

# GRAIN LNG





# National Grid overview

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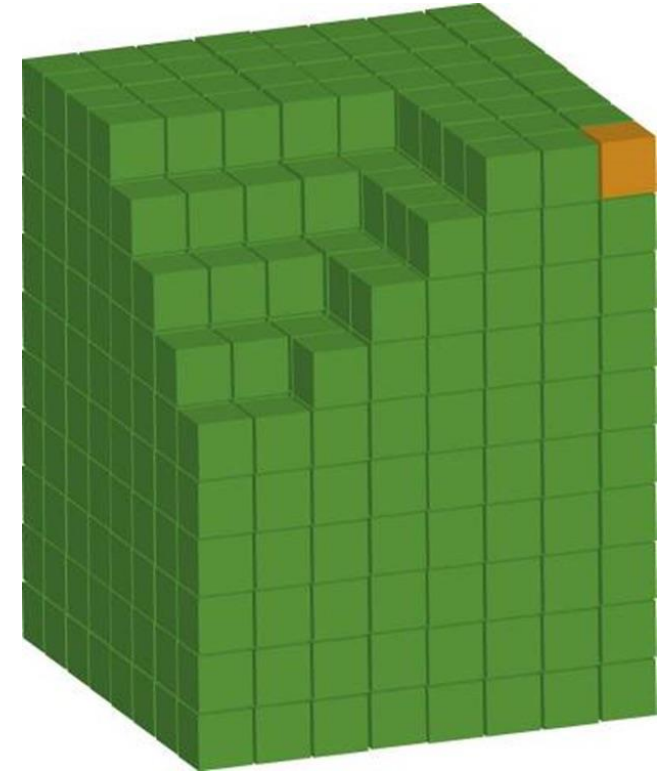
- National Grid is an international electricity and gas company and one of the largest investor-owned energy companies in the world
- We play a vital role in delivering gas and electricity to many millions of people across Great Britain and north eastern US in an efficient, reliable and safe manner
- We own and manage the grids to which many different energy sources are connected
- Connecting you to your energy today, trusted to help you meet your energy needs tomorrow



# What is LNG?

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- LNG is Liquefied Natural Gas
- Identical to the gas at home
- Stored as a liquid at  $-161^{\circ}\text{C}$  in heavily insulated tanks
- Stored at low pressures, (0.1 barg)
- When natural gas is a liquid it reduces its volume by 600 times
- It enables large volumes of gas to be transported long distances safely and efficiently



# Grain LNG overview

- Largest terminal in Europe and 8th largest in the World
- Can supply 20% of UK gas demand
- Two purpose built jetties can take world's largest LNG carriers
- Independent terminal operator, giving equitable customer service
- Key geographical location – close to London and at the gateway to/from continental Europe
- Over 30 years experience in the LNG industry – 10 years of importation
- Regular community support through volunteering, education and fund-raising programme



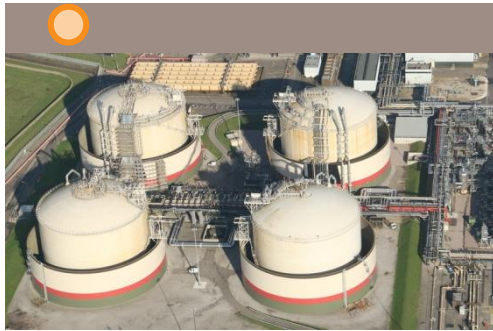


# Our history

From small peak shave facility to world's 8th largest regasification terminal

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2005



## Phase 1 completed

- Originally a peak shave facility built in 1981
- Converted into an import facility in 2005 with a purpose built jetty and 13 mcm/day regas capacity - capable of supplying 4% of UK gas demand
- Customers - BP/Sonatrach
- £150million low conversion cost

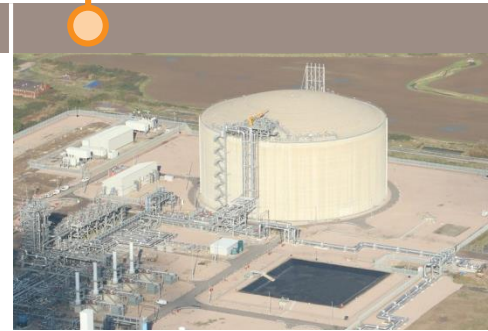
2008



## Phase 2 completed

- Added three new tanks, each 190,000m<sup>3</sup>
- Tripled capacity - capable of supplying 12% of UK demand
- Customers - Centrica, Engie and Sonatrach
- £390million investment

2010



## Phase 3 completed

- Increased total storage to 1,000,000m<sup>3</sup> and total capacity to 15 mtpa of LNG (~20 bcm/yr of gas)
- Capable of supplying ~ 20% of UK demand
- Built a 2nd jetty - Qmax compatible
- Customers - Uniper, Iberdrola & Centrica
- £310 million investment

2015



## Truck loading facility launches

- Successfully commissioned in November 2015
- Two bays operating 24/7, capable of loading 36 slots per day
- Planning permission for additional two bays
- Nine road tanker operators signed up to date

# Ideal location and largest LNG Terminal in Europe



		Terminal	Number of tanks	Tank capacity m <sup>3</sup>		Terminal	Number of tanks	Tank capacity m <sup>3</sup>	
1	South Korea	Pyeong-Taek	21	2,960,000	6	Japan	Negishi	14	1,180,000
2	South Korea	Incheon	20	2,880,000	7	Japan	Futtsu	10	1,110,000
3	Japan	Sodegaura	35	2,660,000	8	<b>UK</b>	<b>Isle of Grain</b>	<b>8</b>	<b>1,000,000</b>
4	South Korea	Tong-Yeong	16	2,480,000	9	Spain	Barcelona	8	840,000
5	Japan	Senboku II	18	1,585,000	10	USA	Sabine Pass	5	800,000

# Commercial: Business Model and Market

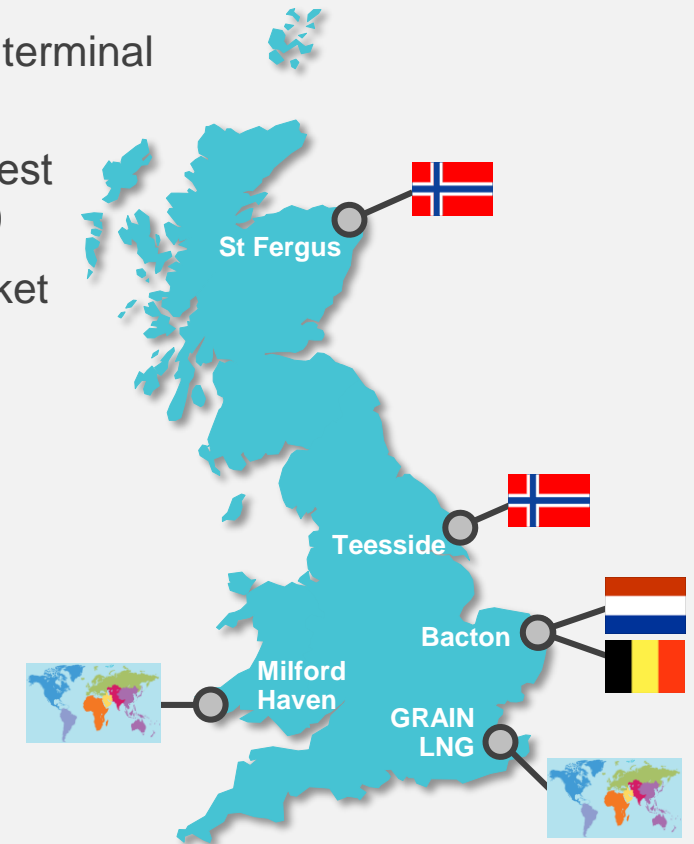
- ~ £1bn Shareholder investment
- Long term take or pay contracts
- Construction & operational risk
- Independent terminal operator
- Sole equity holder
- Multi-user terminal with capacity sold via Open Season
- All capacity exempt from regulated 3rd party access
- Anti-hoarding mechanisms in place
- Highly flexible service for customers
  - Use of storage
  - Ship movements
  - Send out

## Grain LNG Customers



## UK Market

- Grain largest import terminal outside of Far East
- UK: World's 3rd largest LNG importer (2011)
- ~100bcm/y gas market
- ~ 55% imported
- Access to world gas supplies



# Market evolution

How things have changed...



Source: Wood Mackenzie



# Market outlook

## Where we are heading...

**25% increase**

in energy demand by 2040  
(ExxonMobil)

**45% increase**

in gas demand by 2030 (Shell)

**25%**

of global LNG production  
uncontracted (Woodmackenzie)

**30% increase**

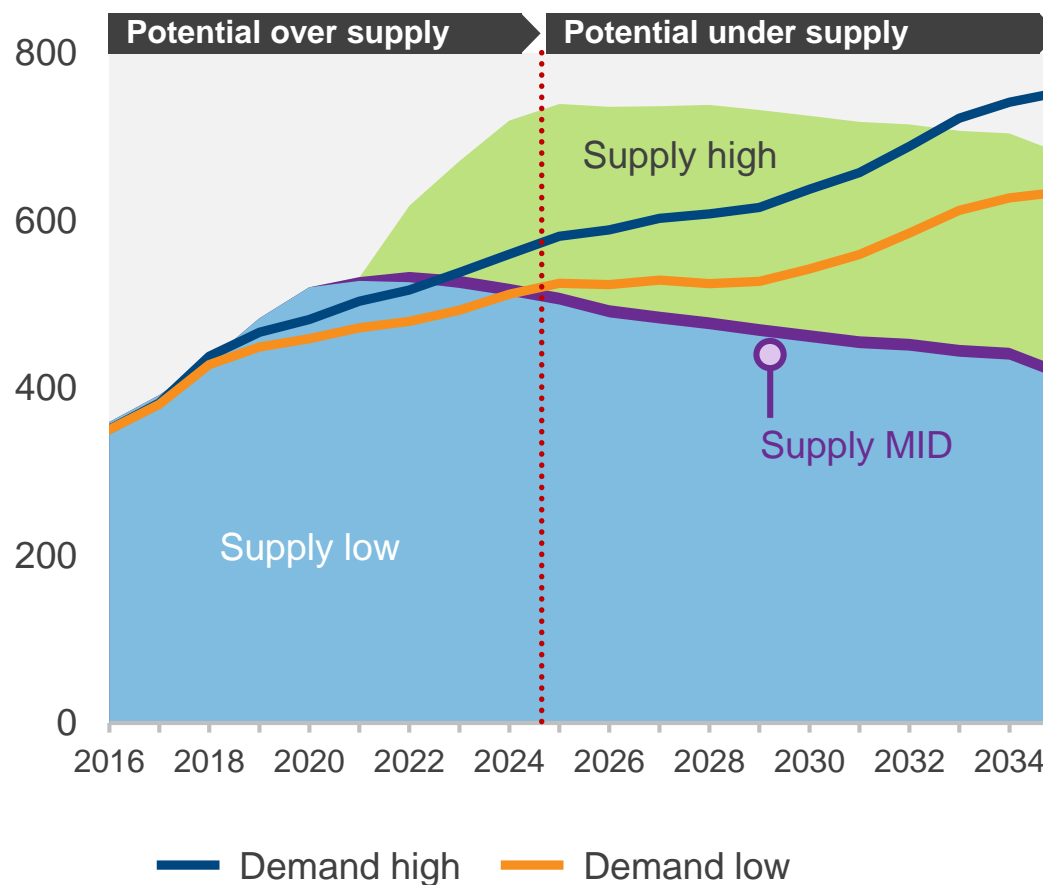
in LNG export capacity by 2030  
(IEA)

**170% increase**

in LNG exports by 2040  
(ExxonMobil)

**10% of marine fuel =**

LNG by 2040 (ExxonMobil)



- Period of oversupply likely to last until ~ 2025
  - Driving down LNG prices (supported by low HH price)
  - FID 'slowdown' as projects struggle economically
  - Market will move away from long term contracted demand – flexibility will be key
- Low price will lead to increased demand - new LNG buyers emerging as LNG competes with alternative fuels
- Potential supply gap post 2025

## Flexibility and shared opportunities

### REGASIFICATION



- Primary service & main revenue generator
- Capacity is sold 'bundled' & consists of berthing slots, storage & regasification capacity
- Highly flexible service – customers control storage and send out (within operational parameters)

### LARGE SCALE RELOADS



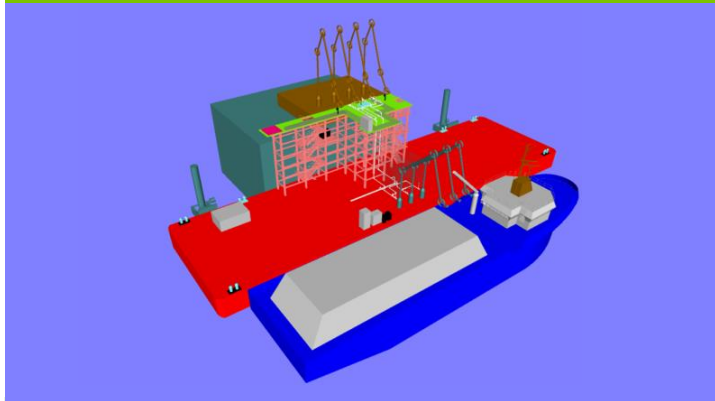
- New service introduced in 2015
- Allows capacity customers to reload their LNG & move to higher priced market
- Provides enhanced flexibility and optimisation opportunities

### TRUCK LOADING



- Launched late 2015
- Allows capacity holders to sell their LNG to new markets – primarily servicing off-grid markets and LNG vehicle market
- Grain charges a slot fee for each loading operation
- Has introduced new customers to Grain – Road Tanker Operators

## LNG Break bulk Marine



### Description

Ability to reload smaller vessels that will in turn supply off-grid/satellite sites or marine

### Purpose

- Drive financial growth by selling services to new customers
- Enable further expansion projects at GLNG

## On-site power Generation



### Description

Develop a CHP plant at GLNG

### Purpose

- Improve GLNGs competitive position by reducing BOG & power costs
- Achieve financial growth via leasing arrangement

## Floating Storage



### Description

Offer additional capacities on a flexible basis

### Purpose

- Sweat existing assets
- Increase financial revenue streams



# Additional Importation Capacity: Phase 4

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## Opportunity

- Direct Access to largest EU market (NBP)
- Close to new LNG supply routes
- Not competing with Russian pipeline gas
- Huge flexibility, customer controlled space & jetties
  - Additional import/swing
  - Re-load, Re-export, Break bulk,
  - Road tanker loading
  - Tran-shipment

## Current status

- Planning consents in place
- FID - ready to build when market is
- Revised construction costs received

## Metrics

- Incremental investment leveraging existing assets
- Capacity increase up to 6mtpa
- Additional 190,000m<sup>3</sup> tank
- Second cryogenic unloading line



# Isle of Grain – The Energy Island

