

Challenges and Opportunities for LPG

NZ Gas Industry Forum – Gas Association of New Zealand

Queenstown – New Zealand

2nd – 4th November 2016

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Agenda

- **Background**
- **Challenges**
- **Opportunities**

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- Opportunities

WLPGA by Numbers



250

Members

125

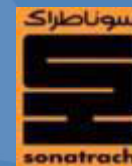
different countries

Representing the entire
LPG value chain

50%

Members in the
distribution and
marketing business

Membership

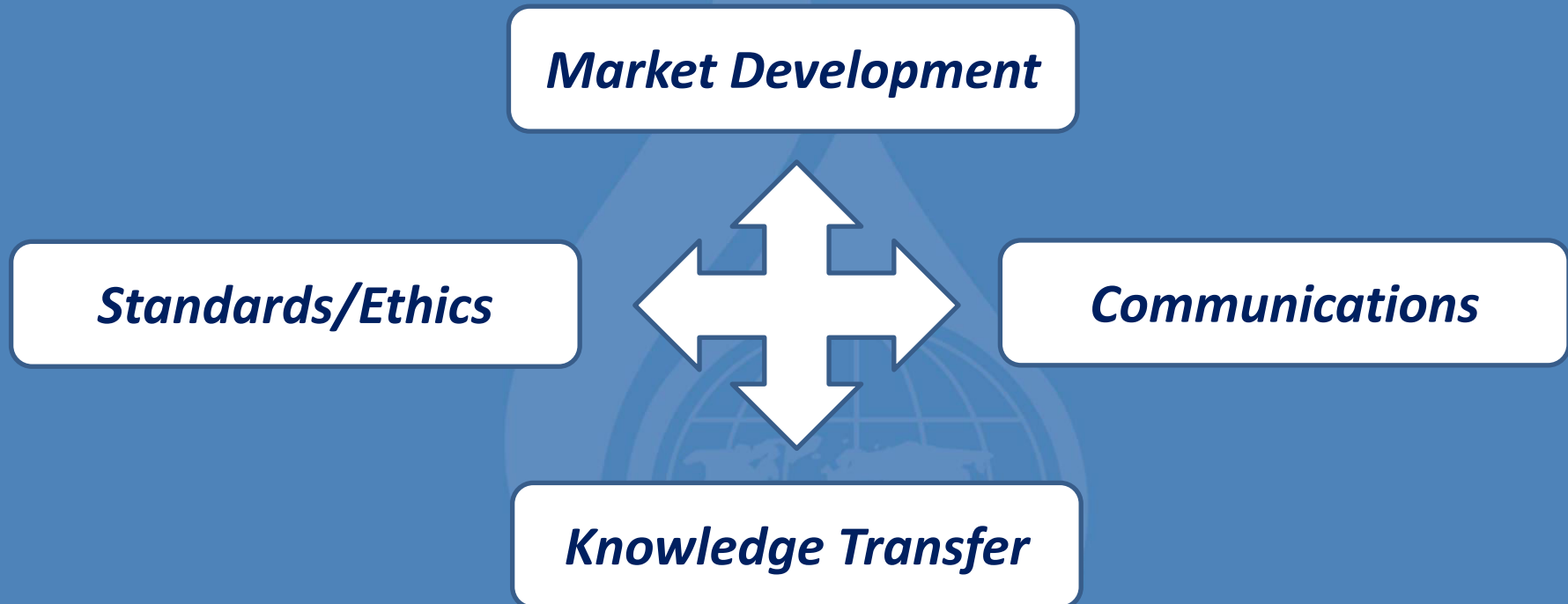


“WLPGA promotes the use of LPG worldwide to foster a cleaner, healthier and more prosperous world”

WLPGA Mission Goals



Four Key Components ...



- LPG is a product of NG production and crude oil refining
- It consists of propane and/or butane
- Around 285mMT was consumed globally in 2015
- Growing at 3%-4% a year
- LPG is a US\$250+bn global business
- Employing hundreds of thousands of people

But it's a by-product ... !!

- Refinery managers focus on gasoline, diesel, kerosene, ...
- LPG is just a few % of refinery output
- Can interfere with NG specification
- Is not fully understood
- Flaring LPG has been (still is) an option



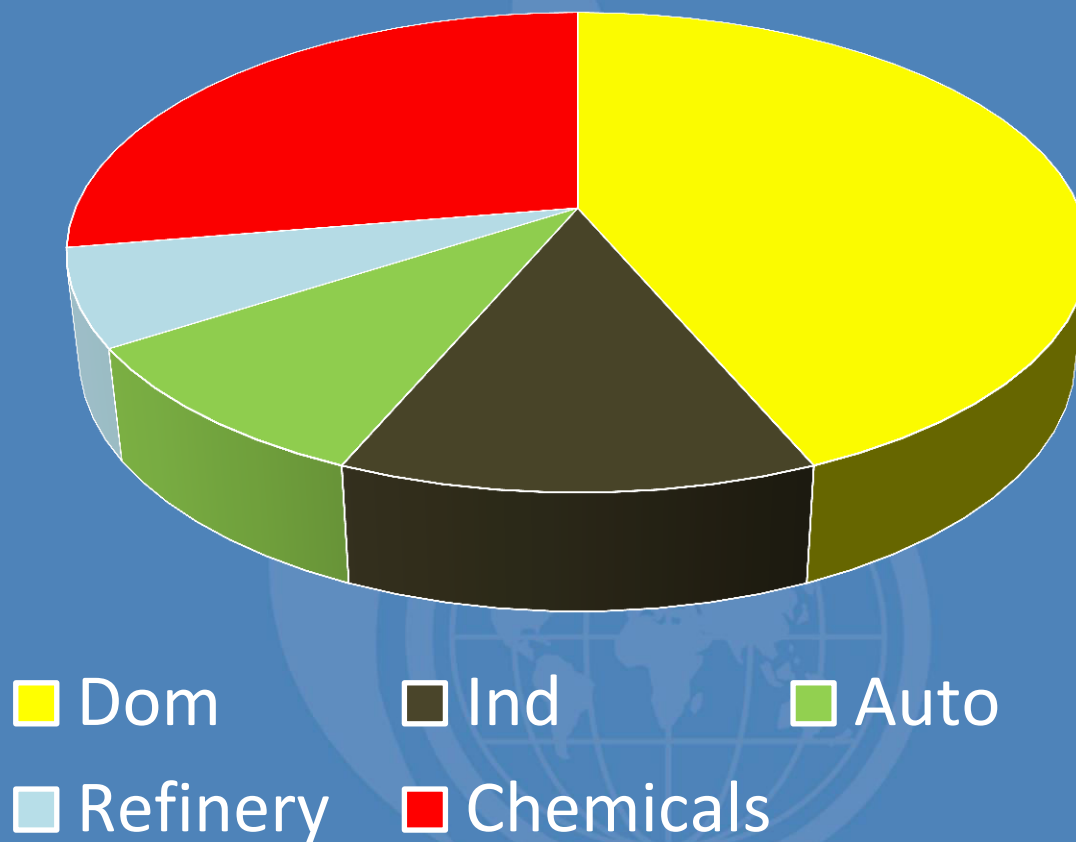
But wait! It's an Exceptional Energy!

- Portable and accessible
- Efficiently stored as a liquid
- High energy value
- Very hot flame
- Clean to store and burn
- Extremely versatile
- Excellent safety record



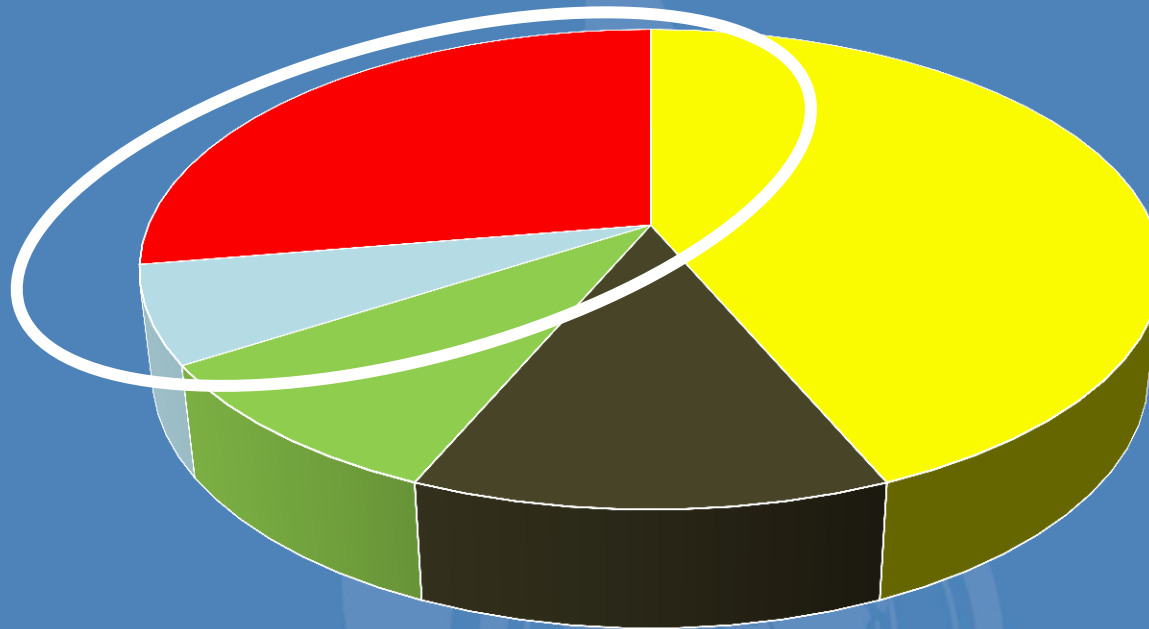
Global LPG demand by Sector

2015 Global LPG Demand - 285mMT



A third gets used in Refinery/Chemicals

2015 Global LPG Demand - 285mMT



Dom

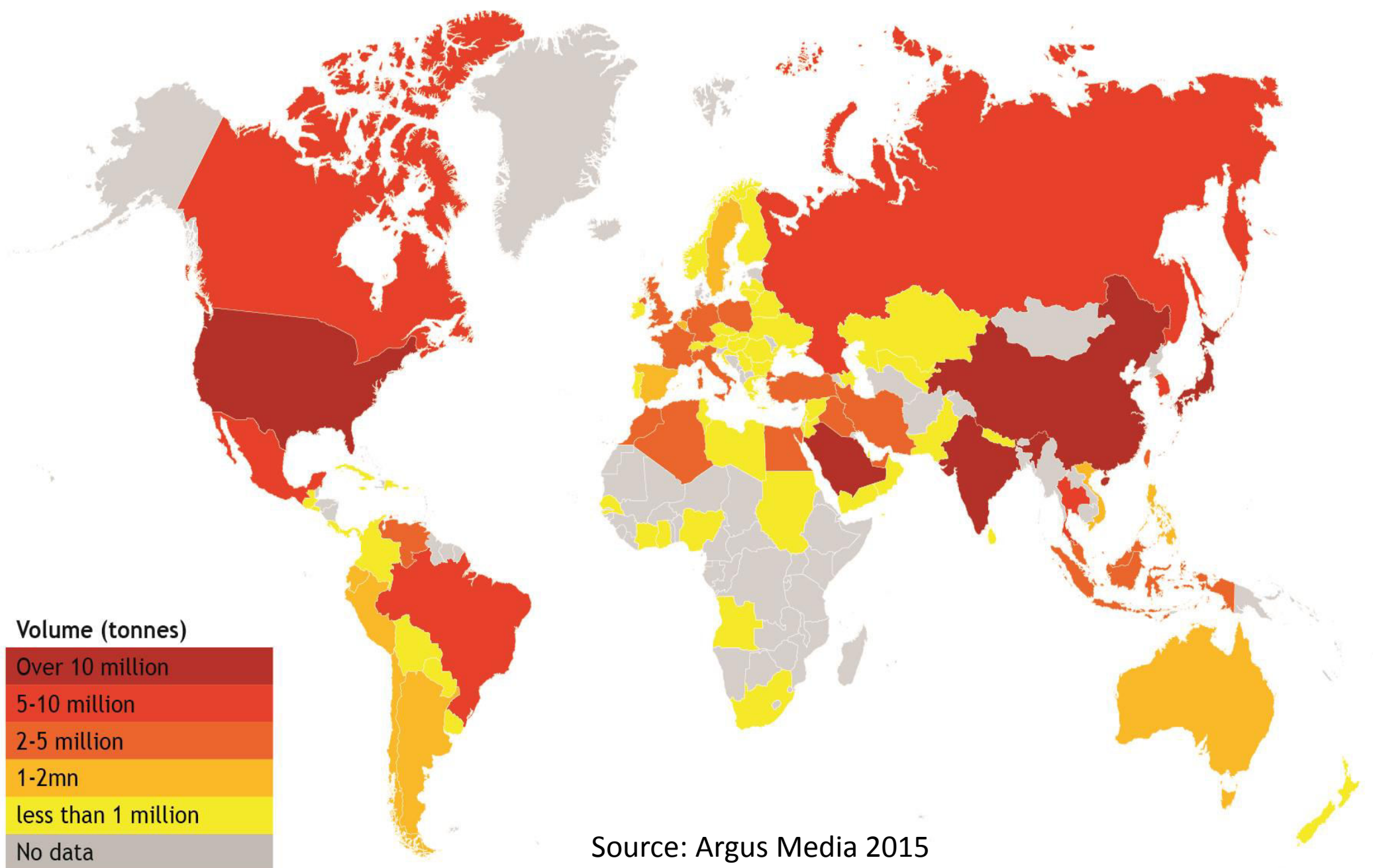
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Auto

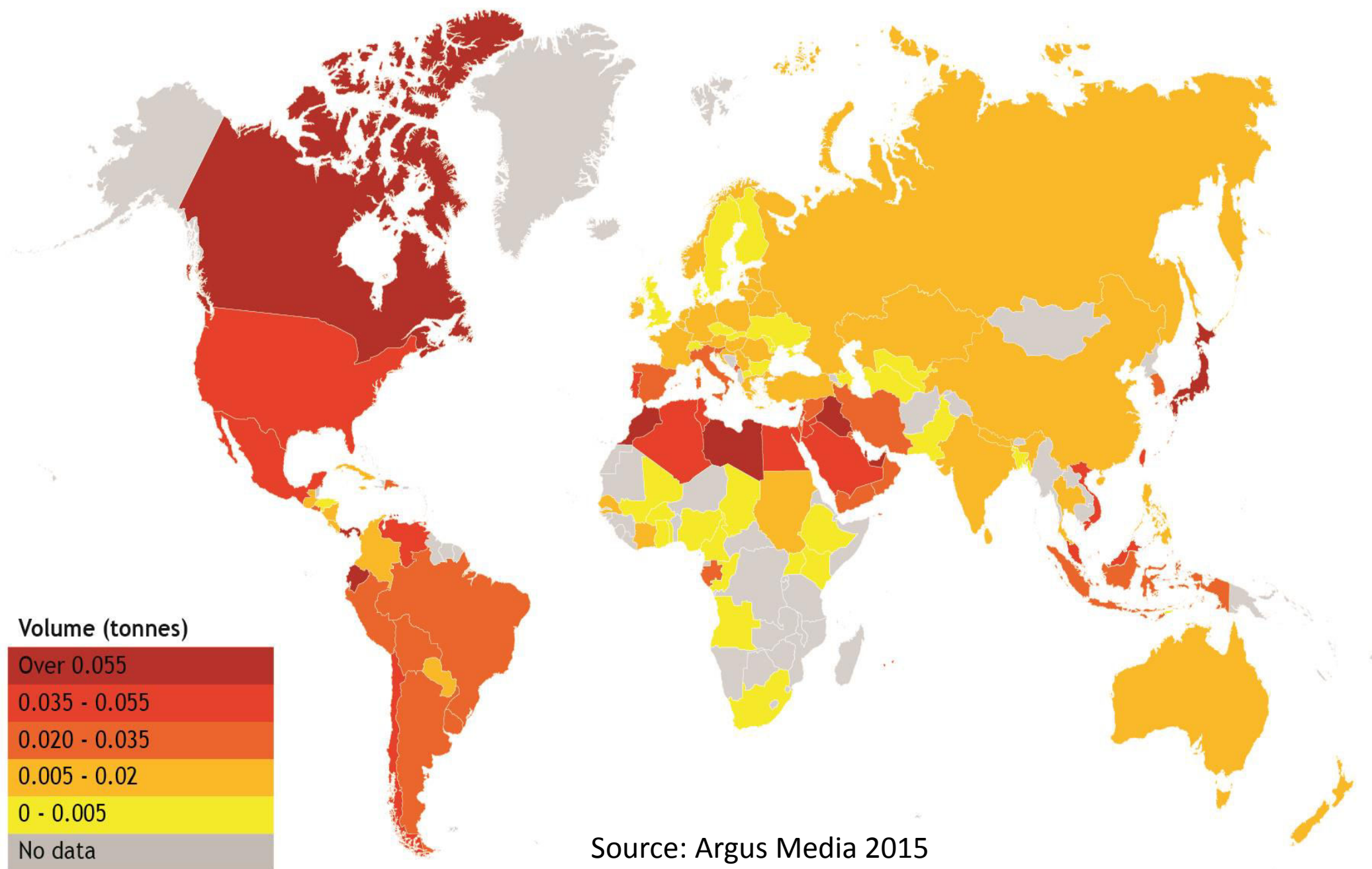
Refinery

Chemicals

World LPG consumption by volume



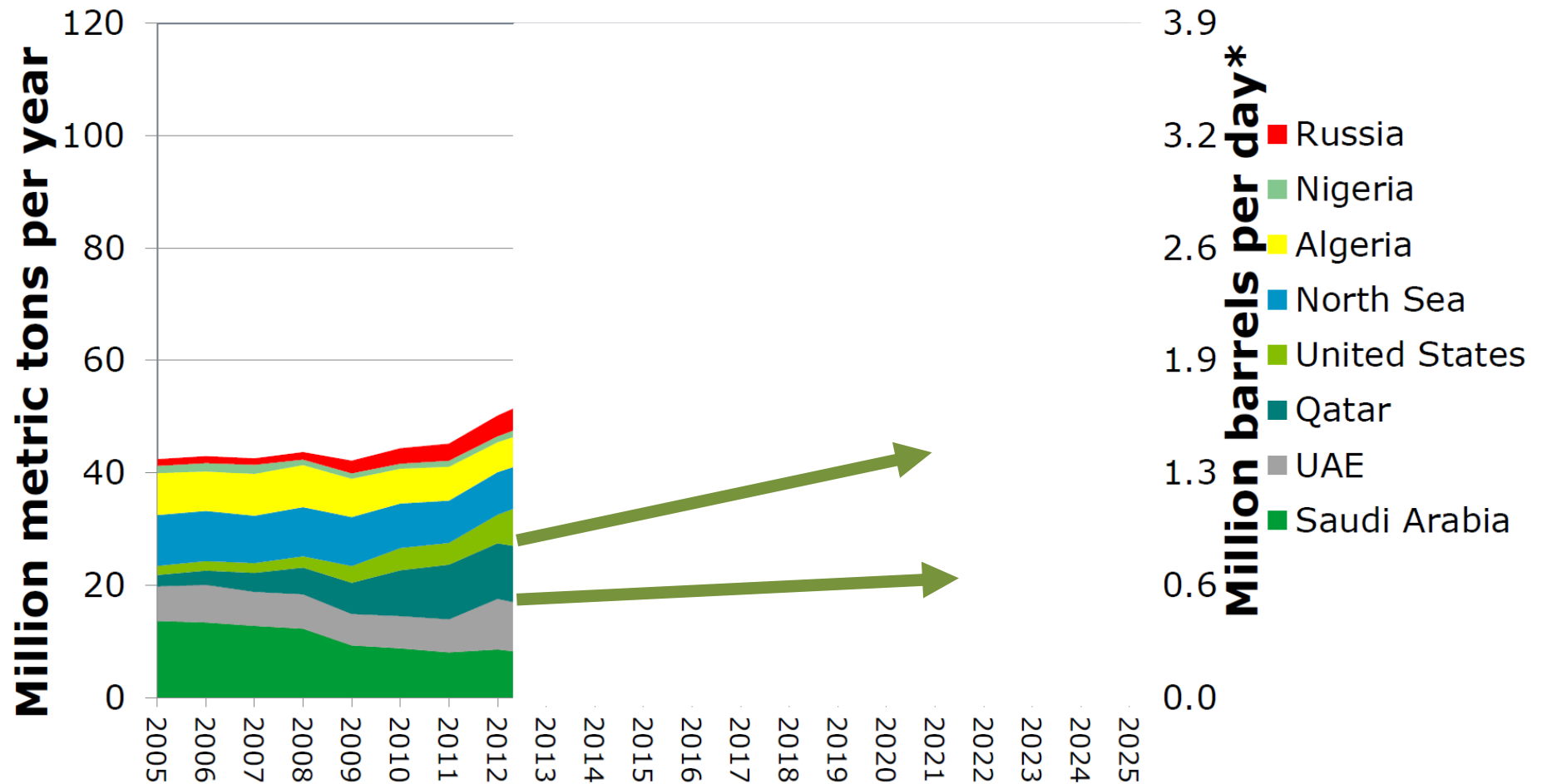
World LPG domestic consumption per capita



Source: Argus Media 2015

Qatar was the next big exporter in 2012

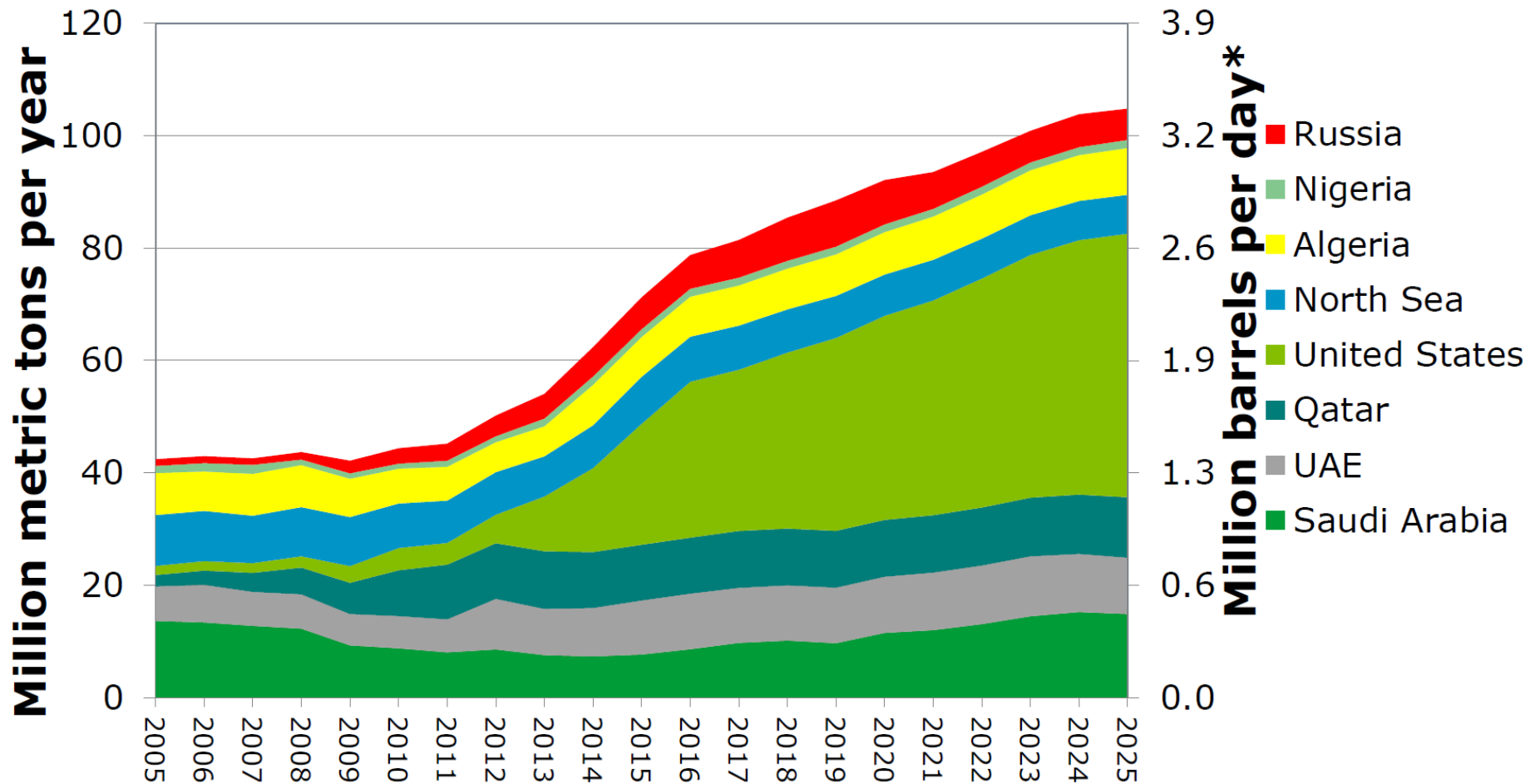
Total LPG exports by selected major exporters



Source: IHS

Then came the shale revolution in the US

Total LPG exports by selected major exporters



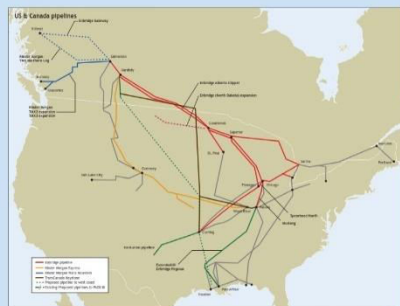
Source: IHS

New trade routes opening up

argus LPG World Map

argusmedia.com

In association with:

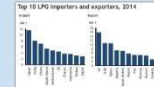
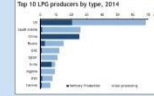
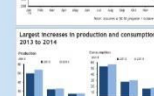
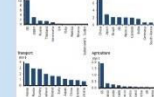
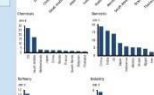
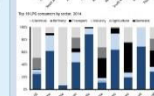
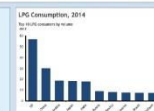


Key LNG Shipping Information

Company	Fleet Size	Capacity (m³)	Operating Regions
QatarEnergy	10	170,000	Asia, Europe
Shell	12	170,000	Asia, Europe, Africa
Teekor	15	170,000	Asia, Europe, Africa
WärmeGas	18	170,000	Asia, Europe, Africa



argus LPG World 20th Anniversary



Agenda

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- **Challenges**
- Opportunities



Challenge 1 – Breaking the myth

- ‘LPG is dangerous’
- How to break the myth?
- Need for complete stakeholder engagement
- Industry already convinced
- Governments, distribution channel, OEM, consumers...
- Educational campaigns needed







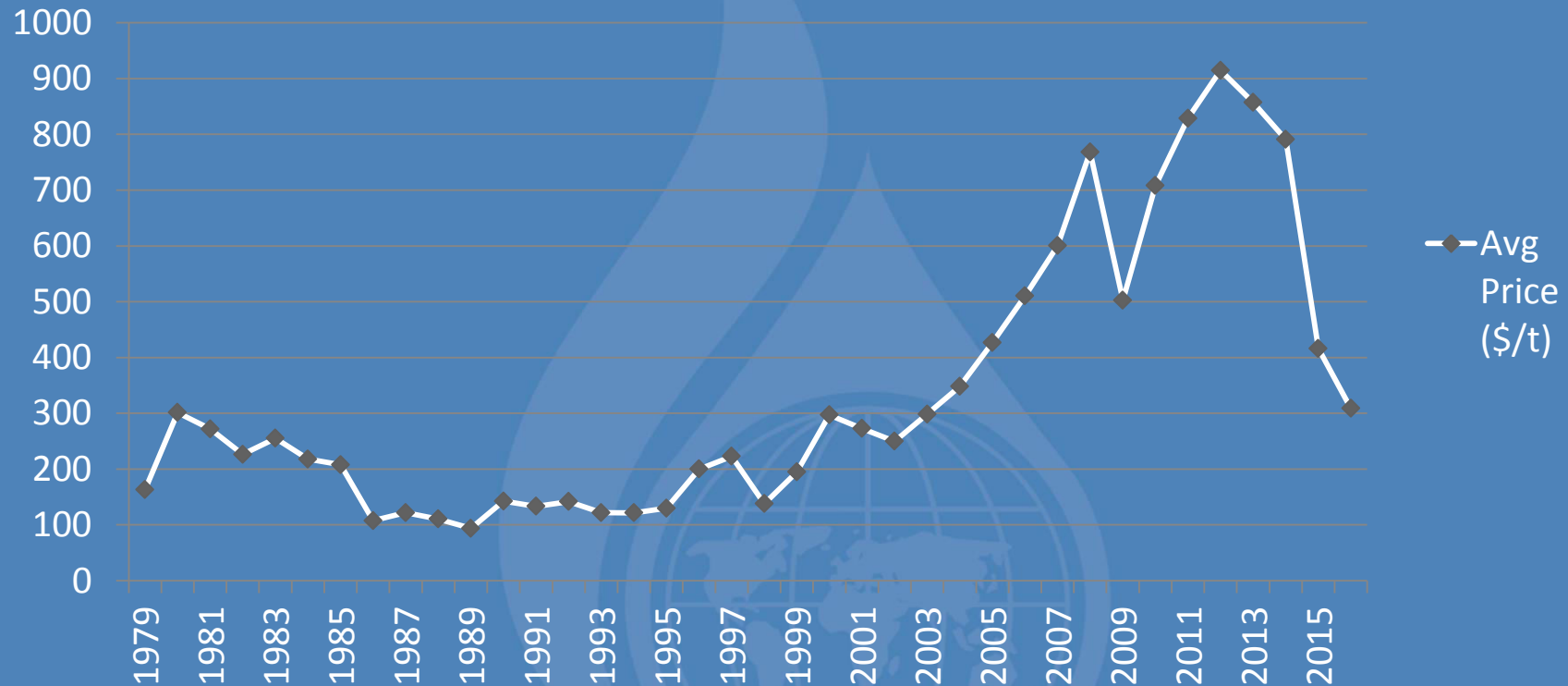


Challenge 2 – Use it or lose it

- ‘Mind the gap’ - supply demand gap not decreasing
- World Bank Global Gas Flaring Reduction Partnership
(<http://www.worldbank.org/en/programs/gasflaringreduction>)
- Shipping rates close to operating cost levels
- Iranian exports entering the markets
- ‘Use it or lose it’

LPG prices are at historic lows

Saudi Arabia LPG Prices: 1979 - July 2016 (\$/t)



Challenge 3 – Managing the growth

- Industry growing at 3%-4%/year
- 10mMT of new to industry business globally
- Tens of thousands of new consumers
- ...and new staff, channel operatives
- But large players are divesting
- Knowledge transfer critical






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Opportunity 1 – Wood displacement



- 3bn people burning traditional fuels (wood, charcoal etc)
- Cause of deforestation
- Social challenge for woman
- Coal & charcoal dirty to handle
- Difficult to burn when wet
- Creates smoke & inefficient to burn
- Health problems (4m die/year)  World Health Organization
- WLPGA report with UNHCR/GACC – displaced people
- Cooking for Life (<http://www.cooking-for-life.org/>)



Opportunity 2 – Diesel displacement



- WHO confirms diesel emissions cause cancer (2012)
- VW emissions scandal (test bed v real world)
- Major cities banning diesel vehicles (Paris, London)
- OEM's stopping diesel passenger car production?
- London black cabs...Manila Jeepneys
- Ship emissions under scrutiny (EU, IMO)
- EU/USA now monitoring emissions from large ships
- Is diesel (HFO) dead?



ENGINEERING WORKS



ENGINEERING WORKS

Chicago, IL, USA

January 10, 2010

CHICAGO

CHICAGO

WELCOME
TO CHICAGO
TRAIN STATION
East Mid
Train



Sulphur Emission Control Areas



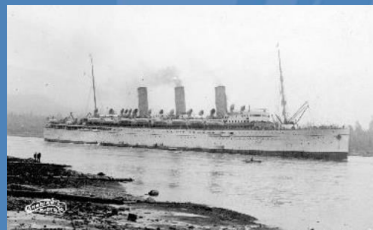
The Sulphur Emission Control Areas (SECA's) or Emission Control Areas (ECA's) are sea areas in which stricter controls were established to minimize airborne emissions (SO_x, NO_x, ODS, VOC) from ships as defined by Annex VI of the 1997 MARPOL Protocol which came into effect in May 2005.

A view from the industry on bunker fuel



‘...we also anticipate gas demand in the marine sector to increase significantly, stimulated by new emission standards. By 2040, gas is likely to account for about 10% of total marine fuels, up from 1% now, with about two thirds of the growth in developing countries...’

ExxonMobil Outlook for Energy – A view to 2040



IMO sets 2020 date for low sulphur fuel



‘...The decision to implement a global sulphur cap of 0.50% m/m (mass/mass) in 2020 (from 3.5% m/m currently) was taken by the International Maritime Organization (IMO), the regulatory authority for international shipping, during its Marine Environment Protection Committee (MEPC), meeting for its 70th session in London...’

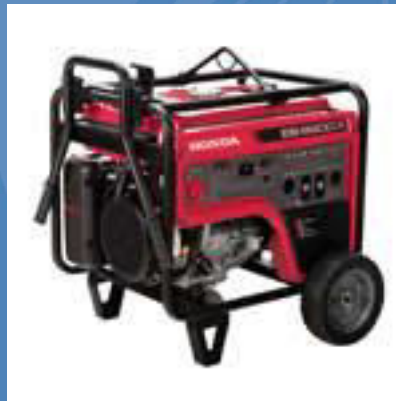
IMO 28/10/16

<http://www.imo.org/en/MediaCentre/PressBriefings/Pages/MEPC-70-2020sulphur.aspx>



Opportunity 3 – Power generation

- LPG for power generation is not new



But this is...

US Virgin Island LPG Power Gen project

- First large LPG power gen project
- LPG displaced fuel oil
- Seven GE turbines converted to LPG (>100MW)
- Vitol secured contract to supply LPG
- LPG import facilities and storage tanks installed
- Plant commissioned this year
- Economic and environmental benefits



And so is this...

Bridge Power project in Tema, Ghana (with GE)

- 194MW (stage I) + 206MW (stage II)
- GE gas turbines to run on LPG (then NG)
- LPG infrastructure by Vitol
- 45,000MT/year (80% propane)
- Current LPG demand 280,000MT/yr
- Commissioning planned for 2017
- Pilot programmes in Nigeria with 4MW units
- LPG assets will not be stranded after NG takes over



What these large projects do ...

- Creates an LPG infrastructure (jetty, terminal, storage etc)
- In countries where LPG consumption is low...
- ...and traditional fuel use dominates
- Allows a traditional LPG cylinder business to develop later
- Targeting the displacement of wood, charcoal etc.
- SNG opportunities to establish NG customer base



Opportunities - summary

Challenges

- Breaking the myth
- Use it or lose it
- Managing the growth

Opportunities

- Wood displacement
- Diesel displacement
- Power generation

2016 WLPGA World Forum in Italy



Florence 15th – 17th November 2016
29th World LPG Forum & 2016 AEGPL Congress



**29th WORLD
LPG FORUM
& 2016 AEGPL
CONGRESS**
15th-17th NOVEMBER 2016
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