

Clearing the Air: How Delhi Broke the Logjam on Air Quality Reforms

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Like many other cities straddling the divide between the developed and developing world, the capital city of Delhi—which includes New and Old Delhi and its surrounding metropolitan area—has suffered for decades from declining air quality. In the early 1990s, despite a plethora of environmental laws and numerous government-initiated policies to combat pollution, India's capital gained the dubious distinction of being the fourth-most polluted city in the world.¹

In recent years, however, there have been some significant changes. In response to a public interest lawsuit filed in 1985, the Indian Supreme Court issued a series of orders, the best known of which required tens of thousands of commercial transport vehicles to switch to compressed natural gas (CNG) rather than use more highly polluting fuels. Under the Court's supervision, Delhi has been able to break through seemingly impervious bureaucratic and institutional logjams to put in place a number of measures to reduce harmful emissions.

The city's apparent progress in improving its air has been noted by its neighbors in the developing world, many

of which face the same challenges: high levels of pollution and disappointing legal and policy implementation. Similar lawsuits have been filed in Pakistan and Bangladesh, and Malaysia, Indonesia, Nepal, Sri Lanka, and the Philippines, among others, have identified the Delhi experience as a model.²

A story that has been commonly repeated in India and around the region is that M. C. Mehta, a lawyer and head of a local nongovernmental organization (NGO), filed a "public interest litigation" before the Indian Supreme Court invoking fundamental constitutional rights against the failure of the government to protect Delhi's environment. An activist Supreme Court took charge when legislative and regulatory agencies would not. One of several remedies imposed by the Court was the conversion to CNG. Often the impression is left that much of this happened in a very short time.

Is the story so straightforward? What specifically was the role of the Supreme Court in the effort to put the reins on environmental pollution in Delhi, and did it act alone? Was it appropriate for a judicial body to make environmental regulatory decisions that are normally reserved to legislators and specialized regulatory bodies in the executive branch? If, as is commonly assumed, the Indian Supreme Court did play a central role, what are the long-term consequences when judicial bodies make and implement regulatory policy? What impact will this have over time on governance structures in India and on future efforts to regulate pollution? Will the Court's efforts embolden regulatory bodies or relieve them of the charge to develop their own competence?

The short answer to the first of these questions is that the Supreme Court did play a central role, especially when it directed the conversion to CNG. But the



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Court did not act alone, nor could it have. Most of the policies attributed to the Court originated in the government, but the government apparently lacked the political will to undertake the bold action necessary to carry out the programs it had announced. When the government did not follow through, the Court forced it to implement its announced policies and, in some cases, to develop new ones.

The Court's authority to issue orders to the government that would be obeyed derived from its unique status in Indian public life: It was widely viewed as an independent, relatively uncorrupted protector of fundamental rights in Indian society. But the Court also acted under the watchful eye of an active NGO communi-



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Under pressure from India's Supreme Court, authorities in Delhi enacted a rule that all buses must run on cleaner-burning compressed natural gas (CNG).

ty and a free press, whose actions in turn helped create public awareness that put pressure on the government.

None of this deliberation or decision-making happened overnight. Issues were chewed over and worked through for a long period of time. The 1998 CNG decision illustrates this well: Compressed natural gas was being considered as an alternative fuel for the transportation sector as early as 1988. Such lengthy decision processes seem to reflect the extraordinary difficulties of introducing a new technology, but the CNG case was further extended by a

continuing battle that raged even after the Court issued definitive orders.

Critics argued that the Court-driven decision process led to outcomes that were more costly and inefficient than India could afford. Ideally, it may have been more cost-effective to set vehicular and fuel standards and leave the decision of which technology to use to the consumers. But the Court had evidence that fuel adulteration was rampant and politically impossible to check. CNG's gaseous nature made adulteration impracticable. In view of the institutional realities in India, CNG thus became, by process of elimination, the most efficient option.

Whether the Court's actions constituted good government is a very difficult question to answer. Its actions cannot be understood outside the context of India's history (see the box on page 25) or legal framework for managing environmental pollution (see the box on page 26). However, it can be said that the Court acted with relative restraint. Its reliance upon independent committees was admirable and a good model for future such deliberations that are placed before a court of law. Perhaps the most difficult question is whether courts—rather than technical experts in the executive branch—should be making these kinds of decisions at all. In the case of Delhi's pollution, the Indian Supreme Court apparently was the only authoritative body willing to take these hard decisions and make them stick. One can also speculate that perhaps something is at least better than nothing. However, the jury is out on whether the Court's pervasive presence ultimately will encourage firmer future actions by environmental regulators.

Delhi's Pollution Load

The proliferation of laws in the mid- to late 1980s apparently had little impact on the actual state of pollution in Delhi. In particular, air quality began to decline in this same period. This is a common pattern: Practically every country in the world today has environmental laws, but most have very poor compliance. A 1995 World Bank study estimated that the annual health costs of ambient air pollution in

THE ROLE OF INDIA'S SUPREME COURT IN PUBLIC LIFE

The Indian Supreme Court's actions cannot be understood outside of the context of Indian history. India became independent in 1947. Its government structure included a Supreme Court and the British tradition of Parliamentary supremacy. The constitutional drafters had to decide whether the constitution would contain a declaration of fundamental rights to assure proper treatment of minorities and safeguard against arbitrary rule. The final product enumerated fundamental rights and duties.¹

The founders of India contemplated a Supreme Court best characterized as a technocratic body rather than an arm of the government for social policy. Since that early period, the Indian judiciary has gone through a fascinating evolution in which it has become a unique adjudicative body that considers a wide range of social issues under the rubric of protection of constitutional fundamental rights.

Initially, Parliament could reverse any court decision with a constitutional amendment. But in the mid-1960s, a narrow Supreme Court majority narrowed that Parliamentary right. The legislature could not take away or abridge fundamental rights to life and personal liberty as articulated in Article 21 of the constitution.² In 1975, in what would prove to be a watershed event in the evolution of this doctrine, Prime Minister Indira Gandhi attempted to suppress the political movement against her regime and to change the constitution to whittle down checks on the power of the executive. The Court's Solomon-like response (limiting Parliament's ability to overrule the Court but upholding Gandhi's election) remains controversial to this day.³

Eventually, the Court extended fundamental rights to include the right to a clean environment. The doctrine of Court-protected fundamental rights advanced in a way that gave the Court the last say on the basic structure of the constitution.⁴ Despite the huge power inherent in this authority, the Court has used these powers sparingly. In 25 years, it has struck down provisions of constitutional amendments in only five cases.

The Court also liberalized the rules of standing (who can bring a case to

court) and justiciability (what issues a court will determine). Thus, social activist organizations or individuals can litigate on behalf of the poor and disadvantaged, and citizens can complain about bad governance or environmental degradation. The Court allows fundamental rights issues to be brought to it in unusual ways from a Western perspective. For example, a letter from an ordinary citizen can start a case. The only restriction is that the petitioner "not be a busybody or meddling interloper."⁵

The distinguished Indian legal writer S. P. Sathe calls this a "counter-majoritarian" check on democracy in support of unpopular causes and politically powerless minorities. Social action groups use this type of litigation strategically when political mobilization or direct agitation alone does not yield results.⁶

In many nations, the highest court is principally an appellate body that reviews, affirms, or reverses the decisions of lower courts. When fundamental rights are involved, however, the Indian Supreme Court sits as a court of initial jurisdiction, essentially a trial court. In this capacity, as in the Delhi pollution issues, the Supreme Court receives factual affidavits from the parties and is deeply involved in the details of the matter before it.

In practical terms, the Supreme Court's "one-stop shopping" can reduce the time in which significant issues are adjudicated. On average, litigation in Indian lower courts—not including time for appeals—takes 15 years to come to closure.⁶ The Supreme Court and other high courts take relatively less time, although a petition like M.C. Mehta's, which asked for wide-ranging relief, can take a long time to resolve.

How did a court come to decide matters of social policy? Sathe posits that the Court increasingly came to be seen by the public as the defender of ordinary citizens against the abuse of powers by ministers and administrative officials. This perception of independence is assisted by a relatively disinterested appointment and tenure process.⁷ But Sathe also admits that many of the Court's decisions are

essentially political, that "the Court performs the political function of legitimizing or censuring the acts of the other organs of governments."⁸

1. The discussion in this section relies heavily on S. P. Sathe, *Judicial Activism in India: Transgressing Borders and Enforcing Limits* (Oxford, UK: Oxford University Press, Second Edition, 2002).

2. Fundamental rights are contained in Part III of the Indian Constitution. Unlike, for example, the U.S. Constitution, India's Constitution is detailed and specific, which is why amendments are necessary. About 81 amendments have been passed in the past 50 years. See Sathe, note 1 above, page 64. In comparison, the U.S. Constitution is much more general and very difficult to amend (27 amendments in more than 200 years).

3. See Sathe, note 1 above, pages 8–9 and 73–76. In 1975, the election of Indira Gandhi to the Indian Parliament was set aside by a state high court on grounds that she had "taken recourse to a corrupt practice" under the election law. She appealed to the Supreme Court, which upheld the decision allowing her to continue as prime minister without voting rights. On 25 June 1975, Gandhi declared an emergency under article 352 of the Constitution and caused a constitutional amendment to be passed to prevent scrutiny of her election by the Court. The clause substituted a new law that made Gandhi free from liability with retrospective effect and also provided that her election would continue to be valid even if the Court made a contrary decision. In the subsequent litigation, the Court upheld the election but struck down the amendment.

4. See Sathe, note 1 above, page 18. Indeed, the Court itself has characterized its role in this way. In *Bheshwar Nath v. Commissioner, Income Tax*, Justice Subba Rao "... held that persons could not even voluntarily waive their fundamental rights. [it is the duty of this court to protect [the] rights [of the economically poor, educationally backward and politically not conscious] against themselves.]"

5. See Sathe, note 1 above, page 18.

6. See S. Divan and A. Rosencranz, *Environmental Law and Policy in India: Cases, Materials and Statutes* (Oxford, UK: Oxford University Press, 2nd Edition, 2002), footnote 49 at 123. ("For example, in the Bombay High Court the delay in a writ petition is 6 years compared to over 15 years for a suit.")

7. Judges come from various regions and communities. Religion and gender are considered along with professional expertise. Once appointed, a justice cannot be removed except for proven misbehavior or incapacity and unless charges against him are found valid by a committee of judges and jurists. Removal requires a resolution passed in each house of parliament by a majority of the total membership of that house, and by a majority of not less than two-thirds of members present and voting.

8. The "legitimacy of the Court depends upon [the public belief] that its decisions are principled, objective and just." Sathe, note 1 above, page 22.

INDIA'S LEGAL FRAMEWORK FOR MANAGING ENVIRONMENTAL POLLUTION

It is clear that India has not lacked for environmental authority to attack its growing pollution. The authority starts in the Indian constitution. Part XI establishes the relationship and relative authority of the parts of India's government. Constitutionally, the central, or Union government of India has legislative authority over functions such as defense, foreign affairs, interstate transportation and other issues that are considered to transcend state interests. States have exclusive power to legislate on local issues. A "Concurrent List" enumerates matters for which central and state legislatures have overlapping and shared jurisdiction. The city of Delhi is a "Union Territory," one of seven territories administered by the Union government. In 1991, the 69th Constitutional amendment gave Delhi a Legislative Assembly.¹

India's earliest air pollution legislation, the 1981 Air (Prevention and Control of Pollution) Act, is rooted in the central

government's power to make laws implementing decisions taken at international conferences, in this case India's participation at the United Nations Conference on the Human Environment held at Stockholm in 1972.² The 1981 Air Act created central and state pollution control boards and gave them authority over air pollution. The initial concept of a pollution control board was found in a 1974 act, but the central board set up in that act was limited to water issues. The 1981 act broadened the discretion of the Central Pollution Control Board (CPCB) to "lay down standards for the quality of air"; "advise the Central Government on any matter concerning the improvement of the quality of air and the prevention, control, or abatement of air pollution"; and "perform such other functions as may be prescribed."³

In the mid- to late 1980s, the Indian Parliament enacted a number of other laws that gave the government further authority

to enact policies to curb air pollution. These included the Environmental (Protection) Act of 1986, the 1987 Air Act amended, the 1988 Motor Vehicles Act, and the 1989 Central Motor Vehicle Rules. The 1988 Motor Vehicles Act and the 1989 Central Motor Vehicle Rules authorized the government to set standards for vehicular emissions for manufacturers and users.

1. See "Delhi," *Discover India*, <http://meadev.nic.in/states/del/del.htm>.

2. See S. Divan and A. Rosencranz, *Environmental Law and Policy in India: Cases, Materials and Statutes* (Oxford, UK: Oxford University Press, 2nd Edition, 2002), 244. The delegation of executive functions is permitted by Article 258(2) of the Constitution. Article 258(3) requires the central government to compensate the states for the cost of carrying out these delegated functions.

3. It is true that these provisions generally use the word "may" rather than "shall" with a fair inference from this (at least from a U.S. legal point of view) that these powers are permitted, not mandated.

Delhi alone were on the order of 3.5–14 billion Indian rupees (Rs.), or approximately US\$100–400 million.³

Industrial, residential, and transportation sources all contribute to the problem. But in recent years the largest share of the responsibility—60–70 percent of total pollution—has been attributed to transportation, reflecting Delhi's considerable population growth.⁴

When India won independence from Great Britain in 1947, Delhi's population was about two million. Transportation was largely in the form of foot, bicycle, or animal-drawn conveyance. Recent census data shows the population has swelled to 14 million and is still growing. The number of motorized vehicles has also skyrocketed. In fact, from 1980 to 2000, motor vehicle registrations increased three times as rapidly as population.

The mix of vehicles in recent years includes buses, taxis, large numbers of two-stroke auto-rickshaws or three wheelers (small vehicles used as taxis or for light hauling), two-stroke scooters, and privately owned automobiles. Buses are used so heavily that Delhi was ranked in

the world's top 20 of public transportation in 2002.⁵ But, as in the West, everyone aspires to own his or her own vehicle, and increasing affluence means that many can achieve this goal.

The air quality deterioration is usually attributed not just to the number of vehicles, but also to the way they have been built, maintained, and fueled. The vehicles propelled by two-stroke engines illustrate the public policy challenge: Such engines resemble those of highly inefficient lawn mowers, regularly producing oily clouds smoke.⁶ Also, these vehicles account for 70 percent of the total vehicle population in Delhi.⁷

Forming Air Pollution Policy

Concerned with growing pollution from a variety of sources and a government apparently disinclined to deal with this problem, M. C. Mehta asked the Supreme Court to protect fundamental constitutional rights by, among other things, directing government ministries and departments to implement the 1981 Air Act in Delhi. In response to Mehta's petition (the portion

regarding air quality—Mehta also asked for relief related to water pollution), the Court began in 1986 to press Delhi's administration to explain what it was doing to reduce air pollution. Responses to the Court's questions were filed in the form of affidavits.

Sometime in the mid-1980s, quite possibly in response to the Court's pressure for answers, or perhaps on their own initiative, India's central government (also known as the Union government) and the government of the National Capital Territory of Delhi (the Delhi government) began to announce a number of new policies. However, none of these had much tangible impact. For example, in 1989, the central government said it would raise the penalty on owners of polluting vehicles. This initiative failed because the Delhi government lacked emissions testing equipment to implement the new penalties. In 1990, the central government tried again when it announced vehicular exhaust emissions standards for smoke, visible vapor, grit, sparks, ashes, and cinders. These failed for the same reasons: lack of testing equipment and testing stan-

dards that were generally considered inadequate, easily manipulated, and often simply fraudulent.

Other efforts to limit vehicular pollution were either slowed or watered down to the point of being ineffective. In 1993, the Ministry of Environment and Forests (MoEF) notified (announced) the first set of vehicular mass emissions standards for India. MoEF was working from recommendations made by a distinguished central government-appointed committee, established in April 1991 and headed by H. B. Mathur, a professor at the Indian Institute of Technology Delhi. The Mathur Committee was given directions to recommend vehicular mass emissions norms that would be put into place in 1995 and 2000, but the emissions standards that were eventually notified were a diluted version of the committee's recommendations and more lenient than an initial proposal for consideration put up by the Central Pollution Control Board. Under pressure from the automobile industry, MoEF extended the deadline for the diluted standards for a year, to April 1996. Press reports from this period indicate that the automobile industry continued to lobby to further relax the emissions standards set for 2000.

When the Supreme Court began to push the government to act, however, it did not start with vehicular pollution. The first interventions by the Court were to force relocation of hazardous, noxious, heavy, and large polluting industries, also called "category H," from Delhi. The relocation policy came out of the second master plan for Delhi, a planning document that was approved by the central government in August of 1990.⁸ This plan identified category H industries for removal from Delhi within three years, by 1993. The deadline passed but the industries stayed put. With the Court's persistence, category H firms were finally moved by 1997.

With respect to vehicular pollution, the Court managed three separate reform efforts in the time period 1994–1998, each derived almost entirely from policies that had originated in the government but had died on the vine. These were the phaseout of leaded gasoline, introduction of premixed fuels for two-stroke engine vehi-

cles, and the phaseout of 15-year-old commercial vehicles. The policies regarding leaded gas and premixed fuels met with some resistance, but were adopted with relatively few problems.

The history of the phaseout of 15-year-old vehicles, however, was more troubled and was a good example of the complicated back-and-forth between the Court and the government. In October 1997, after much prodding from the Supreme Court, the Delhi government announced that 15-year-old and older commercial vehicles would be phased out by March 1998. But only four months after this announcement, facing parliamentary elections and pro-

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tests, the Delhi government withdrew this policy initiative and said it would make an "objective" decision later. On 28 July 1998, the Court ordered that the previously announced policy be implemented by 2 October 1998. In response to a plea from the Delhi government, the Court later extended the deadline to 31 December 1998—at which date these vehicles were in fact phased out.

The apparent perception of certain Delhi NGOs was that these amounted only to piecemeal actions and that pollution was continuing to rise. In 1996, the NGO Cen-

ter for Science and Environment (CSE) published the book-length report *Slow Murder: The Deadly Story of Vehicular Pollution in India*.⁹ CSE's report made the case that Delhi's high pollution was causing severe health impacts and argued that the fault lay in backward vehicular technology and maintenance, poor fuel quality, and virtually nonexistent traffic planning.

Whatever the reason or motivation—two observers believed it was in direct response to the CSE report, but a justice stated in an interview it was an independent decision¹⁰—on 18 November 1996, the Supreme Court issued a notice on its own initiative. It told the Delhi government to submit an action plan to control the city's air pollution. In response, the Delhi and central governments developed their first comprehensive plans (in 1996 and 1997, respectively).

The Delhi government's action plan called for the construction of a Mass Rapid Transport System (MRTS)¹¹ and a highway bypass around Delhi.¹² MRTS would deal with the growing need for transportation and help reduce the use of private vehicles. The bypass would reduce exposure to out-of-state trucks and buses forced to pass through Delhi. The plan also called for improved vehicular technology and fuel quality, increased use of CNG and propane (and the financial incentives and construction of necessary infrastructure to make CNG and propane viable), restrictions on excessively polluting in-use vehicles, further landscape "greening" of Delhi, and a program for public awareness. Once again, with one exception—a regulation for stricter vehicular emissions norms—good intentions faded into bad practices. In early 1997, the Delhi government announced that it would introduce new vehicular norms in the capital in 1998 instead of 2000. The new norms were notified by the central government in March 1997. Aside from that, however, the Delhi plan was ineffectual. Little was done to implement the rest of it.

On 3 December 1997, MoEF issued its own pollution plan for Delhi. *The White Paper on Pollution in Delhi with an Action Plan* outlined measures to deal with vehicular, industrial, water, and noise pollution,

but its main focus was on transportation. Some of its proposals were very similar to ideas in the Delhi government's action plan: a phasing out of old vehicles; a possible phaseout of two-stroke vehicles, including two and three wheelers; improved traffic flow; a bypass around Delhi; a mass rapid transit system; improved fuel quality; and the introduction of CNG-fueled buses. In addition, MoEF offered a timetable for achieving the proposals.

The Court used the release of the MoEF white paper to step up its pressure on India's central government. Most importantly, it directed MoEF to use its authority under Section 3(3) of the Environment Protection Act to establish a



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Motorized rickshaws in Delhi, such as the one depicted here, often have highly polluting engines. A move has been made to phase out these engines.

committee to monitor the implementation of the white paper and to suggest other policies to control pollution. This committee was the Environment Pollution (Prevention and Control) Authority (EPCA). This was not the first time that the Court had called for a statutory committee: The Saikia Committee, named after its chair, retired Supreme Court Justice K. N. Saikia, had been constituted in March 1991 to devise a solution for vehicular pollution in Delhi.¹³

However, the emergence of EPCA marked a major turning point. While the Saikia Committee is widely regarded as having been ineffectual, EPCA proved to be a major powerhouse. It was helped in this because it had a clear mandate from the Supreme Court. The Court needed EPCA because the issues before it were highly technical and because it was concerned that the adversarial nature of the hearings before it rendered them less useful. Indeed, one view expressed by an insider to the process was that EPCA was established directly in response to government complaints that the Supreme Court was overstepping its bounds and making policy decisions in place of the government.¹⁴ Not only was EPCA empowered to consider policy and provide specific recommendations, but its composition provided a limited forum to feed in the points of view of at least some of the relevant stakeholders. While EPCA was admittedly not broad based, its members included government officials; a representative of Maruti, an automobile manufacturer that was at the time government owned; and a public member from the Center for Science and Environment (CSE).

One of its defining characteristics was its leadership under Bhure Lal, a well-respected, long-time senior civil servant who could hold his ground but was also a talented consensus builder. Indeed, EPCA is widely known in India as the Bhure Lal Committee. One source characterized him as a "steam engine" and another from the automobile industry as a "great man."¹⁵ Perhaps because of Bhure Lal's leadership—and despite the disparate points of view that committee members represented—EPCA almost always acted unanimously. EPCA met once a week and reported back to the Court at regular intervals. In many meetings, the committee heard from stakeholders who came to present data and information or argue for one position or another.

From the start, EPCA monitored the implementation of the Delhi government action plans and MoEF's white paper. It also went on to suggest additional policies and act as a fact-finding body for the Court. In its first progress report, EPCA

pointed out the limitation of the government's proposals as they did not deal with old, in-use vehicles or the tremendous increase in new vehicles. EPCA advised that more drastic measures were warranted, namely that all taxis and autos switch to clean fuel, all 8-year-old (or older) buses except those on clean fuel be banned, and, most dramatic, that the entire bus fleet be shifted to a single fuel—CNG—by 31 March 2001. Previous plans would only have encouraged the use of clean fuels in public transportation. The Supreme Court adopted EPCA's recommendation as a mandate in its seminal 28 July 1998 order.

For the most part, the Court stayed faithful to the recommendations of EPCA—on which it relied heavily for technical support—and closely tracked its orders with existing government policy.¹⁶ Over the next few years, on EPCA's suggestion, the Court ordered improvements in emissions standards and fuel quality. But the shift to CNG proved to be the most controversial change.

The Shift to CNG

A review of the record would appear to refute the popular belief that the idea of using CNG for transportation originated with the Supreme Court. The actual circumstances illustrate a complex process of vetting solutions and working out agreements.

In fact, discussions about vehicular applications of CNG started at least as early as 1988, growing out of a World Bank study. At that time, the state enterprise Oil and Natural Gas Commission introduced CNG on an experimental basis in its own vehicles. In 1992, the Gas Authority of India Limited (GAIL) and the Indo-Burma Petroleum Company Limited attempted to popularize the use of CNG in Mumbai, Baroda, and New Delhi. GAIL floated long-term plans to convert bus fleets to CNG in cities along the Hazira-Vijaypur-Jagishpur pipelines (which did not include Delhi). The Delhi transport authorities converted five buses to CNG in 1992 and, by 1994, claimed the success of a pilot project for 40 vehi-

cles. In 1994, the Delhi government said it would open more CNG outlets and possibly subsidize the cost of CNG conversion kits.

In the early 1990s, the Saikia Committee also suggested CNG as an alternative vehicular fuel on the basis that it was less polluting, cheaper, and more widely available in the country than petrol or diesel. In response, the Supreme Court ordered that all government cars switch to CNG. But the Saikia Committee recommendations illustrate process obstacles that became apparent as ideas started to be translated into policy and then implemented. The initiative short-circuited when it became

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clear that there were not enough CNG conversion kits or retail outlets. None of the early proposals took into account the substantial sequencing problems inherent in introducing new technology: Increased demand for CNG could only be satisfied with in-place CNG infrastructure in the form of pipelines and filling stations, which were difficult and expensive to install, and manufacturers were unlikely to produce new CNG vehicles without demonstration of increased demand.

Even the Court's 1998 order did not turn things around. Despite the clarity of the order, response to it was not so crisp. In the first year following the order, the Delhi government gave verbal support to the Court but little happened beyond a single CNG bus trial.¹⁷ The experience gained in previous CNG bus trials done in the early 1990s was ignored. In part this could be attributed to a change in government: The Indian National Congress party (the Congress party) defeated the incumbent Bharatiya Janata Party (BJP) in November 1998 to form a new government in Delhi. India's central government also announced its support for the Supreme Court directive but did little to help implement it.¹⁸ Very little happened for the better part of two years, despite EPCA's continued efforts to monitor progress in the implementation of the Court's order and coordinate among different government departments to try to move the process along.

As the CNG conversion deadlines approached and the Supreme Court made clear the seriousness of its orders, a furious debate and blame-game ensued. Some key stakeholders became active for the first time. Private bus operators claimed in interviews that they had not previously known about the litigation or the Court's orders. In January 2001, almost two-and-a-half years after the Supreme Court judgment, they asked the government to request from the Supreme Court an extension for bus conversion.¹⁹ The operators pointed out that CNG bus technology was untested and that CNG filling stations were not available in adequate numbers.²⁰

The Supreme Court demanded additional affidavits from the parties and asked specifically what efforts had been made to date to carry out its orders. It told the Delhi government to file a status report detailing what it had done to implement the conversion order; ordered bus manufacturers Telco and Ashok Leyland to report on their ability to manufacture CNG buses; and directed gas supplier GAIL to report on the number of available CNG outlets.²¹ As it became clear that few private operators had converted their buses to CNG mode,²² the Supreme Court mandated the Delhi government to register only CNG buses

(whether old or new) and ordered the private bus operators to place orders for CNG parts and buses.²³ The Court apparently found the availability arguments persuasive and granted a limited extension to the 31 March 2001 deadline. Only groups that had ordered CNG buses and were awaiting delivery, especially those that supplied school buses, were granted an extension until the end of September 2001.²⁴

But the Court also clearly placed the responsibility for making the extension a success on the Delhi Transport Department. On 31 March 2001, the government reported back that as of 30 March, orders had been placed for 2,800 new buses and the conversion of 350 buses.²⁵ Only these operators—who amounted to about 25 percent of Delhi's bus force—were allowed on the roads after 31 March 2001.

As the number of buses on the street declined, frustrated commuters set fire to buses and threw stones.²⁶ The Delhi and central governments again sought to dissuade the Court from its CNG decision. This time, they asked the Court to define "clean fuel" more precisely. The central government argued that low sulfur diesel (LSD) should be placed in this category. The Court sent this to EPCA for examination.²⁷ EPCA's response—that only CNG, liquefied propane gas (LPG), and propane were environmentally acceptable fuels for Delhi—was highly influenced by evidence of rampant and uncontrollable fuel adulteration, largely from government-subsidized kerosene.²⁸

Despite EPCA's recommendation, on 13 September 2001 India's central government appointed a committee headed by R. A. Mashelkar, the Director General of the Council for Scientific and Industrial Research (CSIR). The Mashelkar Committee's assignment was to recommend an appropriate auto fuel policy for the country. It was tasked to find a cost-effective, practical, realistic, and achievable way to reduce pollution.²⁹ The Mashelkar Committee's interim report recommended that the central government should only decide the vehicular emissions standard and not the type of fuel or a particular technology. However, the Supreme Court rejected the Mashelkar

Committee's recommendations. From the Court's point of view, this was too little, too late, and it failed to grapple adequately with the persistent problem of adulteration. Nevertheless, the Court agreed to extend the deadline to 31 March 2002, expressing concern about the adequacy of CNG supplies for the transportation sector and the impacts on commuters.

On 5 April 2002, frustrated by delays, the Supreme Court scolded the Delhi administration for stalling and issued another important order. It directed the immediate installation of 1,500 CNG buses and the replacement of 800 diesel buses per month beginning 1 May 2002. It

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did so after confirming with the two main manufacturers of CNG-equipped buses, Ashok Leyland and Telco, that this schedule was feasible. Furthermore, the court ordered that the transport sector should have priority access to CNG supplies in case of a shortage. Any diesel bus that ignored the order was to be subject to a heavy, daily fine (500 Rs. (about US\$12) per day for the first 30 days and 1,000 Rs. (about US\$24) after) until compliance. The Supreme Court also fined the central

government 20,000 Rs. (about US\$476) for repeatedly delaying the process.³⁰ (The converted figures above might be considerably larger when calculated at purchasing power parity: Experts often calculate the purchasing power of the rupee to be between two and five times higher than its exchange rate value.³¹)

On 6 April 2002, nearly 7,000 diesel buses, about half of Delhi's bus fleet, went off the road because of the Supreme Court's decision. However, in the following month, Delhi received an increased supply of CNG, and by December 2002 all diesel city buses converted to CNG.

It is unclear why the government eventually got behind the Supreme Court orders and ensured their implementation. One high-ranking government official said the government did so once it realized that the Court was serious and was not going to change its order.³² At this point the government had the option to implement the order or face contempt of court proceedings. Another reason may be that overall public awareness and the public's support for the Court kept the government from taking the unpopular step of defying the Court. The fines imposed (and collected) on public and private operators also helped to hasten the conversion.

The Role of Stakeholders and the General Public

The entire population of Delhi was affected by the Court's decisions, but a relatively small number of stakeholders actually played a role in the deliberations. These included representatives of the NGO community who asserted themselves into the debate, some persons and industry groups affected in one way or another by the Court's orders, and opposition political parties. But formal consultation with the public was not evident from the record, although the need to do so was remarked on at various times by members of EPCA and by the Court.³³

Two NGOs were prominent players. Mehta, the public interest lawyer who started this process, played an active role in the litigation for at least 10 years. CSE entered the fray with the publication of

Slow Murder. Thereafter, CSE monitored the Court proceedings, brought the issues into the public domain, and provided data and information at critical points. For example, during the debate about possible adulteration of low- and ultralow-sulfur diesel, CSE deliberately adulterated diesel and sent the sample to labs that were tasked to monitor fuel quality. When the labs reported no adulteration, the technical difficulties of assuring that clean fuel would stay clean had been clearly demonstrated. But CSE also played an inside role; the head of CSE at that time, Anil Agarwal, was the "public" member of EPCA and participated in its deliberative process. (Agarwal died in early 2002; his successor at CSE, Sunita Narain, also took up his position on EPCA.)

The press covered each step of this process extensively. India has a large number of newspapers, published in English, Hindi, and other local languages. From time to time, newspapers identified pollution problems and criticized the authorities for failing to act decisively on them. But in the heat of the CNG battle—when bus operators went on strike or the number of available buses was reduced—the press lambasted authorities for inconveniencing commuters and school-going children.

Some in private industry understood the importance of the case and monitored it from its relatively early stages. Some retained legal counsel throughout the proceedings. Other stakeholders, particularly the private bus operators, were late in joining the battle; they argued that they did not know earlier about the litigation or its potential impact. When they did engage, they felt frustrated by their lack of access to EPCA and the amicus curiae—a lawyer appointed by the Court to speak for the people. They also felt strongly that the Court did not appreciate their plight. Eventually, the bus operators hired counsel and appeared before the Court, but they continued to believe that they had been made scapegoats for a wider problem. They argued that the contribution of private buses to pollution was not significant compared to the sheer number of other vehicles on the roads of Delhi.³⁴

A case can be made that the public at large did not have a very strong role in the Court proceedings or the decision process. To some extent, Mehta and CSE represented the interests of some parts of the wider public, and CSE made efforts to bring the issues into the public domain. However, both were self-appointed, and they did not engage in public consultations as they formulated their positions. No organized group represented other points of view, such as the interests of the bus-riding public. At various points, EPCA tried to inform the public through media advertisements (for example), but none of this could be truly characterized as two-way communication. The amicus curiae's responsibility was to speak for unrepresentative



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sented views before the Court and to review the many affidavits filed with the Court.³⁵ But there was never a systematic effort to keep the public at large abreast of judicial developments or encourage comment on the various options considered, except as reported in the press. However, it should be said that the Indian Parliament does not have a good track record for public outreach.

Finally, many of these issues got caught up in electoral politics, as the two

Most taxis in Delhi were also converted to run on CNG.

major Indian parties repositioned themselves at various times. For example, BJP, the opposition political party in Delhi, became spokesperson for transporter unions that were against the introduction of CNG. However, the Congress party,

which was the ruling party at the time, also saw and tried to exploit opportunities, particularly when the bus operators went on strike and angry commuters burned buses and stalled traffic.

None of that should be surprising. The

issues were controversial and the debate heated. What should be noted is the apparent tension between political motivations and an underlying commitment to the sanctity of the Court process. Two examples illustrate this: In one, the diesel bus

drivers went on strike, backed by BJP party member Madan Lal Khurana. They demanded that the central government issue a law declaring existing diesel a clean fuel.³⁶ Taxi and auto-rickshaw owners also went on strike.³⁷ Despite intense

lobbying and the threat of civil disruption, the government decided against this course of action. The second example came during a very heated debate about the CNG policy. Prime Minister Atal Bihari Vajpayee decided not to back the

passage of a law that would allow existing diesel vehicles to operate on Delhi streets.³⁸ The central government was under substantial pressure and could have argued that it was legal to override the Court. But in both instances, the govern-

ment chose not to confront the Supreme Court and let the policies in question stand, possibly because public awareness on this issue made such a confrontation unpopular. This may provide insights into the larger framework within which all of these institutions work in India, including a basic respect for rule of law and a disinclination to cause damage to the very governmental fabric.

Judging the Efficiency of the Policies

One of the strongest attacks on the CNG decision is that it is not economically efficient to force all commercial vehicles to use a single technology. The Mashelkar Committee and critics such as Ranjan Bose, senior fellow at The Energy Research Institute (TERI), and Dinesh Mohan, Henry Ford Professor for Biomechanics and Transportation Safety at the Indian Institute of Technology Delhi, argued for a multiple fuel policy in which private vehicle operators would decide which technology to use as the most cost-effective way to come into compliance with government requirements. In their view, the government's role would be confined to enforcement. They expressed publicly and in interviews that the Court had made a substantial mistake on this issue.

But criticism of the choice of a single technology was not confined to Indian experts.³⁹ The Indian press reported that World Bank experts expressed skepticism about the CNG decisions. A World Bank study warned about the importance of favorable fuel-pricing policies, the development of suitable infrastructure, and the dangers of retrofitting older vehicles.⁴⁰ And still another argued that the solution to vehicular pollution problems is "sector reform" by eliminating subsidies that motivate adulteration of clean fuels with cheaper ones, for example.⁴¹

However, the evidence shows that fundamental reforms like removing subsidies for kerosene were not politically feasible, certainly not in a predictable timeframe. In any case, conditions in Delhi were far from ideal and not conducive to solutions that might have worked in more developed

countries. Research has demonstrated that Indian environmental regulators were fully aware of the many approaches that could have been taken to control vehicular pollution and had, in fact, tried a number of them. However, few of these efforts bore fruit. India had a particularly hard time mounting effective enforcement. In the end, it was this experience that pushed EPCA and the Court to the CNG solution.

Efforts to crack down on heavily polluting vehicles using inspections were undertaken sporadically for at least 15 years. There have been tough fines on the books since 1988, and at various times even stiffer penalties were threatened, including

Critics expressed publicly that the Court had made a substantial mistake on the issue.

impoundment and permanent confiscations of vehicles (following multiple offenses).

The Pollution Under Control (PUC) program illustrates the limitations of an approach designed for better in-use performance. The Central Pollution Control Board and the Ministry of Road Transport and Highways set up this program to identify the most heavily polluting vehicles, then require that they be repaired or retired. The difficulty is that PUC tests are

easily manipulated.⁴² And, it is arguably even easier and more straightforward simply to bribe the tester.⁴³

The Court and its advisors could turn to other fuel-policy experience to inform their policy deliberations. The experience removing lead from petrol and the introduction of premixed fuels demonstrated the need for simplicity in regulatory change. In both cases, while the technical challenges of making the change were easier to overcome than the decision to shift commercial vehicles to CNG technology, the effort to achieve them was nevertheless considerable. Lead was removed from gasoline by early 2000 under Court order. This was a success story but some problems were encountered that foreshadowed difficulties in introducing CNG into Delhi. At some stages, there were not enough filling stations pumping unleaded petrol to meet the growing consumer demand. This encouraged some motorists to disable their catalytic converters.⁴⁴

The second experience was the requirement that two-stroke engines use premixed fuel (petrol mixed with the proper 2 percent lubrication oil). The purpose of this was to reduce the problem of excess lubricant, which is highly polluting. Many two-stroke vehicle owners were adding as much as 5 percent oil—two-and-a-half times the appropriate amount—which caused significant pollution. Because two-stroke engines powered about two-thirds of Delhi's vehicle fleet in the mid-1990's, premix was an important reform.⁴⁵ This was not only a much easier change to make than the switch to CNG, it actually benefited vehicle owners: Excess use of oil causes deterioration of vehicle performance. Because the economics of introducing new technology were largely favorable and compliance with the program did not require vehicle owners to make a substantial investment, the change could be made without much friction.

The sticking point for the Supreme Court in the debate on clean fuels was pervasive fuel adulteration. As early as 1994, a survey concluded that highly subsidized and therefore cheaper kerosene was being used as a substitute for diesel. Adulteration is very hard to fight. It can take place at

many stages of the supply chain: at the refinery gates, during transport to retail outlets, at retail outlets, and by operators of diesel vehicles. Bus operators siphon off significant amounts of diesel—which they sell—and substitute kerosene to make up the difference.⁴⁶ The evidence before the Court and EPCA was that kerosene causes relatively little damage to diesel vehicles, and as a result, owners have no incentive not to use it (and every incentive to save money), even though it is harmful to the environment. EPCA also heard allegations that even worse adulterants such as waste solvents had been introduced into transport fuels.⁴⁷

The proponents of the more efficient multiple-fuel policy were never able to provide a cogent response to the adulteration question. This is ultimately why the Court chose CNG, a gaseous fuel that cannot be adulterated.

In the end, the experience with PUC and other attempts to regulate polluting vehicles demonstrated the shortcomings of policies that might have been more efficient under more ideal circumstances. It might have been more efficient to identify vehicles that were the worst polluters than to make a blanket judgment and ban all older models—but it is far easier to fake an emissions test than a vehicle's age. If increasingly clean fuels were put on the market, they might be a more efficient way of reducing particulate emissions—but there is simply no way to assure they would not be adulterated with kerosene, so long as kerosene subsidies remain in place.

Long-Term Impacts on Governance and Regulation

What are the long-term consequences when a court assumes the responsibility to sort out environmental protection options and force the government to implement its existing policies? On the one hand, it is not unusual for courts in Western democracies to hold government bodies accountable. Much of the U.S. Environmental Protection Agency's (EPA) regulatory agenda is set by mandatory duty lawsuits in which the federal courts put the government on a

schedule to achieve deadlines set in environmental laws. Like the Delhi litigation, these cases are generally brought by self-appointed public interest groups.

On the other hand, the Indian Supreme Court in this case did not merely take the government to task for its failures. Government experts essentially became advisors to the Court as it drove policy implementation forward. In contrast, the initial role of U.S. courts is to determine whether mandatory deadlines established in the law have been violated and to establish and oversee a schedule in which a federal agency makes progress toward meeting those deadlines. In the U.S. system, the court's next opportunity to examine the regulations comes after they have been



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fully promulgated and, even then, the standard of review is generally whether EPA has been arbitrary and capricious in its implementation of the relevant law.

In the Indian case, if society increasingly looks to the Court rather than to the government to make environmental policy decisions, it is necessary to ask if this is a good outcome. The reality in India seems to be that the bodies charged with environmental regulation lack the political will to effectively implement policies, no mat-

Vehicle emissions inspections in Delhi were found to be easily manipulated and therefore an unreliable means to reduce pollution.



Advocates hope that the actions of the Supreme Court will help to clean up the polluted air in Delhi—seen here obscuring a sunset over the city—and begin a new approach to environmental issues in India.

ter how well they have been thought out. They seem to lack regulatory self-confidence—or even much practice in the actual act of regulating.

One possible outcome is that the appropriate agencies of the Indian government will gain confidence from the Supreme Court's successes. In the fall 2003 Indian elections, numerous politicians, many of whom at various points fought the CNG decision, took public credit for Delhi's cleaner air. The entire experience could be a lesson that bold action to manage difficult pollution problems will be rewarded.

The existing environmental authorities in India might be encouraged not only to announce standards but also to enforce them. Today, India is considering whether to consolidate various EPCA-like committees and to form them into an EPA-like regulatory body. If this happens, and the new body is empowered to make and enforce real decisions, the Supreme Court's role will have been beneficial for India's long-term environmental regulation prospects.

The other, less optimistic possibility is analogous to using a crutch and letting

muscles atrophy. The regulatory muscles of the Delhi and central authorities have not been exercised directly. At each critical point, the Court stepped in and relieved the authorities of the burden of moving forward on their own steam. While the government did, at two important points, demonstrate its backbone by choosing not to overrule the Supreme Court in response to political pressure, it did not take affirmative actions to move events toward a successful regulatory conclusion.

Many believe that the Court acted with relative restraint even in its most dramatic and controversial decision, the order to shift public vehicles to a single fuel. It did not act precipitously, and it mostly relied on experts. Much of its effort involved pushing the government to implement already-announced policies that had lain dormant or had been deferred. Options were vetted by EPCA (and before that by the Saikia Committee). In this respect, the Court may have provided a model for a more conventional regulatory process. In addition, the success of the CNG program could invigorate regulatory bodies and give them confidence that the policies they developed were worth implementing. If this is the case, the net effects of the Court's actions will prove beneficial to the evolution of more mature regulatory institutions and processes.

However, although the Court relied largely on government analysis and existing policies as it made its CNG decision, it is not clear that this same discipline has continued into the most recent activities of the Court—including instances in which the Court has focused on very small details of policy implementation. Many such instances seem increasingly far afield of the original set of issues. For example, the Court seems ready to adjudicate issues such as CNG pricing and intercity transport. While these matters are indirectly related to the core issues before the Court, it can be argued that the legislative branch would more properly decide them. In fact, many Indians—including NGO advocates—have expressed such concerns. It is not hard to see how the Court could become a victim of its own success and push too hard on

issues that are really beyond its technical competence. And this is not a situation in which relying on the competence of the EPCA will necessarily remedy the basic inappropriateness of diverting these substantive decisions into a judicial body.

Lessons for Neighboring Countries

Much of the international attention to the Delhi experience has focused on the litigation and its outcome. Little, however, has been said about the surrounding institutions or the role of the government in its various facets, including committees such as EPCA. As a result, there are similar lawsuits in Bangladesh, Pakistan, Sri Lanka, and Nepal asking the courts to act where the government has not. Often, the Indian case is cited as legal precedent. In some of these cases, the country's highest court has issued orders, but such orders have been entirely or selectively ignored by the government or the public. When this has happened, lawyers and public interest organizations that have brought such cases are understandably frustrated and now seek alternatives. The Lahore High Court in Pakistan has established a quasi-judicial, EPCA-like committee to try to develop consensus on the outstanding issues.

Based on the evidence in India and in other countries, several factors are highly relevant to observers and would be extremely helpful to those who seek to emulate the Delhi experience.

First, a dependable decisionmaker must exist—a body that commands respect and has the requisite independence to order the necessary environmental reforms. In India, this was the Supreme Court. The Court enjoyed a unique status in Indian society, such that even very high-ranking political officials would think twice about resisting once the Court had clearly acted. The Indian Supreme Court was able to navigate Indian tradition and its legal and political culture and knew where the boundaries of its authority lay. Do analogous bodies exist in the other societies that are looking to the Indian experience? Many countries

around the world have a high court that enjoys this status. But not every country has independent courts: Judges in some nations are subservient to the political process and some even receive political training to assure that their results will be in line with official doctrine. In particular, some Asian countries have little experience functioning under a law-based society. In those places, some other body with the social and moral authority to act may need to take the lead.

It is also important to consider the general milieu in which the decision body works. India's government was unwilling

Countries should only consider environmental tools that are consistent with their prevailing technical and institutional realities.

to defy the Supreme Court at critical junctures. Perhaps officials recognized that to do so could damage the fragile foundations on which its democracy rests. Events that unfolded in the United States in the mid-1970s, during the final days of the Watergate crisis, may illustrate this point. On 24 July 1974, President Richard Nixon chose to turn over incriminating tapes rather than defy a unanimous Supreme Court order, despite

the fact that he commanded the armed forces and the Court had only a few, generally unarmed marshals. The issue at stake was not relative power but the basic foundations on which the society rested.

Perhaps in the Indian context, the importance of an independent judiciary was heightened by a strong sense of history. Indira Gandhi's emergency period, in which she tried to rein in the Courts and limit personal freedoms, is remembered many years later with bitterness. Indians take great pride in having the world's largest democracy. Where there is no similar tradition of an independent judiciary or a law-based society, a single case is unlikely to reverse history. Part of the challenge in such countries may be not only to bring these kinds of cases but also to educate judges and the public.

Second, countries should only consider environmental tools that are consistent with their prevailing technical and institutional realities. These realities include the strength and performance of existing enforcement procedures and whether there exists a culture of compliance. For example, it is possible to set performance standards in the United States where there is relatively consistent enforcement, transparency of emissions information, and many "eyes" to watch for potential offenders—including the prospect of citizen enforcement suits.

In India, an on-the-ground, realistic appraisal of the situation led EPCA and the Court to conclude that fuel adulteration was almost unavoidable. India has not had dependable environmental enforcement, in part because there are not many people assigned to such issues, and because the lower courts, to which most cases would be brought, are extremely slow to act.⁴⁸ Faced with this kind of pervasive temptation to cheat, it was reasonable to conclude that a performance standard was doomed to failure. EPCA and the Supreme Court took a realistic response to the facts.

Third, no court in any country acts in an institutional or political vacuum. Any country that seeks to replicate the Delhi process must understand how its judicial branch's actions fit into the larger milieu

of people and institutions. Are there other parts of government or society in general that support its activities or act as “watch-dogs” against official inaction or even intentional failure to implement the laws? Is there some level of transparency so that decisions cannot be sabotaged outside of public view? India has the advantage of a very open press and an independent NGO community. The Court’s decisions were reported in the press, and the government’s failures were also subject to lively comment. CSE could generate independent research and disseminate it, and its reports reached a wide audience. Indeed, CSE very adroitly fed its findings to the press, to assure that they would receive attention. Not all of India’s geopolitical neighbors enjoy all these factors.

Conclusion

Much as one would like to believe it possible, an expansive and far-reaching change in society—such as cleaning the air of Delhi or even the more limited but still daunting task of shifting commercial vehicles to CNG—cannot originate from a single body acting alone. Too many parts of society must play a role in the change and must acquiesce and change their own practices and habits.

The Supreme Court’s orders were successful at least in part because the Court seemed to be at the same time reflecting and driving a wider agreement within society that the air quality in Delhi was unacceptable. India had been through the searing experience of the 1984 Bhopal gas tragedy—in which an accidental release of toxic gas killed more than 8,000 people and may continue to affect people in the area today—which no politician could ignore. And India’s pollution was coming to the attention of the international community. Perhaps the

time was right for the Court to act. The question we cannot answer is why the time was not right for the government to act without Court interference. Nevertheless, Indians may hope that the experiences of recent years will embolden their elected government to fulfill its rightful role in protecting their environmental well being.

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NOTES

1. S.-Y. Tang, V. Prakash, and C.-P. Tang, “Local Enforcement of Pollution Control in Developing Countries: A Comparison of Guangzhou, Delhi, and Taipei,” *Journal of Public Policy* 18, no. 3 (1998): 272.

2. For Bangladesh, see *Farooque v. Government of Bangladesh* WP 300 of 1995 (1995.02); and for Pakistan, see *Dr. Amjad H. Bokhari v. Federation of Pakistan* (Constitutional Petition 45/2003).

3. C. Brandon and K. Homman, *The Cost of Inaction: Valuing the Economy-wide Cost of Environmental Degradation in India* (World Bank, 1995).

4. B. Sengupta, “Air Quality Improvement in National Capital Region Delhi, India—A Case Study,” presented at International Seminar, Better Air Quality—2003, held at Manila, Philippines, 17–19 December 2003.

5. Wendell Cox Consultancy, *Urban Transport Fact Book*, <http://www.publicpurpose.com/ut-intlut98.htm> (accessed 9 February 2004).

6. Each time a new charge of air plus fuel is loaded into the combustion chamber, part of it leaks out through the exhaust port. Smoke results from the combination of leaking hydrocarbons from the fresh fuel and leaking oil.

7. Sengupta, note 4 above.

8. The “Delhi Master Plan is part and parcel of the Act by which Delhi Development Authority [DDA] was created and land acquired compulsorily in Delhi over 40 years only for development according to Plan. Most accurately described as a document of citizens’ entitlements in benefits of balanced equitable and sustainable development, the Plan came into force in 1962, was revised in the ‘80s for 2001 and is now being revised for 2021. Plan revision modifies entitlements and the law protects them from being downsized in this process.” Master Plan Implementation Support Group, *Delhi Master Plan 2021 Minder*, <http://www.delhiscienceforum.org/dmp2021/main.htm> (accessed 4 January 2004). DDA has called the first Delhi Master Plan of 1962 the “first step toward modern planning in India.” The plan was designed as a twenty-year plan and was prepared with assistance from the Ford Foundation. The goal of the plan was the “integrated development of Delhi” and was developed per the Delhi Development Act of 1957. Delhi Development Authority, *Making of the Plan*, <http://ddadelhi.com/planning/mpd-2021.htm> (accessed 4 January 2004).

9. Center for Science and Environment (CSE) is a prominent Delhi environmental advocacy group. It has the advantage of size and a good funding base that allows it to do independent research. CSE also now has a lab for testing, which gives it an advantage in the policy debate. CSE is not a membership organization but it does significant public outreach through publications and its web site. It is adroit in how it provides information to the press.

10. Anumita Roychowdhury of CSE suggested that this report motivated the Court to act, and one observer, Anna Telestam, reported that Chief Justice Kuldip Singh promptly issued a suo moto order (an order issued on its own initiative rather than in response to a pleading or request) demanding that the Delhi government take action directly in response to the CSE report *Slow Murder*. A. Roychowdhury, CSE’s associate director for research and advocacy, in discussion with authors, New Delhi, 1 July 2003; and A. Telestam, “Environmental Politics in India—A Case Study of Air Pollution Policy in Delhi” (master’s thesis, University of Gothenburg, Department of Political Science, 18 January 2002). But in an interview, retired Chief Justice B. N. Kirpal (Kirpal was on the court at the time of the order but not yet chief justice) stated a belief that the suo moto order was entirely the Court’s initiative. B. N. Kirpal, retired Indian Supreme Court

Chief Justice, in discussion with the authors, New Delhi, 7 July 2003.

11. The Mass Rapid Transport System was eventually built and opened on 25 December 2002.

12. As of the writing of this paper, no bypass has yet been constructed.

13. The Saikia and Bhure Lal Committees were not the only way that the Court reached out for technical help. In 1995, the Court appointed Harish Salve the amicus curiae—a court-designated position that provides legal representation in Supreme Court cases to individuals and groups who don’t otherwise have counsel. In this case, the amicus curiae was a combination of special master and advisor to the justices. He collected and sorted out factual material and distilled from the numerous affidavits and other representations submitted to the Court a précis of their perspectives. At several critical junctures, Salve did factual research to debunk extravagant claims and otherwise played a central role in moving the case forward.

14. Harish Salve, amicus curiae, in discussion with the authors, New Delhi, 6 July 2003.

15. K. K. Gandhi, executive director of technology at Society of Indian Automobile Manufacturers (SIAM), in discussion with the authors, New Delhi, 3 July 2003.

16. The most prominent example in which the justices did not was the registration of diesel-fueled private vehicles. The Environment Pollution (Prevention and Control) Authority (EPCA) recommended that private diesel cars should not be registered and that the Supreme Court should freeze sales of diesel cars. Lawyers for the auto industry strenuously opposed this. Instead of following EPCA recommendation, the Court ordered that all private cars must conform to engine standards by new, tighter deadlines. Both sides declared victory.

17. On 2 June 1999, the Delhi government’s chief secretary, Naresh Saigal, announced that his government would meet the deadlines set by the Supreme Court. He announced that all Delhi Transport Corporation (DTC) buses plying in the capital would be converted to compressed natural gas (CNG) by 31 March 2001 and that the Delhi government was planning to allow 2,500 new CNG buses owned by big transport operators to ply in Delhi. He also said that only CNG three-wheelers would be allowed to ply in Delhi after 31 March 2000, but added that new three-wheelers would be given an additional year for the changeover. “DTC Buses to Be CNG-Driven by 2001,” *The Observer of Business and Politics*, 2 June 1999.

18. In a written reply to Lok Sabha, the Minister of State for Environment and Forests said that by 31 March 2001—as directed by the Supreme Court—DTC and private buses would be converted to CNG and all pre-1990 autos and taxis in Delhi would be replaced with new vehicles using clean fuels. He added that buses over 8 years old would only ply on CNG or “other clean fuels” by April 2000. “DTC, Private Buses Will Run on CNG by March 31, 2001,” *Asian Age*, 9 March 1999.

19. Private bus operators urged the Delhi government to “apprise” the Supreme Court about its failure to find “durable and authenticated CNG conversion technology.” Delhi government leader Sheila Dixit supported this assertion: “The conversion of the existing diesel buses was not possible as the technology to convert was neither authenticated nor fully certified by competent authorities.” There were also complaints that CNG buses were almost double the price of diesel buses and that there were not enough CNG filling stations in the capital. “Operators Plead Helplessness in Meeting CNG Deadline,” *The Hindu—Delhi*, 19 January 2001.

20. “CNG Technology Is neither Tested nor Trusted,” *Times of India—Delhi*, 26 February 2001.

21. “Supreme Court Seeks Status Report on CNG

Issue,” *The Hindu—Delhi*, 1 February 2001.

22. In March 2001, Indraprasth Gas, Ltd. (IGL) assured the Supreme Court and the Delhi government that there was enough gas to meet the growing demand of the transport sector. See Telestam, note 10 above.

23. The order was on 16 February 2001. See “Manufactured Chaos,” *Down To Earth*, 30 April 2001.

24. Writ Petition order dated 26 March 2001. For example, because DTC had placed orders for 1,880 new CNG buses, it was allowed to operate that many diesel buses until either the orders were filled or 30 September, whichever came first. See “Key Points of the March 26 Ruling,” *Down To Earth*, 30 April 2001.

25. Additional Solicitor General Kirit Rawal made these representations.

26. *Down To Earth*, note 23 above.

27. “Sabotage,” *Down To Earth*, 30 September 2001. In response to pleas for a more precise definition of “clean fuel” (mostly from the Ministry of Petroleum and Natural Gas (MoPNG); see *Down To Earth*, this note), the Supreme Court asked EPCA to collect various opinions and determine whether other fuels, particularly low (0.05 percent) and ultralow (0.001 percent) sulfur diesel, could be considered in addition to CNG for vehicles (Writ Petition order dated 26 March 2001).

28. *Down To Earth*, note 23 above.

29. K. Mathur, “Battling for a Clean Environment: Supreme Court, Think Tanks and Populist Politics in Delhi,” draft paper, 2002 (on file with authors).

30. “Dead End for Diesel Buses,” *Down To Earth*, 30 April 2002.

31. According to the Penn World Table, the exchange rate in 1998 (last year of data in this iteration) was around 42 rupees per U.S. dollar, but purchasing power parity-adjusted, it was about half that. See A. Heston, R. Summers and B. Aten, *Penn World Table Version 6.1* (Center for International Comparisons at the University of Pennsylvania, October 2002), <http://www.bized.ac.uk/cgi-bin/penndataadb/pennchart.pl>.

32. Sindhusree Khullar, Delhi Transport’s principal secretary and commissioner of transport, in discussion with authors, Delhi, 4 July 2003.

33. For example, the ninth progress report of the Environment Pollution (Prevention and Control) Authority (EPCA), covering July–September 2000, indicates that Anil Agarwal from CSE suggested that EPCA hold a meeting with various nongovernmental organizations to elicit their comments and suggestions on how to improve environmental quality in Delhi. A representative from The Energy Research Institute (TERI), and Dinesh Mohan, the transportation expert from Delhi’s Indian Institute of Technology, attended this meeting, which was held on 30 September 2000.

34. There is some merit to the bus operator’s contentions. They were forced to make a big investment, and the scrap value of their buses declined when they moved to CNG technology. (They sell old buses in other parts of India that are not currently required to use CNG.) On the other hand, now that the changes have been made, they are strong advocates for staying the course.

35. See note 13 above.

36. *Down To Earth*, note 27 above.

37. “Delhi Suffers as Transporters Strike Work,” *Rediff on the Net*, 28 August 2001, <http://www.rediff.com/news/2001/aug/28del.htm> (accessed 6 February 2004).

38. Resources for the Future, *Timeline*, 30 August 2001, <http://www.rff.org>. See Times News Network, “Panel Planned to Frame Auto Fuels Policy,” *Times of India—New Delhi*, 31 August 2001.

39. M. Kojima, “Leapfrogging Technology,” *World*

Bank Private Sector and Infrastructure Network, Public Policy for the Private Sector series, Note Number 254, February 2003. “. . . many policymakers and environmental groups . . . conclude that the technical solutions are the best way to get around the culture of noncompliance. But the same problems that have led to heavy pollution by conventional gasoline- and diesel-fueled vehicles would probably also condemn state-of-the-art control technology to failure.” Similar sentiments seem to have been expressed by World Bank experts in a December 2001 meeting in Delhi on CNG adoption; see Lalit K. Jha, “CNG Experiment Bound to Fail: World Bank,” *The Hindu—Delhi*, 13 December 2001.

40. “International Experience with CNG Vehicles,” *World Bank South Asia Urban Air Quality Management Briefing Note no. 2*, October 2001, accessible via <http://www.worldbank.org/sarurbanair>.

41. Kojima, note 39 above, page 4.

42. R. Tharby, “Making Vehicle Emissions Inspection Effective—Learning from Experience in India,” *World Bank South Asia Urban Air Quality Management Briefing Note no. 9*, July 2002, accessible via <http://www.worldbank.org/sarurbanair>. Petrol-fueled vehicles can be tuned to pass the test by firing “lean and late”, and then returned to their previous settings for regular use. Diesel vehicles are more likely to pass the test if the simulated conditions of acceleration under which they are performed are reduced. See R. Tharby, “Catching Gasoline and Diesel Adulteration,” *World Bank South Asia Urban Air Quality Management Briefing Note no. 7*, July 2002, accessible via <http://www.worldbank.org/sarurbanair>.

43. Writing for the World Bank, technology consultant Ronald Tharby reported that “Technicians can . . . record numbers . . . without turning the analyzer on. For the small percentage of vehicles that have a current PUC certificate, this is believed to be one of the principal means of obtaining it.” It is difficult to disagree with Delhi Administration Transport Minister Rajendra Gupta’s characterization that the program has failed “miserably.” Ibid; and “Now Laser to Measure Pollution Emission,” *Statesman—New Delhi*, 28 April 1998.

44. “Motorists Get Stuck as Green Pumps Run Dry,” *Indian Express—New Delhi*, 13 October 1995.

45. The Ministry of Environment and Forests (MoEF) white paper reported that “. . . in some instances the levels [of pollutants emitted by two-stroke engines] are so high they go beyond the measurable scale of test instruments.” Ibid, page 7. Also see EPCA, *Third Report on Monitoring and Priority Measures Proposed by the Authority for Air Pollution Control* (New Delhi: EPCA, 1998), 1–7.

46. A. Roychowdhury and C. Shah, “Overhaul!” *Down To Earth*, 15 November 2003, 30–40.

47. S. Sinha, “Capital Gasps as Impurities are Added to Fuel,” *Times of India—Delhi*, 10 December 2001; M. Kumar, “Petrol Adulteration Thrives in Capital,” *Hindustan Times—Delhi*, 8 February 1999; and Tharby, note 42 above.

48. Salve, note 14 above.

Correction

Jill Jäger should have been identified as the author of the Books of Note notice of *Taking Sustainable Cities Seriously* on page 45 of the March 2004 issue, rather than Sylvia Karlsson. *Environment* regrets the error.