



PETRONAS

Gas for households - LPG for cooking as first step

Ho Sook Wah
Secretary General
Malaysian Gas Association

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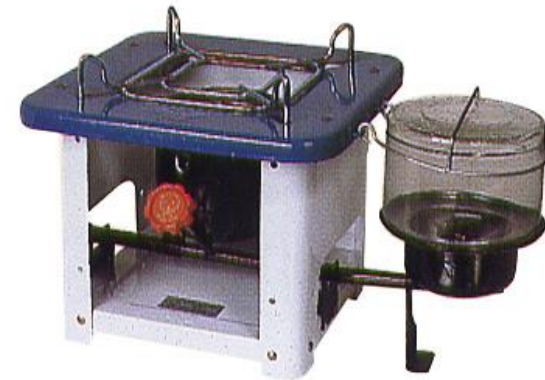
Before the 1970s, the main fuel for cooking were charcoal, wood and kerosene



Charcoal

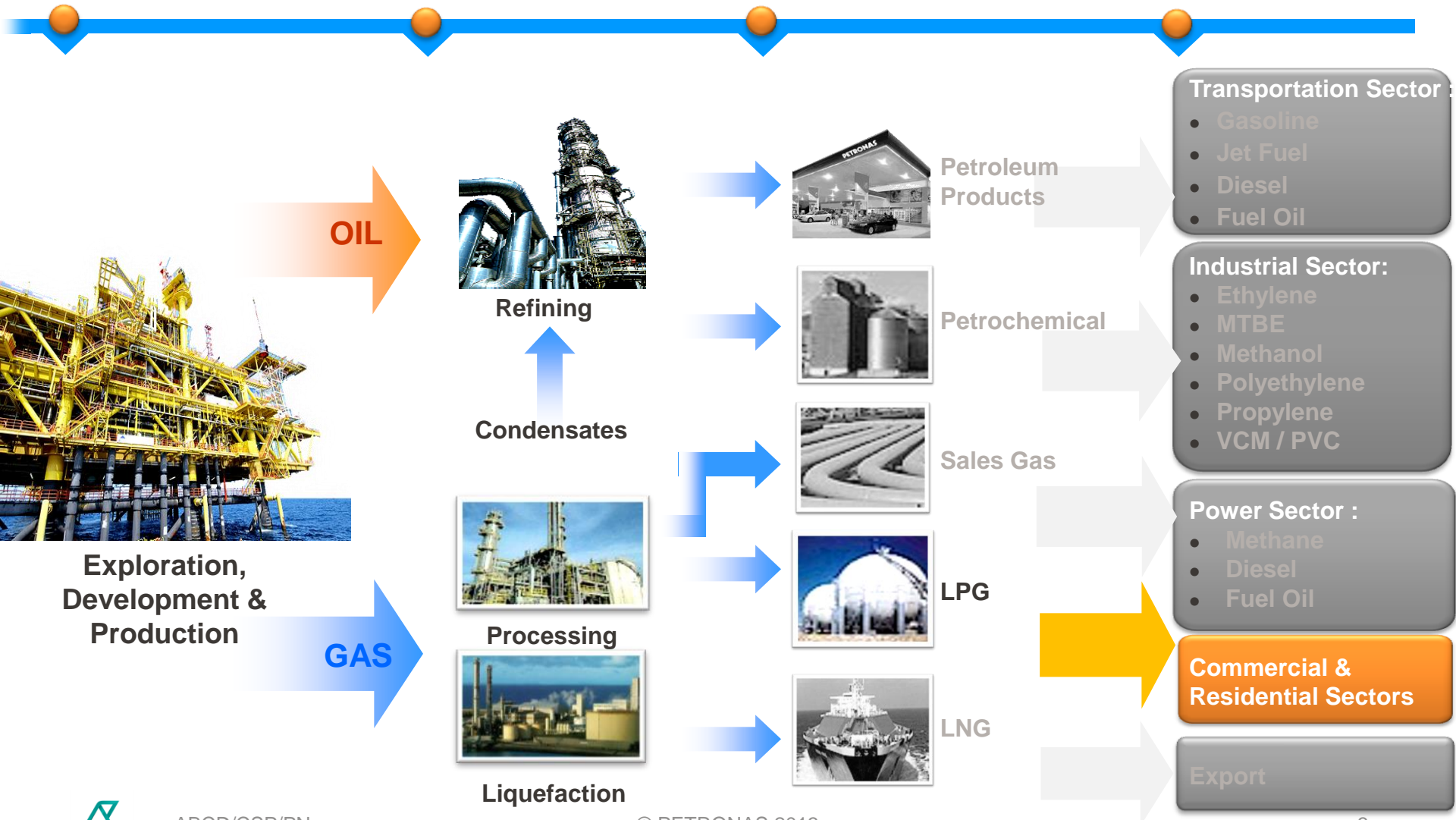


Wood



Kerosene

LPG is derived from oil and gas value chain



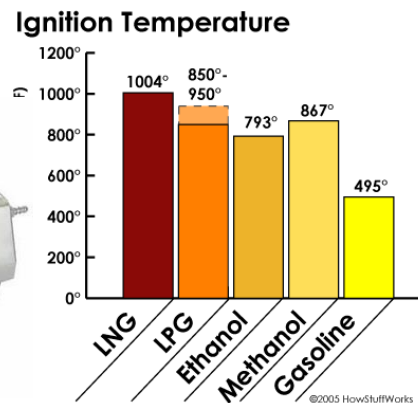
LPG is a BYPRODUCT

- LPG is produced as a byproduct of:
 - Oil production (via the processing of associated gas)
 - Gas production (via the processing of non-associated gas—including LNG)
 - Refining
- Therefore, LPG is a supply-driven market in which demand must adjust to match supplies.
- LPG production tends to increase quickly when one or more of the above industries is expanding quickly.



Benefits of LPG

- LPG is used to replace other traditional fuels such as wood, charcoal and kerosene.
- It has complete burn of true blue flame that ensures the heat is spread across the whole pan.
- Faster cooking reduces gas usage thus making it more economical, environmentally friendlier and healthier for everyone.
- Burns with cleaner flame without burning pots and pans. Thus making washing up a breeze.

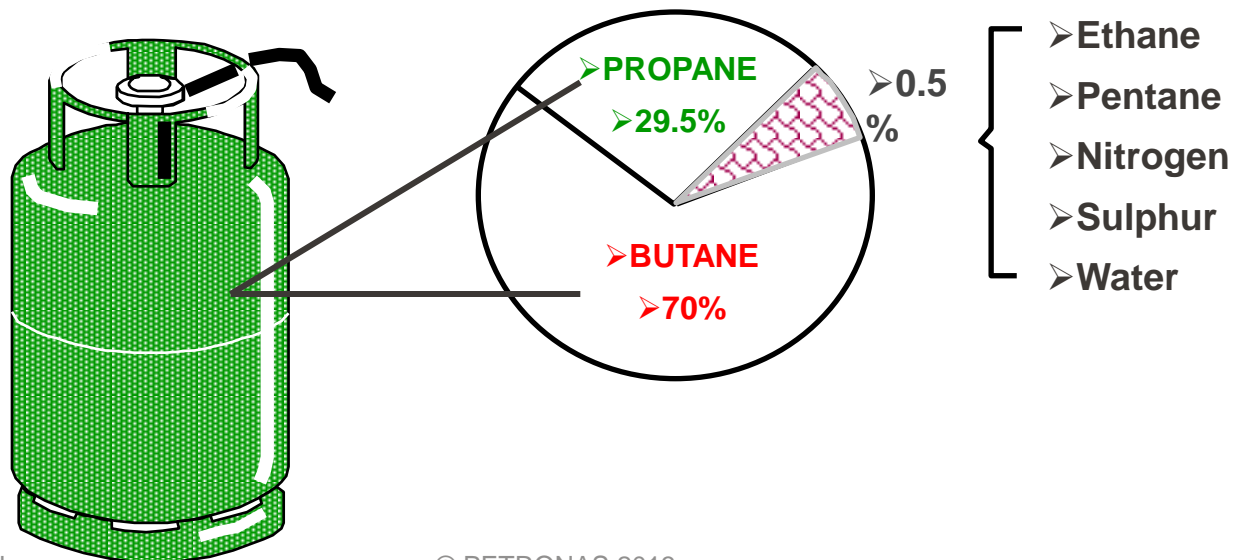


LPG is suitable for burning and heating purposes and for use as feedstock



Technical Specification of LPG

- Composition of Propane-C3 dan Butane-C4: 30% Propane and 70% Butane
- Physical properties : Colourless and odorless
 - (an odorant; ethyl mercaptan was introduced to create smell)
- Density (kg/l) : 0.4149 - 0.5952
- Calorific value (kcal/kg) : 11800
- Vapour Pressure : 6 – 7 bar
- Boiling point of LPG : Propane -42C and Butane -60C



LPG Cylinders are designed with maximum safety and easy handling

- LPG comes with 12-14 kg cylinders for household use and 50 kg cylinders for industries
- Cylindrical shape offers easy handling, retrieval and storage
- Offers maximum safety in case of leakage as LPG vaporize in the air



There are some potential dangers of LPG

- LPG is heavier than air – possible explosion if mixture of LPG and air is within explosive limit and there is an ignition source.
- Suffocation – LPG displacing air, thus lowering the level of oxygen. Use of an odorant to detect leakage of LPG.
- Incorrect use of LPG can result in explosions, fires, lost of property and most importantly, loss of lives.
- Do not neglect issues like leaking gas cylinders or tubes, damaged regulators, incorrect method of storage of LPG cylinders, etc.



A Brief History of LPG in Malaysia

From “Fuel for the Elite” To “Fuel for the Masses”

Prior to 1980s

- Agricultural-based economy with low per capita income.
- Cooking uses traditional fuels- charcoal, kerosene etc.
- LPG production from refineries is mainly for export market; domestic demand limited
- IOCs (i.e. Shell and Esso) dominates the domestic market

1980s-1990s

- Malaysia embarked on industrialization programme to uplift the economy
- PETRONAS entered the LPG business to solve LPG shortages in Northern Peninsula
- Government introduced APM mechanism to provide price stability and ensure sufficient margin to players
- PETRONAS embarked on PGU pipeline and GPP projects to monetize the gas resources offshore Peninsula
- Improved infrastructure - North South Highway project and enabled greater transportation of LPG

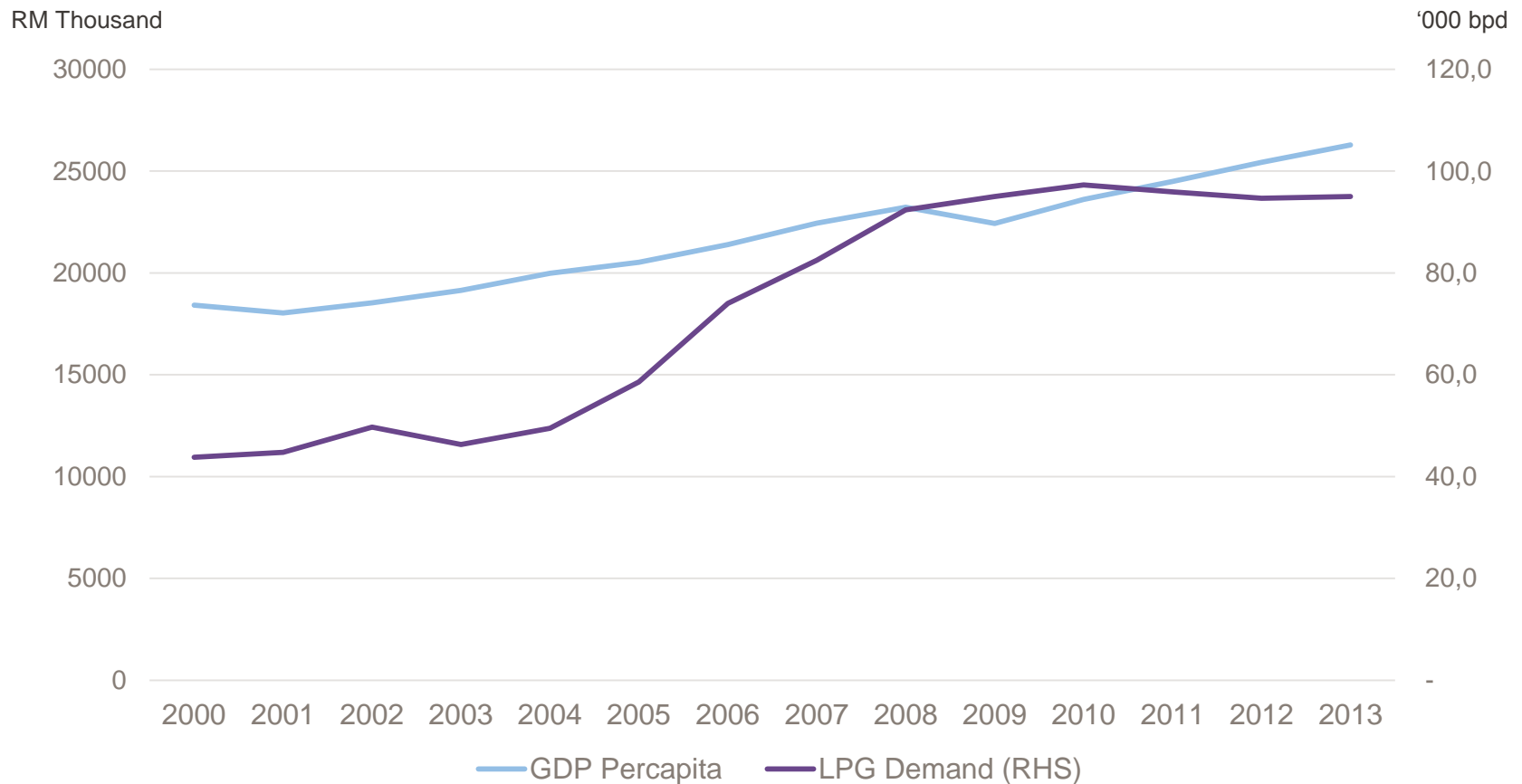
2000s- current

- LPG became the fuel of choice because of availability, affordability and environmental benefits
- PETRONAS achieved 50% market share




LPG demand took-off as a result of higher standards of living

Per-capita GDP vs. LPG Demand



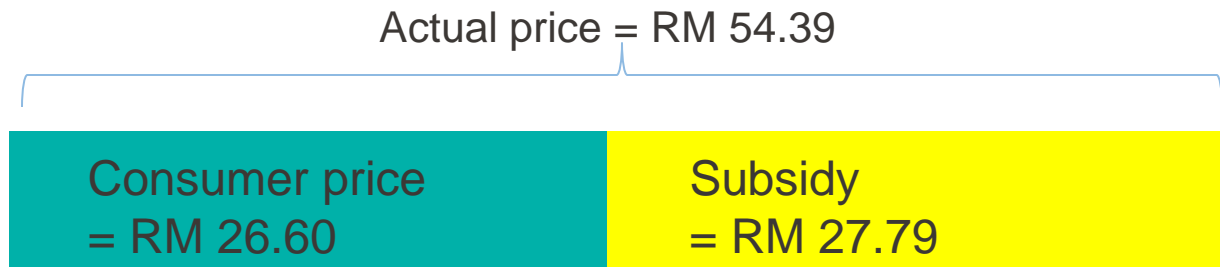
To ensure efficient supply, Malaysia has a developed LPG supply infrastructure



Refinery		3	5
Current Capacity (bpd)		314,300	557,300
Bottling Plants		9	21
LPG Extraction Facility		2	

LPG price in Malaysia is heavily subsidized by the Government for domestic consumers

Price Breakdown for LPG 14 kg



Stiff domestic competition have seen the consolidation of major players over the years

Previous



Current



In summary

Key takeaways

Abundant
Supply



- Availability of oil and gas reserves provide incentives to utilize indigenous resources

Improve
standards
of living



- Rising affluence and living standards shift consumer preference towards more cleaner fuels

Infrastruc-
ture



- Well developed infrastructure to carry and transport LPG to consumers

Government
Support



- LPG is heavily subsidized by the Government for domestic use.





The End