

# The Voice of the Networks

**Energy  
Networks  
Association**

**GEODE Spring  
Seminar:  
Opportunities &  
challenges for local  
distributors – a UK  
view**

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## Electricity Distribution

- 1 SSE
- 2 SP ENERGY NETWORKS
- 3 Electricity
- 4 Electricity
- 5 NORTHERN POWERGRID
- 6 SP ENERGY NETWORKS
- 7 WESTERN POWER DISTRIBUTION
- 8 UK Power Networks
- 9 SSE
- 10 ESB NETWORKS

Independent distribution network operators



## Gas Distribution

- 1 SGN
- 2 Northern Gas Networks
- 3 Cadent
- 4 Gas Networks Ireland
- 5 WALES & WEST UTILITIES

Independent Gas Transporters



## Electricity Transmission

- 1 SSE
- 2 SP ENERGY NETWORKS
- 3 Electricity
- 4 nationalgrid

Owns and operates the Moyle Interconnector



## Gas Transmission

- 1 nationalgrid
- 2 Gas Networks Ireland
- 3 mutualenergy



# ENA - Who we are and what we do

- Energy Networks Association (ENA) represents the companies that operate and maintain the gas and electricity grid network in the UK and Ireland.
- The UK's energy networks have a strong track record of safely and securely providing the UK with the gas and electricity it needs, all whilst delivering for customers and the UK economy.
- They have done so in three key areas:
  1. **Trusted performance**
  2. **Reduced costs**
  3. **Investment & innovation**
- ENA advocates a holistic approach to decarbonisation with our gas networks playing a vital role in the coming years

## ACROSS GREAT BRITAIN, THE NETWORKS SERVE



**30,000,000+**  
Electricity



Customers



**23,000,000+**  
Gas

The electricity network in Great Britain is over

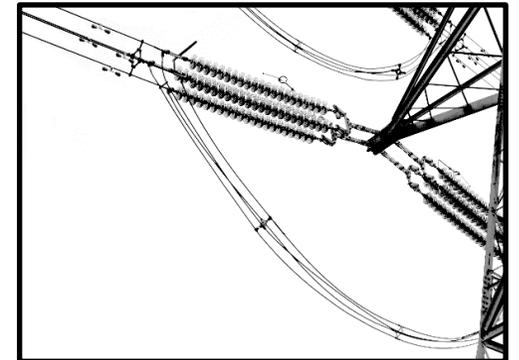
**1 million km**  
long and could circle  
the equator  
**25 times**



Gas is carried along  
**272,000 km**  
of pipe, which could go  
around the world  
**6 times**

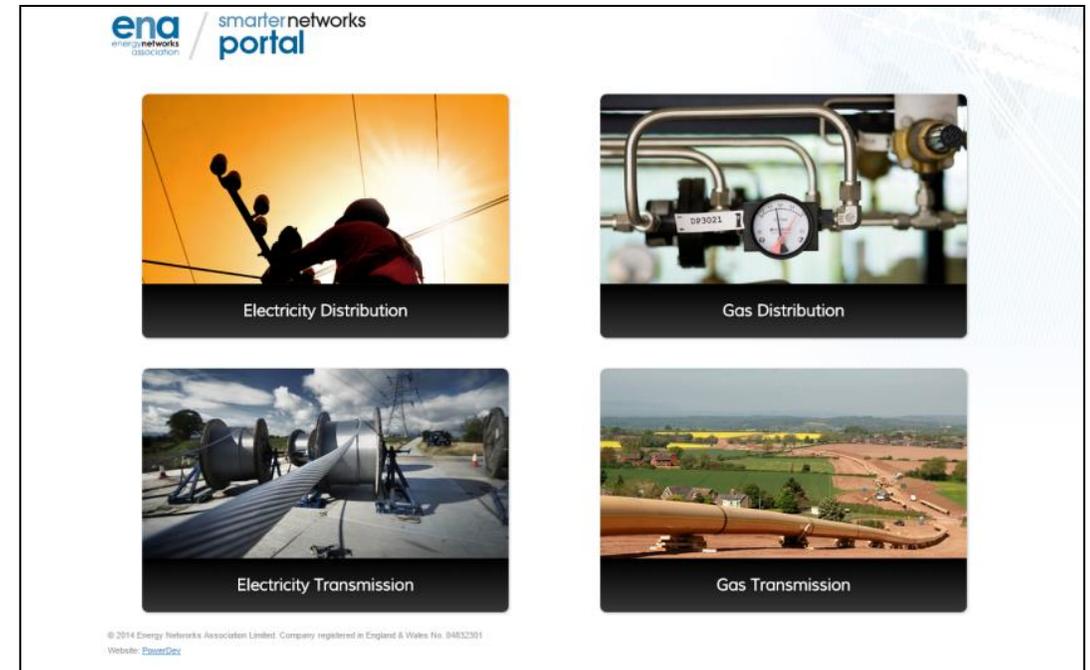
# Challenges for electricity networks

- Increasing uptake in renewable generation, both at a large scale and at a local scale.
- Increasing uptake in electric vehicles
- Increasing uptake in new technology
- Shifting demand and diversity patterns
- The connection and use of energy storage, both at a large and small scale
- Aging assets and an increasing need to plan investment and reinforcement of the network in a smart and cost efficient way
- Increased level of IDNOs (Independent Distribution Network Operators) and private wire networks



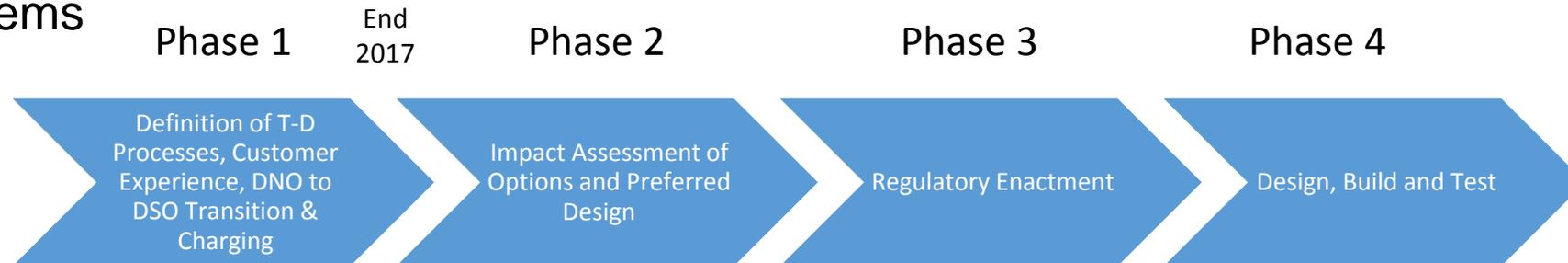
# Opportunities for electricity networks

- Distribution Network Operators (DNOs in the UK, DSOs in Europe) are already meeting the challenges of increasing DG and changing demand patterns
- The distribution network is moving away from the traditional, passive role to a more active one
- Crucial role in reducing the need for investment in traditional network reinforcement, while maintaining network reliability in a low carbon energy system.
- UK regulatory system incentivises innovation by network providers to respond to changes:
  - 2010-15: Low Carbon Network Fund - between £4.5bn and £7.8bn net benefit to consumers
  - 2015-23: Est. £1bn of projected savings in RIIO ED1 business plans as a result of innovative solutions.



- Changes create need for greater collaboration between network companies and industry stakeholders to utilise new energy technologies
- Shift from a passive DNO to a more active 'Distribution System Operator' marks a genuine change of responsibilities to manage electricity generated and used by disruptive technologies.
- The TSO-DSO Project is bringing network operators and key stakeholders together to explore some of the detailed challenges around evolving roles and responsibilities in the short, medium and long term to ensure that the best models for UK customers are identified and taken forward.
- The Project is an opportunity to share key information and lessons with European colleague

- The objectives of the TSO-DSO Project for the first phase of work in 2017 are to:
  1. Develop improved T-D processes around connections, planning, shared TSO/DSO services and operation
  2. Assess the gaps between the experience our customers currently receive and what they would like, and identify any further changes to close the gaps within the context of a 'level playing field' and common T & D approach
  3. Develop a more detailed view of the required transition from DNO to DSO including the impacts on existing organisation capability
  4. Consider the charging requirements of enduring electricity transmission/distribution systems



# Challenges for gas networks

- UK has an extensive gas network, heating 85% of domestic properties
- The challenges of the low carbon transition will require a holistic approach which recognises the vital role of gas and the gas networks in affordable and secure energy future.
- Currently over 80% of energy usage at peak time is derived from gas. The gas network will provide vital support to electricity infrastructure during peak usage both during the low carbon transition and as part of a lower carbon future.
- If the use of electric heating becomes more prevalent, the electricity network will also need to cope with greater seasonal peaks in winter.



**Customer Choice** - Gas is the fuel choice for UK consumers, meeting the heating needs of almost 85% of domestic properties and the cooking needs of around 50% residential and service sector buildings.



**Security** – Over 80% of peak energy usage is currently derived from gas. Without gas and the gas networks there is simply not enough energy for the UK to function or the means to transport that energy at peak periods.



**Sustainability** – Peak gas and electricity demand is 25 times higher than existing low carbon capacity.



**Affordability** - Heating your home by gas is around 3 times cheaper than using electricity and saves consumers over £400 per annum compared to alternatives.

# Four 2050 scenarios for gas networks

## 1 Evolution of Gas networks

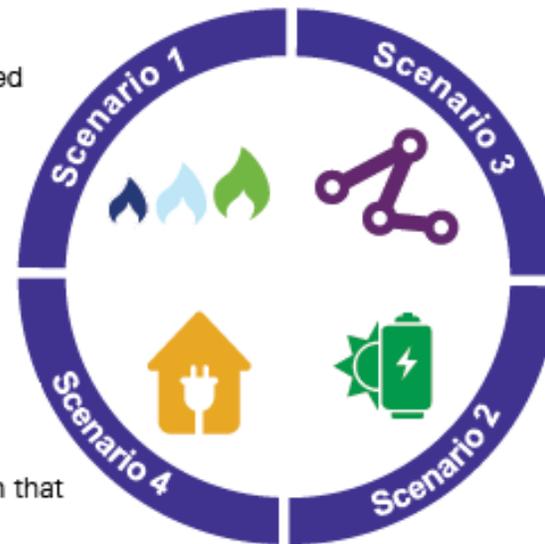
- Gas remains the main heating fuel for the majority of customers.
- Heat is partially decarbonised. The majority of customers convert to Hydrogen gas, derived from natural gas with CO2 permanently stored (sequestered) under the continental shelf.
- Transport is mostly decarbonised.
- Gas distribution networks are mostly used for Hydrogen gas across the country.

### National infrastructure

## 4 Electric Future

- Switch to electric heating systems.
- Heat is decarbonised with assumption that power generation is completely decarbonised by 2050.
  - Majority of Transport is decarbonised.
- Gas distribution networks not used.

### Low substitution of gas



### High substitution of gas

## 3 Diversified energy sources

- A mixture of different technologies is used in different areas of the country.
- Heat is partially decarbonised with a mixture of biomass sourced heat networks, gas and electric heating.
- Transport is partially decarbonised.
- Gas distribution networks only used in half of the country.

### Local infrastructure

## 2 Prosumer

- Self-generating heating and energy solutions develop, but only provide minority of energy, the rest use electric heating.
- Heat is decarbonised with a mixture of self-generating heat and storage, and electric heating.
  - Majority of Transport is decarbonised.
  - Gas distribution networks not used.

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