Outlook of Supply and Demand of Petroleum Products in Asia

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I. International Working Group for Study of Supply and Demand of Petroleum Products Taking Account of Products Quality in 2001

1. Activity Background

The Institute of Energy Economics Japan set up International Working Group to analyze future supply and demand of international petroleum products in East Asian region except Japan*, in response to consignation of Ministry of Economy, Trade and Industry.

It is named Investigation of petroleum products quality related to supply and demand measure in 2001. (Subtitled Investigation of trends in supply and demand of petroleum products to make use of Econometric model)

This fiscal year, International Working Group investigated the supply and demand balance of international petroleum products in 2005 and 2010, reexamining the Economic conditions and oil demand in East Asian countries that are concerned about the impact of economic uncertainty such as U.S. economic recession and IT depression, etc.

*Note: We abbreviate East Asian region except Japan to East Asian region from now on.

About International Working Group

Till last year, International Working Group was established directly under the Petroleum Products Demand Estimation Committee*, a private advisory organization of the Director General of the Agency of Natural Resource and Energy. Its objective is to analyze future supply and demand of international petroleum products in East Asian region since 1996.

Although the former International Working Group was abolished in 2001, the Institute of Energy Economics Japan did continuative research in response to consignation of Ministry of Economy, Trade and Industry so that the international supply and demand prospect of the petroleum products in the East Asian region is still important.

*Note: Owing to the ministries-and-government-offices reorganization in January, 2001, International Subcommittee turned into International Working Group. Finally four WG including this WG were abolished in the 2001 fiscal year.

2. Focused Issues in FY2001

① Oil demand hanged low under the influence of an economic crisis in 1998 and as a result, the great deal of petroleum products were exported especially in Korea, etc that had enough ability to supply, however, the supply and demand balance of

petroleum products in East Asian region came to be import position, because volume of import in China was larger than the exports.

After that, although oil demand slowly started to show a sign of recovery according to the recovery keynote of the economy in Asian countries after the middle of 1999, big changes which would influence the future Asian economy and oil demand have been generated due to the crude-oil price hike and the U.S. recession, etc.

② On the other hand, since it is supposed that China with enormous oil demand will maintain economic growth at an annual rate of about 7%, the influence of the oil demand growth in China corresponding to the economic growth of China, reinforcement of refining equipment in China, and furthermore influence of the trade liberalization by the affiliation to WTO are taken into consideration as the key factors in order to estimate future supply and demand.

Based on the above variable factors, the future trend of the supply and demand balance in the East Asian region was examined.

Ⅱ. Background of International Working Group Study

1. Progress of International Working Group in 2001

(1) Four meetings were held since August 2001 to analyze future supply and demand of international petroleum products focusing on those in East Asian region*.

(*Note: In this report, the East Asian region refers to China, Republic of Korea, Chinese Taipei, Hong Kong, Singapore, Brunei, Indonesia, Malaysia, Philippines, Thailand, and Vietnam.)

(2) The investigation in FY2001 was done with the consciousness of issues as described in the previous page by integrating knowledge of the Working Group members with the help of combined econometric and linear programming models developed by the Energy Data and Modelling Center, the Institute of Energy Economics, Japan.

　The future world supply and demand of energy and petroleum being investigated, in particular, special interest has been focused on that in East Asian region.

(3) Two cases are set as follows reflecting recovery from Asian monetary crisis.

Base case (Business As Usual)

　In this case, economic growth rate as the premise of petroleum products demand was set basically using economic outlooks of corresponding country's governments, international organization and quasi-organizations as such. The recovery from Asian monetary crisis is also taken into consideration in the assumptions. The average economic growth rate of East Asian region from 2000 to 2005 is set at 4.9%.

　And the average economic growth rate of East Asian region from 2005 to 2010 is set at 5.6%. Demand of petroleum products was calculated on the above premises.

　As for supply assumptions, realistic domestic plans for refining capacity expansion are adopted.

Low GDP growth case

　Recovery from the Asian monetary crisis is assumed to be slower than in base case, so that economic growth rate is lower by 1.0% after the year 2002 to the year 2010 compared with that in base case.

　The growth rate is assumed to be 4.1% from 2000 to 2005 and 4.6% from 2005 to 2010. About two cases, assumptions of economic growth rate of each country in East Asia by 2010 are shown in Table 1.

　Supply side assumptions are set all the same with the base case.

Table 1 GDP Growth Rate Assumption of each Country in East Asia

Unit: Average annual growth rate(%)

	Actual		Base case		Low GDP growth case	
	2000/99	2001/00*	2005/00	2010/05	2005/00	2010/05
China	8.0	7.3	7.1	6.5	6.3	5.5
Hong Kong	10.5	-0.4	3.3	4.0	2.5	3.0
Chinese Taipei	5.9	-2.0	2.4	5.0	1.6	4.0
Korea	8.8	2.0	4.1	4.9	3.3	3.9
Singapore	9.9	-3.0	2.6	5.0	1.8	4.0
Brunei	3.0	3.0	3.0	2.8	2.2	1.8
Indonesia	4.8	3.2	4.4	5.5	3.6	4.5
Malaysia	8.3	0.8	4.4	5.5	3.6	4.5
Philippines	4.0	2.7	4.1	4.9	3.3	3.9
Thailand	4.3	1.5	3.3	4.6	2.5	3.6
Vietnam	6.1	6.0	6.0	7.2	5.2	6.2
Average East Asia	6.3	3.2	4.9	5.6	4.1	4.6

(Soureces) Base case and low GDP growth case forcasted by International Working Group, the long-term economic plans and prospects from Asian Development Bank, the government of each country and related are regarded.
2001/00*: Estimation of Asian Development Bank.

Assumption of a Crude Price

The prospect of "World Oil Price" of the Annual Energy Outlook 2002(US DOE) is used for this crude oil price assumption.

Table 2 Assumption of a Crude Oil Price ($/bbl)

	2000	2005	2010	2015	2020
Nominal price ($/bbl)	27.7	25.7	29.9	35.0	42.1
FY2000 Real price($/bbl)	27.7	22.7	23.4	24.0	24.7

(Source) US DOE, Annual energy outlook 2002.
(Note) Nominal price is calcurated by International Working Group using the deflators of the Annual energy outlook 2002.

2. Summary of Working Group Results

(1) Oil demand in East Asian region
- Oil demand in East Asian region will slow down from 1999 -

① Oil Demand in East Asian Countries

Oil demand in East Asian region, which was damaged by economic crisis, began to recover in 1999. But for most countries, the ratio of demand increase has slowed down from 1999 to 2000.

Despite the economic crisis in the region, oil demand in China has been increasing. As a result, the increase of oil demand in China occupied about 2/3 of that of East Asian region from 1999 to 2000. On the other hand, Thailand and Philippines have been decreasing in terms of absolute quantity over the same period (figure-1 and figure-2).

Fig-1 Oil Demand of East Asian Countries
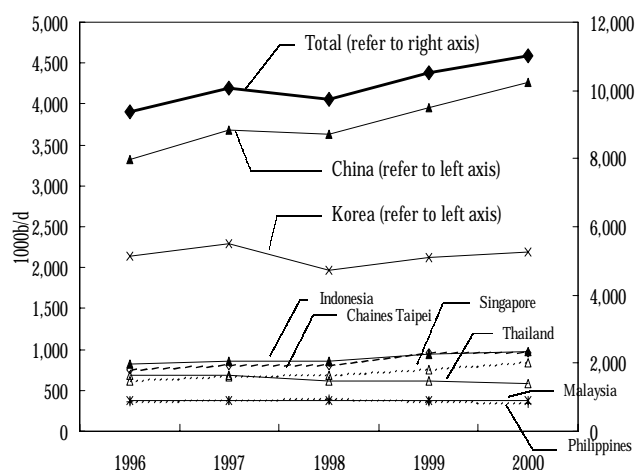
Fig-2 The Rate of Increase of Oil Products Demand in East Asian Countries
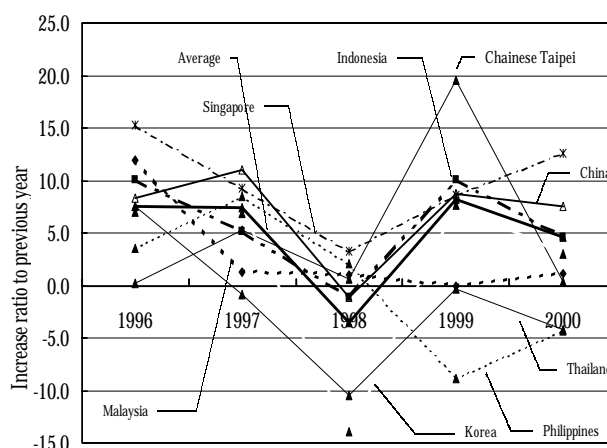
(Source) Estimated by International Working Group, regarding to following information; IEA, Energy balances of OECD countries 1960-1999, Energy balances NON-OECD countries 1960-1999, Oil market report, Blackwell, Oil and energy trends annual statistics review 2001, and so on.

②. Forecasts of petroleum products demand in 2005 and 2010

<Base Case>

It is predicted that demand for petroleum products in the East Asian region will slowly recover till 2005 (figure-3). Based on the demand in 1999, the average annual growth rate of demand by 2005 is 3.3%. After that by 2010, we assume that East Asian region will completely recover from the economic crisis, and petroleum products' demand increase at an average annual rate of 3.4%.

By country, petroleum products' demand of China that with great demand Malaysia, and Vietnam are expected to increase comparatively favorably till 2005.

On the other hand, it is expected that the demand of Chinese Taipei, Thailand, and Philippines will make little increase. After that by 2010, petroleum products' demand in most countries is expected to recover, however, since Chinese petroleum products' demand is expected to have a slightly lower growth rate during that period, it is expected that the demand in East Asian region will show almost same growth rate from 1999 to 2005 period.

Fig-3 Petroleum Products Demand in East Asia Region - Excluding Japan-
(Base Case and Low GDP Growth Case)
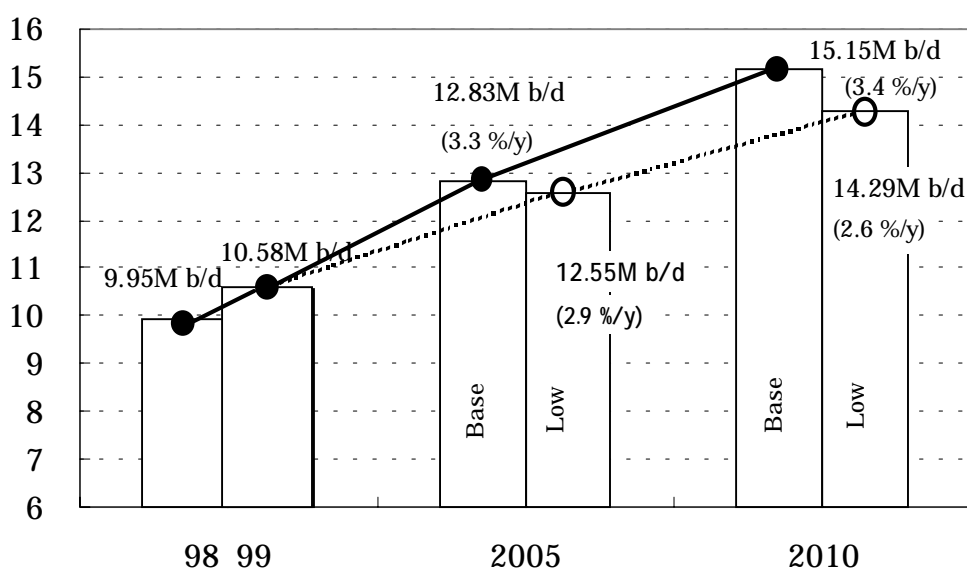
Tabel-3 Petroleum Products Demand in East Asia Region - Excluding Japan-

	1,000 b/d			Increase 1,000 b/d		Growth rate %	
	1999	2005	2010	99-05	10-05	05/99	10/05
China	3,960	5,200	6,250	1,240	1,060	4.7	3.8
Hong Kong	290	330	370	40	40	2.3	2.2
Chinese Taipe	960	1,060	1,170	100	120	1.6	2.1
Korea	2,130	2,470	2,770	340	300	2.5	2.3
Singapore	750	780	850	30	70	0.7	1.7
Brunei	10	10	10	0	0	2.8	2.9
Indonesia	940	1,180	1,420	230	240	3.7	3.8
Malaysia	380	520	650	140	140	5.2	4.8
Philippines	360	380	520	30	140	1.2	6.3
Thailand	660	700	830	40	140	1.0	3.6
Vietnam	150	220	300	60	90	5.9	6.8
Total	10,580	12,830	15,150	2,260	2,320	3.3	3.4
Low GDP growth case	10,580	12,550	14,290	1,970	1,740	2.9	2.6
Refining capacities	12,390	14,270	15,170	1,880	910	2.4	1.2

<Low GDP Growth Case>

In the Low GDP growth case where the economic growth rate in 2002 and

afterwards is 1% lower than Base case, the influence of petroleum products' demand induced by GDP negative growth is expected to be comparatively small by 2005. The reduction width is about 280 thousand b/d as compared with Base case. However, its width is expanded to about 860 thousand b / d in 2010.

(2) Oil refining capacities in East Asian region
  - There are reinforcement of oil refineries in China, and also large-sized oil refinery completion in Chinese Taipei. -

Oil refinery capacities in East Asian region are expected to increase by 1,880 thousand b/d, growing from 12,390 thousand b/d at the end of 1999 up to 14,270 thousand b/d in 2005. Especially the refining capacities in China will increase 1,210 thousand b/d by restructuring petroleum industry in China that leads to abolishment of small scale refineries and reinforcement of large ones. Then refinery capacities in Chinese Taipei will also increase 300 thousand b/d by the completion of new refineries. After the year 2005, oil refining capacities are expected to increase by 900 thousand b/d to 15,170 thousand b/d in 2010. (Among then, China will increase by 600 thousand b/d.)

Table-4 Differences between Refining Capacities and Petroleum Products Demand in East Asian Region (Base Case)- Excluding Japan-

Unit: 1,000 b/d				Increase	
	1999	2005	2010	1999-2005	2005-2010
Refining capacities	12,390	14,270	15,170	1,880	900
Petroleum products demand	10,580	12,830	15,150	2,260	2,320
Supply surplus	1,810	1,440	20	(-380)	(-1,420)

Fig-4 Capacities of Oil Refineries and Petroleum Products Demand in East Asian Region - Excluding Japan-
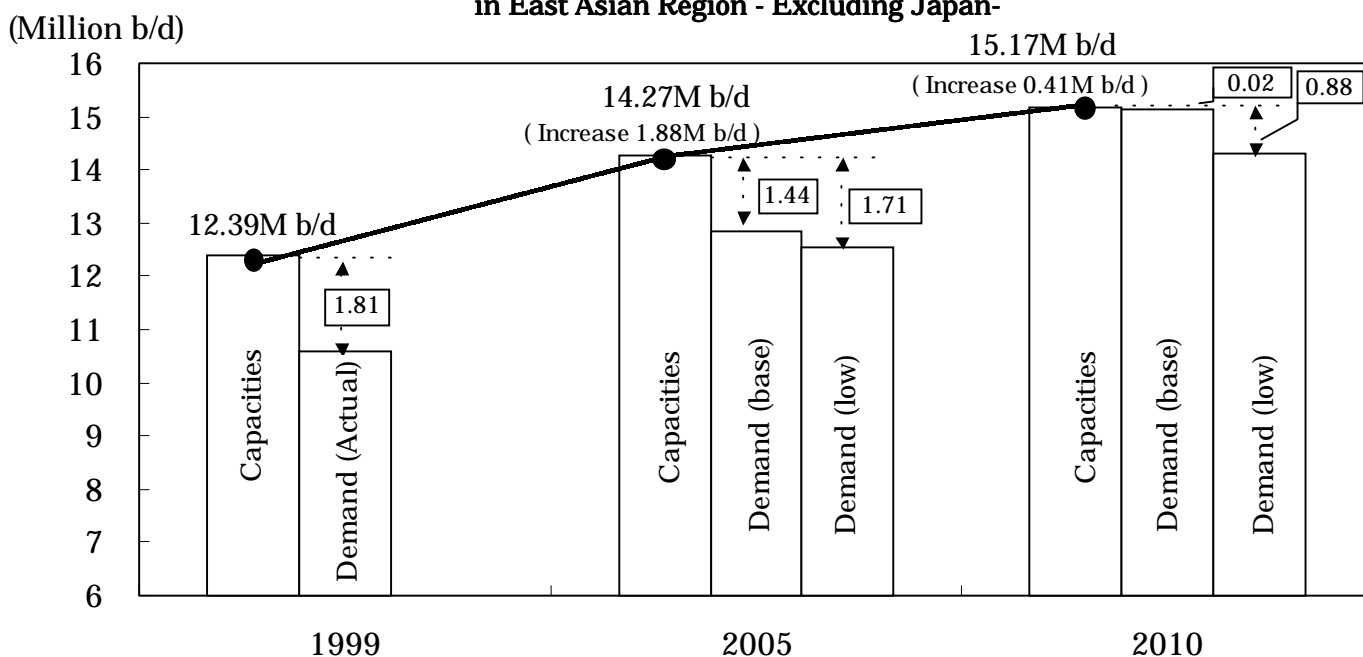
Fig-5 Capacities of Oil Refineries and Petroleum Products Demand in China
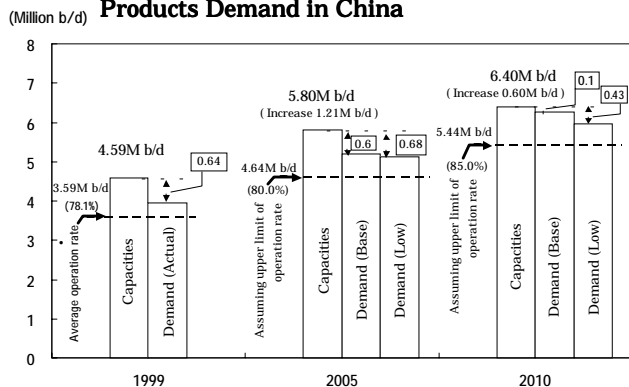
Fig-6 Capacities of Oil Refineries and Petroleum Products Demand in Korea
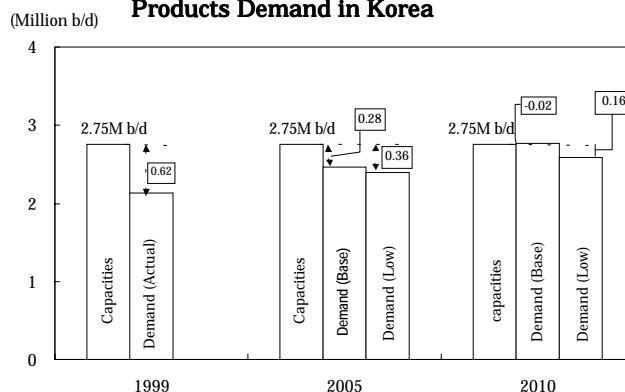
The gap, what's called supply surplus, between oil refining capacities without operation rates being taken into account and demand was 1,810 thousand b/d in 1999, it will decrease to 1,440 thousand b/d in 2005, and further down to 20 thousand b/d in 2010.

In this case where the demand grows more slowly, the reduction tendency of this supply surplus is the same as in Base case. It will be expected that supply surplus is reduced to 1,710 thousand b/d in 2005, and to 880 thousand b/d in 2010.Without any more establishment / reinforcement of oil refinery, it will be expected that refining capacity will fail to meet the demand in East Asian region in 2010.

Although the real maximum operating-ratio of China is to improve by reinforcement of large-scale oil refinery, etc. since the existing old oil refineries (real operating ratio is low) are to remain, it is expected that operating ratio reaches only about 85% in 2010, on an average. Therefore, shortage of supply in both cases of the Base and Low GDP growth case is to be generated in substance.

(3) In 2005, Supply and demand balance of petroleum product in East Asian Region will keep import position by 410 thousand b/d.
In 2010, the gap will become wider, namely 1,340 thousand b/d (in Base case)

In the "Base case", petroleum products demand in East Asian region is expected to increase by 2,260 thousand b/d totally, Especially it will increase by 1,240 thousand b/d in China and by 340 thousand b/d in Korea in 2005 compared with 1999

On the other hand, as compared with 1999, the refining capacity in the East Asian region in 2005 will increase by about 1,880 thousand b/d by refining equipment reinforcement in china, etc. (figure-4, 5 and 6).

Moreover operating ratio of oil refinery also going up, as a result, the amount of production is to increase by 2,320 thousand b/d that will exceed the demand. Therefore it is expected that the petroleum products supply and demand balance, which was in import position of 470 thousand b/d in 1999, will keep the import position of 410 thousand b/d in 2005. (270 thousand b/d import position by fuel oil* sum total)

*Fuel oil consists of Gasoline, naphtha, kerosene, jet fuel, gas oil, and heavy fuel oil.

   Moreover, it is expected that oil demand in China will increase 1,060 thousand b/d, and also oil demand in South Korea will increase 300 thousand b/d etc, till 2005. Therefore the petroleum product demand in East Asian region in Base case will increase up to 2,320thousand b/d in 2010. (It will increase to 2,020 thousand b/d in the fuel oil sum total.)

   On the other hand, although oil refinery operating ratio goes up further, it is expected the increase of the quantity of production will reach only 1,390 thousand b/d that is 930 thousand b/d lower than demand, since the refining capacity in the East Asian region in 2010 will increase only about 900 thousand b/d compared with 2005 in the present plan. Therefore quantity of net petroleum products import will increase to 1,340 thousand b/d in 2010. (It will increase to 1,020 thousand b/d in the fuel oil sum total) compared with year 2005 that will expected to be 410 thousand b/d.

   At this time, even if every country makes refining equipment of its own operate at full swing, it is predicted in East Asian region that many countries cannot satisfy their domestic demand.

   Although especially in china net petroleum product import will expect to be 820 thousand b/d, there will be no problem for importing if abolition of import quota will be done in 2006 on schedule.

Table-5 Petroleum Products Supply and Demand in East Asian region (Base Case)- Excluding Japan-

Unit: 1,000 b/d				Increase	
	1999	2005	2010	1999-2005	2005-2010
Petroleum products demand	10,580	12,830	15,150	2,260	2,320
Petroleum products production	10,110	12,430	13,820	2,320	1,390
Demand-supply gap in East Asia	-470	-410	-1,340	(70)	(-930)
Demand-supply gap in China*	-370	-560	-820	(-190)	(-260)
Refinery utilization in East Asia	81.6%	87.1%	91.1%	(5.5%)	(4.0%)

   （Notes）Because of rounding off, demand-supply gaps are not equal to differences between petroleum
        product demand and production in this table.

     * Demand-supply gap in china is included in East Asia's.

Fig-7 Demand-Supply Gap of Petroleum Products in East Asia (Excluding Japan)

(Demand-Supply Gap) = (Petroleum Products Production) - (Demand)

(1,000 b/d)

Net export

Net import

-125 kb/d

-282 kb/d

-521 kb/d

-471 kb/d

-407 kb/d

-478 kb/d

Low GDP growth case

Base case

-1,338 kb/d

400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400

1997 1998 1999   2005   2010
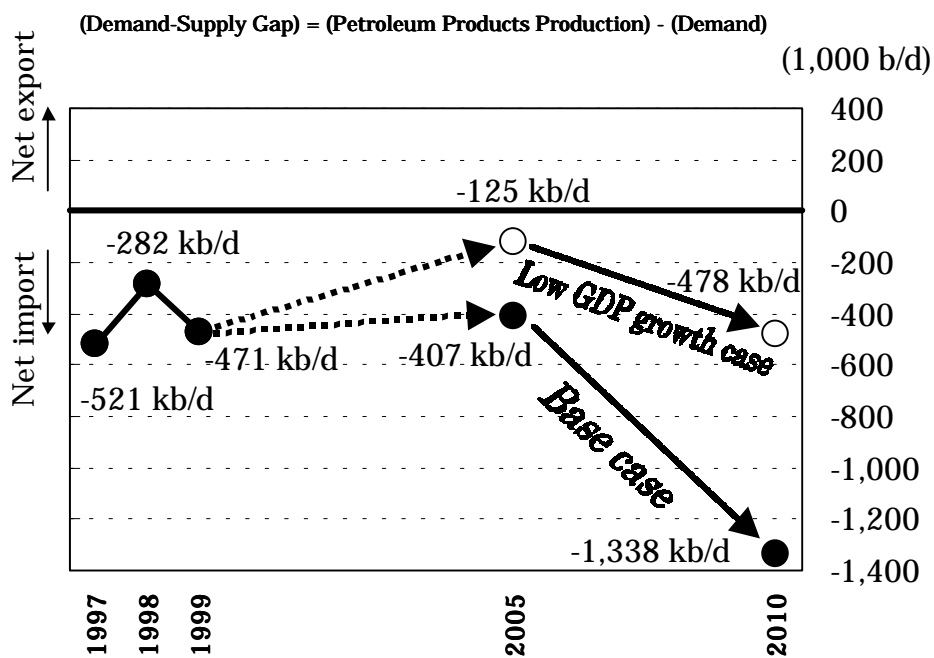
Fig-8 Demand-Supply Gap of Fuel Oil in East Asia (Excluding Japan)

(Demand-Supply Gap) = (Fuel Oil Production) - (Demand)

(1,000 b/d)

Net export

Net import

-27 kb/d

-197 kb/d

-256 kb/d

-397 kb/d -409 kb/d

-272 kb/d

Low GDP growth case

Base case

-1,020 kb/d

200
0
-200
-400
-600
-800
-1,000
-1,200

1997 1998 1999   2005   2010
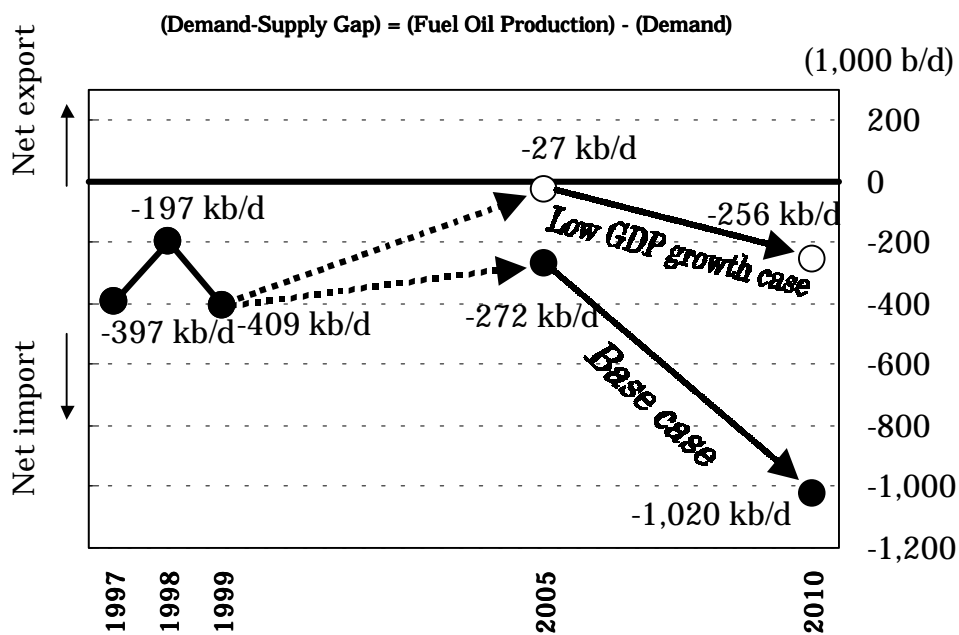
(4) When recovery of petroleum products demand in East Asian region is slow, the balance of it will keep the import position of 130 thousand b/d in 2005 and import position of 480 thousand b/d in 2010 (Low GDP growth case).

In the case of the Low-GDP growth case where the GDP growth rate in 2002 and afterwards is 1% lower than that of Base case, the demand in 2005 will decrease by 280 thousand b/d from Base case. Therefore, it is expected that the supply and demand balance of total petroleum products keeps import position of 130 thousand b/d compared with Base case, which is in import position of 410 thousand b/d. The balance of total fuel oil will be the import position of 30 thousand b/d.

In Low GDP growth case, the total oil demand decreases by 860 thousand b/d in 2010 as compared with Base case. Therefore, it is expected that the balance of total petroleum products will be in import position of 480 thousand b/d compared with Base case, which is in import position of 1,340 thousand b/d. The balance of total fuel oil will be in import position of 260 thousand b/d.

3. Sensitivity Analysis at the Time of High Crude Oil Price Case

The Working group have done the sensitivity analysis of petroleum products when the crude price rises up to 5$ as compare with Base case.

When the crude price will rise by 5$, petroleum products demand in 2005 decreases demand of 190 thousand b/d as compared with Base case. Among them petroleum products demand in china decreases demand of 110 thousand b/d.

Then when the crude price will rise by 5$ as the above same assumption, petroleum products demand in 2010 decreases demand of 230 thousand b/d as compared with Base case. Among them petroleum products demand in china decreases demand of 120 thousand b/d.
As a result, the rate of demand reduction will become about 1.5% of the amount of demand.

**Table-6 Comparison of Simulation Cases for Petroleum Product Demand
in East Asian Region (Excluding Japan)**

Unit: 1,000 b/d

	2005			2010		
	Base	Low	5$ up	Base	Low	5$ up
Demand	12,830	12,550	12,650	15,150	14,290	14,930
Difference *	-	-280	-190	-	-860	-230

(Note) *(Difference) = (Each case) – (Base case)

IEEJ: July 2002

<<For information >>
Table-7 Oil Demand of Main East Asian Countries

Unit: 1,000b/d

	1995	1996	1997	1998	1999	2000
China	3,060	3,320	3,680	3,640	3,960	4,260
Chinese Taipei	760	760	800	800	960	960
Korea	2,010	2,150	2,290	1,970	2,130	2,190
Singapore	530	610	670	690	750	840
Indonesia	750	820	860	850	940	980
Malaysia	330	370	380	380	380	380
Philippines	340	350	380	390	360	340
Thailand	640	690	680	610	610	580
East Asia Total	8,720	9,380	10,070	9,720	10,520	11,090

(Sources) Estimated by International Working Group, regarding to following information; IEA, Energy balances of OECD countries 1960-1999, Energy balances NON-OECD countries 1960-1999, Oil market report, Blackwell, Oil and energy trends annual statistics review 2001, and so on.

(Note) East Asia total includes Hong Kong, Brunei, and Vietnam.

Fig-9 Supply and Demand Balance of Petroleum Products in East Asia (excluding Japan) by Country

C.Y. 1999

<- Net Import   Net Export ->

Country	Value
China	-371
Hong Kong	-286
Chinese Taipei	-104
Korea	342
Singapore	139
Brunei	0
Indonesia	-5
Malaysia	-26
Philippines	-28
Thailand	22
Vietnam	-154
EastAsia (excl.Jap.)	-471

(1000B/D)

Negative Figures indicates net import.

2005 (Base Case)

<- Net Import   Net Export ->

Country	Value
China	-559
Hong Kong	-328
Chinese Taipei	43
Korea	146
Singapore	491
Brunei	-4
Indonesia	-165
Malaysia	-28
Philippines	15
Thailand	60
Vietnam	-79
EastAsia (excl.Jap.)	-407

(1000B/D)

Negative Figures indicates net import.

2005 (Low GDP growth Case)

<- Net Import   Net Export ->

Country	Value
China	-482
Hong Kong	-321
Chinese Taipei	61
Korea	218
Singapore	508
Brunei	-3
Indonesia	-146
Malaysia	-12
Philippines	38
Thailand	86
Vietnam	-72
EastAsia (excl.Jap.)	-125

(1000B/D)

Negative Figures indicates net import.

2010 (Base Case)

<- Net Import   Net Export ->

Country	Value
China	-815
Hong Kong	-366
Chinese Taipei	-14
Korea	-154
Singapore	423
Brunei	-6
Indonesia	-264
Malaysia	-165
Philippines	-123
Thailand	182
Vietnam	-36
EastAsia (excl.Jap.)	-1,338

(1000B/D)

Negative Figures indicates net import.

2010 (Low GDP growth Case)

<- Net Import   Net Export ->

Country	Value
China	-534
Hong Kong	-349
Chinese Taipei	39
Korea	26
Singapore	460
Brunei	-4
Indonesia	-198
Malaysia	-109
Philippines	-52
Thailand	256
Vietnam	-13
EastAsia (excl.Jap.)	-478

(1000B/D)

Negative Figures indicates net import.

Fig-10 Supply and Demand Balance of Fuel Oil in East Asia (excluding Japan) by Country

<- Net Import　**C.Y. 1999**　**Net Export ->**

China	-298
Hong Kong	-278
Chinese Taipei	-77
Korea	412
Singapore	66
Brunei	0
Indonesia	-48
Malaysia	-78
Philippines	-15
Thailand	52
Vietnam	-146
EastAsia (excl.Jap.)	-409

-1,500　-1,000　-500　0　500　1,000　1,500
(1000B/D)
Negative Figures indicates net import.

2005 (Base Case)
<- Net Import　**Net Export ->**

China	-468
Hong Kong	-319
Chinese Taipei	43
Korea	294
Singapore	445
Brunei	-2
Indonesia	-159
Malaysia	-65
Philippines	30
Thailand	2
Vietnam	-74
EastAsia (excl.Jap.)	-272

-1,500　-1,000　-500　0　500　1,000　1,500
(1000B/D)
Negative Figures indicates net import.

2005 (Low GDP growth Case)
<- Net Import　**Net Export ->**

China	-407
Hong Kong	-312
Chinese Taipei	60
Korea	353
Singapore	461
Brunei	-1
Indonesia	-140
Malaysia	-51
Philippines	51
Thailand	26
Vietnam	-67
EastAsia (excl.Jap.)	-27

-1,500　-1,000　-500　0　500　1,000　1,500
(1000B/D)
Negative Figures indicates net import.

2010 (Base Case)
<- Net Import　**Net Export ->**

China	-625
Hong Kong	-355
Chinese Taipei	5
Korea	46
Singapore	381
Brunei	-4
Indonesia	-256
Malaysia	-215
Philippines	-96
Thailand	116
Vietnam	-17
EastAsia (excl.Jap.)	-1,020

-1,500　-1,000　-500　0　500　1,000　1,500
(1000B/D)
Negative Figures indicates net import.

2010 (Low GDP growth Case)
<- Net Import　**Net Export ->**

China	-393
Hong Kong	-338
Chinese Taipei	54
Korea	210
Singapore	417
Brunei	-2
Indonesia	-193
Malaysia	-165
Philippines	-32
Thailand	183
Vietnam	5
EastAsia (excl.Jap.)	-256

-1,500　-1,000　-500　0　500　1,000　1,500
(1000B/D)
Negative Figures indicates net import.

Ⅲ. Supply and Demand Analysis of Petroleum Products in East Asian Region

1. Method and Feature of the Outlook

The supply and demand outlook was done by combining an econometric model (Energy demand estimation model) and a linear programming model (trade flow model of petroleum products) developed by the Energy Data and Modelling Center, the Institute of Energy Economics, Japan. Conceptual figure is as follows. The outlook and analysis deal with the demand and supply of world energy and petroleum, and focus on that in East Asian region. Main preconditions refer to pages 26 and 27.

Fig-11 Model Structure

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┌──────────────────────────────────────────┐
│            Main assumptions              │
│..........................................│
│       GDP, Population, Crude oil price,   │
│  Exchange rate, Inflation rate, Power supply │
│                   plan,                   │
└──────────────────────────────────────────┘
                      ↓
┌──────────────────────────────────────────────────┐
│  World energy demand estimation models (for 31areas) │
│──────────────────────────────────────────────────│
│     Final energy demand estimation by sector by source │
│    Power generation and Fuel consumption for power generation │
│           Primary energy demand by source         │
│                                                    │
│         Final demand of petroleum products        │
│    Transformation sector demand of petroleum products │
│        Domestic demand of petroleum products      │
└──────────────────────────────────────────────────┘

┌────────────────────────┐
│  Assumptions for refining │
│        and freight       │
│..........................│
│   Refining costs, refining │          ↓
│    capacities, freights,  │→
│ crude oil prices, yields of│
│    petroleum products     │
└────────────────────────┘
                      ↓
┌──────────────────────────────────────────────────────┐
│   The petroleum refining and trade estimation model   │
│            (a Liner programming model)                │
│──────────────────────────────────────────────────────│
│        Supplies and trade of Petroleum products        │
│           Utilizations of refining facilities          │
│ (Costs of petroleum products supplies) = (Freights of crude oils) + (Refining costs) + │
│               (Freights of petroleum products)         │
│ [The object is to minimize world total supply cost of petroleum products] │
└──────────────────────────────────────────────────────┘
```

2. Scenarios

Base Case (Business As Usual Case)

In this case, the average annual growth rate of East Asian region except Japan (East Asian region) from 2000 to 2005 is set at 4.9%. And the average annual growth rate of East Asian region from 2005 to 2010 is set at 5.6%. Demand of petroleum products was calculated on these premises.

Low GDP Growth Case

In this case, economic growth rate is lower by 1.0% after the year 2002 up to the year 2010 compared with that in base case. The growth rate is assumed to be 4.1% from 2000 to 2005 and 4.6% from 2005 to 2010.

As for the supply assumption, realistic domestic plans for refineries capacities expansion are adopted in both cases.

3. Simulation Results
(1) Primary energy supply
Base Case

・ Primary energy demand in East Asian region is estimated to grow at an annual rate of 3.2% from 1999 to 2005, and also of whole Asia is estimated to grow at an annual rate of 3.1% during the same period. On the other hand, since the primary energy demand of Asian region is estimated to grow at an annual rate of 2 % during the same period, it is estimated that the share of East Asian region and the whole Asia in the world is expected to grow by 2.4 point, and by 3.3 point respectively, therefore, finally it will reach at 21.2% and at 32.0% respectively.

Table-8 Transition of Primary Energy Demand (Base and Low GDP Growth Case)

	Primary Energy demand (1,000 b/d)*					Annual average growth rate (%)					
	1999	2005		2010		2005/1999		2010/2005		2010/1999	
		Base	Low	Base	Low	Base	Low	Base	Low	Base	Low
World	181,690	203,520	202,490	226,440	223,650	1.91	1.82	2.16	2.01	2.02	1.91
Asia	52,100	62,210	61,250	72,500	69,770	3.00	2.73	3.11	2.64	3.05	2.69
India	5,650	7,390	7,160	9,760	9,170	4.57	4.03	5.73	5.07	5.10	4.50
Other Asia	2,260	2,850	2,730	3,450	3,180	3.99	3.23	3.88	3.08	3.94	3.16
East Asia (Excluding Japan)	33,890	40,770	40,150	47,740	45,870	3.13	2.87	3.21	2.70	3.16	2.79
China	21,770	25,680	25,480	29,520	28,870	2.79	2.66	2.82	2.53	2.81	2.60
Hong Kong	360	450	440	540	500	4.01	3.42	3.60	2.68	3.82	3.08
Chinese Taipei	1,600	1,880	1,840	2,230	2,110	2.74	2.38	3.50	2.74	3.09	2.54
Korea	3,630	4,540	4,370	5,440	5,010	3.80	3.16	3.70	2.74	3.76	2.97
Singapore	450	490	480	580	540	1.34	0.77	3.20	2.52	2.18	1.56
Brunei	30	50	50	50	50	8.80	8.24	2.32	1.45	5.80	5.10
Indonesia	2,720	3,270	3,220	3,870	3,700	3.12	2.86	3.39	2.78	3.25	2.82
Malaysia	850	1,230	1,190	1,540	1,420	6.25	5.76	4.67	3.53	5.53	4.74
Philippines	810	1,100	1,070	1,500	1,390	5.11	4.59	6.42	5.48	5.70	4.99
Thailand	1,410	1,730	1,670	1,990	1,850	3.45	2.93	2.88	2.02	3.19	2.52
Vietnam	260	350	340	480	450	5.42	4.86	6.39	5.48	5.86	5.14

	Denominator	Share (%)				
World	World	100.0	100.0	100.0	100.0	100.0
Asia	World	28.7	30.6	30.2	32.0	31.2
India	World	3.1	3.6	3.5	4.3	4.1
Other Asia	World	1.2	1.4	1.3	1.5	1.4
East Asia	World	18.7	20.0	19.8	21.1	20.5
China		64.2	63.0	63.5	61.8	62.9
Hong Kong		1.1	1.1	1.1	1.1	1.1
Chinese Taipei		4.7	4.6	4.6	4.7	4.6
Korea		10.7	11.1	10.9	11.4	10.9
Singapore	East Asia (Excl. Japan)	1.3	1.2	1.2	1.2	1.2
Brunei		0.1	0.1	0.1	0.1	0.1
Indonesia		8.0	8.0	8.0	8.1	8.1
Malaysia		2.5	3.0	3.0	3.2	3.1
Philippines		2.4	2.7	2.7	3.1	3.0
Thailand		4.2	4.2	4.2	4.2	4.0
Vietnam		0.8	0.9	0.9	1.0	1.0

(Note) The combustible renewable energy demands are included in the primary energy demands of OECD countries, China, Indonesia, Malaysia, Philippines, and Thailand.

  * It means 1,000 oil equivalent barrel per day.

Low GDP Growth Case

・ In this case which is expected slowdown of the economic growth in the East Asian region, growth rate of primary energy demand is lower by 0.4 % compared with that of the Base case from 1999 to 2010, and the primary energy demand is expected to grow at a annual rate of 2.8%.

Although it is predicted that the share of East Asian region in the world will fall by 0.6 point as compared with Base case in 2010, the share of East Asian region in the world will increase as compared with 1999, even if Low GDP growth case. The share of the whole

Asia in the world will also increase, showing the same tendency.

(2) Petroleum products demand
Base Case
・ While the demand of world petroleum products will grow by 0.9% per year from 1999 to 2005, by 1.9% from 2005 to 2010, East Asian region's demand for oil products will expect to grow by 3.3% per year from 1999 to 2005, by 3.4% from 2005 to 2010, including china which grow by 4.7%, by 3.8% respectively during the same period. Therefore, the share of East Asian region in the world is expected to grow by 2.2 point in 2005, by 3.5point in 2010 as compared with 1999. Then the share of whole Asia in the world is expected to grow by 1.9 point in 2005, by 3.2 point in 2010 as compared with 1999.

Table-9 Transition of Petroleum Products Demand (Base and low GDP Growth Case)

| | Petroleum products demand (1,000b/d) | | | | | Annual average growth rate (%) | | | | | |
| | 1999 | 2005 | | 2010 | | 2005/1999 | | 2010/2005 | | 2010/1999 | |
		Base	Low	Base	Low	Base	Low	Base	Low	Base	Low
World total *	71,180	75,190	74,790	82,400	81,240	0.92	0.83	1.85	1.67	1.34	1.21
Asia	18,410	20,910	20,510	24,030	22,880	2.15	1.82	2.82	2.21	2.45	1.99
India	1,930	2,430	2,340	3,120	2,890	3.89	3.25	5.15	4.29	4.46	3.72
Other Asia	620	760	730	890	830	3.27	2.64	3.25	2.57	3.26	2.61
East Asia (Excluding Japan)	10,580	12,830	12,550	15,150	14,290	3.28	2.89	3.38	2.63	3.32	2.77
China	3,960	5,200	5,120	6,250	5,970	4.66	4.40	3.77	3.12	4.25	3.82
Hong Kong	290	330	320	370	350	2.34	1.98	2.21	1.64	2.28	1.83
Chinese Taipei	960	1,060	1,040	1,170	1,120	1.64	1.35	2.10	1.50	1.85	1.42
Korea	2,130	2,470	2,390	2,770	2,590	2.50	2.00	2.32	1.56	2.42	1.80
Singapore	750	780	760	850	810	0.72	0.36	1.70	1.22	1.16	0.75
Brunei	10	10	10	10	10	2.81	2.10	2.92	1.88	2.86	2.00
Indonesia	940	1,180	1,160	1,420	1,350	3.73	3.44	3.79	3.16	3.76	3.31
Malaysia	380	520	500	650	600	5.20	4.65	4.84	3.62	5.04	4.18
Philippines	360	380	360	520	450	1.23	0.22	6.35	4.56	3.53	2.17
Thailand	660	700	670	830	760	1.02	0.38	3.65	2.50	2.21	1.34
Vietnam	150	220	210	300	280	5.88	5.28	6.84	5.90	6.31	5.56

	Denominator	Share (%)				
World total	World	100.0	100.0	100.0	100.0	100.0
Asia	World	25.9	27.8	27.4	29.2	28.2
India	World	2.7	3.2	3.1	3.8	3.6
Other Asia	World	0.9	1.0	1.0	1.1	1.0
East Asia	World	14.9	17.1	16.8	18.4	17.6
China		37.4	40.5	40.8	41.3	41.8
Hong Kong		2.7	2.6	2.6	2.4	2.4
Chinese Taipei		9.1	8.2	8.3	7.7	7.8
Korea		20.1	19.2	19.1	18.3	18.1
Singapore	East Asia (Excl. Japan)	7.1	6.1	6.1	5.6	5.7
Brunei		0.1	0.1	0.1	0.1	0.1
Indonesia		8.9	9.2	9.2	9.4	9.5
Malaysia		3.6	4.0	4.0	4.3	4.2
Philippines		3.4	3.0	2.9	3.4	3.2
Thailand		6.2	5.4	5.4	5.5	5.3
Vietnam		1.5	1.7	1.7	2.0	2.0

(Note) * World total excludes "Other Africa", "Other Latin America", and "Other Asia and Oceania" which are defined by IEA.

Low GDP Growth Case
・ In this case, the growth rate of petroleum products demand in East Asian region is lower than that in Base case by about 0.4 point per year from 1999 to 2005, by about 0.8% from 2005 to 2010. The share of East Asian region in the world is expected to grow by 1.9 point in 2005, by 2.7point in 2010 as compared with 1999, and the share of whole Asia in the world is expected to grow by 1.5 point in 2005, by 2.3 point in 2010 as compared with 1999.

(3) Petroleum Products Supply and CDU (Crude Distillation Unit) Operation Rate
・ CDU capacities in East Asian region will be reinforced by 1,890 thousand b/d from 1999 to 2005, by 2,020 thousand b/d in the whole Asia, so that the share of production is estimated to grow by about 1 point in each area. On the other hand, since the future situation of

refining equipment construction plan will be severe because of uncertain economic conditions, it is expected that the reinforcement width of CDU capacities from 2005 to 2010 will be reduced to 900 thousand b/d in East Asian region, and reduced to 1,530 thousand b/d in the whole Asia, respectively. Therefore, CDU operation rate is expected to rise on the level of 90%, and the growth rate of production will settle at 2.8% per year in East Asian region, at 2.6% in the whole Asia as compared with 1999. Then the share of Asian region and the whole Asia in the world is expected to grow by about 2 point, and by 3 point respectively in 2010 compared with 1999.

Table-10 CDU Capacities (Both in Base Case and Low GDP Growth Case)

(1,000b/d)	1999	Share(%)	2005	share(%)	2010	share(%)	2005/99	2010/05
World	81,920	100%	86,610	100%	89,370	100%	0.9 %/y	0.6 %/y
Asia	19,940	24%	21,960	25%	23,490	26%	1.6	1.4
East	12,380	15%	14,270	16%	15,170	17%	2.4	1.2

(Note) * Excluding Japan.

Table-11 CDU Operation Rate (Both in Base Case and Low GDP Growth Case)

(%)	1999	2005	2010	2005/99	2010/05
World	83.0	84.3	89.7	0.3 %/y	1.3 %/y
Asia	81.6	85.8	91.8	0.8	1.4
East Asia*	81.6	87.1	91.1	1.1	0.9

(Note) * Excluding Japan.

Table-12 Petroleum Products Production (Base case)

(1,000b/d)	1999	Share(%)	2005	share(%)	2010	share(%)	2005/99	2010/05
World	67,990	100%	73,030	100%	80,210	100%	1.2 %/y	1.9 %/y
Asia	16,270	24%	18,830	26%	21,570	27%	2.5	2.8
East Asia*	10,110	15%	12,430	17%	13,810	17%	3.5	2.1

(Note) * Excluding Japan.

(4) Demand-Supply Gap of Fuel oil (Base Case)

Demand-supply gap of fuel oil (gasoline, naphtha, kerosene, jet, gas oil, heavy fuel oil) was in import position of 410 thousand b/d in 1999 in East Asian region, it will be reduced to 270 thousand b/d in 2005, temporarily. But it is estimated that the gap will be in extreme import position of about 1,000 thousand b/d in 2010.

For each product, gasoline and gas oil will change from export position to import position in 2010, reflecting the increase of demand in traffic section. Moreover, it is predicted that the gap which is in import position of naphtha is expanded towards 2010, due to the startup of the petrochemical plant in China, Taiwan, and Singapore that the demand of naphtha is expected to increase as petrochemical materials.

On the other hand, the demand-supply gap of heavy fuel oil which accounts for large ratio of the demand for electric power use will be reduced in 2005, in response to the influence of conversion from oil to natural gas for power generation use. Then it is expected that the import position will expand again extensively, because of steady growth of electricity demand, and absolute shortage of refining capacity in the East Asian region. It is considered that the change of the fuel oil supply and demand balance (trend that the gap will once reduce in 2005, expand again in 2010) will be affected by that of heavy fuel oil.

Fig-12 Demand-Supply Balance of Fuel Oil in East Asia Region (Excluding Japan)

(1,000 b/d)

	Gasoline	Naphtha	Kero/Jet	Gas Oil	Heavy Fuel	Total
1999	45	-114	94	119	-552	-409
2005	-64	-152	138	49	-243	-272
2010	-81	-327	105	-226	-491	-1020
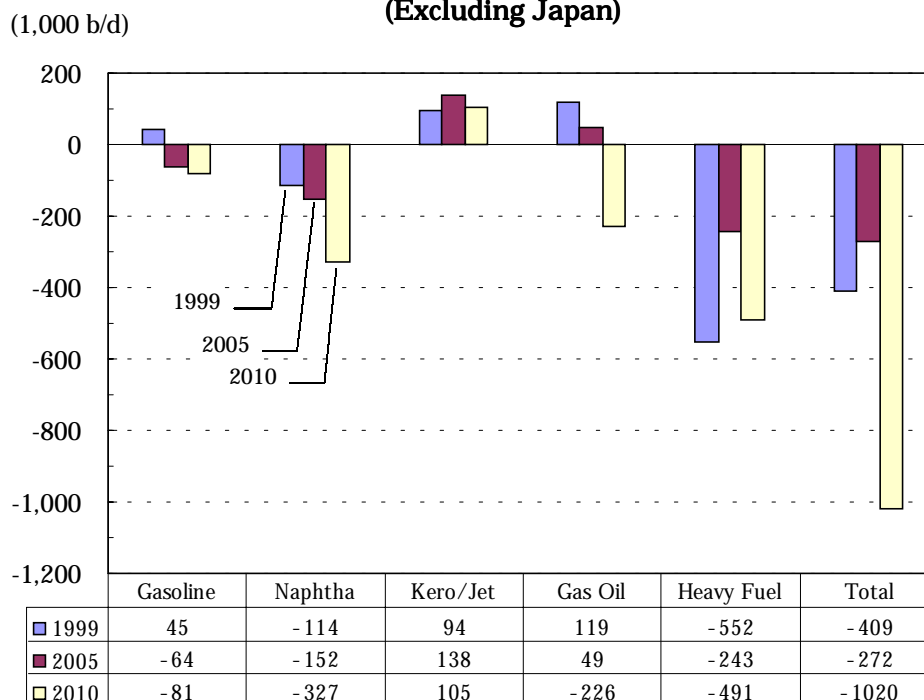
(5) Light Product Share in Products Demand

・ Light product (gasoline, naphtha, kerosene, jet, and gas oil) share in petroleum products demand (light product and heavy fuel oil) in East Asian region is estimated to increase by 4.9 point in 2010, by 3.5 point in whole Asia as compared with 1999.

・ In the Low GDP growth case, the share is almost the same compared with the Base case.

Table-13 Light Product* Share in Petroleum Products Total** (Base Case)

(%)	1999	2005	2010	2005/99	2010/05
World	80.7%	81.9%	82.5%	0.2 %/y	0.1 %/y
Asia	75.9%	78.3%	79.4%	0.5	0.3
East Asia	71.7%	74.9%	76.6%	0.7	0.5

Table-14 Light Product* Share in Petroleum Products Total** (Low GDP Growth Case)

(%)	1999	2005	2010	2005/99	2010/05
World	80.7%	81.9%	82.6%	0.2 %/y	0.2 %/y
Asia	75.9%	78.4%	79.6%	0.5	0.3
East Asia	71.7%	74.9%	76.7%	0.7	0.5

(Note) * Light Product; Gasoline, Naphtha, Kerosene/Jet, and Gas Oil

        ** Petroleum Products; Light Product and Heavy Fuel Oil

Main Assumptions (1)

Table-15 Crude Oil Price

	2000	2005	2010	2015	2020
Nominal Price ($/bbl)	27.7	25.7	29.9	35.0	42.1
FY2000 Real Price($/bbl)	27.7	22.7	23.4	24.0	24.7

(Source) US DOE, Annual energy outlook 2002.

(Note) Nominal price is calcurated by the International working group using the deflators of the Annual energy outlook 2002.

Table-16 GDP Growth Rate toward 2005 and 2010 (Base Case)

(Unit %)	Actual			Forecast (Base Case)		
	98/97	99/98	00/99	05/99	10/05	10/99
U.S.A.	5.3	3.9	4.2	3.7	3.1	3.4
Canada	3.7	3.0	3.6	2.7	2.3	2.6
Mexico	6.8	4.8	3.0	4.2	4.7	4.4
Chile	7.6	3.4	-0.4	3.9	3.8	3.8
Other Latin America	4.6	1.3	-0.6	2.7	2.5	3.0
U.K.	3.5	2.1	2.3	2.5	2.5	2.5
Germany	2.2	2.7	1.6	2.3	2.3	2.3
France	2.3	3.2	2.6	2.4	2.2	2.3
Italy	1.5	1.4	1.1	2.0	2.1	2.1
Other OECD Europe	3.7	3.4	3.3	2.9	2.5	2.8
F.S.U.	1.3	-3.1	-8.3	0.1	2.7	1.2
Other Non OECD Europe	0.7	0.8	4.0	3.7	3.5	3.6
Africa	3.0	3.0	3.1	3.0	3.0	3.0
Middle East	2.4	1.3	1.8	2.5	3.0	3.2
Japan	1.4	-2.8	0.5	1.9	1.7	1.8
China	8.8	7.8	7.8	7.2	6.5	6.9
Hong Kong	5.2	-5.1	3.1	2.5	4.0	4.4
Chinese Taipei	5.2	4.7	5.4	5.6	5.0	5.3
Korea	5.5	-5.8	10.7	7.2	5.0	6.3
Singapore	7.8	0.3	5.4	6.2	5.0	5.7
Brunei	4.0	1.8	2.3	2.5	3.0	2.9
Indonesia	4.9	-13.2	0.3	4.3	5.5	4.8
Malaysia	7.8	-7.5	5.4	5.9	5.5	5.7
Philippines	5.2	-0.5	3.2	4.7	5.5	4.8
Thailand	-0.4	-10.0	4.2	4.6	5.0	7.8
Vietnam	8.8	4.0	4.8	2.5	8.0	6.7
India	5.2	5.8	6.4	6.5	6.5	6.5
Other Asia	3.3	5.0	5.0	5.0	5.0	5.0
Australia	3.8	5.1	4.0	2.5	2.2	2.4
New Zealand	2.0	-0.8	3.0	3.0	3.0	3.0

(Source) Actual from World Bank, World development indicator 2001 etc., forecasted by International Working Group.

Table-17 GDP Growth rate of Asian Countries (Base Case and Low GDP Growth Case)

(Unit %)	Actual		Base case		Low GDP growth case	
	2000/99	2001/00*	2005/00	2010/05	2005/00	2010/05
China	8.0	7.3	7.1	6.5	6.3	5.5
Hong Kong	10.5	-0.4	3.3	4.0	2.5	3.0
Chinese Taipei	5.9	-2.0	2.4	5.0	1.6	4.0
Korea	8.8	2.0	4.1	4.9	3.3	3.9
Singapore	9.9	-3.0	2.6	5.0	1.8	4.0
Brunei	3.0	3.0	3.0	2.8	2.2	1.8
Indonesia	4.8	3.2	4.4	5.5	3.6	4.5
Malaysia	8.3	0.8	4.4	5.5	3.6	4.5
Philippines	4.0	2.7	4.1	4.9	3.3	3.9
Thailand	4.3	1.5	3.3	4.6	2.5	3.6
Vietnam	6.1	6.0	6.0	7.2	5.2	6.2
Average East Asia	6.3	3.2	4.9	5.6	4.1	4.6

(Source) Base case and low GDP growth case forcasted by International Working Group, the long-term economic plans and prospects from Asian Development Bank, the government of each country and related are regarded.

2001/00*: Estimation of Asian Development Bank.

Main Assumptions (2)

Table-18 Outlook of World Crude Distillation Units Capacities

(Unit: 1,000 b/cd)

	1999	2000 Ref.	2005 Outlook	2010 Outlook	1999-2005 Increase	2005-2010 Increase
China	4,594	4,594	5,800	6,400	1,207	600
Hong Kong	0	0	0	0	0	0
Chinese Taipei	925	925	1,220	1,220	295	0
Korea	2,750	2,750	2,750	2,750	0	0
Singapore	1,254	1,254	1,270	1,270	16	0
Brunei	9	9	9	9	0	0
Indonesia	1,065	1,065	1,065	1,215	0	150
Malaysia	516	516	514	514	-2	0
Philippines	422	422	420	420	-2	0
Thailand	842	842	1,070	1,070	228	0
Vietnam	9	0	148	304	139	156
Easet Asia	12,385	12,376	14,265	15,171	1,880	906
India	1,857	1,858	2,298	2,859	441	561
Other Asia	345	345	445	510	100	65
Asia (Including Japan)	19,941	19,576	21,961	23,493	2,020	1,532
Australia	807	812	847	847	39	0
New Zealand	98	98	106	106	8	0
U.S.A.	16,261	16,512	17,600	17,800	1,339	200
Canada	1,873	1,912	2,033	2,169	161	136
Mexico	1,525	1,525	1,627	1,735	102	109
Chile	205	205	205	205	0	0
Other Latin America	4,536	4,664	6,611	6,623	2,075	12
U.K.	1,854	1,785	1,861	1,956	7	95
Germany	2,246	2,275	2,374	2,495	128	121
France	1,947	1,902	1,992	2,094	45	102
Italy	2,446	2,341	2,479	2,606	33	126
Other OECD Europe	8,453	8,545	8,545	8,545	93	0
F.S.U.	9,790	9,803	9,803	9,803	13	0
Other NO-OECD Europe	1,175	1,135	1,135	1,135	-39	0
Africa	3,006	3,044	3,208	3,208	202	0
Middle East	5,756	5,926	6,544	6,544	788	0
Total	81,918	82,059	88,932	91,364	7,014	2,432

(Notes) Estimated by International Working Group, regarding to following informations;
Pen Well, Oil and gas journal Jan. 2001and Apr. 2001, and Oct. 2001,
Tozaiboueki tushinsha Co. Ltd., Petrloeum and petrochmical industry of China 2001,
Petrloeum and petrochmical industry of East Asia 2001,
and the printed material of the government of each country and hearing from refiner.

Fig-13 World and East Asian Primary Energy Consumption (Base Case)

(East Asia excludes Japan)   **(East Asia includes Japan)**

East Asia 18.7% / World Other 81.3%

1999
9,085MTOE
(182Million B/D)

East Asia 21.1% / World Other 78.9%

2010
11,322MTOE
(226Million B/D)

East Asia 24.3% / World Other 75.7%

1999
9,085MTOE
(182Million B/D)

East Asia 26.2% / World Other 73.8%

2010
11,322MTOE
(226Million B/D)
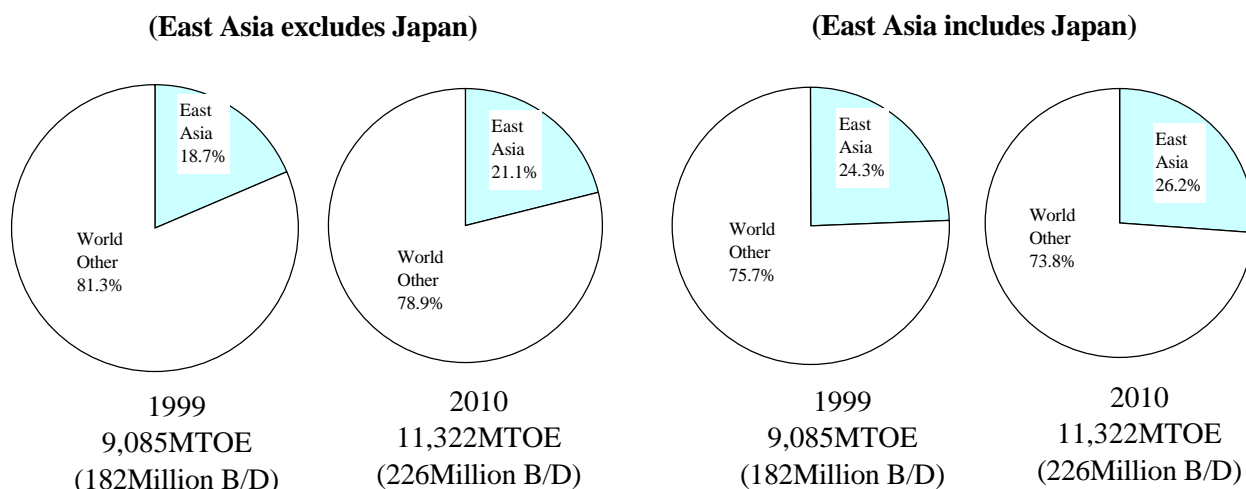
Fig-14 Primary Energy Consumption in East Asia (Base Case)

(East Asia excludes Japan)   **(East Asia includes Japan)**

South East Asia 19.3% / C.Taipei &Korea 15.4% / China &Hong Kong 65.3%

1999
1,694MTOE
(33.89Million B/D)

South East Asia 21.0% / C.Taipei &Korea 16.1% / China &Hong Kong 63.0%

2010
2,387MTOE
(47.74 Million B/D)

South East Asia 14.8% / C.Taipei &Korea 11.8% / Japan 23.3% / China &Hong-Kong 50.1%

1999
2,210MTOE
(44.20 Million B/D)

South East Asia 17% / C.Taipei &Korea 13% / Japan 19% / China &Hong-Kong 51%

2010
2,965MTOE
(59.29 Million B/D)

Fig-15 World and East Asian Petroleum Products Consumption (Base Case)

(East Asia excludes Japan)   **(East Asia includes Japan)**

Others 17.3% / East Asia 15.5% / Japan 7.7% / F.USSR & E.Europ 6.0% / W. Europe 23.1% / North America 30.5%

1999
71.23 Million B/D

Others 23.5% / East Asia 18.4% / Japan 5.9% / F.USSR & E.Europ 5.8% / W. Europe 19.8% / North America 26.5%

2010
82.40 Million B/D

Others 17.3% / East Asia 23.2% / F.USSR& E.Europ 6.0% / W. Europe 23.1% / North America 30.5%

1999
71.23 Million B/D

Others 23.5% / East Asia 24.3% / F.USSR & E.Europ 5.8% / W. Europe 19.8% / North America 26.5%

2010
82.40 Million B/D

Fig-16 Demand by Products in East Asia (excluding Japan)

Base Case

1999
10.56 Million B/D

2010
15.15 Million B/D

Low GDP growth

1999
10.56 Million B/D

2010
14.29Million B/D
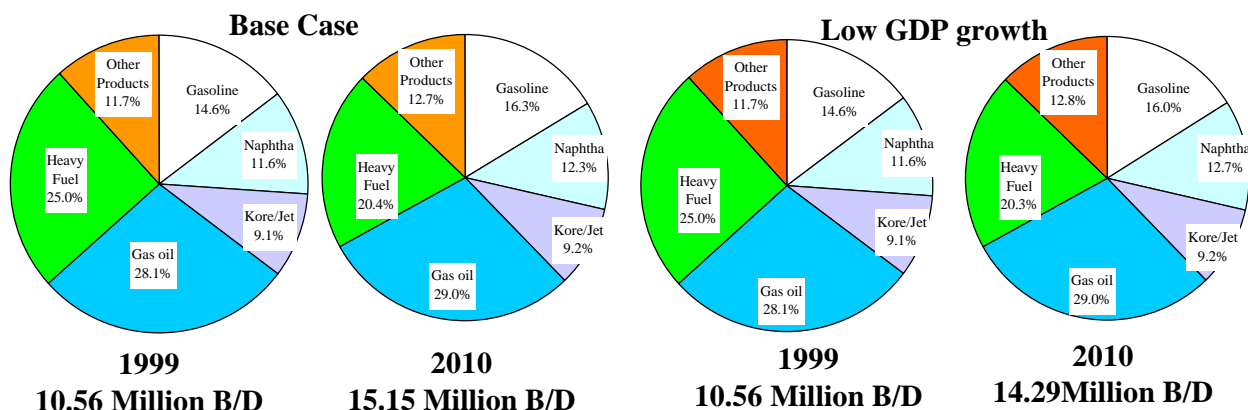
Fig-17 Clean Oil Share in Fuel Oil Demand in East Asia(excluding Japan)

Base Case

1999
9.34 Million B/D

2010
13.23 Million B/D

Low GDP growth

1999
9.34 Million B/D

2010
12.46 Million B/D
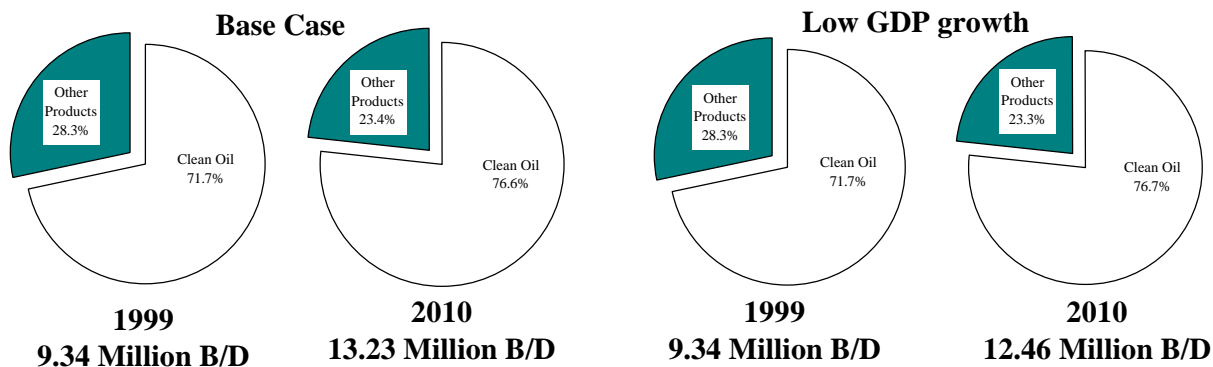
Fig-18 Petroleum Products Demand in East Asia by Country (excludimg Japan)
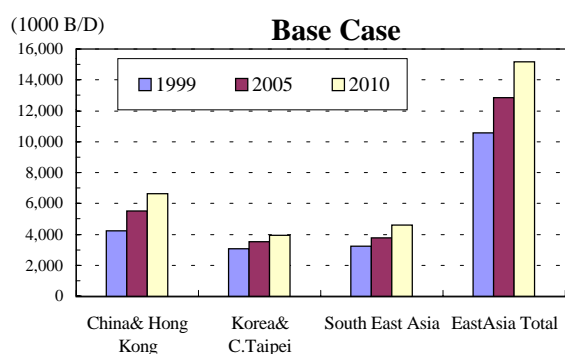
Base Case

	China& Hong Kong	Korea& C.Taipei	South East Asia	EastAsia Total
1999	4,242	3,086	3,249	10,577
2005	5,527	3,524	3,783	12,834
2010	6,621	3,940	4,592	15,153
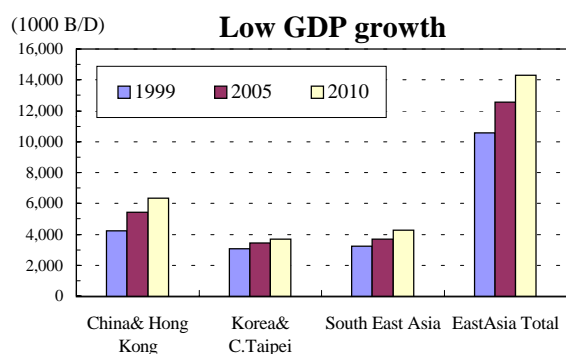
Low GDP growth

	China& Hong Kong	Korea& C.Taipei	South East Asia	EastAsia Total
1999	4,242	3,086	3,249	10,577
2005	5,443	3,434	3,674	12,552
2010	6,322	3,707	4,264	14,292

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Fig-19 Petroleum Products Demand in East Asia by Product (excluding Japan)

(1000 B/D)

Base Case

	Gasoline	Naphtha	Kore/Jet	Gas oil	Heavy Fuel	Others
1999	1,544	1,223	961	2,974	2,640	1,236
2005	1,978	1,569	1,162	3,679	2,816	1,630
2010	2,472	1,871	1,395	4,397	3,092	1,926

(1000 B/D)

Low GDP growth Case

	Gasoline	Naphtha	Kore/Jet	Gas oil	Heavy Fuel	Others
1999	1,544	1,223	961	2,974	2,640	1,236
2005	1,925	1,549	1,138	3,598	2,748	1,593
2010	2,291	1,809	1,315	4,145	2,902	1,830
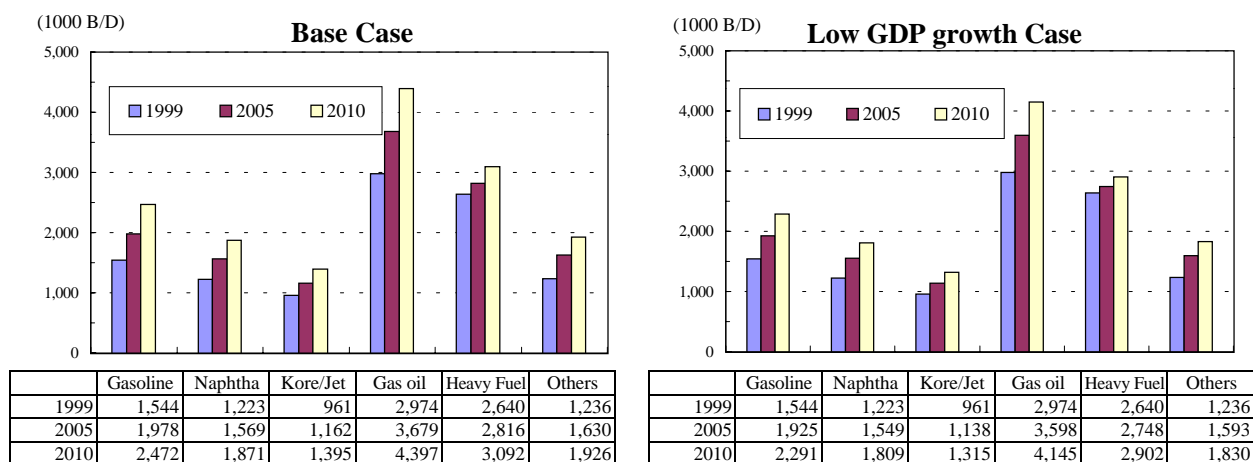
Fig-20 Production of Petroleum Products by Country in East Asia (excluding Japan)

(1000 B/D)

Base Case

	China & Hong Kong	Korea & C.Taipei	South East Asia	East Asia Total
1999	3,585	3,324	3,197	10,105
2005	4,640	3,713	4,073	12,427
2010	5,440	3,772	4,603	13,815

(1000 B/D)

Low GDP growth Case

	China & Hong	Korea & C.Taipei	South East Asia	East Asia Total
1999	3,585	3,324	3,197	10,105
2005	4,640	3,713	4,073	12,427
2010	5,440	3,772	4,603	13,815
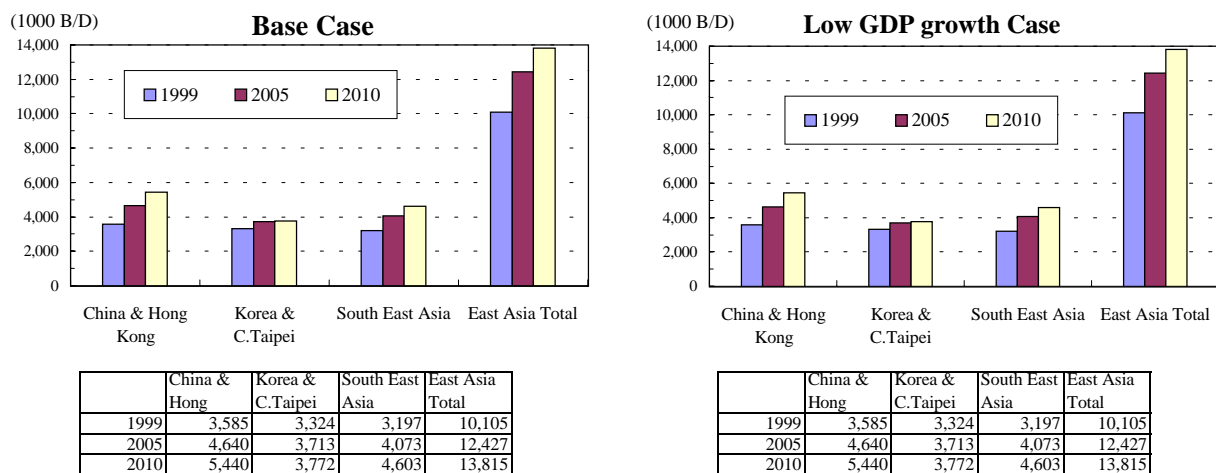
Fig-21 Production of Petroleum Products by Product in East Asia (excluding Japan)

(1000B/D)

Base Case

	Gasoline	Naphtha	Kore/Jet	Gas oil	Heavy Fuel	Others
1999	1,589	1,109	1,054	3,092	2,088	1,173
2005	1,914	1,417	1,301	3,727	2,573	1,495
2010	2,392	1,543	1,500	4,171	2,601	1,608

(1000B/D)

Low GDP growth Case

	Gasoline	Naphtha	Kore/Jet	Gas oil	Heavy Fuel	Others
1999	1,589	1,109	1,054	3,092	2,088	1,173
2005	1,914	1,417	1,301	3,727	2,573	1,495
2010	2,392	1,543	1,500	4,171	2,601	1,608
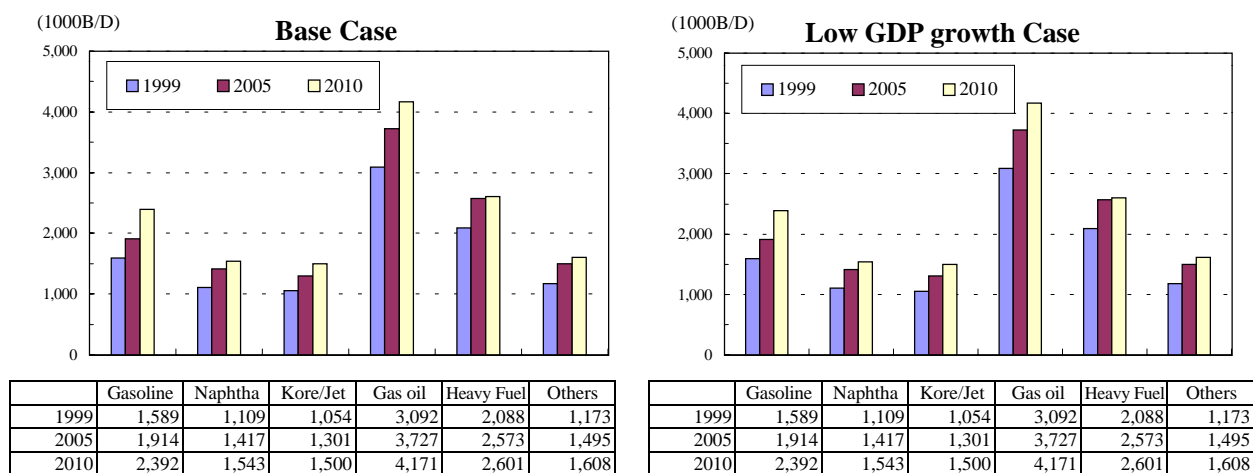
contact: ieej-info@tky.ieej.or.jp

Table-19 Petroleum Products Balances in East Asia
(Base Case 1/3)

	1999 (Actual)							2005 (Base Case)							2010 (Base Case)						
	Demand	(share)	99/80	Production	(share)	99/80	Net Export	Demand	(share)	05/99	Production	(share)	05/99	Net Export	Demand	(share)	10/05	Production	(share)	10/05	Net Export
	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d
China																					
Products Total	3,956	(100.0)	5.3	3,585	(100.0)	4.4	-371	5,199	(100.0)	4.7	4,640	(100.0)	4.4	-559	6,255	(100.0)	3.8	5,440	(100.0)	3.2	-815
Gasoline	697	(17.6)	6.4	769	(21.5)	6.5	72	911	(17.5)	4.6	835	(18.0)	1.4	-76	1,122	(17.9)	4.3	1,022	(18.8)	4.1	-100
Naphtha	406	(10.3)	12.4	406	(11.3)	10.9	0	628	(12.1)	7.5	597	(12.9)	6.6	-31	835	(13.4)	5.9	734	(13.5)	4.2	-101
Kero/Jet	170	(4.3)	4.4	153	(4.3)	3.3	-17	250	(4.8)	6.6	261	(5.6)	9.3	10	331	(5.3)	5.8	331	(6.1)	4.9	0
Gas oil	1,262	(31.9)	7.1	1,259	(35.1)	6.5	-3	1,640	(31.5)	4.5	1,624	(35.0)	4.3	-16	1,957	(31.3)	3.6	1,904	(35.0)	3.2	-53
Heavy Fuel	742	(18.7)	1.2	392	(10.9)	-2.2	-350	866	(16.7)	2.6	510	(11.0)	4.5	-356	923	(14.8)	1.3	553	(10.2)	1.6	-370
Fuel Oil Total	3,277	(82.8)	5.1	2,979	(83.1)	4.2	-298	4,295	(82.6)	4.6	3,827	(82.5)	4.3	-468	5,169	(82.6)	3.8	4,544	(83.5)	3.5	-625
LPG	407	(10.3)	11.6	332	(9.3)	10.4	-75	545	(10.5)	5.0	454	(9.8)	5.4	-90	669	(10.7)	4.2	602	(11.1)	5.8	-67
Other Products	272	(6.9)	2.5	274	(7.6)	2.4	2	359	(6.9)	4.7	359	(7.7)	4.6	0	417	(6.7)	3.1	293	(5.4)	-3.9	-124
CDU capacity	4,594 thou.b/d		Oper. Rate: 78.1 %					5,800 thou.b/d		Oper. Rate: 80.0 %					6,400 thou.b/d		Oper. Rate: 85.0 %				
Hong Kong																					
Products Total	286	(100.0)	4.3	0	(0.0)	0.0	-286	328	(100.0)	2.3	0	(0.0)	0.0	-328	366	(100.0)	2.2	0	(0.0)	0.0	-366
Gasoline	8	(2.8)	3.6	0	(0.0)	0.0	-8	9	(2.9)	2.9	0	(0.0)	0.0	-9	11	(2.9)	2.5	0	(0.0)	0.0	-11
Naphtha	12	(4.2)	9.7	0	(0.0)	0.0	-12	12	(3.7)	0.1	0	(0.0)	0.0	-12	12	(3.4)	0.7	0	(0.0)	0.0	-12
Kero/Jet	58	(20.4)	6.5	0	(0.0)	0.0	-58	71	(21.6)	3.3	0	(0.0)	0.0	-71	82	(22.3)	2.9	0	(0.0)	0.0	-82
Gas oil	163	(57.2)	11.2	0	(0.0)	0.0	-163	191	(58.1)	2.6	0	(0.0)	0.0	-191	215	(58.6)	2.4	0	(0.0)	0.0	-215
Heavy Fuel	36	(12.6)	-4.0	0	(0.0)	0.0	-36	36	(11.0)	-0.1	0	(0.0)	0.0	-36	36	(9.8)	0.0	0	(0.0)	0.0	-36
Fuel Oil Total	278	(97.2)	4.3	0	(0.0)	0.0	-278	319	(97.1)	2.3	0	(0.0)	0.0	-319	355	(97.1)	2.2	0	(0.0)	0.0	-355
LPG	5	(1.6)	3.6	0	(0.0)	0.0	-5	6	(1.7)	3.1	0	(0.0)	0.0	-6	6	(1.7)	2.7	0	(0.0)	0.0	-6
Other Products	3	(1.2)	3.9	0	(0.0)	0.0	-3	4	(1.2)	2.3	0	(0.0)	0.0	-4	4	(1.2)	2.0	0	(0.0)	0.0	-4
CDU capacity	0 thou.b/d		Oper. Rate: 0.0 %					0 thou.b/d		Oper. Rate: 0.0 %					0 thou.b/d		Oper. Rate: 0.0 %				
Chinese Taipei																					
Products Total	959	(100.0)	4.6	855	(100.0)	4.5	-104	1,057	(100.0)	1.6	1,101	(100.0)	4.3	43	1,173	(100.0)	2.1	1,159	(100.0)	1.0	-14
Gasoline	150	(15.6)	8.4	111	(13.0)	6.5	-39	182	(17.2)	3.3	182	(16.5)	8.6	0	224	(19.1)	4.2	223	(19.2)	4.1	-1
Naphtha	187	(19.5)	8.2	172	(20.1)	8.4	-15	201	(19.0)	1.3	191	(17.4)	1.8	-10	203	(17.3)	0.2	185	(16.0)	-0.6	-18
Kero/Jet	48	(5.0)	7.5	40	(4.6)	5.0	-8	58	(5.4)	3.3	140	(12.7)	23.3	82	70	(6.0)	4.1	122	(10.5)	-2.7	51
Gas oil	106	(11.1)	3.7	136	(15.9)	4.1	29	121	(11.5)	2.3	174	(15.8)	4.2	53	142	(12.1)	3.2	207	(17.9)	3.6	66
Heavy Fuel	341	(35.5)	2.1	296	(34.6)	2.4	-45	357	(33.7)	0.8	275	(25.0)	-1.2	-81	383	(32.6)	1.4	290	(25.0)	1.0	-93
Fuel Oil Total	831	(86.6)	4.3	754	(88.2)	4.3	-77	919	(86.9)	1.7	962	(87.4)	4.1	43	1,022	(87.1)	2.2	1,027	(88.6)	1.3	5
LPG	63	(6.5)	4.2	44	(5.2)	2.8	-18	64	(6.1)	0.4	64	(5.8)	6.3	0	66	(5.6)	0.7	46	(4.0)	-6.3	-20
Other Products	66	(6.8)	9.6	56	(6.6)	9.2	-9	75	(7.1)	2.1	75	(6.8)	4.8	0	85	(7.3)	2.7	85	(7.4)	2.7	0
CDU capacity	925 thou.b/d		Oper. Rate: 92.4 %					1,220 thou.b/d		Oper. Rate: 90.2 %					1,220 thou.b/d		Oper. Rate: 95.0 %				
Korea																					
Products Total	2,127	(100.0)	7.6	2,469	(100.0)	8.9	342	2,466	(100.0)	2.5	2,613	(100.0)	0.9	146	2,767	(100.0)	2.3	2,613	(100.0)	0.0	-154
Gasoline	162	(7.6)	12.4	189	(7.6)	13.2	27	205	(8.3)	1.4	205	(7.8)	1.4	0	251	(9.1)	4.1	356	(13.6)	11.7	105
Naphtha	559	(26.3)	13.1	416	(16.8)	11.5	-143	645	(26.2)	2.4	473	(18.1)	2.2	-172	724	(26.2)	2.4	435	(16.7)	-1.7	-288
Kero/Jet	283	(13.3)	11.7	387	(15.7)	13.2	104	293	(11.9)	0.6	285	(10.9)	-5.0	-8	313	(11.3)	1.3	261	(10.0)	-1.7	-51
Gas oil	381	(17.9)	6.9	618	(25.0)	9.6	236	440	(17.8)	2.4	627	(24.0)	0.3	187	500	(18.1)	2.6	627	(24.0)	0.0	127
Heavy Fuel	494	(23.2)	2.6	682	(27.6)	5.2	189	584	(23.7)	2.8	871	(33.3)	4.1	287	641	(23.2)	1.9	793	(30.4)	-1.8	152
Fuel Oil Total	1,879	(88.3)	7.0	2,291	(92.8)	8.6	412	2,167	(87.9)	2.4	2,461	(94.2)	1.2	294	2,427	(87.7)	2.3	2,473	(94.7)	0.1	46
LPG	195	(9.2)	17.7	106	(4.3)	15.0	-89	236	(9.6)	3.2	129	(4.9)	3.3	-107	265	(9.6)	2.3	35	(1.3)	-22.9	-230
Other Products	53	(2.5)	11.6	71	(2.9)	13.0	18	64	(2.6)	3.0	23	(0.9)	-17.2	-41	75	(2.7)	3.2	105	(4.0)	35.4	30
CDU capacity	2,750 thou.b/d		Oper. Rate: 89.8 %					2,750 thou.b/d		Oper. Rate: 95.0 %					2,750 thou.b/d		Oper. Rate: 95.0 %				
Singapore																					
Products Total	746	(100.0)	7.2	884	(100.0)	1.7	139	779	(100.0)	0.7	1,270	(100.0)	6.2	491	847	(100.0)	1.7	1,270	(100.0)	0.0	423
Gasoline	14	(1.9)	3.4	85	(9.6)	1.1	70	15	(2.0)	1.2	159	(12.5)	11.0	143	17	(2.0)	2.2	159	(12.5)	0.0	142
Naphtha	54	(7.3)	21.4	80	(9.0)	3.0	26	76	(9.8)	5.9	127	(10.0)	8.1	51	88	(10.4)	3.0	140	(11.0)	1.9	51
Kero/Jet	49	(6.6)	5.0	153	(17.3)	0.0	104	53	(6.8)	1.3	210	(16.5)	5.4	156	59	(7.0)	2.3	244	(19.2)	3.1	185
Gas oil	81	(10.9)	6.5	286	(32.3)	4.1	205	83	(10.7)	0.4	381	(30.0)	4.9	298	87	(10.2)	0.8	381	(30.0)	0.0	294
Heavy Fuel	520	(69.8)	7.3	182	(20.6)	-0.7	-338	520	(66.8)	0.0	318	(25.0)	9.7	-203	561	(66.3)	1.5	270	(21.3)	-3.2	-291
Fuel Oil Total	719	(96.4)	7.3	785	(88.8)	1.3	66	748	(96.1)	0.7	1,194	(94.0)	7.2	445	813	(96.0)	1.7	1,194	(94.0)	0.0	381
LPG	16	(2.1)	5.3	33	(3.7)	12.2	17	17	(2.2)	1.4	64	(5.0)	11.7	47	19	(2.2)	2.0	64	(5.0)	0.0	45
Other Products	11	(1.5)	3.0	66	(7.5)	5.6	55	13	(1.7)	3.2	13	(1.0)	-24.1	-1	16	(1.8)	3.3	13	(1.0)	0.0	-3
CDU capacity	1,254 thou.b/d		Oper. Rate: 70.5 %					1,270 thou.b/d		Oper. Rate: 100.0 %					1,270 thou.b/d		Oper. Rate: 100.0 %				

Table-20 Petroleum Products Balances in East Asia
(Base case 2/3)

	1999 (Actual)							2005 (Base Case)							2010 (Base Case)						
	Demand	(share)	99/80	Production	(share)	99/80	Net Export	Demand	(share)	05/99	Production	(share)	05/99	Net Export	Demand	(share)	10/05	Production	(share)	10/05	Net Export
	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d
Brunei																					
Products Total	11	(100.0)	4.8	11	(100.0)	4.5	0	13	(100.0)	2.8	9	(100.0)	-2.6	-4	15	(100.0)	2.9	9	(100.0)	0.0	-6
Gasoline	4	(38.2)	5.3	4	(38.8)	3.6	0	5	(38.9)	3.1	3	(30.0)	-6.6	-2	6	(39.5)	3.2	4	(39.9)	5.9	-2
Naphtha	0	(1.1)	-1.5	0	(1.1)	-1.5	0	0	(0.9)	0.0	0	(0.0)	-100.0	0	0	(0.8)	0.0	0	(0.0)	0.0	0
Kero/Jet	2	(15.3)	8.4	2	(15.6)	0.0	0	2	(14.7)	2.1	1	(13.4)	-4.9	-1	2	(13.8)	1.6	1	(11.6)	-2.9	-1
Gas oil	3	(28.8)	4.9	3	(30.2)	5.1	0	4	(30.0)	3.5	3	(30.0)	-2.7	-1	5	(31.3)	3.8	3	(30.0)	0.0	-2
Heavy Fuel	0	(0.0)	-100.0	0	(0.0)	-100.0	0	0	(0.2)	0.0	2	(26.6)	0.0	2	0	(0.1)	0.0	2	(18.5)	-7.0	2
Fuel Oil Total	9	(83.4)	5.4	9	(85.7)	5.1	0	11	(84.7)	3.1	9	(100.0)	0.0	-2	13	(85.5)	3.1	9	(100.0)	0.0	-4
LPG	2	(13.8)	2.2	2	(14.3)	2.2	0	2	(12.8)	1.5	0	(0.0)	-100.0	-2	2	(12.0)	1.7	0	(0.0)	0.0	-2
Other Products	0	(2.8)	6.0	0	(0.0)	0.0	0	0	(2.5)	1.1	0	(0.0)	0.0	0	0	(2.4)	2.4	0	(0.0)	0.0	0
CDU capacity	9 thou.b/d			Oper. Rate:	122.3 %			9 thou.b/d			Oper. Rate:	100.0 %			9 thou.b/d			Oper. Rate:	100.0 %		
Indonesia																					
Products Total	945	(100.0)	4.4	940	(100.0)	5.2	-5	1,177	(100.0)	3.7	1,012	(100.0)	1.2	-165	1,418	(100.0)	3.8	1,154	(100.0)	2.7	-264
Gasoline	191	(20.2)	6.3	188	(20.0)	8.0	-3	236	(20.0)	3.6	208	(20.6)	1.7	-27	286	(20.1)	3.9	215	(18.6)	0.6	-70
Naphtha	4	(0.4)	0.0	24	(2.6)	0.0	21	5	(0.4)	3.9	15	(1.4)	-8.3	10	6	(0.5)	6.0	15	(1.3)	0.0	8
Kero/Jet	220	(23.3)	2.3	175	(18.6)	4.9	-45	268	(22.8)	3.4	192	(19.0)	1.6	-76	323	(22.8)	2.7	219	(19.0)	2.7	-104
Gas oil	384	(40.7)	5.6	279	(29.7)	9.1	-106	462	(39.2)	3.1	304	(30.0)	1.4	-159	554	(39.0)	3.7	346	(30.0)	2.7	-207
Heavy Fuel	135	(14.3)	3.9	219	(23.3)	1.2	85	170	(14.4)	3.9	263	(26.0)	3.1	93	202	(14.3)	3.6	320	(27.7)	4.0	118
Fuel Oil Total	933	(98.8)	4.5	885	(94.2)	5.1	-48	1,140	(96.9)	3.4	981	(97.0)	1.7	-159	1,371	(96.7)	3.8	1,115	(96.6)	2.6	-256
LPG	-2	-(0.2)	-197.6	31	(3.3)	3.8	33	18	(1.5)	0.0	20	(2.0)	-6.7	3	21	(1.5)	3.8	28	(2.4)	6.4	6
Other Products	14	(1.5)	5.4	24	(2.5)	8.5	10	19	(1.6)	5.6	10	(1.0)	-13.3	-9	26	(1.8)	6.0	12	(1.0)	2.7	-14
CDU capacity	1,065 thou.b/d			Oper. Rate:	88.2 %			1,065 thou.b/d			Oper. Rate:	95.0 %			1,215 thou.b/d			Oper. Rate:	95.0 %		
Malaysia																					
Products Total	381	(100.0)	4.6	354	(100.0)	6.1	-26	516	(100.0)	5.2	488	(100.0)	5.5	-28	654	(100.0)	4.8	488	(100.0)	0.0	-165
Gasoline	126	(33.1)	8.5	61	(17.3)	6.3	-65	163	(31.6)	4.4	83	(17.0)	5.2	-80	218	(33.4)	6.0	83	(17.0)	0.0	-135
Naphtha	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	1	(0.3)	0.0	1	0	(0.0)	0.0	4	(0.8)	24.4	4
Kero/Jet	35	(9.1)	5.6	47	(13.2)	9.0	12	44	(8.6)	4.2	62	(12.8)	4.9	18	57	(8.7)	5.2	80	(16.4)	5.1	23
Gas oil	135	(35.5)	4.7	134	(37.8)	7.2	-1	176	(34.1)	4.5	146	(30.0)	1.5	-30	224	(34.3)	4.9	146	(30.0)	0.0	-78
Heavy Fuel	77	(20.2)	1.7	52	(14.7)	0.9	-25	78	(15.1)	0.2	103	(21.1)	12.1	25	87	(13.4)	2.4	58	(11.9)	-10.8	-29
Fuel Oil Total	372	(97.8)	4.8	294	(83.0)	5.4	-78	461	(89.4)	3.6	396	(81.2)	5.1	-65	587	(89.8)	4.9	372	(76.1)	-1.3	-215
LPG	1	(0.2)	-10.0	17	(4.8)	8.6	16	47	(9.1)	108.1	43	(8.8)	16.8	-4	59	(9.1)	4.7	68	(13.9)	9.5	8
Other Products	8	(2.0)	0.0	43	(12.2)	13.2	36	8	(1.5)	0.0	49	(10.0)	2.1	41	8	(1.2)	0.0	49	(10.0)	0.0	41
CDU capacity	516 thou.b/d			Oper. Rate:	68.7 %			514 thou.b/d			Oper. Rate:	95.0 %			514 thou.b/d			Oper. Rate:	95.0 %		
Philippines																					
Products Total	356	(100.0)	2.6	329	(100.0)	3.1	-28	384	(100.0)	1.2	399	(100.0)	3.3	15	522	(100.0)	6.3	399	(100.0)	0.0	-123
Gasoline	57	(15.9)	3.7	51	(15.5)	2.9	-6	80	(20.8)	5.8	80	(19.9)	7.7	0	115	(22.0)	7.6	87	(21.8)	1.8	-28
Naphtha	1	(0.2)	-5.1	11	(3.3)	9.5	10	1	(0.2)	-0.4	9	(2.1)	-3.7	8	1	(0.1)	0.0	11	(2.9)	5.9	11
Kero/Jet	30	(8.6)	3.6	27	(8.1)	2.7	-4	42	(11.1)	5.7	69	(17.3)	17.3	27	57	(11.0)	6.2	57	(14.4)	-3.7	0
Gas oil	114	(31.9)	4.3	101	(30.8)	3.9	-12	149	(39.0)	4.7	120	(30.0)	2.8	-30	209	(40.0)	6.9	120	(30.0)	0.0	-89
Heavy Fuel	117	(32.9)	0.4	115	(34.9)	2.0	-2	61	(15.8)	-10.4	86	(21.6)	-4.7	26	78	(14.9)	5.1	88	(22.0)	0.4	10
Fuel Oil Total	319	(89.5)	2.3	304	(92.5)	2.9	-15	333	(86.8)	0.7	363	(91.0)	3.0	30	459	(88.1)	6.7	363	(91.0)	0.0	-96
LPG	33	(9.1)	10.0	20	(6.0)	8.4	-13	40	(10.5)	3.5	32	(8.0)	8.4	-8	48	(9.1)	3.5	32	(8.0)	0.0	-16
Other Products	5	(1.4)	-0.3	5	(1.5)	1.1	0	11	(2.8)	13.4	4	(1.0)	-3.3	-7	15	(2.8)	6.6	4	(1.0)	0.0	-11
CDU capacity	422 thou.b/d			Oper. Rate:	78.0 %			420 thou.b/d			Oper. Rate:	95.0 %			420 thou.b/d			Oper. Rate:	95.0 %		
Thailand																					
Products Total	657	(100.0)	5.7	679	(100.0)	8.2	22	698	(100.0)	1.0	757	(100.0)	1.8	60	835	(100.0)	3.6	1,017	(100.0)	6.1	182
Gasoline	107	(16.3)	6.0	131	(19.4)	8.4	25	128	(18.3)	3.0	144	(19.0)	1.5	16	157	(18.8)	4.2	193	(19.0)	6.1	36
Naphtha	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	4	(0.5)	0.0	4	0	(0.0)	0.0	19	(1.8)	35.9	19
Kero/Jet	54	(8.1)	5.2	71	(10.5)	7.4	18	64	(9.1)	3.0	64	(8.4)	-1.9	0	78	(9.4)	4.2	162	(15.9)	20.5	84
Gas oil	266	(40.6)	7.1	277	(40.8)	9.5	11	312	(44.7)	2.7	294	(38.7)	1.0	-18	375	(44.9)	3.8	305	(30.0)	0.8	-70
Heavy Fuel	151	(23.0)	2.9	150	(22.0)	6.3	-2	103	(14.7)	-6.2	103	(13.6)	-6.0	0	118	(14.2)	2.9	165	(16.3)	10.0	47
Fuel Oil Total	578	(88.0)	5.3	629	(92.7)	8.1	52	606	(86.8)	0.8	608	(80.3)	-0.6	2	728	(87.3)	3.8	844	(83.0)	6.8	116
LPG	65	(9.9)	10.4	35	(5.1)	7.8	-30	72	(10.4)	1.8	89	(11.7)	17.0	17	81	(9.7)	2.3	91	(9.0)	0.5	10
Other Products	14	(2.1)	8.1	15	(2.2)	10.3	1	20	(2.8)	6.0	61	(8.0)	26.4	41	26	(3.1)	5.3	81	(8.0)	6.1	56
CDU capacity	842 thou.b/d			Oper. Rate:	80.6 %			1,070 thou.b/d			Oper. Rate:	70.8 %			1,070 thou.b/d			Oper. Rate:	95.0 %		

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Table-21 Petroleum Products Balances in East Asia
(Base case 3/3)

	1999 (Actual)							2005 (Base Case)							2010 (Base Case)						
	Demand	(share)	99/80	Production	(share)	99/80	Net Export	Demand	(share)	05/99	Production	(share)	05/99	Net Export	Demand	(share)	10/05	Production	(share)	10/05	Net Export
	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d
Vietnam																					
Products Total	154	(100.0)	7.8	0	(0.0)	0.0	-154	217	(100.0)	5.9	138	(100.0)	0.0	-79	302	(100.0)	6.8	266	(100.0)	14.1	-36
Gasoline	29	(18.8)	7.1	0	(0.0)	0.0	-29	44	(20.5)	7.4	16	(11.3)	0.0	-29	67	(22.2)	8.6	50	(18.9)	26.4	-17
Naphtha	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	0	(0.0)	0.0	0
Kero/Jet	13	(8.4)	4.9	0	(0.0)	0.0	-13	17	(7.7)	4.3	17	(12.2)	0.0	0	21	(7.1)	5.1	21	(8.1)	5.1	0
Gas oil	76	(49.6)	8.5	0	(0.0)	0.0	-76	101	(46.3)	4.7	56	(40.3)	0.0	-45	131	(43.4)	5.4	131	(49.2)	18.7	0
Heavy Fuel	28	(18.0)	7.5	0	(0.0)	0.0	-28	42	(19.4)	7.1	42	(30.5)	0.0	0	62	(20.6)	8.2	62	(23.4)	8.2	0
Fuel Oil Total	146	(94.8)	7.6	0	(0.0)	0.0	-146	204	(93.9)	5.7	130	(94.3)	0.0	-74	282	(93.3)	6.7	265	(99.5)	15.3	-17
LPG	5	(3.1)	21.3	0	(0.0)	0.0	-5	8	(3.6)	8.9	8	(5.7)	0.0	0	11	(3.7)	7.2	1	(0.5)	-30.8	-10
Other Products	3	(2.1)	7.3	0	(0.0)	0.0	-3	5	(2.5)	8.9	0	(0.0)	0.0	-5	9	(3.0)	10.5	0	(0.0)	0.0	-9
CDU capacity	9 thou.b/d			Oper. Rate:	0.0 %			148 thou.b/d			Oper. Rate:	93.1 %			304 thou.b/d			Oper. Rate:	87.6 %		
East Asia (excluding Japan)																					
Products Total	10,577	(100.0)	5.5	10,105	(100.0)	5.1	-471	12,834	(100.0)	3.3	12,427	(100.0)	3.5	-407	15,153	(100.0)	3.4	13,815	(100.0)	2.1	-1,338
Gasoline	1,544	(14.6)	6.9	1,589	(15.7)	6.6	45	1,978	(15.4)	4.2	1,914	(15.4)	3.2	-64	2,472	(16.3)	4.6	2,392	(17.3)	4.6	-81
Naphtha	1,223	(11.6)	11.9	1,109	(11.0)	9.6	-114	1,569	(12.2)	4.2	1,417	(11.4)	4.2	-152	1,871	(12.3)	3.6	1,543	(11.2)	1.7	-327
Kero/Jet	961	(9.1)	5.4	1,054	(10.4)	5.2	94	1,162	(9.1)	3.2	1,301	(10.5)	3.6	138	1,395	(9.2)	3.7	1,500	(10.9)	2.9	105
Gas oil	2,974	(28.1)	6.6	3,092	(30.6)	6.9	119	3,679	(28.7)	3.6	3,727	(30.0)	3.7	49	4,397	(29.0)	3.6	4,171	(30.2)	2.3	-226
Heavy Fuel	2,640	(25.0)	2.4	2,088	(20.7)	1.4	-552	2,816	(21.9)	1.1	2,573	(20.7)	3.5	-243	3,092	(20.4)	1.9	2,601	(18.8)	0.2	-491
Fuel Oil Total	9,341	(88.3)	5.3	8,932	(88.4)	5.0	-409	11,203	(87.3)	3.1	10,932	(88.0)	3.4	-272	13,227	(87.3)	3.4	12,206	(88.4)	2.2	-1,020
LPG	786	(7.4)	10.4	618	(6.1)	9.0	-168	1,053	(8.2)	5.0	902	(7.3)	6.5	-151	1,247	(8.2)	3.4	967	(7.0)	1.4	-280
Other Products	449	(4.2)	3.9	555	(5.5)	4.7	106	577	(4.5)	4.3	592	(4.8)	1.1	15	680	(4.5)	3.3	642	(4.6)	1.6	-38
CDU capacity	12,385 thou.b/d			Oper. Rate:	81.6 %			14,266 thou.b/d			Oper. Rate:	87.1 %			15,172 thou.b/d			Oper. Rate:	91.1 %		
India																					
Products Total	1,930	(100.0)	5.8	1,590	(100.0)	6.1	-340	2,427	(100.0)	3.9	2,064	(100.0)	4.4	-363	3,120	(100.0)	5.2	2,859	(100.0)	6.7	-261
Gasoline	126	(6.5)	7.3	126	(7.9)	7.4	0	154	(6.4)	3.4	144	(7.0)	2.3	-10	205	(6.6)	5.9	200	(7.0)	6.7	-5
Naphtha	161	(8.3)	6.7	160	(10.0)	6.8	-1	155	(6.4)	-0.6	218	(10.6)	5.4	63	207	(6.6)	5.9	343	(12.0)	9.4	137
Kero/Jet	266	(13.8)	4.6	154	(9.7)	4.1	-112	355	(14.6)	5.0	326	(15.8)	13.3	-29	457	(14.6)	5.2	372	(13.0)	2.7	-85
Gas oil	827	(42.9)	6.8	694	(43.6)	7.5	-133	1,047	(43.2)	4.0	826	(40.0)	2.9	-222	1,389	(44.5)	5.8	1,144	(40.0)	6.7	-245
Heavy Fuel	279	(14.5)	2.9	274	(17.3)	3.8	-5	374	(15.4)	5.0	374	(18.1)	5.3	0	439	(14.1)	3.2	498	(17.4)	5.9	60
Fuel Oil Total	1,659	(86.0)	5.6	1,408	(88.5)	6.1	-251	2,086	(85.9)	3.9	1,889	(91.5)	5.0	-197	2,696	(86.4)	5.3	2,557	(89.4)	6.2	-139
LPG	166	(8.6)	12.1	79	(4.9)	8.0	-88	215	(8.9)	4.4	103	(5.0)	4.6	-112	266	(8.5)	4.3	143	(5.0)	6.7	-123
Other Products	105	(5.4)	4.3	104	(6.5)	5.0	-1	126	(5.2)	3.2	72	(3.5)	-5.8	-54	159	(5.1)	4.7	159	(5.6)	17.1	0
CDU capacity	1,857 thou.b/d			Oper. Rate:	85.6 %			2,298 thou.b/d			Oper. Rate:	89.8 %			2,859 thou.b/d			Oper. Rate:	100.0 %		
Other Asia																					
Products Total	625	(100.0)	5.2	263	(100.0)	1.1	-361	757	(100.0)	3.3	356	(100.0)	5.2	-401	889	(100.0)	3.3	408	(100.0)	2.8	-481
Gasoline	79	(12.6)	4.3	52	(19.6)	2.6	-27	105	(13.8)	4.9	46	(13.0)	-1.9	-59	130	(14.7)	4.5	52	(12.7)	2.4	-79
Naphtha	2	(0.2)	0.0	4	(1.6)	-4.1	3	2	(0.2)	0.0	1	(0.4)	-16.1	0	2	(0.2)	0.0	1	(0.4)	0.0	0
Kero/Jet	64	(10.3)	1.6	37	(14.0)	0.8	-28	76	(10.0)	2.8	57	(15.9)	7.4	-19	86	(9.7)	2.6	71	(17.5)	4.7	-15
Gas oil	264	(42.3)	5.8	80	(30.5)	1.8	-184	302	(39.9)	2.2	81	(22.9)	0.2	-221	335	(37.7)	2.1	118	(28.8)	7.6	-217
Heavy Fuel	186	(29.7)	7.3	65	(24.8)	0.1	-120	236	(31.2)	4.1	156	(43.7)	15.5	-81	292	(32.9)	4.3	148	(36.2)	-1.0	-145
Fuel Oil Total	595	(95.2)	5.3	239	(90.7)	1.1	-356	721	(95.2)	3.3	341	(95.9)	6.1	-380	846	(95.2)	3.2	390	(95.6)	2.7	-456
LPG	12	(1.9)	3.5	8	(2.8)	1.0	-4	15	(1.9)	3.8	15	(4.1)	11.9	0	18	(2.0)	3.9	18	(4.4)	3.9	0
Other Products	18	(2.9)	2.9	17	(6.5)	2.2	-1	22	(2.9)	3.1	0	(0.0)	-100.0	-22	25	(2.8)	2.9	0	(0.0)	0.0	-25
CDU capacity	345 thou.b/d			Oper. Rate:	76.4 %			445 thou.b/d			Oper. Rate:	80.0 %			510 thou.b/d			Oper. Rate:	80.0 %		
Asia (excluding Japan)																					
Products Total	13,131	(100.0)	5.5	11,959	(100.0)	5.1	-1,173	16,018	(100.0)	3.4	14,847	(100.0)	3.7	-1,172	19,162	(100.0)	3.6	17,082	(100.0)	2.8	-2,080
Gasoline	1,749	(13.3)	6.8	1,766	(14.8)	6.5	18	2,237	(14.0)	4.2	2,105	(14.2)	3.0	-133	2,808	(14.7)	4.6	2,644	(15.5)	4.7	-164
Naphtha	1,385	(10.5)	11.0	1,273	(10.6)	9.0	-112	1,725	(10.8)	3.7	1,637	(11.0)	4.3	-89	2,079	(10.8)	3.8	1,888	(11.1)	2.9	-191
Kero/Jet	1,291	(9.8)	4.9	1,245	(10.4)	4.9	-46	1,593	(9.9)	3.6	1,683	(11.3)	5.2	90	1,938	(10.1)	4.0	1,943	(11.4)	2.9	5
Gas oil	4,065	(31.0)	6.6	3,867	(32.3)	6.8	-199	5,028	(31.4)	3.6	4,634	(31.2)	3.1	-394	6,121	(31.9)	4.0	5,432	(31.8)	3.2	-689
Heavy Fuel	3,105	(23.6)	2.7	2,428	(20.3)	1.6	-677	3,426	(21.4)	1.7	3,103	(20.9)	4.2	-323	3,823	(20.0)	2.2	3,247	(19.0)	0.9	-576
Fuel Oil Total	11,595	(88.3)	5.4	10,578	(88.5)	5.0	-1,016	14,010	(87.5)	3.2	13,162	(88.7)	3.7	-849	16,768	(87.5)	3.7	15,153	(88.7)	2.9	-1,615
LPG	965	(7.3)	10.4	704	(5.9)	8.7	-260	1,283	(8.0)	4.9	1,020	(6.9)	6.4	-263	1,530	(8.0)	3.6	1,128	(6.6)	2.0	-402
Other Products	572	(4.4)	3.9	676	(5.6)	4.7	104	725	(4.5)	4.0	665	(4.5)	-0.3	-60	864	(4.5)	3.6	801	(4.7)	3.8	-63
CDU capacity	14,586 thou.b/d			Oper. Rate:	82.0 %			17,009 thou.b/d			Oper. Rate:	87.3 %			18,541 thou.b/d			Oper. Rate:	92.1 %		

Table-22 Petroleum Products Balances in East Asia
(Low GDP Growth Case 1/3)

	1999 (Actual)							2005 (Low GDP Growth Case)							2010 (Low GDP Growth Case)						
	Demand	(share)	99/80	Production	(share)	99/80	Net Export	Demand	(share)	05/99	Production	(share)	05/99	Net Export	Demand	(share)	10/05	Production	(share)	10/05	Net Export
	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d
China																					
Products Total	3,956	(100.0)	5.3	3,585	(100.0)	4.4	-371	5,122	(100.0)	4.4	4,640	(100.0)	4.4	-482	5,974	(100.0)	3.1	5,440	(100.0)	3.2	-534
Gasoline	697	(17.6)	6.4	769	(21.5)	6.5	72	892	(17.4)	4.2	835	(18.0)	1.4	-57	1,045	(17.5)	3.2	1,022	(18.8)	4.1	-24
Naphtha	406	(10.3)	12.4	406	(11.3)	10.9	0	625	(12.2)	7.5	597	(12.9)	6.6	-28	820	(13.7)	5.6	734	(13.5)	4.2	-86
Kero/Jet	170	(4.3)	4.4	153	(4.3)	3.3	-17	244	(4.8)	6.2	261	(5.6)	9.3	17	309	(5.2)	4.8	331	(6.1)	4.9	23
Gas oil	1,262	(31.9)	7.1	1,259	(35.1)	6.5	-3	1,611	(31.4)	4.1	1,624	(35.0)	4.3	13	1,854	(31.0)	2.9	1,904	(35.0)	3.2	50
Heavy Fuel	742	(18.7)	1.2	392	(10.9)	-2.2	-350	862	(16.8)	2.5	510	(11.0)	4.5	-352	909	(15.2)	1.1	553	(10.2)	1.6	-356
Fuel Oil Total	3,277	(82.8)	5.1	2,979	(83.1)	4.2	-298	4,234	(82.7)	4.4	3,827	(82.5)	4.3	-407	4,937	(82.7)	3.1	4,544	(83.5)	3.5	-393
LPG	407	(10.3)	11.6	332	(9.3)	10.4	-75	533	(10.4)	4.6	454	(9.8)	5.4	-79	632	(10.6)	3.5	602	(11.1)	5.8	-29
Other Products	272	(6.9)	2.5	274	(7.6)	2.4	2	356	(6.9)	4.6	359	(7.7)	4.6	3	405	(6.8)	2.6	293	(5.4)	-3.9	-111
CDU capacity	4,594 thou.b/d		Oper. Rate:	78.1 %				5,800 thou.b/d		Oper. Rate:	80.0 %				6,400 thou.b/d		Oper. Rate:	85.0 %			
Hong Kong																					
Products Total	286	(100.0)	4.3	0	(0.0)	0.0	-286	321	(100.0)	2.0	0	(0.0)	0.0	-321	349	(100.0)	1.6	0	(0.0)	0.0	-349
Gasoline	8	(2.8)	3.6	0	(0.0)	0.0	-8	9	(2.9)	2.5	0	(0.0)	0.0	-9	10	(2.9)	1.9	0	(0.0)	0.0	-10
Naphtha	12	(4.2)	9.7	0	(0.0)	0.0	-12	12	(3.7)	0.1	0	(0.0)	0.0	-12	12	(3.5)	0.5	0	(0.0)	0.0	-12
Kero/Jet	58	(20.4)	6.5	0	(0.0)	0.0	-58	69	(21.4)	2.8	0	(0.0)	0.0	-69	77	(22.0)	2.2	0	(0.0)	0.0	-77
Gas oil	163	(57.2)	11.2	0	(0.0)	0.0	-163	186	(58.0)	2.2	0	(0.0)	0.0	-186	204	(58.4)	1.8	0	(0.0)	0.0	-204
Heavy Fuel	36	(12.6)	-4.0	0	(0.0)	0.0	-36	36	(11.2)	-0.1	0	(0.0)	0.0	-36	36	(10.3)	0.0	0	(0.0)	0.0	-36
Fuel Oil Total	278	(97.2)	4.3	0	(0.0)	0.0	-278	312	(97.1)	2.0	0	(0.0)	0.0	-312	338	(97.1)	1.6	0	(0.0)	0.0	-338
LPG	5	(1.6)	3.6	0	(0.0)	0.0	-5	5	(1.7)	2.6	0	(0.0)	0.0	-5	6	(1.7)	2.1	0	(0.0)	0.0	-6
Other Products	3	(1.2)	3.9	0	(0.0)	0.0	-3	4	(1.2)	2.0	0	(0.0)	0.0	-4	4	(1.2)	1.5	0	(0.0)	0.0	-4
CDU capacity	0 thou.b/d		Oper. Rate:	0.0 %				0 thou.b/d		Oper. Rate:	0.0 %				0 thou.b/d		Oper. Rate:	0.0 %			
Chinese Taipei																					
Products Total	959	(100.0)	4.6	855	(100.0)	4.5	-104	1,039	(100.0)	1.3	1,101	(100.0)	4.3	61	1,120	(100.0)	1.5	1,159	(100.0)	1.0	39
Gasoline	150	(15.6)	8.4	111	(13.0)	6.5	-39	179	(17.2)	3.0	182	(16.5)	8.6	3	211	(18.8)	3.3	223	(19.2)	4.1	12
Naphtha	187	(19.5)	8.2	172	(20.1)	8.4	-15	198	(19.0)	1.0	191	(17.4)	1.8	-7	199	(17.8)	0.2	185	(16.0)	-0.6	-14
Kero/Jet	48	(5.0)	7.5	40	(4.6)	5.0	-8	57	(5.4)	2.9	140	(12.7)	23.3	83	66	(5.9)	3.3	122	(10.5)	-2.7	55
Gas oil	106	(11.1)	3.7	136	(15.9)	4.1	29	119	(11.5)	2.0	174	(15.8)	4.2	55	134	(12.0)	2.4	207	(17.9)	3.6	73
Heavy Fuel	341	(35.5)	2.1	296	(34.6)	2.4	-45	350	(33.7)	0.5	275	(25.0)	-1.2	-75	363	(32.4)	0.7	290	(25.0)	1.0	-73
Fuel Oil Total	831	(86.6)	4.3	754	(88.2)	4.3	-77	903	(86.8)	1.4	962	(87.4)	4.1	60	974	(87.0)	1.5	1,027	(88.6)	1.3	54
LPG	63	(6.5)	4.2	44	(5.2)	2.8	-18	64	(6.1)	0.3	64	(5.8)	6.3	0	65	(5.8)	0.4	46	(4.0)	-6.3	-19
Other Products	66	(6.8)	9.6	56	(6.6)	9.2	-9	73	(7.0)	1.8	75	(6.8)	4.8	1	81	(7.2)	2.1	85	(7.4)	2.7	4
CDU capacity	925 thou.b/d		Oper. Rate:	92.4 %				1,220 thou.b/d		Oper. Rate:	90.2 %				1,220 thou.b/d		Oper. Rate:	95.0 %			
Korea																					
Products Total	2,127	(100.0)	7.6	2,469	(100.0)	8.9	342	2,394	(100.0)	2.0	2,613	(100.0)	0.9	218	2,587	(100.0)	1.6	2,613	(100.0)	0.0	26
Gasoline	162	(7.6)	12.4	189	(7.6)	13.2	27	196	(8.2)	3.3	205	(7.8)	1.4	8	232	(8.9)	3.4	356	(13.6)	11.7	125
Naphtha	559	(26.3)	13.1	416	(16.8)	11.5	-143	638	(26.6)	2.2	473	(18.1)	2.2	-164	691	(26.7)	1.6	435	(16.7)	-1.7	-256
Kero/Jet	283	(13.3)	11.7	387	(15.7)	13.2	104	289	(12.1)	0.4	285	(10.9)	-5.0	-4	297	(11.5)	0.5	261	(10.0)	-1.7	-36
Gas oil	381	(17.9)	6.9	618	(25.0)	9.6	236	429	(17.9)	2.0	627	(24.0)	0.3	198	477	(18.4)	2.1	627	(24.0)	0.0	150
Heavy Fuel	494	(23.2)	2.6	682	(27.6)	5.2	189	556	(23.2)	2.0	871	(33.3)	4.1	315	567	(21.9)	0.4	793	(30.4)	-1.8	226
Fuel Oil Total	1,879	(88.3)	7.0	2,291	(92.8)	8.6	412	2,108	(88.0)	1.9	2,461	(94.2)	1.2	353	2,263	(87.5)	1.4	2,473	(94.7)	0.1	210
LPG	195	(9.2)	17.7	106	(4.3)	15.0	-89	225	(9.4)	2.4	129	(4.9)	3.3	-96	255	(9.9)	2.5	35	(1.3)	-22.9	-220
Other Products	53	(2.5)	11.6	71	(2.9)	13.0	18	62	(2.6)	2.5	23	(0.9)	-17.2	-39	68	(2.6)	2.1	105	(4.0)	35.4	36
CDU capacity	2,750 thou.b/d		Oper. Rate:	89.8 %				2,750 thou.b/d		Oper. Rate:	95.0 %				2,750 thou.b/d		Oper. Rate:	95.0 %			
Singapore																					
Products Total	746	(100.0)	7.2	884	(100.0)	1.7	139	762	(100.0)	0.4	1,270	(100.0)	6.2	508	810	(100.0)	1.2	1,270	(100.0)	0.0	460
Gasoline	14	(1.9)	3.4	85	(9.6)	1.1	70	15	(2.0)	1.2	159	(12.5)	11.0	143	17	(2.1)	2.2	159	(12.5)	0.0	142
Naphtha	54	(7.3)	21.4	80	(9.0)	3.0	26	71	(9.4)	4.7	127	(10.0)	8.1	56	79	(9.7)	2.0	140	(11.0)	1.9	61
Kero/Jet	49	(6.6)	5.0	153	(17.3)	0.0	104	53	(7.0)	1.3	210	(16.5)	5.4	156	59	(7.3)	2.3	244	(19.2)	3.1	185
Gas oil	81	(10.9)	6.5	286	(32.3)	4.1	205	83	(10.9)	0.4	381	(30.0)	4.9	298	86	(10.7)	0.8	381	(30.0)	0.0	295
Heavy Fuel	520	(69.8)	7.3	182	(20.6)	-0.7	-338	509	(66.8)	-0.3	318	(25.0)	9.7	-192	535	(66.0)	1.0	270	(21.3)	-3.2	-265
Fuel Oil Total	719	(96.4)	7.3	785	(88.8)	1.3	66	732	(96.1)	0.3	1,194	(94.0)	7.2	461	776	(95.9)	1.2	1,194	(94.0)	0.0	417
LPG	16	(2.1)	5.3	33	(3.7)	12.2	17	17	(2.2)	1.4	64	(5.0)	11.7	47	19	(2.3)	2.0	64	(5.0)	0.0	45
Other Products	11	(1.5)	3.0	66	(7.5)	5.6	55	13	(1.7)	2.7	13	(1.0)	-24.1	0	15	(1.8)	2.7	13	(1.0)	0.0	-2
CDU capacity	1,254 thou.b/d		Oper. Rate:	70.5 %				1,270 thou.b/d		Oper. Rate:	100.0 %				1,270 thou.b/d		Oper. Rate:	100.0 %			

Table-23 Petroleum Products Balances in East Asia
(Low GDP growth case 2/3)

	1999 (Actual) Demand thou.b/d	(share) %	99/80 %/Y	Production thou.b/d	(share) %	99/80 %/Y	Net Export thou.b/d	2005 (Low GDP Growth Case) Demand thou.b/d	(share) %	05/99 %/Y	Production thou.b/d	(share) %	05/99 %/Y	Net Export thou.b/d	2010 (Low GDP Growth Case) Demand thou.b/d	(share) %	10/05 %/Y	Production thou.b/d	(share) %	10/05 %/Y	Net Export thou.b/d
Brunei																					
Products Total	11	(100.0)	4.8	11	(100.0)	4.5	0	12	(100.0)	2.1	9	(100.0)	-2.6	-3	13	(100.0)	1.9	9	(100.0)	0.0	-4
Gasoline	4	(38.2)	5.3	4	(38.8)	3.6	0	5	(38.8)	2.4	3	(30.0)	-6.6	-2	5	(39.2)	2.1	4	(39.9)	5.9	-2
Naphtha	0	(1.1)	-1.5	0	(1.1)	-1.5	0	0	(1.0)	0.0	0	(0.0)	-100.0	0	0	(0.9)	0.0	0	(0.0)	0.0	0
Kero/Jet	2	(15.3)	8.4	2	(15.6)	0.0	0	2	(14.8)	1.5	1	(13.4)	-4.9	-1	2	(14.4)	1.3	1	(11.6)	-2.9	-1
Gas oil	3	(28.8)	4.9	3	(30.2)	5.1	0	4	(29.6)	2.6	3	(30.0)	-2.7	-1	4	(30.4)	2.4	3	(30.0)	0.0	-1
Heavy Fuel	0	(0.0)	-100.0	0	(0.0)	-100.0	0	0	(0.2)	0.0	2	(26.6)	0.0	2	0	(0.1)	0.0	2	(18.5)	-7.0	2
Fuel Oil Total	9	(83.4)	5.4	9	(85.7)	5.1	0	10	(84.4)	2.3	9	(100.0)	0.0	-1	11	(85.0)	2.0	9	(100.0)	0.0	-2
LPG	2	(13.8)	2.2	2	(14.3)	2.2	0	2	(13.0)	1.1	0	(0.0)	-100.0	-2	2	(12.5)	1.0	0	(0.0)	0.0	-2
Other Products	0	(2.8)	6.0	0	(0.0)	0.0	0	0	(2.6)	1.1	0	(0.0)	0.0	0	0	(2.5)	1.2	0	(0.0)	0.0	0
CDU capacity	9 thou.b/d		Oper. Rate: 122.3 %					9 thou.b/d		Oper. Rate: 100.0 %					9 thou.b/d		Oper. Rate: 100.0 %				
Indonesia																					
Products Total	945	(100.0)	4.4	940	(100.0)	5.2	-5	1,157	(100.0)	3.4	1,012	(100.0)	1.2	-146	1,352	(100.0)	3.2	1,154	(100.0)	2.7	-198
Gasoline	191	(20.2)	6.3	188	(20.0)	8.0	-3	230	(19.9)	3.2	208	(20.6)	1.7	-22	269	(19.9)	3.1	215	(18.6)	0.6	-54
Naphtha	4	(0.4)	0.0	24	(2.6)	0.0	21	5	(0.4)	3.1	15	(1.4)	-8.3	10	6	(0.4)	4.8	15	(1.3)	0.0	9
Kero/Jet	220	(23.3)	2.3	175	(18.6)	4.9	-45	265	(22.9)	3.2	192	(19.0)	1.6	-73	313	(23.1)	3.3	219	(19.0)	2.7	-93
Gas oil	384	(40.7)	5.6	279	(29.7)	9.1	-106	454	(39.2)	2.8	304	(30.0)	1.4	-151	528	(39.0)	3.1	346	(30.0)	2.7	-182
Heavy Fuel	135	(14.3)	3.9	219	(23.3)	1.2	85	167	(14.4)	3.6	263	(26.0)	3.1	96	193	(14.3)	3.0	320	(27.7)	4.0	127
Fuel Oil Total	933	(98.8)	4.5	885	(94.2)	5.1	-48	1,121	(96.9)	3.1	981	(97.0)	1.7	-140	1,308	(96.8)	3.1	1,115	(96.6)	2.6	-193
LPG	-2	-(0.2)	-197.6	31	(3.3)	3.8	33	17	(1.5)	0.0	20	(2.0)	-6.7	3	20	(1.5)	3.2	28	(2.4)	6.4	7
Other Products	14	(1.5)	5.4	24	(2.5)	8.5	10	19	(1.6)	5.1	10	(1.0)	-13.3	-9	24	(1.7)	4.8	12	(1.0)	2.7	-12
CDU capacity	1,065 thou.b/d		Oper. Rate: 88.2 %					1,065 thou.b/d		Oper. Rate: 95.0 %					1,215 thou.b/d		Oper. Rate: 95.0 %				
Malaysia																					
Products Total	381	(100.0)	4.6	354	(100.0)	6.1	-26	500	(100.0)	4.6	488	(100.0)	5.5	-12	597	(100.0)	3.6	488	(100.0)	0.0	-109
Gasoline	126	(33.1)	8.5	61	(17.3)	6.3	-65	157	(31.4)	3.7	83	(17.0)	5.2	-74	196	(32.8)	4.6	83	(17.0)	0.0	-113
Naphtha	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	1	(0.3)	0.0	1	0	(0.0)	0.0	4	(0.8)	24.4	4
Kero/Jet	35	(9.1)	5.6	47	(13.2)	9.0	12	43	(8.5)	3.5	62	(12.8)	4.9	20	52	(8.6)	3.9	80	(16.4)	5.1	28
Gas oil	135	(35.5)	4.7	134	(37.8)	7.2	-1	172	(34.3)	4.0	146	(30.0)	1.5	-25	206	(34.5)	3.8	146	(30.0)	0.0	-60
Heavy Fuel	77	(20.2)	1.7	52	(14.7)	0.9	-25	77	(15.3)	0.0	103	(21.1)	12.1	26	83	(13.9)	1.6	58	(11.9)	-10.8	-25
Fuel Oil Total	372	(97.8)	4.8	294	(83.0)	5.4	-78	448	(89.5)	3.1	396	(81.2)	5.1	-51	537	(89.9)	3.7	372	(76.1)	-1.3	-165
LPG	1	(0.2)	-10.0	17	(4.8)	8.6	16	45	(8.9)	106.2	43	(8.8)	16.8	-2	52	(8.8)	3.3	68	(13.9)	9.5	15
Other Products	8	(2.0)	0.0	43	(12.2)	13.2	36	8	(1.5)	0.0	49	(10.0)	2.1	41	8	(1.3)	0.0	49	(10.0)	0.0	41
CDU capacity	516 thou.b/d		Oper. Rate: 68.7 %					514 thou.b/d		Oper. Rate: 95.0 %					514 thou.b/d		Oper. Rate: 95.0 %				
Philippines																					
Products Total	356	(100.0)	2.6	329	(100.0)	3.1	-28	361	(100.0)	0.2	399	(100.0)	3.3	38	451	(100.0)	4.6	399	(100.0)	0.0	-52
Gasoline	57	(15.9)	3.7	51	(15.5)	2.9	-6	77	(21.3)	5.2	80	(19.9)	7.7	3	104	(23.1)	6.3	87	(21.8)	1.8	-18
Naphtha	1	(0.3)	-5.1	11	(3.3)	9.5	10	1	(0.2)	-0.9	9	(2.1)	-3.7	8	1	(0.2)	0.0	11	(2.9)	5.9	11
Kero/Jet	30	(8.6)	3.6	27	(8.1)	2.7	-4	40	(11.0)	4.5	69	(17.3)	17.3	29	50	(11.1)	4.7	57	(14.4)	-3.7	7
Gas oil	114	(31.9)	4.3	101	(30.8)	3.9	-12	143	(39.7)	3.9	120	(30.0)	2.8	-24	189	(41.8)	5.6	120	(30.0)	0.0	-69
Heavy Fuel	117	(32.9)	0.4	115	(34.9)	2.0	-2	52	(14.3)	-12.8	86	(21.6)	-4.7	35	51	(11.3)	-0.3	88	(22.0)	0.4	37
Fuel Oil Total	319	(89.5)	2.3	304	(92.5)	2.9	-15	312	(86.5)	-0.3	363	(91.0)	3.0	51	395	(87.5)	4.8	363	(91.0)	0.0	-32
LPG	33	(9.1)	10.0	20	(6.0)	8.4	-13	39	(10.8)	3.0	32	(8.0)	8.4	-7	44	(9.7)	2.5	32	(8.0)	0.0	-12
Other Products	5	(1.4)	-0.3	5	(1.5)	1.1	0	10	(2.7)	12.0	4	(1.0)	-3.3	-6	13	(2.8)	5.1	4	(1.0)	0.0	-9
CDU capacity	422 thou.b/d		Oper. Rate: 78.0 %					420 thou.b/d		Oper. Rate: 95.0 %					420 thou.b/d		Oper. Rate: 95.0 %				
Thailand																					
Products Total	657	(100.0)	5.7	679	(100.0)	8.2	22	672	(100.0)	0.4	757	(100.0)	1.8	86	760	(100.0)	2.5	1,017	(100.0)	6.1	256
Gasoline	107	(16.3)	6.0	131	(19.4)	8.4	25	122	(18.2)	2.3	144	(19.0)	1.5	22	141	(18.6)	2.9	193	(19.0)	6.1	52
Naphtha	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	4	(0.5)	0.0	4	0	(0.0)	0.0	19	(1.8)	35.9	19
Kero/Jet	54	(8.1)	5.2	71	(10.5)	7.4	18	61	(9.1)	2.2	64	(8.4)	-1.9	3	71	(9.3)	2.9	162	(15.9)	20.5	92
Gas oil	266	(40.6)	7.1	277	(40.8)	9.5	11	300	(44.6)	2.0	294	(38.7)	1.0	-6	340	(44.8)	2.6	305	(30.0)	0.8	-35
Heavy Fuel	151	(23.0)	2.9	150	(22.0)	6.3	-2	100	(14.8)	-6.7	103	(13.6)	-6.0	3	109	(14.4)	1.9	165	(16.3)	10.0	56
Fuel Oil Total	578	(88.0)	5.3	629	(92.7)	8.1	52	582	(86.7)	0.1	608	(80.3)	-0.6	26	661	(87.0)	2.6	844	(83.0)	6.8	183
LPG	65	(9.9)	10.4	35	(5.1)	7.8	-30	71	(10.5)	1.4	89	(11.7)	17.0	18	76	(10.0)	1.5	91	(9.0)	0.5	15
Other Products	14	(2.1)	8.1	15	(2.2)	10.3	1	19	(2.8)	5.4	61	(8.0)	26.4	42	23	(3.0)	3.8	81	(8.0)	6.1	58
CDU capacity	842 thou.b/d		Oper. Rate: 80.6 %					1,070 thou.b/d		Oper. Rate: 70.8 %					1,070 thou.b/d		Oper. Rate: 95.0 %				

Table-24 Petroleum Products Balances in East Asia
(Low GDP growth case 3/3)

	1999 (Actual)							2005 (Low GDP Growth Case)							2010 (Low GDP Growth Case)						
	Demand	(share)	99/80	Production	(share)	99/80	Net Export	Demand	(share)	05/99	Production	(share)	05/99	Net Export	Demand	(share)	10/05	Production	(share)	10/05	Net Export
	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d	thou.b/d	%	%/Y	thou.b/d	%	%/Y	thou.b/d
Vietnam																					
Products Total	154	(100.0)	7.8	0	(0.0)	0.0	-154	210	(100.0)	5.3	138	(100.0)	0.0	-72	279	(100.0)	5.9	266	(100.0)	14.1	-13
Gasoline	29	(18.8)	7.1	0	(0.0)	0.0	-29	42	(20.2)	6.6	16	(11.3)	0.0	-27	61	(21.7)	7.4	50	(18.9)	26.4	-11
Naphtha	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	0	(0.0)	0.0	0	0	(0.0)	0.0	0	(0.0)	0.0	0
Kero/Jet	13	(8.4)	4.9	0	(0.0)	0.0	-13	16	(7.8)	3.8	17	(12.2)	0.0	0	20	(7.2)	4.4	21	(8.1)	5.1	1
Gas oil	76	(49.6)	8.5	0	(0.0)	0.0	-76	98	(46.6)	4.2	56	(40.3)	0.0	-42	123	(43.9)	4.7	131	(49.2)	18.7	8
Heavy Fuel	28	(18.0)	7.5	0	(0.0)	0.0	-28	40	(19.2)	6.4	42	(30.5)	0.0	2	57	(20.3)	7.1	62	(23.4)	8.2	6
Fuel Oil Total	146	(94.8)	7.6	0	(0.0)	0.0	-146	197	(93.8)	5.1	130	(94.3)	0.0	-67	260	(93.2)	5.8	265	(99.5)	15.3	5
LPG	5	(3.1)	21.3	0	(0.0)	0.0	-5	8	(3.8)	8.9	8	(5.7)	0.0	0	11	(4.0)	7.2	1	(0.5)	-30.8	-10
Other Products	3	(2.1)	7.3	0	(0.0)	0.0	-3	5	(2.5)	8.0	0	(0.0)	0.0	-5	8	(2.8)	9.0	0	(0.0)	0.0	-8
CDU capacity	9 thou.b/d			Oper. Rate:	0.0 %			148 thou.b/d			Oper. Rate:	93.1 %			304 thou.b/d			Oper. Rate:	87.6 %		
East Asia (excluding Japan)																					
Products Total	10,577	(100.0)	5.5	10,105	(100.0)	5.1	-471	12,552	(100.0)	2.9	12,427	(100.0)	3.5	-125	14,292	(100.0)	2.6	13,815	(100.0)	2.1	-478
Gasoline	1,544	(14.6)	6.9	1,589	(15.7)	6.6	45	1,925	(15.3)	3.7	1,914	(15.4)	3.2	-11	2,291	(16.0)	3.5	2,392	(17.3)	4.6	101
Naphtha	1,223	(11.6)	11.9	1,109	(11.0)	9.6	-114	1,549	(12.3)	4.0	1,417	(11.4)	4.2	-132	1,809	(12.7)	3.1	1,543	(11.2)	1.7	-265
Kero/Jet	961	(9.1)	5.4	1,054	(10.4)	5.2	94	1,138	(9.1)	2.9	1,301	(10.5)	3.6	163	1,315	(9.2)	2.9	1,500	(10.9)	2.9	185
Gas oil	2,974	(28.1)	6.6	3,092	(30.6)	6.9	119	3,598	(28.7)	3.2	3,727	(30.0)	3.2	129	4,145	(29.0)	2.9	4,171	(30.2)	2.3	25
Heavy Fuel	2,640	(25.0)	2.4	2,088	(20.7)	1.4	-552	2,748	(21.9)	0.7	2,573	(20.7)	3.5	-175	2,902	(20.3)	1.1	2,601	(18.8)	0.2	-301
Fuel Oil Total	9,341	(88.3)	5.3	8,932	(88.4)	5.0	-409	10,959	(87.3)	2.7	10,932	(88.0)	3.4	-27	12,462	(87.2)	2.6	12,206	(88.4)	2.2	-256
LPG	786	(7.4)	10.4	618	(6.1)	9.0	-168	1,025	(8.2)	4.5	902	(7.3)	6.5	-122	1,182	(8.3)	2.9	967	(7.0)	1.4	-215
Other Products	449	(4.2)	3.9	555	(5.5)	4.7	106	568	(4.5)	4.0	592	(4.8)	1.1	24	648	(4.5)	2.7	642	(4.6)	1.6	-7
CDU capacity	12,385 thou.b/d			Oper. Rate:	81.6 %			14,266 thou.b/d			Oper. Rate:	87.1 %			15,172 thou.b/d			Oper. Rate:	91.1 %		
India																					
Products Total	1,930	(100.0)	5.8	1,590	(100.0)	6.1	-340	2,339	(100.0)	3.3	2,064	(100.0)	4.4	-275	2,885	(100.0)	4.3	2,859	(100.0)	6.7	-26
Gasoline	126	(6.5)	7.3	126	(7.9)	7.4	0	148	(6.3)	2.7	144	(7.0)	2.3	-3	188	(6.5)	4.9	200	(7.0)	6.7	12
Naphtha	161	(8.3)	6.7	160	(10.0)	6.8	-1	144	(6.2)	-1.8	218	(10.6)	5.4	74	183	(6.3)	4.9	343	(12.0)	9.4	160
Kero/Jet	266	(13.8)	4.6	154	(9.7)	4.1	-112	346	(14.8)	4.5	326	(15.8)	13.3	-20	431	(14.9)	4.5	372	(13.0)	2.7	-59
Gas oil	827	(42.9)	6.8	694	(43.6)	7.5	-133	1,004	(42.9)	3.3	826	(40.0)	2.9	-178	1,270	(44.0)	4.8	1,144	(40.0)	6.7	-126
Heavy Fuel	279	(14.5)	2.9	274	(17.3)	3.8	-5	364	(15.6)	4.5	374	(18.1)	5.3	10	413	(14.3)	2.6	498	(17.4)	5.9	85
Fuel Oil Total	1,659	(86.0)	5.6	1,408	(88.5)	6.1	-251	2,006	(85.8)	3.2	1,889	(91.5)	5.0	-118	2,485	(86.1)	4.4	2,557	(89.4)	6.2	72
LPG	166	(8.6)	12.1	79	(4.9)	8.0	-88	210	(9.0)	3.9	103	(5.0)	4.6	-107	251	(8.7)	3.6	143	(5.0)	6.7	-108
Other Products	105	(5.4)	4.3	104	(6.5)	5.0	-1	123	(5.2)	2.7	72	(3.5)	-5.8	-50	150	(5.2)	4.1	159	(5.6)	17.1	9
CDU capacity	1,857 thou.b/d			Oper. Rate:	85.6 %			2,298 thou.b/d			Oper. Rate:	89.8 %			2,859 thou.b/d			Oper. Rate:	100.0 %		
Other Asia																					
Products Total	625	(100.0)	5.2	263	(100.0)	1.1	-361	730	(100.0)	2.6	356	(100.0)	5.2	-374	829	(100.0)	2.6	408	(100.0)	2.8	-421
Gasoline	79	(12.6)	4.3	52	(19.6)	2.6	-27	100	(13.7)	4.0	46	(13.0)	-1.9	-54	119	(14.3)	3.6	52	(12.7)	2.4	-67
Naphtha	2	(0.2)	0.0	4	(1.6)	-4.1	3	2	(0.2)	0.0	1	(0.4)	-16.1	0	2	(0.2)	0.0	1	(0.4)	0.0	0
Kero/Jet	64	(10.3)	1.6	37	(14.0)	0.8	-28	74	(10.1)	2.3	57	(15.9)	7.4	-17	82	(9.9)	2.0	71	(17.5)	4.7	-10
Gas oil	264	(42.3)	5.8	80	(30.5)	1.8	-184	295	(40.4)	1.8	81	(22.9)	0.2	-213	320	(38.6)	1.7	118	(28.8)	7.6	-203
Heavy Fuel	186	(29.7)	7.3	65	(24.8)	0.1	-120	225	(30.9)	3.3	156	(43.7)	15.5	-70	267	(32.2)	3.4	148	(36.2)	-1.0	-119
Fuel Oil Total	595	(95.2)	5.3	239	(90.7)	1.1	-356	695	(95.2)	2.6	341	(95.9)	6.1	-354	789	(95.2)	2.6	390	(95.6)	2.7	-399
LPG	12	(1.9)	3.5	8	(2.8)	1.0	-4	14	(1.9)	3.1	15	(4.1)	11.9	1	16	(2.0)	3.1	18	(4.4)	3.9	1
Other Products	18	(2.9)	2.9	17	(6.5)	2.2	-1	21	(2.9)	2.5	0	(0.0)	-100.0	-21	24	(2.8)	2.3	0	(0.0)	0.0	-24
CDU capacity	345 thou.b/d			Oper. Rate:	76.4 %			445 thou.b/d			Oper. Rate:	80.0 %			510 thou.b/d			Oper. Rate:	80.0 %		
Asia (excluding Japan)																					
Products Total	13,131	(100.0)	5.5	11,959	(100.0)	5.1	-1,173	15,620	(100.0)	2.9	14,847	(100.0)	3.7	-774	18,006	(100.0)	2.9	17,082	(100.0)	2.8	-925
Gasoline	1,749	(13.3)	6.8	1,766	(14.8)	6.5	18	2,173	(13.9)	3.7	2,105	(14.2)	3.0	-68	2,598	(14.4)	3.6	2,644	(15.5)	4.7	46
Naphtha	1,385	(10.5)	11.0	1,273	(10.6)	9.0	-112	1,695	(10.9)	3.4	1,637	(11.0)	4.3	-58	1,993	(11.1)	3.3	1,888	(11.1)	2.9	-105
Kero/Jet	1,291	(9.8)	4.9	1,245	(10.4)	4.9	-46	1,558	(10.0)	3.2	1,683	(11.3)	5.2	125	1,827	(10.1)	3.2	1,943	(11.4)	2.9	116
Gas oil	4,065	(31.0)	6.6	3,867	(32.3)	6.8	-199	4,897	(31.4)	3.2	4,634	(31.2)	3.1	-263	5,735	(31.9)	3.2	5,432	(31.8)	3.2	-304
Heavy Fuel	3,105	(23.6)	2.7	2,428	(20.3)	1.6	-677	3,338	(21.4)	1.2	3,103	(20.9)	4.2	-235	3,582	(19.9)	1.4	3,247	(19.0)	0.9	-335
Fuel Oil Total	11,595	(88.3)	5.4	10,578	(88.5)	5.0	-1,016	13,660	(87.4)	2.8	13,162	(88.7)	3.7	-498	15,736	(87.4)	2.9	15,153	(88.7)	2.9	-582
LPG	965	(7.3)	10.4	704	(5.9)	8.7	-260	1,249	(8.0)	4.4	1,020	(6.9)	6.4	-229	1,449	(8.0)	3.0	1,128	(6.6)	2.0	-322
Other Products	572	(4.4)	3.9	676	(5.6)	4.7	104	712	(4.6)	3.7	665	(4.5)	-0.3	-47	822	(4.6)	2.9	801	(4.7)	3.8	-21
CDU capacity	14,586 thou.b/d			Oper. Rate:	82.0 %			17,009 thou.b/d			Oper. Rate:	87.3 %			18,541 thou.b/d			Oper. Rate:	92.1 %		