

CNG-NGV ASIA PACIFIC FORUM 2008

23RD – 25TH APRIL 2008

ANGVA ROUNDTABLE SESSION

BEST PRACTICES AND CHALLENGES IN IMPLEMENTING SUCCESSFUL NGV PROGRAMMES



25th April 2008
Jakarta, Indonesia

**BEST PRACTICES AND CHALLENGES IN IMPLEMENTING
SUCCESSFUL NGV PROGRAMMES**

■ **PANEL MEMBERS**

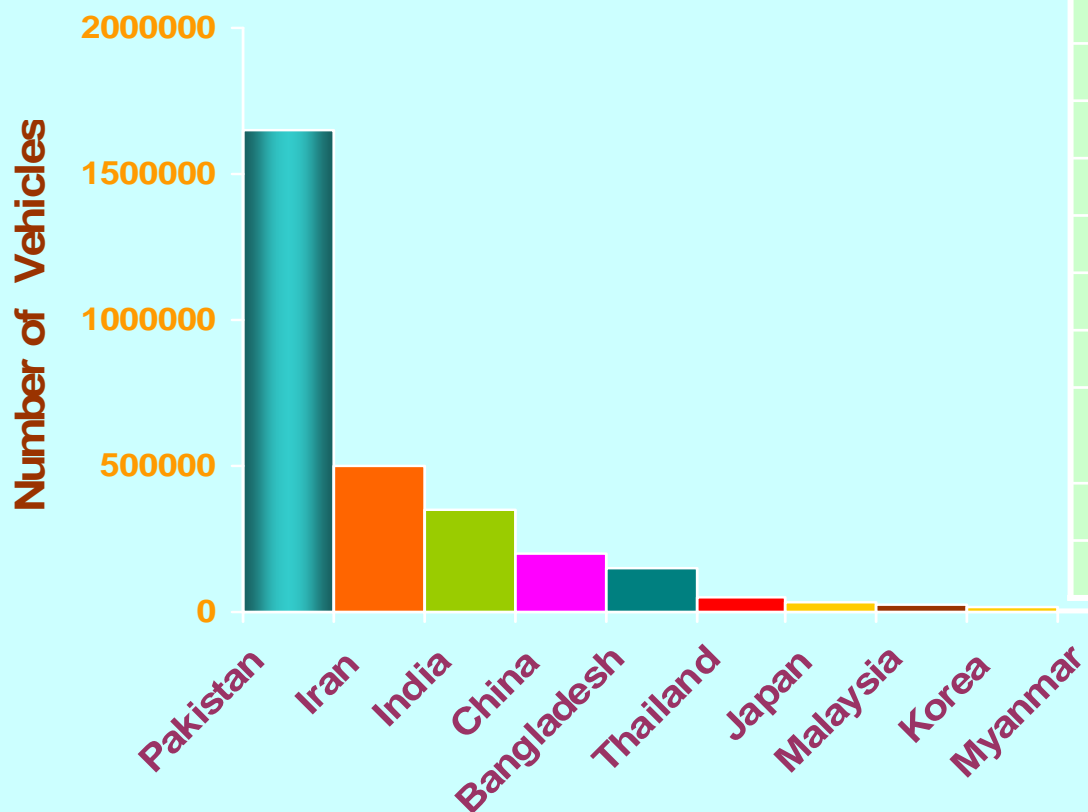
- **Mr. Muazzam Hussain Chaudry, Executive Director (CNG), OGRA, Pakistan.**
- **Mr. AK Gumber, Chief Manager, Business Development, GAIL, India.**
- **Mr. Punnachai Footrakul, VP NGV Marketing, PTT PLC, Thailand.**
- **Ms. Azita M Azmi, NGV Planning Dept., PETRONAS Dagangan, Malaysia.**
- **Mr. M Husen, Assistant Deputy III -Energy, Coordinating Ministry of Economic Affairs, Indonesia**
- **Mr. Mohammad Luthfi, Technical Manager, Trans Batavia, Indonesia.**
- **Mr. Danny Praditya, Director, PT. CNG, Indonesia.**

- **Moderator:** Lee Giok Seng, Executive Director, ANGVA.

NUMBERS OF NATURAL GAS VEHICLES AND REFUELLING STATIONS IN ASIA PACIFIC REGION

	Asia Pacific Countries	No. of Vehicles	No. of Stations	Remarks
1	Pakistan	1,650,000	1,847	Nov '07
2	Iran	498,709	294	Nov '07
3	India	354,000	325	Dec '07
4	China	200,873	486	Jan '08
5	Bangladesh	150,000	200	Dec '07
6	Uzbekistan	47,000	43	Dec '07
7	Thailand	46,885	153	May '07
8	Japan	32,691	293	Sept '07
9	Malaysia	28,309	60	Feb '07
10	Republic of Korea	14,323	121	Oct '07
11	Myanmar	10,900	20	Dec '06
12	Tajikistan	10,600	53	Dec '07
13	Kyrgyzstan	6,000	6	Dec '07
14	Australia	2,453	146	Mar '07
15	Indonesia	1,460	7	Dec '07
16	Singapore	370	1	Sept '07
17	United Arab Emirates	305	2	Mar '07
18	New Zealand	283	14	Mar '07
19	Philippines	36	1	Feb '06
20	Taiwan	4	1	Apr '05
	TOTAL	3,055,201	4,073	

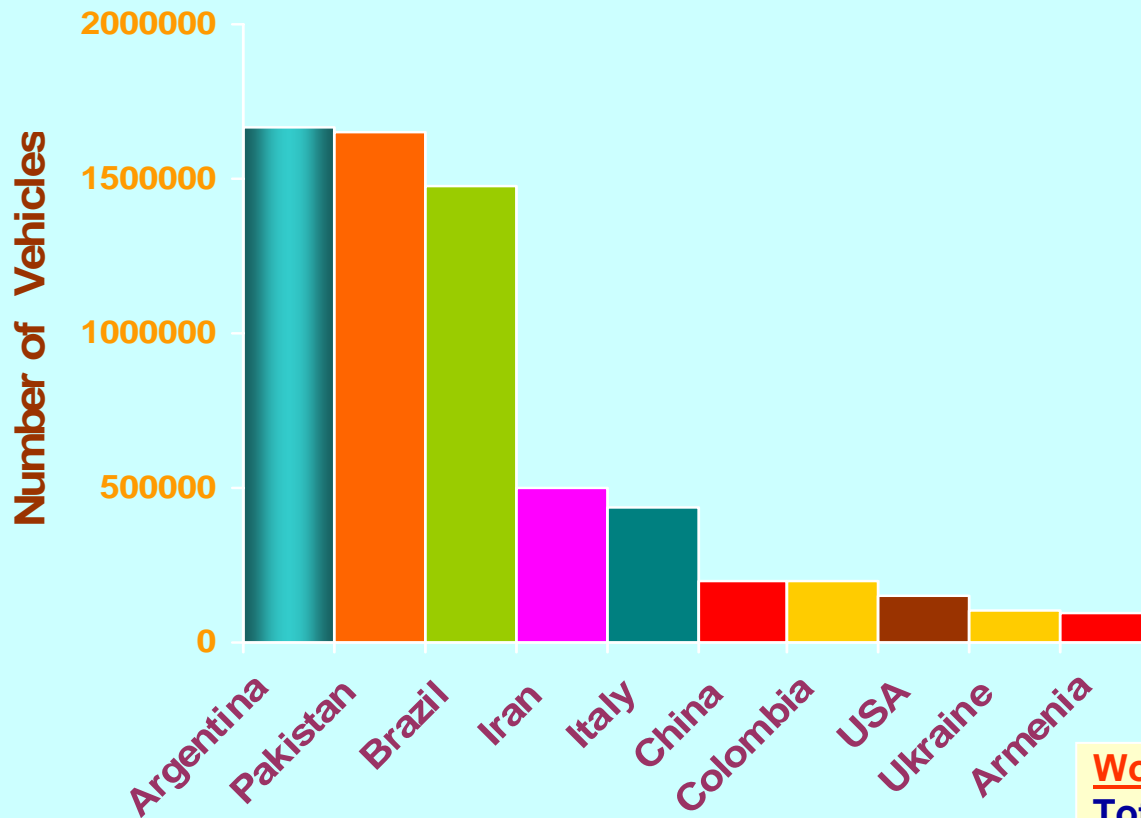
TOP 10 NGV COUNTRIES IN ASIA PACIFIC REGION



	Countries	No. of Vehicles	No. of Stations	Remarks
1	Pakistan	1,650,000	1,847	Nov '07
2	Iran	498,709	294	Nov '07
3	India	354,000	325	Dec '07
4	China	200,873	486	Jan '08
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6	Thailand	46,885	153	May '07
7	Japan	32,691	293	Sept '07
8	Malaysia	28,309	60	Feb '07
9	Republic of Korea	14,323	121	Oct '07
10	Myanmar	10,900	20	Dec '06
	TOTAL	2,986,690	3,799	

Excluding Uzbekistan

TOP 10 NGV COUNTRIES IN THE WORLD



	Top Ten Countries	No. of Vehicles	No. of Stations	Remarks
1	Argentina	1,663,340	1,713	Sept '07
2	Pakistan	1,650,000	1,847	Nov '07
3	Brazil	1,476,219	1,561	Sept '07
4	Iran	498,709	294	Nov '07
5	Italy	432,900	609	Mar '07
6	China	200,873	486	Jan '08
7	Colombia	198,844	313	May '07
8	USA	146,876	1,600	Dec '04
9	Ukraine	100,000	200	Dec '06
10	Armenia	96,100	172	Dec '07
TOTAL		6,463,861	8,795	

Worldwide:

**Total number of natural gas vehicles = 7,820,751.
Total number of refuelling stations = 12,481.**

NUMBERS OF NATURAL GAS VEHICLES AND REFUELLING STATIONS IN VARIOUS REGIONS OF THE WORLD

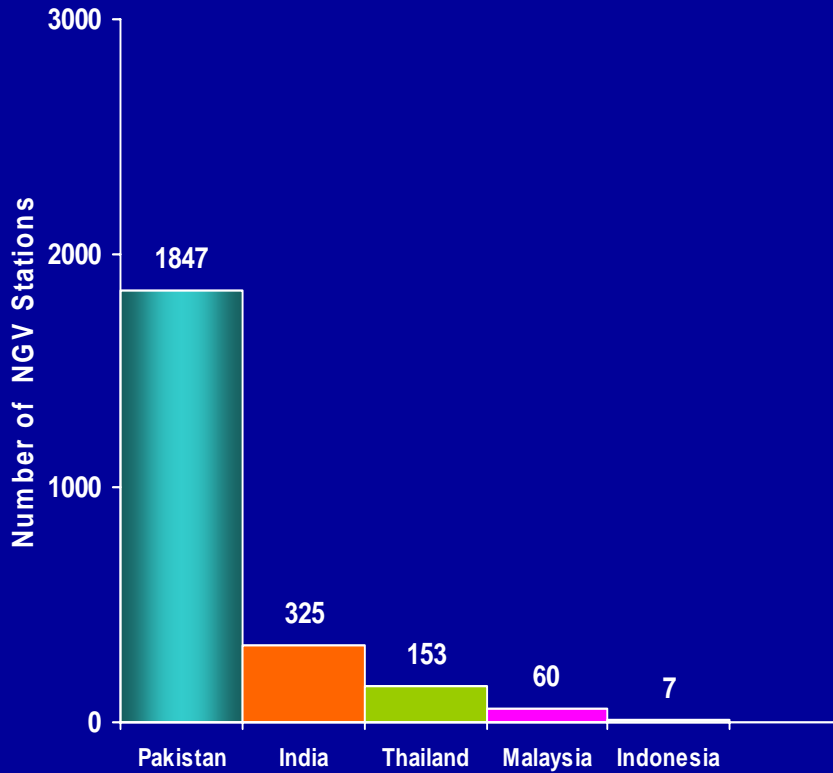
Region	No. of Vehicles	No. of Stations
Asia Pacific region	3,055,201	4,073
South America	3,434,363	3,706
Europe	642,227	2,166
Others	688,960	2,536
Worldwide (Total)	7,820,751	12,481

FIVE SELECTED COUNTRIES IN ASIA PACIFIC REGION FOR ANGVA ROUNDTABLE DISCUSSIONS

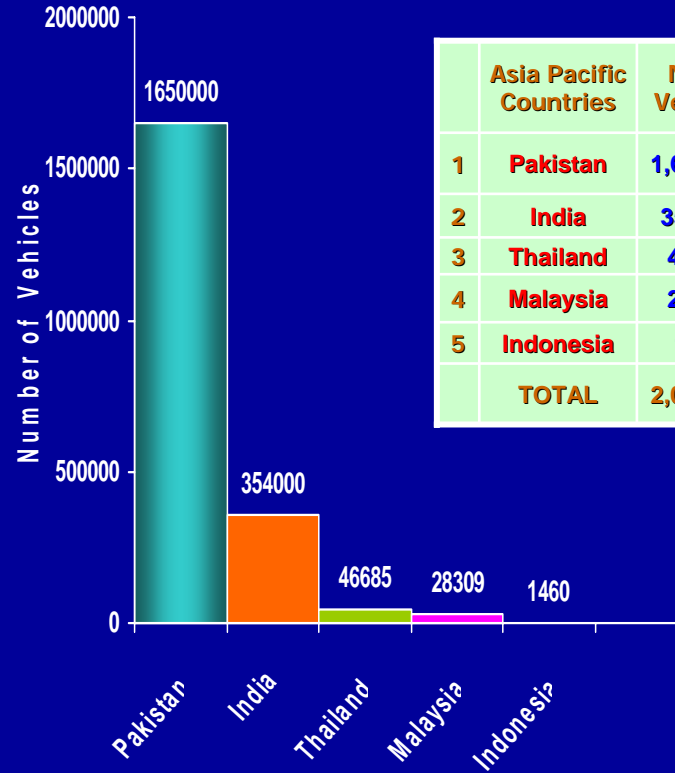
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4	Malaysia	28,309	60	Feb '07
5	Indonesia	1,460	7	Dec '07
	TOTAL	2,080,654	2,392	

NGV IN THE FIVE SELECTED COUNTRIES

No. of NGV Stations



No. of Natural Gas Vehicles



	Asia Pacific Countries	No. of Vehicles	No. of Stations	Remarks
1	Pakistan	1,650,000	1,847	Nov '07
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KEY DRIVERS AND MAJOR CHALLENGES FOR SUCCESSFUL NGV PROGRAMMES

■ Key Drivers:

- ✓ Energy
- ✓ Economics
- ✓ Environment

■ Major Challenges:

- ✓ Government Support & Policies
- ✓ Gas Supply and Refuelling Infrastructure
- ✓ Technology and Know-how
- ✓ Safety Standard and Enforcement
- ✓ Market Awareness and Education

KEY DRIVERS FOR DECISION TO IMPLEMENT NGV PROGRAMMES

- **Key drivers:**
 - ✓ **Energy**
 - ✓ **Economics**
 - ✓ **Environment**

- **Energy**
 - **More natural gas reserves than oil reserves.**
 - **Most countries consumed more oil than produced.**
 - **Most oil consumption are gasoline and diesel for transportation sector.**
 - **Trans boundary pipelines and LNG supplies will ensure adequate and reliable supply of natural gas for countries that lack supplies.**

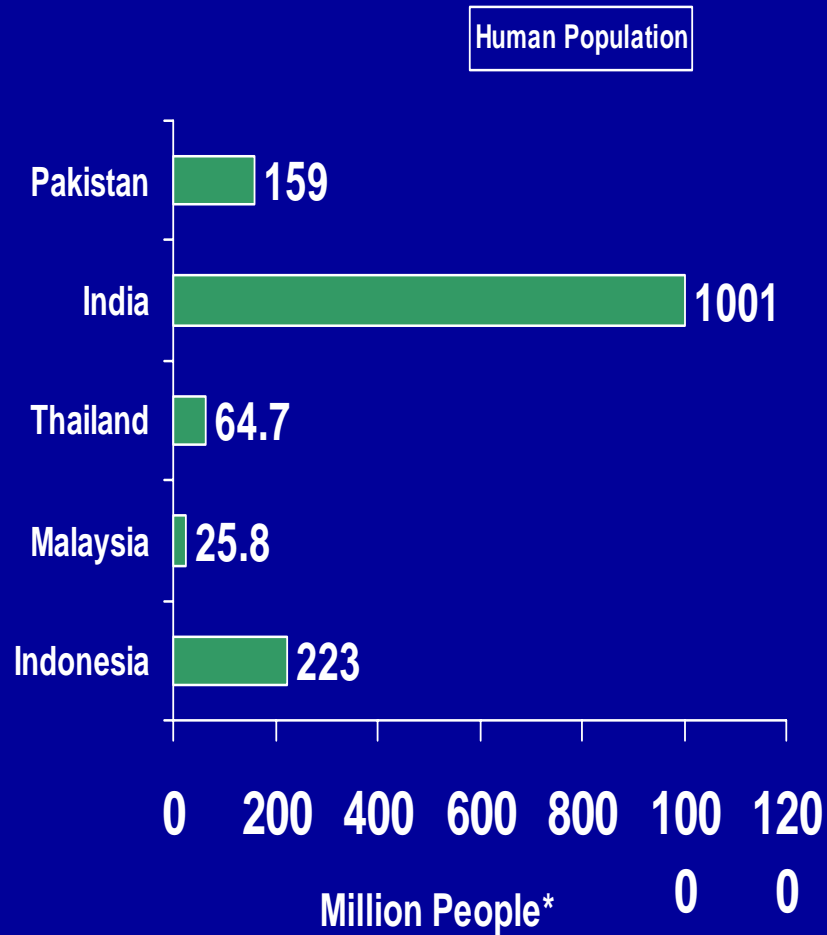
■ Economics

- **Prices of Gasoline and Diesel continue to increase.**
- **Government subsidies heavily gasoline and diesel, need to look for alternative such as CNG/NGV.**
- **CNG/NGV are price much lower price than gasoline and diesel, thus encouraging many vehicle owners to use CNG/NGV.**
- **Other incentives such as import duty exemption on conversion kits, reduction of road-taxes, subsidies for purchasing / conversion of vehicles, etc., were also given.**

■ Environment

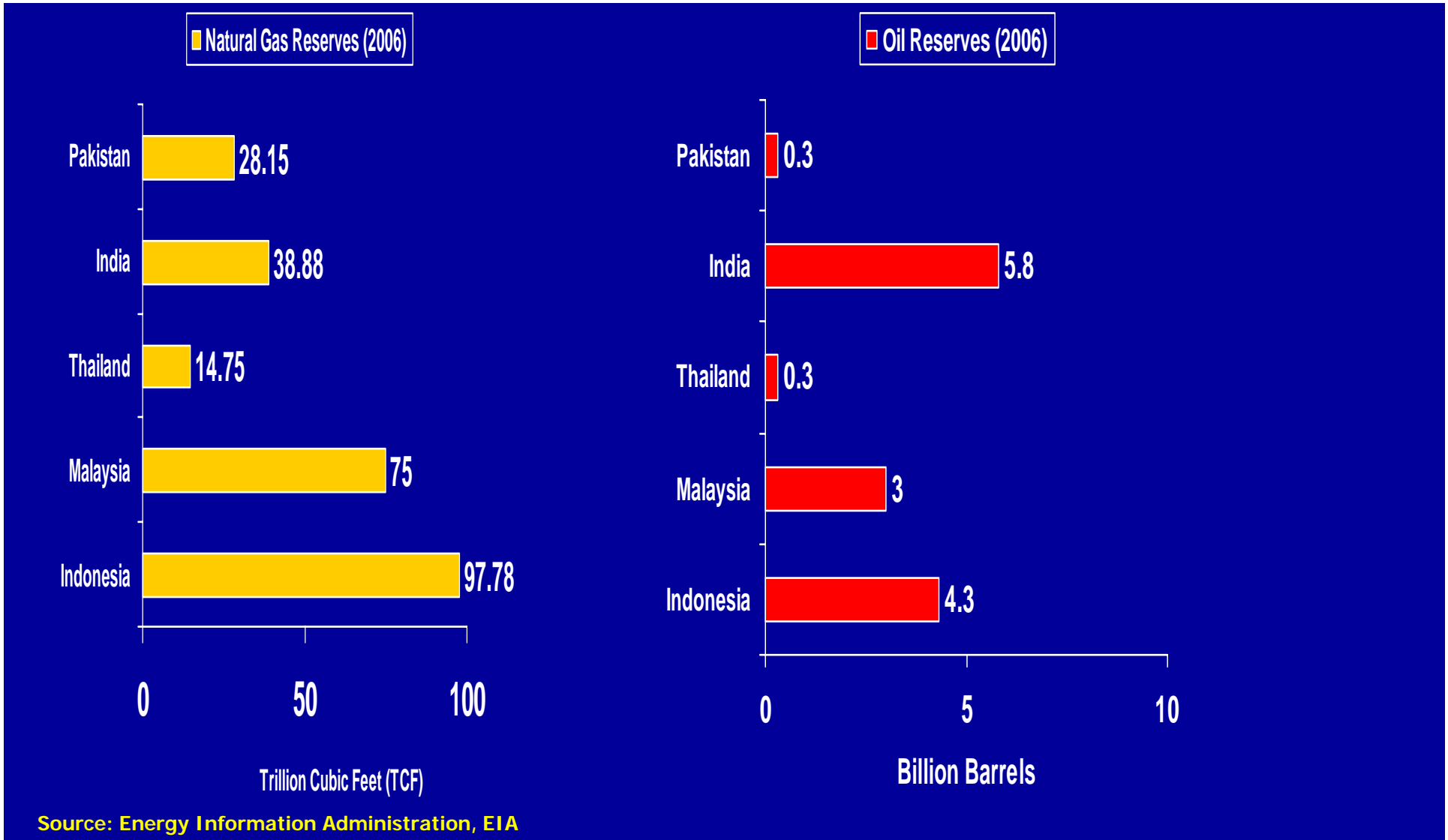
- **Air quality in major cities in Asia Pacific are deteriorating, major contributors are emissions from vehicles.**
- **Some cities already have regulated pollutants such as Carbon Monoxide (CO) and Particulate Matters (PM10) above recommended guidelines of WHO, US EPA and EU.**
- **Harmful air pollutants can be reduced significantly by using cleaner fuels such as CNG/NGV for vehicles.**
- **Vehicles Emission Standards are being tightened in many countries. Using CNG/NGV is one of the way to quickly meet this stringent emissions standards.**

HUMAN POPULATION IN THE FIVE SELECTED COUNTRIES

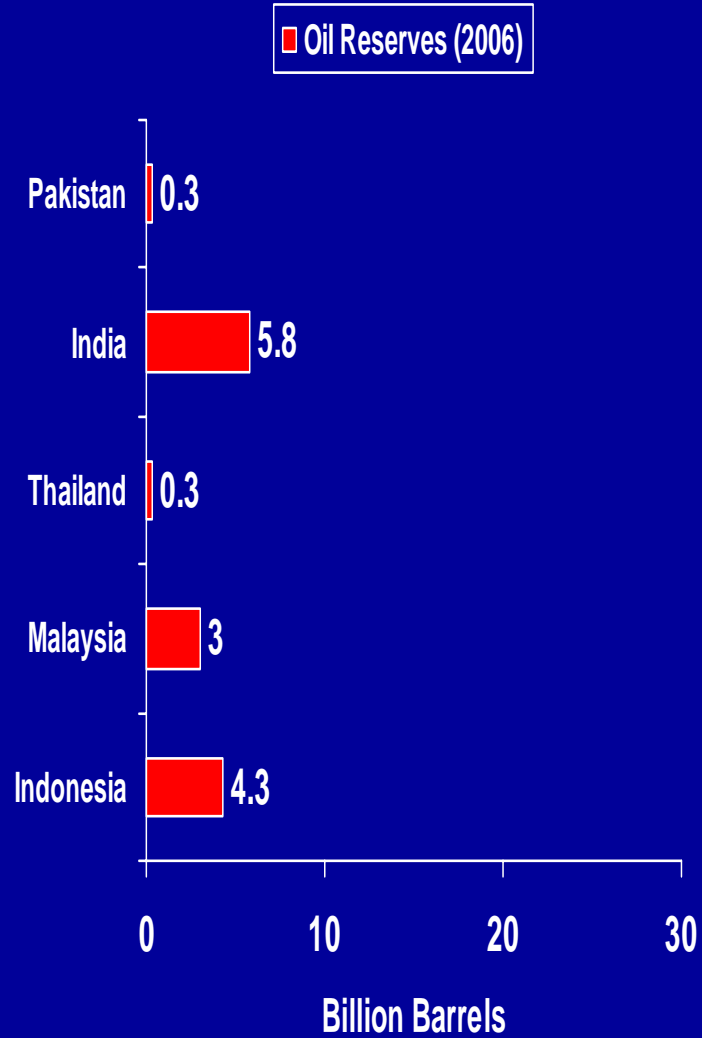
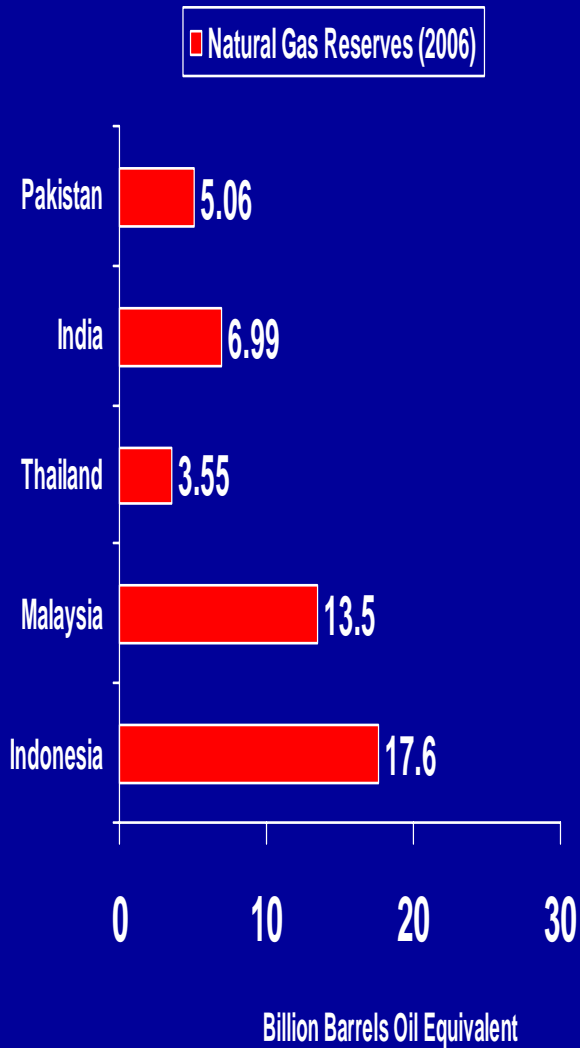


*Source: World Bank Data, 2006.

NATURAL GAS AND OIL RESERVES IN THE FIVE SELECTED COUNTRIES



NATURAL GAS AND OIL RESERVES IN THE FIVE SELECTED COUNTRIES



Source: Energy Information Administration, EIA

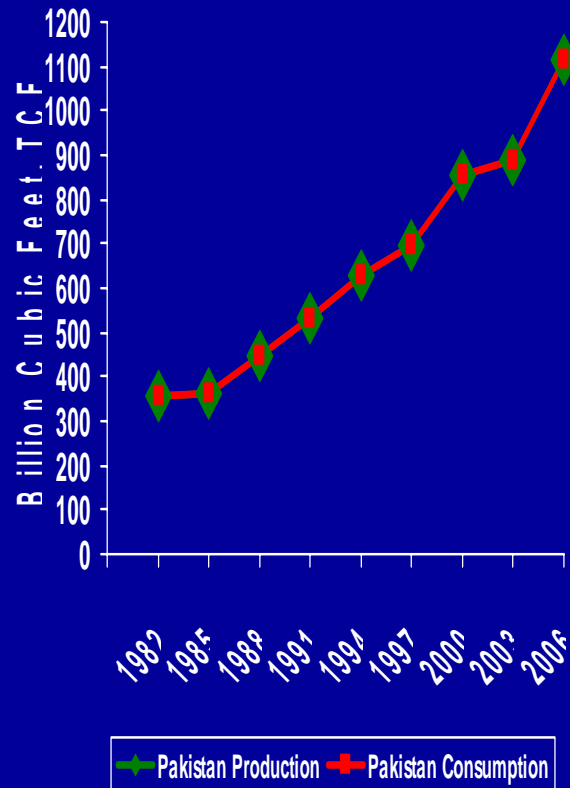


- Produces some oil, but imports the majority of oil consumed in the country.
- Largest energy source is natural gas. Looking at import options to increase natural supply in the country.
- Coal currently plays a minor role in energy mix.

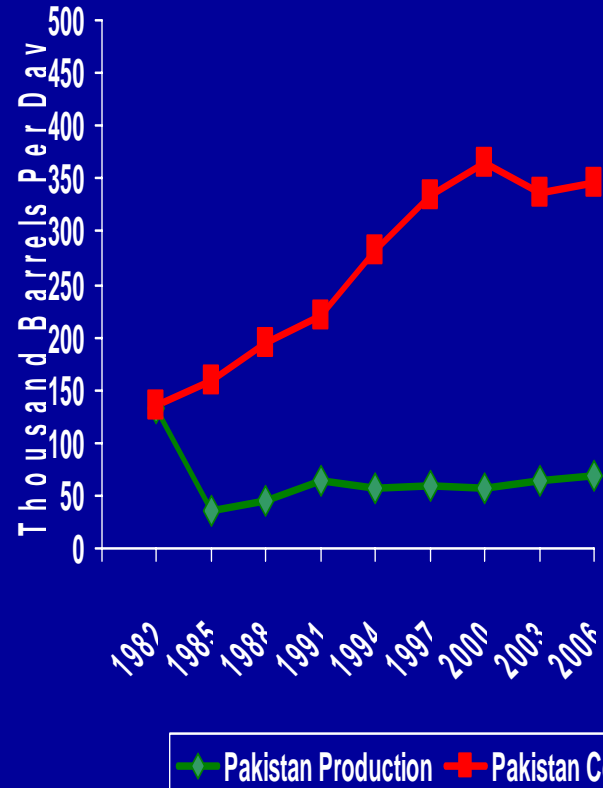
*Source: Energy Information Administration (EIA), USA, country analysis, Dec 2006

PAKISTAN NATURAL GAS PRODUCTION AND CONSUMPTION

Pakistan Dry Natural Gas Production and Consumption

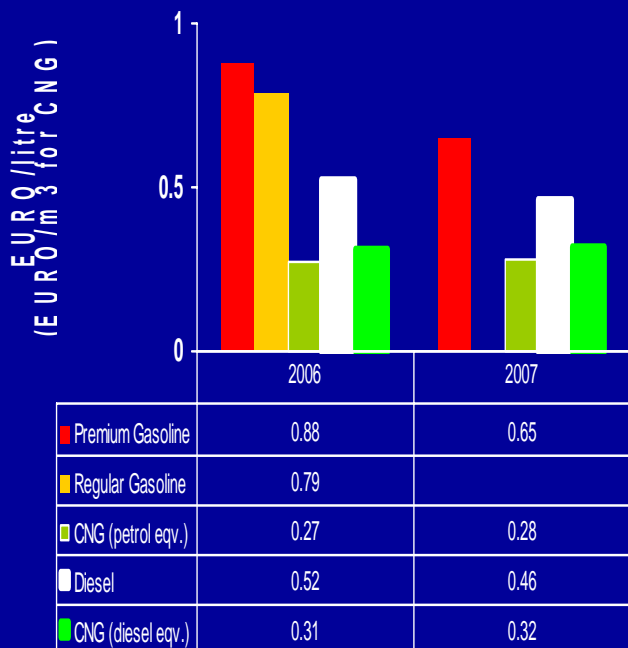


Pakistan Total Oil Production and Petroleum Products Consumption

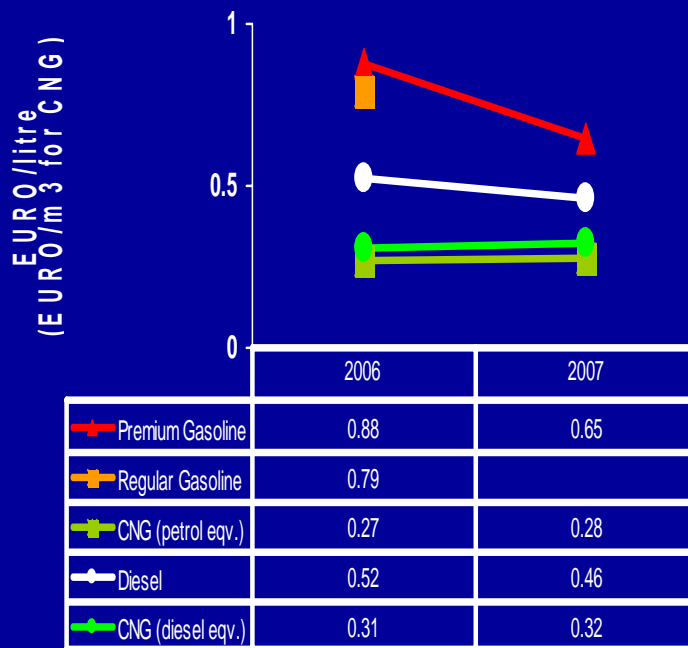


PAKISTAN PRICES OF GASOLINE, DIESEL AND CNG

Pakistan Gasoline, Diesel and CNG Prices



Pakistan Gasoline, Diesel and CNG Prices



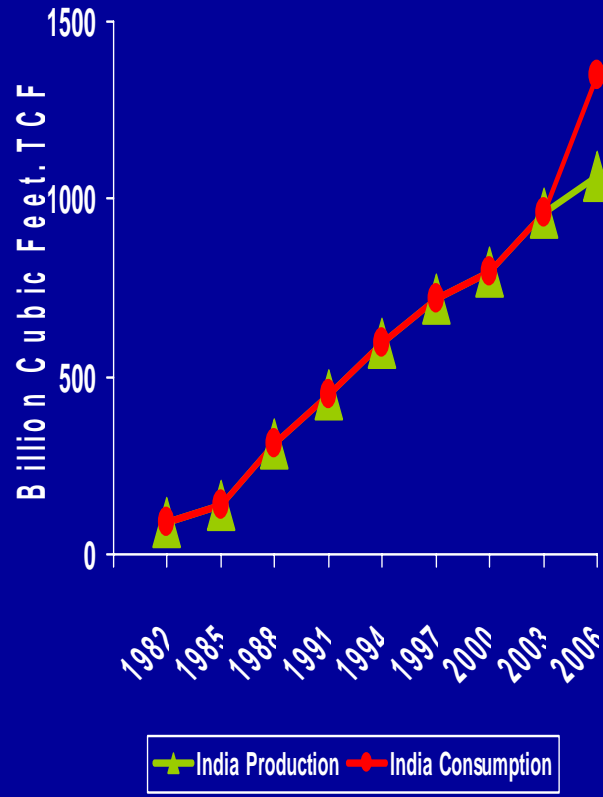


- Growing economy, and is increasingly a significant consumer of oil and natural gas.
- Growing net importer of oil.
- Despite major new natural gas discoveries in recent years, is considering large-scale imports via pipelines and LNG terminals to help meet growing demand.
- World's third-largest coal producer.

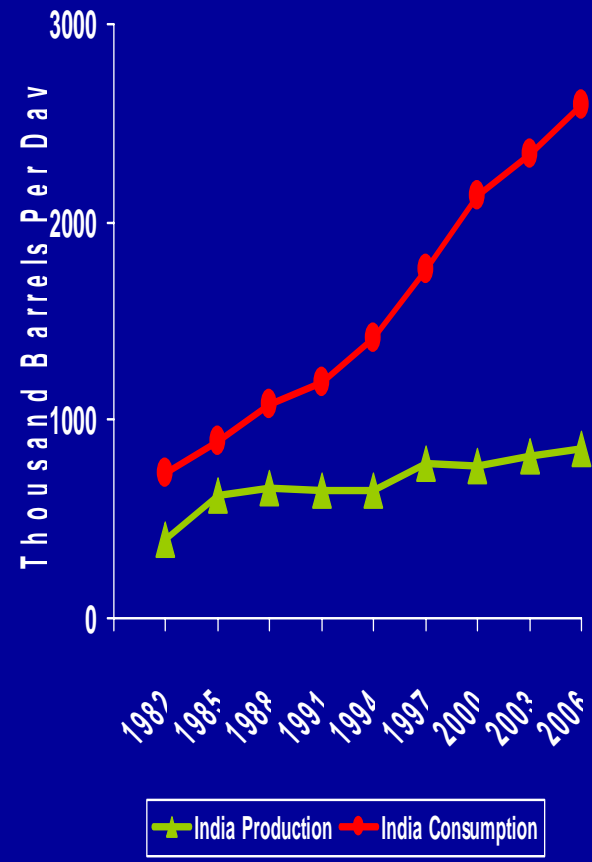
*Source: Energy Information Administration (EIA), USA, country analysis, Jan 2007

INDIA DRY NATURAL GAS PRODUCTION AND CONSUMPTION

India Dry Natural Gas Production and Consumption

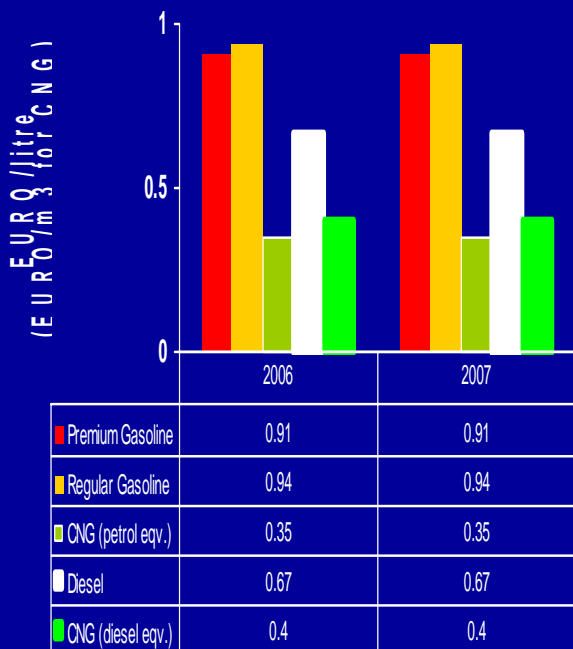


India Total Oil Production and Petroleum Products Consumption

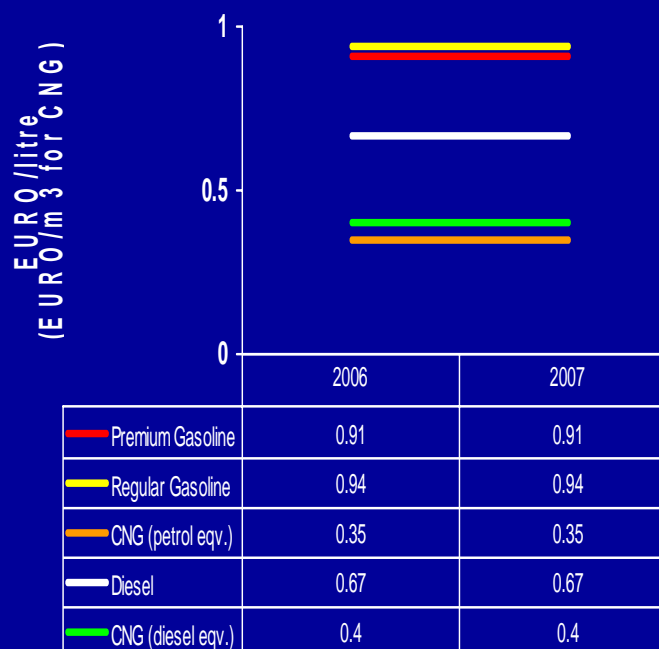


INDIA PRICES OF GASOLINE, DIESEL AND CNG

India Gasoline, Diesel and CNG Prices



India Gasoline, Diesel and CNG Prices



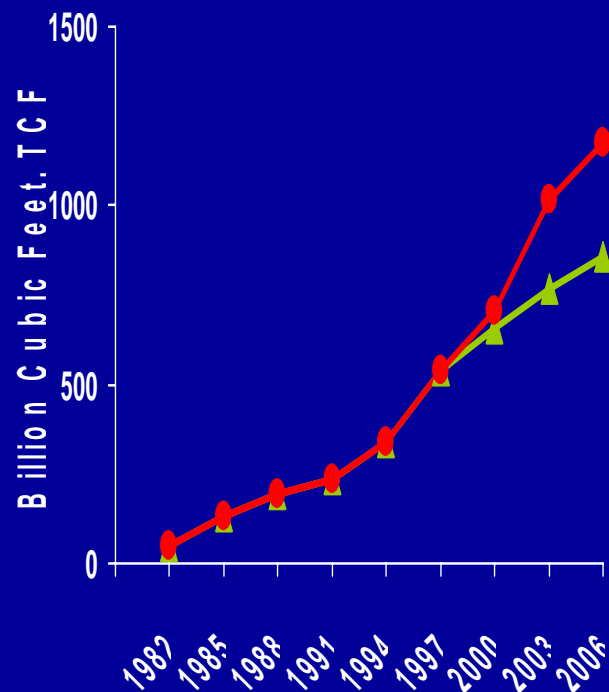


- Net importer of oil and natural gas, although the country is a growing producer of natural gas.
- Second largest net oil importer in Southeast Asia behind Singapore.
- Several new projects will increase natural gas production. Country considering several different natural gas import schemes to meet growing domestic demand.

*Source: Energy Information Administration (EIA), USA, country analysis, Apr 2007

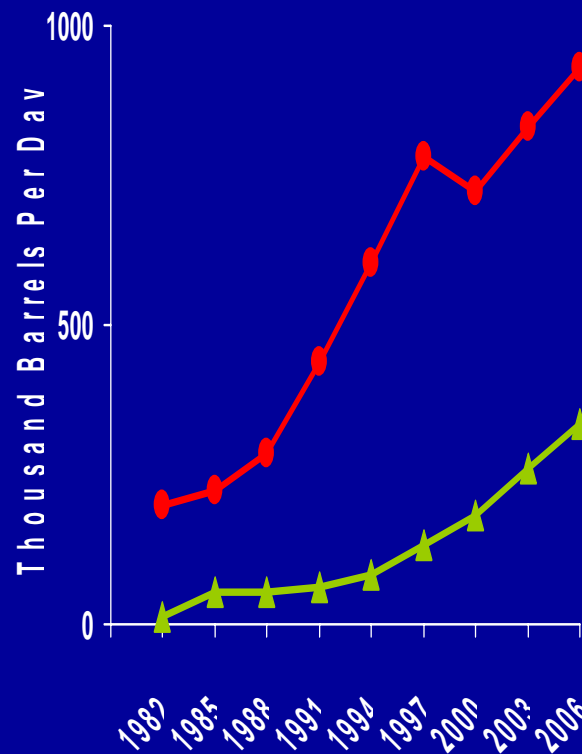
THAILAND DRY NATURAL GAS PRODUCTION AND CONSUMPTION

Thailand Dry Natural Gas Production and Consumption



▲ Thailand Production ● Thailand Consumption

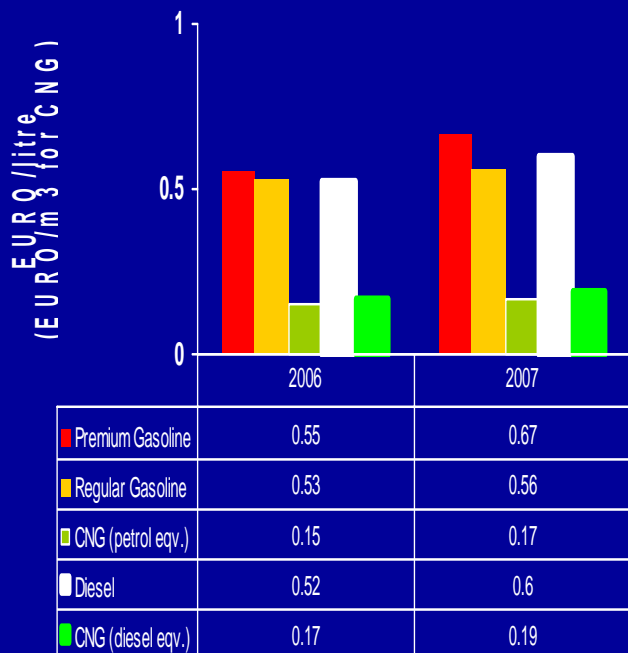
Thailand Total Oil Production and Petroleum Products Consumption



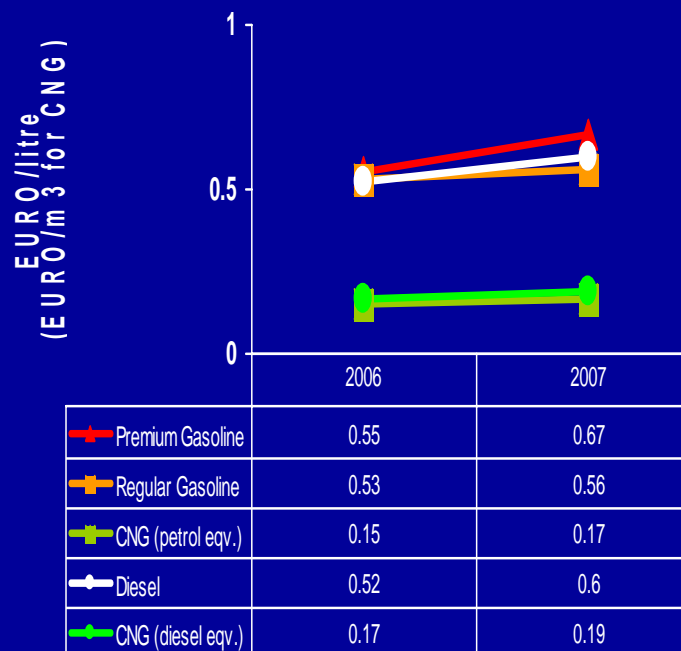
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THAILAND PRICES OF GASOLINE, DIESEL AND CNG

Thailand Gasoline, Diesel and CNG Prices



Thailand Gasoline, Diesel and CNG Prices



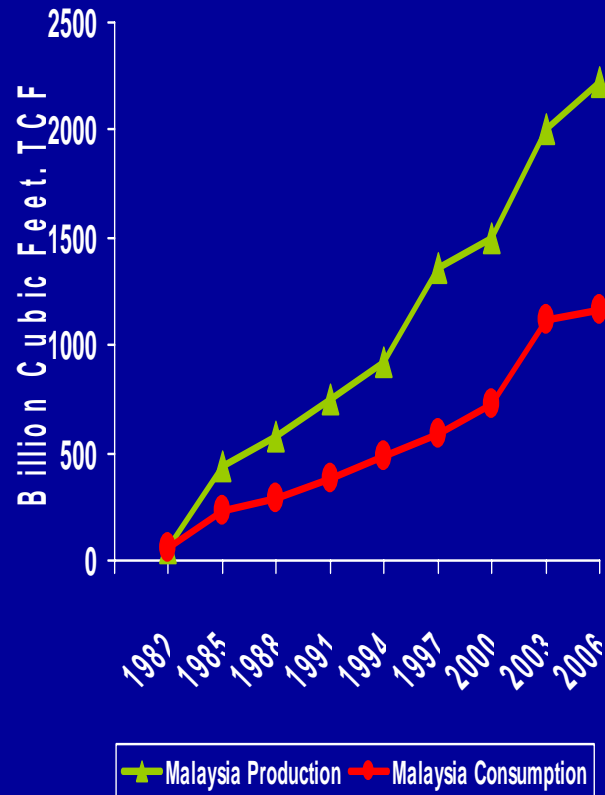


*Source: Energy Information Administration (EIA), USA, country analysis, Mar 2007

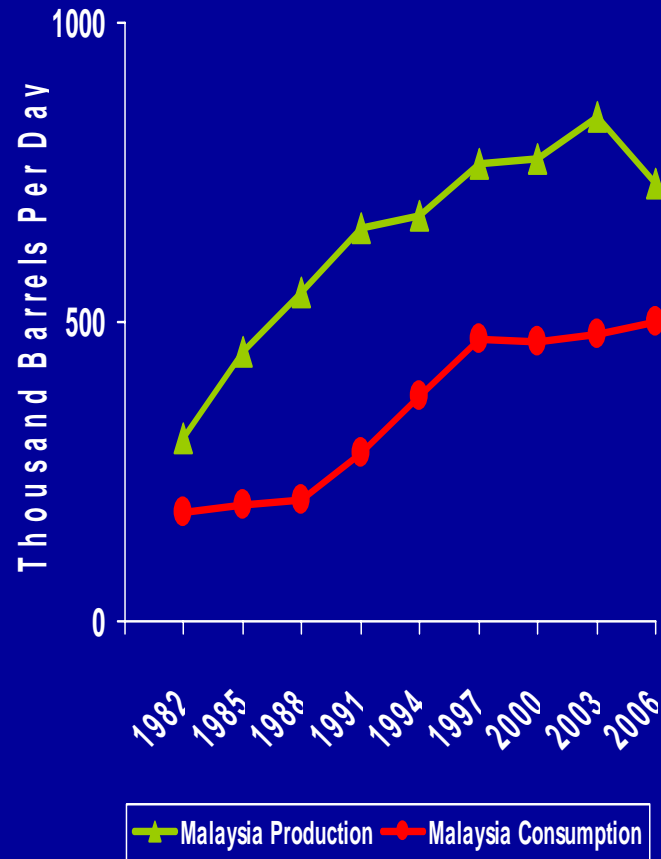
- Net exporter of oil and natural gas.
- Despite new offshore developments, EIA forecasts that its oil production will decline over the next two years.
- One of the world's leading exporters of liquefied natural gas.
- Promoting coal as a fuel of choice for power generation, to free up more natural gas for export.

MALAYSIA DRY NATURAL GAS PRODUCTION AND CONSUMPTION

Malaysia Dry Natural Gas Production and Consumption

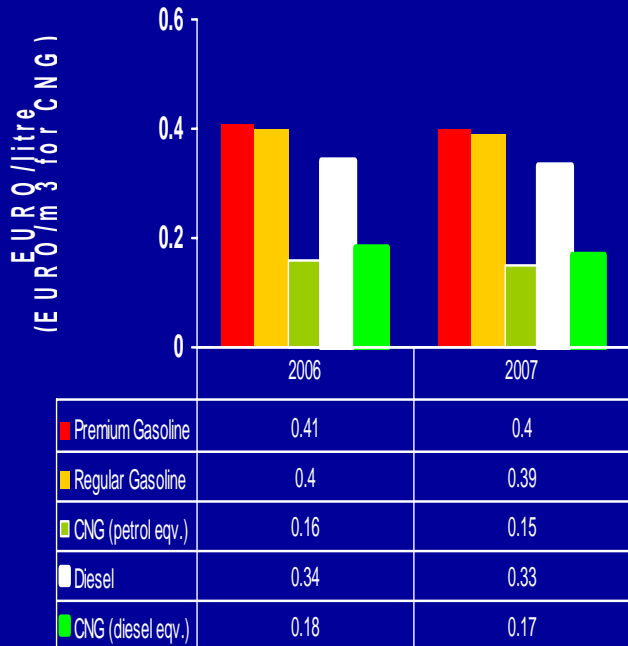


Malaysia Total Oil Production and Petroleum Products Consumption

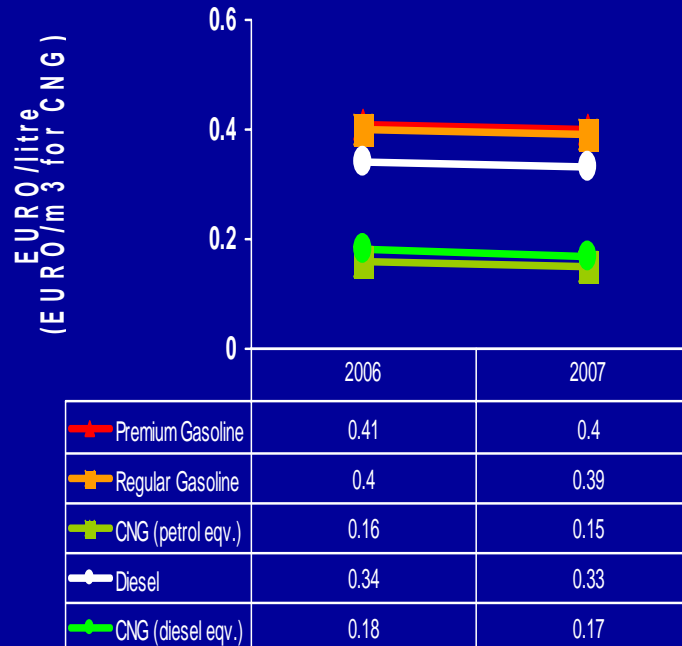


MALAYSIA PRICES OF GASOLINE, DIESEL AND CNG

Malaysia Gasoline, Diesel and CNG Prices



Malaysia Gasoline, Diesel and CNG Prices





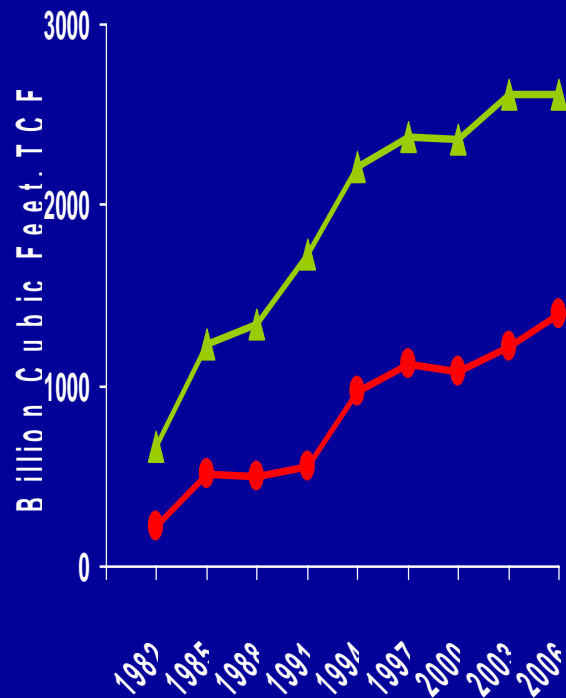
- Only Southeast Asian member of OPEC, although the country became a slight net oil importer in 2004.
- Oil production has declined in recent years.
- Largest oil producing fields are mature and declining in output.

- Natural gas production has increased in recent years, although facing a declining global LNG market share.
- Coal production has increased in recent years. Today is one of the world's chief coal exporters.

*Source: Energy Information Administration (EIA), USA, country analysis, Jan 2007

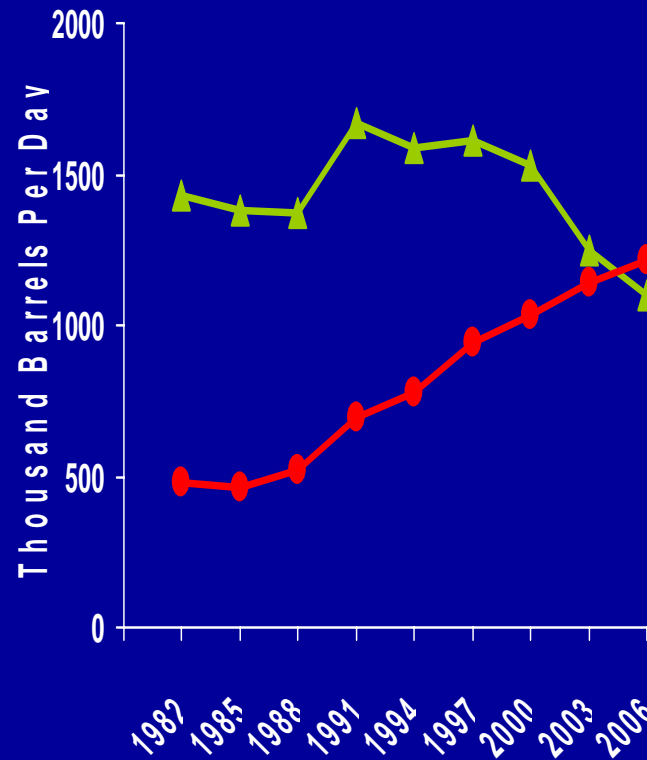
INDONESIA DRY NATURAL GAS PRODUCTION AND CONSUMPTION

Indonesia Dry Natural Gas Production and Consumption



Indonesia Production (Green Triangle) Indonesia Consumption (Red Circle)

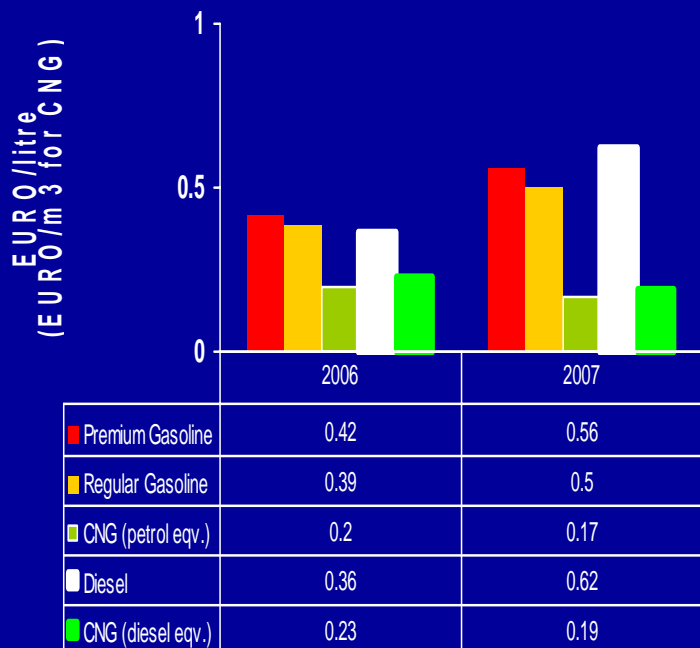
Indonesia Total Oil Production and Petroleum Products Consumption



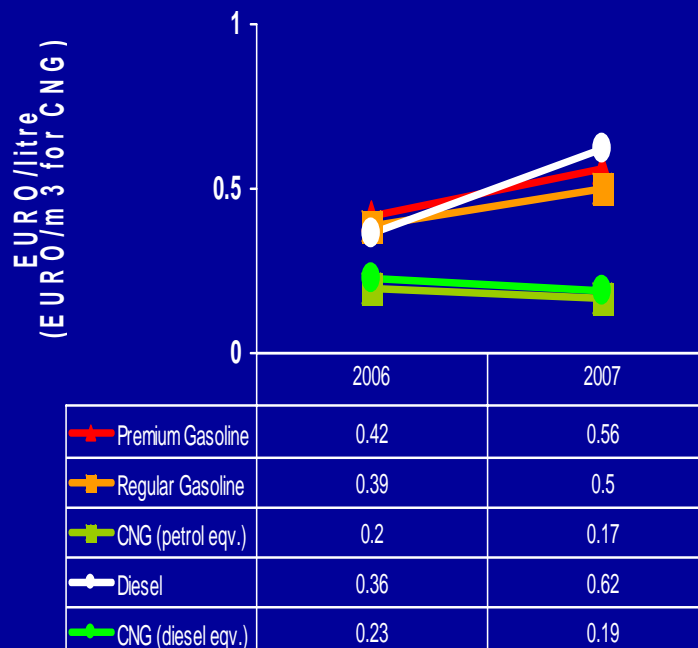
Indonesia Production (Green Triangle) Indonesia Consumption (Red Circle)

INDONESIA PRICES OF GASOLINE, DIESEL AND CNG

Indonesia Gasoline, Diesel and CNG Prices

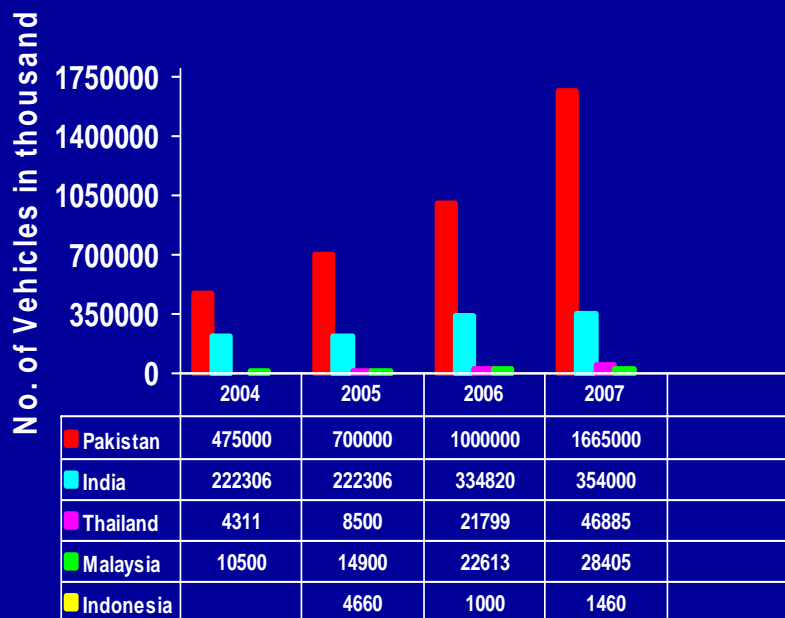


Indonesia Gasoline, Diesel and CNG Prices

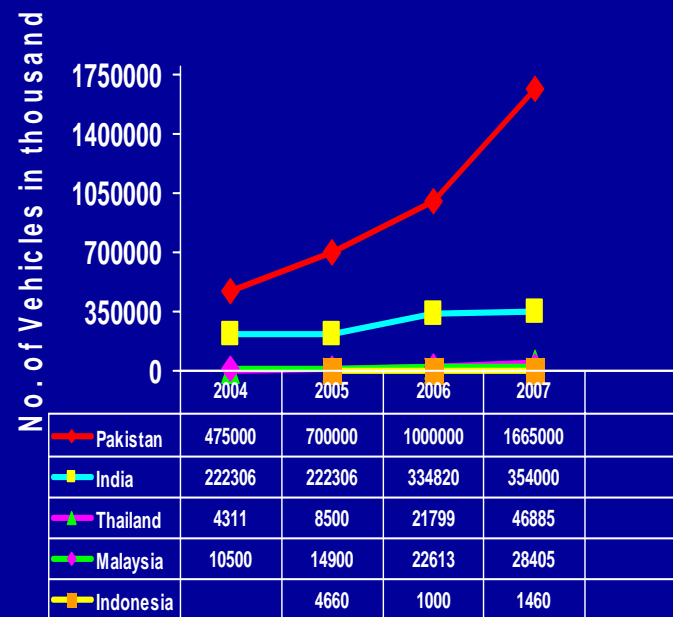


NATURAL GAS VEHICLES GROWTH IN THE FIVE SELECTED COUNTRIES

Natural Gas Vehicles Growth

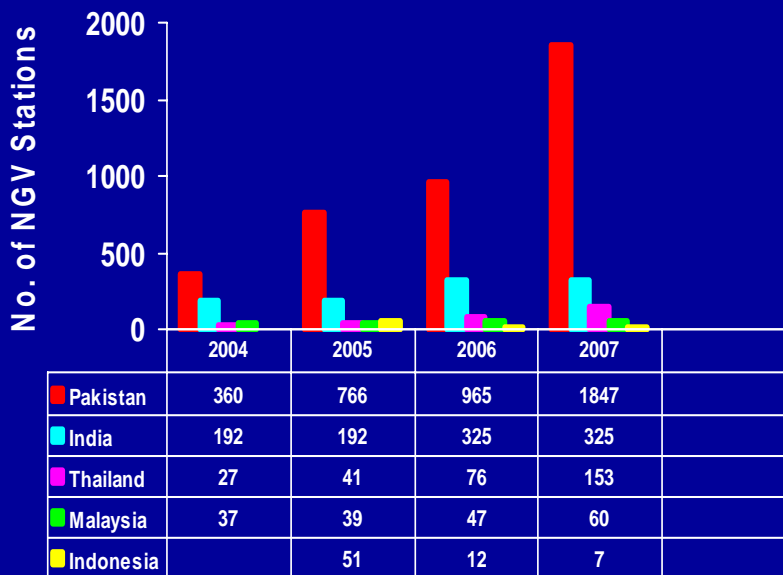


Natural Gas Vehicles Growth

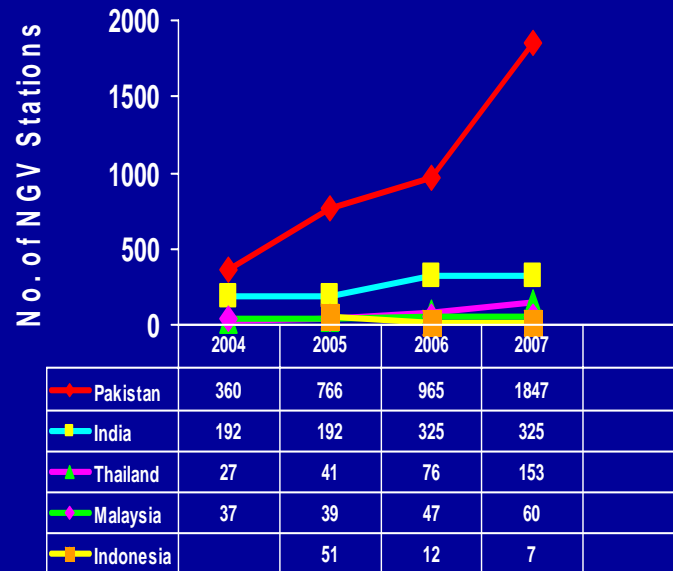


NGV STATIONS GROWTH IN THE FIVE SELECTED COUNTRIES

NGV Stations Growth



NGV Stations Growth



KEY DRIVERS INFLUENCE ON DECISION TO IMPLEMENT NGV PROGRAMMES

Country	Energy	Economics	Environment
Pakistan	+++	+++	++
India	+++	+++	+++
Thailand	+++	+++	++
Malaysia	++	++	++
Indonesia	+++	+++	++

+++ : High
 ++ : Medium
 + : Low

- **Major Challenges:**
 - ✓ **Government Support & Policies**
 - ✓ **Gas Supply and Refuelling Infrastructure**
 - ✓ **Technology and Know-how**
 - ✓ **Safety Standard and Enforcement**
 - ✓ **Market Awareness and Education**

MAJOR CHALLENGES IN IMPLEMENTING SUCCESSFUL NGV PROGRAMMES

Country	Government Support & Policies	Gas Supply & Refuelling Infrastructure	Technology & Know How	Safety Standard & Enforcement	Market Awareness & Education
Pakistan					
India					
Thailand					
Malaysia					
Indonesia					

THANK YOU