

## **Oil Supply/Demand Outlook and Energy Security in Asian Countries**

Kazuya Fujime, Managing Director  
The Institute of Energy Economics, Japan

### **Introduction**

Real gross domestic product in Asian countries (Pakistan and eastward, excluding Japan) grew at an annual average pace of 6.5% from 1973 to 1998. In line with the GDP growth, their primary energy demand increased 4.1% annually during the period, their oil demand 5.2% and their net oil imports from non-Asian countries 11.7%.

Asian countries in 1998 depended on oil for 24.3% of primary energy supply, up 6.5 percentage points from 17.7% in 1973. Their net oil imports from non-Asian nations increased by 3.7 million barrels per day from 300,000 barrels per day in 1973 to 4 million barrels per day (from 5.8 million barrels per day to 9.2 million barrels per day including those of Japan).

This trend is expected to continue. Their GDP is projected to grow 5.3% annually until 2020, their primary energy demand 4.4% and their oil demand 4.0% and their net oil imports 6.5%. The net oil imports are expected to expand to 13.1 million barrels per day (18.8 million barrels per day including those of Japan) in 2010 and to 23 million barrels per day (28.7 million barrels per day including those of Japan).

The oil demand and import expansion indicates two serious energy security problems for Asian countries as follows:

- (1) First, Asian countries' net oil imports in 2010 are expected to increase by about 8 million barrels per day and those in 2020 by about 18 million barrels per day. Which countries will supply the increase? If Asian countries depend on the Middle East for the expansion in imports, their dependence on the region for oil supply will rise to some 95% from the current level of some 78%. This means that Asian countries will grow more vulnerable to the Middle East's oil supply suspension.
- (2) Second, Asian countries are increasing their dependence on oil for primary energy supply to boost their oil imports in value and these imports' ratios to their total imports and GDP. This means that oil price hikes will have far greater adverse effects on their economies.

### **1. Presumptions for Oil Supply/Demand Outlook for 12 Asian Countries**

- (1) Population: Up 1.1% annually from 1996 to 2020 (0.8% for China and 1.4%

- for India)
- (2) Real GDP: Up 5.3% annually from 1996 to 2020 (6.9% for China and 4.6% for India)

(Note) The 12 Asian economies account for 90% of primary energy demand in all Asian economies (excluding Japan). China, Hong Kong, Taiwan, South Korea, Thailand, The Philippines, Malaysia, Indonesia, Brunei, Singapore, Vietnam, India.

## 2. Energy and Oil Supply/Demand Outlook for 12 Asian Countries

- (1) Final energy demand: Up 4.4% annually from 1996 to 2020
- Transportation sector demand: Up 4.6% annually from 1996 to 2020
  - Number of automobiles: Up 7.6% annually for China, 6.0% for India, and 4.1% for Asian NIES
- (2) Primary energy supply: Up 4.4% annually from 1996 to 2020 (4.4% for China and 4.9% for India)
- (3) Net energy imports: Up 8.5% annually from 1996 to 2020 (China turning from an exporter to an importer, 7.8% for India)
- Of total imports, China will account for 30%, India for 24% and Asian NIES for 39%.
- Of total imports, oil will account for 69% and coal for 27%.

## 3. Asian Countries' Increasing Dependence on Oil Imports

- |           |               |       |         |
|-----------|---------------|-------|---------|
| (1) Asia  | 40.4% in 1996 | 71.5% | in 2020 |
| (2) China | 9.3%          | 54.9% |         |
| (3) India | 59.9%         | 85.7% |         |

## 4. Asian Countries' Expansion of Net Oil Imports and Dependence on Middle East

Asian countries (all) are projected to boost their net oil imports from non-Asian countries from 11.1 million barrels per day in 1996 to 18.8 million barrels per day in 2010 and to 28.7 million barrels per day in 2020. An increase from 1996 to 2020 is 17.6 million barrels per day.

Net oil imports of the 12 Asian countries are expected to increase by about 16 million barrels per day from 4.5 million barrels per day in 1996 to 20.6 million barrels per day (including 5.2 million barrels per day for China and 4.2 million barrels per day for India) in 2020. If Asian countries (all) depend on the Middle East for most of the increase, their dependence on the Middle East will rise from 78% (in 1998, from BP

Amoco statistics) to 95% (one million barrels per day projected to come from other regions than the Middle East). This will become a serious energy security problem for Asian countries.

#### 5. Oil Price Hikes' Adverse Effects on Asian Economies

A crude oil price hike of 5 U.S. dollars per barrel in 1999 is estimated to have led to a GDP loss of 0.9% for South Korea, the Philippines and Thailand, 16% for Singapore, 0.5% for Taiwan and 0.2% for China and Japan (see Table 3). Asian countries other than Japan were less affected by oil crises in the 1970s as their dependence on oil or oil imports was lower.

By 2010 or 2020, China and other Asian countries will considerably expand oil imports. Indonesia and other Asian oil-exporting nations, which now benefit from oil price hikes, will become importers on domestic demand expansion to get adverse economic effects of such hikes. In this way, oil price hikes' adverse effects on Asian economies will grow greater. This will become a grave energy security problem.

(This paper was presented at the US-Japan energy policy dialog held in Washington D.C. on November 16, 17, 2000.)

TABLE 1 POPULATION, REAL GDP, PRIMARY ENERGY DEMAND, OIL  
DEMAND AND OIL IMPORTS IN ASIA AND WORLD

POPULATION, REAL GDP, PRIMARY ENERGY DEMAND, OIL DEMAND AND OIL IMPORTS IN ASIA AND WORLD						
			1973	%	1998	%
POPULATION	million	WORLD	3874.7	100.0	5838.5	100.0
		ASIA	2285.4	59.0	3192.6	54.7
		ASIA excl. JAPAN	2176.7	56.2	3066.1	52.5
		JAPAN	108.7	2.8	126.5	2.2
REAL GDP	billion US\$90					
	using exchange rates	WORLD	13457.1	100.0	25941.5	
		ASIA	2241.8	16.7	5647.3	21.8
		ASIA excl. JAPAN	651.4	4.9	2343.7	9.0
		JAPAN	1590.4	11.8	3303.6	12.8
PRIMARY ENERGY DEMAND						
	million B/DOE	WORLD	120.9	100.0	189.8	100.0
		ASIA	23.1	19.1	55.5	29.3
		ASIA excl. JAPAN	16.6	13.7	45.3	23.9
		JAPAN	6.5	5.4	10.2	5.4
OIL DEMAND						
	million B/D	WORLD	54.24	100.0	67.7	100.0
		ASIA	8.1	14.9	15.4	22.8
		ASIA excl. JAPAN	2.9	5.3	10.2	15.1
		JAPAN	5.2	9.6	5.2	7.7
SHARE OF OIL						% change
	PERCENT	WORLD	44.9		35.7	(9.2)
	(%)	ASIA	35.0		27.8	(7.2)
		ASIA excl. JAPAN	17.3		22.5	5.2
		JAPAN	80.6		51.1	(29.5)
OIL IMPORTS						
	million B/D	WORLD	-1.0		-1.2	
		ASIA	5.8		9.2	1.9%/y
		ASIA excl. JAPAN	0.3		4.0	11.7%/y
		JAPAN	5.5		5.2	-0.2%/y

TABLE 2 OUTLOOK FOR POPULATION, REAL GDP, PRIMARY ENERGY  
DEMAND, OIL DEMAND AND OIL IMPORTS IN ASIA AND WORLD

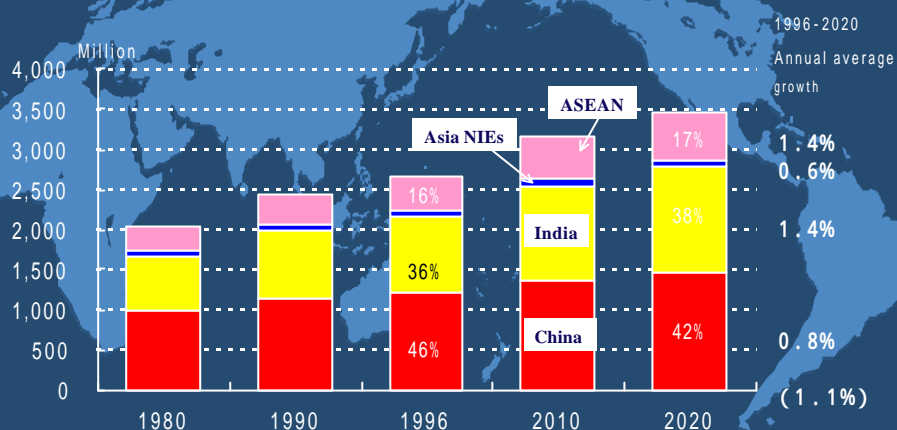
			1996	%	2010	%	2020	%	2020/1996
POPULATION	million	WORLD	5680.3	100.0	6,722.0	100.0	7,581.1	100.0	1.2
		ASIA -TOTAL	3066.1	54.0	3,623.4	53.9	3986.7	52.6	1.1
		ASIA(13)	2788.9	49.1	3,284.8	48.9	3592.2	47.4	1.1
		ASIA(12) excl JAPAN	2663.0	46.9	3,157.8	47.0	3466.2	45.7	1.1
		JAPAN	125.9	2.2	127.0	1.9	126.0	1.7	0.0
REAL GDP	billion US\$90								
	using exchange rates	WORLD	24509.1	100.0	37,579.3	100.0	50995.9	100.0	3.1
		ASIA -TOTAL	5896.4	24.1	9,110.0	24.2	13384.9	26.2	3.5
		ASIA(13)	5731.6	23.4	8,855.3	23.6	13010.6	25.5	3.5
		ASIA(12) excl JAPAN	2379.9	9.7	4,839.3	12.9	8219.5	16.1	5.3
		JAPAN	3351.6	13.7	4,015.9	10.7	4791.2	9.4	1.5
PRIMARY ENERGY DEMAND									
	million B/D OE	WORLD	188.5	100.0	230.2	100.0	275.0	100.0	1.6
		ASIA -TOTAL	56.1	29.8	88.5	38.5	137.3	49.9	3.8
		ASIA(13)	45.9	24.4	72.4	31.5	112.3	40.8	3.8
		ASIA(12) excl. JAPAN	35.7	19.0	60.7	26.4	100.3	36.5	4.4
		JAPAN	10.2	5.4	11.7	5.1	12.0	4.4	0.7
OIL DEMAND									
	million B/D	WORLD	66.0	100.0	89.4	100.0	105.3	100.0	2.0
		ASIA -TOTAL	17.2	26.0	25.3	28.3	35.4	33.7	3.1
		ASIA(13)	16.6	25.2	24.5	27.4	34.3	32.6	3.1
		ASIA(12) excl. JAPAN	11.1	16.9	18.8	21.1	28.6	27.2	4.0
		JAPAN	5.5	8.3	5.7	6.4	5.7	5.4	0.2
SHARE OF OIL									3.3
	PERCENT	WORLD	35.0		38.8		38.3		3.3
	%	ASIA -TOTAL	30.6		28.6		25.8		-4.8
		ASIA(13)	36.2		33.9		30.5		-4.8
		ASIA(12) excl. JAPAN	31.2		31.0		28.5		-2.7
		JAPAN	53.7		48.8		47.7		-6.0
OIL IMPORTS									
	million B/D	WORLD	-0.1		0.0		0.0		
		ASIA -TOTAL	11.1		18.8		28.7		4.0
		ASIA(13)	10.1		17.1		26.2		4.0
		ASIA(12) excl. JAPAN	4.5		11.4		20.5		6.5
		JAPAN	5.6		5.7		5.7		0.1

TABLE 3 MAIN ECONOMIC INDICATORS AND INFLUENCES OF CRUDE OIL  
PRICE RISES IN ASIAN COUNTRIES (1999)

EDMC, IEEJ  
2000.9.25

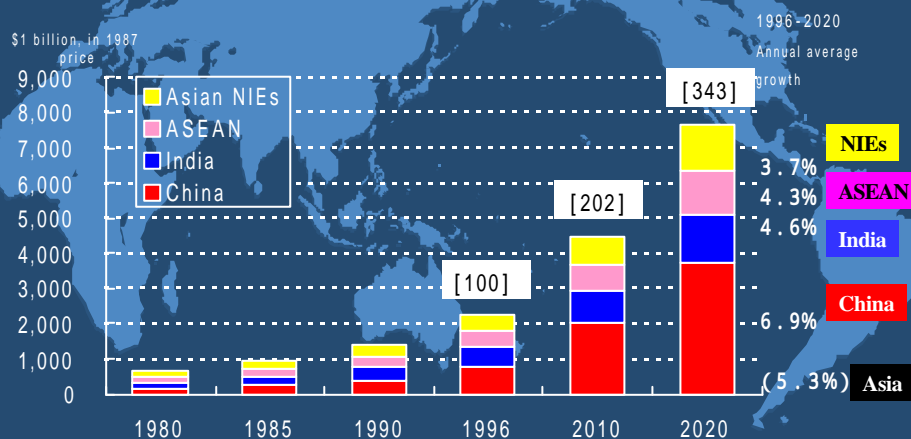
	China	NIES	Taiwan	South Korea	Singapore	ASEAN	Indonesia	Malaysia	Philippines	Thailand	Japan
Oil Dependency in Primary Energy Supply	18.9%	57.4%	48.2%	56.2%	94	42.7%	32.5%	55.1%	48.6%	49.7%	51.1%
% of Oil Import Amounts in GDP	0.7%	4.3%	1.9%	4.4%	11.8	2.5%	1.5%	1.7%	3.2%	3.7%	0.8%
% of Import Amounts in Total Import Amounts	4.4%	9.8%	5.2%	15.0%	8.7	6.1%	8.6%	2.1%	7.5%	9.1%	11.7%
Oil Demand / GDP	0.220	0.215	0.139	0.258	0.276	0.333	0.405	0.339	0.286	0.295	0.069
GDP (Billion US\$)	991.1	780.6	288.7	406.9	84.9	420.5	140.7	78.7	76.5	124.4	4346.8
Net Crude oil Imports (10 <sup>4</sup> B/D)	59	399	70	239	89	14	-59	-29	32	70	432
Trade Balances (Billion US\$)	36.2	50.5	15.3	23.9	11.3	62.3	24.7	19.1	5.0	13.5	123.0
Influence of US Five Dollars per Barrel Rises											
Amount Increases for Oil Imports (Billion US\$)	1.6	6.5	1.5	3.6	1.4	0.2	-1.1	-0.5	0.7	1.1	9.1
Losses in GDP	-0.2%	-0.8%	-0.5%	-0.9%	-1.6	0.0%	0.8%	0.6%	-0.9%	-0.9%	-0.2%

**FIG. 1 ASSUMPTION OF POPULATION  
IN ASIA**



3

**FIG. 2 ASSUMPTION OF GDP IN ASIA**



4

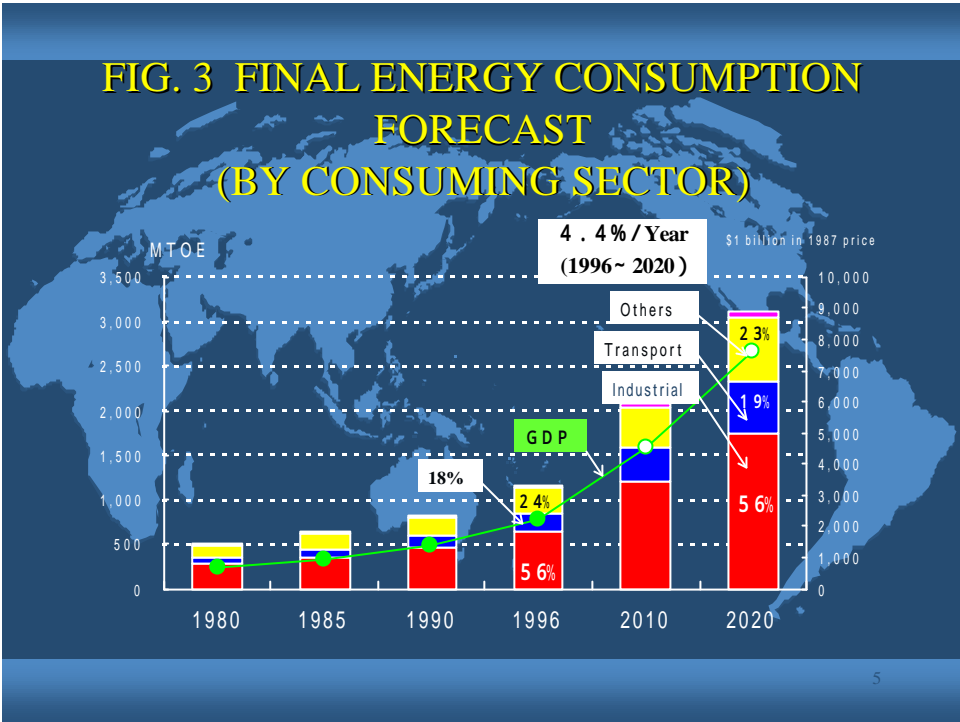


FIG. 4 PER CAPITA GDP AND CARS PER 1000 PEOPLE

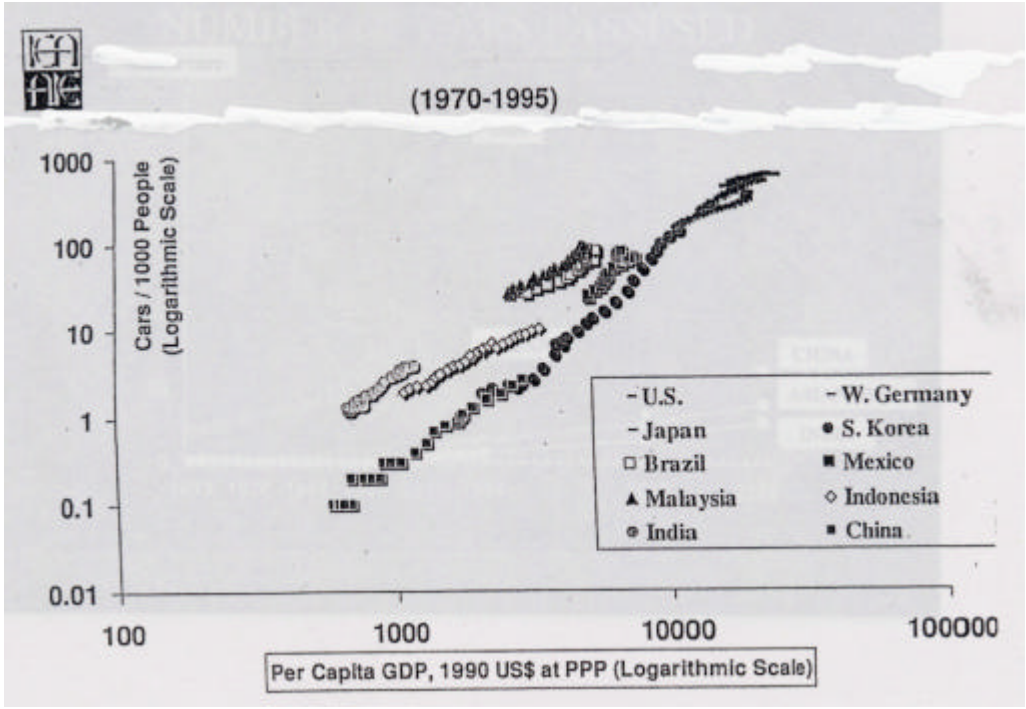
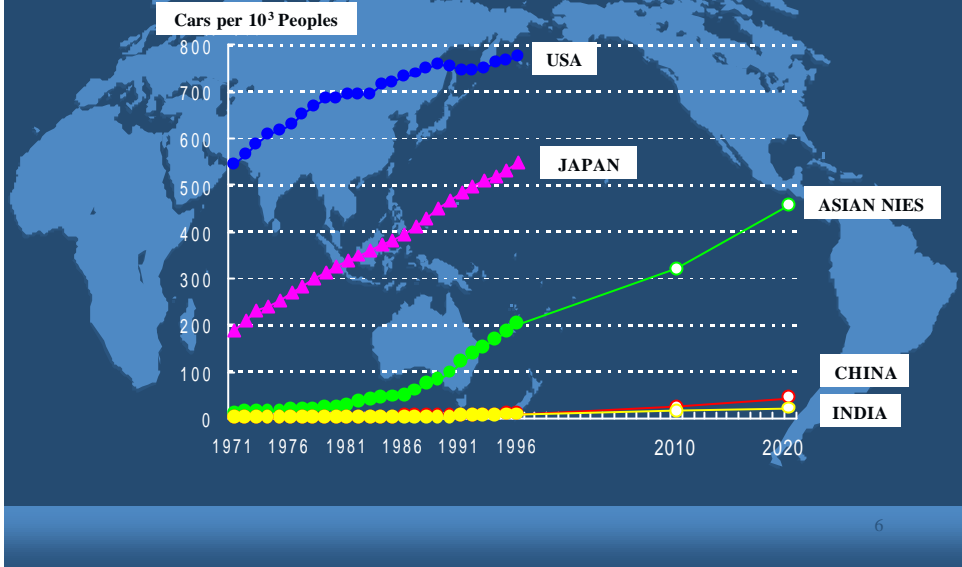
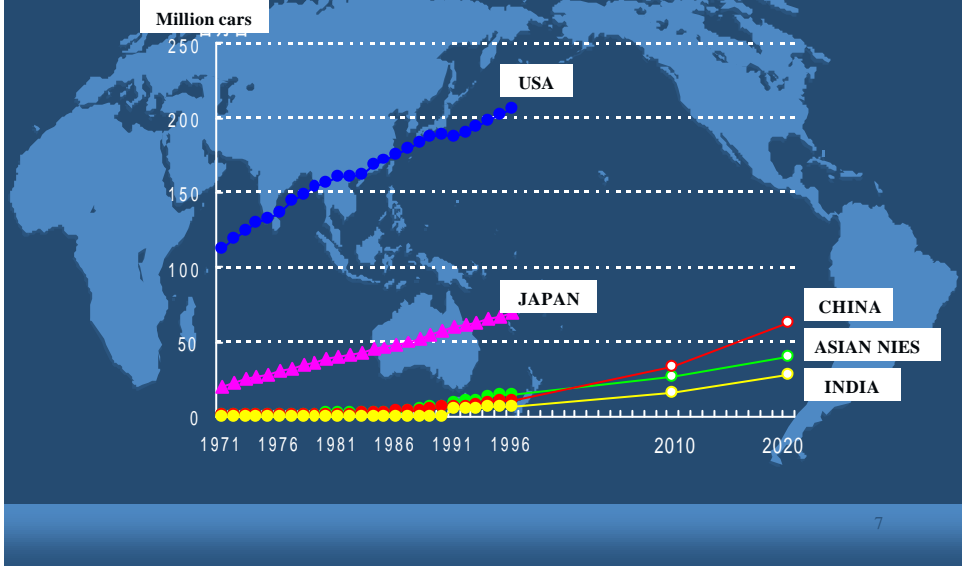


FIG. 5 EVOLUTION AND OUTLOOK FOR THE NUMBER OF CARS PER THOUSAND PEOPLE



6

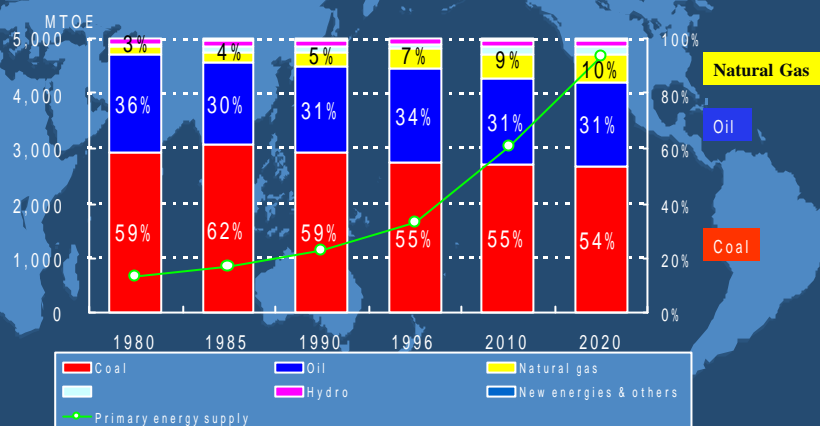
FIG. 6 EVOLUTION AND OUTLOOK FOR NUMBER OF CARS PASSESED



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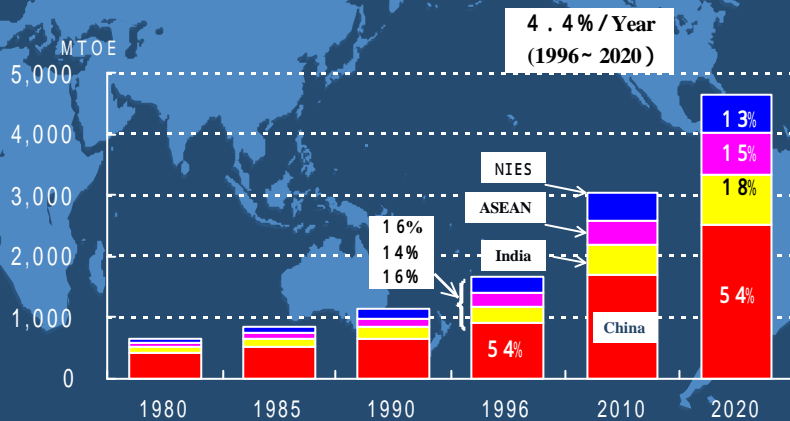


**FIG. 7 PRIMARY ENERGY SUPPLY MIX FORECAST**



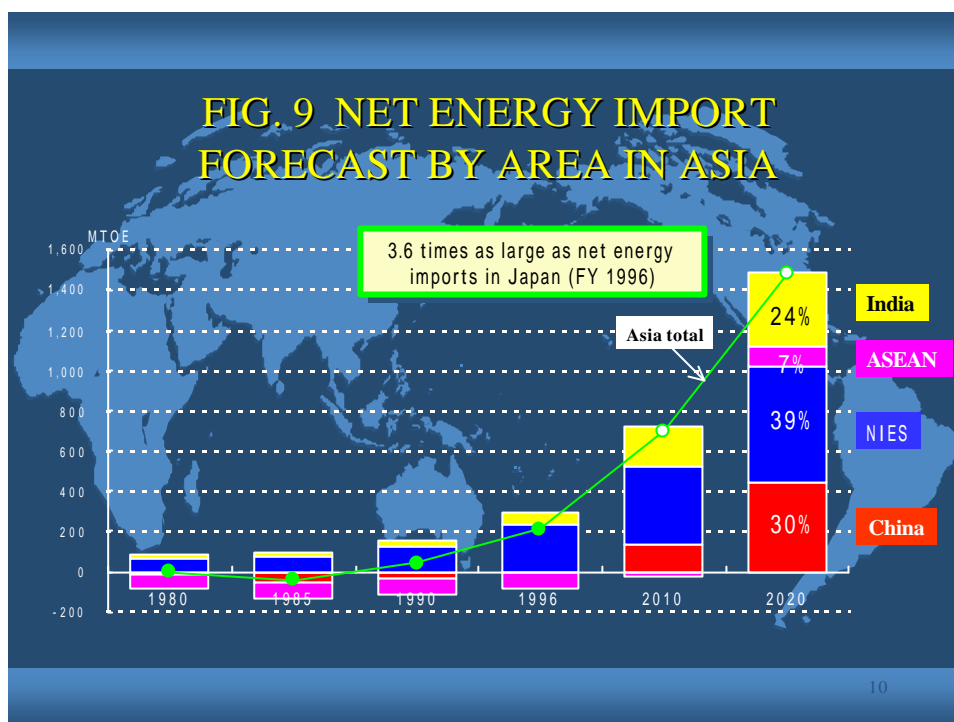
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**FIG. 8 PRIMARY ENERGY SUPPLY OUTLOOK BY AREA IN ASIA**

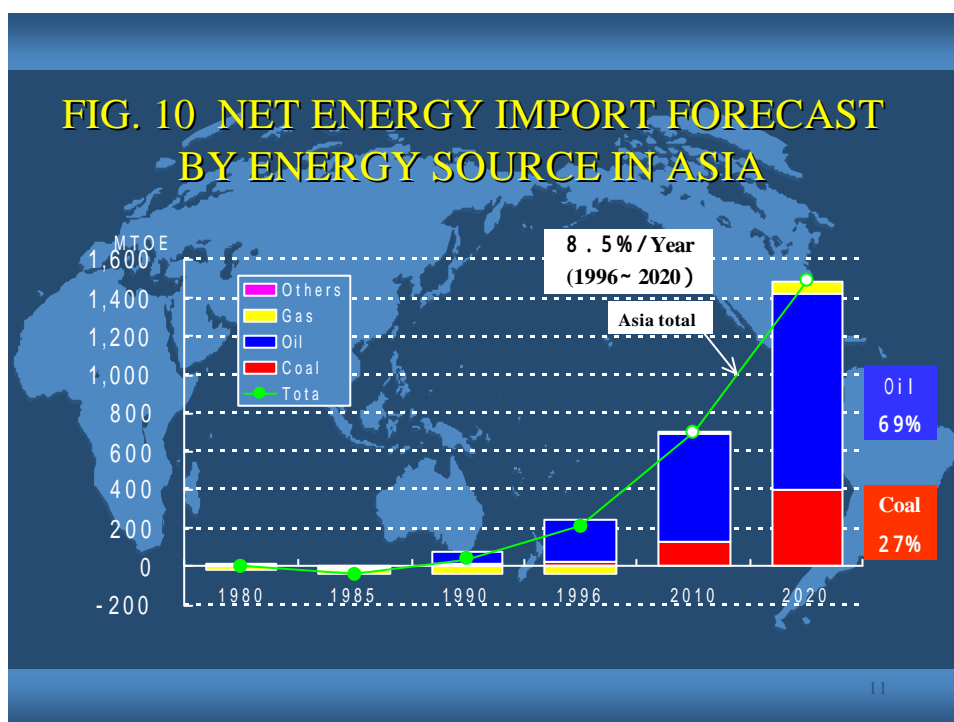


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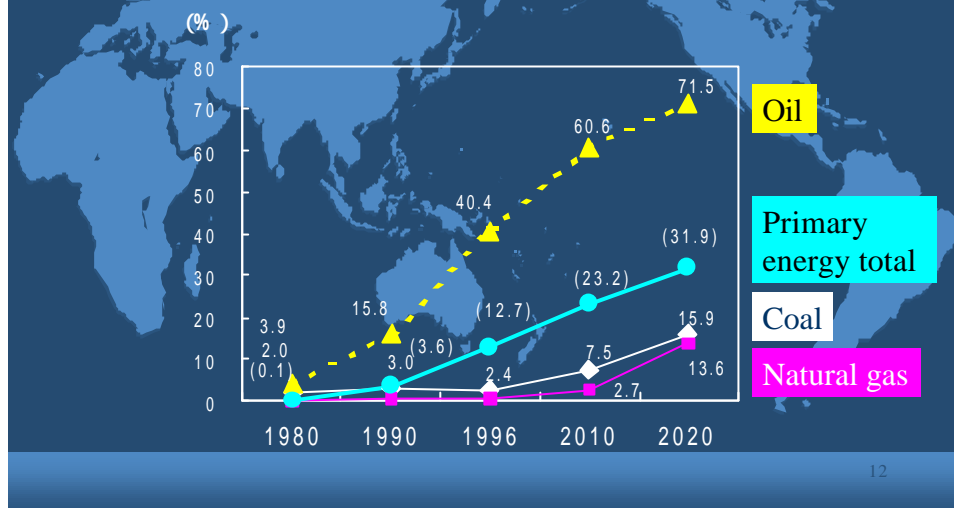
**FIG. 9 NET ENERGY IMPORT FORECAST BY AREA IN ASIA**



**FIG. 10 NET ENERGY IMPORT FORECAST BY ENERGY SOURCE IN ASIA**

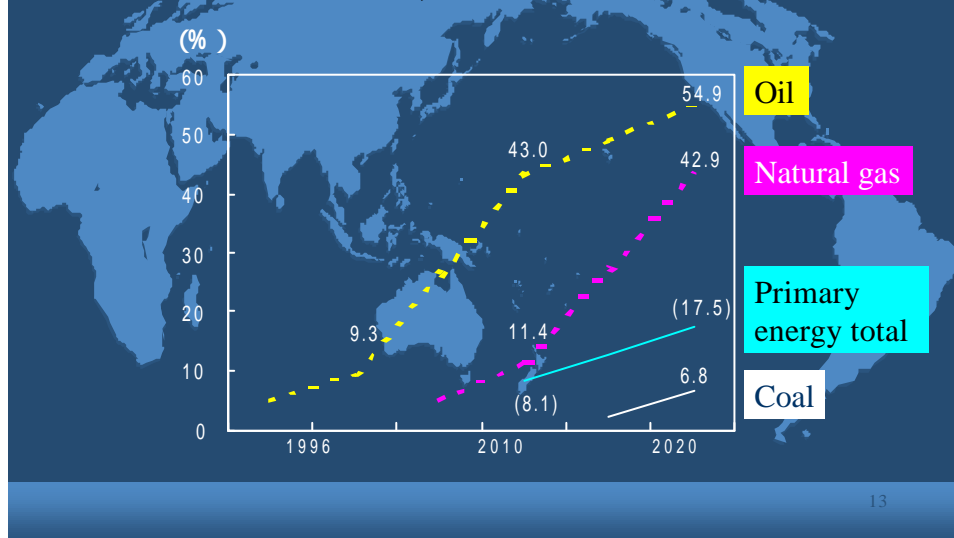


**FIG. 11 OUTSIDE DEPENDENCY OF OIL,  
NATURAL GAS, AND COAL IN ASIA  
ASIA 12 ECONOMIES**



12

**FIG. 12 OUTSIDE DEPENDENCY OF OIL,  
NATURAL GAS, AND COAL IN CHINA**



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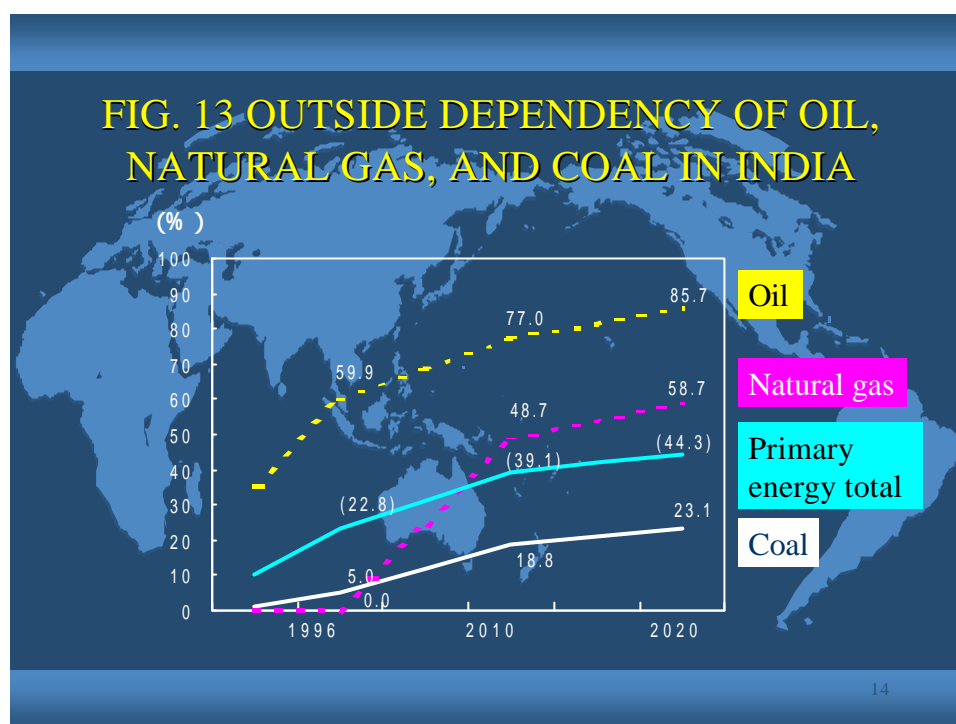


TABLE 4 OUTLOOK FOR OIL IMPORTS IN CHINA AND INDIA

	1996	2010	2020
IEEJ			
CHINA	0.3	2.7	5.2
INDIA	1.0	2.5	4.2
12 ASIAN ECONOMIES	4.5	11.4	20.5
IEA2000 (DOE 2000)			
CHINA	0.5	4.6	8.5
			(6.5)
DEVELOPING ASIAN ECONOMIES	5.3	15.2	25.3