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# The UK approach to SMRs

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# UK nuclear power stations

- 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 energy – currently for baseload power.
- Reduction in UK's CO2 emissions.
- Diversifying local economies.



# History of UK interest in SMRs

UK Government has had a growing interest in SMRs, amid suggestions they are well placed to become part of the energy mix in the UK, and globally, in the foreseeable future.

This interest in the potential benefits offered by SMRs was first set out in the Nuclear Industrial Strategy, published in 2013.

In particular, SMRs may have the potential to enable:

- Shorter deployment times.
- Less costly financing.
- Reduced costs of nuclear power for energy consumers.
- High value opportunity for UK industry.
- Increased flexibility in low-carbon generation.
- Improved ability to site.
- Added functionality.

# Outcome of SMR projects 2014-17

UK undertook a series of studies of small and modular nuclear designs.

“SMR”, as commonly understood, is too narrow a description for technologies coming forward. Generally advanced nuclear technologies fall into one of 2 groups:

- Generation III water-cooled Small Modular Reactors (SMRs), which are similar to existing nuclear power station reactors but on a smaller scale.
- Generation IV and beyond Advanced Modular Reactors (AMRs), which use novel cooling systems or fuels to offer new functionality (such as industrial process heat) and potentially a step change reduction in costs.

**Twin-track approach needed**

# UK's SMR and AMR framework



## Regulatory Readiness

Up to £12m to build capability and capacity  
GDA Optimisation for small and advanced reactors  
Vendor engagement



## Finance

Consideration of recommendations from the [Expert Finance Working Group](#).



## Siting & Land Access

Role of HMG in enabling sites  
Process to be announced soon



## International Engagement

UK re-joining GIF  
Participation in Nuclear Innovation: Clean Energy (NICE) Future  
Bilateral cooperation e.g UK-Poland IGC



## Supply Chain Development

£20m for Advanced Manufacturing & Construction Programme



## Research & the AMR Competition

Underpinning “need-case” for small nuclear  
Up to £44m for Advanced Modular Reactor (AMR) Programme

# Expert Finance Working Group



Expert group brought together from financial sector, industry, academia and Government



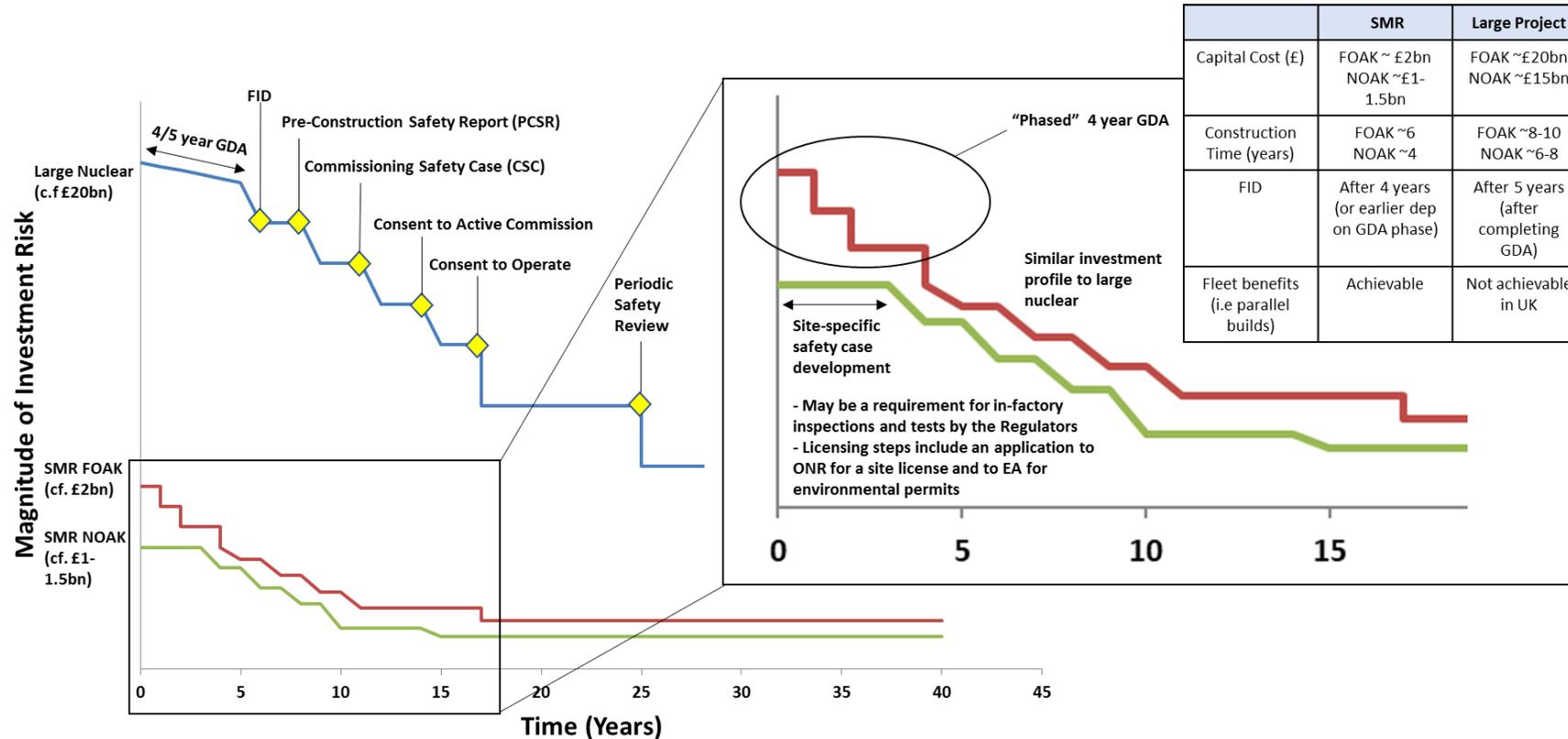
Organisations came forward throughout the process to present commercial/financing models



Process identified opportunities to integrate financial and nuclear sectors

- The Group has identified several market conditions which if in place could attract private finance to support small nuclear technologies coming forward as commercially viable propositions.
- The Group issued a series of recommendations that it believes could enable the UK to become a vibrant market place for small and advanced reactor technologies.

# What makes small nuclear different?



# Advanced Modular Reactor programme

Supports the development of non-water cooled modular reactor technology

- Phase 1: funding (up to £4 million) to undertake a series of feasibility studies for AMR designs. Contracts are worth up to £300,000 (excluding VAT)
- The following 8 organisations have been awarded contracts to produce feasibility studies as part of phase 1 of the AMR F&D project:
  - Advanced Reactor Concepts LLC
  - DBD Limited
  - Blykalla Reaktorer Stockholm AB (LeadCold)
  - Moltex Energy Limited
  - Tokamak Energy Ltd
  - U-Battery Developments Ltd
  - Ultra Safe Nuclear Corporation
  - Westinghouse Electric Company UK



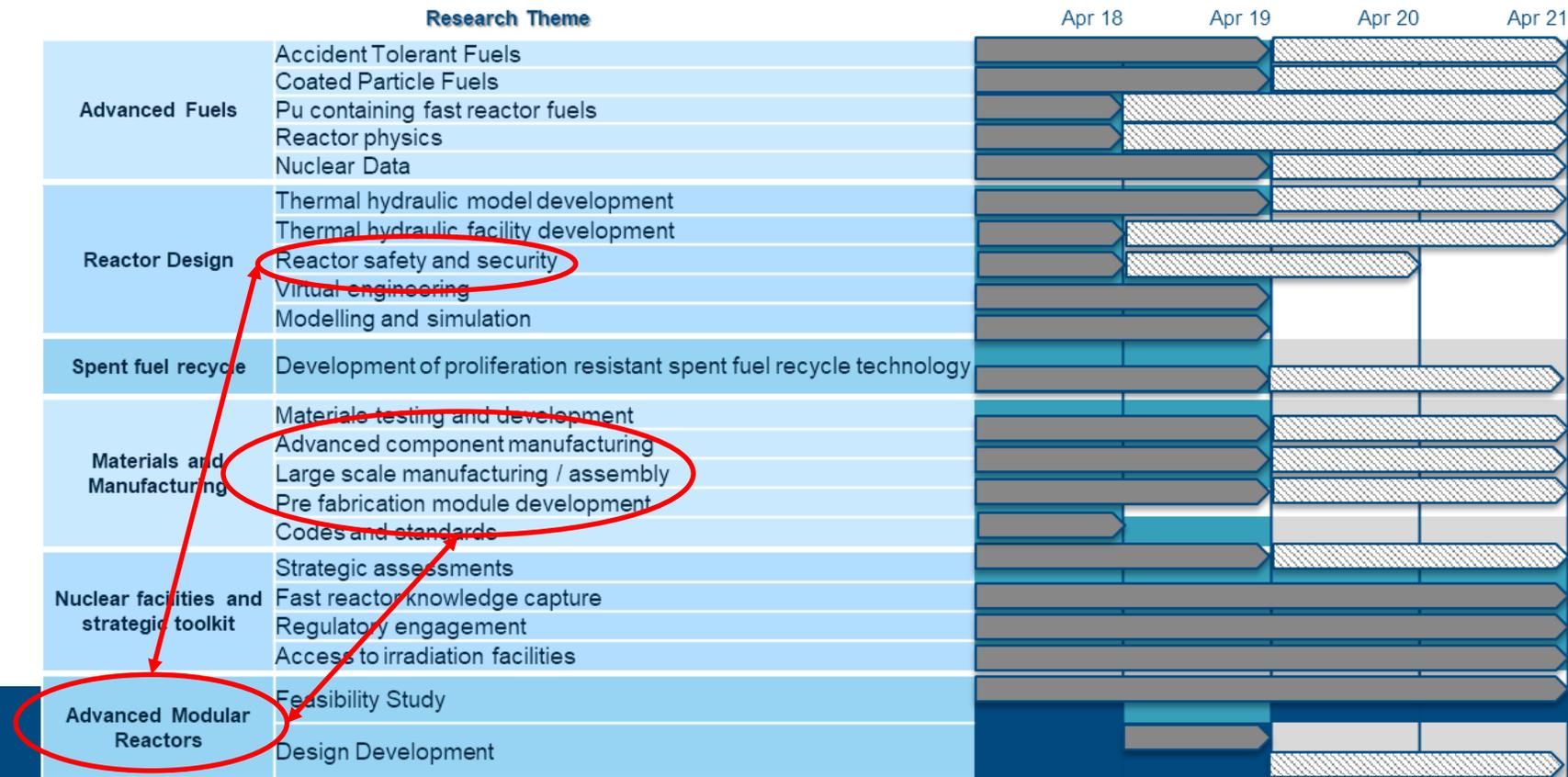
# Advanced Modular Reactor programme

Phase 2: subject to phase 1 demonstrating clear value for money and government approval, a share of up to £40 million could be available for selected projects from phase 1 to undertake development activities. Up to a further £5 million may also be made available to regulators to support this.



# Relation to wider UK nuclear innovation

AMR / SMR work relates to wider sections of the current UK Nuclear Innovation Programme.



# Relation to wider UK nuclear innovation

R&D on AMRs also relates to the UK's recent accession to the GIF Research Framework Agreement.



- Common themes include HTRs, metal-cooled FRs, advanced manufacturing and materials, etc.
- UK engagement in advanced reactor systems and energy market needs.

# Thank you for your attention!

Further reading:

Advanced Nuclear Technologies policy:

<https://www.gov.uk/government/publications/advanced-nuclear-technologies/advanced-nuclear-technologies>

Market framework for financing small nuclear:

<https://www.gov.uk/government/publications/market-framework-for-financing-small-nuclear>

