

LPG in a Sustainable World

NZ Gas Industry Forum – Gas Association of New Zealand

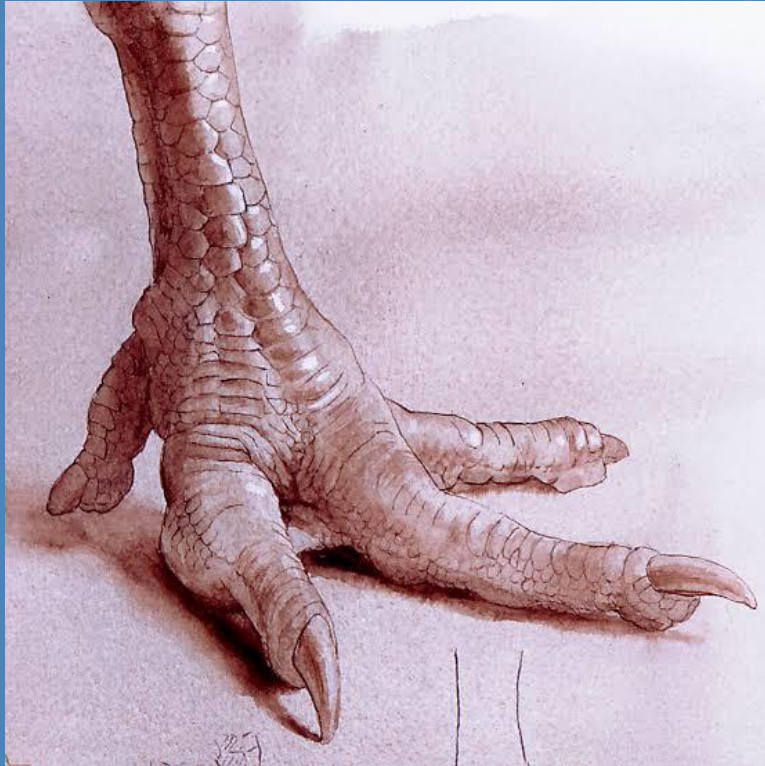
Wellington – New Zealand

7th – 9th November 2018

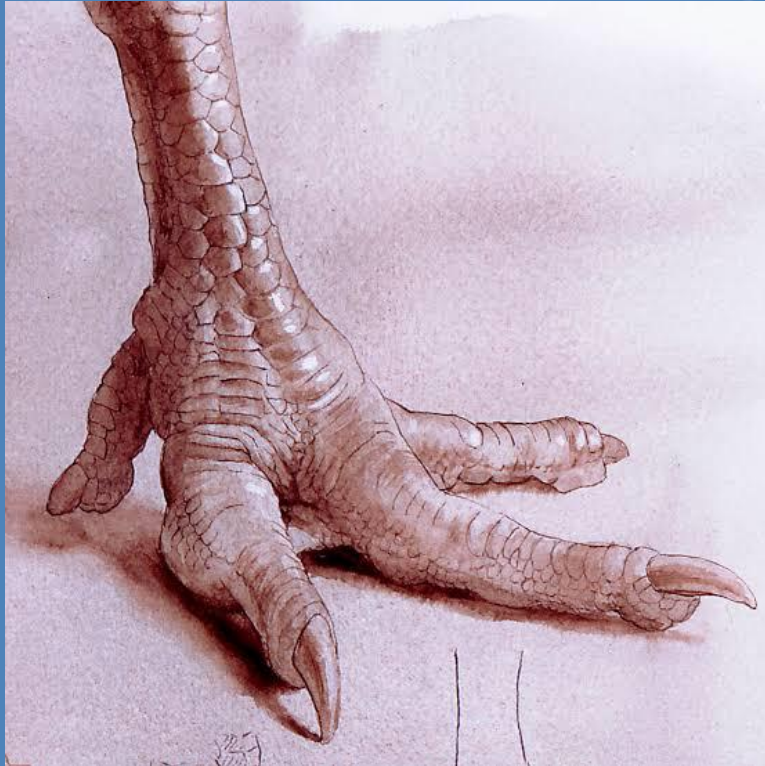
David Tyler - WLPGA

contact: dtyler@wlpga.org

What do these have in common?



What do these have in common?



- By-products
- Not fully understood
- Both eventually found valuable markets

LPG in a sustainable world...some truths



- By-product of fossil fuel
- Low carbon footprint (5 star fossil fuel)
- LPG not a GHG (IPCC)
- Portable, powerful, versatile, clean, abundant
- 'Gap, or bridging' fuel
- BioLPG proven but...
- Production limited



WLPGA at a glance

LPG in a sustainable world

- (i) Marine Bunkers
- (ii) Power Generation
- (iii) Internet of Things (IoT)
- (iv) UNHCR partnership

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Who Are We?



270+

Member companies

125

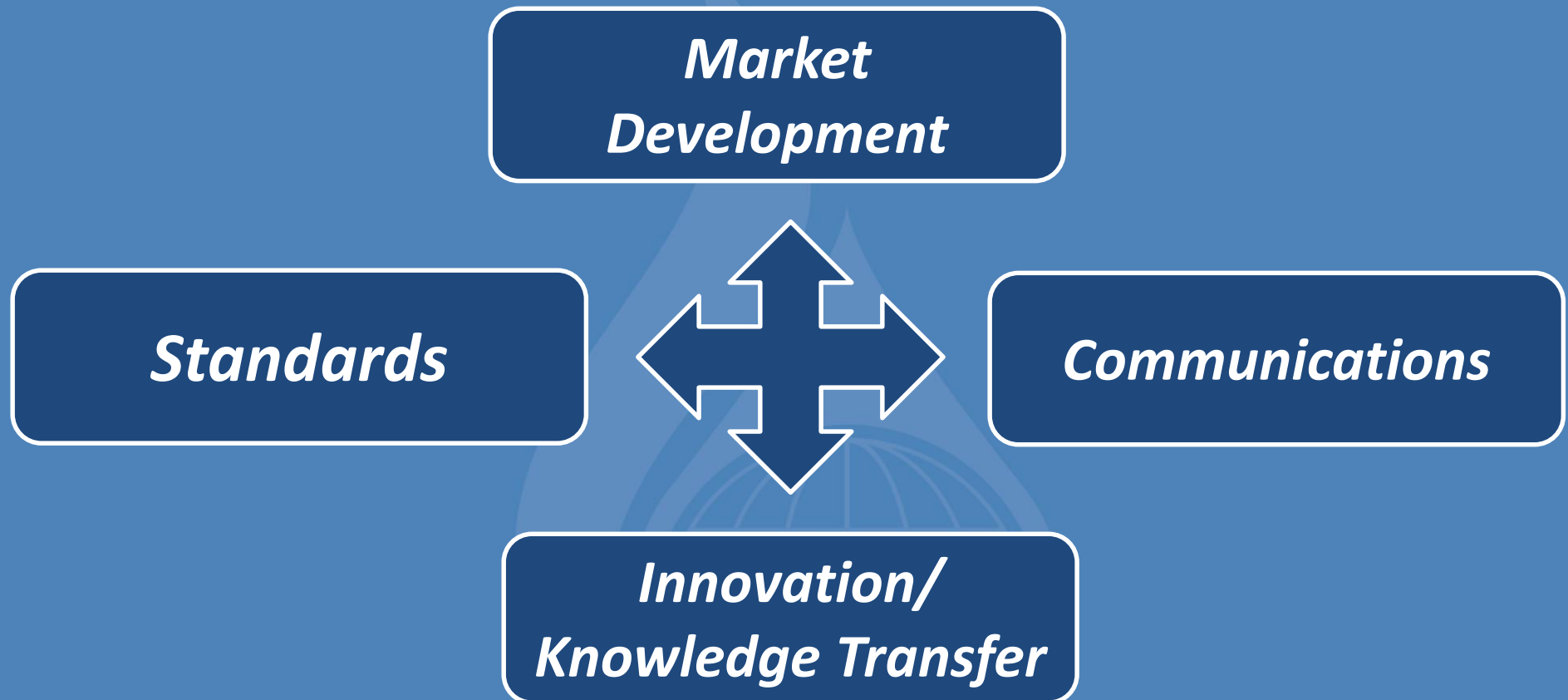
Countries

Serving the full LPG value chain



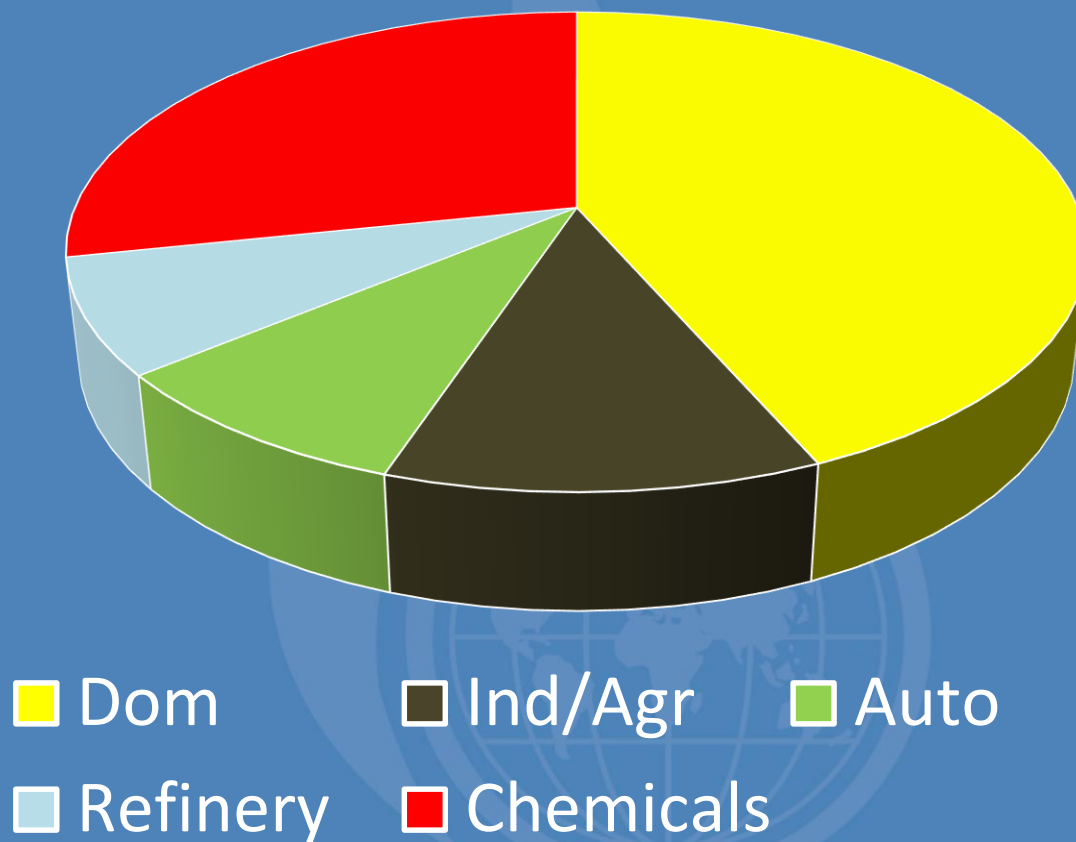
The WLPGA promotes the use of LPG
to foster a safer, cleaner, healthier
and more prosperous world

Mission (2017-2019)



Global LPG demand by Sector

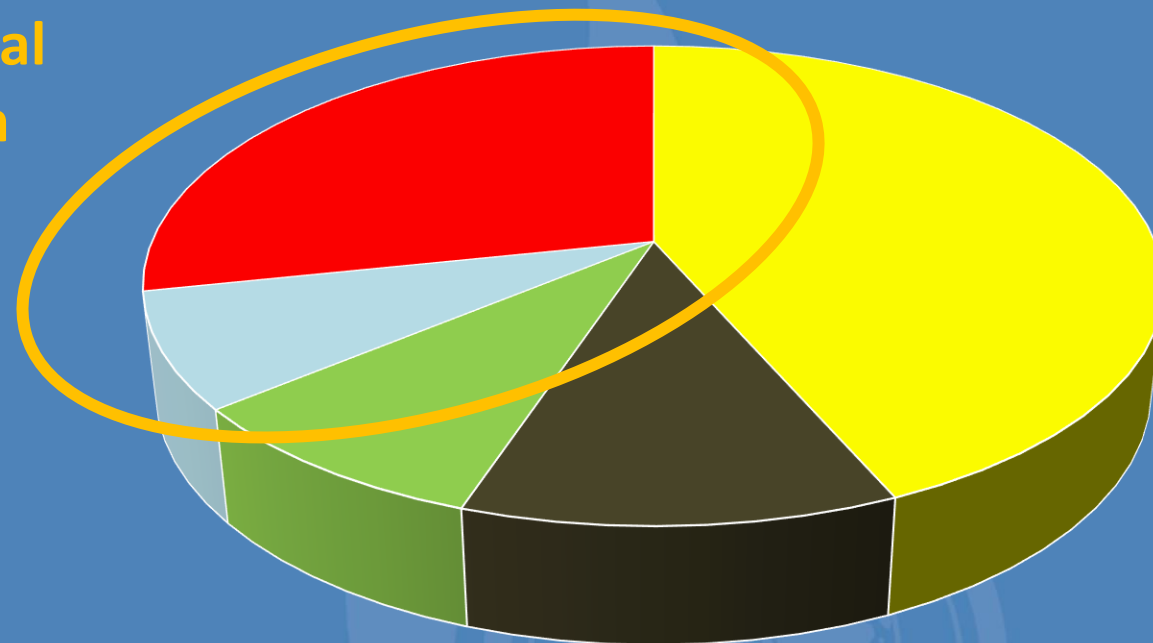
2017 Global LPG Demand - 303mMT



Global LPG demand by Sector

2017 Global LPG Demand - 303mMT

36% of global demand in 2017 was here!



Dom

Ind/Agr

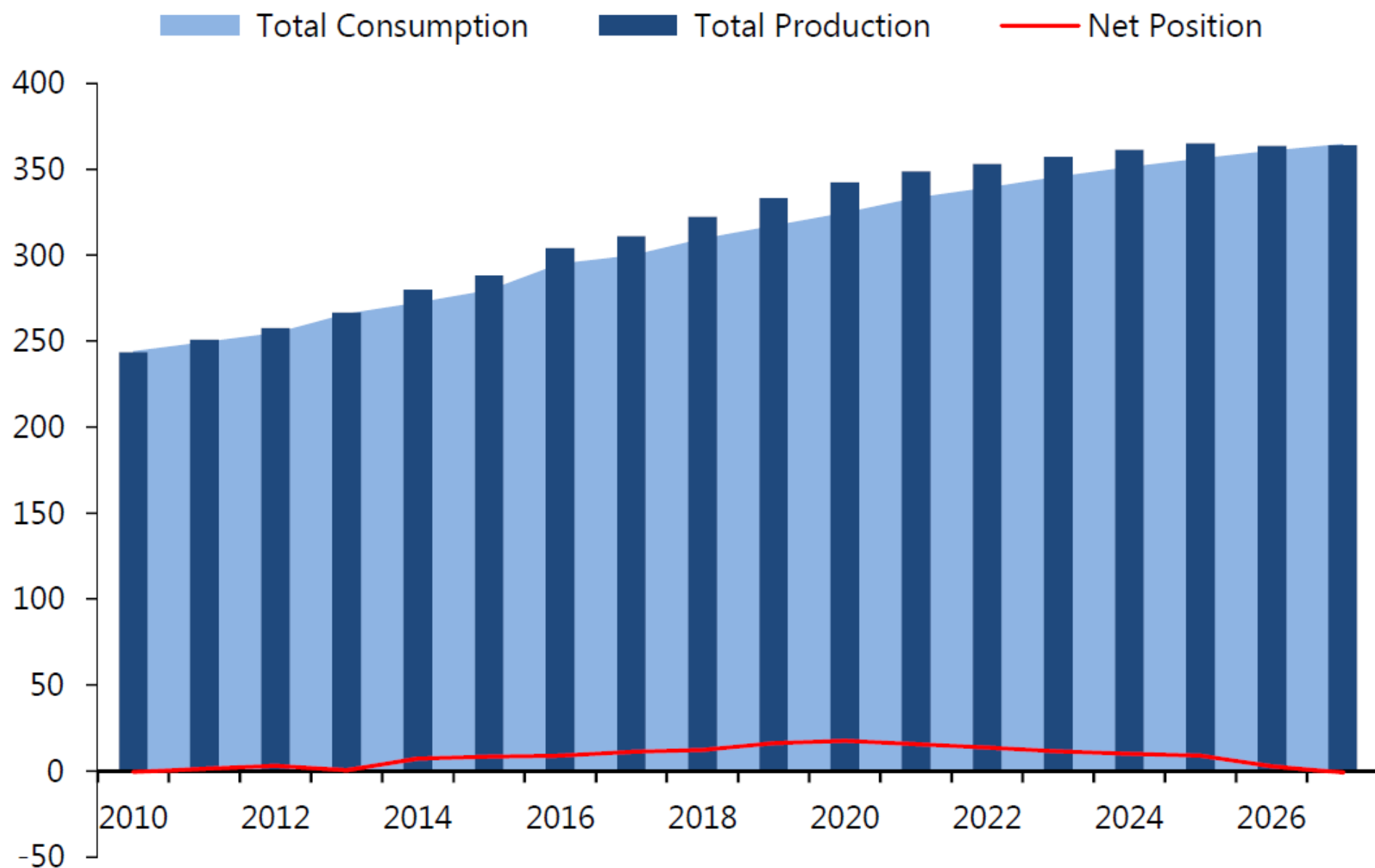
Auto

Refinery

Chemicals

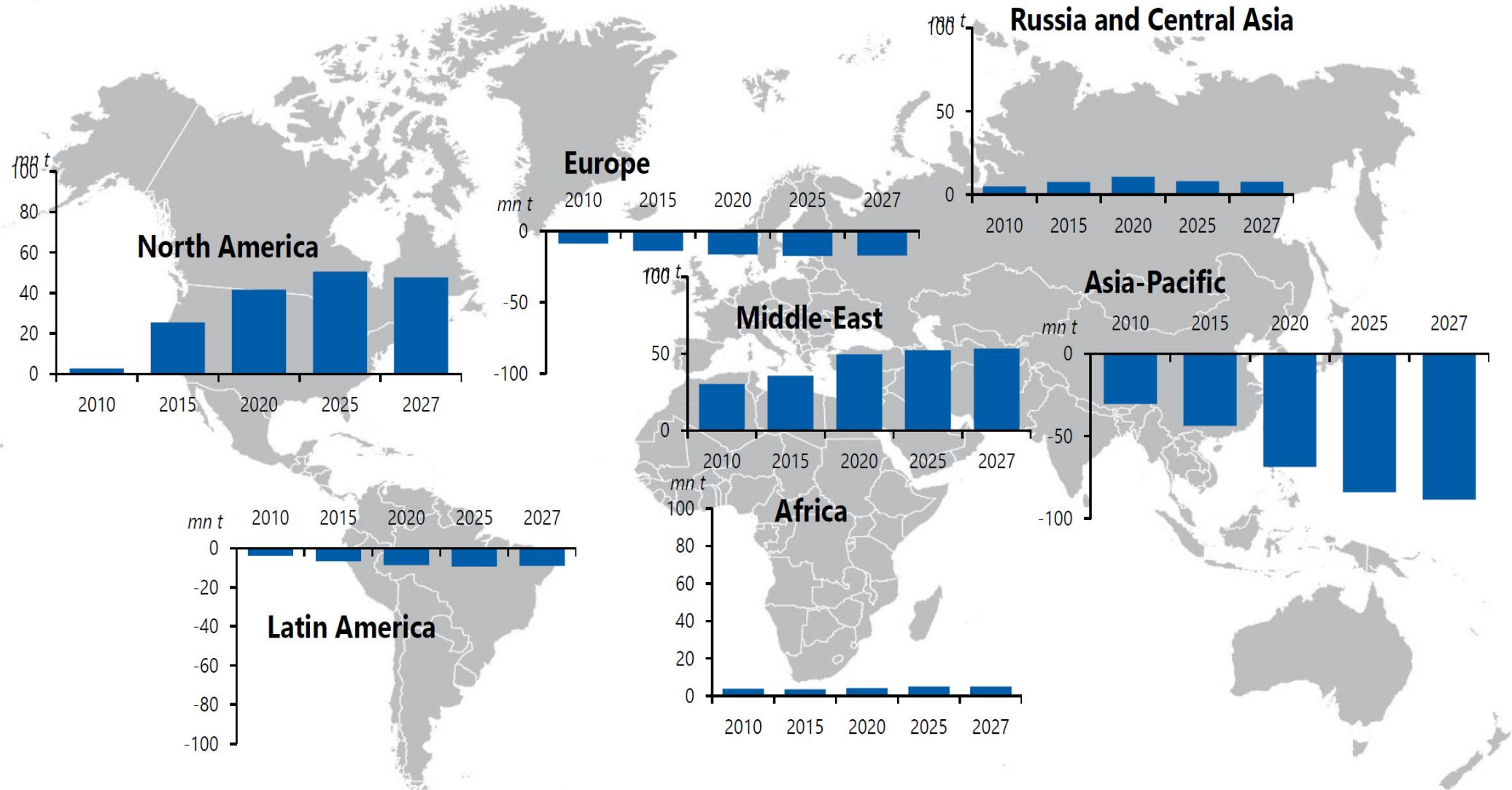
World LPG production and consumption 2010-27

mn t



Source: 2018 WLPGA Global Statistical Review

Regional LPG Net Positions (2010-2027)



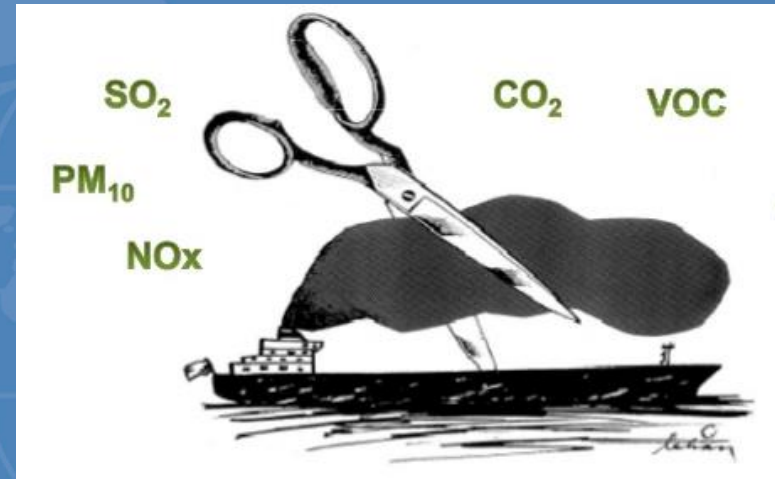
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(i) Marine Bunkers - Background

- Bunker fuel market < 180m mt/yr
- Bunkers traditionally low quality
- On-shore emissions been the focus
- Off-shore emissions now under spot light



Global LPG Marine Vessels

- Third of LPG moved by sea (>100m mt)
- 1,156 LPG cargo vessels in total
- 272 VLGC's

Type	Fleet	Order Book
VLGC	272	38
LGC	23	0
MGC	129	6
HANDY	94	11
8k – 15k cbm	131	5
3.75k – 7.99k cbm	257	12
1k – 3.75k cbm	250	2

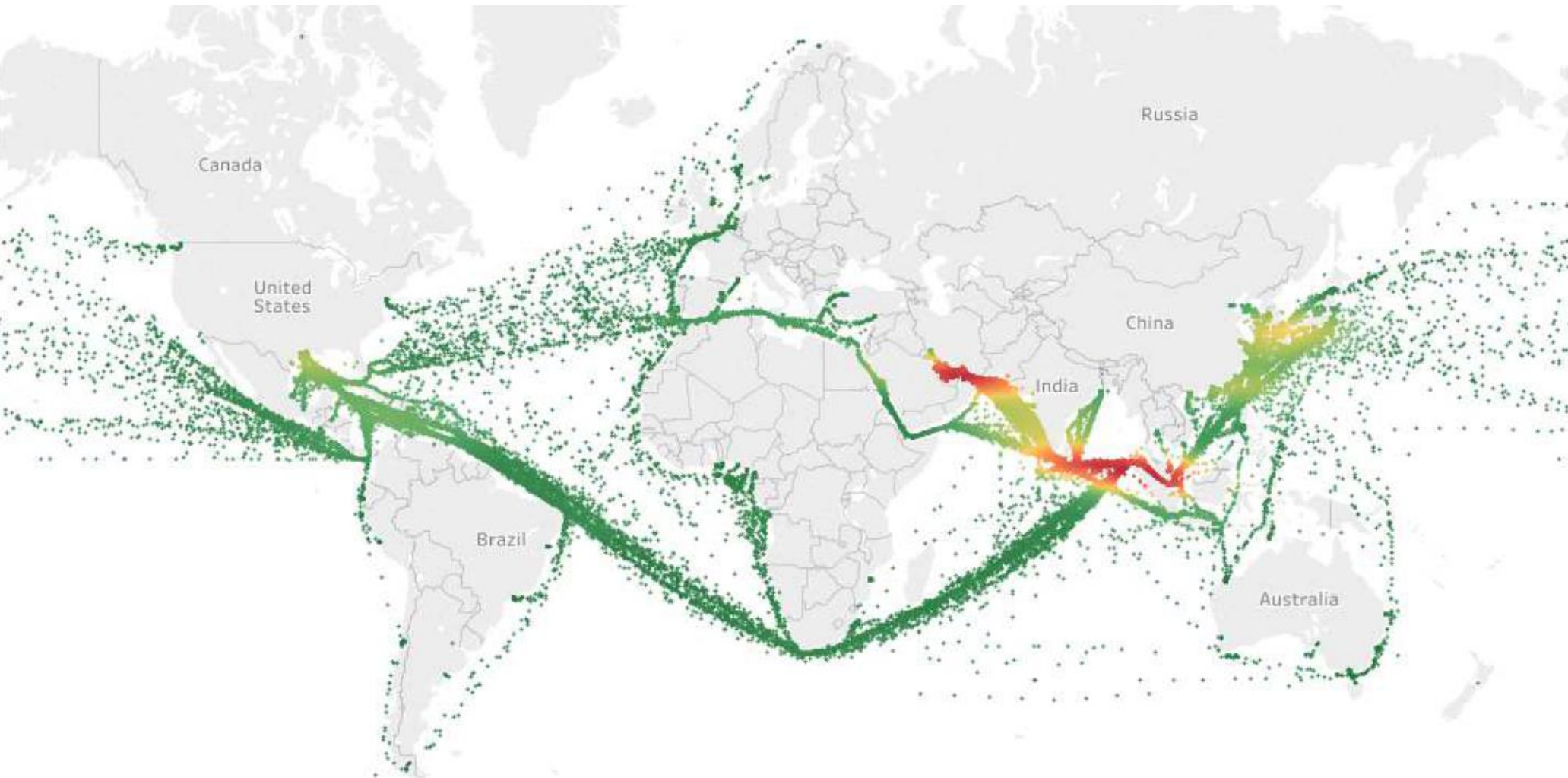


Very Large Gas Carriers (VLGC's)

- VLGC population growing fast (<20%/year) - workhorse
- 105 new builds 2015-2017
- Main drivers US exports & Asian imports
- 70-85,000m³ capacity (<48,000mt)
- VLGC's account for 64% of fleet capacity
- Good utilisation rates (90%) but...
- ...severe competition driving freight rates down
- Around 10-12 VLGC's used as floating storage

VLGC Trading Pattern density map (Year 2016)


VLGC Trade in 2016 is a lot more driven by US – Far East trades, both via Cape of Good Hope, and increasingly via the Panama Canal



Courtesy: BWLPG

LPG as Marine Bunker Fuel


- IMO introducing 0.5% S by 01/01/2020
- LPG a very good engine fuel (zero sulphur)
- WLPGA 2017 report 'LPG for Marine Engines'
- Equinor, BWLPG, Dorian switching to LPG
- Vessels run off the cargo - no bunkering
- One VLGC consumes 45mt/day
- Total VLGC fleet <4m mt/yr



WLPGA

LPG for Marine Engines
The Marine Alternative Fuel

Commercial, Passenger, Offshore Boats/Ships,
Recreational Crafts and Other Boats



Innovation & Technology

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(ii) LPG for Power Gen

- Project launched in 2017
- Chaired by GE
- Created recommendations for the industry
- Focus on communications campaign



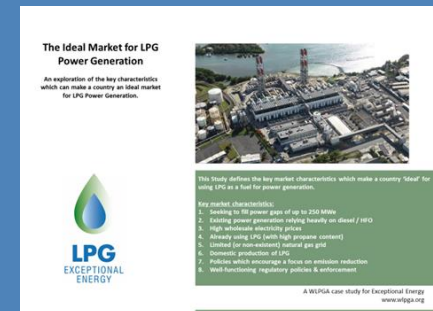
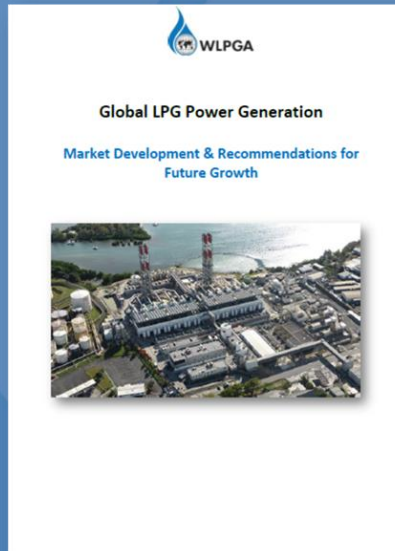
WILL HAVE A
GENERATING
CAPACITY OF **400 MWE**

IT WILL BE THE
LARGEST
POWER PLANT
OF ITS KIND FUELED
BY LPG



LOCAL POWER

LPG POWER PLANTS CAN BE SET UP CLOSE TO WHERE ENERGY IS NEEDED, THUS AVOIDING ENERGY LOSS OVER POWER LINES. VIRTUALLY **EVERY KW/H PRODUCED IS A KW/H USED**



LPG FOR POWER GENERATION CAN ACT AS



"BRIDGE"

UNTIL NATURAL GAS
INFRASTRUCTURE IS BUILT
AND SOME POWER PLANTS
CAN EASILY BE CONVERTED



LPG IS EASIER & LESS EXPENSIVE TO COMPRESS, SHIP, AND STORE THAN LNG



LOCAL POWER

LPG POWER PLANTS CAN BE SET UP CLOSE TO WHERE ENERGY IS NEEDED, THUS AVOIDING ENERGY LOSS OVER POWER LINES. VIRTUALLY **EVERY KW/H PRODUCED IS A KW/H USED**

A PARTNER FOR RENEWABLE POWER:

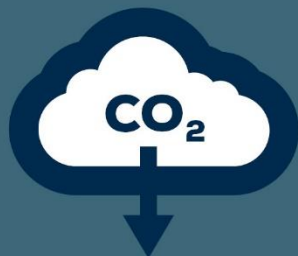
AN LPG POWER PLANT CAN BE COMBINED WITH WIND, SOLAR, HYDRO OR OTHER RENEWABLE SOURCES



THE BRIDGE POWER PLANT IN GHANA

WILL HAVE A GENERATING CAPACITY OF **400 MWE**

IT WILL BE THE **LARGEST POWER PLANT** OF ITS KIND FUELED BY LPG

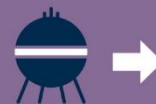


POWER GENERATION FUELED BY LPG HAS A LOWER EMISSIONS PROFILE

COMPARED TO HEAVY FUEL OIL AND DIESEL

RELIABLE POWER

LPG CAN BE STORED ON SITE THUS INCREASING UP-TIME



AVAILABLE POWER

COUNTRIES WHERE LPG IS USED FOR OTHER APPLICATIONS

THE INFRASTRUCTURE TO GROW LPG FOR POWER GENERATION WILL ALREADY BE IN PLACE

LPG FUELED POWER PLANTS ARE THE PERFECT SOLUTIONS

FOR ISLANDS, REMOTE AREAS AND EMERGING ECONOMIES WITH NO, OR LIMITED, ACCESS TO NATURAL GAS



LPG IS OFTEN MORE COST EFFECTIVE & ALWAYS CLEANER

THAN DIESEL AND OTHER FUELS THAT IT REPLACES

LPG EMITS LESS



PARTICULATE



≈ -30%

≈ -95%

≈ -24%

≈ -85%

PER MWE COMPARED TO DIESEL

LPG FOR POWER GENERATION CAN ACT AS



"BRIDGE"

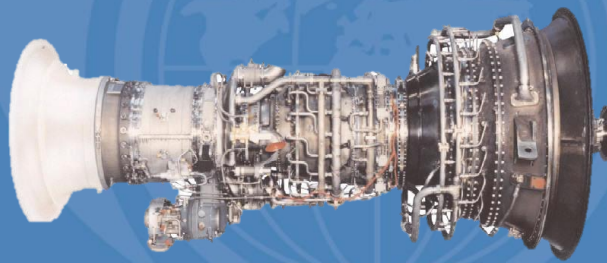
UNTIL NATURAL GAS INFRASTRUCTURE IS BUILT AND SOME POWER PLANTS CAN EASILY BE CONVERTED

Market characteristics support growth

- Limited, and straining, natural gas grids
- High/increasing electricity prices
- Diesel under pressure – cost gap closing
- Forecast growth in power demand
- Focus on emission reductions
- Government incentives for switching oil, or coal, to gas

Proposition for LPG

- Broad range (< 50 KW) to very large (≤ 200 MW)
- Well to wheel competitive
- Emissions advantage
- LPG infrastructure already in place
- Handling, transportation & storage easy and cheap
- Solutions relatively fast and cost effective



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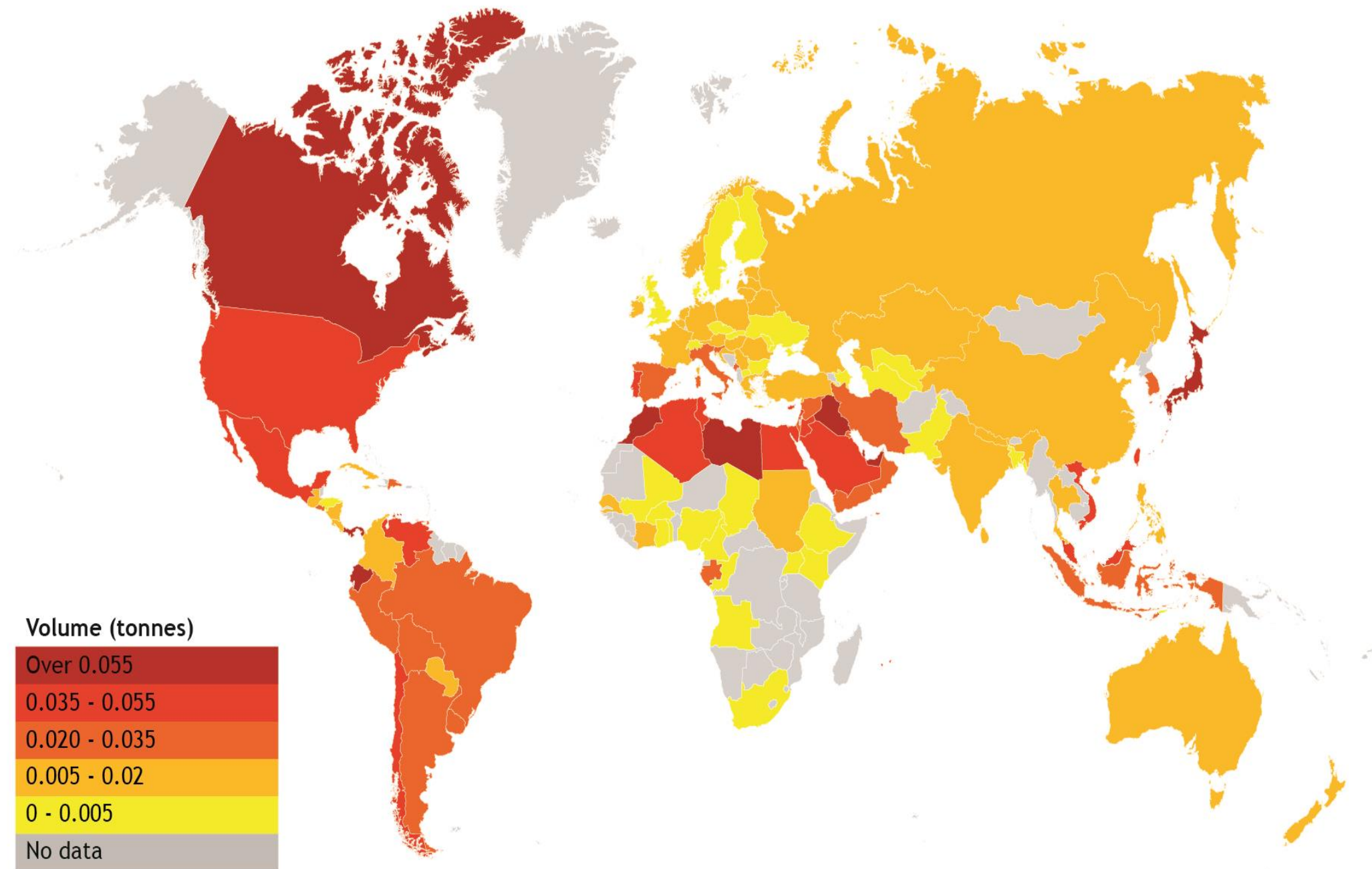
A photograph showing a group of people, likely in a rural or developing area, carrying large, heavy bundles of firewood on their heads. They are walking away from the camera through a dry, brushy landscape. The people are wearing traditional clothing, including colorful patterned saris. The scene is brightly lit, suggesting daylight. A dark blue rectangular box with white text is overlaid on the bottom left of the image.

**3 billion people have no
access to modern energy**

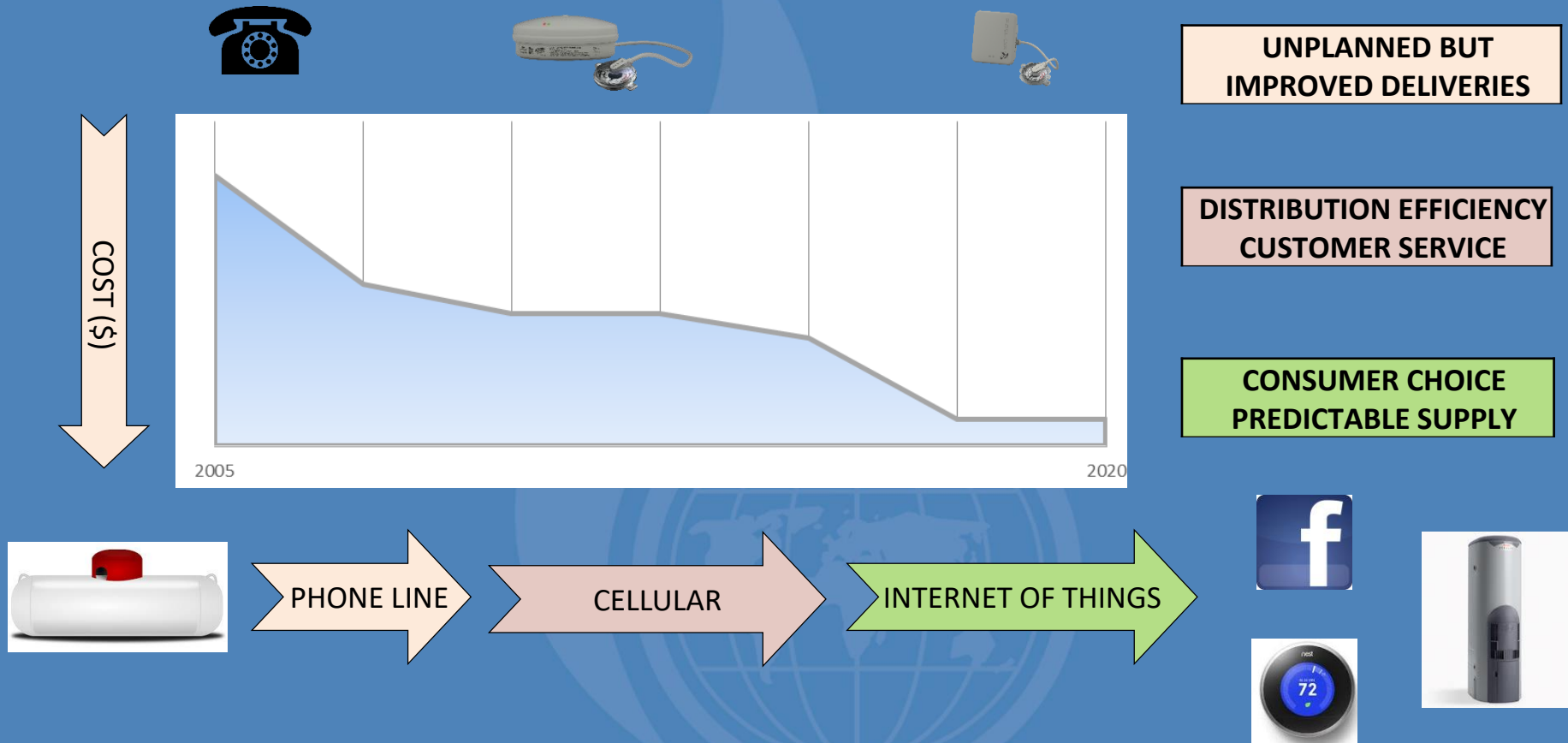
Indoor air pollution is a real killer



World LPG domestic consumption per capita



Evolution of Communications



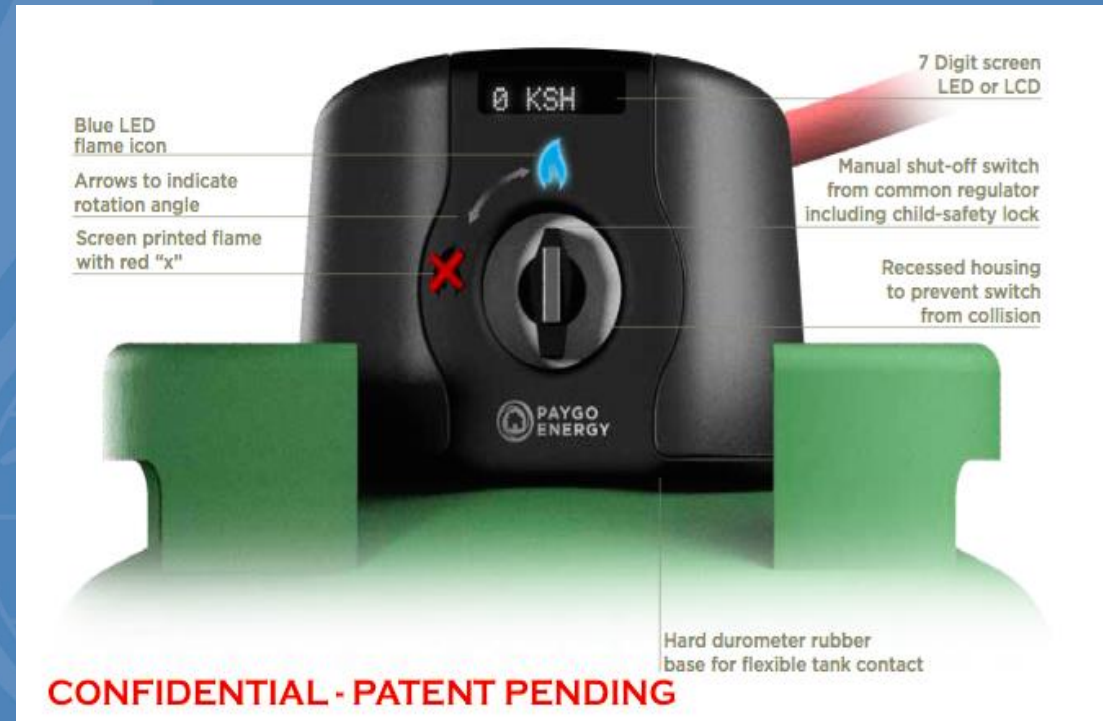
IoT - Smart Cylinder Valves

A Game Changer for the industry?

Old Game



New Game



IoT enables small purchases to be made



Purchasing power is
limited



Smart Valves with IoT...

- Improves asset management
- Lowers the entry barrier
- Tracks consumer behaviour
- Eliminates stock outs
- Mitigates bad practices (e.g. illegal filling)
- Supports the consumer value proposition

DIRTY FUELS ARE MORE EXPENSIVE THAN GAS



Cooking with
Charcoal & Kerosene
\$0.50/day



Cooking with
LP Gas
\$0.27/day

88% of the Kenyan Market Cooks with Dirty Fuels

LPG



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WLPGA/UNHCR partnership

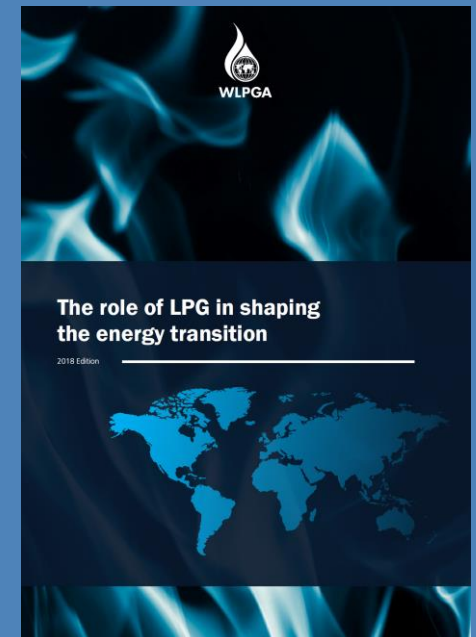
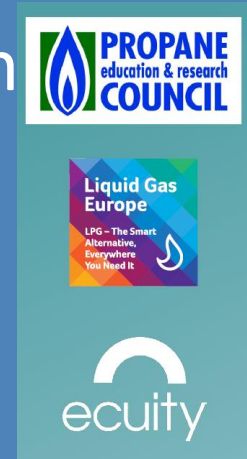


- 60+m refugees worldwide
- Burning traditional fuels (wood)
- Pressure from host governments to stop deforestation
- UNHCR support from WLPGA to switch to LPG
- Initial project in Bangladesh
- Partnership formed in 2018, UNHCR joined WLPGA
- Rwanda project in 2019



Summary

- LPG's role in shaping the energy transition
- '...opportunities for LPG are endless...'
- Timescale should be 2030 & beyond
- Traditional fuel key target for LPG
- Diesel and rural heating oil also
- Quantifies opportunities (\$bn's)



‘...(LPG) Industry innovation and visibility is critical to remain relevant in the broader energy debate as future fuels develop...’

Nick Smith

Director, Energy Programs & Services

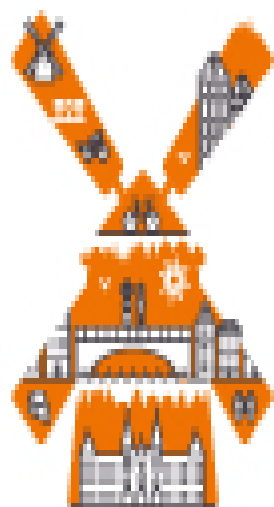
Government of South Australia

June 2018

2019 WLPGA Forum in The Netherlands



Amsterdam 24th – 26th September 2019
32nd World LPG Forum & European Congress



**32nd World
LPG Forum
& European
Congress**

24-26 September 2019

ENERGY IN TRANSITION

AMSTERDAM

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