

# INEOS: Importing shale gas ethane for European Manufacturing



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# AGENDA

- Who are INEOS?
- INEOS Ethylene crackers and feedstocks
- The INEOS ethane project
- Other Developments
- Impact on LPG

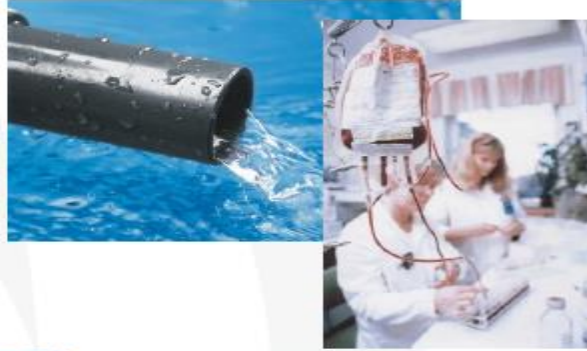
# INEOS – Who are we ?

- A leading private global chemical company
  - Sales \$60bn
  - 17,000+ employees
  - 65 manufacturing sites in 16 countries including 6 in the UK
- 60 million tonnes of chemicals capacity
- 20 million tonnes of refinery products (400,000 bbls/day)

Our name isn't on the product label but we make the vital chemicals that go into the manufacture of everyday items

# We keep people.....

Healthy



Housed



Mobile



Clothed



And...in Touch



# INEOS joins the North Sea Top 10 Companies (excl States)

Before: North Sea Top 30

kb/d	Company	kb/d	Company
1,258	Statoil	80	LETTER ONE
1,059	Norway State DFI	73	Apache
611	Shell	70	newfield
518	ExxonMobil	70	BP
398	TOTAL	67	SUNCOR
346	Energie Beheer Nederland	65	Lundin Petroleum
203	ConocoPhillips	65	OMV
185	Eni	59	OMV
156	centrica	59	PERENCO
147	BP	52	DET NORSKE
142	MAERSK	50	Hess
91	Wintershall	40	EQ
89	DONG ENERGY	39	Endust
87	Chevron	31	Canadian Natural
85	ENGIE	28	PremierOil
		23	中石油
		21	INEOS

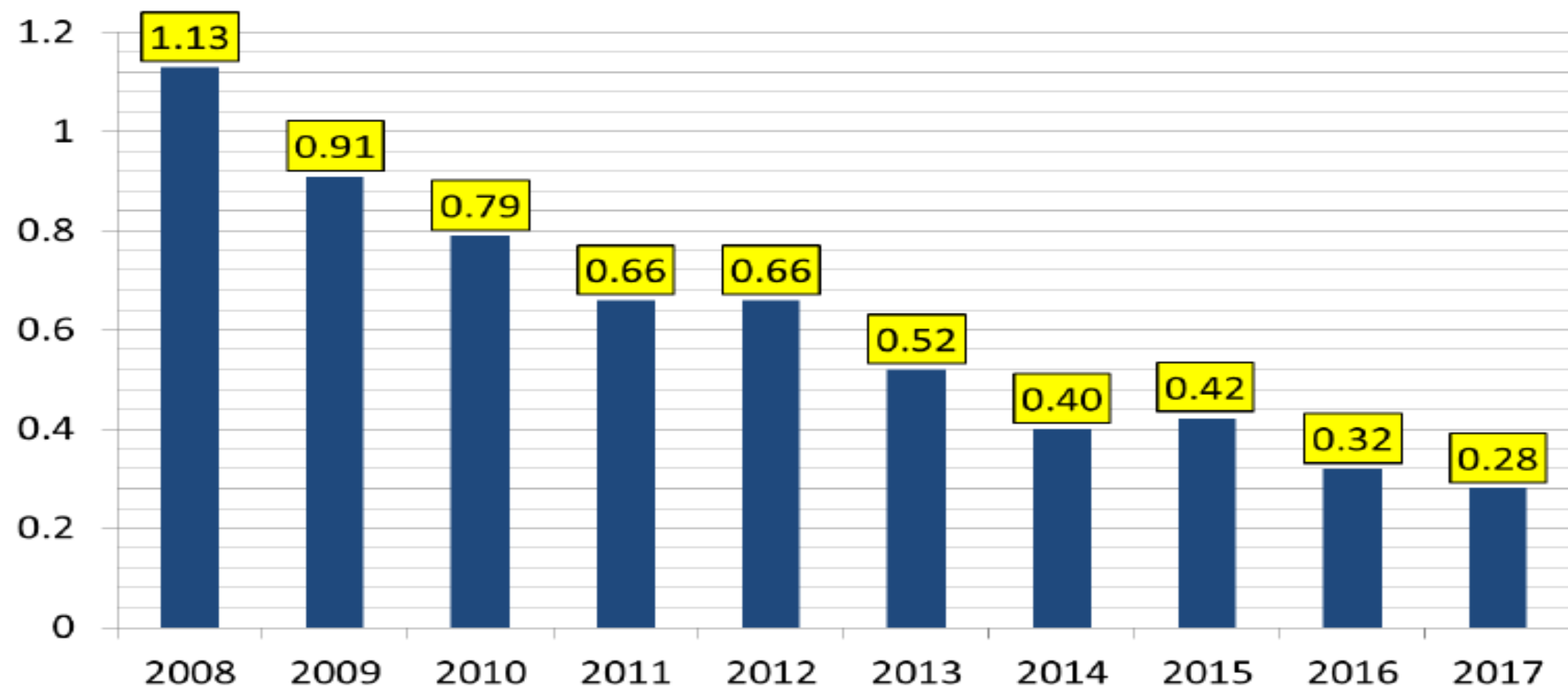


After: North Sea Top 10

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142	MAERSK
110	INEOS
91	Wintershall
87	DONG ENERGY
85	ENGIE



# Group Safety Performance – OSHA



OSHA RECORDABLE RATE PER 200,000 HRS

# Gas is more than Methane

- US shale gas is **wet**
  - 90% methane ‘Gas’
    - 5 % ethane.
    - 3% propane.
    - 2% butane.
    - 1% other liquids.

OPPORTUNITY and / or THREAT for Gas producers

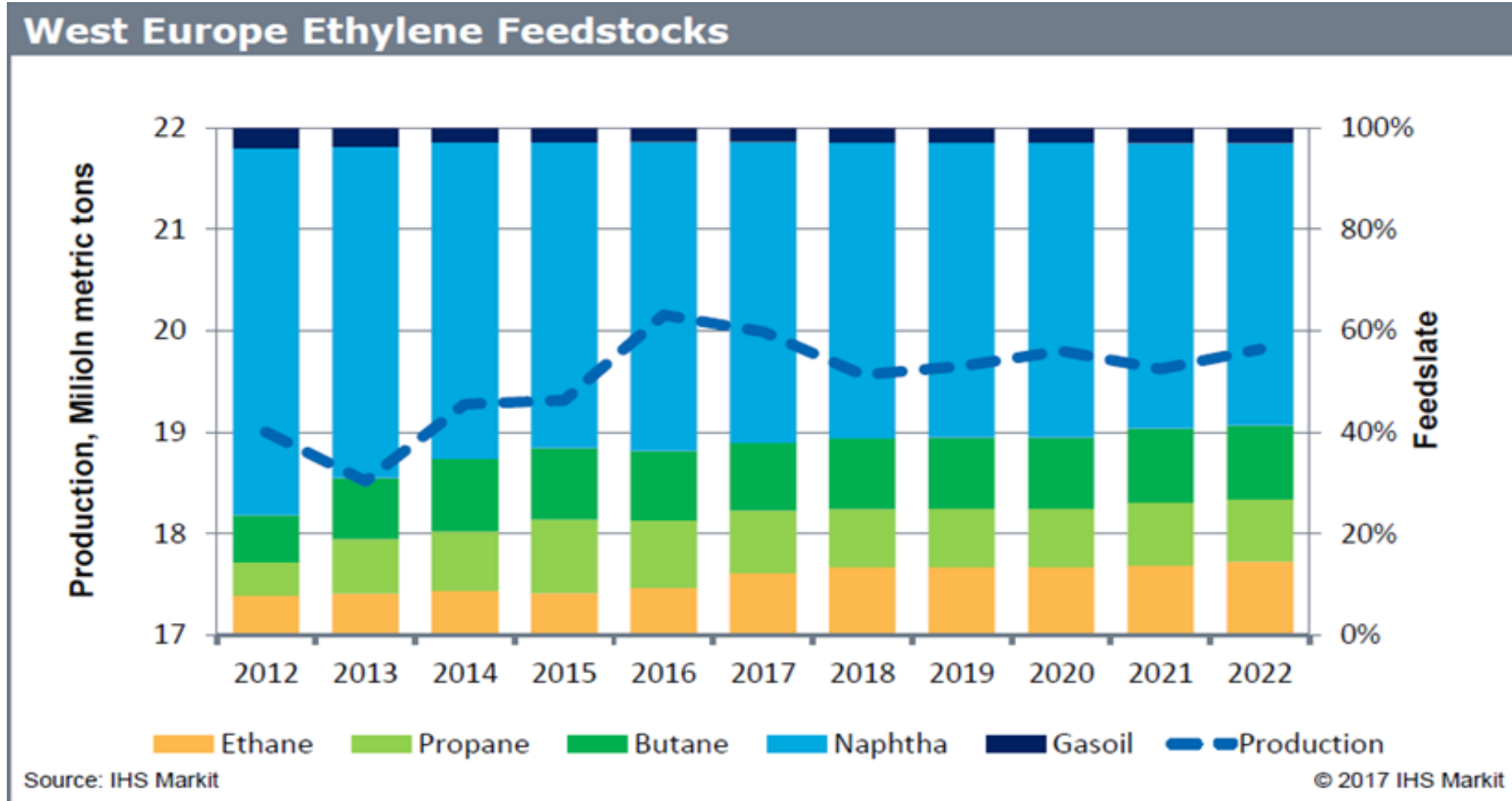
# INEOS CRACKERS and FEEDSTOCKS

WHERE		Feedstock	Ethylene
Koln	Germany	Naphtha / Butane	1mte +
Grangemouth	Scotland (UK)	Gas	700 kte
Rafnes	Norway	Gas	750 kte
Lavera	France (Med)	Naphtha	500 kte
Chocolate Bayou	Texas	Gas	1mte +

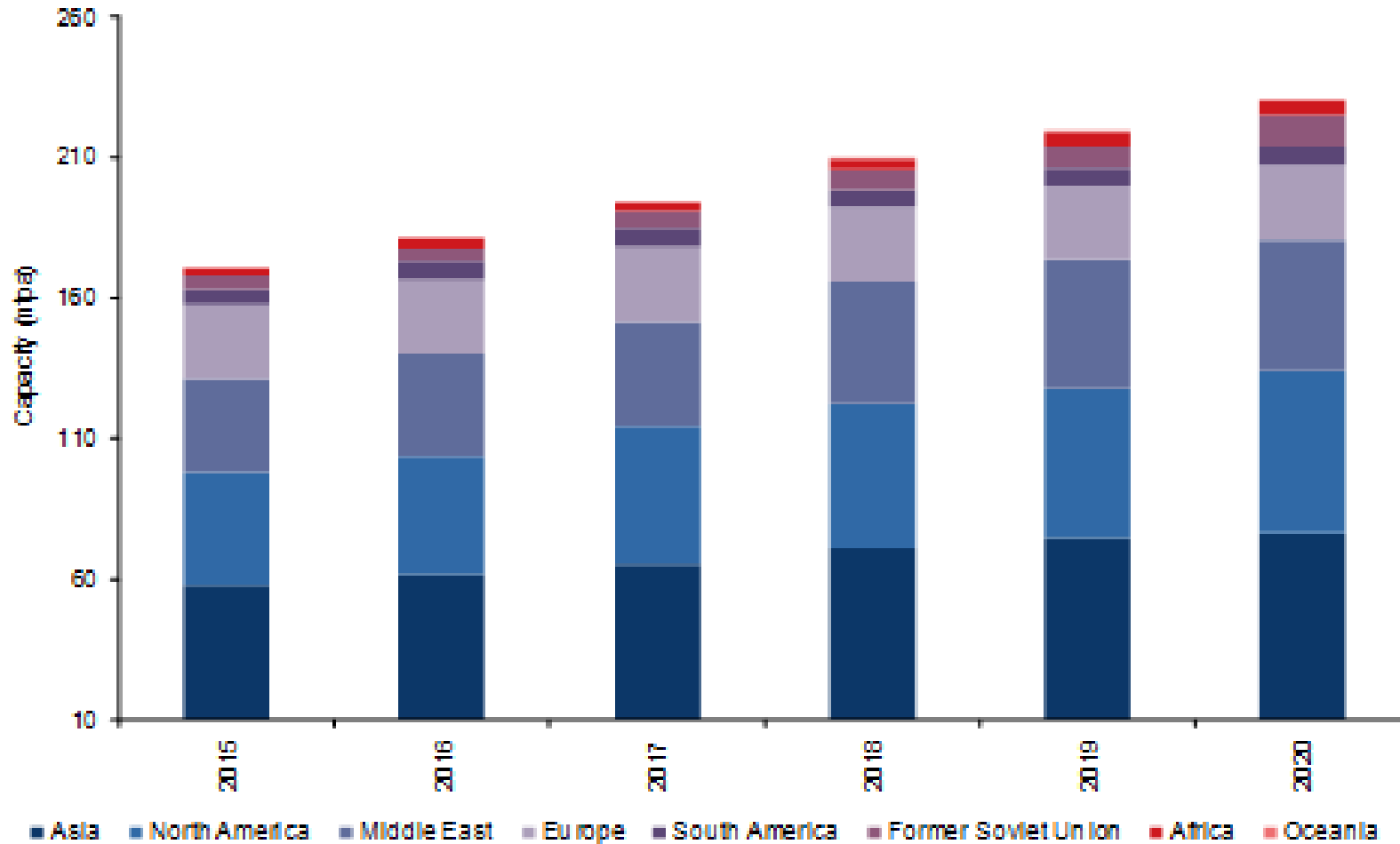
In Europe Ineos produces 3mte **ethylene** but consumes 4mte + net buyer **propylene**

Europe purchases: naphtha ~4.5 mte, gas ~2mte

# Ethylene production 'lightening' to gases

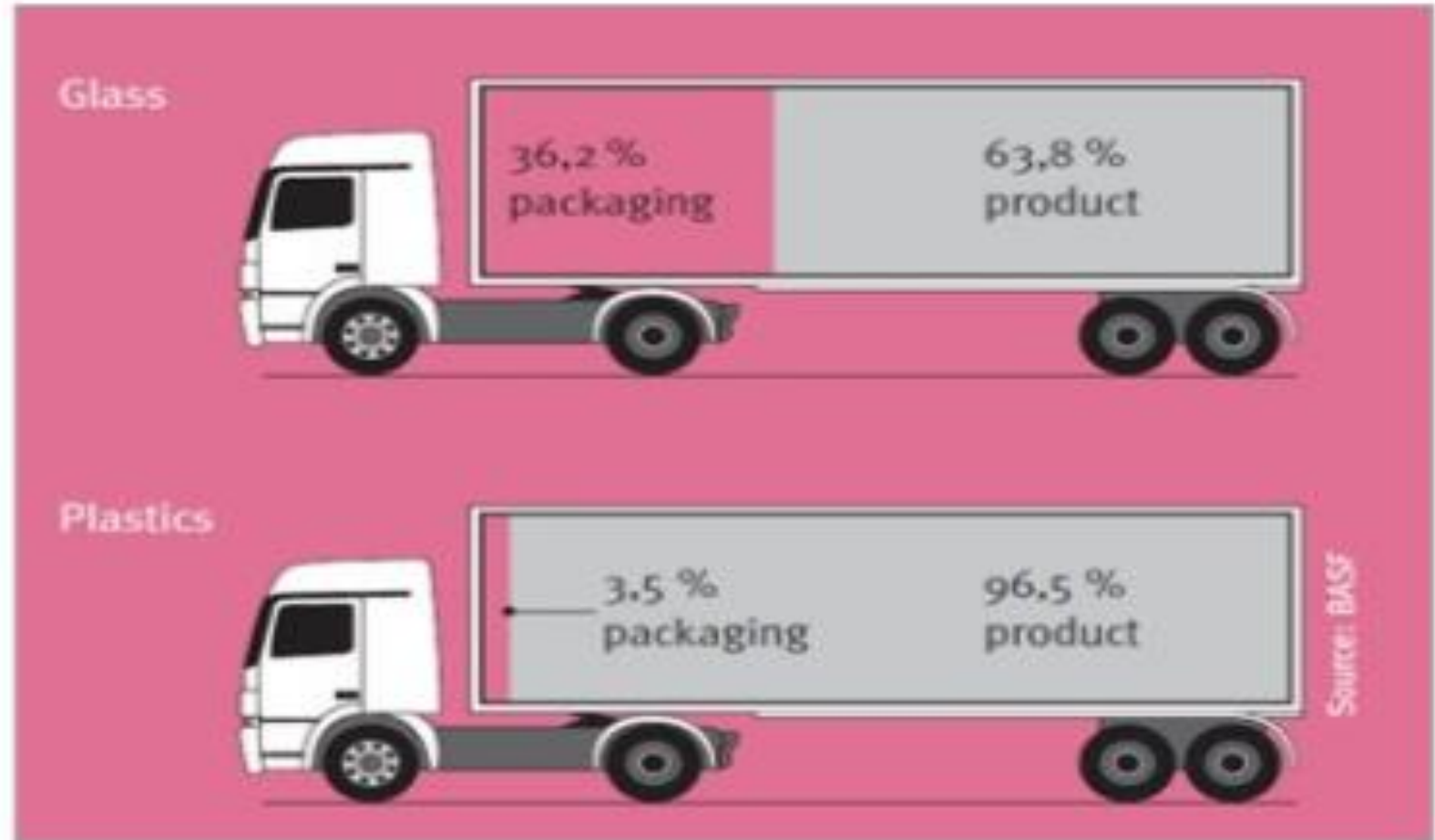


## Total Ethylene Capacity by Region (mtpa)



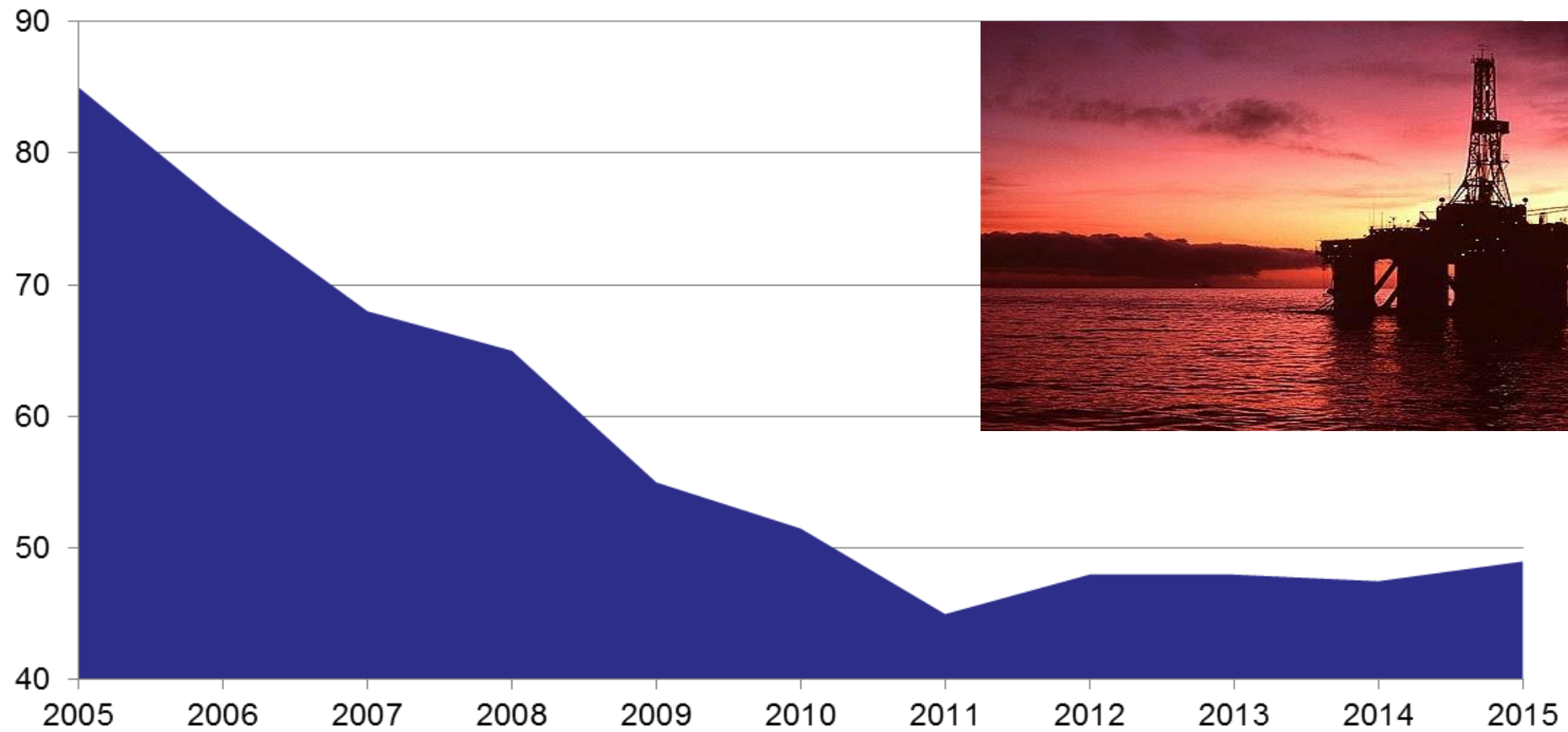
Source: GlobalData, Oil & Gas Deals Analytics [Accessed on December 15, 2016]

# PLASTICS – have many hugely beneficial uses



# INEOS SHALE ETHANE IMPORT PROJECT

## North Sea Gas Decline (billion cm/y)



■ Gas (cm/y)

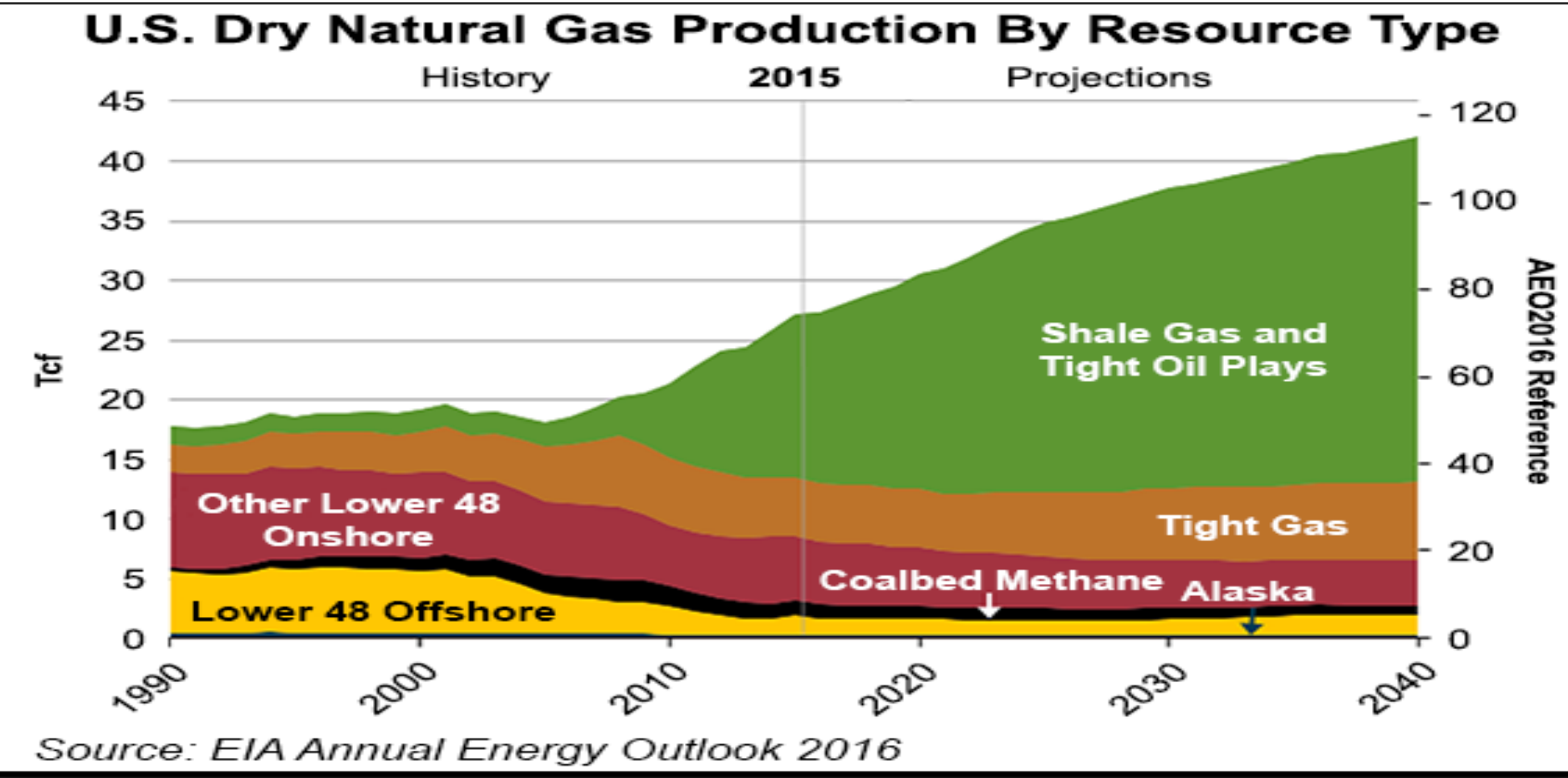
Source: Wood Mackenzie

# ISSUES

- Ethane supply to 2 gas crackers running out
  - Offers increasingly expensive.
- ‘Simple’ choice facing us.....
  - Source competitive **ethane** or **CLOSE**.
  - Where is the most competitive ethane ?
  - How do we get it to our sites.
  - How can we make this work ?

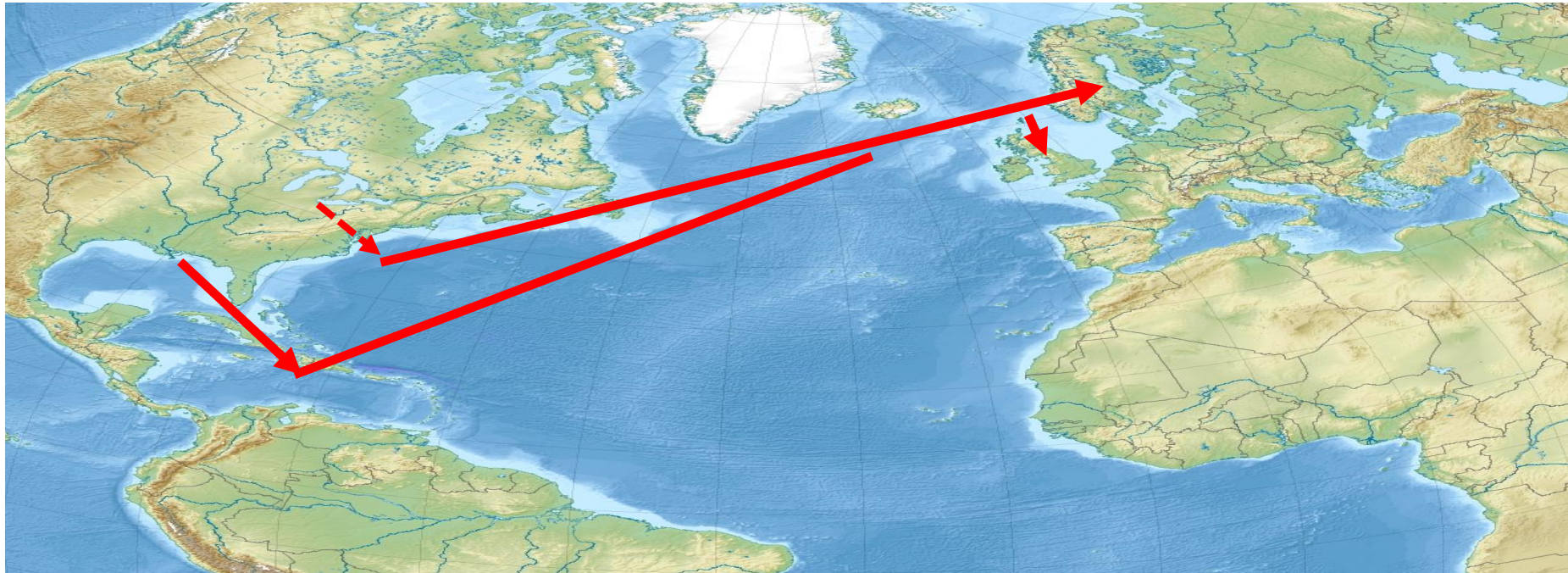
“People said it couldn’t be done. At INEOS we believe everything is possible.” Jim Ratcliffe.

# Where is the most stranded ethane in world ?



# Just have to get it to Europe !

- Pipe to Marcus Hook ( Pennsylvania) and Morgans Point Texas
- Ship from USA to Scotland / Norway



# THE 'INEOS' ETHANE PROJECT

– many partners **\$2bn** investment

- Northern US shale gas is separated to 'produce' ethane (and other NGLs).
- Pipe ethane to coast.
- Build ethane export tanks and terminals in USA.
- Build 8 ethane ships (Dragon Class).
- Build worlds largest ethane tanks in UK.
- De mothball / expand ethylene crackers in Europe.

# DRAGON CLASS SHIPs

- In 2010 largest ethane ship was about 6kte
- How to make shipping competitive ?
  - Largest ship possible that can fit into sites
  - Most efficient design
  - Multi fuel flexibility
    - Won Lloyds List Innovation award 2017



Dragons : 14.5 kte+ ethane capacity

8 in fleet today : JS INEOS Insight / Inspiration / Ingenuity / Intrepid



# A Producing Shale gas site





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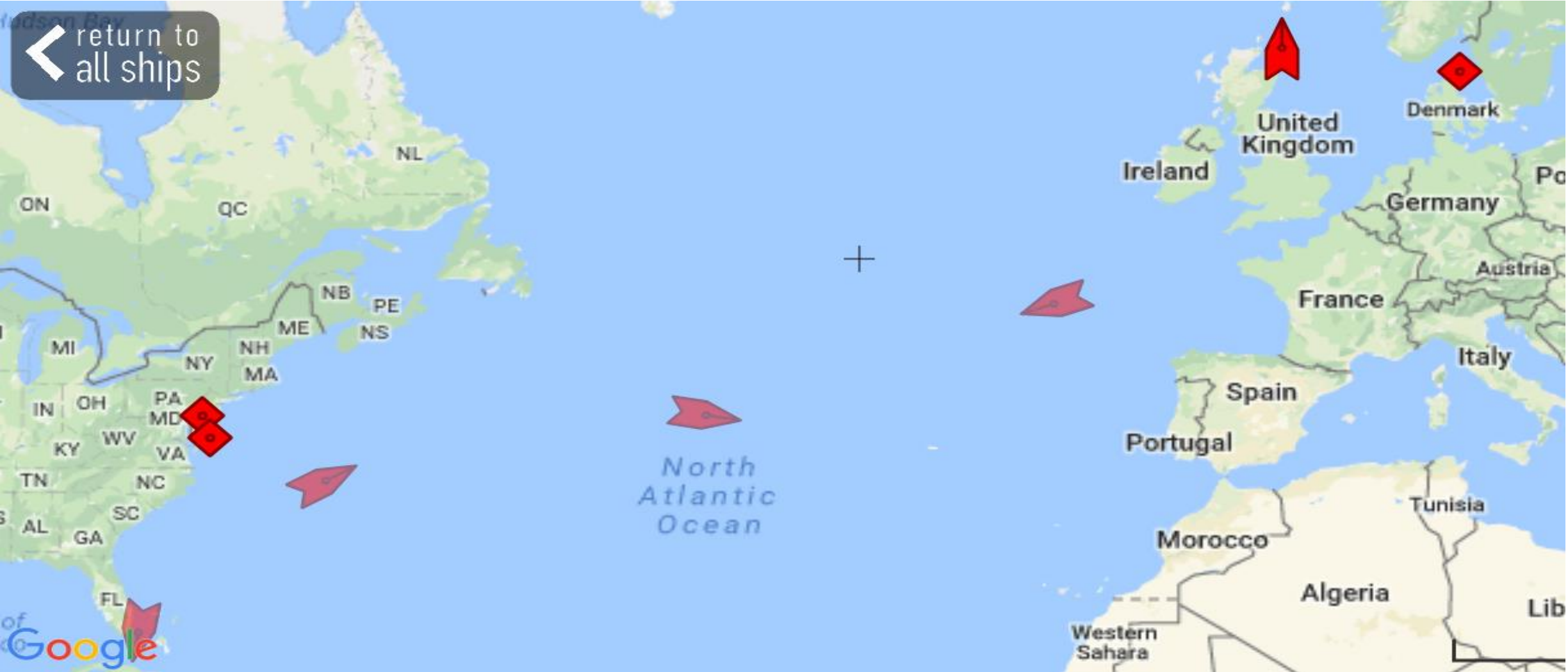
FRACTIONATE GAS to separate LPGs and 'Methane'

# Marcus Hook (East Coast USA)

- Loading ethane onto ships



# The virtual ethane pipeline



# Designed to just fit in the Grangemouth Lock



# Grangemouth 700 ktpa ethylene capacity



# Rafnes (Norway)

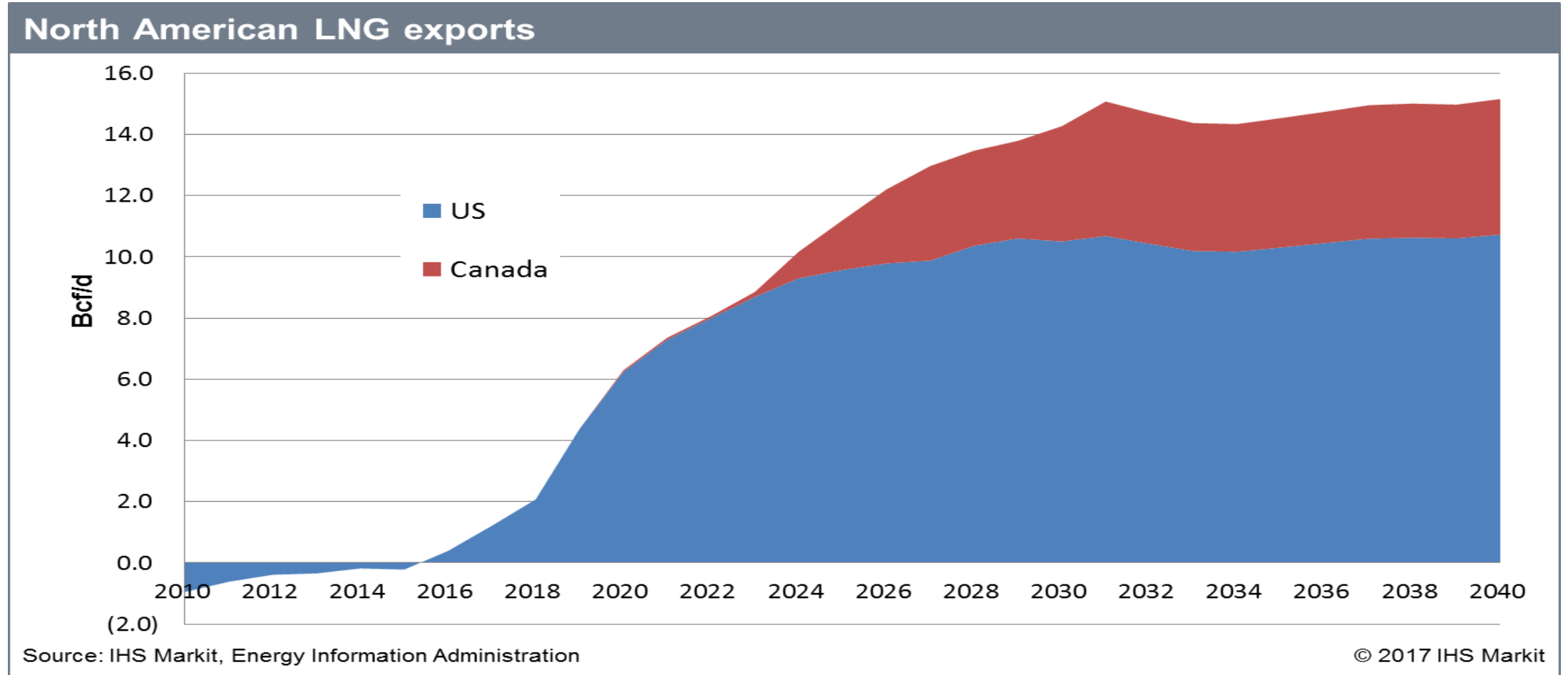
- 750 kt pa ethylene.



# US DEVELOPMENTS

Much more gas and NGLs are coming

# US capability to export LNG is huge



# Mariner East /ME2X are coming to export NGLs



# Recent INEOS Announcements

- INEOS confirmed it has signed a contract with Oiltanking Antwerp Gas Terminal (OTAGT) to construct the **largest butane storage** tank ever built in Europe.
  - INEOS to build 4 of the **largest gas barges** in Europe to move butane to supply Koln Cracker.
- INEOS to invest in a new world scale **750,000 tonne PDH** plant in ARA.
- INEOS is planning to increase the capacity of its crackers at Grangemouth in Scotland and Rafnes in Norway to over **1 million tonnes each**.
- INEOS Oxide announces that it is planning to build a **300 kt (VAM)** plant.



**INEOS**  
Trading & Shipping

**Shale gas is securing Manufacturing jobs in Europe**