

national**grid**



**LONDON**  
**NEW YORK**  
SEPTEMBER 2018

# Cautionary statement

This presentation contains certain statements that are neither reported financial results nor other historical information. These statements are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements include information with respect to National Grid's financial condition, its results of operations and businesses, strategy, plans and objectives. Words such as 'aims', 'anticipates', 'expects', 'should', 'intends', 'plans', 'believes', 'outlook', 'seeks', 'estimates', 'targets', 'may', 'will', 'continue', 'project' and similar expressions, as well as statements in the future tense, identify forward-looking statements. These forward-looking statements are not guarantees of National Grid's future performance and are subject to assumptions, risks and uncertainties that could cause actual future results to differ materially from those expressed in or implied by such forward-looking statements. Many of these assumptions, risks and uncertainties relate to factors that are beyond National Grid's ability to control or estimate precisely, such as changes in laws or regulations, including any arising as a result of the United Kingdom's exit from the European Union; announcements from and decisions by governmental bodies or regulators, including those relating to the role of the UK electricity system operator as well as increased political and economic uncertainty; the timing of construction and delivery by third parties of new generation projects requiring connection; breaches of, or changes in, environmental, climate change and health and safety laws or regulations, including breaches or other incidents arising from the potentially harmful nature of its activities; network failure or interruption, the inability to carry out critical non network operations and damage to infrastructure, due to adverse weather conditions including the impact of major storms as well as the results of climate change, due to counterparties being unable to deliver physical commodities, or due to the failure of or unauthorised access to or deliberate breaches of National Grid's IT systems and supporting technology; failure to adequately forecast and respond to disruptions in energy supply; performance against regulatory targets and standards and against National Grid's peers with the aim of delivering stakeholder expectations regarding costs and efficiency savings, including those related to investment programmes and remediation plans; and customers and counterparties (including financial institutions) failing to perform their obligations to the Company. Other factors that could cause actual results to differ materially from those described in this announcement include fluctuations in exchange rates, interest rates and commodity price indices; restrictions and conditions (including filing requirements) in National Grid's borrowing and debt arrangements, funding costs and access to financing; regulatory requirements for the Company to maintain financial resources in certain parts of its business and restrictions on some subsidiaries' transactions such as paying dividends, lending or levying charges; inflation or deflation; the delayed timing of recoveries and payments in National Grid's regulated businesses and whether aspects of its activities are contestable; the funding requirements and performance of National Grid's pension schemes and other post-retirement benefit schemes; the failure to attract, train or retain employees with the necessary competencies, including leadership skills, and any significant disputes arising with the National Grid's employees or the breach of laws or regulations by its employees; and the failure to respond to market developments, including competition for onshore transmission, the threats and opportunities presented by emerging technology, development activities relating to changes in the energy mix and the integration of distributed energy resources, and the need to grow the Company's business to deliver its strategy, as well as incorrect or unforeseen assumptions or conclusions (including unanticipated costs and liabilities) relating to business development activity (including acquisitions and disposals) and joint ventures. For further details regarding these and other assumptions, risks and uncertainties that may impact National Grid, please read the Strategic Report section and the 'Risk factors' on pages 193 to 196 of National Grid's most recent Annual Report and Accounts, as published on 4 June 2018. In addition, new factors emerge from time to time and National Grid cannot assess the potential impact of any such factor on its activities or the extent to which any factor, or combination of factors, may cause actual future results to differ materially from those contained in any forward-looking statement. Except as may be required by law or regulation, the Company undertakes no obligation to update any of its forward-looking statements, which speak only as of the date of this presentation.



INTRODUCTION

**JOHN PETTIGREW**

CHIEF EXECUTIVE

# The purpose of today's event

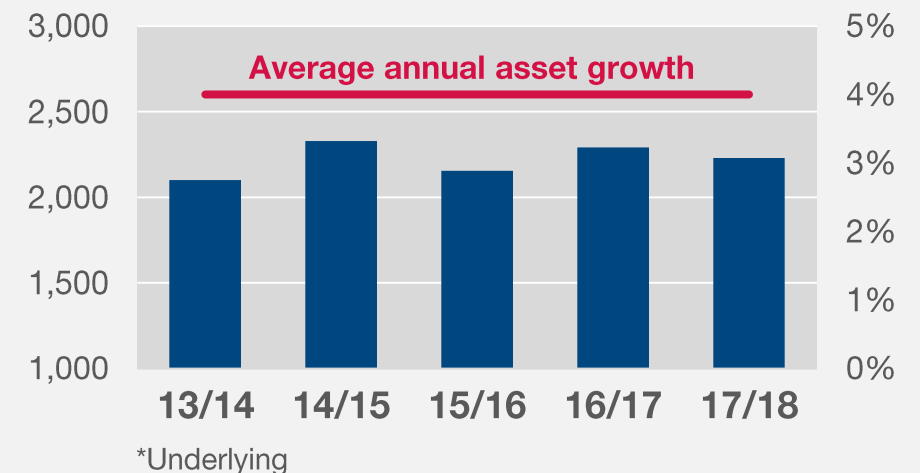
- Provide a detailed understanding of our UK transmission businesses
- Show how we are evolving the organisation to succeed in a dynamic environment
- Share the range of opportunities we see to create value for customers and shareholders
- Give you an opportunity to meet the UK leadership team and ask them any questions you have





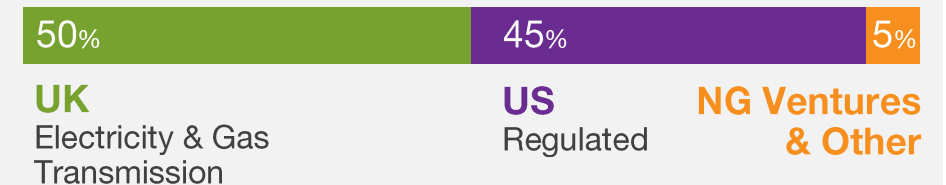
- High-quality transmission assets
  - 50% of the Group's asset base
- The UK remains at the heart of our investment proposition
  - delivering consistent growth and strong cash returns
- Supporting our balance sheet strength
- Sharing experience and resources between US and UK helps us to deliver better

## UK EBITDA\* (£m)



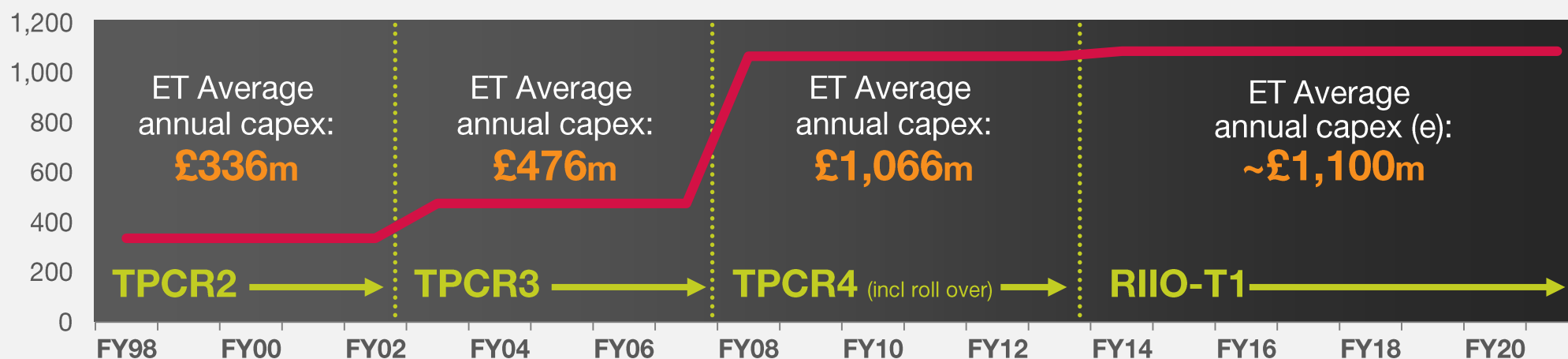
## TOTAL ASSETS BY SEGMENT

as at 31 March 2018



# National Grid has a strong track-record in the UK

## ET AVERAGE CAPEX OVER PRICE CONTROLS (£m)



World-class  
reliability  
**>99.9999%**

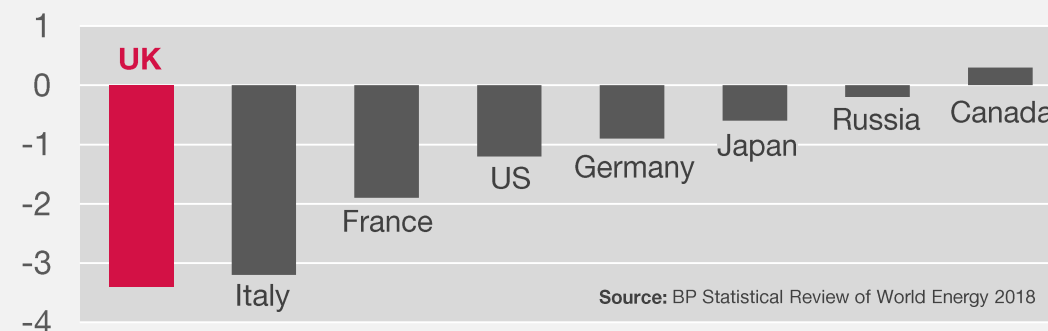
- Significant increase in investment
- Electricity and Gas Transmission - over the last decade, we have invested almost £14 billion
- Clear benefits: world-class reliability; cost-effectiveness for customers; growth and yield for investors
- Achieved in the context of a transforming energy mix

# National Grid is enabling the UK's energy transition

- The UK is a clear leader in the adoption of low carbon energy
- We have connected 9GW of onshore and offshore wind since 2010
- Ensured high levels of network reliability, safety and smooth day-to-day balancing

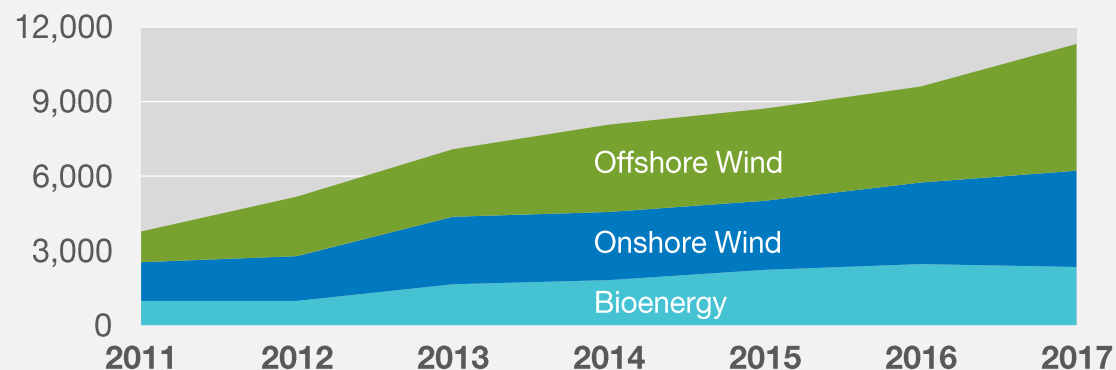
## CO<sub>2</sub> EMISSIONS FROM ENERGY

Growth rate 2006 to 2016



## GROWTH IN TRANSMISSION CONNECTED RENEWABLES

MW Capacity



# Long-term drivers of success for National Grid

## CUSTOMER FIRST



Performance optimisation



Growth



Evolve for the future

# Evolving our business in a dynamic environment

- The needs of our existing customers are changing
  - affordability and reliability remain a key focus
- We are maximising performance under RIIO-T1
  - and preparations well underway for RIIO-T2
- We must continue to challenge ourselves to do more for our customers
- Highly-experienced team leading the business
  - driving an efficient organisation
  - driven by a customer led strategy





UK INTRODUCTION

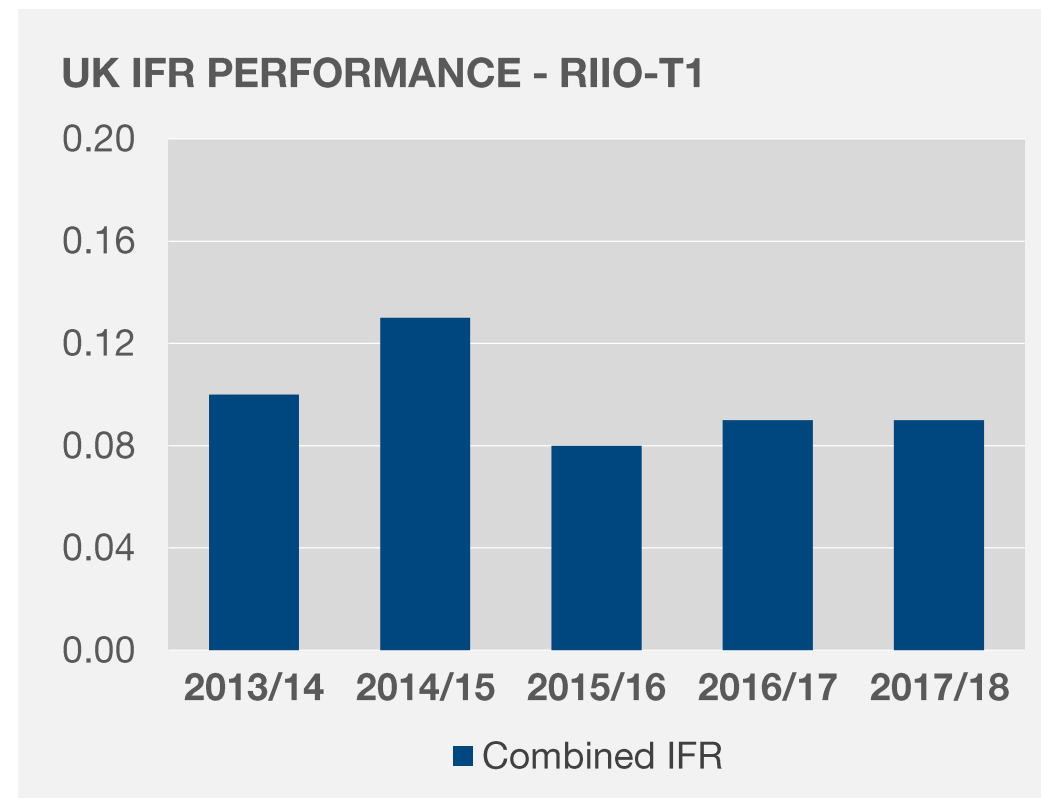
**NICOLA SHAW**

EXECUTIVE DIRECTOR, UK



# Strong safety performance

- Relentless focus on safety
- Average combined IFR\* of less than 0.1 in RIIO
- Changes since December 2016:
  - improved management of training and training records
  - simplifying our processes and the number of policies
- Operational, process and public safety



\* Combined IFR is the number of injuries per 100,000 hours worked in a 12 month period for both employees and contractors

# Customer first the key to our long term success

## Industry continues to evolve in a dynamic external environment

- Cost of energy remains an important point of debate

## National Grid recognises the need to go beyond our obligations

- Have delivered > £1bn of savings and value to customers through:
  - outperformance under RII0-T1
  - voluntary deferral of allowances; and
  - further initiatives such as ‘Warm Homes Fund’

- Facilitating the change in generation for less than 10p a day/household, 3% of the average dual fuel bill



# An increasingly customer oriented culture

## Driving culture change

- Net promoter scores
- Customer immersion

## Improving customer service

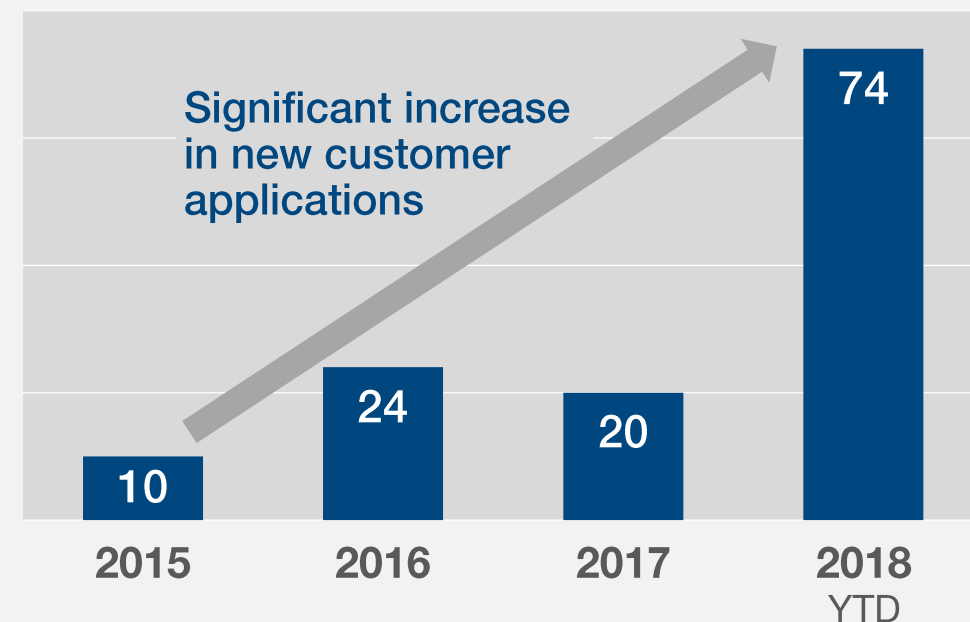
**30% reduction**  
in time for new customer connections

## New customer types

**Multi faceted customer solutions**  
Connection, land and planning

- Pivot Power

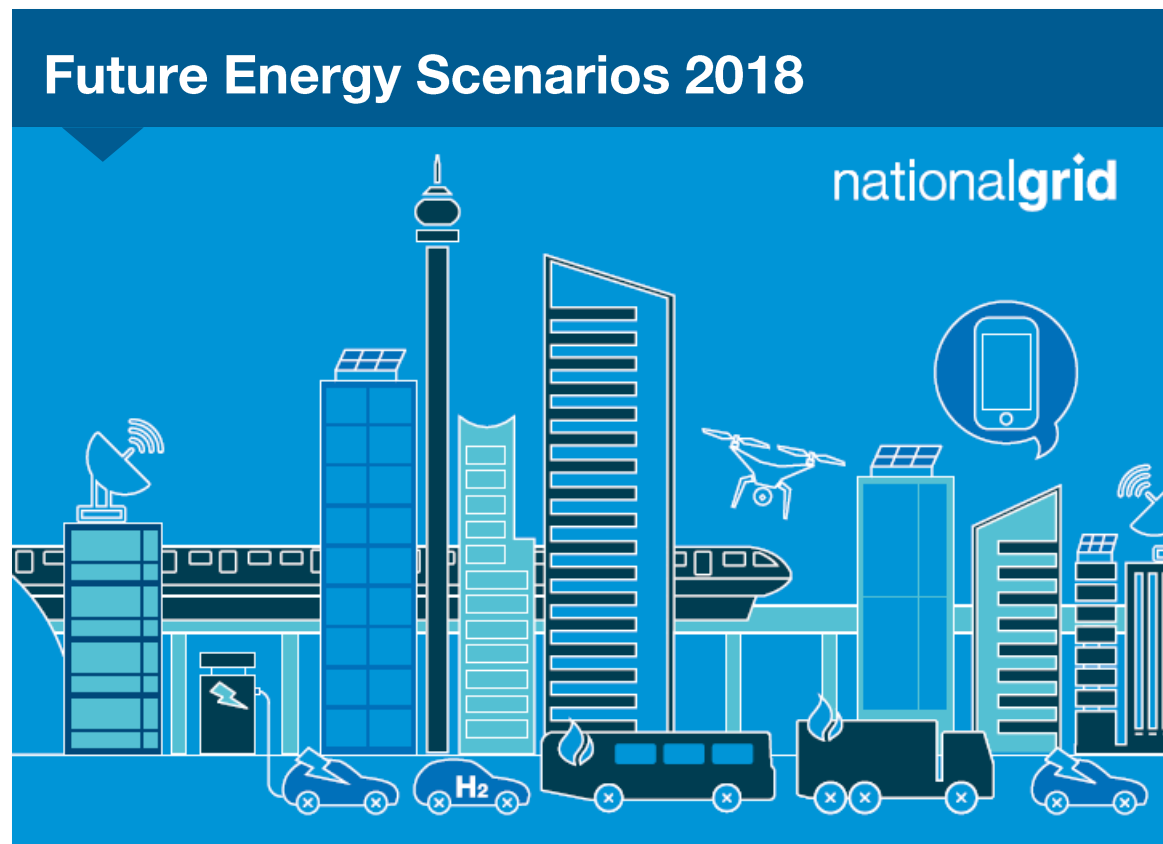
## NEW ELECTRICITY TRANSMISSION CUSTOMER APPLICATIONS



# Helping shape the UK's energy future

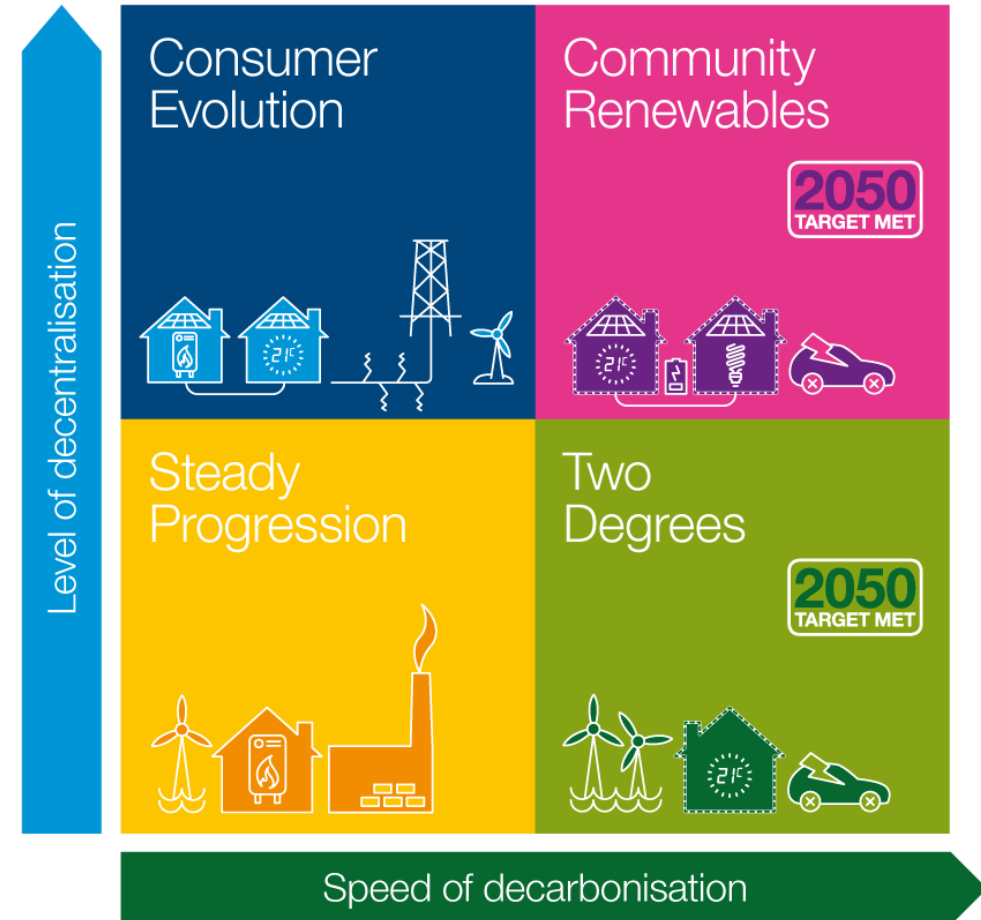
## Proactively contributing to the evolution of the UK's energy policy

- Engaging with Government, opposition parties and pressure groups
- Enable the country to remain a leader in the energy transition
- Facilitating industry wide discussion through Future Energy Scenarios
  - shaping the debate on the future of networks and the whole energy system
- Created two new independent stakeholder panels to inform our T2 plans
- Customers want us to lead on thinking about the future for them



# The energy market is evolving at pace and we have a vital role

- There's a wide range of potential outcomes
- National Grid plays a vital role in all scenarios
- Even in a highly decentralised scenario like community renewables, transmission is the most efficient way of transporting energy around the country



# Electric demand expected to grow significantly

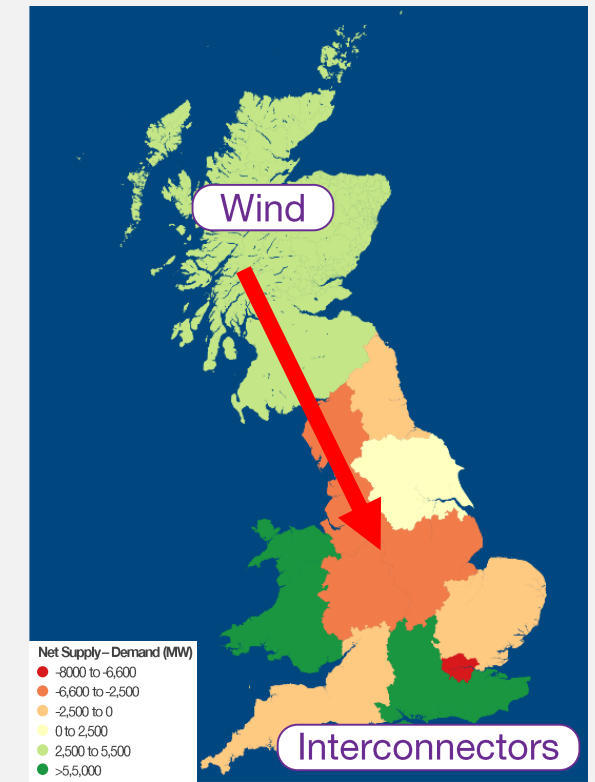
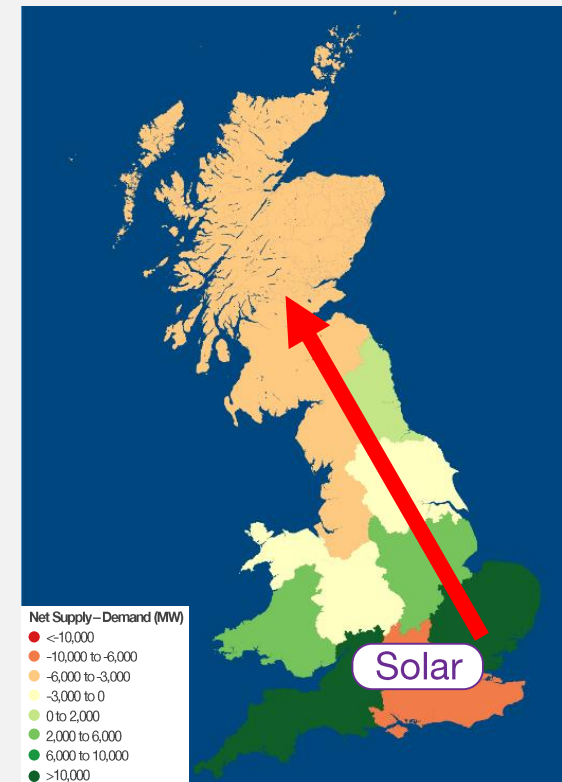
- Installed capacity of 268GW by 2050
  - 65% renewable sources
  - peak demand of 83GW versus 51GW now
- Drivers for demand growth
  - over 38m electric vehicles by 2050
  - decarbonisation of heating
- Changing energy mix and growth in distributed generation
- Transmission vital in transporting energy across the country

## 2040 regional supply versus demand

### Decentralised 'Community Renewables' scenario

Summer 2040

Winter 2040

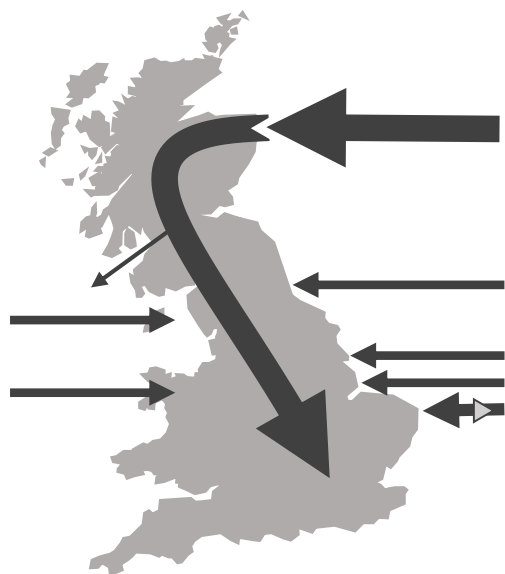




# Gas plays a vital role to decarbonisation

## Gas flow 2000

Predominant North to South

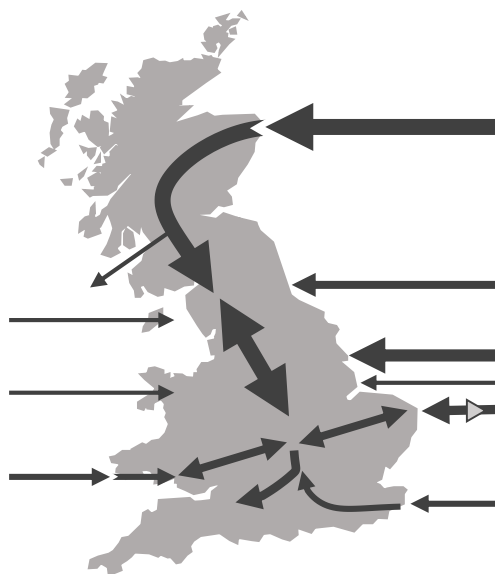


### Sources of Gas Typical day in 2000



## Gas flow 2018

Increasing diversity of supply

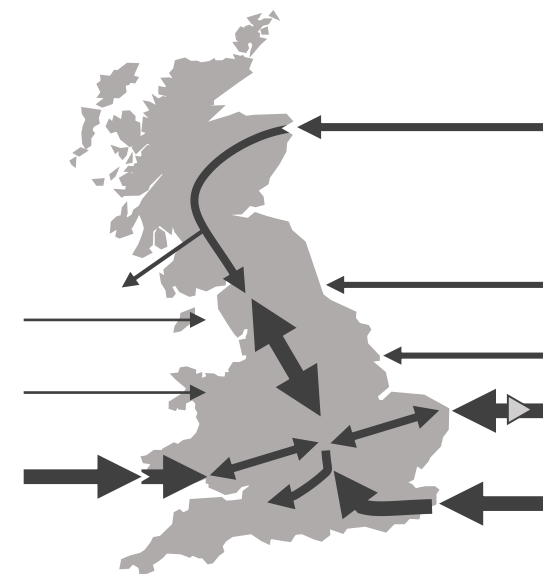


### Sources of Gas Typical day in 2018

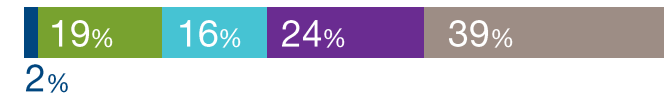


## Gas flow 2040

Higher LNG and interconnector supply

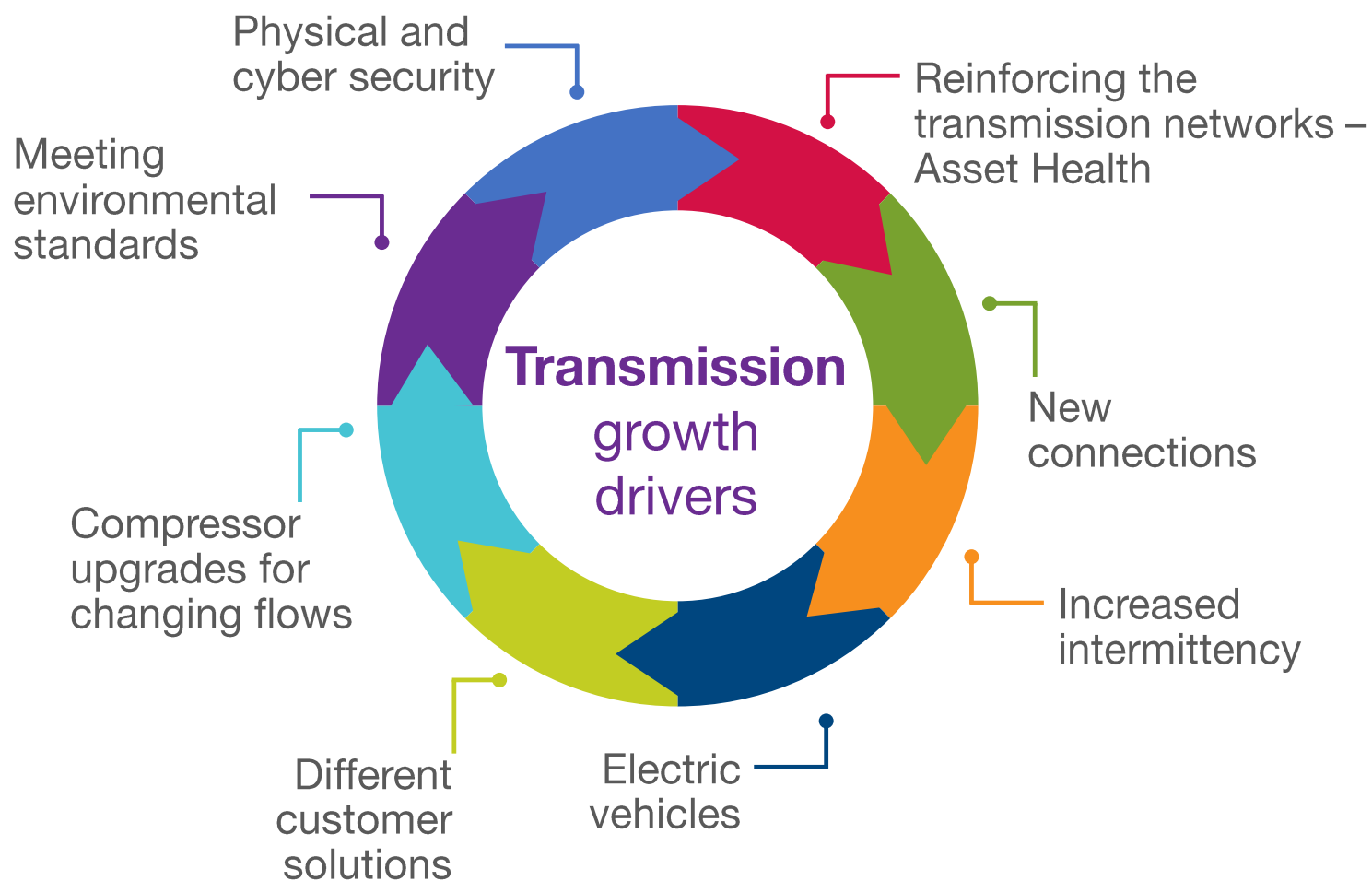


### Sources of Gas Typical day in 2040



KEY ● UKCS ● Green Gas ● Norway ● Interconnectors ● Liquified Natural Gas (LNG)

# Industry evolution offers a wide range of opportunities



# Achievements during RIIO

## London Power Tunnels



## 'Beast from the East'



## Aylesbury catalytic convertors



## GRAID robot



## G3 at Sellindge



## Western Link



## Canterbury to Richborough



## Investment in flood defences



# Delivering strong financial performance under RII0

In the first  
**five years**  
of RII0-T1

**4.2%**  
average annual  
**UK RAV GROWTH**

**£6.6bn**  
total  
**CAPITAL INVESTMENT**

**200 - 300bps**  
annual  
**INCENTIVE  
OUTPERFORMANCE**

**£540m**  
total  
**CUSTOMER SAVINGS**





## Hinkley Seabank

- £650m investment by 2025
- Remain disappointed with final decision
- Will work to make our case, and consider options appropriately



## T1 reopeners

- Part of the RIIO framework
- Covers physical & cyber security, emissions reductions and feeder 9
- Final decision expected by the end of September



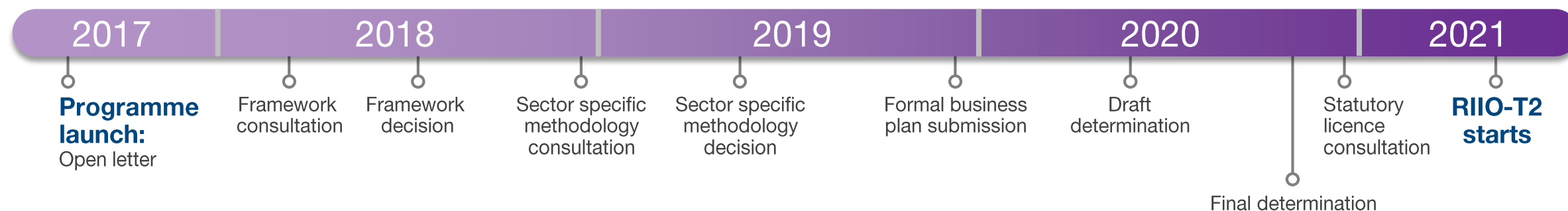
## ESO separation

- Legal separation work on track
- New legal entity, Board and governance structure
- Will be ready from 1 April 2019

# RIO-T2 preparation well underway

- Overall framework decision in line with expectations
- Support the importance of putting customers at the center of the process
- We have a clear, stakeholder led strategy
- Final package needs a balance of cash and returns
- Focussed on maintaining a constructive relationship with Ofgem

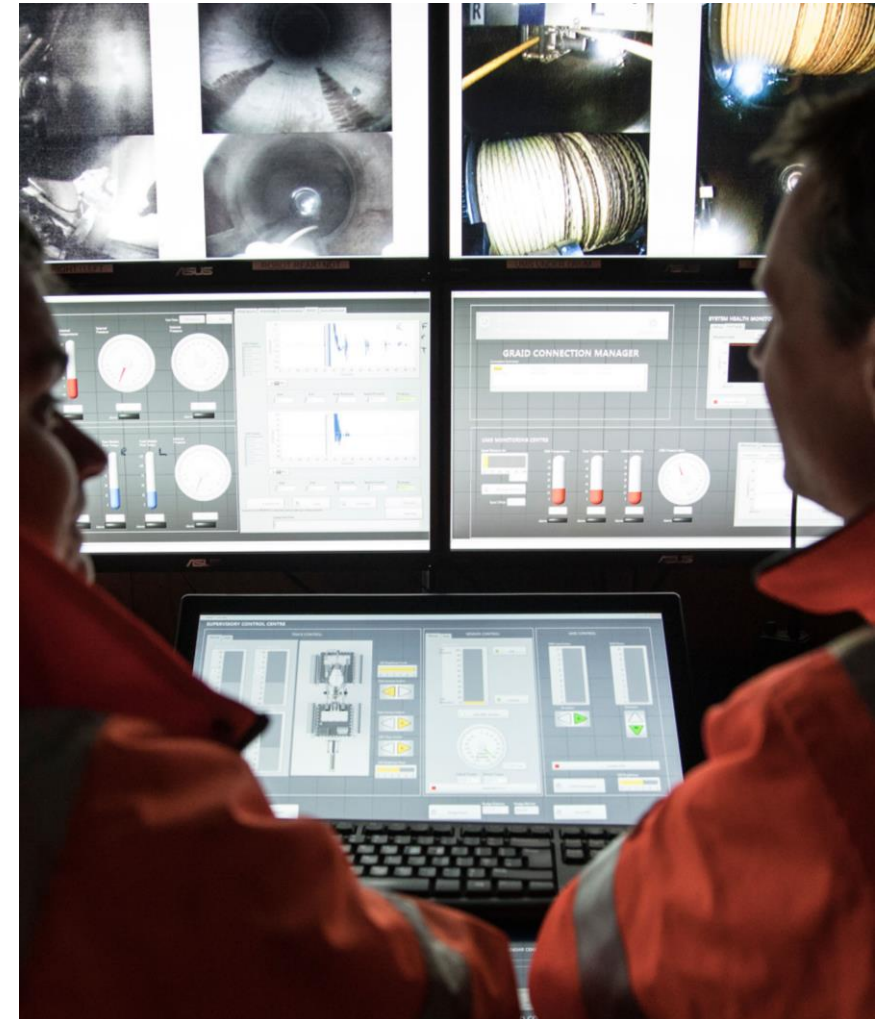
## RIO-T2 timeline





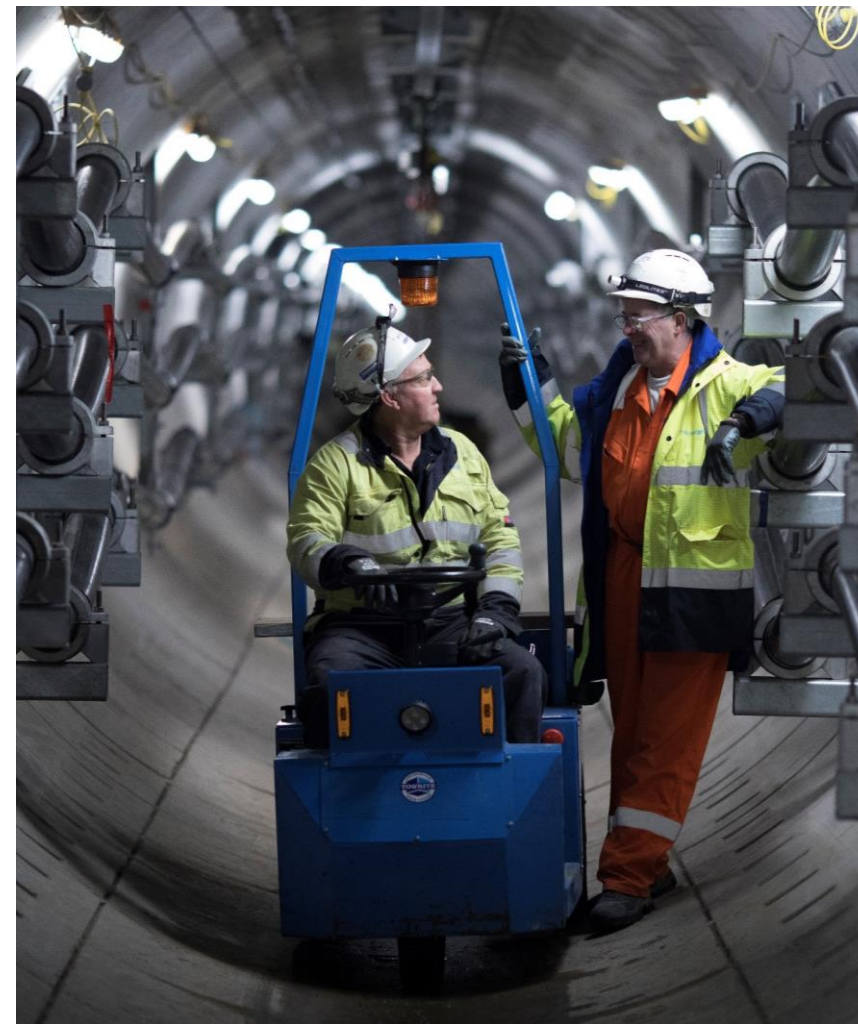
# Leaner organisation, leveraging new technology

- New streamlined processes to meet changing customer needs
  - more agile, faster decision making
- Significant opportunity through digitalisation
  - increase efficiency and enhance customer experience
- Projects already underway
  - ESO solar and demand forecasting using AI
  - GT 4D digital modelling
  - Gas Robotic Agile Inspection Device (GRAID)
  - ET line scan robot
  - further remote network health monitoring



# Summary

- Our industry is in a period of significant change
- Creating huge opportunity for us over the long term
- We will maintain our safe and reliable networks, and deliver strong financial performance
- We are responding now to maximise our potential



# A highly experienced and committed team



## NICOLA SHAW

EXECUTIVE  
DIRECTOR, UK

**12 years** experience in the energy  
and infrastructure industries



## PHIL SHEPPARD

DIRECTOR, GAS  
TRANSMISSION

**31 years** experience  
at National Grid



## CHRIS BENNETT

DIRECTOR,  
UK REGULATION

**26 years** experience  
at National Grid



## FINTAN SLYE

DIRECTOR OF UK  
SYSTEM OPERATOR

**27 years** experience  
in the energy industry



## ALAN FOSTER

UK CHIEF  
FINANCIAL OFFICER

**18 years** experience  
at National Grid



## DAVID WRIGHT

DIRECTOR, ELECTRICITY  
TRANSMISSION

**26 years** experience  
at National Grid



OPERATING  
WORLD-CLASS NETWORKS

**DAVID WRIGHT**

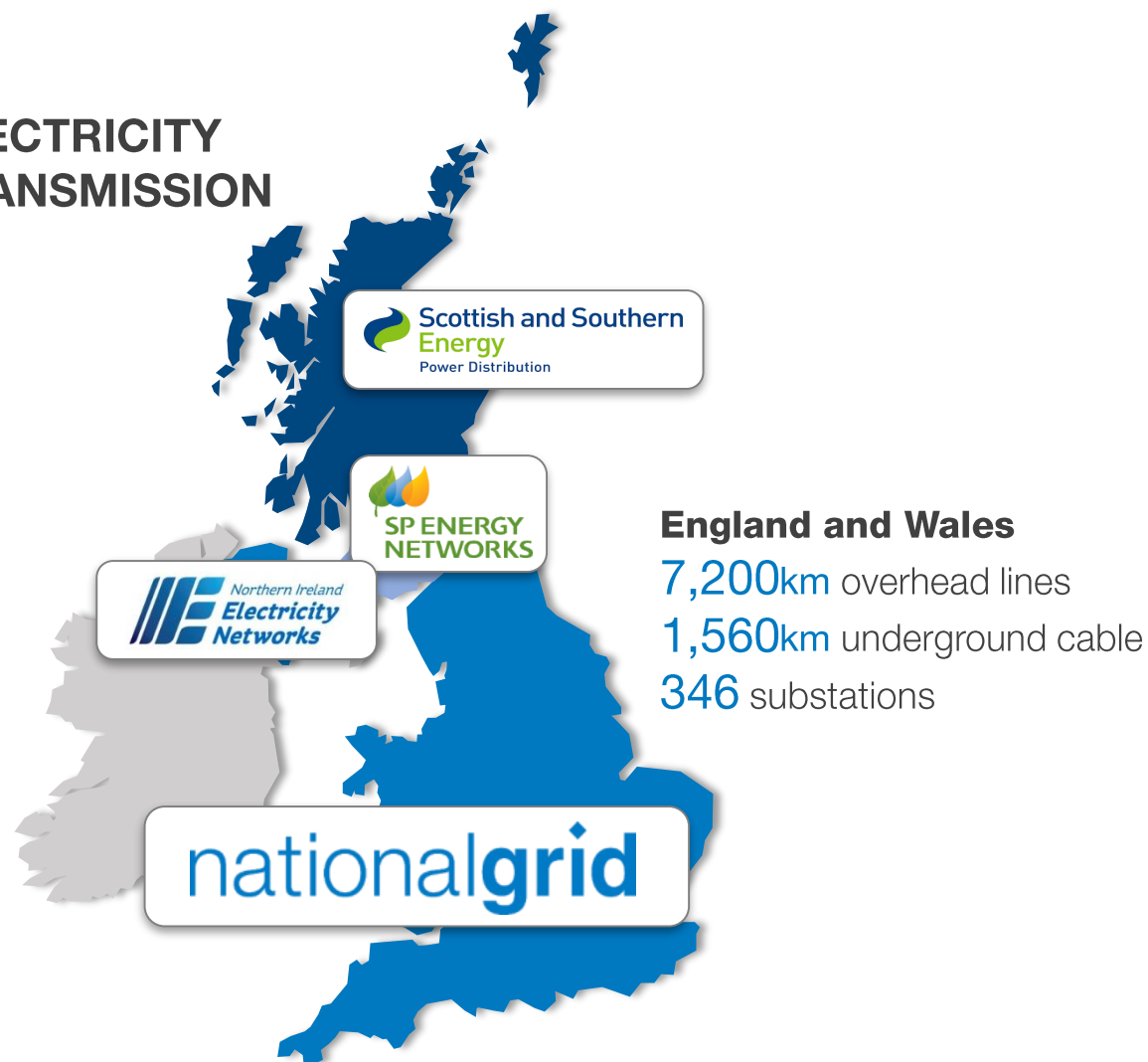
DIRECTOR, UK ELECTRICITY  
TRANSMISSION AND  
GROUP CHIEF ELECTRICAL ENGINEER



# The Electricity Transmission network today

- Transmission owner in England and Wales
- World class safety performance
- Highly reliable network
  - **99.999984%** network reliability
- Growing Regulated Asset Value (RAV)
  - **£13 billion** (FY 2017/18)
- Cost effective delivery
  - **£440m** savings for customers so far in T1
  - **£26** on annual average electricity bills

## ELECTRICITY TRANSMISSION



# Continued investment in our core business

- Significant capex has ensured excellent reliability
  - Capex of £1.0bn in 2017/18
    - £5.6bn capex over first 5 years in T1
- Three primary investment drivers
  - reliability / asset health in an ageing system
  - network resilience – physical security and cyber threats
  - connecting customers
- Decarbonisation is driving new customer types
  - offshore wind, new-build nuclear, interconnectors
  - new customer types e.g. storage





# Successfully delivering in T1



## Asset replacements

- Protection replacement
- Circuit breakers
- Overhead line fittings
- Overhead line steelwork recovery



## Large, complex projects

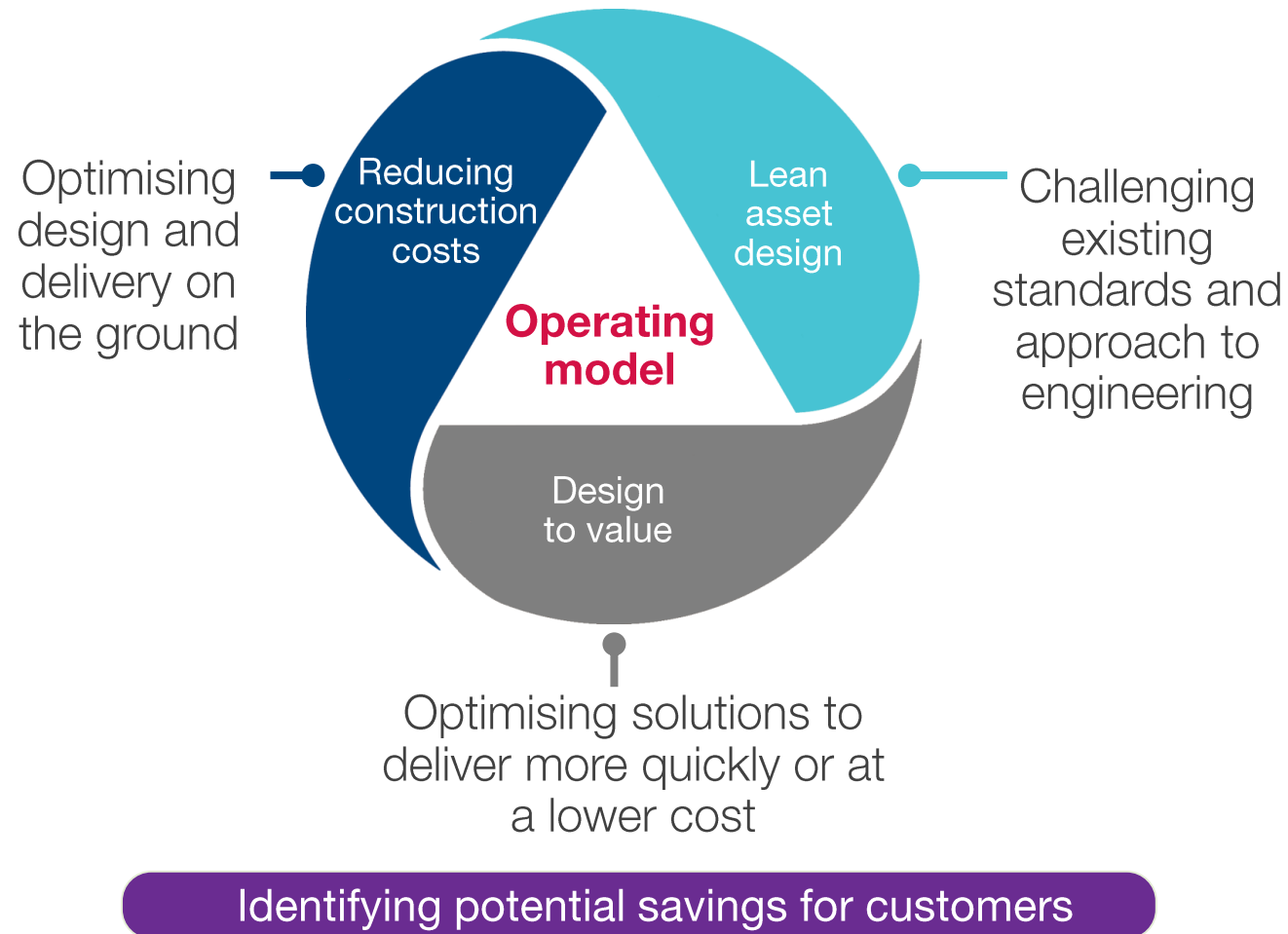
- London Power Tunnels
- Canterbury to Richborough
- Western Link
- Underground lines through National Parks



## Digitalisation

- Optimising Asset Interventions
- Advanced state of the art condition monitoring

# Increasing efficiency across the business



## Wimbledon substation



- Major upgrade - 3D modelling
- Densely populated location
- Savings achieved:
  - **£30m** site layout
  - **£9m** construction costs
  - **23%** carbon footprint reduction



# Driving a culture of innovation

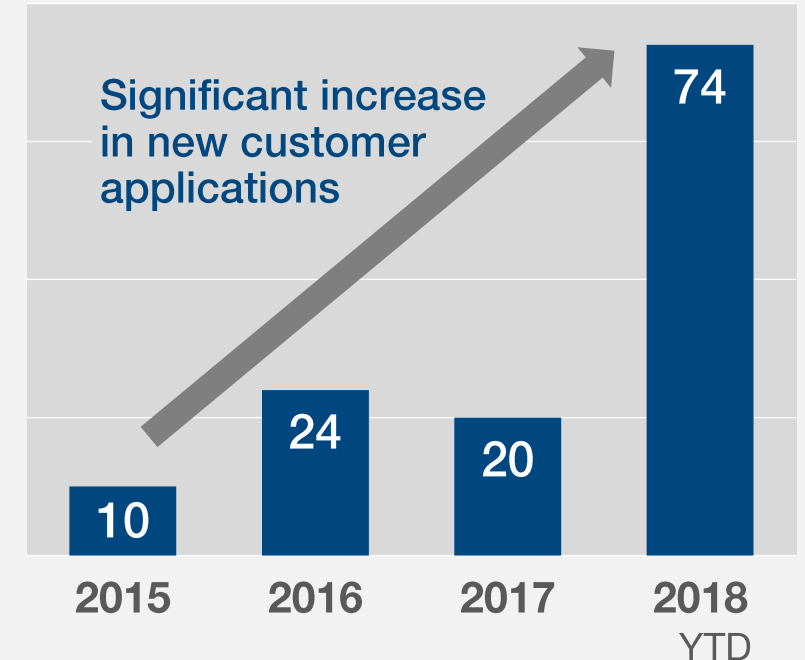
- Progressing new, innovative solutions
  - increasing remote monitoring
  - introducing robots
  - deploying new T-pylons
  - reducing undergrounding cost
  - zero carbon insulation gas
- Innovation is more than technology
  - designing a new EV charging network
- Building Europe's first flexible high voltage test substation in North Wales
  - testing new assets off grid, 24 hours a day



# Attracting new customers

- Proactively targeting new customers
- Growth from new customers seeking connections
  - ports, data centres, airports, EVs
  - demand side growth
- New customers require a different service
  - greater flexibility
  - 30MW to 100MW loads
  - transmission best placed to deliver
- Our business proposition
  - competitive on cost
  - great customer experience
  - network capacity

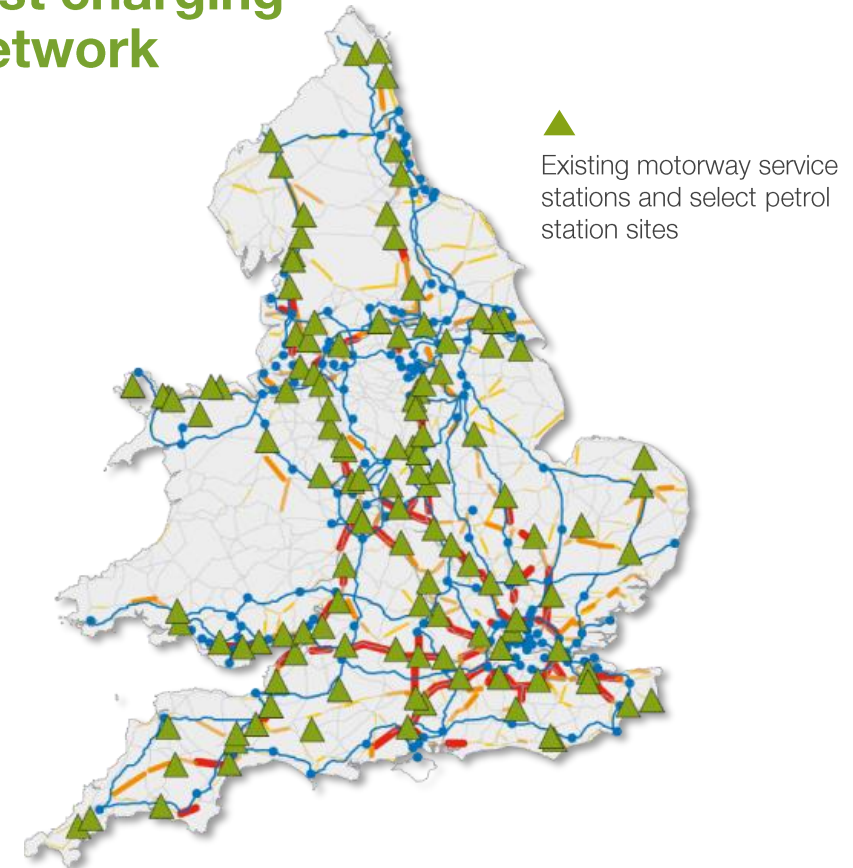
## NEW ELECTRICITY TRANSMISSION CUSTOMER APPLICATIONS



# Designing new opportunities for Electric Vehicles

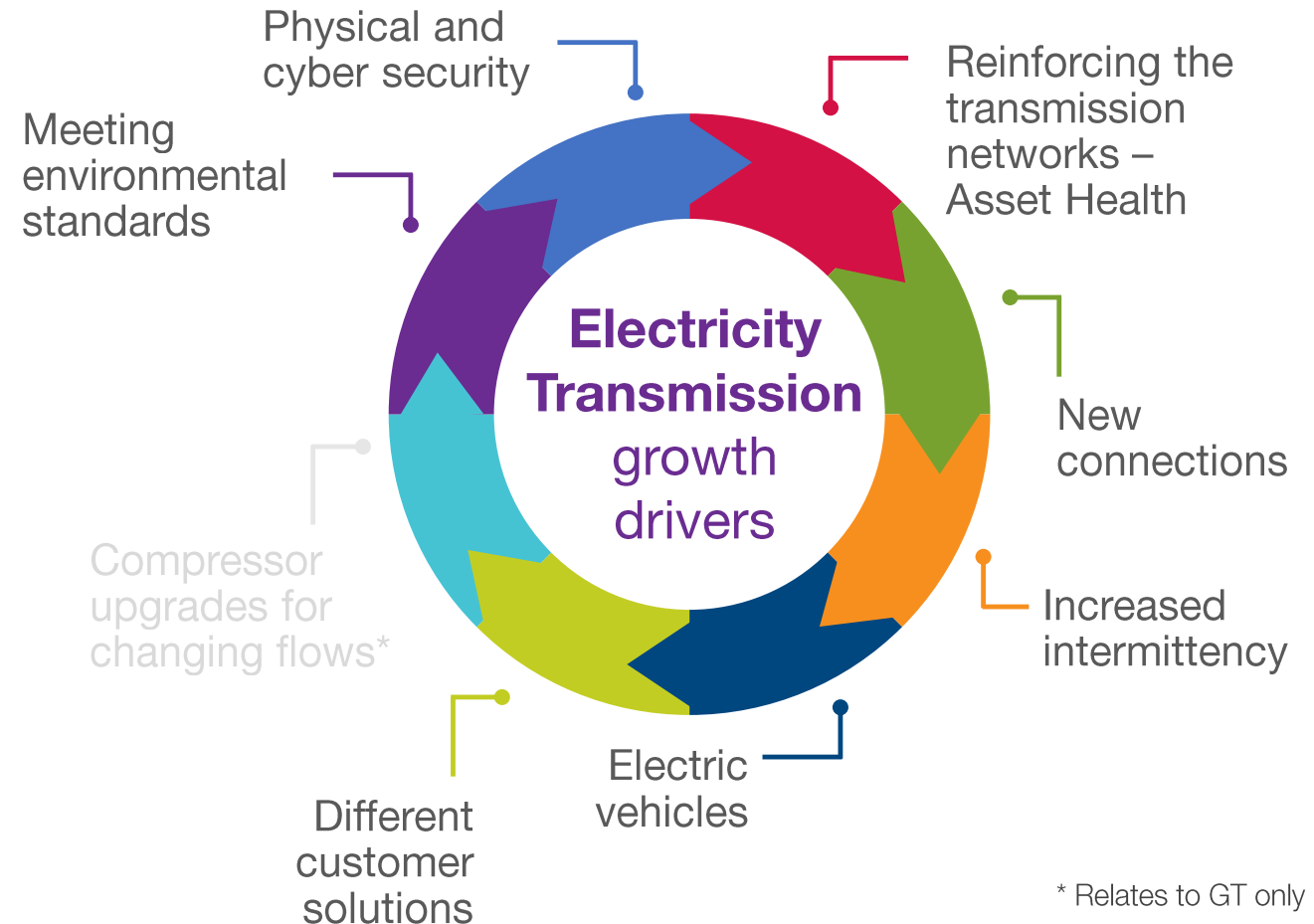
- National Grid has proposed a fast charging network
  - covers 99% of England and Wales
  - comprises 54 motorway service stations
  - charging time 50 times faster than domestic charging
- Our proposal is competitive and innovative
  - against distribution costs
- Addresses barriers, including 'range anxiety'
  - no more than 50 miles from a fast charging station
- ET is key to enabling EV industry development
  - £0.5bn to £1.0bn opportunity

## Proposed fast charging network



# A long-term business delivering shareholder value

- Consistent investment over RII0-T1
  - highly reliable network and an efficient business
- Network underpins decentralisation, decarbonisation and digitalisation
- Resilient transmission network critical to future energy supply
  - essential to the UK's low carbon agenda
- Our business is going further
  - driving efficiency and innovation
  - transforming our customer proposition
  - exploring new customer opportunities







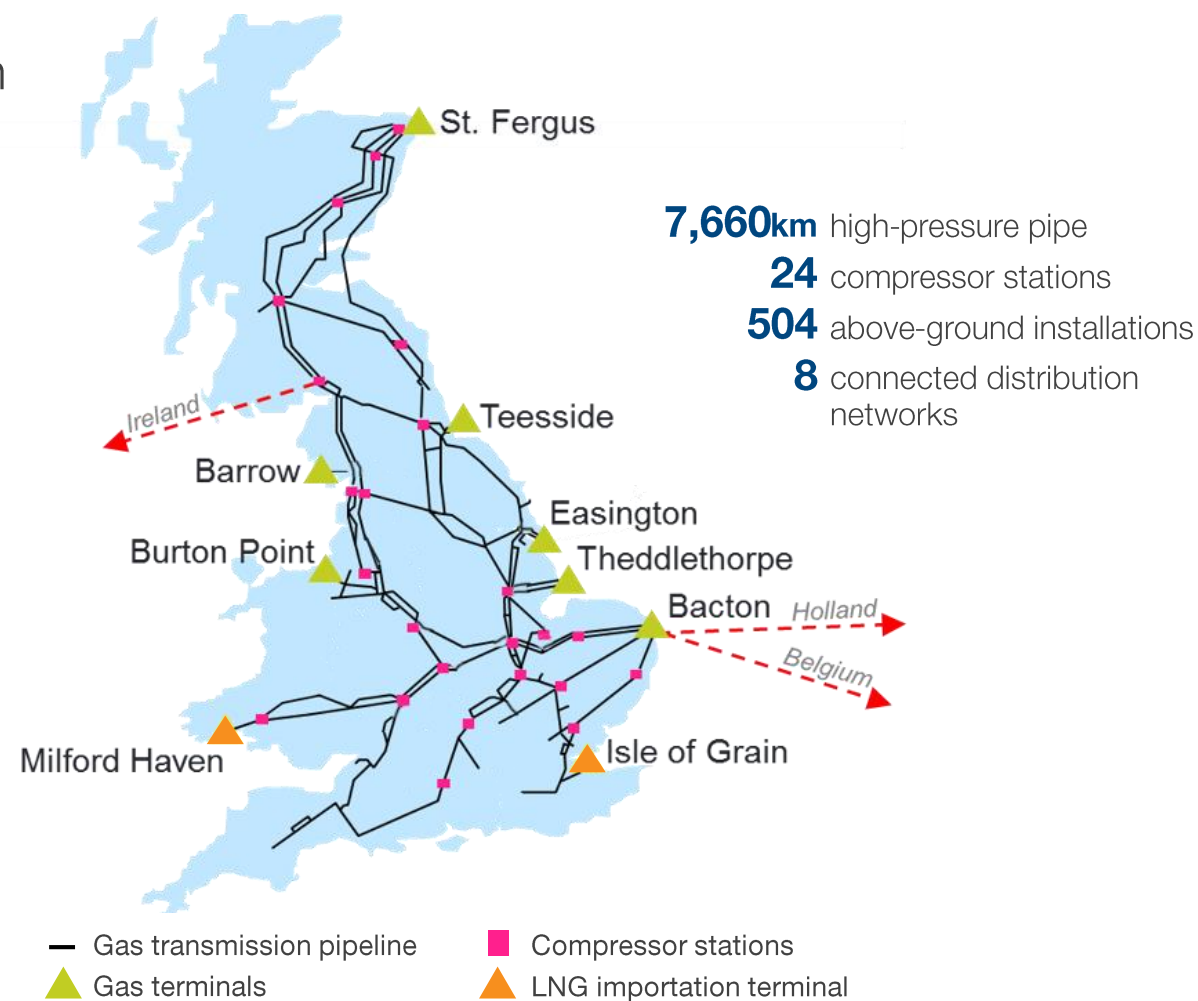
OPERATING  
WORLD CLASS NETWORKS

**Antony Green**

HEAD OF NETWORK ENGINEERING,  
UK GAS TRANSMISSION

# Our National Transmission System

- Own and operate the high-pressure gas transmission system in Great Britain
- World class safety performance
- **99.996%** network reliability in 2017/18
- Delivered at least cost to the consumer
  - **£9** of average dual fuel bill
- **£6bn** regulatory asset value
  - **18%** of the Group



# Gas plays an important role

- The gas networks deliver nearly 3x the energy delivered by the electricity networks:

**810** TWh

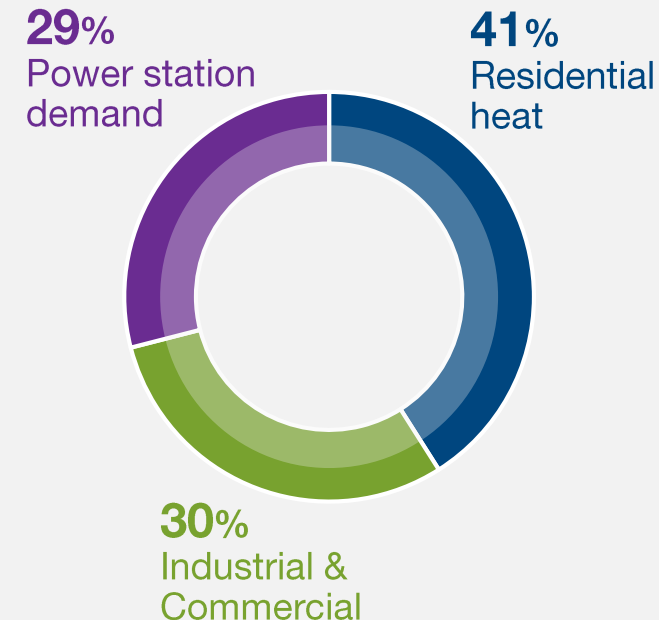
2017: **Total gas demand**

**297** TWh

2017: **Total electricity demand**

- 60,000 new consumers connected to gas networks each year
- Primary source of heating in homes and offices
- Generates 40% of annual electricity, at a lower total cost than other sources

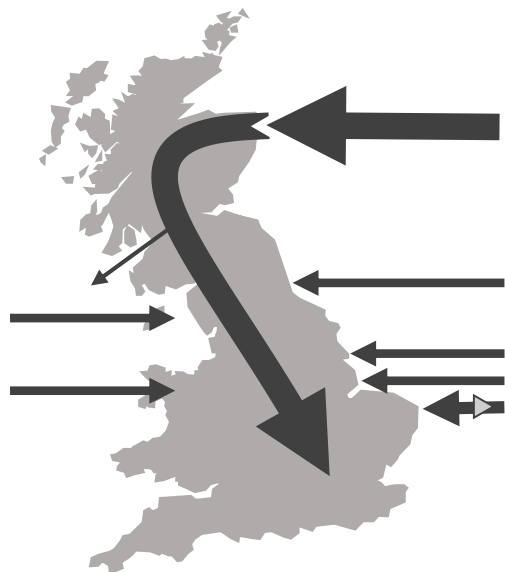
## THE UK'S GAS NEEDS IN 2017



# Evolution of our network

## Gas flow 2000

Predominant North to South

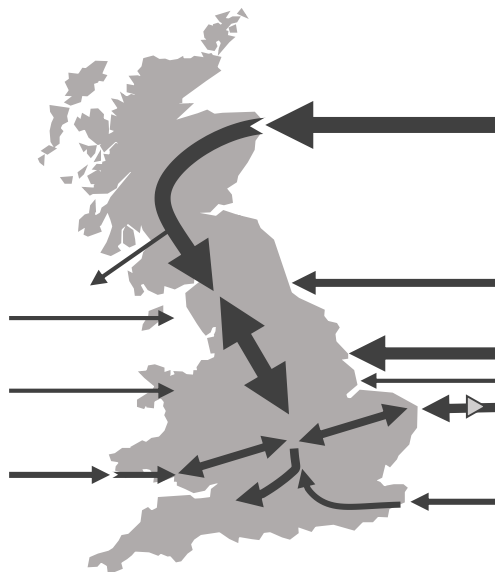


### Sources of Gas Typical day in 2000



## Gas flow 2018

Increasing diversity of supply

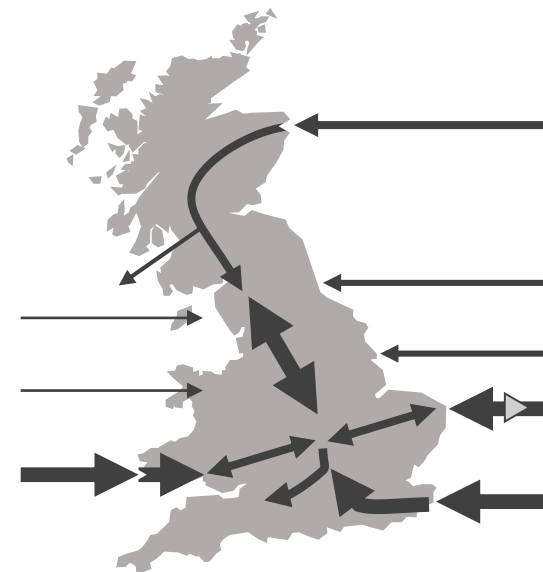


### Sources of Gas Typical day in 2018

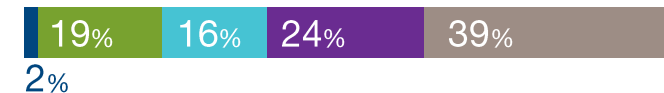


## Gas flow 2040

Higher LNG and interconnector supply



### Sources of Gas Typical day in 2040



KEY ● UKCS ● Green Gas ● Norway ● Interconnectors ● Liquified Natural Gas (LNG)

# Significant investment in asset health over RIIO-T1

## Managing our ageing asset base

- Operational and safety performance is a priority
- Invested £520m in asset health so far in RIIO-T1
- Refurbishment vs replacement solutions

## Optimising performance

- Strong incentive performance offsetting necessary overspend against Totex allowances
- Cost efficiency programme and improved asset data quality in preparation for RIIO-T2
- Adopting a campaign approach to minimise system outages and reduce costs

### Above Ground Installation renovation campaign



- £150m, 6-year programme
- 70 sites across the UK
- Addressing over 1,500 ageing assets
- With 340 addressed so far



# Applying a customer centric approach

## Putting the customer at the heart of our business

- Record of exceeding satisfaction targets over RIIO

## Continuing to evolve the customer experience

- Increasing number of customer connection requests
- 23 customer projects in development
- Reducing barriers for connecting future gas customers
- Proactively engaging with customers
- Receiving positive feedback from customers

## Customer low cost connections



- From initial application to design phase
- 50% reduction in connection costs to the National Transmission System
- Cutting time involved from three years to less than one



# Embracing the digital world

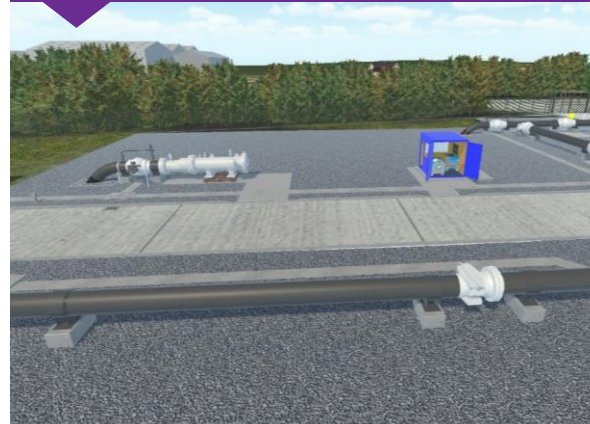
## Creating a culture of innovation

- A portfolio of over 130 projects
- Investment of £29m
- Awarded £11m through Network Innovation Competitions

## Committed to delivering value for customers

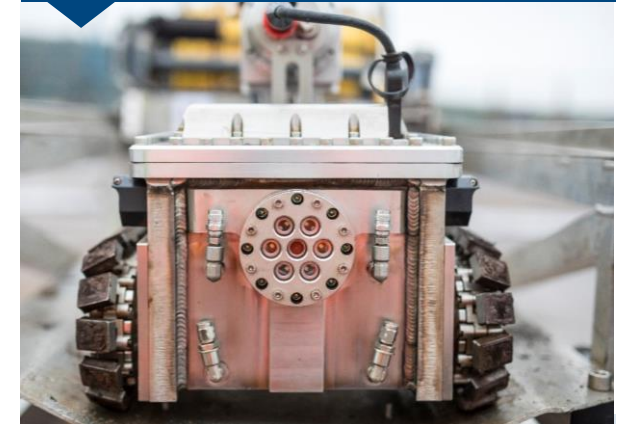
- £9m savings to customers
- Targeting an increase in our return on investment
- 39 projects live this year

### Digital Twin



- 4D digital representations of our assets
- Savings of £4.6m realised to date
- Cost savings of up to 20% over any asset's lifetime

### GRAID



- Inspecting previously unreachable parts of the network
- Expecting c£60m savings over a 20-year period
- Annually reducing carbon emissions by 2,000 tonnes

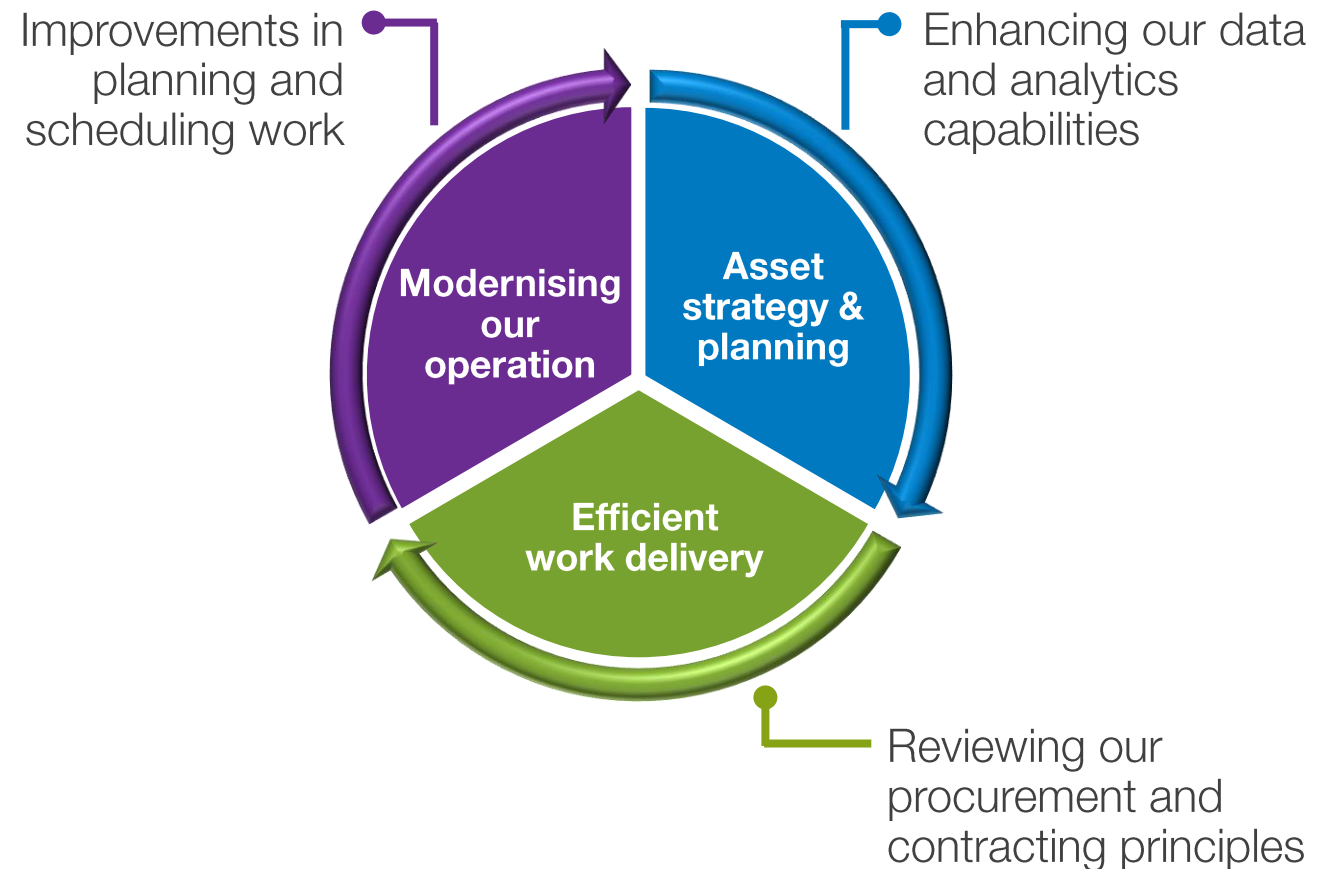
# Staying at the forefront of asset management

## Our asset management transformation programme

- Finding a better way
- Adopting scaled agile framework for rapid delivery



- Will deliver benefits in the remainder of RIIO-T1 and throughout RIIO-T2



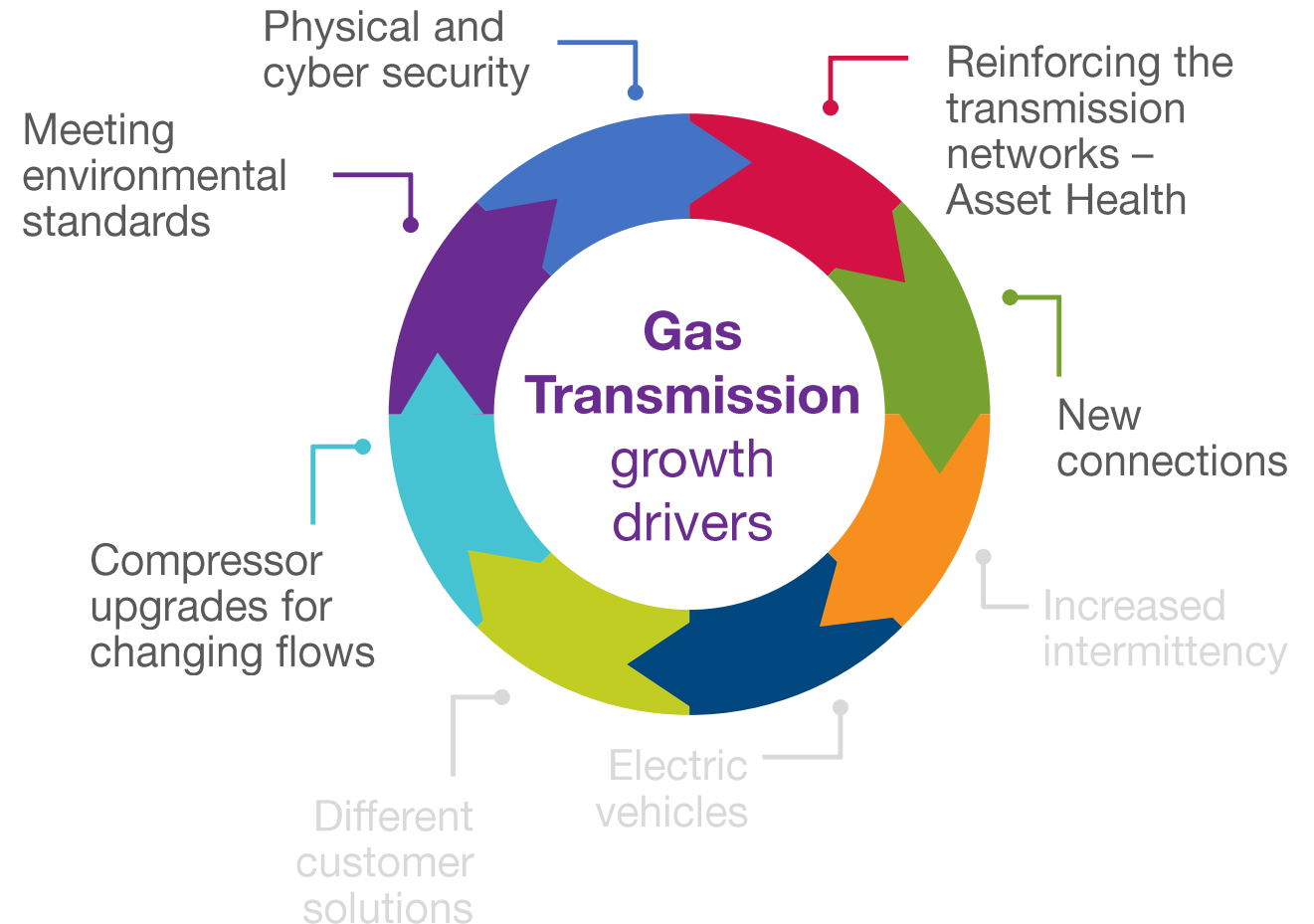
# Our long-term investment programme

## Purpose of our investment programme

- Deliver a network fit for the future
- Minimise effect on customer bills
- Maintain safety and reliability

## Growth drivers

- Asset health investment represents nearly 50% of capex
- Improving environmental standards on our compressor units
- Enhancing physical and cyber security to safeguard the network



# Supporting the transition to a low-carbon future

- Gas provides the reliability and flexibility to support intermittent renewables
- Investment will be required to support
  - changing flows
  - pronounced winter peaks
- Commercial vehicles could use biogases, natural gas or hydrogen
- Our gas transmission network provides options for hydrogen and CCUS





# Gas will continue to play an important role

- Gas required for heat and generation beyond 2050
- Gas infrastructure supported by several players in the energy industry
- The flexibility and reliability of our gas network will support the transition to a low-carbon future
- Gas will continue to be the default energy source





REGULATION AND FINANCE

**CHRIS BENNETT**

DIRECTOR, UK REGULATION



# RIO-T2 Framework decision sets a solid foundation

## Early stage of RIO-T2 process

- Framework decision published in July
- Fundamental principles reaffirmed
  - incentives
  - innovation
  - output based regulation

## Key framework decisions include

- Shorter price control - from 8 years to 5 years
- Removal of the option to
  - cap returns
  - pass through debt costs
- Move from RPI to CPIH RAV indexation
- Enhance stakeholder engagement

### KEY ELEMENTS OF RIO-2 FRAMEWORK

Stakeholder engagement

Totex and capitalisation ratios

Depreciation policy

Recovery of pass through costs

Incentivisation

Returns (debt and equity)

Competition

SO regulation

Adjust for uncertainty

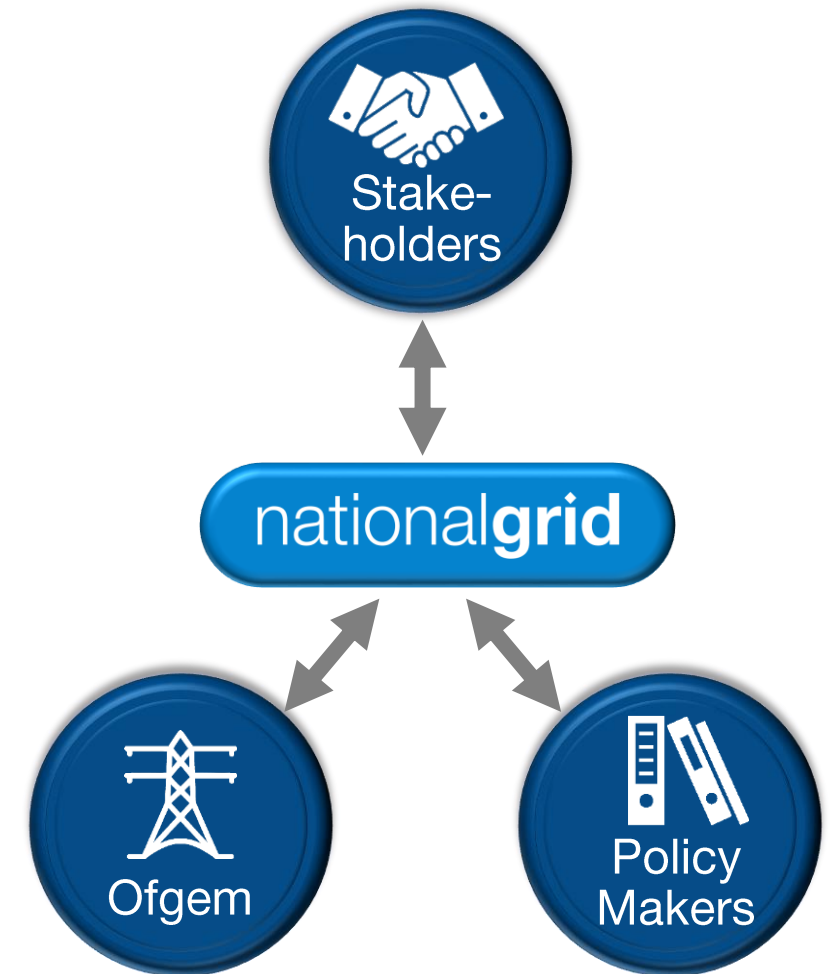
# Our interests are aligned with consumers

- We understand the priorities of consumers and other stakeholders
  - a reliable and affordable energy network
  - energy companies are earning a fair level of profit
- Constructive engagement with Ofgem
  - enabling solutions consumers want
  - underpinned by objective evidence and strong stakeholder support
- Ofgem and Government engagement for system operator outcome
  - to minimise cost to consumers



# New stakeholder led strategy

- Enhanced engagement with stakeholders
  - National Grid created the first independent stakeholder group
    - TO chaired by Trisha McCauley OBE
    - SO chaired by Charlotte Morgan
  - user group will challenge and review business plans
  - advocate for our plans
- Helps to support Ofgem and GEMA in their final determination

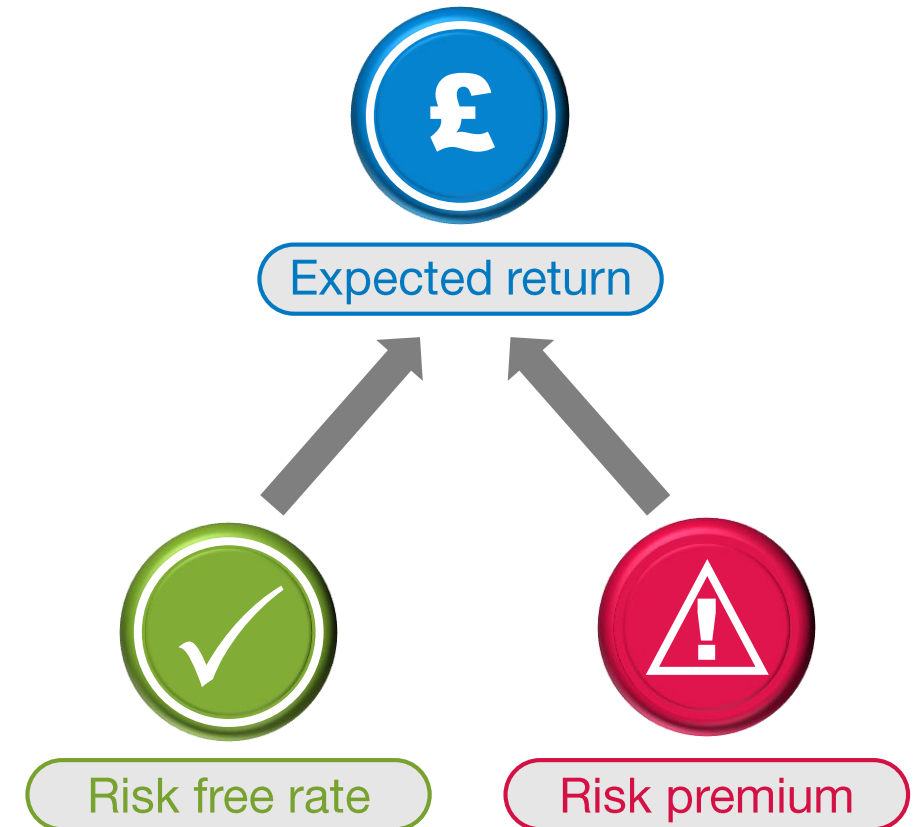


- CPIH includes housing costs and more widely relied on by statisticians
  - RPI no longer supported as an inflation measure in the UK
- We are supportive of transition
  - better reflection of consumer inflation
  - NPV neutral
  - supports our credit metrics through increased near term cash returns
- More detail to be worked through to understand the full impact
  - phasing of transition to CPIH remains to be decided

# RIIO-T2 key financial metrics

## Cost of equity

- Ofgem 3-5% range set in March 2018 not consistent with the risk of a transmission company
- Risk free rate is lower now but will be set closer to the start of RIIO-T2
- In our view asset beta has not changed significantly since the last price control
  - proposed changes inconsistent with historical precedent and FTSE data
- Proactively engaging Ofgem





# RIIO-T2 key financial metrics

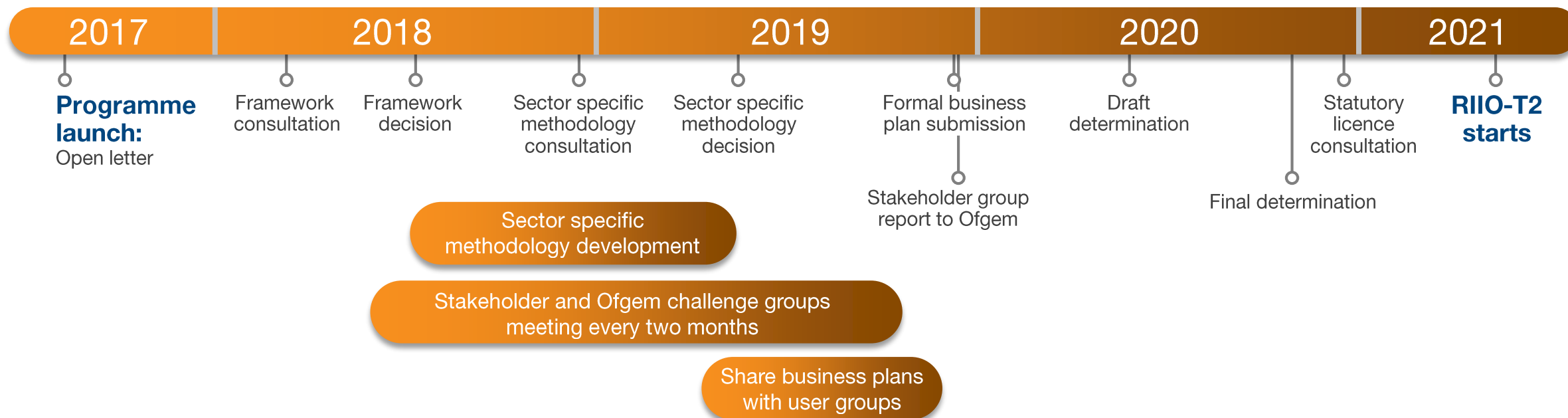
## Incentivisation and fair returns

- RIIO-T1 provides a base return complemented by symmetrical financial incentives
  - good performance has been delivered only by networks that create savings for customers
  - incentivisation is good for consumers and investors
- Legitimacy of returns is important
- We have proposed variable sharing factors which
  - shares greater proportion of outperformance as the level achieved increases
  - maintains the incentives for efficient networks
  - common in US regulation



# Well positioned for RIIO-T2

- Sector specific framework consultation will bring more definition to outputs and incentives, uncertainty mechanisms and cost of capital
- Building our business plans transparently with stakeholder group through 2019
- Draft business plan in Q1 2019, final plan submission along with the user group report in Q4 2019





REGULATION AND FINANCE

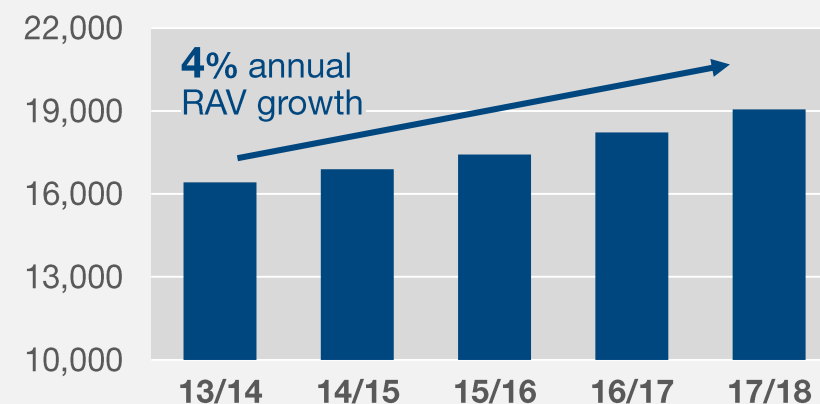
**ALAN FOSTER**

UK CFO

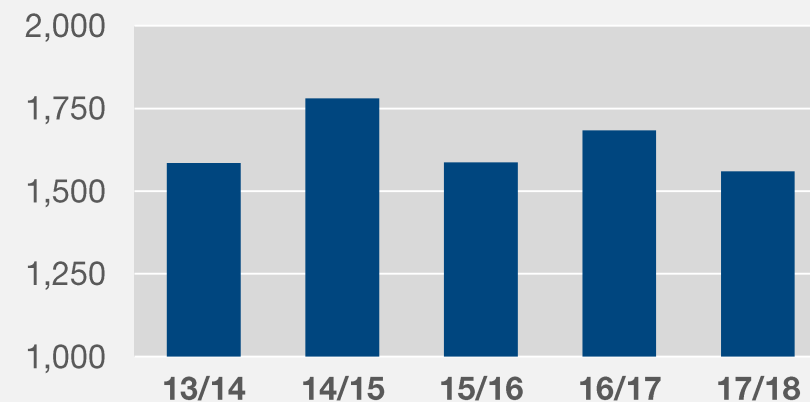
# Financial overview

- Strong regulatory performance over the first 5 years of RIIO
  - outperformed base returns by 200-300bps on average
  - UK RAV growth of 4% per annum
- Regulatory mechanisms distort short-term IFRS performance

### UK TRANSMISSION RAV (£m)



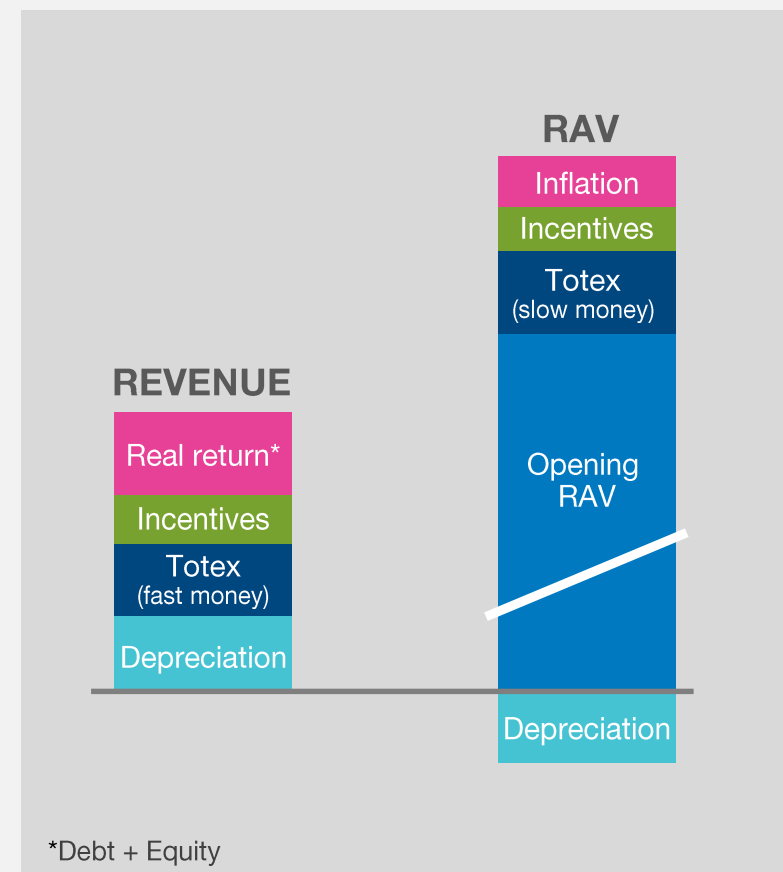
### UK UNDERLYING EBIT (£m)



# Key principles of the RIIO financial model

- RAV is recovered through regulatory depreciation
- Totex recovered through fast and slow money
- Incentives remunerated in revenue and RAV
- Real return remunerated through revenue
- Inflation remunerated through RAV

## RIIO REGULATORY MODEL

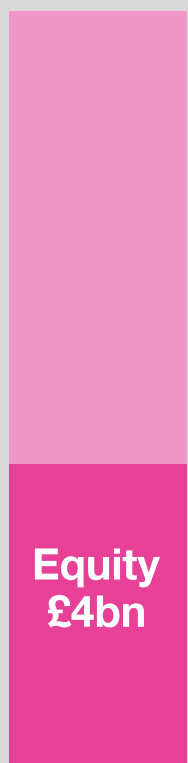




# Multiple financial drivers contribute to the overall package

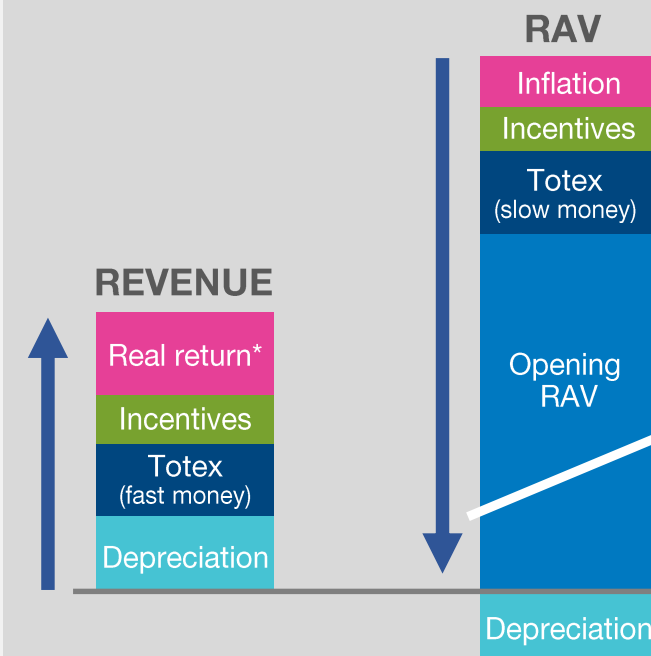
## REVENUE & RAV SENSITIVITIES EXAMPLE

RAV - £10bn



- 100bps change to ROE would impact revenue by £40m
- 50:50 transition to CPI
  - faster recovery of the RAV increases the cash return by £50m
- 5% increase to fast money
  - faster in-year funding of totex increases the cash return by £50m

## RIIO REGULATORY MODEL



\*Debt + Equity


# Opportunities for out performance remain

- Ofgem are committed to out performance for well performing companies
  - we have a strong track record of delivery that sets a good foundation to build on in RIIO-T2
- Out performance is driven by delivering what our customers want
  - innovative totex savings
  - delivering our outputs
  - new whole system outcomes

nationalgrid

**Leaner organisation, leveraging new technology**

- New streamlined processes to meet changing customer needs
  - more agile, faster decision making
- Significant opportunity through digitalisation
  - increase efficiency and enhance customer experience
- Projects already underway
  - ESO solar and demand forecasting using AI
  - GT 4D digital modelling
  - Gas Robotic Agile Inspection Device (GRAID)
  - ET line scan robot
  - further remote network health monitoring



UK INVESTOR TEACH-IN September 2018 24

# RIO-T1 outlook and summary

- Continue to expect good regulatory performance over the remainder of RIO-T1
  - out performance of 200-300bps points
  - capital investment ~£1.3bn in FY20 and FY21
- Still early days in the RIO-T2 process
- Focused on an overall financial package
- Our track record and current preparation set a good foundation for realising RIO-T2 opportunities

