*Building **better energy** together*

WELCOME

Nuclear New Build

Hinkley Point C: Innovation in Knowledge Management

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EDF Energy

- We employ nearly 14,000 people
- We generate around 20 - 25% of UK's electricity
- We are the countrys largest producer of low carbon electricity
- We operate eight nuclear power stations plus wind farms, gas, and coal
- We plan to build four new nuclear reactors:
    - 2 at Hinkley Point in Somerset
    - 2 at Sizewell in Suffolk

Hinkley Point C

HPC Progress

- To Date
  - Development Consent Order granted in 2013
  - Electricity Market Reform: the Energy Act achieved Royal Assent
  - Project will benefit from UK Guarantees Scheme
  - New Chinese and French partners identified
  - Industrial Relations agreements achieved with main trade unions
  - Design Reference Configuration established
- Next
  - Final Agreements with Investors and UK Government
  - FID (Final Investment Decision)

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Initial Site Construction - Archaeology

What is **Nuclear** Knowledge Management?

Nuclear Projects

- Complex projects!

- Covering the entire nuclear lifecycle from design, construction, commissioning, operations, and eventually decommissioning

- Long timescales:

  Construction + Operations + Decommissioning

  = Over 100 years of Knowledge to manage

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Types of Knowledge

- **Explicit knowledge** is declared knowledge:
    - Easily captured and codified.
- **Implicit knowledge** is difficult to reveal, but possible to record:
    - Why things (such as the EPR design) are as they are.
- **Tacit knowledge** is the most difficult to store or transfer:
    - Individual's knowledge of how they function within an organisation.

Properties of Knowledge

- Decays over time, what is the "half-life" of knowledge? ~20 years?
- Needs to be viewed as an asset
- Continuously increases over the entire lifecycle of the project

$$\mathcal{K}\textbf{nowledge} = f(\textit{info, experience of use, application, context})$$
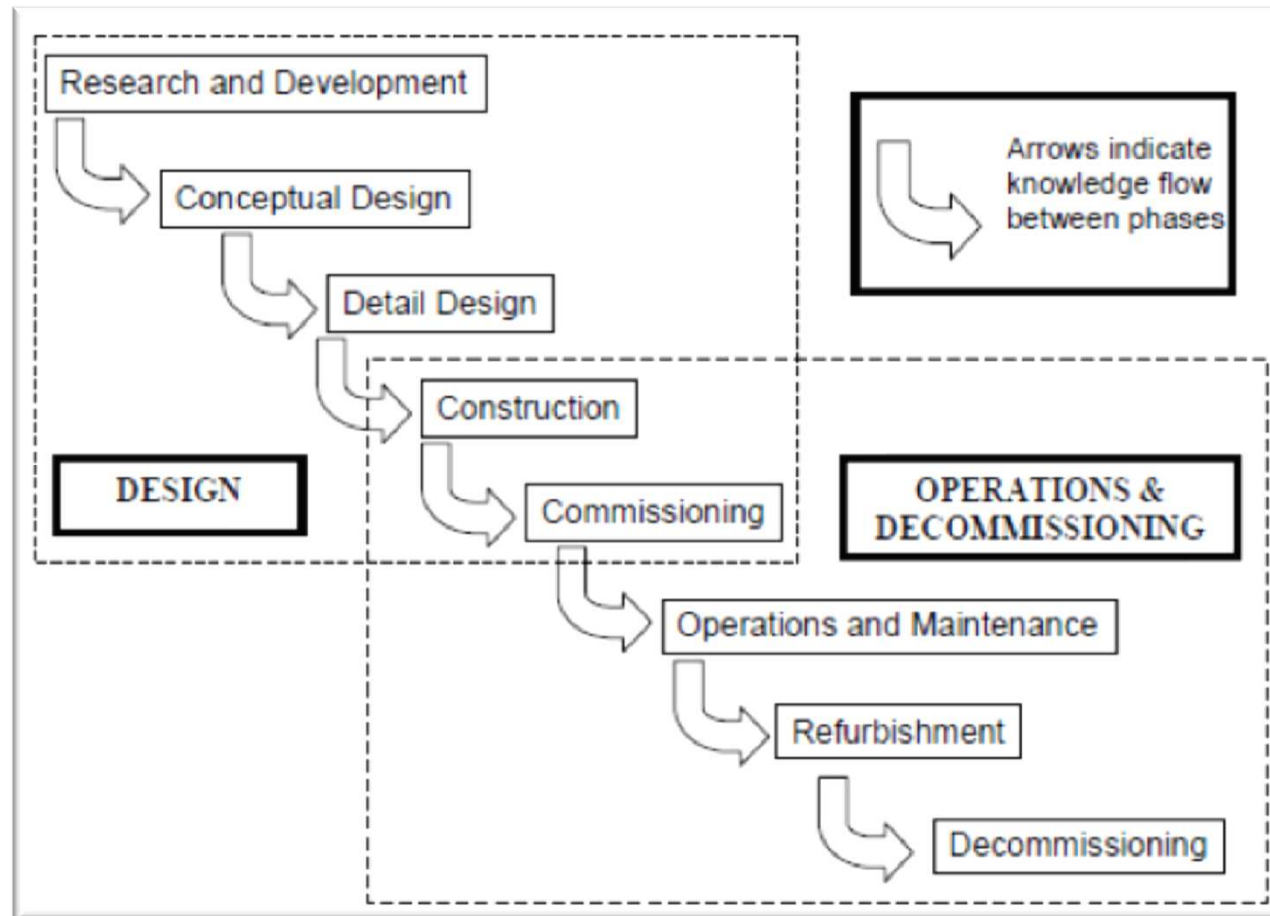
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Generation of Knowledge

- Essential to recognise the role of all organisations in the generation of knowledge that affects a nuclear facility over its lifecycle
  - Capture
  - Utilisation
  - Transfer
  - Retention

- Knowledge needs change over time but do not end when the construction of the facility is complete!

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IAEA Knowledge Management Definition

- The IAEA defines KM as:

"An integrated, systematic approach to identifying, acquiring, transforming, developing, disseminating, using, and preserving knowledge, relevant to achieving specified objectives."

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IAEA - Nuclear Lifecycle Knowledge Flow

Research and Development → Conceptual Design → Detail Design → Construction → Commissioning → Operations and Maintenance → Refurbishment → Decommissioning

Arrows indicate knowledge flow between phases

DESIGN

OPERATIONS & DECOMMISSIONING

We are generating knowledge now that we will need in the future.

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NNB Knowledge Management Strategy

NNB Knowledge Management Strategy

- Unique opportunity!
- Avoid consequences of losing design history "future proofing"
- NNB strives to be a learning organisation
- Capture knowledge from all lifecycle phases
- Innovative tools to compliment information and data capture
- Prevent personnel hoarding knowledge in their desk drawers (or garage)
- Accessible (and hopefully maintainable) repository

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NNB KM Approach – things we need to do well

- Integrated and holistic approach:
    - Existing procedures must create and validate single source of truths
    - Configuration Management must be religiously adhered to
    - Organisational Learning is critical – NNB must be a Learning Organisation in all aspects
    - Asset Information Management – the key output
- OPEX and experience capture across the industry
- Training and Competency Assessment processes is critical to ensuring knowledge is maintained at required levels

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Stakeholder and Supply Chain Involvement

- Many organisations will be involved in HPC across the facility lifecycle:

  - Government, regulators, design authority, responsible designer, suppliers, vendors, utilities, etc

- Lets work together:

  - Define what good Knowledge Management means across the nuclear industry and supply chain

  - Break down silos and share

- What can we learn?

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Final Thoughts

Final Thoughts on Knowledge Management

- HPC is positioned to develop strong and sustainable knowledge management process that can be an example in the industry
  - Technology creates the opportunity to make this easier than ever before
- Work with our stakeholders and supply chain to define knowledge requirements
- Major cost/time savings if knowledge is captured and codified as it is created
  - Explicit instead of Implicit

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THANK YOU