Cleansing of Environment and Energy Pricing -An Example in India

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1. Introduction

(1) Many of Asian developing countries have curbed, or still curb, domestic energy prices at low levels through subsidization and the like in an attempt to stabilize the people's livelihood or protect local industries.

(2) India is a typical example. Since 1991 India has shifted from the postwar socialist economic development line to a market liberalization line, under which mainly corrected has been the low energy price policy designed to help stabilize national life.

(3) Yet, the subsidy system still remains, which precipitated inefficient energy use and environmental pollution.

(4) From now on, whether India could further slash, or even scrap, energy subsidies or not will become the key to environmental cleansing.

2. Energy subsidization and its removal effects

IEA reported in a 1999 study as follows:

(1) In 1998 India's weighted-average electricity price stayed about 14.2% below the reference price at which supply costs and fair returns were recoverable.

(2) Removal of subsidies, if realized, could reduce primary energy supply by 14% in value and trim CO_2 emissions by about 14%.

(3) In fiscal terms, to scrap subsidization means to delete $8.6 billion (356 billion rupees), equivalent to some 15% of government spending. Of the present $8.6-billion subsidies, 52.6% goes to cooking kerosene, and 31.6% to LPG. Steaming and coking coals are sold cheaper by 13.1% and 42.3%, each, than their adequate reference prices.

(4) Removing subsidies could discourage energy use, thus contributing to energy security and environmental cleansing.

(5) Resultant energy savings are estimated at 33 million tons oil equivalent, with industrial steaming coal (responsible for 21.3% of the saved amount) and residential kerosene (13.3%) as the centerpieces.

3. Electric Power

(1) India's electricity consumption grew 7.4% per annum in 28 years, 1971-1999. Given a 4.9% growth of real GDP over the same period, electricity elasticity to GDP was as large as 1.51, which looked particularly striking when compared with China's 0.95, Japan's 1.12, and America's 0.94 recorded in the identical period.

Table 1 Trends of GDP in India, China, Japan and USA

Billion US Dollars in 1995

	1971	1980	1990	1999
India	122	161	284	463
China	104	164	396	964
Japan	2187	3232	4782	5356
USA	3597	4767	6525	8582
	1971-1999	1971-1980	1980-1990	1990-1999
India	4.9	3.1	5.8	5.6
China	8.3	5.2	9.2	10.4
Japan	3.3	4.4	4.0	1.3
USA	3.2	3.2	3.2	3.1

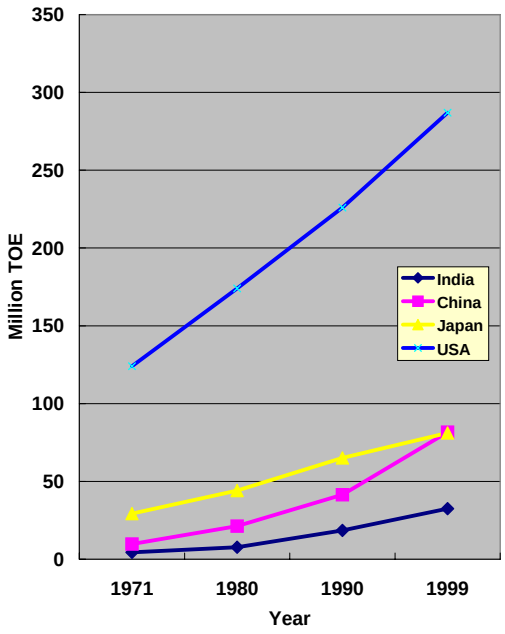
(Source: World Bank)

Table 2 Trends of Electricity Consumption in India(China, Japan and USA)

Million TOE	1971	1980	1990	1999
India	4.42	7.68	18.5	32.5
China	9.82	21.3	41.4	81.7
Japan	29.3	44.1	65.1	81.1
USA	124	174	226	287.0
%/Year	1971-1999	1971-1980	1980-1990	1990-1999
India	7.4	6.3	9.2	6.5
China	7.9	9.0	6.9	7.8
Japan	3.7	4.6	4.0	2.5
USA	3.0	3.8	2.6	2.7

(Source: IEA)

Fig. 1 Trends of Electric Consumption in India (China, Japan and USA)



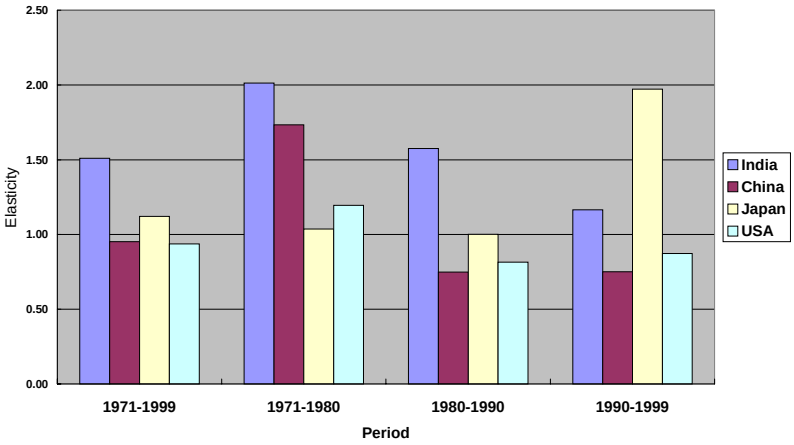
(Source: Table 2)

Table 3 Elasticity of Electricity Consumption Against

	1971-1999	1971-1980	1980-1990	1990-1999
India	1.51	2.01	1.58	1.16
China	0.95	1.73	0.75	0.75
Japan	1.12	1.04	1.00	1.97
USA	0.94	1.20	0.82	0.87

(Source: Table 1 and Table 2)

Fig.2 Elasticity of Electricity Consumption against GDP



(Source: Table 3)

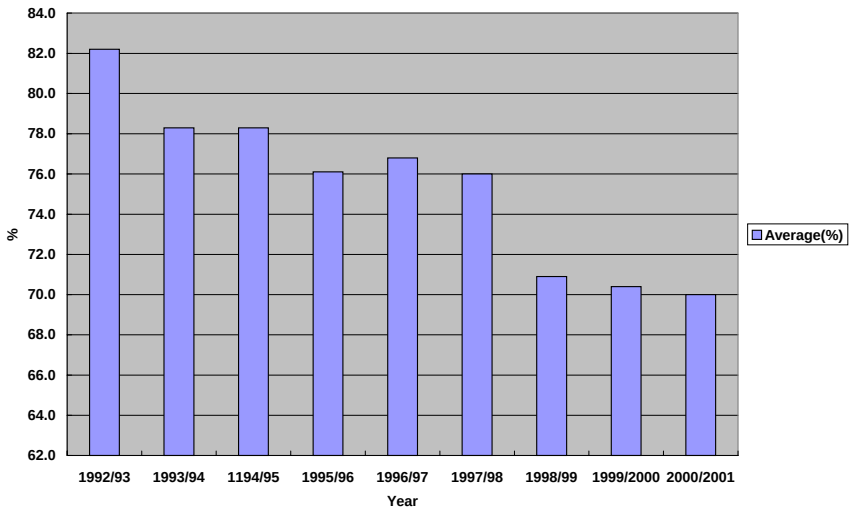
(2) This outcome may reflect a price effect of electricity prices kept artificially low by such means as subsidization. Indeed, the Indian electricity price has remained below the electricity supply cost by around 22% during the first half of the 1990s and by 30% in the second half of the same decade, both on national average. Conversely speaking, the supply cost recovery rate remained as low as around 78% and 70% in the first and second half of the 1990s, respectively.

Table 4 Sales revenue as a ratio of cost(%):1992/93 to 2000/01 (Electric Power)

	1992/93	1993/94	1194/95	1995/96	1996/97
Average(%)	82.2	78.3	78.3	76.1	76.8
	1997/98	1998/99	1999/2000	2000/2001	
Average(%)	76.0	70.9	70.4	70.0	

(Source: Planning Commission 2001 (TEDDY))

Fig. 3 Sales Revenue as a Ratio of Cost (%): 1992/93 to 2000/01(Electric Power)



(Source: Table 4)

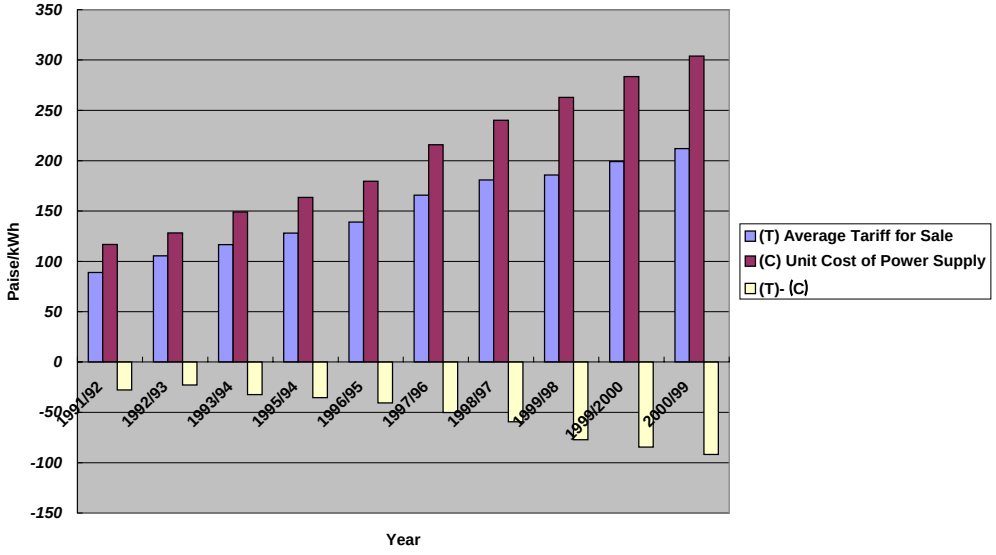
Table 5 Gap Between Average Tariff for Sale of Electricity and Unit Cost of Power Supply in India

paise/kWh

	1991/92	1992/93	1993/94	1995/94	1996/95
(T) Average Tariff for Sale	89.06	105.4	116.7	128	139
(C) Unit Cost of Power Supply	116.8	128.15	149.12	163.4	179.6
(T)- (C)	-27.74	-22.75	-32.42	-35.4	-40.6
(T-C)/ (C) %	-23.8	-17.8	-21.7	-21.7	-22.6
	1997/96	1998/97	1999/98	1999/2000	2000/99
(T) Average Tariff for Sale	165.74	180.85	185.75	199.13	212
(C) Unit Cost of Power Supply	215.78	240.2	262.93	283.67	303.86
(T)- (C)	-50.04	-59.35	-77.18	-84.54	-91.86
(T-C)/ (C) %	-23.2	-24.7	-29.4	-29.8	-30.2

(Source: Planning Commission 2001 (TEDDY))

Fig.4 Tariff and Cost of Electric Power



(Source: Table 5)

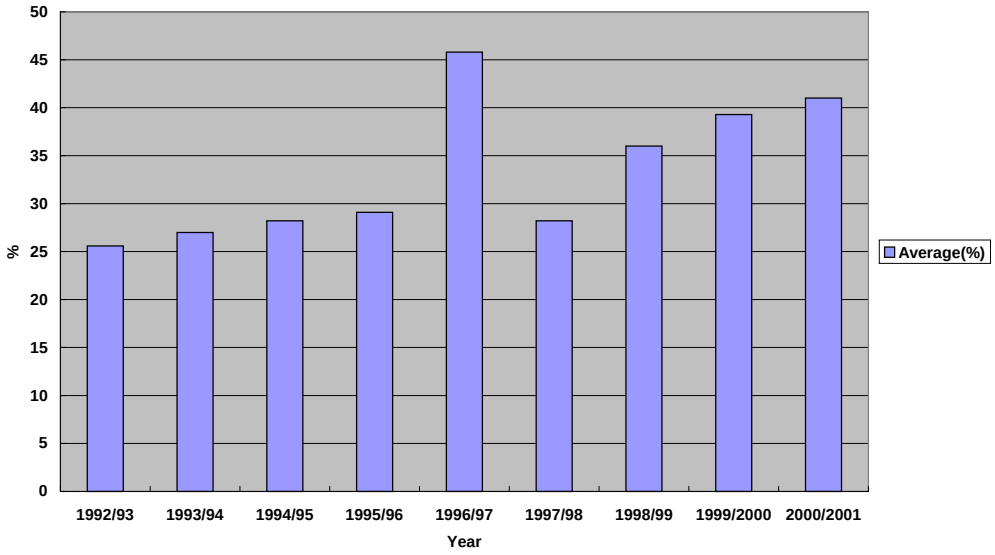
Table 6 Subsidy to Sales Revenue Ratio (With Cross-Subsidization) (%)

: 1992/93 to 2000/01 (Electric Power)

	1992/93	1993/94	1994/95	1995/96	1996/97
Average(%)	25.6	27.0	28.2	29.1	45.8
	1997/98	1998/99	1999/2000	2000/2001	
Average(%)	28.2	36.0	39.3	41.0	

(Source: Planning Commission 2001 (TEDDY))

Fig.5 Average(%) of Subsidy to Sales Revenue Ratio (Electric Power)



(Source: Table 5)

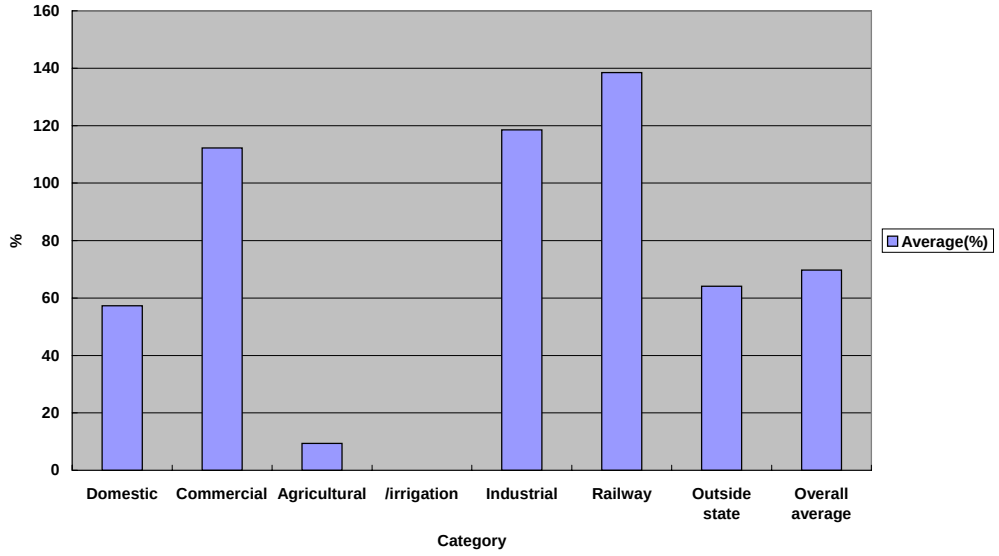
(3) While outrunning 100% for commercial, industrial and railway uses, etc., the cost recovery rate stands at 60%-short for residential use and fails to reach even 10% for agricultural/irrigation use.

Table 7 % of Unit Cost of Supply Recovered from the Consumer Tariff by Category:1999/2000 (Electric Power)

	Domestic	Commercial	Agricultural	/irrigation
Average(%)	57.33	112.29	9.35	
	Industrial	Railway	Outside state	Overall average
Average(%)	118.54	138.48	64.11	69.77

(Source: Planning Commission 2001 (TEDDY))

Fig. 6 % of Unit Cost of Supply Recovered from the Consumer Tariff by Category 999/2000 (Electric Power)



(Source: Table 7)

Table 8 Consumer Category wise Average Tariff of Electricity: 2000/01

Paise/kWh

	Domestic	Commercial	Agriculture/Irrigation	
Average	174.2	341.2	28.4	
	Industrial	Railway	Outside state	Overall Average
Average	360.2	420.8	194.8	212

(Source: Planning Commission 2001 (TEDDY))

(4) Given that the poor outcome stems largely from political factors, typically stabilization of the people's livelihood, to normalize the electricity pricing level or system won't be easy.

4. Petroleum Products

(1) Even now India's residential energy consumption is composed largely of traditional biomass (e.g. cattle's feces and urine, firewood, agricultural wastes etc.). Yet, in urban areas, LPG and kerosene consumption has been on the considerable rise especially in cooking and lighting uses.

(2) In 1980 – 1997, LPG has been up 14.6% and kerosene up 5.3% yearly. Subsidies are offered to cover 48.2% of LPG import prices as late as 2000. Kerosene is subsidized as well.

Table 9 All-India Estimates of Commercial Energy Consumption in the Domestic Sector: (1998/81 to March 1997)

	1980/81	1990/91	1995/96	1997
LPG				
(million tonnes)	0.33	1.89	3.09	3.36
Kerosene				
(million tonnes)	3.38	6.74	7.49	8.1
	1980-90	1990－95	1995-97	1980-97
LPG				
(%/Year)	19.1	10.3	4.3	14.6
Kerosene				
(%/Year)	7.1	2.1	4.0	5.3

(Source: MoPNG, 1997 (TEDDY))

Table 10 High-speed Diesel Consumption in Transport: 1990/91-1999/2000

thousand tones, %/ year

1990/91	1992/93	1994/95	1996/97
18813	21726	24742	30357
1997/98	1998/99	1999/2000	1990-99
311106	32098	33703	6.7

(Source: MoPNG, 2001 (TEDDY))

(3) An overwhelming portion of Indian road vehicles is diesel cars. Riding on motorization waves, diesel consumption increased nearly 7%/year in 1990 – 2000. Diesel is priced cheaper due to subsidy than rivaling products, which should have grave impacts on environment, particularly air pollution.

Table11 Estimated subsidy LPG on based on May 2000 price

LPG (Rs/cylinder)

Ex-storage	point price				154.01
Import parity price based on ex-storaged point price					297.09
Subsidy					143.08
Subsidy(%)	of the Import Parity Price				48.16%

(Source: MoPNG, 2001 (TEDDY))

5. Conclusion

Removing subsidies could improve energy efficiency, thus contributing to environmental cleansing. although it would not be so easy due to political and social reasons.

(This article was presented at the Quadripartite Seminar on Clear Air for Asia, 29 April – 1 May 2002, New Delhi.)

(Quadripartite: India, China, Japan and U.S, The Center for Energy Policy Promotion / CEPP represents Japan.)

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