classification that long encompassed a variety of toxic wastes.²¹³ The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, to which Taiwan is not a signatory,²¹⁴ bans parties from trading in waste with non-parties,²¹⁵ unless they have entered bilateral agreements that do not contradict the Convention.²¹⁶ This restricts Taiwan, a non-party, from freely shipping hazardous wastes abroad to many countries.

Taiwan's response to the Basel Convention was the Hazardous Industrial Waste Import, Export, Transit, and Transshipment Management Measures of 1993, which were updated in 1997.²¹⁷ These regulations include a provision that requires an exporting waste management company to commit to re-importing the waste, should it be rejected by the receiving party.²¹⁸ This law allowed foreigners to hold Taiwanese companies accountable for their pollution transgressions. Taiwan's Formosa Plastics Group ("FPG"), the world's largest producer of PVC plastics, dumped 3000

²⁰⁹ See, e.g. Kuei-Jung Ni, *The Status of Taiwan in International Environmental Law*, 31 NAT'L TAIWAN NAT'L U. L. SCHOOL J. [GUOLI TAIWAN DAXUE FAXUE LUNCONG] 97 (2002).

²¹⁰ See discussion *supra* Part II.B.

²¹¹ *Id.*

²¹² Among other things, Taiwan recycled ships, batteries, and scrap metal. See *supra* Part II.A.

²¹³ ROC EPA, *Global Environmental Issues in Taiwan: Transboundary Movement of Hazardous Waste*, <http://ivy2.epa.gov.tw/gepp/english/page05e.htm> (last visited May 25, 2003).

²¹⁴ U.N. Environmental Programme, *Secretariat of the Basel Convention, Status of Ratification*, U.N. Environmental Programme, <http://www.basel.int/ratif/ratif.html> (site updated June 10, 2003).

²¹⁵ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Final Act (Mar. 22, 1989), art. 4, para. 5, available at <http://www.basel.int/text/con-e.htm> (last visited Oct. 15, 2003).

²¹⁶ *Id.* art. 11.

²¹⁷ ROC, HAZARDOUS INDUSTRIAL WASTE IMPORT, EXPORT, TRANSIT, AND TRANSSHIPMENT MANAGEMENT MEASURES, (English translation), available at <http://www.epa.gov.tw/english/LAWS/hazarwasteio.htm> (last visited Oct. 15, 2003).

²¹⁸ *Id.* art. 17.

tons of mercury-contaminated waste in Cambodia in 1998.²¹⁹ FPG was forced to re-import the waste, along with 1400 tons of contaminated Cambodian topsoil, and treat it in Taiwan.²²⁰ Furthermore, FPG was required to pay the Taiwanese residents near the treatment facility damages that were used to hire inspectors to minimize risk of further contamination.²²¹ Even the American Chamber of Commerce in Taipei, which interacts with the EPA on behalf of industry, agrees that “efficient control of the more than 1000 waste hauling companies nationwide is vital in order to control the potential risk of further illegal dumping activities.”²²²

B. *Policy Conflicts at the National Level*

In addition to conflicts between international demands and domestic priorities, conflicting domestic interests also impact Taiwan’s environmental regulation. Analysis of Taiwan’s multiple five and six-year development plans since 1990 shows the constant balancing act between environmental interests and economic growth concerns. The most recent plan includes plans to become a world leader in fifteen high tech industries.²²³ This will require the development of multiple new science parks around the island, in spite of the significant environmental problems associated with the Hsinchu Science-based Technology Park.²²⁴ Rapid development of more high-tech parks on the island is likely to increase pollution problems, since many of the effluents from these facilities are not easily treatable.²²⁵

In 2000, the change in political power from the KMT to the Democratic Progressive Party (“DPP”) offered a prime opportunity for

²¹⁹ Jud Lohnes, *Hazardous Materials and Energy: Taiwanese Company Dumps 3000 Tons of Toxic Waste in Cambodia*, 1999 COLO. J. INT’L ENVTL. L. Y.B. 262 (1999). See also GreenAction, *Chronology of Formosa Plastics Dumping Scandal*, <http://www.greenaction.org/la/pr060900.shtml> (last visited Oct. 15, 2003). The shipment caused death and illness in local Cambodians before it was sent back to Taiwan. *Id.*

²²⁰ ROC EPA, *Formosa Plastics to Roll Out Treatment of Domestic Sludge*, 3 ENVTL POL. MONTHLY 13 (2000), available at <http://www.epa.gov.tw/English/EPM/issue0007.htm> (last visited Oct. 15, 2003).

²²¹ GreenAction, *Victory for Environmental Justice: Formosa Plastics Gives Up!* <http://www.greenaction.org/la/pr060900.shtml> (last visited Oct. 15, 2003).

²²² AMERICAN CHAMBER OF COMMERCE IN TAIPEI, AMCHAM 2002 TAIWAN WHITE PAPER: ENVIRONMENTAL PROTECTION, <http://www.washingtonstate.org.tw/English/taiwan-trade-economy/amcham-white-paper/environmental-protection.htm#Issue%204:%20Regulatory%20Transparency> (last visited May 23, 2003) (on file with author).

²²³ *Analysis: Taiwan’s Ambitious 6-Year Plan*. NEWSMAX WIRES, May 10, 2002, at <http://www.newsmax.com/archives/articles/2002/5/10/60304.shtml> (last visited May 7, 2003).

²²⁴ See generally, Kinne, *supra* note 142.

²²⁵ The waste water treatment system of the new Tainan Science-based Industrial Park failed before the park was operating near capacity. Observation of author, Apr. 2001, Tainan, Taiwan. For further discussion on high-tech manufacturing emissions, see MAZUREK, *supra* note 73, 53-57.

exposure of past and present pollution. For the first time in history the ruling political party could vigorously publicize Taiwan's pollution problems, pointing the finger at the outgoing government.²²⁶ Just as in the United States, however, the constituents that benefited from the KMT's lax pollution standards are also strong lobbyists of the DPP, and Taiwan's financial well-being still depends on a strong export economy.²²⁷

The conflicts of interest that cause friction among sectors of the central government lead to inconsistency in directives passed down to the local governments. This horizontal disconnect is compounded by the vertical disconnect between national and local level governments and agencies.

C. *Conflicting Interests Between Central and Local Governments*

Decentralization of government power in Taiwan has made the divergent interests of the central and local governments apparent.²²⁸ In the environmental context, the relationship between the EPA and local EPBs provides an example of this conflict. The EPBs are funded in part by the EPA and in part from tax income from their locale.²²⁹ Funding from the central government often covers only the duties required of them by the EPA. For additional projects specific to their locales, they depend on a portion of the local tax revenue.²³⁰ Therefore, part of the EPB budget is tied directly to the economic welfare of the local community and the leadership of the local government, while the other part is directed by the national goals of the EPA. This leads to mixed incentives within the EPB-EPA structure and between the EPB and the local government where funding of environmental enforcement is concerned. For example, local political leadership may favor industrial development for reasons such as creating employment opportunities and local tax revenue at the expense of national environmental policy.²³¹

²²⁶ The KMT has been criticized for lax regulation during the fifty years that it ruled Taiwan. See Hsiao, *supra* note 97, at 42, 49.

²²⁷ Foreign trade constitutes eighty-percent of Taiwan's GDP. Taiwan Government Information Office, *Q&A About the ROC (Taiwan)*, at http://www.gio.gov.tw/taiwan-website/5-gp/q&a/page_07.htm (last visited May 11, 2003).

²²⁸ Jeffrey Hou, *From Dual Disparities to Dual Squeeze: The Emerging Patterns of Regional Development in Taiwan*, 14 BERKELEY PLAN. J. 4, 10 (2000), available at <http://dcrp.ced.berkeley.edu/bpj/pdf/14-Hou.pdf> (last visited Oct. 15, 2003).

²²⁹ Kinne, *supra* note 142, at 71.

²³⁰ Interview with director of the Hsinchu City Environmental Protection Bureau in Hsinchu, Taiwan (Apr. 2001).

²³¹ In one town, the mayor was accused of allowing a high-tech company to build and begin operation of a new manufacturing facility without completing the legally required Environmental Impact Assessment

The EPA is aware of shortcomings in the application of environmental laws and regulations and recognizes the importance of coordinating the goals of the central agency and local EPBs.²³² In 1998, the EPA's own audit of Environmental Impact Assessments ("EIAs") found that "some EIA reports are made after the project was established, are carried out over an inadequate period of time, [and] contain results that address only a portion of the negative environmental effects...."²³³ Populations in some locales, such as towns in southern and rural Taiwan that are looking to the lucrative high-tech industry to propel them into the wealth enjoyed by many in the northern urban areas on the island, may not be as concerned with conducting thorough EIAs.²³⁴ Conversely, some industrial development projects slated by the central government to boost economies in these same areas are strongly opposed by local communities.²³⁵

D. *The Private Sector: Conflicts of Interests and For-Profit Regulation*

While enlisting the aid of private organizations to ensure environmental compliance may be the only way to make the cost of regulation manageable, the introduction of for-profit mechanisms into the regulatory system is problematic to the extent that it either places control in the private sector or removes controls entirely. The ISO 14001 Environmental Management System certification systems are an example of the latter. Government agencies vigorously promoted ISO environmental certification by firms in the industrial sector, resulting in the growth of ISO Certification franchises in Taiwan.²³⁶ A large number of manufacturing firms quickly implemented EMSs, although the results are difficult to track due to the high variability of internal target goals that the ISO system

("EIA"). *NSC Promises Heads Will Roll Over UMC Plant*, TAIPEI TIMES, APRIL 28, 2000, available at <http://www.taiwanheadlines.gov.tw/20000428/20000428b7.html> (last visited Oct. 15, 2003).

²³² In 2000, EPA director Edgar Lin called a meeting of the directors of all the EPBs in order to coordinate efforts among them, particularly with respect to industrial pollution. ROC EPA, *Edgar Lin Urges Greater Interaction Between Environmental Agencies*, 3 ENV'T'L POL'Y MONTHLY 14 (2000), available at <http://www.epa.gov.tw/english/EPM/issue0008.htm> (last visited Oct. 15, 2003).

²³³ ROC EPA, *The History and Performance of the ROC's EIA System*, 2 ENV'T'L POL'Y MONTHLY 1 (1998), www.epa.gov.tw/english/EPM/issue9807.htm (last visited Oct. 15, 2003).

²³⁴ The Tainan Science-based Industrial Park is built on a flood-prone lowland in southern Taiwan.

²³⁵ Some examples include the treatment of the Formosa Plastics Group mercury waste in Sihanoukville, Cambodia, see Lohnes, *supra* note 219, and the rejection of the Binnan Industrial Complex on the Chiku Lagoon in south-eastern Taiwan. See John Byrne & Tze-Luen Lin, *The Binnan Industrial Complex: An Environmentally and Economically Costly Choice for Taiwan*, Presentation to the Legislative Yuan of Taiwan on the Binnan Industrial Complex (March 13, 1998) (on file with author). *The Future of Coastal Tainan*, *supra* note 39.

²³⁶ See generally ISO 14000 in Taiwan, *supra* note 14.

accepts.²³⁷ Financial incentives, in the form of access to markets and corporate image-building, push a company to implement an EMS, but those financial incentives, like the certification, are independent from any actual reduction or failure to reduce pollution outputs.

In addition, auditing requirements generated by private third-party auditors can be subject to conflicts of interest. The EPA requires manufacturing companies to submit regular reports of pollution data, along with audit data provided by government licensed independent environmental auditors. While this shifts the burden of monitoring industrial pollution from the government to the industry, the government picks up the cost of certifying and monitoring the environmental certification companies. The addition of these companies into the chain of communication between industry and the EPA opens up opportunities for loss of information and entrance of conflicting interests. Audit companies depend on the EPA for their licenses, but they depend on the industry for their business.

Private sector firms that deal in waste treatment and disposal are another potential weak spot in Taiwan's pollution regulatory process. For example, in 2000, a government licensed waste disposal company, Sheng Li, dumped tons of toxic solvent into the Chisan River, a tributary to the Kaoping River, which supplies the drinking water for Kaoshung City, the second largest city in Taiwan.²³⁸ In response, the EPA initiated a new system of tracking waste transporters in 2002 — all hazardous waste trucks now have global positioning system ("GPS") units installed to allow satellite tracking of waste and discourage illegal dumping.²³⁹

Although utilization of multiple stakeholders in the regulatory process has greatly increased monitoring of polluters, it has also introduced a greater number of self-interested players, who require a degree of monitoring themselves. Unfortunately, the EPA still predominantly plays the role of policeman with respect to most of these stakeholders; the system has not yet matured to the point where individual interest groups are effectively policing each other.

²³⁷ *Id.*

²³⁸ *EPA Revokes Polluters Operating License*, *TAIPEI TIMES*, Aug. 8, 2000, available at <http://www.svtc.org/listserv/letter64.htm> (last visited Oct. 15, 2003).

²³⁹ *ROC EPA, GPS to be Installed on Hazardous Waste Transport Vehicles*, 2 *ENV'TL POL'Y MONTHLY* 4 (2002), <http://www.epa.gov.tw/english/EPM/issue0204.doc>. (last visited Oct. 15, 2002). See also Chiu Yu-Tzu, *EPA to Monitor Toxic Trucks*, *TAIPEI TIMES*, OCT. 29, 2003, at 2, available at <http://www.taipeitimes.com/News/taiwan/archives/2003/10/29/2003073777> (last visited Nov. 10, 2003).

VII. THE NEED FOR THE CONTINUED ROLE OF THE STATE AS COORDINATOR AND AUDITOR

The global literature on environmental regulation stresses evolution over revolution. In the words of one scholar, "the goal of environmental sustainability clearly demands solutions beyond the regulatory approaches on which we have relied to date. Yet, however justified our frustration with traditional policy instruments, we should not rush to embrace new ones simply on faith."²⁴⁰ Taiwan's environmental regulatory regime has evolved rapidly from a highly centralized, command-and-control model to a diverse mosaic of regulatory approaches, incorporating many private sector players as integral parts of the system.²⁴¹ The benefits of this system are many. However, the drawbacks are detrimental to building confidence in environmental regulatory bodies and risk allowing recourse to personal connections in lieu of legal procedures. The Taiwanese government is mitigating some of these shortcomings by acting at the international level to harmonize national environmental policies with international standards. It is also acting on the domestic level to increase legitimacy and consistency by creating controls on both local governmental and private sector players in the regulatory game.

Taiwan's international political status is not likely to change in the near future, but the increasing numbers of bilateral environmental agreements on the environment will help to compensate for its lack of participation in UN treaties.²⁴² The efforts that Taiwan has made to draft domestic versions of international treaties to which it cannot be a party are laudable. Taiwan's attempts to work with other countries on global and regional environmental issues,²⁴³ its domestic versions of treaties such as the Basel Convention, and concrete actions like the ban on import of scrap metal, an umbrella category which historically included many kinds of hazardous wastes,²⁴⁴ These indicate that Taiwan is both striving to be recognized by the global community as a responsible environmental citizen and concerned about protecting its natural environment from further degradation.

²⁴⁰ Kathryn Harrison, *Talking with the Donkey: Cooperative Approaches to Environmental Protection*, 2 J. OF INDUS. ECOLOGY 53, 69 (1999).

²⁴¹ See *supra* Parts II through IV.

²⁴² ROC EPA, *EPA to Strengthen International Communications*, 5 ENVTL. POL'Y MONTHLY 12 (2002), at <http://www.epa.gov.tw/english/EPM/issue0212.htm> (last visited Oct. 15, 2003).

²⁴³ ROC EPA, *Eco-Diplomacy: NGOs Participate in Taiwan-US Bilateral Conference*, 3 ENVTL. POL'Y. MONTHLY 17, at <http://epa.gov.tw/english/EPM/issue0011.htm> (last visited Oct. 15, 2003); *Taiwan Takes a Step Forward in Eco-Diplomacy with Asian NGOs*, ROC EPA, *supra*.

²⁴⁴ ROC EPA, *Global Environmental Issues in Taiwan: Transboundary Movement of Hazardous Waste*, <http://ivy2.epa.gov.tw/gepp/english/page05e.htm> (last visited Oct. 15, 2003).

At the national level, Taiwan is making efforts to coordinate domestic environmental legislation. The Legislative Yuan passed the Fundamental Environmental Protection Act in November 2002. This law gives environmental protection precedence over economic development when the two come into conflict,²⁴⁵ and demonstrates that the central government is taking the need for environmental regulation seriously. The government has also commissioned studies in an effort to integrate sustainability indicators into economic plans,²⁴⁶ and to account for local resources and vulnerabilities.²⁴⁷ These advances may help to mitigate the general lack of coordination among development departments and environmental protection departments at the central level, as well as a general disconnect between central economic planning and local environmental realities.²⁴⁸

At the interface between national and local levels, the EPA is restructuring relationships with local EPBs and with other sectors responsible for pollution regulation. In 2001, the EPA revised the EIA enforcement rules to require local EIA review committees to submit their organizational rules to the central EPA for approval, rather than to local government authorities.²⁴⁹ Although EPB employment is no longer thought of as merely a political sinecure, the need for additional EPB funding was recognized by the director of the EPA as necessary to increase effectiveness of the local EPBs.²⁵⁰ Commitments by the central government in 2002 to double the environmental police force created in 1999²⁵¹ indicated acknowledgement of the need for continued monitoring of pollution sources.²⁵² In addition, utilizing the EPBs to design long-term economic development plans that harmonize regional differences in environment and

²⁴⁵ ROC EPA, *The Fundamental Environmental Protection Act: Legislation for a Non-Nuclear Homeland*, 5 ENVTL. POL'Y MONTHLY 12, available at <http://www.epa.gov.tw/english/EPM/issue1212.htm>; see also ROC EPA, *Legislative Yuan Passes the Fundamental Environmental Protection Act*, http://www.ftis.org.tw/sidn/Sidn4-1/current.htm#ca_01 (last visited Oct. 15, 2003).

²⁴⁶ Sustainability indicators for environmental and social health were determined in 1999. See Yeh Jiunn-Rong & Ling-Ling Lee, *Sustainable Development Indicators for Taiwan*, at http://www.ihdp.uni-bonn.de/html/publications/update/update02_02/Update02_02_art4.html (last visited Oct. 15, 2003).

²⁴⁷ See Hou, *supra* note 228.

²⁴⁸ *Id.*

²⁴⁹ ROC EPA, *Revised EIA Regulations Benefit Industry and Environment*, 4 ENVTL. POL'Y MONTHLY 10 (2001), available at <http://www.epa.gov.tw/English/EPM/issue0110.htm> (last visited Oct. 15, 2003).

²⁵⁰ ROC EPA, *Edgar Lin Urges Greater Interaction Between Environmental Agencies*, *supra* note 232.

²⁵¹ EPA Police Force Doubles, Taiwan News Briefs Env'tl. (2003), at <http://www.washingtonstate.org.tw/English/news-events/news-briefs/news-briefs-environmental.htm> (last visited Oct. 15, 2003); ROC EPA, *Environmental Police Force to be Expanded*, 4 ENVTL. POL'Y MONTHLY 7, <http://www.epa.gov.tw/english/EPM/issue0105.htm> (last visited Oct. 15, 2003).

²⁵² Yu-Tzu Chiu, *Environmentalists Laud 'Green Police' Legislation*, TAIPEI TIMES, Apr. 19, 2003, <http://taipeitimes.com/chnews/2000/04/19/story/0000032832> (last visited Oct. 15, 2003).

resource management would help to mitigate some of the environmental degradation that has occurred with the modern industrialization of Taiwan.²⁵³

In addition to changes at the policy level, Taiwan's courts are beginning to enter the environmental enforcement process, aiding the EPA's battle against pollution. In the Kaoping River poisoning incident of July 2000, twenty-two people were indicted for illegally dumping chemical solvents into the Kaoping's tributary, the Chishan River.²⁵⁴ This was a landmark environmental case for Taiwan, which could indicate an increasing willingness on the part of the EPA to use the courts to prosecute environmental crimes. Whether the EPA is prepared to take legal action against violations that result in less immediate impacts remains to be seen.

In contrast to government lawsuits against polluters, citizen suits have not been very effective, and are not common in Taiwan.²⁵⁵ Although it is possible to bring class action lawsuits, they are seldom used to prosecute environmental crimes.²⁵⁶ Earlier mass environmental disputes often resulted in the central government compensating residents for damage to water, crops, and air,²⁵⁷ but the idea of compensation from the polluting corporations, or compensation for health impacts, is fairly new. However, since the passage of the Public Nuisance Disputes Mediation Act in 1992,²⁵⁸ the government has promoted mediation of nuisance claims, including noise and air pollution.²⁵⁹ The 1998 amendments to the Air Pollution Control Act included a provision for environmental civil lawsuits to be brought against authorities that neglect regulatory enforcement duties.²⁶⁰ The first such suit was filed in early 1999 by the Taiwan Environmental Observation Center.²⁶¹

The NGO movement in Taiwan has been a significant force in improving environmental regulation and has great potential for filling part of the policing role that the EPA currently holds. The Taiwanese government

²⁵³ See generally Hou, *supra* note 228.

²⁵⁴ 22 Indicted over River Pollution Incident, *TAIPEI TIMES*, Aug. 16, 2000, available at <http://www.taiwanheadlines.gov.tw/20000816/20000816s1.html> (last visited Oct. 15, 2003).

²⁵⁵ ROC EPA, *Environmental Group Raises First Environmental Civic Lawsuit*, 2 ENVTL. POL'Y MONTHLY 11 (1999) <http://www.epa.gov.tw/EPM/issue9905.htm> (last visited Oct. 15, 2003). (*hereinafter* "First Environmental Lawsuit.")

²⁵⁶ Litigation is not commonly used to address environmental wrongs. Dennis Te-chung Tang, *The Environmental Laws and Policies of Taiwan*, 26 *VAND. J. TRANSNAT'L L.* 521, 545 (1993).

²⁵⁷ Chen, *supra* note 153.

²⁵⁸ ROC Public Nuisance Disputes Mediation Act (1992) (English translation), at http://www.epa.gov.tw/english/laws/Public_Disputes_Mediation_Act.doc (last visited Oct. 15, 2003).

²⁵⁹ ROC GOVERNMENT INFORMATION OFFICE, ENVIRONMENTAL PROTECTION, at <http://www.gio.gov.tw/taiwan-website/5-gp/yearbook/chpt13.htm> (last visited Oct. 15, 2003).

²⁶⁰ "First Environmental Lawsuit" *supra* note 252.

²⁶¹ *Id.*

is supporting further training of this sector,²⁶² which will add to the sophistication and subsequent political power of NGOs. Taiwan hosted the Sixth Asian Environmental NGO Conference, highlighting the role that NGOs can play in international environmental cooperation.²⁶³ Given the diffuse nature of the SMEs in Taiwan and the difficulty in monitoring them, NGOs maybe vital in disseminating information about pollution control and decreasing what is effectively non-point source pollution. Most importantly, given the voting rates of Taiwanese citizens, the information can also be a powerful tool to effect regulatory change through election of new government representatives.

VIII. CONCLUSION

The government of Taiwan, like those of many newly industrialized countries, is attempting to simultaneously mitigate past pollution legacies, address current pollution sources, and reduce future pollution from industrial development. Taiwan's story is complicated by the geographical limitations of a small island supporting a relatively large population, and its unique political status. The historical and current choice of industries on the island further contributes to the pollution problem.

Although forty years of martial law resulted in a delayed response by the Taiwanese government to extreme environmental degradation, beginning in 1987, pollution law gained ground rapidly with the liberalization of Taiwanese society, tapping into multiple resources and non-traditional approaches to pollution regulation. EPA is gradually moving from a role of policeman to one of mentor and occasional disciplinarian. The gaps in pollution regulation are increasingly bridged by alliances and collaborative efforts involving multi-stakeholder participation. In addition, the growth in the number and sophistication of environmental NGOs in Taiwan, and the integration of international environmental standards into the industrial sector is effectively shifting some of the responsibility and cost of environmental regulation to the private and third sectors.

Government initiatives have led to increased availability of information, which in turn has allowed more parties to play a role in the regulatory process. This integration of multiple parties and mechanisms will

²⁶² See ROC EPA, National Institute of Environmental Training, *Number of Authorized Certificates for Environmental Protection Specialists*, http://www.epa.gov.tw/statistics/%E7%B5%B1%E8%A8%88%E5%B9%B4%E5%A0%B1/90%E5%B9%B4%E7%89%88/6_其他/3609.htm (last visited Oct. 15, 2003).

²⁶³ ROC EPA, *Taiwan Takes a Step Forward in Eco-Diplomacy with Asian NGOs*, 3 ENVT'L POLICY MONTHLY 17, <http://www.epa.gov.tw/english/EPM/issue0011.htm> (last visited Oct. 15, 2003).

likely allow Taiwan to construct the versatile and comprehensive pollution regulation scheme that mirrors its versatile and comprehensive economic development scheme. Taiwan's economic strategy promoted SMEs to build an adaptable and resilient economy. Now the government is promoting the role of small and medium-sized players in the environmental regulation game to create an equally efficient and adaptable regulatory network.

Taiwan could greatly improve the efficiency of its mosaic of regulators by assessing its current diverse regulatory systems, identifying areas of conflicting interest, and increasing supervision and guidance in these areas. Taiwan's environmental regulatory regime has come a long way in a very short time and met challenges that any country would consider daunting. However, there are still many challenges ahead. Just as the SMEs have become a problematic source of pollution for regulators, Taiwan's small- and medium-sized regulators may become a problematic source of regulatory inefficiency. These multiple regulators will require sophisticated and coordinated regulation by the state if they are to be successful in transforming Taiwan into the "Green Silicon Island."