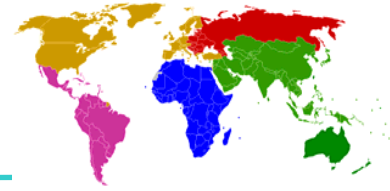


2009 China Natural Gas Vehicle Technology Innovation and Industry Development Forum



13 – 14th May 2009, Chongqing, China



AN ANALYSIS OF NGV MARKET IN ASIA PACIFIC

by

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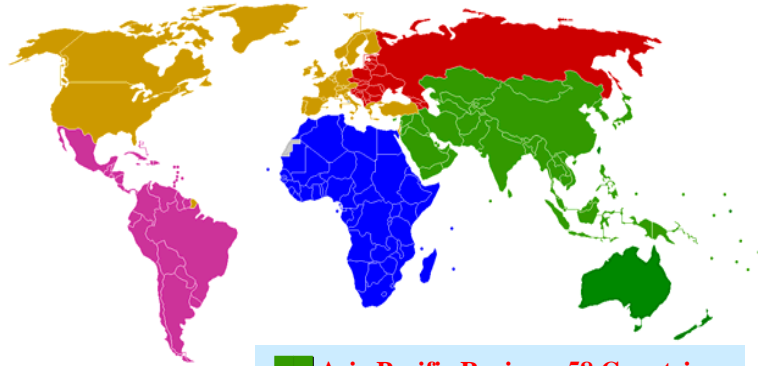
Tel: 603 8926 1798 Fax: 603 8926 1834

Email: angva@angva.org Website: www.angva.org

13th May 2009



- **Asia Pacific Natural Gas Vehicles Association (ANGVA)**
- **NGV in Asia Pacific**
- **Some NGV Market Analysis**
- **Conclusion**



Asia Pacific Region – 58 Countries

(Asia Pacific region comprises of countries in the United Nations Asian Regional Group and Australasia).

VISION

To make natural gas the transportation fuel of choice.

MISSION

- ❖ Assisting members in their NGV business.
- ❖ Reducing emissions and greenhouse gases.
- ❖ Optimising the use of indigenous fuel.
- ❖ Establishing a platform for harmonising standards.
- ❖ Encourage development of NGV technology and refuelling infrastructure.



- Website: www.angva.org
- Secretariat Office: Malaysia.
- Memberships: 77 members from 20 countries (as of 2nd April '09). China has 6 members.



The 3rd ANGVA International Conference & Exhibition

- Dates: 27th – 29th October 2009.
- Theme: “Natural Gas for Vehicles – Rising to the Challenge”
- Host: Donghae City.
- Website: www.angva2009.com



The 3rd Asia Pacific Natural Gas Vehicles Association International Conference & Exhibition



주 관 | Host



후 원 | Sponsors



주 최 | Organizers



ANGVA 2009 Organizing Committee

240-701 77 Cheongok-ro, Donghae-si, Gangwon-do, Korea
Tel : 82-33-530-2564 Fax : 82-33-530-2959 Email : info@angva2009.com www.angva2009.com



- **Objectives:**
 - Create awareness and promote NGV, ANGVA, and NGV Infrastructure along the routes.
 - Promote harmonisation of Standards and Code of Practices along the routes.
- ❖ To reach Donghae City in time for ANGVA 2009, 27th – 29th Oct '09.

ANGVA Green Highways:

- Iran - Pakistan
- Pakistan – India
- India – Bangladesh
- Bangladesh - Myanmar
- Myanmar – Thailand

ANGVA Green Highways:

- Singapore – Malaysia
- Malaysia - Thailand

ANGVA Green Highways:

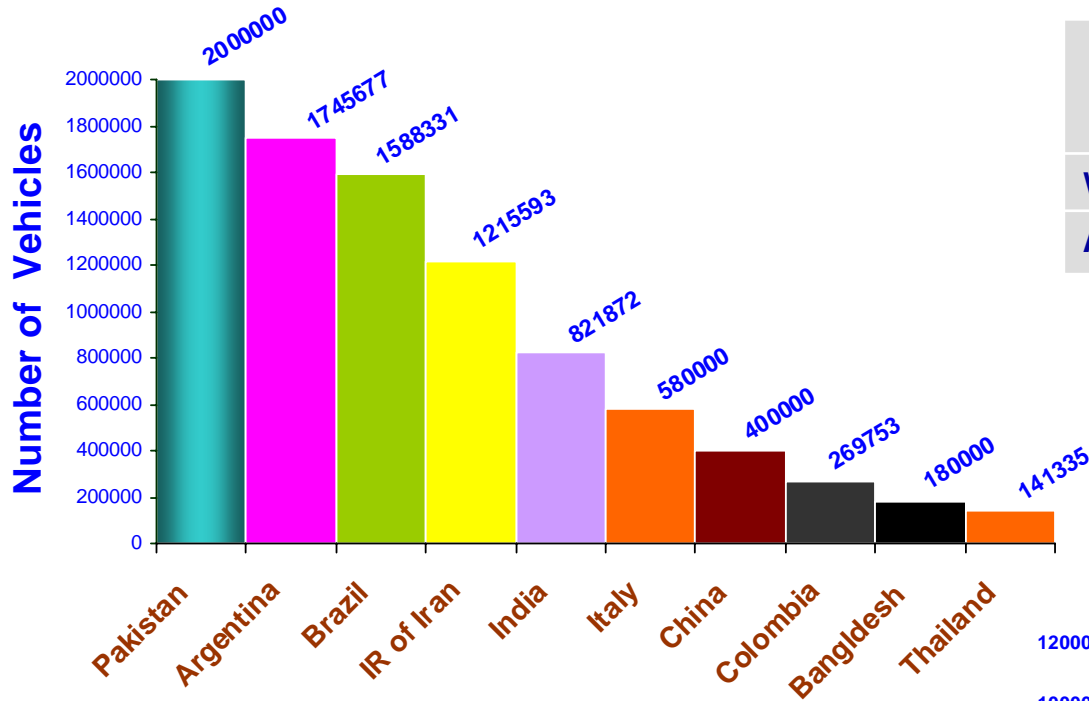
- Thailand – Vietnam
- Vietnam – China
- China – Korea.



- **2nd Iranian National Conference & Exhibition on CNG and related Industries**
 - **Date: 26 – 27 July 2009**
 - **Place: Tehran, IR of Iran**
 - **Organiser: Hamayash Sanat Institute & National Iranian Gas Company (NIGC)**

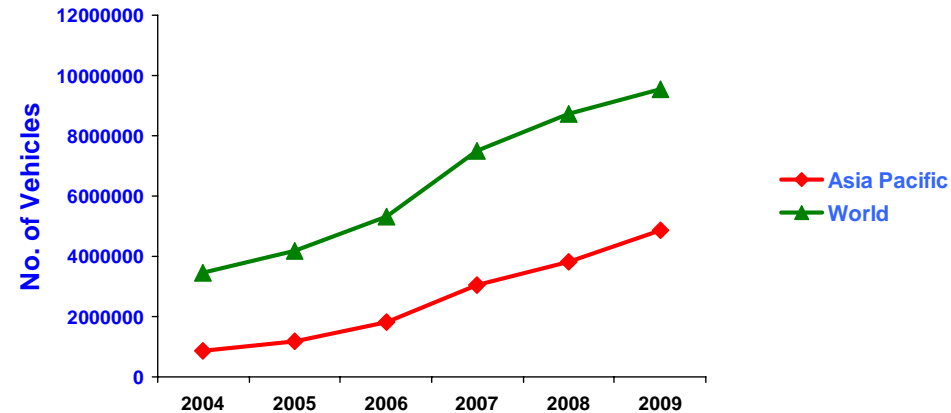


Status of NGV in Asia Pacific

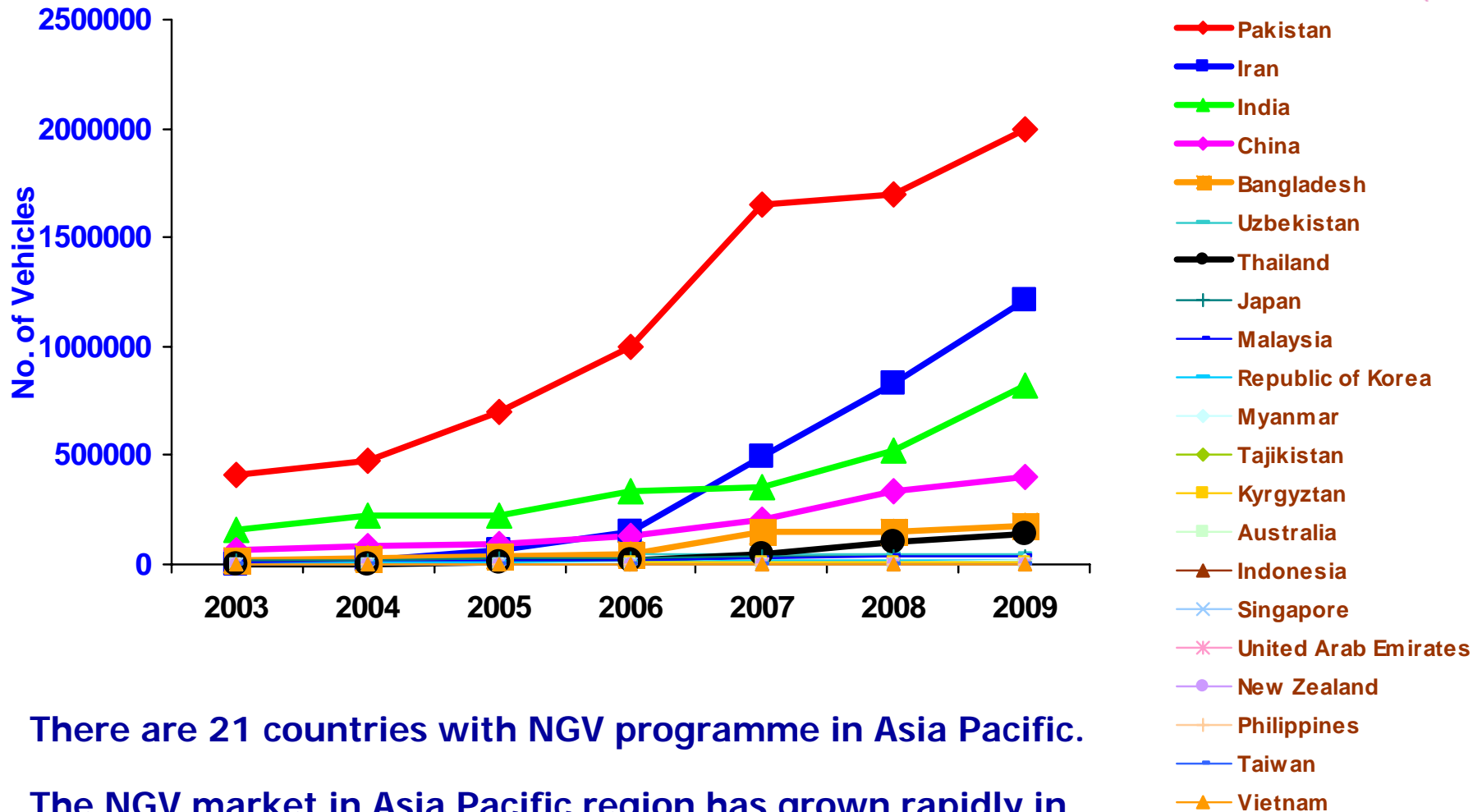


	Total No. of Vehicles in 2009	Total Number of Stations in 2009
World	9.56 millions	14,550
Asia Pacific	4.95 millions	6,600

- 9.6 millions vehicles and 14,550 stations worldwide with 4.95 millions vehicles and 6,600 stations in Asia Pacific region.
- Among the top 10 NGV countries worldwide, 6 are from the Asia Pacific.



NGV Growth in Asia Pacific



- There are 21 countries with NGV programme in Asia Pacific.
- The NGV market in Asia Pacific region has grown rapidly in the last 5 years, growing at an average of 40 % per year.

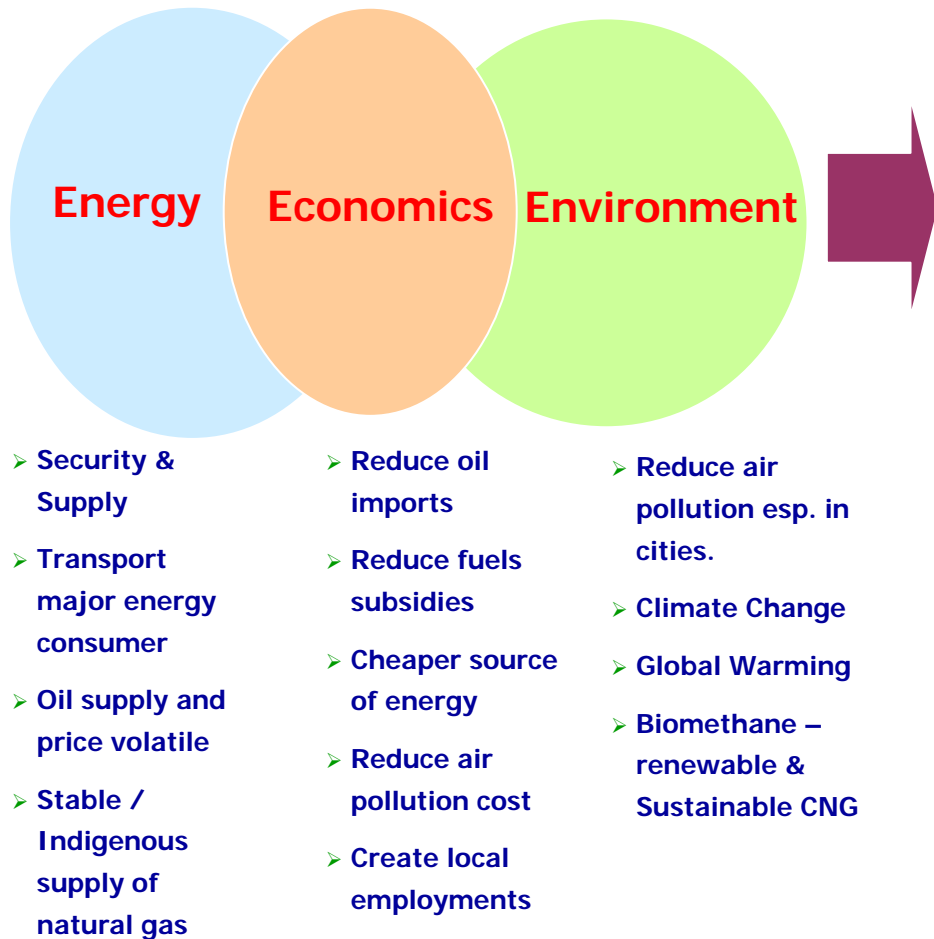


4.95 Millions Natural Gas Vehicles and 6600 Stations in Asia Pacific

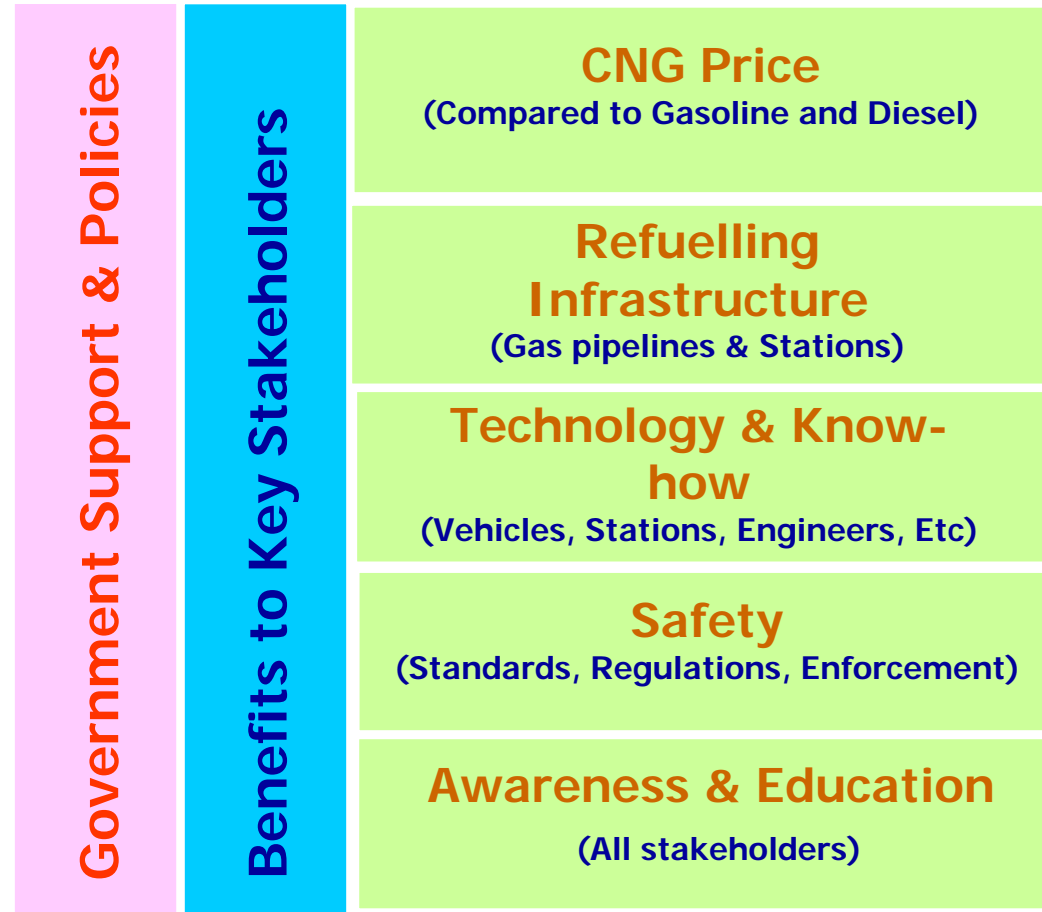
	Country	No. of Vehicles	No. of Stations	Remarks
1	Pakistan	2,000,000	2,700	Dec '08
2	IR of Iran	1,215,593	764	Feb '09
3	India	821,872	402	Apr '08
4	China	400,000	1,260	July '08
5	Bangladesh	180,000	296	Nov '08
6	Thailand	141,335	310	Mar '09
7	Uzbekistan	47,000	43	Dec '07
8	Malaysia	42,000	120	Apr '09
9	Japan	36,345	327	Dec '08
10	Myanmar	25,802	44	Apr '09
11	Republic of Korea	17,123	121	June '08
12	Tajikistan	10,600	53	Dec '07
13	Kyrgyzstan	6,000	6	Dec '07
14	Singapore	3,443	3	Jan '09
15	Indonesia	3,079	9	Apr '08
16	Australia	2,453	146	Mar '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
21	Vietnam	2	1	Jan '09
	Total	4,953,275	6,623	



Key Drivers

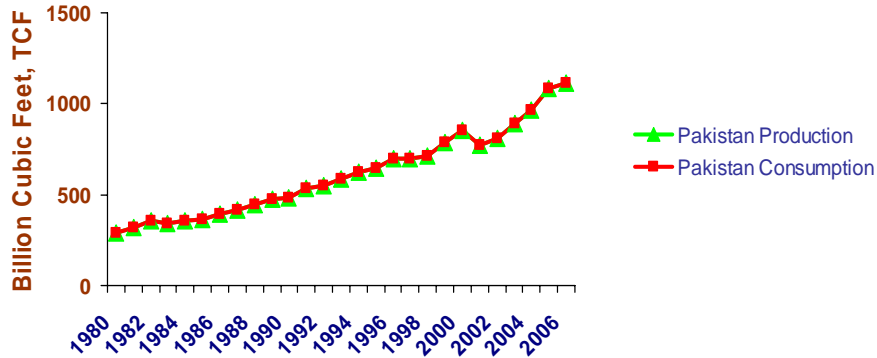


Key Success Factors / Challenges





Pakistan Gas Production & Consumption

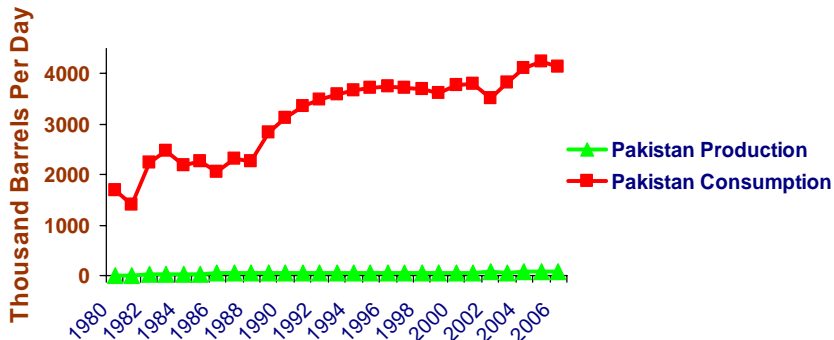


Human Population (2006) = 159 million.

Pakistan Oil Reserves (2006) = 0.3 Billion Barrels.

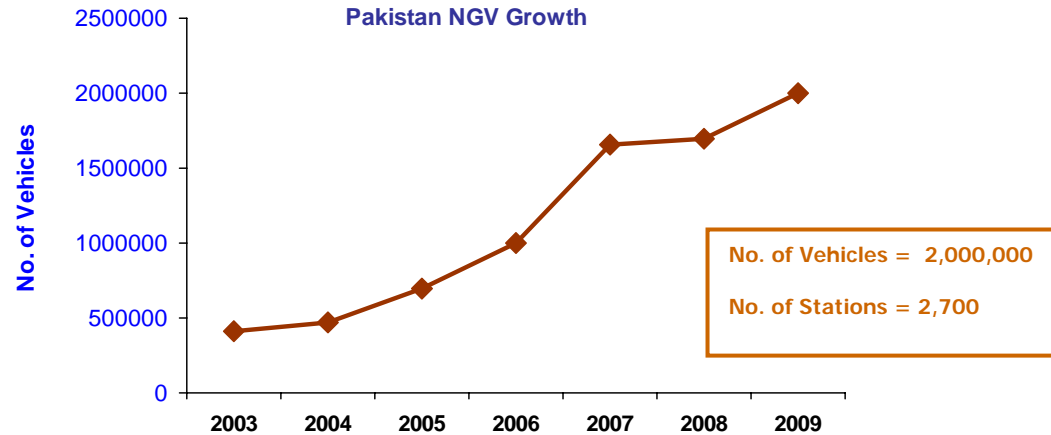
Pakistan Gas Reserves (2006) = 28.15 TCF
(~ 5.067 billion barrels equivalent of oil)

Pakistan Oil Production and Petroleum Products and Oil Consumption



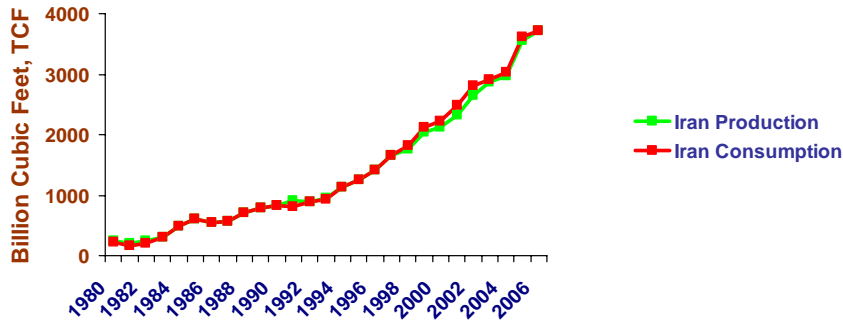
Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> 1. Reduction of oil import and air pollution. 2. Duty/tax free import of CNG equipment. 3. Deregulated pricing structure for CNG 4. Attractive rate of return for private sector to build and operate NGV stations
		Refuelling Infrastructure		
		Technology & Know-how		
		Safety	CNG Price*	<p>~ 75 % < gasoline.</p> <p>~ 30% < diesel</p>
		Awareness & Education	Major Challenges	<ol style="list-style-type: none"> 1. Maintaining safety. 2. Gas allocation policy. 3. Maintaining attractive price differential of CNG.





Iran Gas Production & Consumption

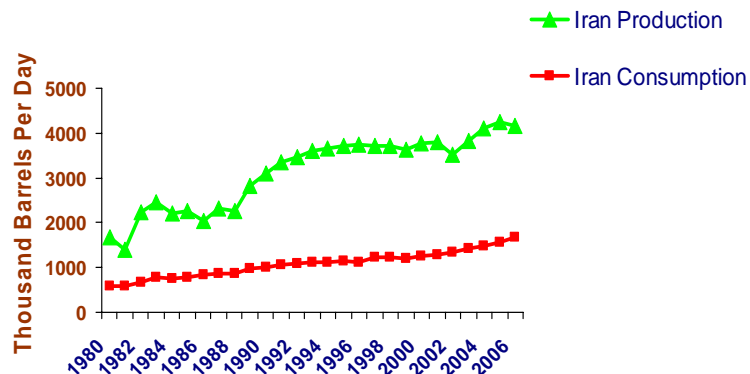


Human Population (2006) = 62.92 millions.

Iran Oil Reserves (2006) = 132.5 Billion Barrels.

Iran Gas Reserves (2006) = 971.15 TCF
(~ 174.807 billion barrels equivalent of oil)

Iran Oil Production & Petroleum Products and Oil Consumption



Key Success Factors / Challenges

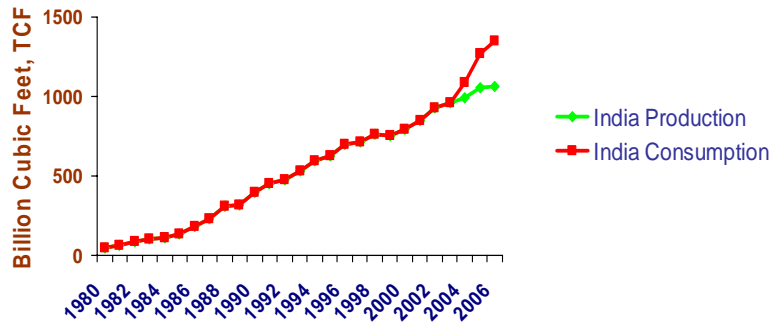
Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> Increase utilisation of local gas resource. Reduction of oil import and air pollution. Subsidy to cover 90 % of conversion cost. Encourage production of OEM CNG vehicles. Investment on infrastructure by national gas company
		Refuelling Infrastructure		
		Technology & Know-how		
		Safety		
		Awareness & Education		
		CNG Price*		<p>~85 % < gasoline. ~ 25% > diesel (more expensive)</p>
		Major Challenges		<ol style="list-style-type: none"> Maintaining safety of industry. Building more NGV stations.

Iran NGV Growth





India Gas Production and Consumption

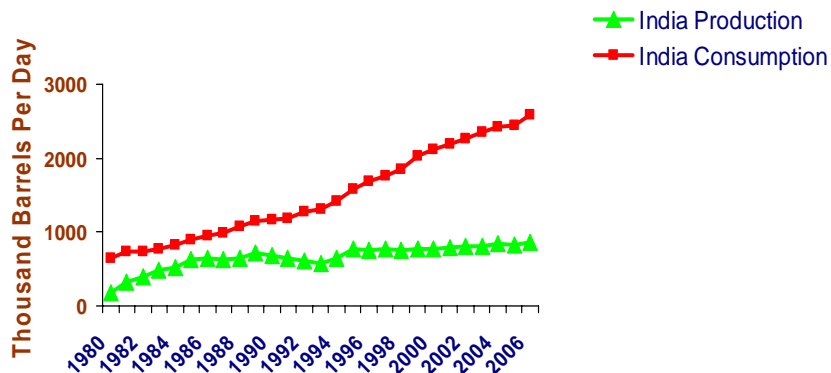


Human Population (2006) = 1.001 billions.
 India Oil Reserves (2006) = 5.8 Billion Barrels.
 India Gas Reserves (2006) = 38.88 TCF
 (~ 6.9984 billion barrels equivalent of oil)

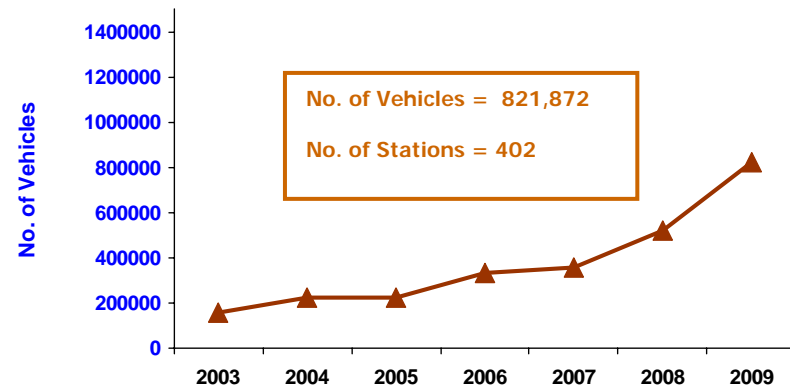
Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> 1. Court decision to fight air pollution. 2. Reduction of reduce oil import and air pollution. 3. Attractive rate of return for gas companies to build and operate NGV stations.
		Refuelling Infrastructure		
		Technology & Know-how	CNG Price*	<ol style="list-style-type: none"> 1. ~70% < gasoline. 2. ~45% < diesel
		Safety	Major Challenges	<ol style="list-style-type: none"> 1. Maintaining safety of industry. 2. Building more NGV stations. 3. Maintaining attractive price differential of CNG.
		Awareness & Education		

India Oil Production & Petroleum Products and Oil Consumption

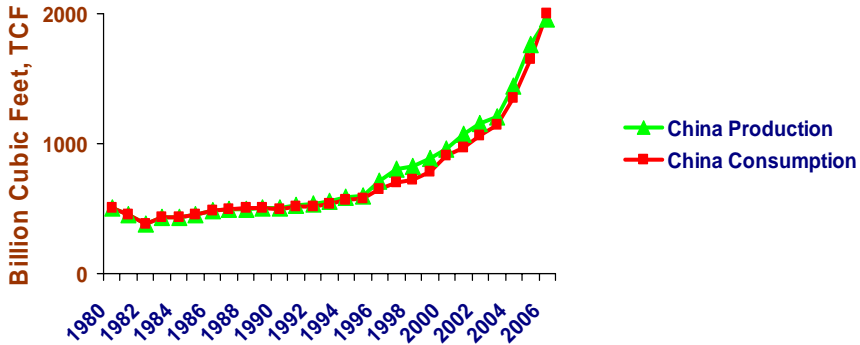


India NGV Growth





China Gas Production & Consumption



Human Population (2006) = 1.3 billions.

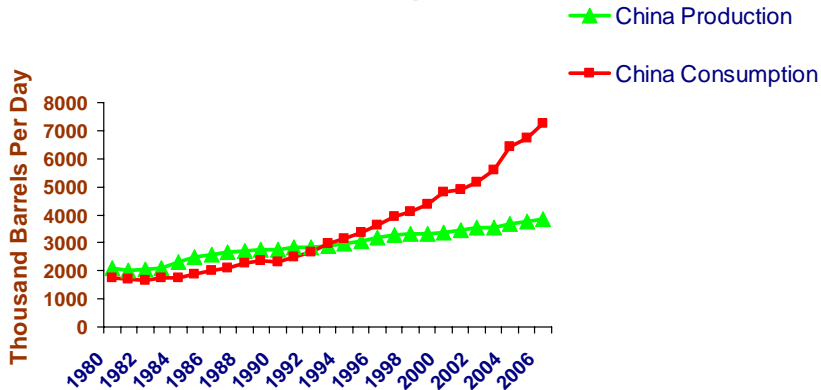
China Oil Reserves (2006) = 18.2 Billion Barrels.

China Gas Reserves (2006) = 53.32 TCF
(~ 9.5976 billion barrels equivalent of oil)

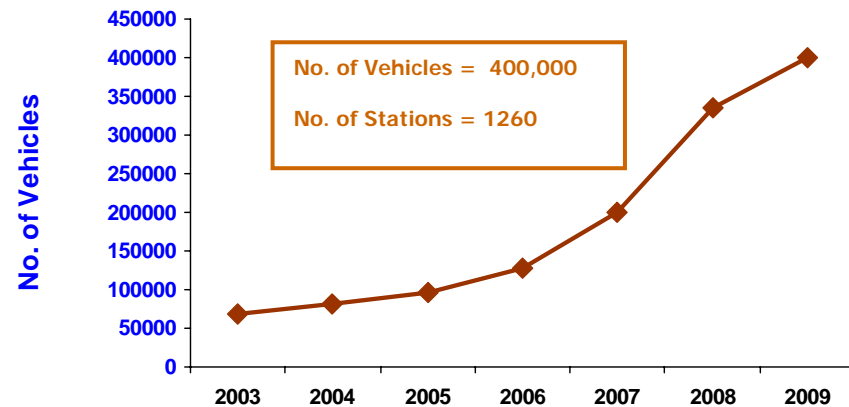
Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> Increase utilisation of local gas resource. Reduction of oil import. Attractive rate of return for gas companies and private sector to build and operate NGV stations
		Refuelling Infrastructure		
		Technology & Know-how		
		Safety	CNG Price*	<ul style="list-style-type: none"> ~ 50% < gasoline. ~ 30% < diesel
		Awareness & Education	Major Challenges	<ol style="list-style-type: none"> Standards & Regulations. Building more NGV stations. Maintaining attractive price differential of CNG.

China Oil Production & Petroleum Products and Oil Consumption

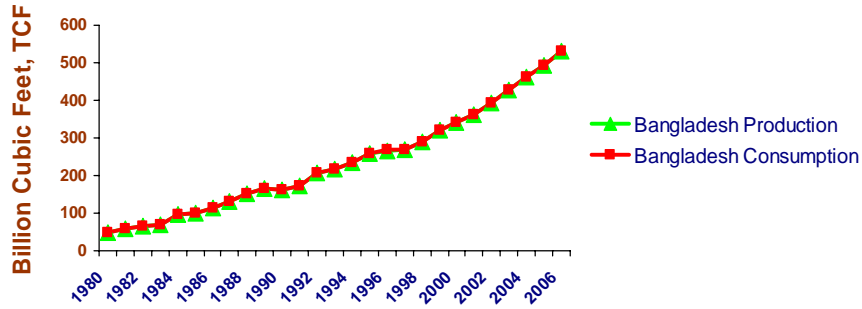


China NGV Growth





Bangladesh Gas Production and Consumption

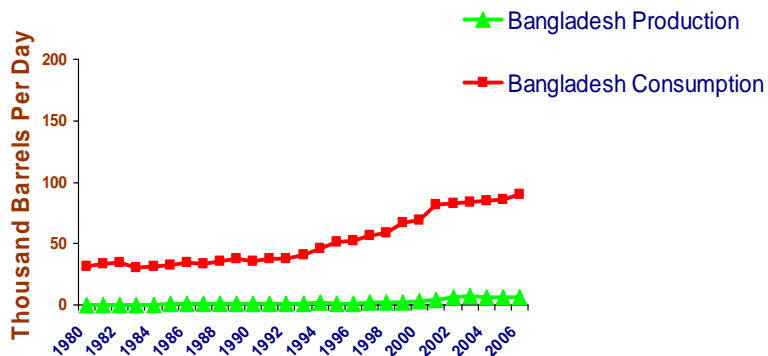


Human Population = 144.3 millions.

Bangladesh Oil Reserves (2006) = 0 Billion Barrels.

Bangladesh Gas Reserves (2006) = 5 TCF
(~ 0.9 billion barrels equivalent of oil)

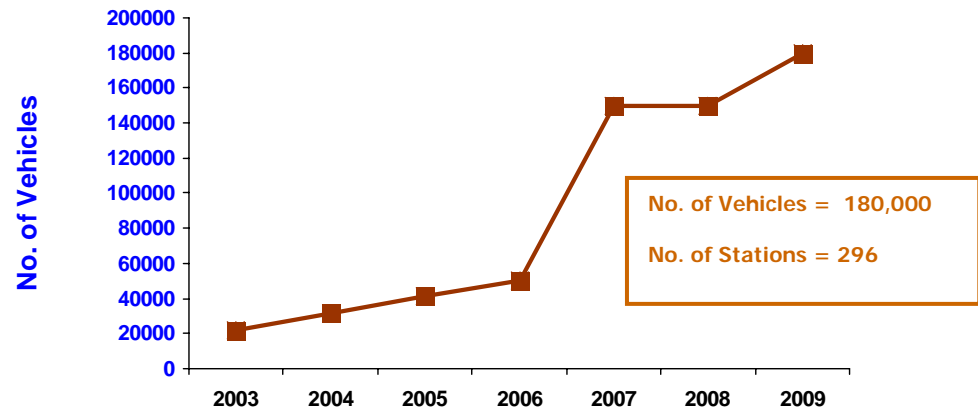
Bangladesh Oil Production & Petroleum Products and Oil Consumption



Key Success Factors / Challenges

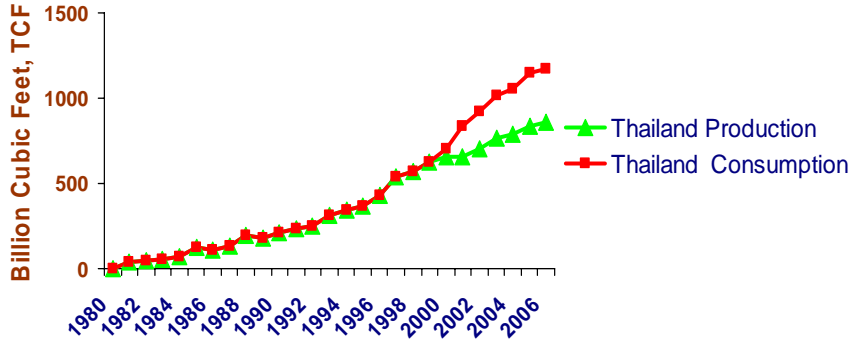
Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> 1. Reduction of oil imports and air pollution. 2. Duty/tax free import of CNG equipment. 3. Deregulated pricing structure for CNG 4. Attractive rate of return for private sector to build and operate NGV stations
		Refuelling Infrastructure		
		Technology & Know-how		
		Safety		
		Awareness & Education		
		CNG Price*		<p>~ 70 % < gasoline.</p> <p>~ 50% < diesel</p>
			Major Challenges	<ol style="list-style-type: none"> 1. Maintaining safety. 2. Gas allocation policy. 3. Low gas supply pressure in some areas. 4. Maintaining attractive price differential of CNG.

Bangladesh NGV Growth





Thailand Gas Production and Consumption

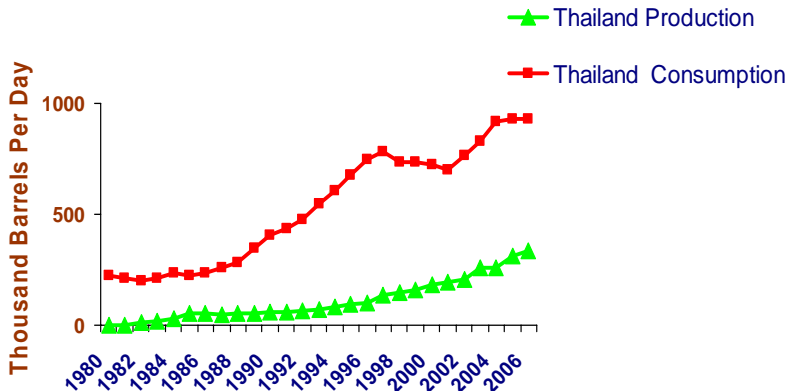


Human Population (2006) = 64.7 millions.
 Thailand Oil Reserves (2006) = 0.3 Billion Barrels.
 Thailand Gas Reserves (2006) = 14.75 TCF
 (~ 2.655 billion barrels equivalent of oil)

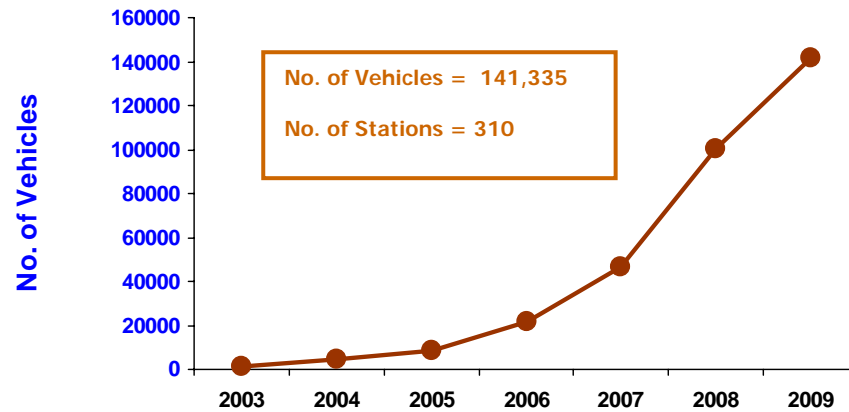
Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> 1. Energy policy to use alternative fuels for transportation sector. 2. Reduction of oil imports and air pollution. 3. Investment on infrastructure by national oil & gas company.
		Refuelling Infrastructure		
		Technology & Know-how		
		Safety	CNG Price*	<ol style="list-style-type: none"> ~ 70 % < gasoline. ~ 60% < diesel
		Awareness & Education	Major Challenges	<ol style="list-style-type: none"> 1. Maintaining safety. 2. Building more NGV stations. 3. Maintaining attractive price differential of CNG.

Thailand Oil Production & Petroleum Products and Oil Consumption

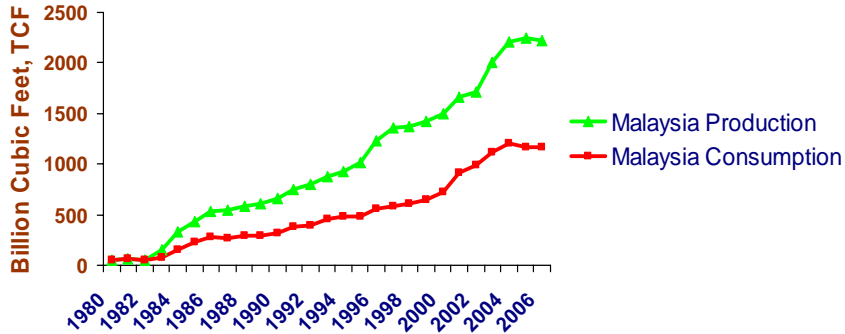


Thailand NGV Growth





Malaysia Gas Production and Consumption



Human Population (2006) = 25.8 millions.

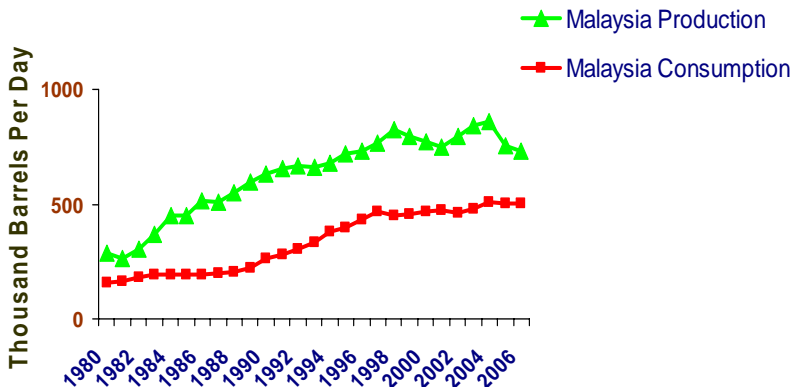
Malaysia Oil Reserves (2006) = 3 Billion Barrels.

Malaysia Gas Reserves (2006) = 75 TCF
(~ 13.5 billion barrels equivalent of oil)

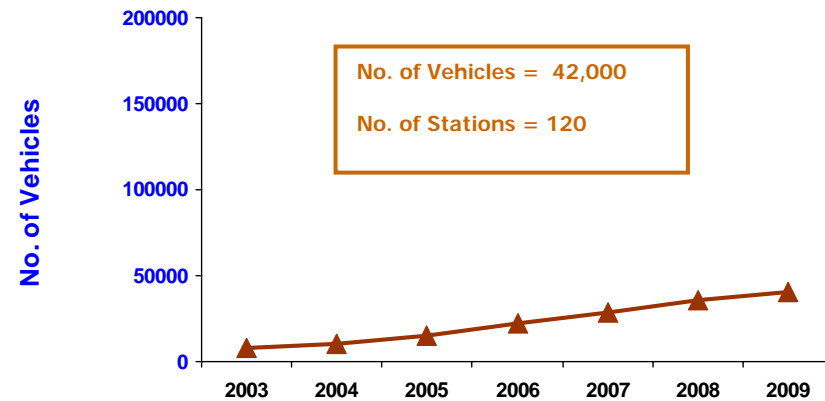
Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> 1. Reduction of Air Pollution. 2. Investment on infrastructure by national oil & gas company. 3. Import Duty and sales tax exemption for kits
		Refuelling Infrastructure		
		Technology & Know-how	CNG Price*	<p>~ 60 % < gasoline.</p> <p>~ 60% < diesel</p>
		Safety	Major Challenges	<ol style="list-style-type: none"> 1. Building more NGV stations. 2. Maintaining attractive price differential of CNG. 3. Maintaining Safety.
		Awareness & Education		

Malaysia Oil Production & Petroleum Products and Oil Consumption

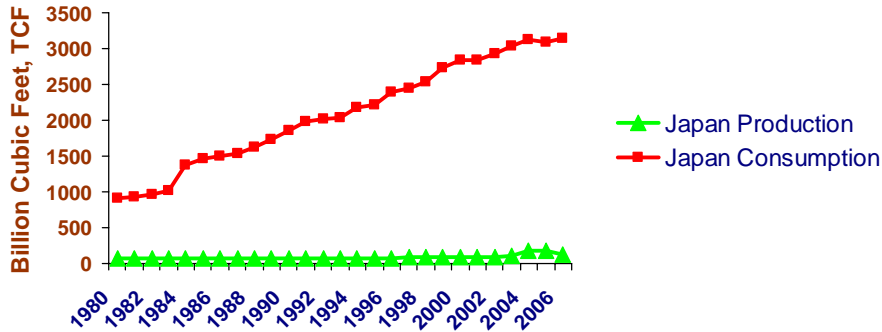


Malaysia NGV Growth





Japan Gas Production and Consumption



Human Population (2006) = 127.6 millions

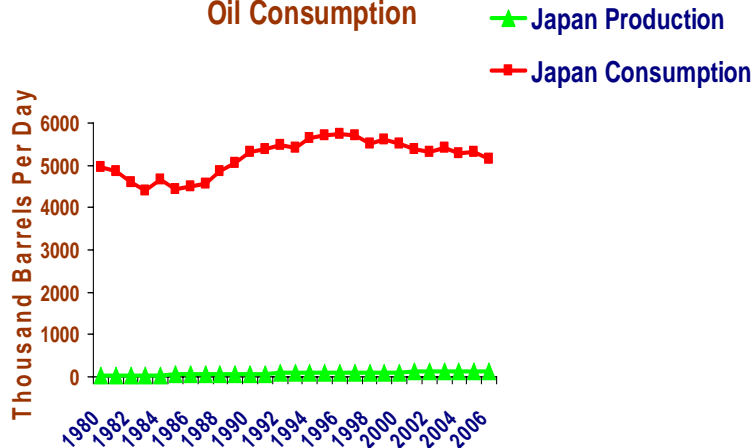
Japan Oil Reserves (2006) = 0.1 Billion Barrels.

Japan Gas Reserves (2006) = 1.4 TCF
(~ 0.252 billion barrels equivalent of oil)

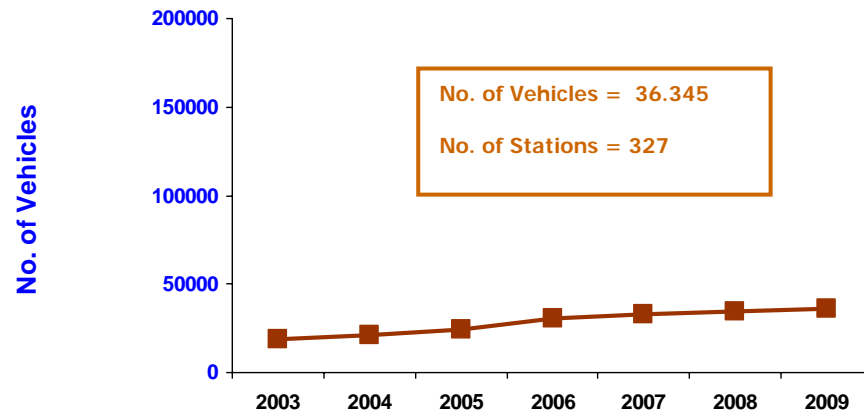
Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> Reduction of Air Pollution. Subsidies on construction of stations and purchase of CNG heavy duty vehicles.
		Refuelling Infrastructure		
		Technology & Know-how	CNG Price*	<p>~ 60 % < gasoline.</p> <p>~ 50% < diesel</p>
		Safety	Major Challenges	<ol style="list-style-type: none"> Building more NGV stations. Maintaining attractive price differential of CNG. Stronger government policy and support
		Awareness & Education		

Japan Oil Production & Petroleum Products and Oil Consumption

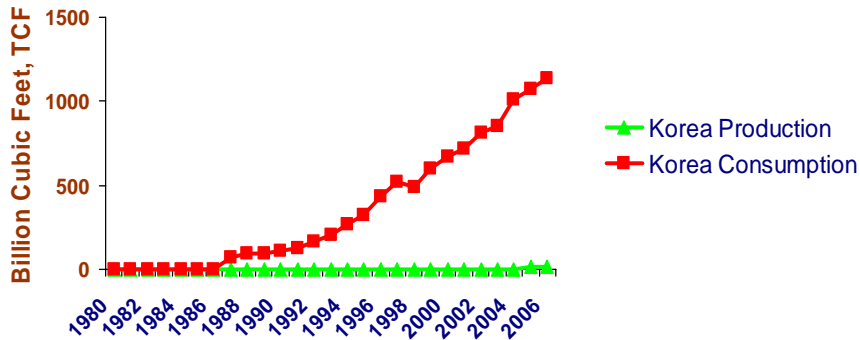


Japan NGV Growth



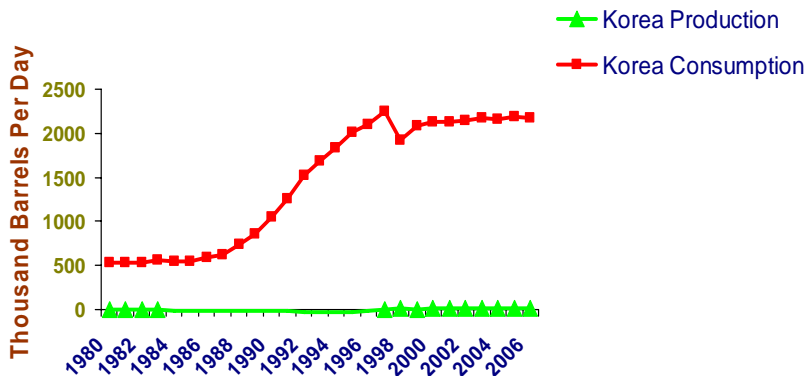


Korea Gas Production and Consumption



Human Population (2006) = 48.4 millions.
 Korea Oil Reserves (2006) = 0 Billion Barrels.
 Korea Gas Reserves (2006) = 0 TCF
 (0 billion barrels equivalent of oil)

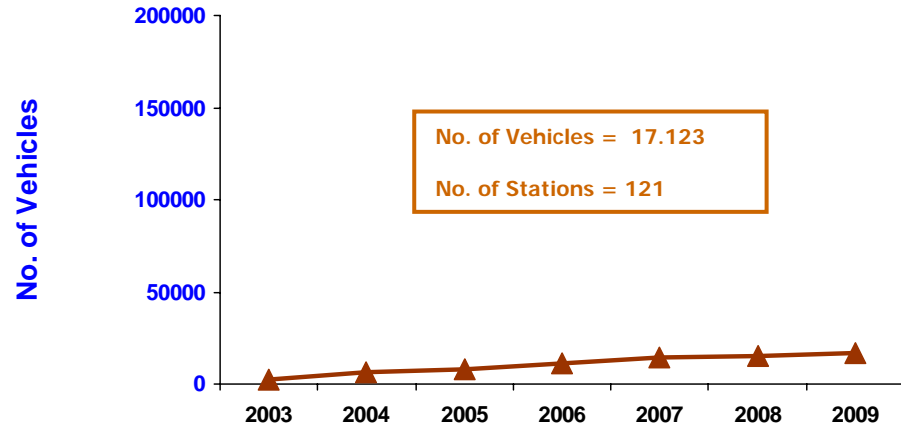
Korea Oil Production & Petroleum Products and Oil Consumption



Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> Reduction of Air Pollution. Subsidies on purchase of CNG buses and construction of stations.
		Refuelling Infrastructure		
		Technology & Know-how	CNG Price*	~ 60% < gasoline. ~ 60% < diesel
		Safety	Major Challenges	<ol style="list-style-type: none"> Building more NGV stations. Maintaining attractive price differential of CNG.
		Awareness & Education		

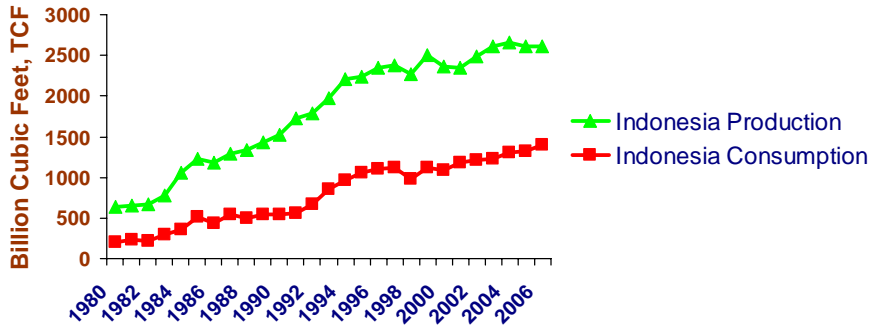
Korea NGV Growth



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



Indonesia Gas Production and Consumption



Human Population (2006) = 223 millions.

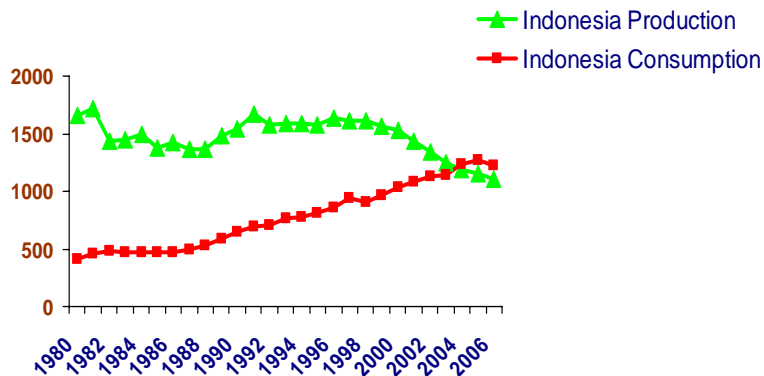
Indonesia Oil Reserves (2006) = 4.3 Billion Barrels.

Indonesia Gas Reserves (2006) = 97.78 TCF
 (~ 17.6004 billion barrels equivalent of oil)

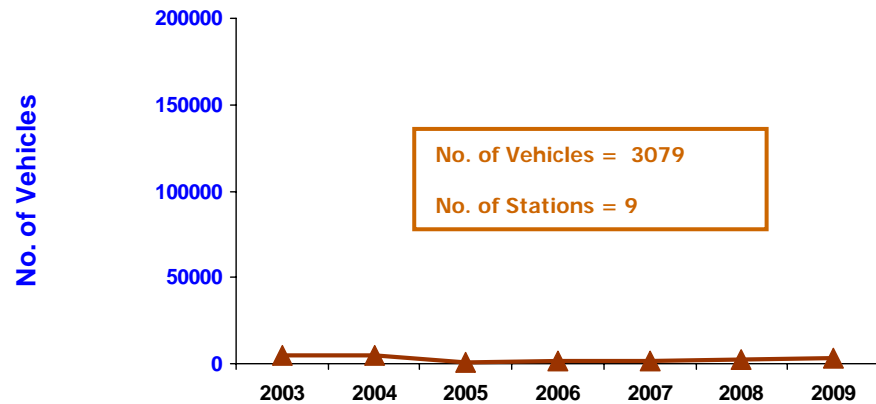
Key Success Factors / Challenges

Government Support & Policies	Benefits to Key Stakeholders	CNG Price	Government Support & Policy	<ol style="list-style-type: none"> Reduction of Air Pollution. Investment on infrastructure by national oil & gas company.
		Refuelling Infrastructure		
		Technology & Know-how	CNG Price*	~ 60% < gasoline. ~ 60% < diesel
		Safety	Major Challenges	<ol style="list-style-type: none"> Clear & consistent government support and policy. Building more NGV stations. Maintaining attractive price differential of CNG.
		Awareness & Education		

Indonesia Oil Production & Petroleum Products and Oil Consumption



Indonesia NGV Growth





- **NGV will continue to grow in the Asia Pacific region due to present of strong key drivers of Energy, Economics and Environment. However, success of NGV programmes depend on various key factors (challenges) that must be adequately addressed.**
- **Many countries have successfully implemented and sustain their NGV markets. Such experiences must be shared among countries to facilitate the development and growth of the NGV market in the region.**
- **ANGVA, as a non-profit industry association for NGV, can facilitate the exchange and sharing of information and lessons learned among countries and members.**



THANK YOU