NUCLEAR AMRC

ADVANCED MANUFACTURING RESEARCH CENTRE

Advancing UK manufacturing

The University Of Sheffield.

MANCHESTER 1824
The University of Manchester
Dalton Nuclear Institute

Supported by the
Regional Growth Fund

CATAPULT
High Value Manufacturing

EUROPEAN UNION
Investing in Your Future
European Regional Development Fund 2007-13

NUCLEAR **AMRC**

Nuclear supply chain support & progress

Andrew Storer

September 2016

Agenda

1 Introduction to the Nuclear AMRC

2 UK challenge

3 What are we doing to meet the challenge?

NUCLEAR **AMRC**

PLAY VIDEO (SHORT VERSION)

Nuclear AMRC – at the heart of advanced manufacturing

Purpose-built 8,000m^2 facility located on the Advanced Manufacturing Park, South Yorkshire.

Part of University of Sheffield AMRC:

- AMRC with Boeing
- Castings Technology International
- AMRC Training Centre

Collaboration with The University of Manchester Dalton Nuclear Institute

Equipment and expertise

Research factory

- 8000m^2 facility
- £60 million capital equipment
- Specified for representative-sized nuclear components

Engineering expertise

- Open access to over 70 advanced manufacturing experts
- Over 1,000 person-years of manufacturing experience
- Most have higher degrees or chartered engineer status
- Access to wider AMRC and University

Making an impact – closing the innovation gap

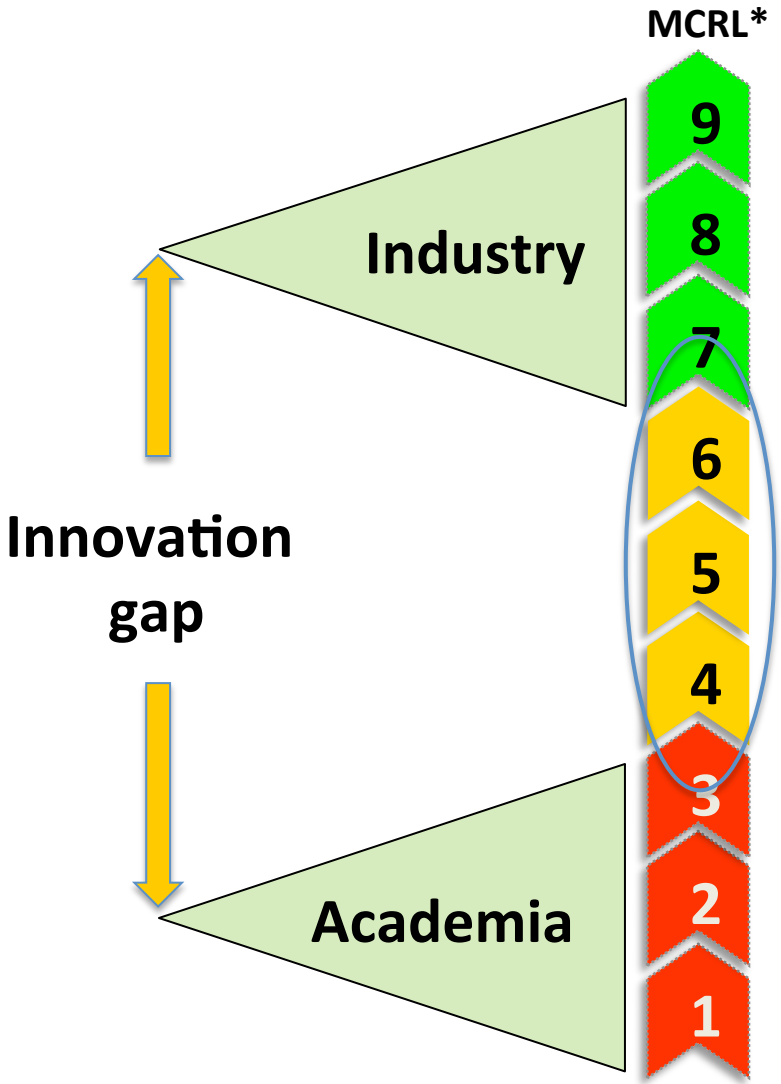
Advancing manufacturing

Taking technologies from the laboratory to the factory gate

Technology development from MCRL 3 to 7 can be expensive and time-consuming – Catapult centres reduce the risk

Focus on large-scale, high-precision, quality-led manufacturing:

- Machining
- Welding & cladding
- Metrology & inspection
- Engineering support



National network of expertise

High Value Manufacturing Catapult

Network of 7 manufacturing R&D centres, backed by Innovate UK.

- Advanced Forming Research Centre
- Centre for Process Innovation
- **Nuclear AMRC**
- AMRC with Boeing
- Manufacturing Technology Centre
- Warwick Manufacturing Group
- National Composites Centre

c£15 value added for every £1 invested

Nuclear AMRC

Our mission

The Nuclear AMRC helps UK companies win work in civil nuclear – in new build, operations, decommissioning and new technology

The UK’s nuclear challenge

UK civil nuclear

New build

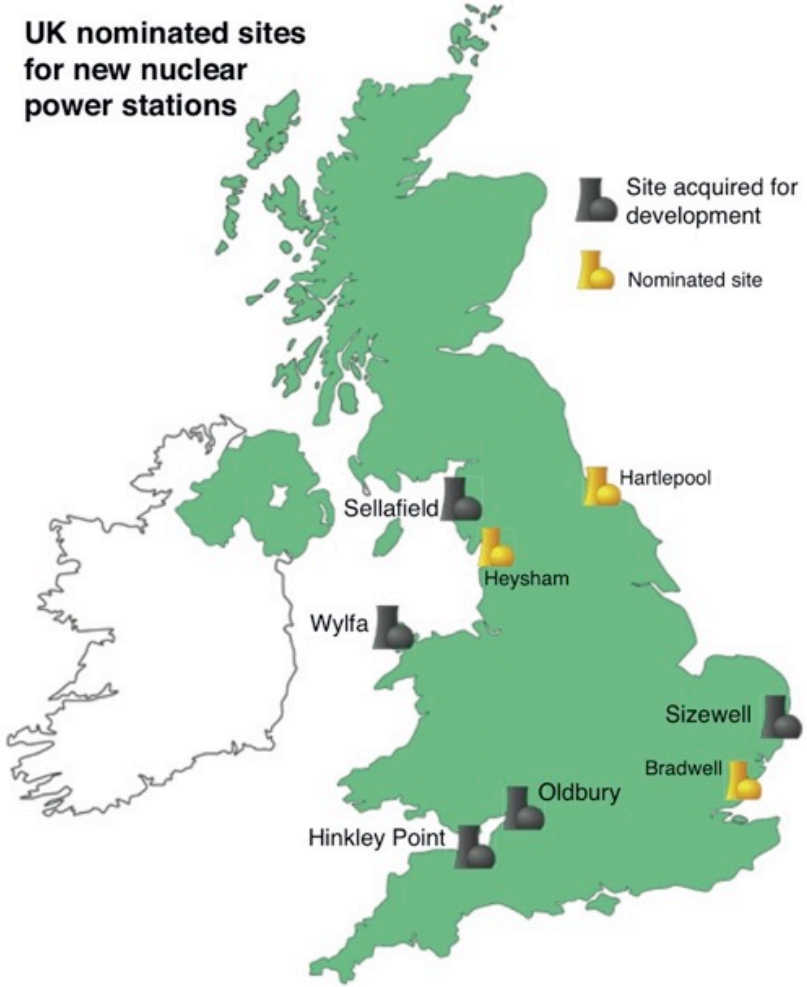
There are currently three developers planning up to 16GW new capacity at five sites around England and Wales

Potential of further developers beyond 16GW

Could be Gen III, Gen IV, SMR and Fusion design

National imperatives:

- Diverse technology – EPR, AP1000, ABWR
- Economic strike price
- Advanced manufacturing capability & capacity
- Create long-term high-value jobs
- Export opportunity



UK civil nuclear

Operations

EDF Energy: 15 reactors at 7 sites around UK

Supply chain requirements c£600 million a year

Decommissioning

17 sites managed by Nuclear Decommissioning Authority through 6 site licence companies

Supply chain requirements c£1.5 billion a year

National imperatives:

- Safe and secure generating fleet
- Affordable electricity supply
- Manage waste
- Site clean-up on time

Sizewell B

Sellafield

UK defence nuclear

Operating fleet

Maintain at-sea deterrent

New build

Manufacture the Astute Class plant

Design and manufacture new state-of-the-art plant

On-time and affordable

Summary of the UK challenge

- Affordable, safe, low carbon electricity generation

- Deliver current nuclear programmes
  - Maintain/manage current generating fleet
  - Manage waste and clean-up programmes in line with schedule

- Capitalise on civil nuclear new build opportunity (inc SMR)
  - Create long term high value jobs and economic value
  - Create export opportunities
  - Develop UK capability / capacity for the future

- UK supply chain working with different technologies and cultures

- Deliver other large infrastructure programmes in parallel (HS2 etc)

So what is the UK doing about this?

SMR roadmapping
EOI process

F4N (supply chain development)
Skills – workforce modeling
ICE construction forum

Manufacturing forum
Developer supply chain events

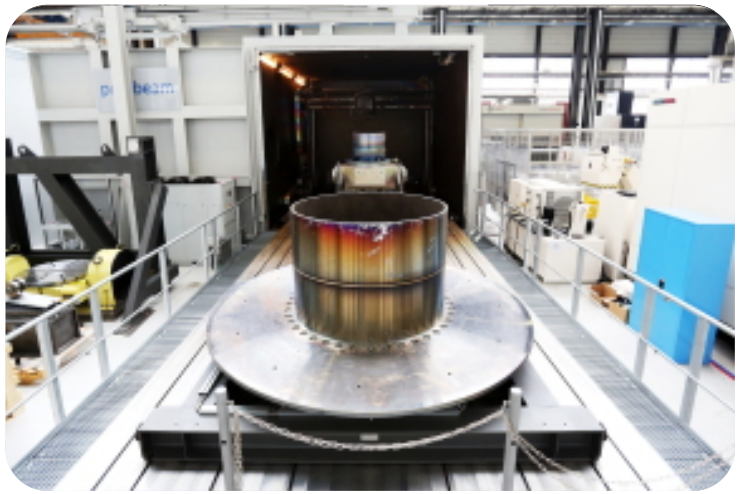
Local enterprise events
Government strategy action plans

NIC and industrial strategy

How is the Nuclear AMRC tackling the challenge?

Manufacturing innovation

- Improving cycle time and quality
- Reducing lead time, cost and risk
- Developing innovative techniques and technologies



How is the Nuclear AMRC tackling the challenge?

Supplier development

- Raising quality, capability and cost competitiveness
- Helping companies meet nuclear industry requirements

We are open to all UK manufacturers with strong ambitions to work in nuclear

How is the Nuclear AMRC tackling the challenge?

Supplier development programmes:

- **F4N**
- **CNSIG**
- Ask Nuclear
- Nuclear AMRC Local
- Nuclear Link

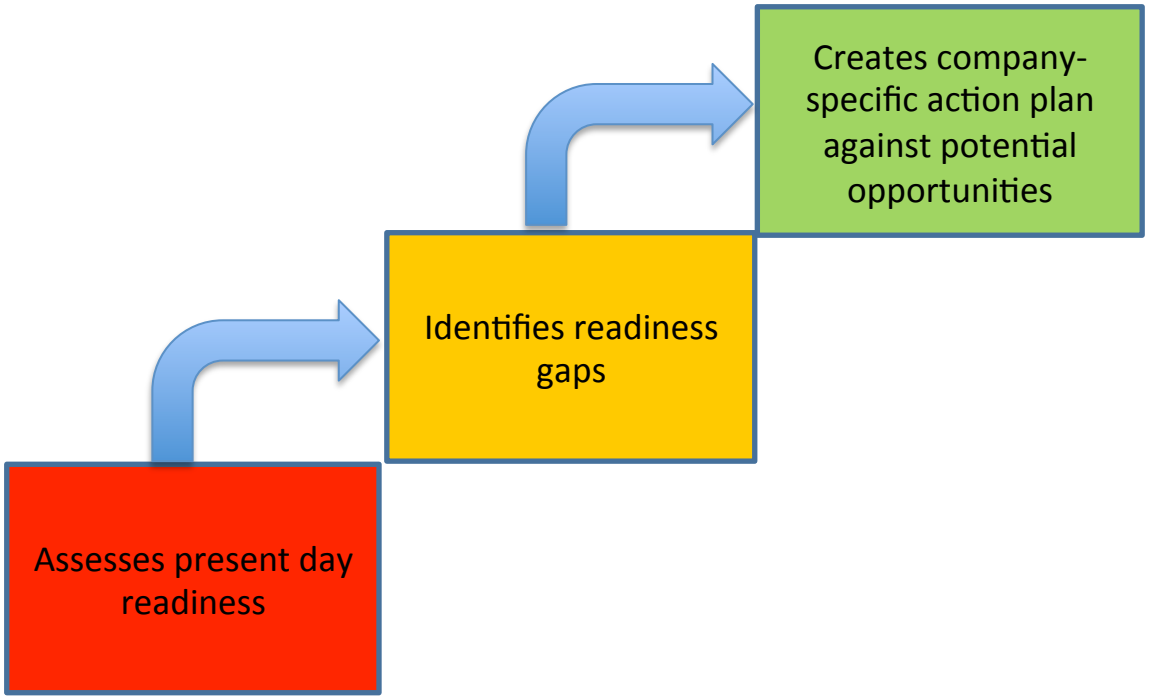
F4N
Fit For Nuclear

F4N and **CNSIG** provide the current focus

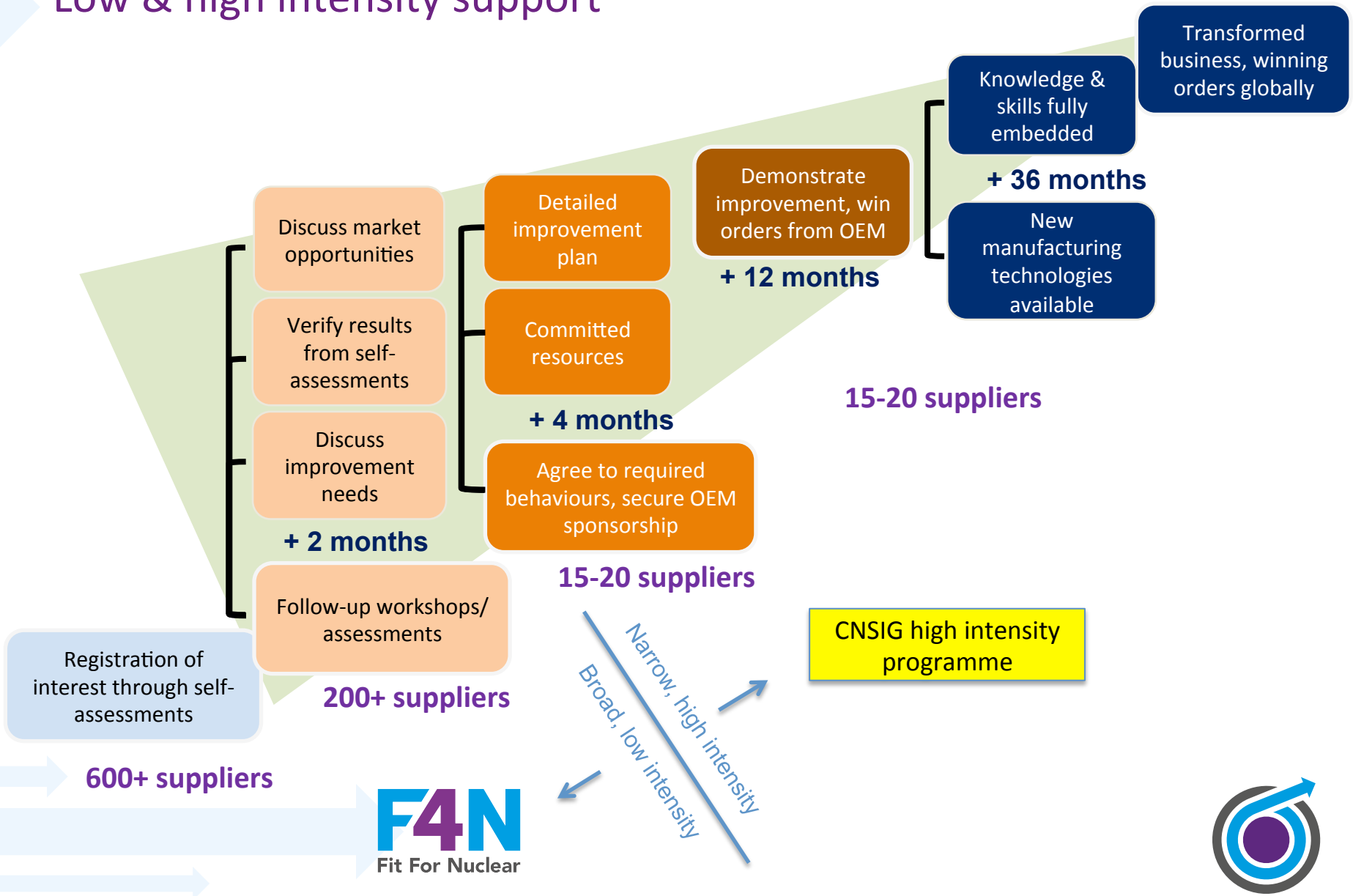
NUCLEAR AMRC
LOCAL

Fit For Nuclear

F4N offers a focused and free-to-use readiness programme,
designed for manufacturing supply chain companies wanting to win work in nuclear



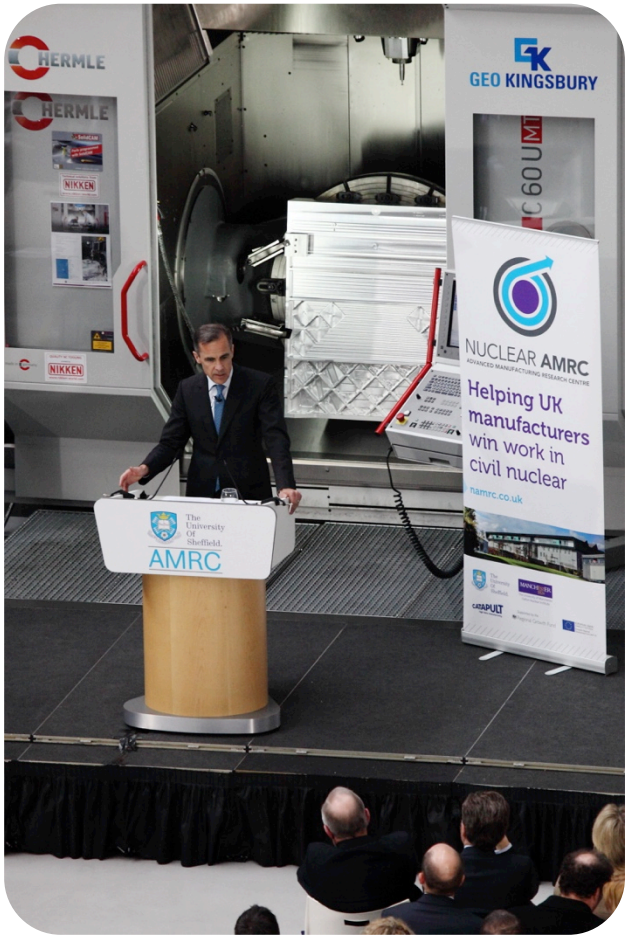
Low & high intensity support



Nuclear AMRC impact for UK industry

So far we have:

- Helped companies win over **£600 million** of new business, creating or sustaining over **3600 jobs**
- Worked with over **800 SMEs**
- Welcomed over **4000 industry group visits** to our centre
- Helped over **400 companies** through the Fit For Nuclear assessment
- **100+** companies granted F4N status



But we can do more….

Demand modelling – collaboration with NIA

Main product groups in:

- New build
- Operations
- Decommissioning
- Defence

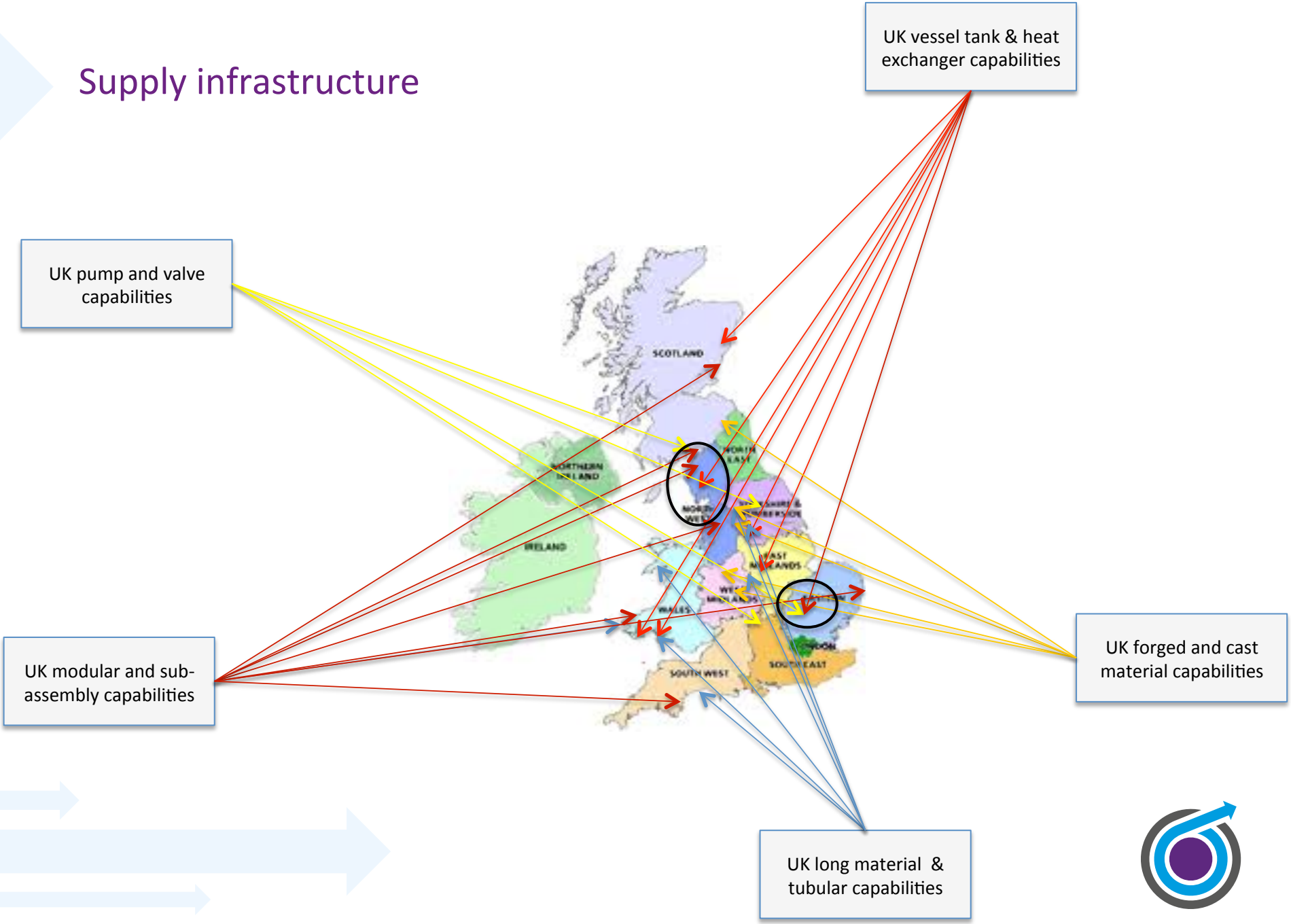
Aggregate numbers across the sector

Identify opportunities and risk

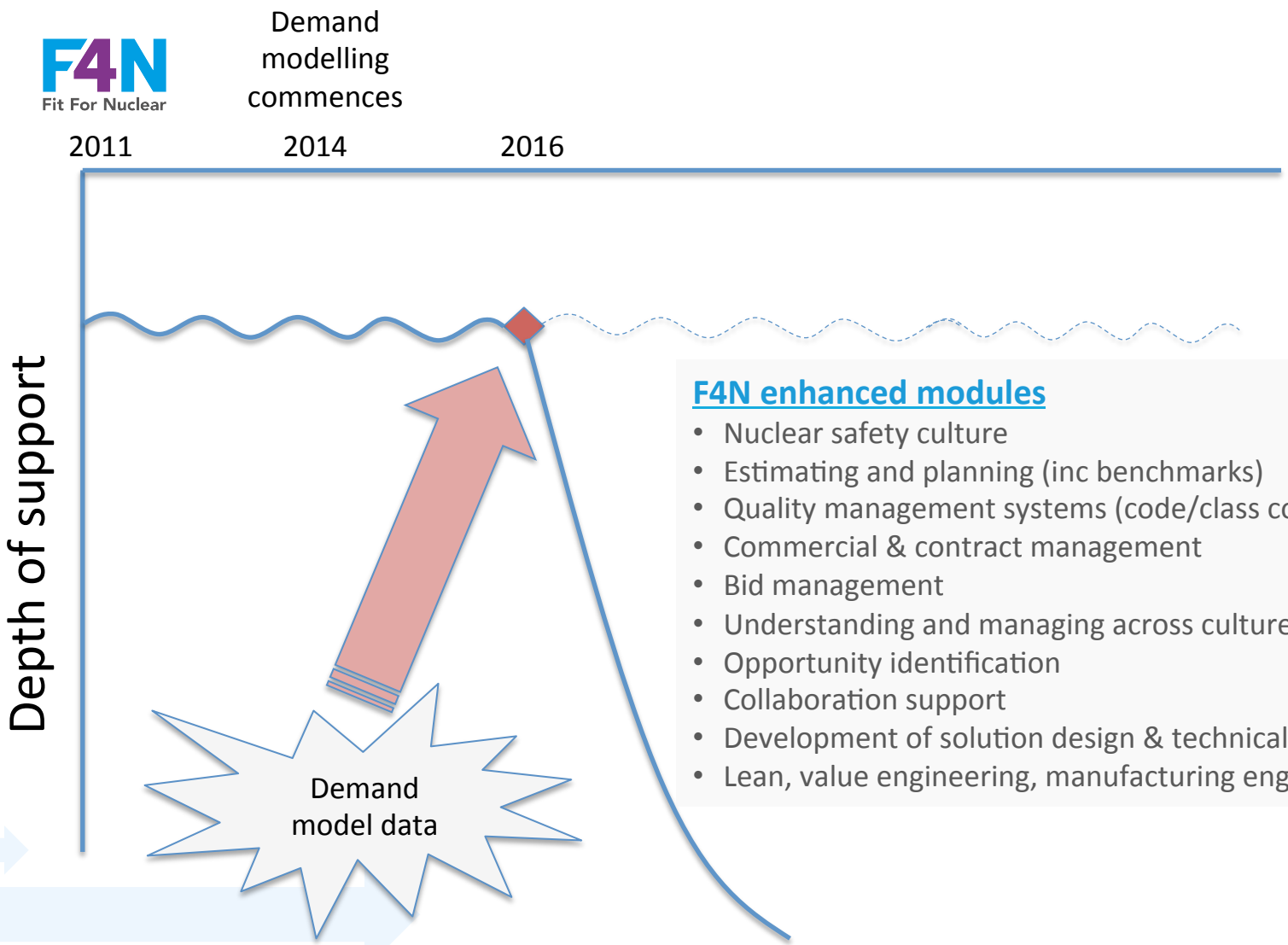
Example numbers

Commodity Group	NDA		Existing		New Build			Demand	Capacity	Gap	Mitigation
	Sellafield	Magnox	EDFE	MoD	EPR	AP1000	ABWR				
Valves	1500	1000	500	350	1000	1000	1000	6350	5000	-1350	Smooth demand
Pumps	1000	750	750	500	500	500	500	4500	4000	-500	Add capacity
Heat Exchangers	50	50	20	10	50	50	50	280	300	20	Add capacity
Presure Vessels	15	15	50	25	50	50	50	255	300	45	Smooth demand
Sensors	500	500	500	150	500	500	500	3150	4000	850	OK
Pipes											
Shield Doors											
Cranes											
Steelwork											
Diesels											
Waste Building											

Supply infrastructure



Increasing Nuclear AMRC impact



F4N enhanced modules

- Nuclear safety culture
- Estimating and planning (inc benchmarks)
- Quality management systems (code/class compliance)
- Commercial & contract management
- Bid management
- Understanding and managing across cultures
- Opportunity identification
- Collaboration support
- Development of solution design & technical specifications
- Lean, value engineering, manufacturing engineering

Summary

- Coordination of interventions is getting much better
- We understand sector capabilities and challenges, and are targeting specific interventions
- We need to be realistic about the scope from current planned new build plants
- SMRs could provide great UK supply chain opportunity, but there is a long way to go
- We need to continue to deliver existing nuclear programmes, and grow for new nuclear
- There are significant challenges but we are addressing them

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