





ASIA: Major trends (1980-1997)

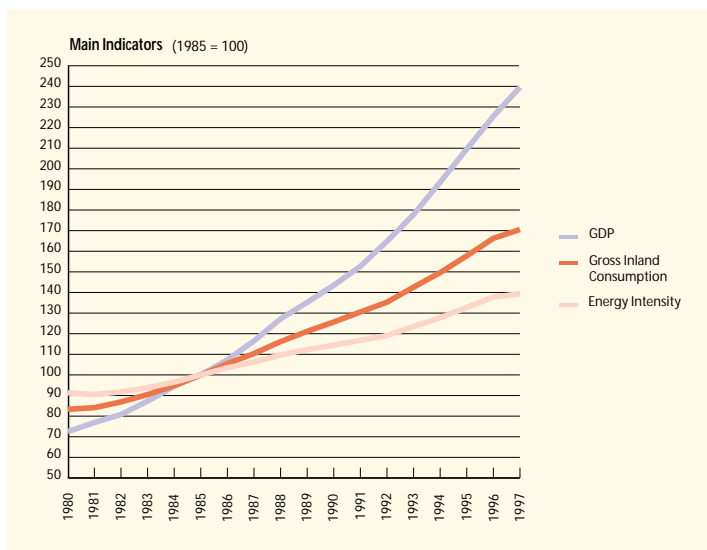
- Since 1990 GDP has grown by 7.3% per year on average, and population by only 1.5%...
- ... but the financial crisis, commencing in mid-1997 will slow down growth in the near future
- Final energy demand, still dominated by biomass and solid fuels, increased on average by 3.5% per year since 1980
- Growth in the transport sector is the driving force in the growth of final energy consumption
- Electricity and oil demand are both highly income-elastic
- The share of solid fuels in gross inland energy consumption grew to reach 40% in 1997
- Primary energy requirements were based on indigenous energy sources, with the exception of oil
- Asia represented 21% of world fossil fuel reserves, principally solid fuels
- Electricity generation is largely dominated by solid fuels, locally available at low cost
- Rapid expansion of generation capacity argues in favour of foreign investment ...
- ... even if the financial crisis has delayed many planned projects
- Asia remained the most dynamic market world-wide for power generation from renewables
- Large refinery expansion programmes to meet increasing domestic oil products demand
- Energy intensity has improved by 2.8% per year since 1980, mainly driven by China
- Energy consumption per capita reached only 20% of the European Union level
- CO₂ emissions increased by 45% since 1990
- The contributions of the power sector and industry, roughly the same in 1996, reached 67% of total CO₂ emissions
- Increasing energy dependency, mainly related to oil imports from the Middle East

Since 1990 GDP has grown by 7.3% per year on average, and population by only 1.5%...

Asia is the largest world region, characterised by a population that grew by 1.8% per year on average during the 1980's but by only 1.5% on average since 1990. This is as a result of the sharp reduction in the Chinese population growth rate. GDP growth has been 7.3% per year on average since 1980 even though the Asian financial crisis slowed down growth in some East Asian countries in 1997. Despite this sustained evolution, the region is still characterised by a rather low level of economic development (GDP per capita in 1997 was 23 times lower than the European Union average). However, the four NICs (Hong Kong, Singapore, South Korea and Taiwan) enjoyed a GDP per capita only 45% below the European average in 1997.

...but the financial crisis initiated in mid-97 will slow down growth in the near future

The severe pressure on foreign exchange markets in many East Asian countries has accentuated internal financial strains (increasing interest rate and depressed equity markets) and constrained economic activity (adverse terms of trade, declines in private sector net worth, increases in the cost of capital and major credit limitations). The countries most affected by the economic crisis that originated in Asia in mid-97 (Thailand, Malaysia, South Korea, Indonesia and the Philippines) have undertaken various economic policies to restore economic growth, and there have been some positive signs that their economies are beginning to turn



ASIA : GDP/CAPITA (THOUSAND 1990 EUR/INHABITANT)

	1980	1985	1990	1994	1995	1996	1997(1)
ASIA	0.27	0.34	0.45	0.57	0.61	0.64	0.67
China	0.12	0.18	0.25	0.38	0.41	0.45	0.48
India	0.19	0.23	0.28	0.31	0.32	0.34	0.35
NICs	3.01	3.95	5.83	7.30	7.76	8.16	8.56
Other	0.20	0.25	0.31	0.40	0.42	0.45	0.47
European Union	11.81	12.76	14.58	14.96	15.27	15.48	15.85

(1) Estimates

around rapidly. China and India have also been affected by the crisis, although by not nearly as much. The main impact could be a

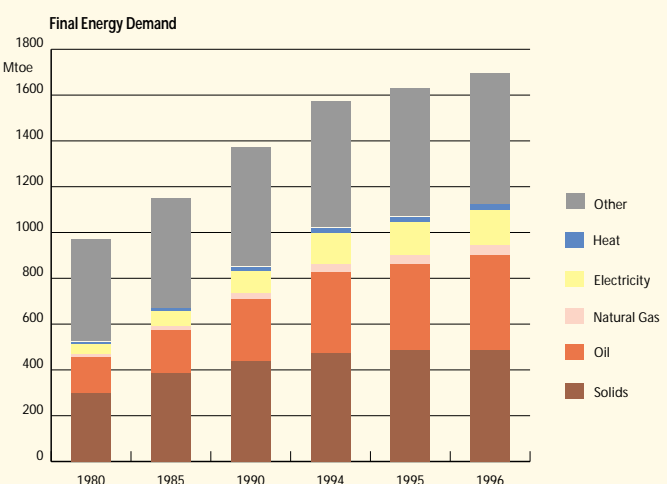


reduction of foreign investment. Early 1998, this financial crisis spread to some Latin America countries and to many countries in transition, especially Russia, with severe impacts in the latter. The impact of the financial difficulties in the East Asian countries began to affect the energy markets, and particularly the oil market, towards the end of 1997 and carried over into the first half of 1998.

ENERGY OUTLOOK

Final energy demand, still dominated by biomass and solid fuel, increased on average by 3.5% per year since 1980...

Sustained by the strong economic growth, **final energy demand** increased steadily by 3.5% per year on average, or less than 50% of the GDP growth rate. Biomass still remained the largest single component of final energy demand even though its contribution has been declining continuously from 46% in 1980 to 34% in 1996. Biomass consumption was concentrated in three major countries: China (207 Mtoe), India (201 Mtoe) and Indonesia (45 Mtoe). Despite a continuous slowing down of growth, solid fuel remained the second component, its share declining from 34% in 1985 to only 29% in 1996. Demand for other fuels has been increasing since 1985 in line with GDP: natural gas at 6.5% per year on average, oil at 7.5%, distributed heat at 8.3% and electricity at 8.5%. Consequently, incremental demand since 1990 was satisfied mainly by oil products (44% of the overall increment), followed by electricity (18%), biomass (16%), solid fuels (15%), gas (4%) and derived heat (2%). China accounted for about 48% of the total regional final energy demand in 1995 but only 37% of incremental demand since 1990, followed by India with 21% (19% of incremental demand) and the NICs with only 10% (but 21% of incremental demand).



Main items

In recent years, Asia has been the main engine of the global economy. Growth in some countries faltered following the economic crisis which unfolded progressively from mid 1997 and affected East Asia in particular. The crisis, based upon large-scale movement of funds and especially upon poor financial supervision, led to currency depreciation, liquidity shortages, falling incomes and rising unemployment. In turn, this led to social unrest but has stimulated some restructuring of financial systems and reform of corporate governance. Chiefly for other reasons, Japan is experiencing its worst and most prolonged recession since 1945. The other giant regional economies, China and India - comprising nearly 38% of the global population - were largely unaffected, though falling intra-regional trade has imposed some second-round effects upon their economies. Within much of the region the progress towards market-based economies remains slow - with heavy state regulation and energy prices often set far below costs, particularly for oil products and electricity. These factors have stimulated energy demand but also reduced investment resources leading to financing difficulties and to cancellation or deferral of some projects, especially in the power sector. Biomass and coal dominate the energy balances of China and India. Elsewhere energy use is somewhat more diversified and gas demand has grown strongly since 1990. After a period of sustained and rapid growth, regional oil demand has slackened recently, leading to lower international oil prices. But, given growth in overall fossil fuel demand, CO₂ emissions are rising rapidly and becoming a significant component of incremental global emissions - a trend likely to continue.

Growth in the transport sector is the driving force in the growth of final energy consumption...

Increasing business and industrial activity, combined with increasing household incomes and growing urban populations, have led to a rising demand for transport across Asia even if the transportation sector is still underdeveloped in China and India. Road transport in particular remained limited in these countries both for freight haulage and for personal travel, but is likely to develop rapidly in the future. Passenger car ownership rates differ substantially among the Asian countries. South Korea has a passenger car density of 132 cars per 1000 inhabitants, both China and India have rates of approximately 3 to 4 cars per 1000 inhabitants. In 1995 new car registration grew by almost 40% in China, India and Malaysia. About 50% of the increase in oil demand since 1990



has been accounted for by the transport sector, the energy consumption of which grew by about 7.6% per year since 1990.

Energy demand growth by the industrial sector resulted from the region's strong economic performance. In most countries, the industrial sector continued to be dominated by coal but significant increases in oil and gas demand occurred especially in East Asian countries. Energy-intensive industries, such as iron and steel, chemicals, cement and pulp and paper, accounted for 50% to 80% of final industrial energy demand. As a consequence of the rapid expansion of the basic chemical industry, the consumption related to non-energy uses, mainly petrochemical feedstocks, exploded between 1990 and 1996, multiplying by 2.7 to reach 90 Mtoe. This recent development accelerated oil product consumption.

Electricity and oil demands were highly income-elastic...

The share of the tertiary-domestic sector in final energy consumption declined from 58% in 1980 to 48% in 1996 given growth of both the transport sector (from 8% to 13%) and industry (from 34% to 39%). In the domestic-tertiary sector, the consumption of non-commercial biomass energy is far larger in absolute terms than the consumption of commercial energy: biomass accounted for 74% of this sector's energy consumption in 1980 and still for 64% in 1996. This consumption was mainly located in China and South Asia (India, Pakistan and Bangladesh). Though solid fuel remained the second contributor, major increases occurred for electricity (+9.9% per year on average since 1980) and oil products (+6.0%). The demand for the latter, and for natural gas where available, was highly income-elastic. Household income, combined with the development of services, is expected to continue to be the major determinant of both the amount of energy consumed and the choice of fuel used. Demographic trends, such as urbanisation, also affect the development of the energy use levels in the tertiary-domestic sector.

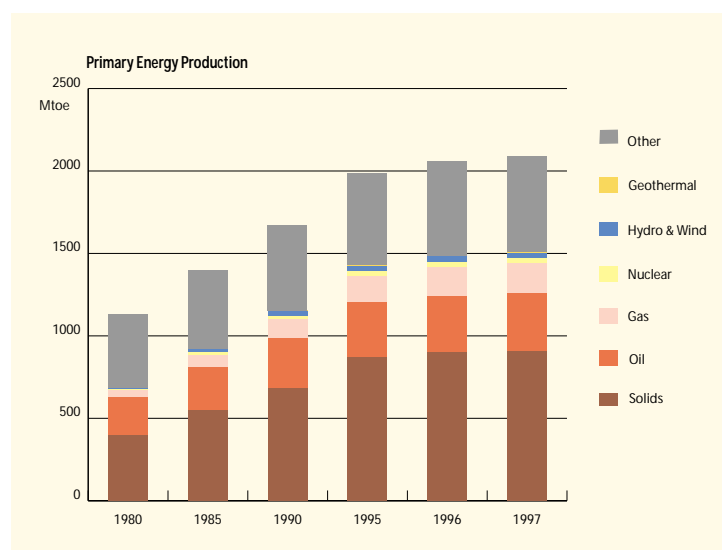
The sustained growth in electricity demand reflects the very low level of consumption per capita (750 kWh compared to 6460 kWh in the European Union). In industry, still its primary market, the share of electricity grew from 9% in 1980 to 13.5% in 1996. This rapid expansion was partly due to a shift toward less labour-intensive activities and the increased penetration of electric technologies such as arc furnaces in iron and steel production. In the tertiary-domestic sector, a rapid increase in ownership of electrical appliances and the continuing electrification of rural areas have both contributed to the high growth of electricity demand.

Share of solid fuels in gross inland energy consumption increased to reach 40% in 1997...

Gross inland energy consumption has been growing in the period 1980-1997 by about 4.3% per year on average with all primary fuels contributing. Coal remained the dominant fuel in the region, bolstered by the strong growth in China and India, although it has the lowest growth rate of the three major fossil fuels. The contribution of coal was particularly important in China where its share in gross inland energy consumption reached 61% in 1996, increasing from 51% in 1980. Even if its growth rate was limited to 1.6% per year on average since 1980, biomass remains the second main contributor, mainly in China and South Asia, at a level comparable with oil. The NICs and South East Asian countries rely most heavily upon oil although natural gas consumption in some of these countries has been growing at an explosive rate. Nuclear energy developed rapidly in the 1980's (growing over 20% per year on average) but stabilised in the early 1990's before new plants were developed in China and South Korea since 1993. In 1997 each primary fuel contributed to the gross inland consumption as follows: solid fuels with 40% (36% in 1980), biomass with 25% (39% in 1980), oil with 26% (21% in 1980); natural gas with 6% (2% in 1980), nuclear with 2% (almost nil in 1980) and hydro with 1% (as in 1980).

Primary energy requirements were based on indigenous sources, with the exception of oil...

Primary energy production in Asia evolved on the basis of indigenous energy sources, with the exception of oil which has led to growing oil imports since 1985. Primary production was largely dominated by solid fuels with 43% of total production in 1997 (35% in 1980). China and India represented about 78% and 15%





of the total region's production respectively in 1997 due to their reserves (11% of total world reserves for China and 7% for India). The share of biomass decreased substantially from 39% in 1980 to 28% in 1997, as biomass production increased on average by 1.6% per year since 1980 while total primary energy production increased by 3.7% per year. The major biomass producers in 1997 were China (208 Mtoe), India (205 Mtoe), Indonesia (45 Mtoe), Pakistan (23 Mtoe) and Thailand (23 Mtoe). Since 1990, however, stable production in China means that biomass production has increased more rapidly in other countries, except in the NICs where its use remained negligible. The share of oil decreased from 20% in 1980 to 17% in 1997 with a growth rate slowing down progressively since the beginning of the 1990's. China was the biggest oil producer in 1997 (161 Mtoe) followed by Indonesia (78 Mtoe), Malaysia (40 Mtoe) and India (36 Mtoe); together these four countries account for 90% of the region's oil production. Oil producers in Far East Asia are beginning to reap the benefits of enhanced exploration and extraction technologies. A significant increase in output potential is projected at the turn of the century for many countries (India, deepwater offshore fields in the Philippines, Vietnam, Malaysia, Papua New Guinea...). Natural gas production increased continuously in the period by 8.6% per year on average since 1980, to reach 181 Mtoe in 1997 or about half that of crude oil production. Indonesia (64 Mtoe), Malaysia (33 Mtoe), China (21 Mtoe) and India (21 Mtoe) were the four main sources of this increase. The 1997 financial crisis resulted in delays to many energy projects in developing Asia. Nevertheless many natural gas projects in this part of the world are proceeding, some of them benefiting from hydroelectric project postponement. Nuclear energy production was dominated by the NICs which accounted for 93% of total nuclear energy in 1990 but only 82% in 1997 due to the commissioning of more nuclear plants in China since 1993.

Asia represented 21% of the world's fossil fuel reserves, principally solid fuels...

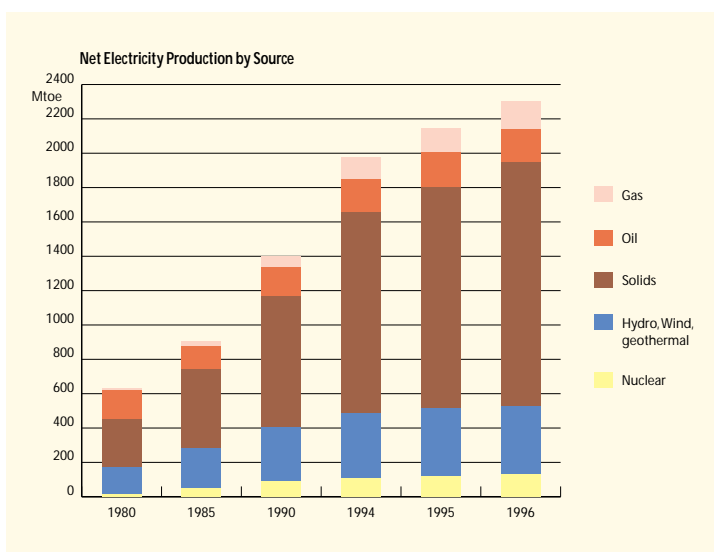
In late 1997, Asian oil reserves amounted to about 3.8% of world reserves, mostly (2.3%) located in China. The oil reserves/production ratio was only 15.6 years, significantly below the world average. The situation for gas reserves was more comfortable, with about 5.9% of world reserves and a reserves/production ratio close to 38 years. Finally, coal reserves, mainly located in China (11%), India (6.8%) and Indonesia (3.1%), accounted for only 21.3% of world reserves. As a result of this, Asia represented 16.3% of total world fossil fuel reserves.

Electricity generation largely dominated by solid fuels, locally available at low cost...

Electricity generation in Asia grew steadily by 8.4% per year over the period 1980-1996, though this growth rate slowed down progressively. Thermal generation dominated electricity production (78% in 1996) with nuclear and hydro accounting for 6% and 16% of total generation respectively. Solid fuels, which are widely produced around the region at low cost, dominated thermal generation of electricity. In 1996, solid fuels accounted for 79% of thermal generation (60% in 1980); oil and gas representing 11% and 9% respectively (37% and 2% in 1980). The contribution of natural gas is growing, sustained by the exploitation of indigenous resources in producing countries and by the development of IPP projects, mainly located in Southeast Asia, often associated with the importation of LNG.

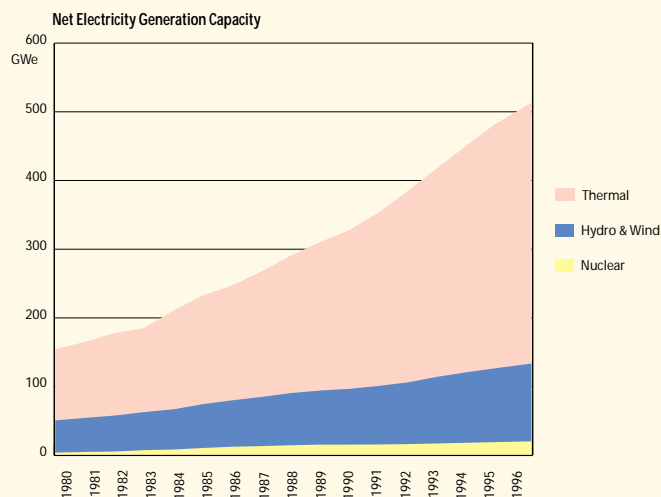
Rapid expansion of generation capacity argues in favour of foreign investment...

The total generation capacity reached 511 GWe in 1996 and the rate of expansion was very substantial: 7.8% per year on average or about 31 GWe of new capacity per year since 1990. Conventional thermal plants dominate this market, mainly steam coal power units (the bulk of Chinese generation capacity) but combined cycles units started to be developed where indigenous gas resources are available. In 1996, thermal units accounted for 75% of total generation capacity (69% in 1980), hydro and wind for 22% (29% in 1980) and nuclear for 4% (2% in 1980). In the next ten years, according to most estimates, China will require about 15 GWe additional capacity each year and India about 10 GWe. This would represent about 40-50% of additional world capacity requirements. Faced with this challenging situation, most of the Asian countries are looking to foreign investment and electricity privatisation. Foreign investment has played a critical role in financing 10% of the expansion of China's electric power infrastructure between 1979 and 1996 and, in the near future, China expects forei-





gn investment to supply 20% of its electric power investment capital through joint ventures and build-operate-transfer (BOT) schemes. In 1991, the national Indian government enacted legislation to encourage private sector involvement in independent power production. Of the 40 GWe of generating capacity planned to be built between 1997 and 2002, nearly half is expected to be funded from private sources and foreign capital will account for much of that investment. To varying degrees, power shortages and high investment needs have induced changes in electric utility policy in several other Asian countries over the past decade. Pakistan has been one of the most aggressive nations in adopting and implementing electricity reforms followed by the Philippines, Thailand, and Indonesia...



... even if the financial crisis delayed many planned projects

While much of the planned new independent power producer (IPP) capacity was seen as a relatively sure bet a couple of years ago, the financial crisis has caused delays and cancellations of many of the projects planned or under construction. The problems affecting independent power producers in Asia relate to the sharp devaluation of currencies and the financial crisis which will cause a slowdown in the growth of both economic output and energy demand. Currency devaluations have proved to be a problem for IPP projects, primarily because of pressure being placed on them to accept lower prices for their electricity than were originally agreed to in their long-term contracts with electricity distributors, usually national utilities. Because most of the costs of IPP projects are based in US dollars, the acceptance of lower prices by project owners would mean lower or negative returns on project investment. On the other hand, the electricity distributors are not in a position to raise rates to end-use consumers of electricity, because national governments typically have control over end-

use prices and are unwilling to grant requests for increases. Reduced expectations for future growth in electricity demand also mean that less new generating capacity will be needed than previously expected, delaying or eliminating the need for some of the planned IPP projects. In total an estimated 11 GWe of new capacity has recently been postponed or cancelled.

The profitability of the power plants owned and operated by state-owned utilities has also been adversely affected, because capital, operating and maintenance costs incurred by the utilities have generally risen substantially. Three main factors contributed to the cost increases: payments for imported fuels usually listed in US dollars; equipment costs, much of which is imported, also expressed in US dollars; and higher interest rates.

Asia remained the most dynamic market world-wide for power generation from renewables...

Asia is one of the most dynamic markets world-wide for power generation from renewables. China is aggressively developing its hydroelectric resources. In addition to the controversial 18 GWe Three Gorges Dam on the Yangtse River, about 20 GWe of other hydroelectric projects are currently under construction. The construction of the Three Gorges project began in 1994, and is expected to be completed in 2009. The Chinese Government has had problems securing financing, largely because of international concerns about the environmental impact of the dam. In spite of the high potential for hydroelectric development in India, the environmental issues and high costs involved have until now limited projects to 11.3 GWe of new hydro capacity. On the other hand, India is one of the world's largest producers of wind energy. In 1996, India had 829 MWe of installed wind capacity, with some 1.5 GWe of further capacity in various stages of planning. The American Wind Energy Association forecasts that India and China will be amongst the five top growth markets for wind energy over the period to 2005.

Refinery expansion programmes to meet increasing domestic oil products demand...

In 1997, **the refinery capacity** (12.2 millions barrels per day) represented 15.4% of the world capacity (7.6% in 1980). Since 1980, the capacity grew by 4.0% per year largely under China's leadership (4.9% per year). In 1997, China represented about 35% of the total refinery capacity of the region, against 30% in 1980. Over the same period major refinery expansion occurred in South Korea where installed capacity increased by 20% but capacity in Indonesia decreased by 8%. At the same time, the utilisation rate of the refineries increased from 79% to 92%, remaining consis-



tently above the world average. In order to meet increasing domestic oil demand the region has embarked on an ambitious refinery expansion programme, partially based on joint ventures with foreign investors.

COMPETITIVENESS

Under the pressure of China, energy intensity has improved by 2.8% per year since 1980...

The **energy intensity** indicator for the region has improved significantly (by about -2.8% per year on average) since 1980 and this trend has accelerated since the early 1990's. This was mainly sustained by the Chinese improvement since 1980 (-5.7% per year on average) though other countries also registered significant gains: Nepal (-2.1%), Hong Kong (-2.0%), Sri Lanka (-1.9%), India, Indonesia and Bangladesh (-1.6%). However, energy intensities in some other developing countries, such as Malaysia and Philippines, are increasing. Apart from the CIS, China currently has an energy intensity that is amongst the highest in the world. Compared to the European Union, China was about 8 times more

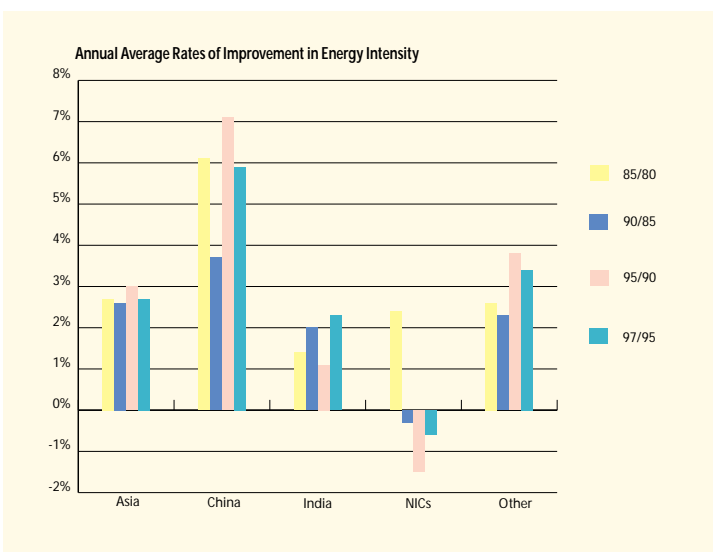
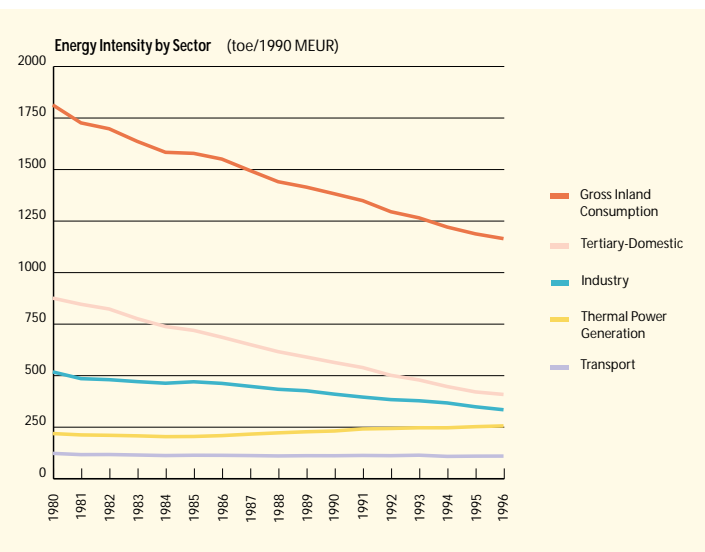
energy intensive. But the Asian region presents widely differing patterns as the energy intensity of the NICs was close to that of the United States in 1996 but still 70% higher than that of the European Union.

The exceptionally rapid decrease of China's energy intensity has been questioned by several authors. The World Bank, along with a number of other sources, claims that official statistics tend to underestimate the level of national income mainly for the following reasons: official statistics for some service sectors are still weak; the national accounting system provides incomplete coverage of the national economy; and the added value of agriculture is underestimated. In addition inflation rates have been underestimated and real economic growth rates overestimated in official Chinese statistics. This explains the very high energy intensity observed for China in the early 1980's. Using the GDP estimates of the World Bank for energy intensity calculations provides a "more typical" picture: China's commercial energy intensity decline in the last 15 years falls to 3.4% per year.

ASIA : ENERGY INTENSITY

toe/1990 MEUR	1980	1985	1990	1994	1995	1996	1997(1)
ASIA	1813.4	1578.5	1382.3	1221.0	1188.1	1164.0	1123.8
China	5077.5	3712.2	3073.4	2224.8	2125.5	2005.9	1882.6
India	1822.5	1695.5	1535.4	1478.7	1452.9	1430.8	1385.7
NICs	438.9	387.9	392.8	430.1	422.4	427.6	427.3
Other	2402.6	2105.3	1875.8	1597.9	1548.6	1505.0	1445.6
European Union	285.5	272.5	247.3	240.4	239.8	244.2	237.2

(1) Estimates



The continual improvement of energy intensity has been mainly sustained, at both the regional and Chinese level, by the tertiary-domestic sector (-53% since 1980). This is in spite of improving standards of living both in cities and rural zones, and by the industrial sector (-35% since 1980) notwithstanding the rapid industrialisation of the region. On the other hand, the contribution of transport remained stable but, as is often the case for developing economies, increased personal wealth has resulted in the desire for more individual and comfortable means of transport. This will prove a major challenge in the future. Finally the weight of power generation was increasing as the share of electricity in the final demand rose continuously, but also due to the thermal inefficien-



cy of the power sector. For example, there are many problems associated with Chinese power plants, such as small unit size, inconsistent coal quality and low load factors due to low plant availability or lack of fuel. As result, the average thermal efficiency of electricity generation in Chinese fossil fuel plants ranges between 27% and 29% compared to around 38% in OECD countries. In the same way, the large-scale use of biomass in the tertiary-domestic sector was associated with low end-use conversion efficiency and hence low useful energy. Hence the progressive replacement of biomass by commercial energy will lead to significant efficiency improvements in this sector even if it is accompanied by wide diffusion of electrical appliances.

Energy consumption per capita reached only 20% of the European level...

The gross inland consumption per capita increased by 52% between 1980 and 1997 but remained at the rather low level of 0.76 toe/capita - only 20% of the European Union level. One of the lowest levels occurred in India with 0.50 toe/capita, still lower than the African average, while the NICs' consumption per capita progressively approached the EU level.

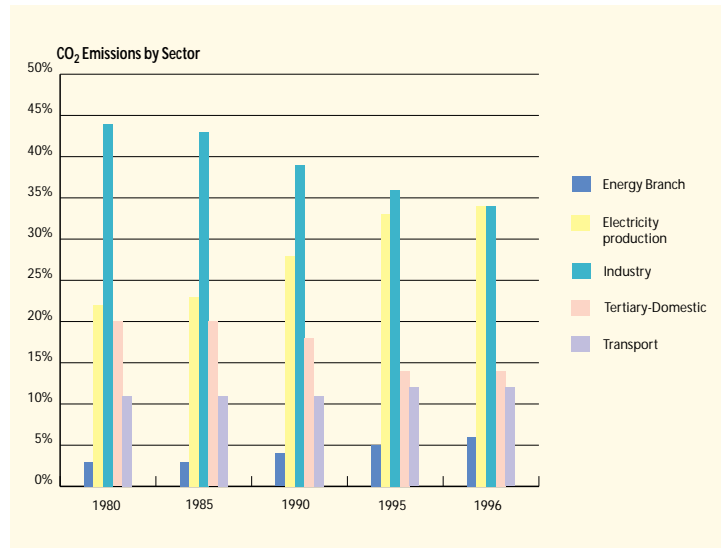
ENVIRONMENT

CO₂ emissions increased by 45% since 1990...

China and India are presently the world's first and second fastest growing sources of greenhouse gases, respectively. The air quality deterioration and the pollution from the growing use of coal as a fuel is expected to worsen, especially as much additional coal-fired power capacity is put on stream, unless adequate regulatory measures are built-in from the design stage. On the other hand, a

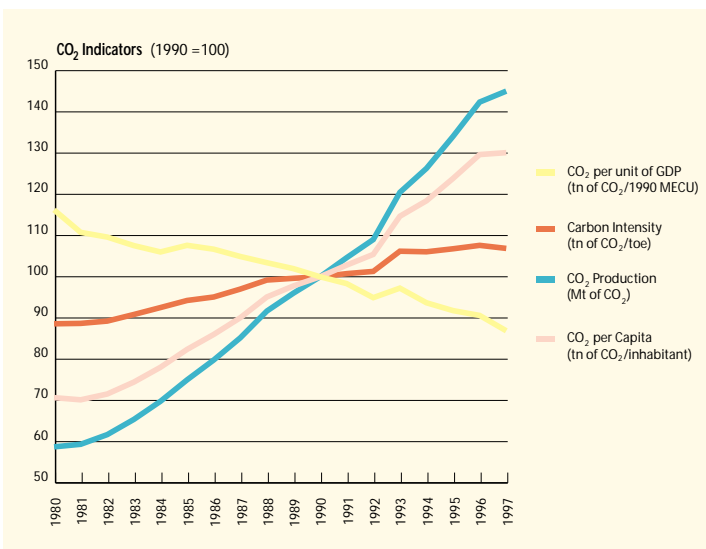
recent study completed by the International Energy Agency reported that most of the coal-fired capacity in Southeast Asian countries is not fitted with FGD equipment, primarily because of cost but also because most plants in the region currently use low-sulphur coal. The study concludes that public concern over pollution is likely to increase as living standards rise, but at present the emphasis is on increasing electricity generation to satisfy demand and ensure economic growth. This view is prevalent in Asian countries, and more generally in developing countries when negotiating their Kyoto targets.

CO₂ emissions have been increasing continuously since 1980 (5589 Mt of CO₂ in 1997, compared to 3854 Mt in 1990 and 2263 Mt in 1980), resulting in a 45% rise since 1990. As the increasingly dominant position of solid fuels induces an increase in the carbon intensity of fossil fuels, emissions are increasing 24% more rapidly than gross inland energy consumption. Consequently, the share of Asia in total world CO₂ emissions has doubled since 1980, increasing from 12.5% to 25%. This trend must nevertheless be compared with other indicators. Per capita CO₂ emissions stemming from higher standards of living increased by 3.6% since 1980, with a more sustained growth since 1990. But CO₂ intensity per unit of GDP declined by only 1.4% per year on average since 1980, also with an acceleration during the 1990's.



Contributions of power sector and industry, roughly the same in 1996, reached 67% of total CO₂ emissions...

Looking at sectoral CO₂ emissions at the regional level, by far the largest sector in terms of emissions was industry with 34% of total emissions (44% in 1980). The power sector, mainly based on solids, increased continuously to approach the industrial contribution in 1996 (33% of the total in 1996 against 21% in 1980), partly explained by the low conversion efficiencies. But this





means that substantial gains can be achieved in the near future. The tertiary-domestic sector, where renewable energy continued to make a significant impact, reduced its share of emissions from 20% in 1980 to only 14% in 1996 though its emissions volume increased by more than 60% over this period. More significantly, it must be stressed that the CO₂ emissions growth rate in this sector declined continuously from 5.3% per year on average between 1980 and 1985 to only 0.7% per year on average during the first half of the 1990's despite a general increase in living standards. The contribution of the transport sector has remained quite stable since 1980 with about 11% of total emissions though transport's volume of emissions has multiplied by 2.6 since 1980.

GLOBAL MARKETS

Increasing energy dependency, mainly related to oil imports from the Middle East...

With an energy dependency in 1997 of about 12%, Asia is increasingly a net importer of energy. This is true for oil (net imports of 290 Mtoe, supplied mainly by the Middle East) and solid fuels (net imports of 30 Mtoe). But Asia remained a net exporter of natural gas (about 35 Mtoe since 1990). Exports accounted for 31% of indigenous production in 1990, but this share fell to only 20% in 1997 in line with increasing indigenous consumption. Exports consisted mainly of LNG to Japan. At a national level, this broad picture differs widely. China, with an overall energy dependence near zero, is a net exporter of solid fuels but has become a net importer of oil since 1993 (oil imports representing about 16% of its oil consumption in 1997). India remained a net importer of all commercial energy sources except natural gas, with oil accounting for 88% of total 1997 imports. The NICs, without significant fossil fuel reserves, are all major net energy importers. Indeed, they depended on foreign supplies for 87% of their consumption in 1996, the remainder being mainly supplied by nuclear power. The situation of other developing Asian countries was a little more complex. Their apparent self-sufficiency resulted in fact from a balancing of their oil imports (100 Mtoe in 1997) by their exports of coal (30 Mtoe) and natural gas (55 Mtoe).



ASIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	1137.5	1404.0	1675.8	1989.9	2063.1	2096.0	4.3%	3.6%	3.5%	3.7%	1.6%
Solids	402.6	550.7	684.8	874.2	905.3	907.6	6.5%	4.5%	5.0%	3.6%	0.3%
Oil	226.8	261.4	304.9	335.9	341.4	351.2	2.9%	3.1%	2.0%	1.6%	2.9%
Natural gas	44.8	76.8	111.7	153.9	170.5	181.5	11.4%	7.8%	6.6%	10.8%	6.4%
Nuclear	3.8	13.2	24.0	32.1	35.2	35.9	28.2%	12.7%	6.0%	9.4%	2.2%
Hydro & Wind	13.3	18.8	25.4	31.8	31.5	30.6	7.2%	6.2%	4.6%	-0.9%	-2.7%
Geothermal	1.8	4.4	5.7	7.1	7.6	8.0	19.9%	5.0%	4.7%	6.5%	5.5%
Other	444.3	478.6	519.4	554.7	571.6	581.0	1.5%	1.6%	1.3%	3.0%	1.7%
Net Imports	19.5	0.9	85.4	213.5	252.7	283.6	-45.9%	148.2%	20.1%	18.4%	12.2%
Solids	7.0	23.7	30.6	23.1	20.5	30.4	27.8%	5.2%	-5.4%	-11.6%	48.5%
Oil	30.8	7.7	90.2	225.7	269.5	289.5	-24.2%	63.7%	20.1%	19.4%	7.4%
Crude oil	23.5	14.2	67.4	169.4	214.9	na	-9.6%	36.6%	20.2%	26.8%	na
Oil products	7.3	-6.5	22.8	56.3	54.7	na	-	-	19.8%	-2.9%	na
Natural gas	-18.2	-30.5	-35.4	-35.5	-37.6	-36.8	10.9%	3.0%	0.0%	6.1%	-2.2%
Electricity	0.0	0.1	0.1	0.1	0.4	0.5	10.8%	-3.2%	19.8%	189.6%	35.8%
Gross Inland Consumption	1148.4	1378.3	1732.2	2174.5	2291.8	2350.7	3.7%	4.7%	4.7%	5.4%	2.6%
Solids	411.2	552.8	707.9	891.5	929.4	938.0	6.1%	5.1%	4.7%	4.3%	0.9%
Oil	247.3	264.1	373.7	539.2	583.8	612.3	1.3%	7.2%	7.6%	8.3%	4.9%
Natural gas	26.6	46.3	76.2	118.0	132.5	144.7	11.7%	10.5%	9.2%	12.3%	9.2%
Other (1)	463.2	515.1	574.5	625.8	646.1	655.8	2.1%	2.2%	1.7%	3.2%	1.5%
Electricity Generation in TWh	634.2	905.1	1400.3	2145.8	2302.0	na	7.4%	9.1%	8.9%	7.3%	na
Nuclear	14.7	50.8	92.2	123.3	134.9	na	28.2%	12.7%	6.0%	9.4%	na
Hydro & wind	154.3	218.2	295.4	369.6	365.4	na	7.2%	6.2%	4.6%	-1.1%	na
Thermal	465.2	636.1	1012.7	1653.0	1801.6	na	6.5%	9.7%	10.3%	9.0%	na
Generation Capacity in GWe	153.4	230.8	325.8	479.9	511.5	na	8.5%	7.1%	8.1%	6.6%	na
Nuclear	2.9	9.5	14.5	18.1	19.3	na	27.1%	8.8%	4.6%	6.7%	na
Hydro & wind	44.6	61.8	79.0	105.4	110.9	na	6.7%	5.1%	5.9%	5.2%	na
Thermal	105.9	159.6	232.3	356.5	381.3	na	8.6%	7.8%	8.9%	7.0%	na
Average Load Factor in %	47.2	44.8	49.1	51.0	51.4	na	-1.1%	1.8%	0.8%	0.7%	na
Fuel Inputs for Thermal Power Generation	140.5	183.4	295.9	469.4	509.3	na	5.5%	10.0%	9.7%	8.5%	na
Solids	84.2	132.2	223.9	365.5	401.5	na	9.4%	11.1%	10.3%	9.8%	na
Oil	51.6	39.1	48.1	57.5	55.7	na	-5.4%	4.3%	3.6%	-3.1%	na
Gas	3.0	7.6	18.2	39.3	44.5	na	20.7%	18.9%	16.7%	13.5%	na
Geothermal	1.8	4.4	5.7	7.1	7.6	na	19.9%	5.0%	4.7%	6.5%	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	28.5	29.8	29.4	30.3	30.4	na	0.9%	-0.3%	0.6%	0.4%	na
Non-Energy Uses	19.2	22.9	32.8	78.1	88.7	na	3.6%	7.5%	19.0%	13.5%	na
Total Final Energy Demand	967.1	1145.2	1369.3	1622.8	1693.8	na	3.4%	3.6%	3.5%	4.4%	na
Solids	298.7	388.0	441.2	485.2	490.0	na	5.4%	2.6%	1.9%	1.0%	na
Oil	158.9	184.9	268.1	379.8	411.3	na	3.1%	7.7%	7.2%	8.3%	na
Gas	13.2	21.1	28.3	38.5	42.3	na	9.9%	6.0%	6.4%	9.8%	na
Electricity	44.7	63.6	97.6	144.6	156.6	na	7.3%	8.9%	8.2%	8.3%	na
Heat	7.4	9.1	14.8	20.1	22.0	na	4.3%	10.1%	6.3%	9.6%	na
Other	444.3	478.6	519.4	554.7	571.6	na	1.5%	1.6%	1.3%	3.1%	na
CO₂ Emissions in Mt of CO₂	2263.4	2889.8	3853.5	5166.1	5486.7	5589.1	5.0%	5.9%	6.0%	6.2%	1.9%
Indicators											
Population (Million)	2313.8	2534.6	2784.1	3013.4	3057.5	3103.5	1.8%	1.9%	1.6%	1.5%	1.5%
GDP (index 1985=100)	72.5	100.0	143.5	209.6	225.5	239.6	6.6%	7.5%	7.9%	7.6%	6.2%
Gross Inl Cons./GDP (toe/1990 MEUR)	1813.4	1578.5	1382.3	1188.1	1164.0	1123.8	-2.7%	-2.6%	-3.0%	-2.0%	-3.5%
Gross Inl Cons./Capita (toe/inhabitant)	0.50	0.54	0.62	0.72	0.75	0.76	1.8%	2.7%	3.0%	3.9%	1.1%
Electricity Generated/Capita (kWh/inhabitant)	274	357	503	712	753	na	5.4%	7.1%	7.2%	5.7%	na
CO ₂ Emissions/Capita (t of CO ₂ /inhabitant)	1.0	1.1	1.4	1.7	1.8	1.8	3.1%	4.0%	4.4%	4.7%	0.4%
Import Dependency (%)	1.7	0.1	4.9	9.7	10.9	12.0	-48.4%	139.6%	14.8%	12.2%	9.9%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

(2) Estimates



ASIA : MAIN INDICATORS

	1980	1985	1990	1994	1995	1996	85/80	90/85	95/90	96/95
	Annual % Change									
Gross Inland Consumption (Mtoe)	1148.4	1378.3	1732.2	2062.6	2174.5	2293.4	3.7%	4.7%	4.7%	5.5%
Public Thermal Power Generation	135.1	173.7	284.0	407.1	450.6	490.1	5.2%	10.3%	9.7%	8.8%
Autoprod. Thermal Power Generation	3.7	5.2	6.2	10.3	11.6	14.6	7.3%	3.6%	13.3%	25.8%
Energy Branch	27.0	33.8	61.1	103.7	110.0	122.8	4.6%	12.5%	12.5%	11.6%
Final Energy Consumption	960.7	1138.6	1360.3	1559.0	1610.0	1680.0	3.5%	3.6%	3.4%	4.4%
Industry	328.2	410.6	514.1	620.9	638.7	658.9	4.6%	4.6%	4.4%	3.2%
Transport	77.8	99.5	139.7	182.9	200.4	216.2	5.0%	7.0%	7.5%	7.9%
Tertiary-Domestic	554.7	628.4	706.6	755.2	770.9	804.9	2.5%	2.4%	1.8%	4.4%
Energy Intensity (toe/1990 MEUR)	1813.4	1578.5	1382.3	1221.0	1188.1	1164.8	-2.7%	-2.6%	-3.0%	-2.0%
Public Thermal Power Generation	213.3	198.9	226.6	241.0	246.2	248.9	-1.4%	2.6%	1.7%	1.1%
Autoprod. Thermal Power Generation	5.8	6.0	5.0	6.1	6.3	7.4	0.6%	-3.6%	5.0%	16.9%
Industry	518.2	470.3	410.2	367.6	349.0	334.6	-1.9%	-2.7%	-3.2%	-4.1%
Transport	122.9	113.9	111.5	108.3	109.5	109.8	-1.5%	-0.4%	-0.4%	0.3%
Tertiary-Domestic	876.0	719.7	563.8	447.1	421.2	408.8	-3.9%	-4.8%	-5.7%	-2.9%
Energy per Capita (Kgoe/inhabitant)	496	544	622	695	722	750	1.8%	2.7%	3.0%	3.9%
Industry	142	162	185	209	212	215	2.7%	2.7%	2.8%	1.7%
Transport	34	39	50	62	66	71	3.1%	5.0%	5.8%	6.3%
Tertiary-Domestic	240	248	254	254	256	263	0.7%	0.5%	0.2%	2.9%
Electricity Share (%)										
Final Energy Consumption	4.7%	5.6%	7.2%	8.6%	9.0%	9.3%	3.7%	5.1%	4.6%	3.8%
Industry	9.0%	10.0%	11.7%	12.5%	13.1%	13.5%	2.0%	3.2%	2.4%	3.2%
Transport	0.6%	0.9%	1.0%	1.1%	0.8%	0.8%	7.9%	1.7%	-3.6%	-2.0%
Tertiary-Domestic	2.6%	3.5%	5.1%	7.2%	7.7%	8.2%	5.6%	8.2%	8.4%	6.3%
Total Renewable Consumption (Mtoe)	459.4	501.7	550.4	586.2	593.6	610.6	1.8%	1.9%	1.5%	2.9%
Hydro	13.3	18.8	25.4	30.0	31.8	31.4	7.2%	6.2%	4.6%	-1.1%
Biomass	444.3	478.6	519.4	549.1	554.6	571.5	1.5%	1.6%	1.3%	3.0%
Other	1.8	4.4	5.7	7.1	7.2	7.7	19.9%	5.1%	4.7%	7.2%
Renewable intensity (toe/1990MEUR)	725.4	574.6	439.2	347.0	324.3	310.1	-4.6%	-5.2%	-5.9%	-4.4%
Renewable per capita (Kgoe/inhabitant)	198.5	198.0	197.7	197.4	197.0	199.7	-0.1%	0.0%	-0.1%	1.4%
CO₂ Emissions (Mt of CO₂)	2263.4	2889.8	3853.5	4866.4	5166.1	5493.4	5.0%	5.9%	6.0%	6.3%
Public Thermal Power Generation	484.0	640.1	1051.5	1507.8	1670.0	1815.3	5.8%	10.4%	9.7%	8.7%
Autoprod. Thermal Power Generation	13.6	19.5	23.1	38.1	43.4	54.9	7.5%	3.4%	13.5%	26.4%
Energy Branch	69.3	82.6	148.5	252.4	265.6	310.7	3.6%	12.5%	12.3%	17.0%
Industry	989.7	1242.0	1515.8	1816.8	1855.9	1891.8	4.6%	4.1%	4.1%	1.9%
Transport	250.7	316.4	435.8	561.7	614.8	662.5	4.8%	6.6%	7.1%	7.8%
Tertiary-Domestic	456.0	589.2	678.8	668.8	701.3	742.2	5.3%	2.9%	0.7%	5.8%
Carbon Intensity (tn of CO₂/toe)	2.0	2.1	2.2	2.4	2.4	2.4	1.2%	1.2%	1.3%	0.8%
Public Power Generation	3.1	3.0	3.1	3.2	3.2	3.2	-0.6%	0.4%	0.6%	0.7%
Public Thermal Power Generation	3.6	3.7	3.7	3.7	3.7	3.7	0.6%	0.1%	0.0%	-0.1%
Autoprod. Power Generation	3.7	3.7	3.7	3.7	3.7	3.7	0.3%	-0.4%	0.3%	0.6%
Autoprod. Thermal Power Generation	3.7	3.8	3.7	3.7	3.7	3.8	0.3%	-0.2%	0.2%	0.5%
Energy Branch	2.6	2.4	2.4	2.4	2.4	2.5	-1.0%	-0.1%	-0.1%	4.8%
Industry	3.0	3.0	2.9	2.9	2.9	2.9	0.1%	-0.5%	-0.3%	-1.2%
Transport	3.2	3.2	3.1	3.1	3.1	3.1	-0.3%	-0.4%	-0.3%	-0.1%
Tertiary-Domestic	0.8	0.9	1.0	0.9	0.9	0.9	2.7%	0.5%	-1.1%	1.4%
CO₂ per Capita (kg of CO₂/inhabitant)	978	1140	1384	1639	1714	1797	3.1%	4.0%	4.4%	4.8%
Industry	428	490	544	612	616	619	2.8%	2.1%	2.5%	0.5%
Transport	108	125	157	189	204	217	2.9%	4.6%	5.4%	6.2%
Tertiary-Domestic	197	232	244	225	233	243	3.4%	1.0%	-0.9%	4.3%
CO₂ per unit of GDP (tn of CO₂/1990 MEUR)	3574	3310	3075	2881	2823	2790	-1.5%	-1.5%	-1.7%	-1.2%
Public Thermal Power Generation	764	733	839	893	912	922	-0.8%	2.7%	1.7%	1.0%
Autoprod. Thermal Power Generation	21	22	18	23	24	28	0.9%	-3.8%	5.2%	17.5%
Energy Branch	109	95	119	149	145	158	-2.9%	4.6%	4.1%	8.8%
Industry	1563	1422	1210	1076	1014	961	-1.9%	-3.2%	-3.5%	-5.2%
Transport	396	362	348	333	336	336	-1.8%	-0.8%	-0.7%	0.2%
Tertiary-Domestic	720	675	542	396	383	377	-1.3%	-4.3%	-6.7%	-1.6%



NICS : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	18.0	27.7	34.1	32.4	34.5	34.9	9.0%	4.3%	-1.0%	6.4%	1.1%
Solids	10.2	11.5	8.2	2.7	2.3	2.1	2.5%	-6.5%	-19.8%	-14.7%	-9.8%
Oil	0.2	0.2	0.3	0.1	0.1	0.1	3.7%	4.6%	-27.9%	-3.8%	0.0%
Natural gas	1.6	1.1	1.2	0.8	0.7	0.7	-7.5%	1.8%	-6.3%	-14.8%	0.0%
Nuclear	3.0	11.9	22.3	26.7	29.1	29.5	31.2%	13.5%	3.6%	9.2%	1.4%
Hydro & Wind	0.4	0.9	1.3	1.0	1.0	1.1	16.6%	6.6%	-4.4%	4.0%	2.5%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	2.6	2.1	0.9	1.1	1.2	1.4	-4.1%	-16.4%	5.4%	11.6%	13.2%
Net Imports	70.4	81.4	147.3	239.7	258.9	267.5	2.9%	12.6%	10.2%	8.0%	3.3%
Solids	8.1	22.7	33.2	51.8	53.7	60.0	22.8%	7.8%	9.3%	3.7%	11.7%
Oil	62.3	58.7	110.7	174.6	188.9	188.9	-1.2%	13.5%	9.5%	8.2%	0.0%
Crude oil	74.4	73.6	107.7	170.9	190.1	na	-0.2%	7.9%	9.7%	11.2%	na
Oil products	-12.1	-14.9	3.0	3.7	-1.2	na	4.2%	-	3.9%	-	na
Natural gas	0.0	0.0	3.5	12.7	15.6	18.0	-	-	29.2%	22.7%	15.9%
Electricity	0.0	-0.1	-0.2	0.5	0.6	0.5	22.4%	10.3%	-	19.5%	-16.3%
Gross Inland Consumption	83.4	103.9	163.8	247.5	266.5	282.5	4.5%	9.5%	8.6%	7.7%	6.0%
Solids	17.2	32.7	41.1	49.6	54.2	62.1	13.6%	4.7%	3.9%	9.2%	14.7%
Oil	58.5	55.4	93.8	155.0	164.4	169.0	-1.1%	11.1%	10.6%	6.0%	2.8%
Natural gas	1.6	1.1	4.7	13.5	15.9	18.8	-7.5%	34.1%	23.8%	17.5%	18.0%
Other (1)	6.0	14.8	24.3	29.3	32.0	32.5	19.6%	10.5%	3.8%	9.3%	1.5%
Electricity Generation in TWh	99.5	142.8	239.3	373.9	405.7	na	7.5%	10.9%	9.3%	8.5%	na
Nuclear	11.7	45.5	85.8	102.3	111.7	na	31.2%	13.5%	3.6%	9.2%	na
Hydro & wind	4.9	10.6	14.5	11.6	11.5	na	16.6%	6.6%	-4.4%	-1.5%	na
Thermal	82.9	86.7	139.0	259.9	282.5	na	0.9%	9.9%	13.3%	8.7%	na
Generation Capacity in GWe	23.8	43.1	52.6	76.0	81.5	na	12.6%	4.1%	7.7%	7.3%	na
Nuclear	1.9	8.0	12.8	13.8	14.8	na	33.9%	9.8%	1.5%	7.2%	na
Hydro & wind	2.8	4.9	5.1	7.0	7.4	na	11.8%	0.9%	6.5%	6.2%	na
Thermal	19.2	30.2	34.7	55.3	59.4	na	9.5%	2.8%	9.8%	7.5%	na
Average Load Factor in %	47.7	37.8	52.0	56.2	56.8	na	-4.5%	6.6%	1.6%	1.1%	na
Fuel Inputs for Thermal Power Generation	18.7	19.4	30.8	51.1	52.8	na	0.7%	9.7%	10.6%	3.4%	na
Solids	2.3	11.0	15.0	23.2	26.4	na	37.0%	6.4%	9.1%	13.7%	na
Oil	16.4	8.4	13.6	21.0	18.4	na	-12.5%	10.0%	9.2%	-12.4%	na
Gas	0.0	0.0	2.3	6.9	8.0	na	-	-	24.5%	16.9%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	38.1	38.4	38.8	43.7	45.9	na	0.2%	0.2%	2.5%	5.0%	na
Non-Energy Uses	3.4	5.8	7.7	9.7	10.1	na	11.7%	5.8%	4.7%	4.2%	na
Total Final Energy Demand	57.9	69.4	108.2	165.8	175.7	na	3.7%	9.3%	8.9%	6.0%	na
Solids	13.2	18.4	21.2	18.5	19.5	na	6.8%	2.8%	-2.6%	5.3%	na
Oil	33.8	37.4	66.3	109.0	114.8	na	2.1%	12.1%	10.5%	5.3%	na
Gas	0.9	0.9	2.3	7.7	7.7	na	1.4%	20.0%	27.7%	-0.7%	na
Electricity	7.4	10.5	17.6	28.8	31.6	na	7.2%	11.0%	10.3%	9.6%	na
Heat	0.0	0.0	0.0	0.6	0.7	na	-	-	-	21.9%	na
Other	2.6	2.1	0.9	1.1	1.4	na	-4.1%	-16.3%	5.3%	21.4%	na
CO₂ Emissions in Mt of CO₂	226.8	269.1	413.4	619.2	649.5	695.4	3.5%	9.0%	8.4%	4.9%	7.1%
Indicators											
Population (Million)	63.09	67.88	71.51	75.54	76.37	77.22	1.5%	1.0%	1.1%	1.1%	1.1%
GDP (index 1985=100)	70.9	100.0	155.7	218.7	232.7	246.8	7.1%	9.3%	7.0%	6.4%	6.1%
Gross Inl Cons./GDP (toe/1990 MEUR)	438.9	387.9	392.8	422.4	427.6	427.3	-2.4%	0.3%	1.5%	1.2%	-0.1%
Gross Inl Cons./Capita (toe/inhabitant)	1.32	1.53	2.29	3.28	3.49	3.66	3.0%	8.4%	7.4%	6.5%	4.8%
Electricity Generated/Capita (kWh/inhabitant)	1577	2103	3346	4950	5312	na	5.9%	9.7%	8.1%	7.3%	na
CO ₂ Emissions/Capita (t of CO ₂ /inhabitant)	3.6	4.0	5.8	8.2	8.5	9.0	2.0%	7.8%	7.2%	3.8%	5.9%
Import Dependency (%)	79.1	73.7	82.3	89.5	89.2	87.2	-1.4%	2.2%	1.7%	-0.3%	-2.3%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

(2) Estimates



CHINA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
	Annual % Change										
Primary Production	608.6	761.9	894.0	1072.9	1101.3	1113.1	4.6%	3.3%	3.7%	2.6%	1.1%
Solids	303.9	427.4	529.1	680.4	698.3	704.6	7.1%	4.4%	5.2%	2.6%	0.9%
Oil	107.9	127.1	140.8	150.0	157.3	160.8	3.3%	2.1%	1.3%	4.9%	2.2%
Natural gas	12.0	10.8	12.8	16.7	18.7	21.0	-2.0%	3.4%	5.5%	12.1%	11.9%
Nuclear	0.0	0.0	0.0	3.3	3.7	3.1	-	-	-	11.7%	-16.2%
Hydro & Wind	5.0	7.9	10.9	16.4	16.2	15.6	9.7%	6.5%	8.5%	-1.4%	-3.5%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	179.9	188.5	200.4	206.1	207.0	208.0	0.9%	1.2%	0.6%	0.5%	0.5%
Net Imports	-19.7	-39.1	-32.0	-10.1	-7.1	12.4	14.7%	-3.9%	-20.6%	-29.6%	-
Solids	-2.3	-2.9	-8.4	-20.4	-23.0	-17.8	4.8%	23.5%	19.5%	12.8%	-22.7%
Oil	-17.4	-36.3	-23.8	10.8	16.2	30.5	15.8%	-8.1%	-	50.8%	88.1%
Crude oil	-13.2	-30.3	-21.4	-1.1	2.2	na	18.1%	-6.7%	-44.4%	-	na
Oil products	-4.3	-6.0	-2.4	11.9	14.0	na	7.0%	-16.9%	-	17.7%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	0.2	-	-	-	-	-
Electricity	0.0	0.1	0.2	-0.5	-0.3	-0.5	-	11.5%	-	-33.4%	50.1%
Gross Inland Consumption	593.1	705.5	856.2	1058.6	1097.7	1121.0	3.5%	3.9%	4.3%	3.7%	2.1%
Solids	306.6	404.8	515.4	658.1	679.0	686.8	5.7%	4.9%	5.0%	3.2%	1.2%
Oil	89.7	93.3	116.5	158.4	173.4	186.7	0.8%	4.5%	6.3%	9.5%	7.7%
Natural gas	12.0	10.8	12.8	16.7	18.7	21.2	-2.0%	3.4%	5.5%	12.1%	13.0%
Other (1)	184.9	196.6	211.5	225.4	226.6	226.3	1.2%	1.5%	1.3%	0.6%	-0.2%
Electricity Generation in TWh	300.6	410.7	621.2	1007.7	1080.0	na	6.4%	8.6%	10.2%	7.2%	na
Nuclear	0.0	0.0	0.0	12.8	14.3	na	-	-	-	11.7%	na
Hydro & wind	58.2	92.4	126.7	190.6	188.0	na	9.7%	6.5%	8.5%	-1.4%	na
Thermal	242.4	318.3	494.5	804.3	877.7	na	5.6%	9.2%	10.2%	9.1%	na
Generation Capacity in GWe	65.8	87.0	137.9	217.2	236.5	na	5.7%	9.6%	9.5%	8.9%	na
Nuclear	0.0	0.0	0.0	2.2	2.2	na	-	-	-	0.0%	na
Hydro & wind	20.3	26.4	36.0	51.0	55.6	na	5.4%	6.4%	7.2%	9.0%	na
Thermal	45.6	60.6	101.8	164.0	178.8	na	5.9%	10.9%	10.0%	9.0%	na
Average Load Factor in %	52.1	53.9	51.4	53.0	52.1	na	0.7%	-0.9%	0.6%	-1.6%	na
Fuel Inputs for Thermal Power Generation	78.3	99.1	154.2	249.1	271.4	na	4.8%	9.2%	10.1%	9.0%	na
Solids	57.9	81.8	138.0	235.1	258.5	na	7.2%	11.0%	11.2%	10.0%	na
Oil	20.2	16.9	15.2	13.3	12.2	na	-3.5%	-2.1%	-2.7%	-8.3%	na
Gas	0.2	0.3	0.9	0.7	0.7	na	11.7%	23.8%	-3.5%	-5.7%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	26.6	27.6	27.6	27.8	27.8	na	0.7%	0.0%	0.1%	0.2%	na
Non-Energy Uses	8.3	7.1	7.3	45.3	52.7	na	-3.2%	0.4%	44.2%	16.3%	na
Total Final Energy Demand	497.7	594.8	694.4	793.2	814.1	na	3.6%	3.1%	2.7%	2.6%	na
Solids	230.5	299.2	345.0	392.8	394.1	na	5.4%	2.9%	2.6%	0.3%	na
Oil	51.8	60.1	79.5	99.8	109.6	na	3.0%	5.8%	4.7%	9.8%	na
Gas	6.8	7.9	10.8	9.1	10.3	na	3.2%	6.4%	-3.4%	13.0%	na
Electricity	21.3	29.9	44.0	65.9	71.8	na	7.0%	8.0%	8.4%	8.9%	na
Heat	7.4	9.1	14.8	19.5	21.3	na	4.3%	10.1%	5.7%	9.2%	na
Other	179.9	188.5	200.4	206.1	207.0	na	0.9%	1.2%	0.6%	0.5%	na
CO₂ Emissions in Mt of CO₂	1412.5	1794.1	2277.0	3006.8	3171.0	na	4.9%	4.9%	5.7%	5.5%	na
Indicators											
Population (Million)	981.2	1051.0	1135.2	1203.3	1215.4	1228.2	1.4%	1.6%	1.2%	1.0%	1.1%
GDP (index 1985=100)	61.5	100.0	146.6	262.1	287.9	313.3	10.2%	7.9%	12.3%	9.9%	8.8%
Gross Inl Cons./GDP (toe/1990 MEUR)	5077.5	3712.2	3073.4	2125.5	2005.9	1882.6	-6.1%	-3.7%	-7.1%	-5.6%	-6.1%
Gross Inl Cons./Capita (toe/inhabitant)	0.60	0.67	0.75	0.88	0.90	0.91	2.1%	2.4%	3.1%	2.7%	1.1%
Electricity Generated/Capita (kWh/inhabitant)	306	391	547	837	889	na	5.0%	7.0%	8.9%	6.1%	na
CO ₂ Emissions/Capita (t of CO ₂ /inhabitant)	1.4	1.7	2.0	2.5	2.6	na	3.5%	3.3%	4.5%	4.4%	na
Import Dependency (%)	-3.3	-5.5	-3.7	-1.0	-0.6	1.1	10.7%	-7.6%	-23.9%	-32.1%	-

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

(2) Estimates

INDIA : SUMMARY ENERGY BALANCE

Mtoe	1980	1985	1990	1995	1996	1997(2)	85/80	90/85	95/90	96/95	97/96
							Annual % Change				
Primary Production	221.9	278.3	333.6	386.2	402.5	407.9	4.6%	3.7%	3.0%	4.2%	1.4%
Solids	58.1	75.5	104.3	135.7	141.6	137.4	5.4%	6.7%	5.4%	4.4%	-3.0%
Oil	9.6	31.0	35.6	38.0	34.9	36.3	26.4%	2.8%	1.3%	-8.2%	4.0%
Natural gas	1.2	3.8	10.1	15.6	17.3	20.5	25.3%	21.5%	9.0%	11.0%	18.6%
Nuclear	0.8	1.3	1.6	2.0	2.2	3.1	10.7%	4.3%	4.4%	10.5%	41.9%
Hydro & Wind	4.0	4.4	6.2	6.3	5.9	5.6	1.9%	7.0%	0.3%	-5.0%	-5.0%
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-
Other	148.1	162.3	175.8	188.7	200.5	204.9	1.8%	1.6%	1.4%	6.3%	2.2%
Net Imports	23.5	16.8	29.7	50.4	58.5	67.6	-6.5%	12.1%	11.1%	16.1%	15.6%
Solids	0.3	1.1	3.5	5.4	5.7	7.6	32.3%	24.7%	9.3%	6.2%	32.8%
Oil	23.2	15.7	26.1	44.8	52.6	59.7	-7.6%	10.8%	11.4%	17.3%	13.5%
Crude oil	16.3	13.0	20.6	27.4	34.2	na	-4.4%	9.6%	5.9%	24.9%	na
Oil products	6.9	2.6	5.6	17.4	18.4	na	-17.7%	16.3%	25.7%	5.5%	na
Natural gas	0.0	0.0	0.0	0.0	0.0	0.1	-	-	-	-	-
Electricity	0.0	0.0	0.1	0.1	0.1	0.1	19.7%	-	2.3%	0.0%	0.0%
Gross Inland Consumption	242.0	292.3	359.8	436.7	462.1	472.6	3.8%	4.2%	3.9%	5.8%	2.3%
Solids	56.3	76.3	105.9	142.0	149.1	145.0	6.3%	6.8%	6.0%	5.0%	-2.7%
Oil	31.5	44.1	60.1	82.1	87.0	93.1	6.9%	6.4%	6.4%	5.9%	7.1%
Natural gas	1.2	3.8	10.1	15.6	17.3	20.6	25.3%	21.5%	9.0%	11.0%	19.3%
Other (1)	152.9	168.0	183.7	197.0	208.8	213.8	1.9%	1.8%	1.4%	6.0%	2.4%
Electricity Generation in TWh	119.3	183.4	289.4	417.8	435.1	na	9.0%	9.6%	7.6%	4.1%	na
Nuclear	3.0	5.0	6.1	7.6	8.4	na	10.7%	4.3%	4.4%	10.5%	na
Hydro & wind	46.6	51.0	71.7	72.7	69.1	na	1.9%	7.0%	0.3%	-5.0%	na
Thermal	69.7	127.4	211.6	337.5	357.6	na	12.8%	10.7%	9.8%	6.0%	na
Generation Capacity in GWe	33.3	52.3	73.7	93.7	96.7	na	9.4%	7.1%	4.9%	3.2%	na
Nuclear	0.9	1.3	1.6	2.0	2.2	na	9.1%	3.3%	5.1%	11.0%	na
Hydro & wind	11.8	15.5	18.8	21.3	21.1	na	5.6%	3.9%	2.6%	-0.9%	na
Thermal	20.6	35.5	53.3	70.4	73.4	na	11.4%	8.5%	5.7%	4.3%	na
Average Load Factor in %	40.9	40.0	44.9	50.9	51.3	na	-0.4%	2.3%	2.6%	0.9%	na
Fuel Inputs for Thermal Power Generation	22.3	34.1	62.7	100.5	108.5	na	8.9%	12.9%	9.9%	7.9%	na
Solids	19.0	30.2	56.7	92.6	100.0	na	9.7%	13.4%	10.3%	7.9%	na
Oil	2.8	2.7	2.7	2.5	2.5	na	-0.6%	-0.5%	-1.1%	0.0%	na
Gas	0.5	1.2	3.3	5.4	6.0	na	21.4%	22.8%	10.0%	11.0%	na
Geothermal	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Average Thermal Efficiency in %	26.9	32.1	29.0	28.9	28.4	na	3.6%	-2.0%	-0.1%	-1.8%	na
Non-Energy Uses	4.7	5.9	7.7	9.4	10.2	na	4.9%	5.5%	3.9%	8.6%	na
Total Final Energy Demand	210.3	251.7	290.6	334.5	351.9	na	3.7%	2.9%	2.9%	5.2%	na
Solids	30.6	43.0	46.1	48.5	47.1	na	7.0%	1.4%	1.0%	-2.9%	na
Oil	23.2	32.5	44.5	62.6	67.6	na	7.0%	6.5%	7.1%	8.0%	na
Gas	0.6	2.4	5.6	7.7	8.5	na	30.8%	18.5%	6.3%	11.0%	na
Electricity	7.7	11.4	18.5	27.1	28.2	na	8.3%	10.2%	7.9%	4.1%	na
Heat	0.0	0.0	0.0	0.0	0.0	na	-	-	-	-	na
Other	148.1	162.3	175.8	188.7	200.5	na	1.8%	1.6%	1.4%	6.3%	na
CO₂ Emissions in Mt of CO₂	291.1	422.3	591.7	811.8	855.6	na	7.7%	7.0%	6.5%	5.4%	na
Indicators											
Population (Million)	687.33	765.15	849.52	929.36	945.12	961.41	2.2%	2.1%	1.8%	1.7%	1.7%
GDP (index 1985=100)	77.0	100.0	136.0	174.4	187.4	197.9	5.4%	6.3%	5.1%	7.5%	5.6%
Gross Inl Cons./GDP (toe/1990 MEUR)	1822.5	1695.5	1535.4	1452.9	1430.8	1385.7	-1.4%	-2.0%	-1.1%	-1.5%	-3.2%
Gross Inl Cons./Capita (toe/inhabitant)	0.35	0.38	0.42	0.47	0.49	0.49	1.6%	2.1%	2.1%	4.1%	0.5%
Electricity Generated/Capita (kWh/inhabitant)	174	240	341	450	460	na	6.7%	7.3%	5.7%	2.4%	na
CO ₂ Emissions/Capita (t of CO ₂ /inhabitant)	0.4	0.6	0.7	0.9	0.9	na	5.4%	4.8%	4.6%	3.6%	na
Import Dependency (%)	9.7	5.7	8.3	11.5	12.6	14.3	-10.0%	7.5%	6.9%	9.7%	13.0%

(1) Includes nuclear, hydro and wind, net imports of electricity, and other energy sources.

(2) Estimates