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**“LPG/CNG vehicles for a cleaner tomorrow in
Metro Manila”**

**Presented by the Department of Energy (Philippines), the
Asian Development Bank and the Ministry of Transport,
Public Works and Water Management, The Netherlands**

**Organized by the Partnership for Clean Air
Metro Manila, Philippines, 23-24 October, 2002**

Session 3:

**Perspectives and experiences with gaseous
fuelled vehicles worldwide**

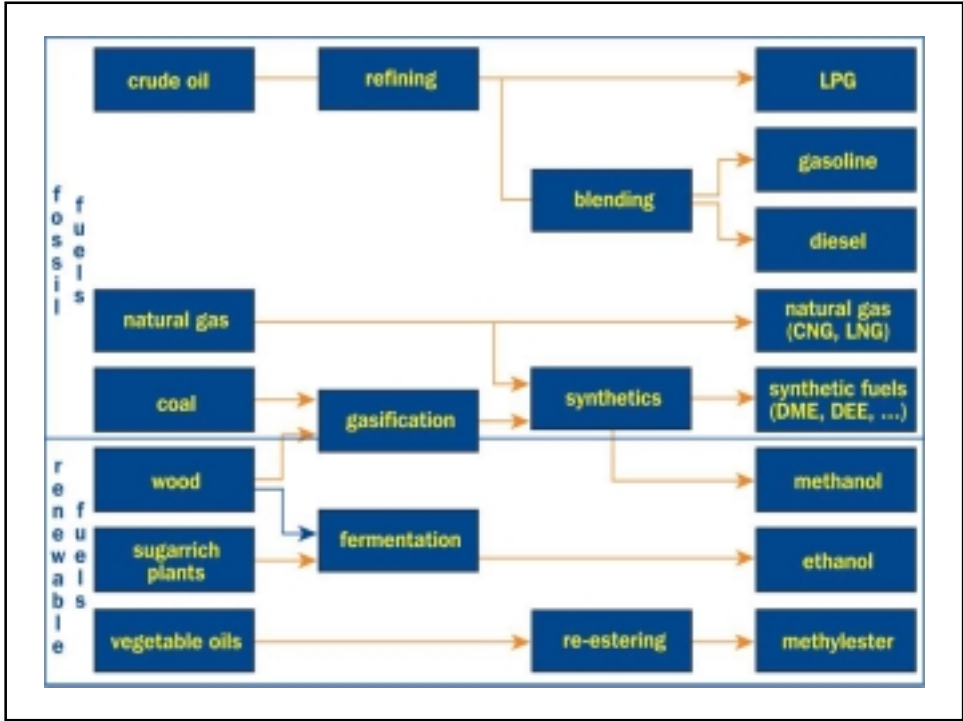
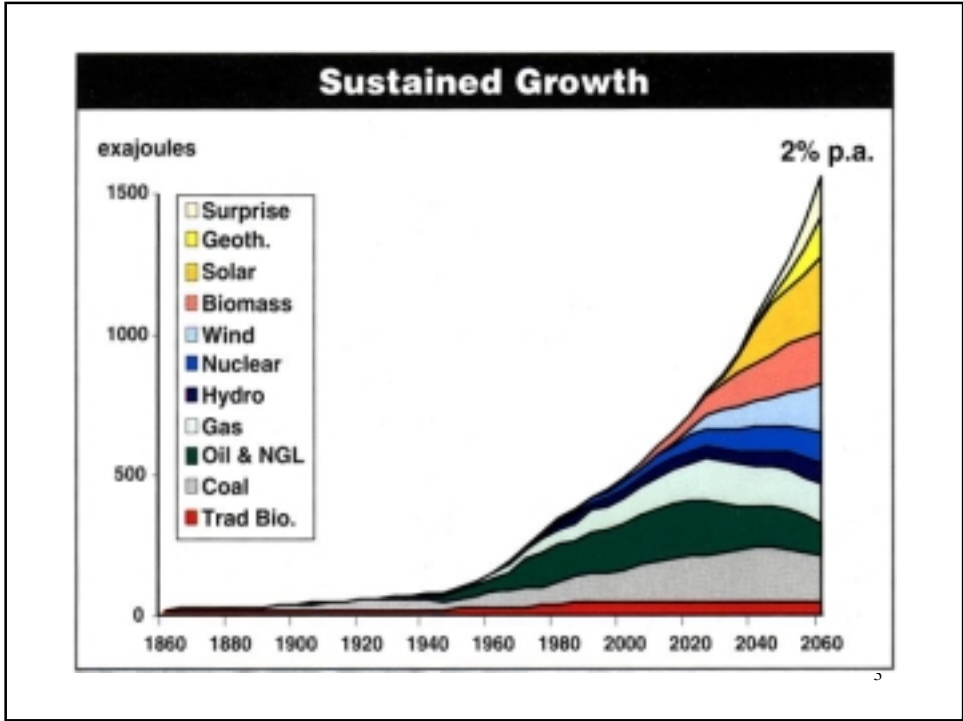
**J. van der Weide, Senior Advisor ENGVA
The Netherlands**

1

CONTENTS

- Future of energy
- SWOC analysis gaseous fuels
- Incentives; good and bad example
- Market penetration so far

2





SWOC ANALYSIS

- **STRENGTHS**
- **WEAKNESSES**
- **OPPORTUNITIES**
- **CHALLENGES**

5



STRENGTHS

- **Technology is Commercial in Many Parts of the World**
- **More OEM Products Available Than Any Other Alternative Fuel Vehicles**
 - ~55 Manufacturers worldwide producing 150+ vehicle models & engines

6



STRENGTHS con't

- **Environmental Fuel & Technology**
 - Proven better for smog, particulates, global warming, etc.
 - Positive public perceptions
- **Low Cost Fuel (Attractive Economics)**
- **Fuel and Vehicles Are *Very* Safe**

7



STRENGTHS con't

- **Abundant Worldwide Gas Resources**
 - 200+ years in-ground supply
 - Strong & growing distribution network
- **NG Can Be a Renewable Resource**
 - Human waste (water treatment)
 - Agricultural waste
 - Household garbage

8



STRENGTHS con't

- **LNG Adds Diversity**
- **Standards Well Developed**
 - **International Standards Org. (ISO)**
 - **Cmtte. European Normalisation (CEN)**
 - **United Nations**
- **Organised (& Improving) Worldwide Association Network**

9



WEAKNESSES

- **High First Cost of Vehicles**
 - **Requires government support**
 - **Target High Fuel Consuming Customers**
- **High Cost of Fuelling Station**

10

WEAKNESSES con't



- **Gaseous Fuel Properties Present Technical Challenges**
 - Energy density affects vehicle range
 - Heavier storage tanks required
 - Gas is harder to ignite in engines
- **Fuel Composition Varies**

11

WEAKNESSES con't

- **NGVs Lack *'Sex Appeal'* Relative to Electric & Fuel Cell Vehicles**
- **Public Generally Not Knowledgeable About NGVs or their Benefits**

12

OPPORTUNITIES



- **Global Environmental Concerns Make NGVs Attractive**
 - CO₂ and global warming
 - Links of particulates to cancer
 - Urban pollution mitigation strategies
- **Biogas in Vehicles Is Increasingly Attractive**
 - Stronger global support for renewables
 - Clean air/water solution

13

OPPORTUNITIES con't



- **Energy Security Issues = Short Term Oil Price Volatility**
- **Long Term Petroleum Prices Increases**
 - Supply shortages, real or engineered
 - Low sulfur fuels more expensive
 - Sharp oil demand increase in developing countries

14



CHALLENGES

- **Global Natural Gas Industry Support Inconsistent**
 - NGVs not part of the *core* business
 - Long term markets not in view
 - **Company fleets driving on competitor's fuel**
- **Oil Industry & Customers Embrace Status Quo Petroleum Products**

15



CHALLENGES con't

- **OEMs Not Fully Committed to AFVs**
 - Small volumes & low revenues
 - R&D expense
 - AFV fuelling infrastructure barrier
- **New Generation Fuels & Vehicles**
Narrow Environmental Benefits of NGVs

16

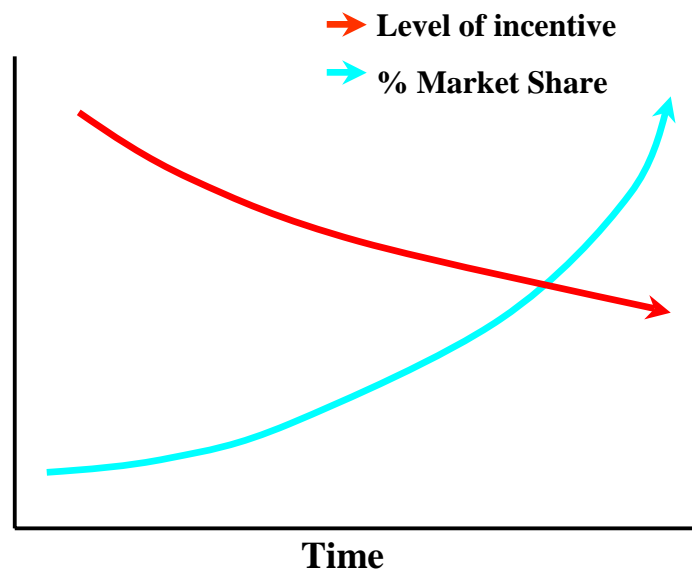


CHALLENGES con't

- **Belief in Hydrogen/Fuel Cell *Panacea* Detracts from NGV Benefits**
 - H₂ & Fuel Cells PR overshadows CNG technical & marketing efforts
 - H₂ & Fuel Cells R&D funding detracts from CNG investments

17

Incentives for Clean Fuels & Environmental Technologies Based on Market Share



18

THE ROLE OF GOVERNMENT*

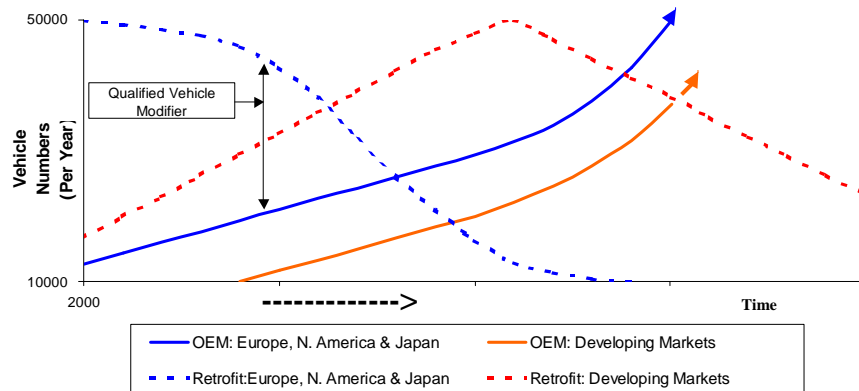
(Strategies Supported by Specific Actions!)

- **Create Incentives (financial & others)**
- **Enforce Mandates (but *with* incentives)**
- **Develop Standards**
- **Fund Research & Development**
- **Leadership by Example**
- **PR & Communications**

* What's good for one alternative fuel is good for them all!

19

Long-term International Markets for Retrofit & OEM NGVs



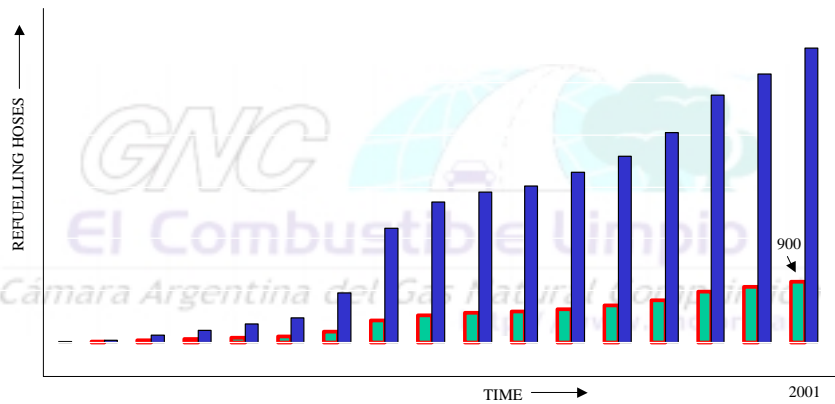
Argentina: Growth in the Vehicle Market



21

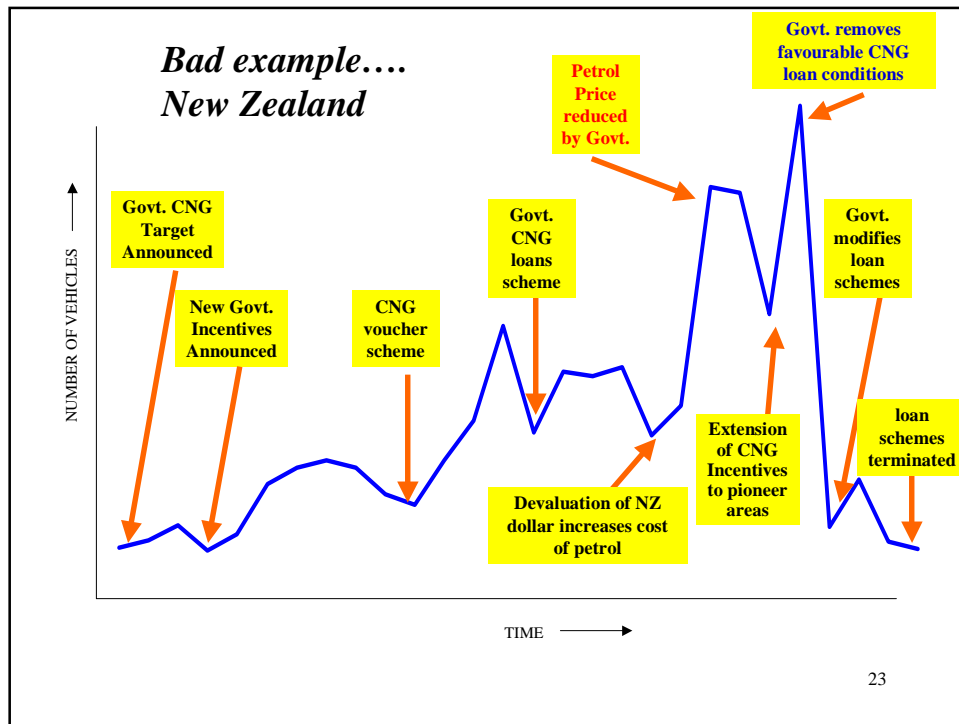
Good example....
Argentina

Fuelling Stations & Hoses



- REFUELLING STATIONS
- REFUELLING HOSES

22



Country	Vehicles converted	Refuelling stations			
Argentina	686,496	896	Bangladesh	1,000	5
Italy	370,000	355	Great Britain	835	18
Pakistan	200,000	200	Iran	800	2
Brazil	120,000	131	Holland	574	27
USA	102,430	1,250	Spain	300	6
China	36,000	70	Belgium	300	5
Venezuela	33,584	170	Switzerland	270	14
Egypt	33,293	52	South Korea	245	13
Russia	31,000	205	Turkey	189	3
India	25,000	6	Thailand	184	1
Canada	20,505	222	Austria	83	5
New Zealand	12,000	100	Ireland	81	2
Colombia	12,000	28	Cuba	45	1
Germany	10,000	146	Finland	34	5
Japan	8,884	140	Czech	30	11
Bolivia	6,000	17	Nigeria	28	2
France	4,550	105	Luxembourg	25	5
Trinidad & Tobago	4,000	12	Poland	20	4
Malaysia	3,700	18	Norway	18	3
Indonesia	3,000	12	Taiwan	6	1
Chile	3,000	6	Denmark	5	1
Australia	2,104	127	Korea	4	1
Mexico	1,600	4	Algeria	1	
Sweden	1,550	25	Hungary	14	
			South Africa	4	
			TOTALS	1,735,772	4,425

24

Automotive LP Gas Vehicles and Automotive LP Gas Dispensing Sites

Country	Number of vehicles x 1000 (1997)	Number of Dispensing sites (1997)
Austria	0,55	9
Baltic States	15	20
Belgium	35	556
Bulgaria	15	30
Croatia	12	16
Czech Republic	75	94
Denmark	1	83
France	70	800
Germany	3	97
Greece	5	30
Hungary	35	55
Ireland	3	400
Italy	1,100	1,702
Luxembourg	0	8
Moldavia	2	15
Netherlands	362	2,200
Norway	0,4	18
Poland	310	7090
Portugal	5	20
Spain	13	60
Slovenia	2	15
Sweden	0,6	11
United Kingdom	1,5	100
Total Europe	2,064	7,039
Indonesia	1	10
Japan	300	1,722
South Korea	401	525
Taiwan	32	10
Thailand	17	85
Total Asia	751	2,352
Australia	490	3,200
New Zealand	25	80
Total Australasia	515	3,280
U.S.A.	271	3,500
Canada	135	3,500
Total North America	406	7,000
Mexico	175	1,000
Former Soviet Union	75	300
Turkey	10	60
Algeria	25	80
Tunisia	6	35
Iran	45	60
Total Miscellaneous	336	1,535
TOTAL WORLD	4,072	21,206

25

EUROPEAN ALTERNATIVE FUELS POLICY

% Fuel Replacement, Transport Sector, 15 EU Countries
by 2020

[] = Optimistic

Year	Biofuel	CH4	H2	Total %
2005	2			2
2010	6	2		8
2015	[7]	5	2	14
2020	[8]	10	5	[23]

26

**IANGV ACTIVITIES (Since 1998)
FOSTERING the
GLOBAL NGV STRATEGY**

- **Initiated in 1992... Lead to Creation of European NGV Association**
- **TODAY.... Formation of:**
 - **Association Latino-American GNV**
 - **Asia-Pacific NGV Association**

27

**LET'S GO DOWN THE PATHWAY
(TO PROFITABILITY)
TOGETHER**

- **IANGV: WWW.IANGV.ORG.NZ**
- **NGVC: WWW.NGVC.ORG**
- **ENGVA: WWW.ENGVA.ORG**
- **ANGVA: WWW.ANGVA.ORG**
- **ALGNV:**
- **ETC.**

28