

UK BEIS Programme for SMR and Innovative Technologies

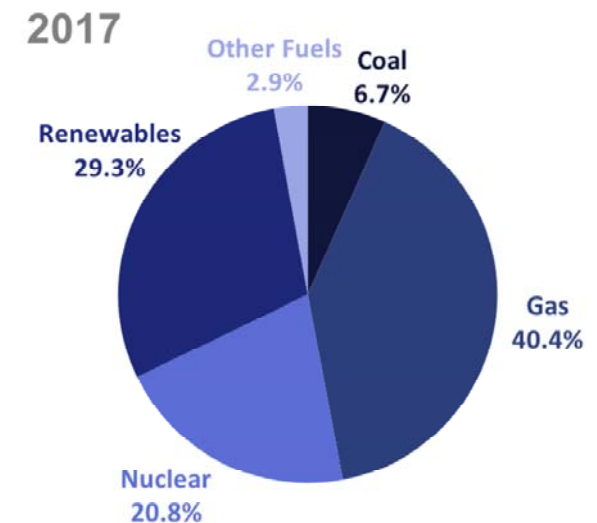
Dan Mathers



UK Current Nuclear Landscape

- Powering homes and businesses for over 60 years
- 20% of the UK's electricity needs
- **40% of UK low-carbon electricity**
- Low-carbon, secure and reliable base-load power
- Steady public/cross party support

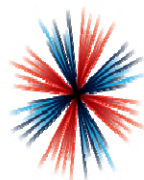
Shares of electricity generation by fuel



Source:
DUKES



Department for
Business, Energy
& Industrial Strategy



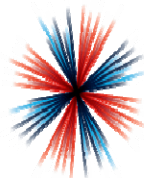
**INDUSTRIAL
STRATEGY**

Future of UK Energy

- Net Zero means “more of everything” (including CCUS for Gas)
- Need to meet much higher electricity demand as we decarbonise energy, transport and heat
- Need to go “beyond the grid” into industrial process and hydrogen production/use
- VfM important – will be a system wide cost (not just cheapest component)



Department for
Business, Energy
& Industrial Strategy



**INDUSTRIAL
STRATEGY**

UK Clean Growth Strategy



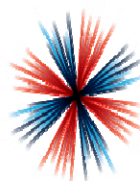
**Not just about decarbonisation
– also about economic growth**

Some key policies to enable:

- Acceleration of clean growth – develop world leading **Green Finance** capabilities.
- Accelerating the shift to low carbon **transport**.
- Rolling out low carbon **heating** - phase out the installation of high carbon fossil fuel heating in new and existing homes.
= Delivering clean, smart, flexible, reliable power.



Department for
Business, Energy
& Industrial Strategy



**INDUSTRIAL
STRATEGY**

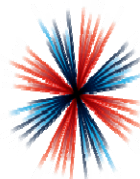
Why Nuclear?

- Currently provides around 40% of UK's low carbon electricity
- Reliable baseload power complements the growing renewable portfolio
- UK Nuclear sector is an economic powerhouse currently equivalent in scale to the aerospace manufacturing industry
- Provides highly-skilled, long-term employment for 87,000 people and is a driver of regional growth
- Can do more than electricity generation

- Sites currently generating
- *NPS sites with development proposed*
- *NPS Sites, no proposals at present*



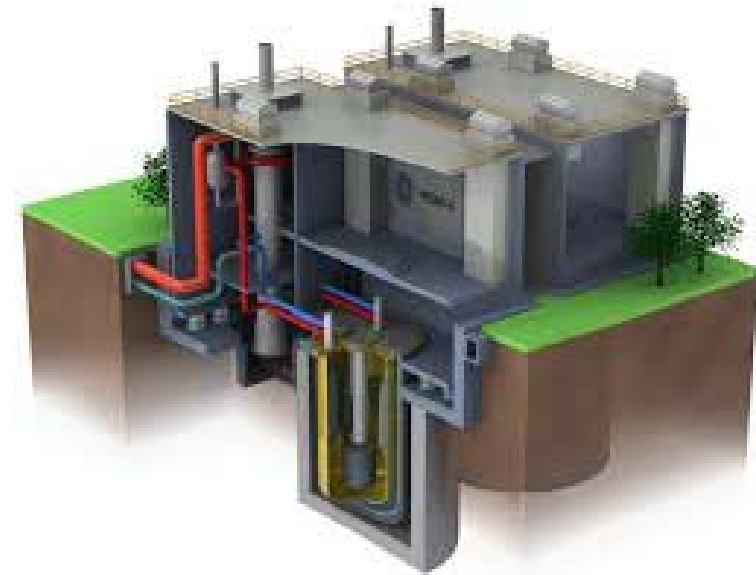
Department for
Business, Energy
& Industrial Strategy



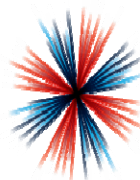
**INDUSTRIAL
STRATEGY**

Potential applications of nuclear

- a) Low cost power
- b) Flexible power
- c) Process heat
- d) Hydrogen production
- e) District heating
- f) Medical isotopes
- g) Recycling
- h) Seawater desalination



Department for
Business, Energy
& Industrial Strategy



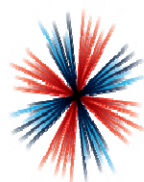
**INDUSTRIAL
STRATEGY**

Future demand?

- Nuclear is a key part of the UK energy strategy going forward
- Nuclear contribution is reducing both in absolute terms and as a % as reactors retire and demand grows
- Electricity demand expected to at least double
- New nuclear and gas combined with CCUS will be required to provide a baseload



Department for
Business, Energy
& Industrial Strategy



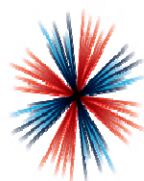
**INDUSTRIAL
STRATEGY**

Principles for New Nuclear: Sustainability

- Nuclear has an important, *complementary* role to play in the UK's energy future as we transition to a low carbon economy
- Public acceptability
- Emphasis on value for money for consumers and taxpayers – 30% cost reduction in new build by 2030
- Sustainable funding mechanisms are key
 - The Government looking at alternative funding models to finance large-scale new nuclear projects to reduce the costs of capital and therefore costs to consumers.
 - Consulting on the Regulated Asset Base (RAB) model as a sustainable funding model that can attract significant investment for new nuclear projects.



Department for
Business, Energy
& Industrial Strategy

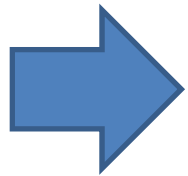


**INDUSTRIAL
STRATEGY**

Sector development

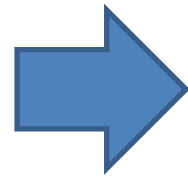
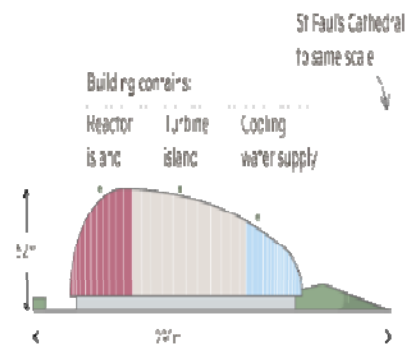
1950s - Present

1st to 3rd Generation nuclear reactors



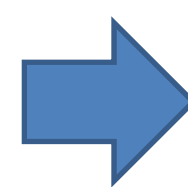
2030s

Small Modular Reactors (SMRs)



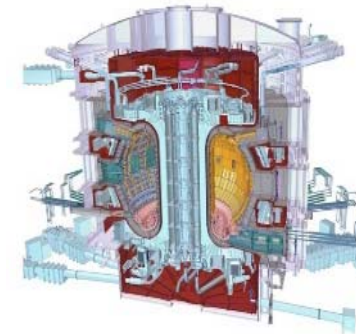
2040s

Advanced Modular Reactors (AMRs)

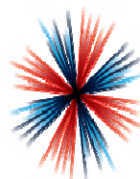


2050s +

Nuclear Fusion



Department for
Business, Energy
& Industrial Strategy



**INDUSTRIAL
STRATEGY**

Nuclear Pipeline 1#

Large Scale – existing technology

- Hinkley Point C
- Sizewell C
- Bradwell B

Nuclear Pipeline 2#

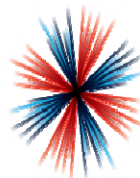
- Wylfa?
- Moorside?
- Oldbury
- Hartlepool
- Heysham

Nuclear Pipeline 3# ??

- Trawsfynydd?
- Sellafield?
- NDA land?
- MoD land?
- Coal power stations?
- Industrial sites?



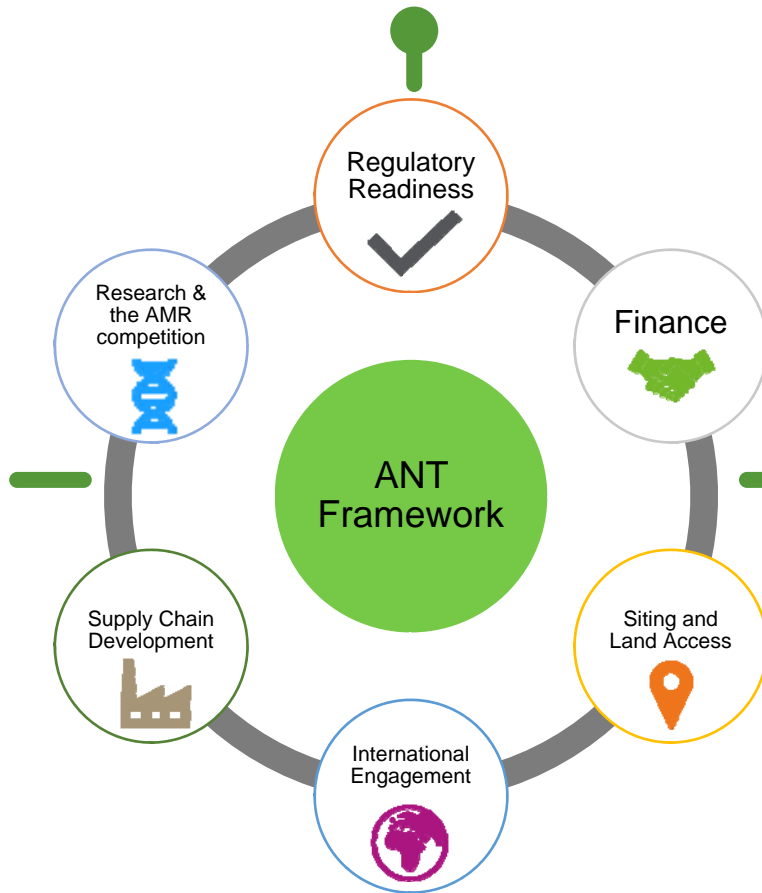
Department for
Business, Energy
& Industrial Strategy



**INDUSTRIAL
STRATEGY**

The Advanced Nuclear Policy Framework

ANT Framework Developed




 Department for
 Business, Energy
 & Industrial Strategy



Advanced Modular Reactor Feasibility and Development - £44m phased scheme to develop advanced reactor designs

6th November 2018 – Commercialisation of Small Nuclear in the UK
 Next: 2nd December 2019
 Commercialisation of Small Nuclear

£12 million invested to modernise and build capability and capacity of the UK Regulator GDA process

Low Cost Nuclear Challenge accepted in the Industrial Strategy Challenge Fund – An initial £18 million to be awarded to Rolls-Royce subject to business case and other approvals

UK re-joining the Generation IV International Forum
 US and UK Research and Development action plan
 Participation in the Clean Energy Ministerial and the NICE Future

Advanced Manufacturing and Construction Programme – £20 million to develop technologies for SMRs and AMRs

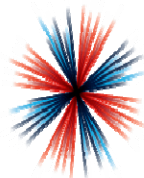
Nuclear Innovation Programme –
 Advanced Fuel Cycle Programme (£56M)
 Digital Reactor Design (£30M), Toolkit (£4M)

Thank you for listening

Daniel.mathers@beis.gov.uk



Department for
Business, Energy
& Industrial Strategy



**INDUSTRIAL
STRATEGY**