IBM Global Business Services

UK New Nuclear

Evaluation of supply chain capability and capacity

Jamie Houghton

18th May 2006

REAL ESTATE & FACILTIIES

Land
Offices, Warehouses
Barracks, Airfields
Schools, Hospitals
Housing

INFRASTRUCTURE

Railways
Electric and Gas Distribution
Road User Charging
Telecommunications
Water and Wastewater

PLANT & PRODUCTION

Mining
Semi-Conductor
Textile
Petroleum & Chemicals
Electronics, Food

MOBILE ASSETS

Military
Airlines
Trucking
Shipping
Rail

Structure

- Context
- Objectives and approach
- UK and Global supply chain capability and capacity
- Enabling new nuclear in the UK

Context

- Study undertaken in Autumn 2005 in response to increasing profile of New Nuclear build in the UK

- Context set by:
  - Energy White paper 2003
  - Need for reductions in carbon emissions
  - Rising costs of oil and gas supplies
  - Security of supply issues
  - Need for additional capacity to off-set planned decommissioning of existing generation capacity

- Energy review announcement on 29th November 2005 at the end of the study

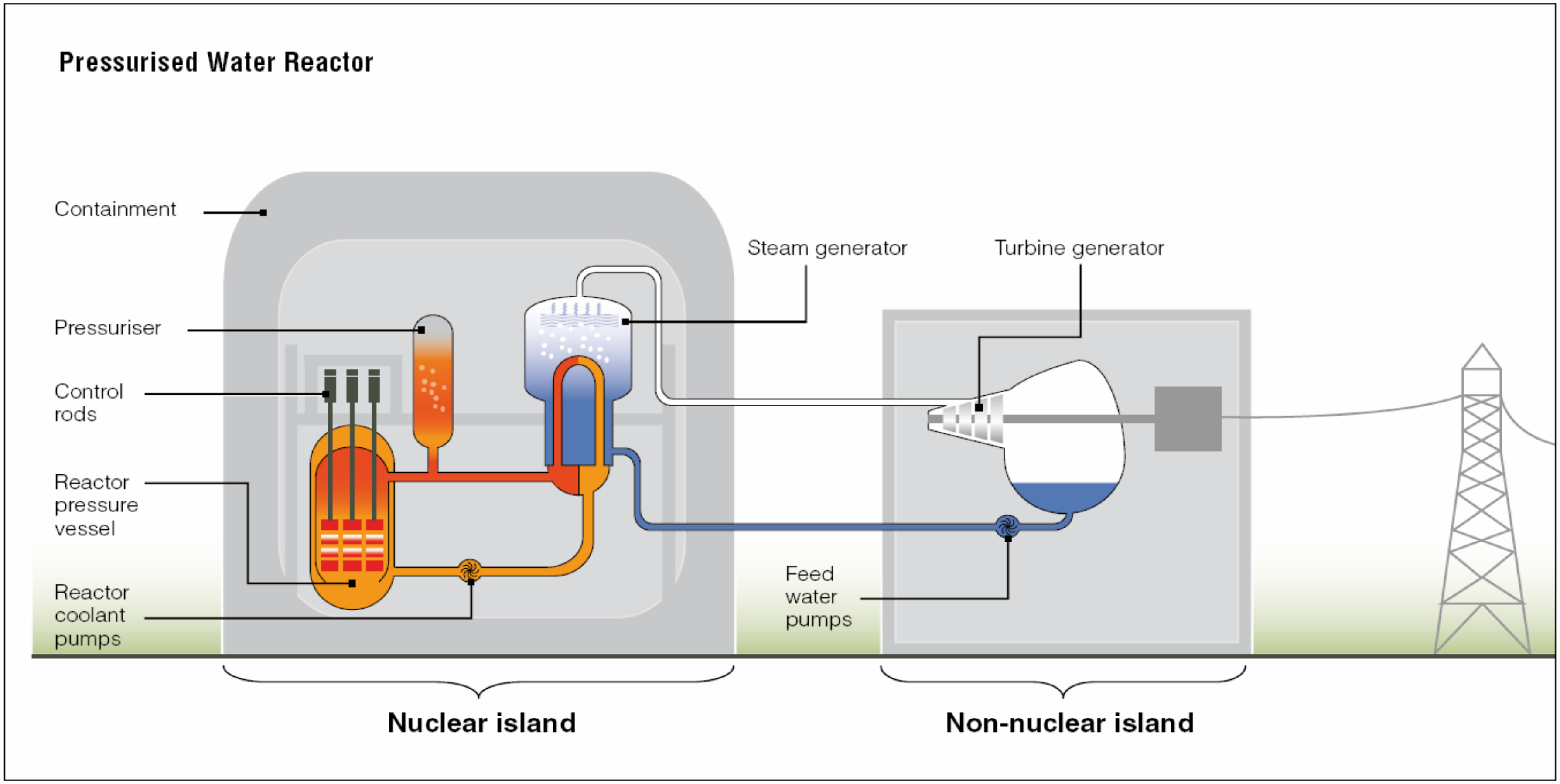
Study Objectives

- What is the capability and capacity of the UK and global supply chain to support a new nuclear build programme in the UK?

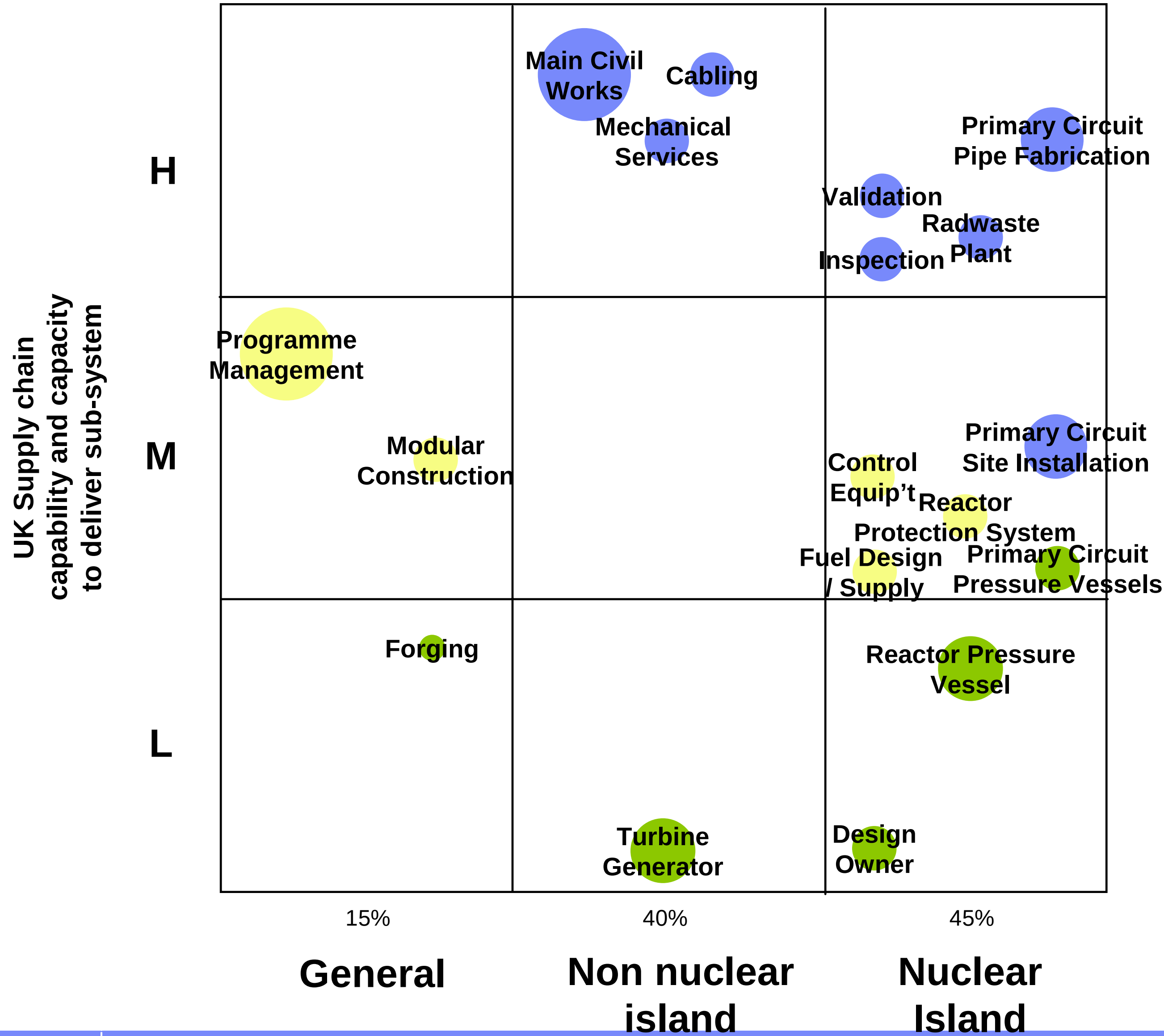
- What are the “pinch-points” that could occur between the requirements and the UK supply chain’s ability to deliver? Are there any global constraints?

- Where pinch points do exist, what actions could be taken by the UK Government or the private sector?

Approach


Pressurised Water Reactor
Containment
Pressuriser
Control rods
Reactor pressure vessel
Reactor coolant pumps
Steam generator
Turbine generator
Feed water pumps
Nuclear island
Non-nuclear island

UK Supply Chain Capability and Capacity Summary



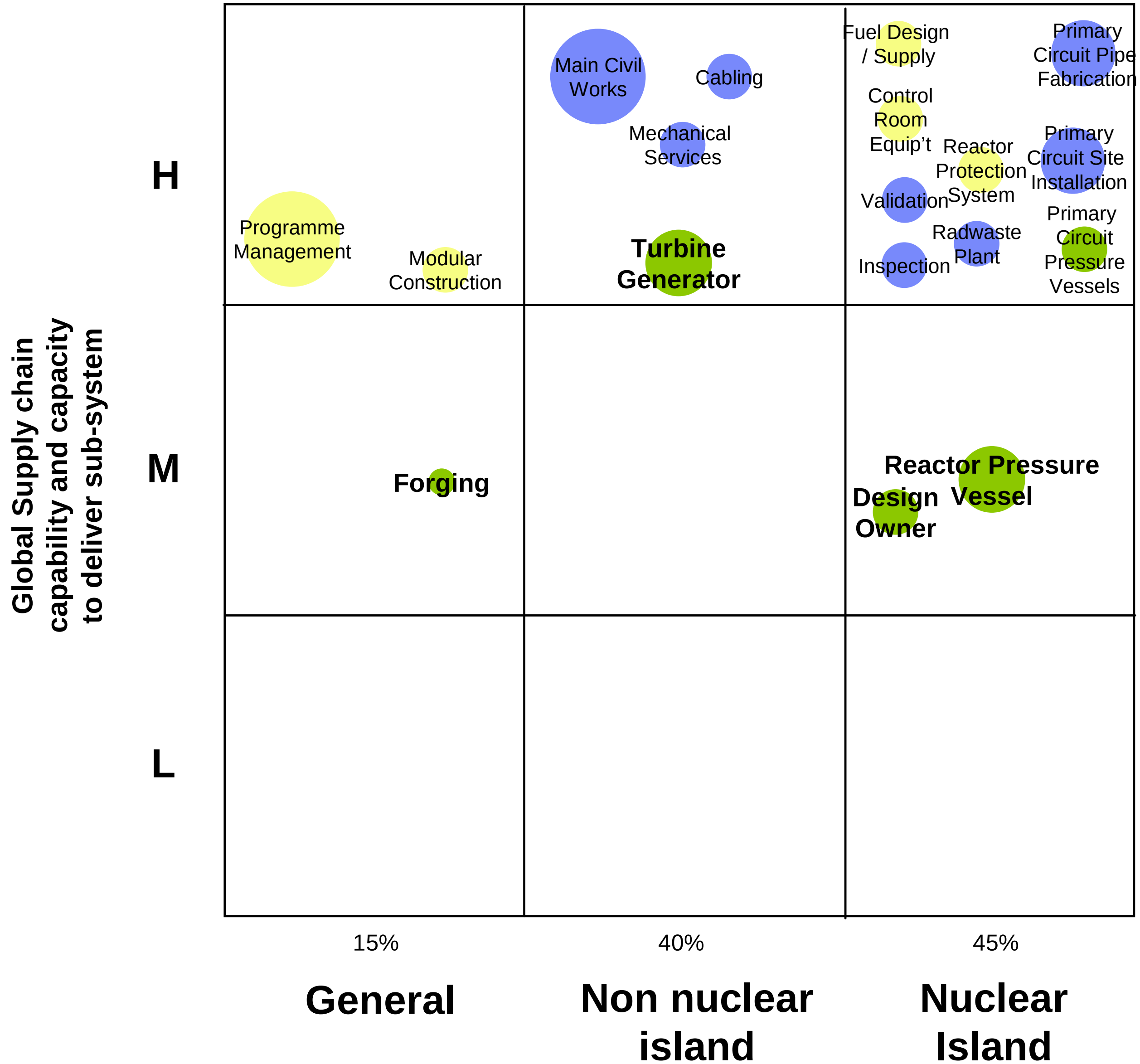
UK Supply Chain Issues and Barriers

- UK supply chain capability is strong for site based activities, however:
  - Availability of skilled resources is an critical issue and levels are diminishing year on year
  - Considerable competition for UK construction resources from other sectors

- UK will have a significant reliance on overseas suppliers for key components:
  - Reactor design
  - Reactor pressure vessels and forgings
  - Turbine generators

- Suppliers are willing to invest in recruitment, training and new assets <u>BUT</u> only when there is clarity around a new nuclear programme in terms of:
  - Government commitment to a <u>programme</u> of new build
  - Programme timeline
  - Certainty around the regulatory and public inquiry processes
  - Waste strategy

Global Supply Chain Capability and Capacity Summary



Global Supply Chain Issues and Barriers

- **Increasing global demand**
  - Demand forecast to increase significantly (From ~5 pa to 10-20 pa)
- **Capacity of Design Owners**
  - Limited number of design owners - Design Owners expect to be able to meet forecast demand.
  - There is a risk that demand will exceed supply
- **Low Alloy Forgings**
  - Low-alloy ring forgings are in globally short supply. Current suppliers are reported to be considering further expansion, but the short-term capacity is likely to remain limited.
- **Scale of the UK programme**
  - The UK programme will be relatively small compared to the global market and may not be a priority market for suppliers, operators or investors.
  - ***The UK needs to ensure it is an attractive market for the global supply chain***.
- **Total cost of ownership**
  - A clear strategic programme will encourage suppliers to approach this as a programme, rather than a series of isolated projects.
  - Smaller number of reactor designs => reduced operational costs, and improved supply chain investment in support and maintenance facilities.

Summary of our findings

- **The UK supply chain has the capability in many areas, particularly the non-nuclear systems and infrastructure.**
  - Competition for a limited pool of skilled and experienced staff
  - Investment needed in facilities and staff

- **The UK supply chain alone, unable to deliver a new build programme**

- **There is a risk that the global supply chain may be capacity limited.**
  - Increasing global demand
  - Limited capacity – Reactor Pressure Vessels, Design Owner
  - Need to make the UK attractive to global supply chain

- **A number of key enablers would need to be put in place to ensure the UK is an attractive market**
  - Clarity on policy for new nuclear
  - Waste Strategy
  - Site Selection / Public Inquiry / Planning
  - Impact of regulatory environment

Enabling new nuclear in the UK

UK Government

Policy

- Establish macro energy policy
- Establish strategy for carbon emissions
- Establish the role of nuclear power within the energy policy
- Establish delivery model e.g. concession structure
- Establish organisational and legislative structures for the Strategic Enabling Authority

Strategic Enabling Authority

Enable

- Develop Waste strategy
- Facilitate Planning process / Site selection
- Facilitate Regulatory Approval / Public Inquiry
- Develop contractual framework
- Implement mechanisms to support delivery of energy policy
- Monitor market response to ensure continuity of supply
- Monitor availability of key resources and sponsor skills training initiatives if required.

Concessionaire / Consortium

Implementation

- Select reactor design
- Establish supply chain
- Recruit and train new staff
- Invest in new facilities
- Build, finance and operate

Summary

- UK and global supply chains have sufficient capability and capacity in many areas provided some investment in staff and facilities, but some constraints have been identified.

- A UK new build programme needs to be <u>attractive</u> to both UK and global supply chains.
  - The first step is the establishment of a clear position on nuclear power.
  - The Government needs to decide what role it wishes to take to ensure the successful delivery of a new nuclear build programme, and resolve the issues identified in the report.
    - Waste Strategy, Regulatory framework, Public Inquiry, Site Selection, Planning processes
  - IBM believes that the establishment of a Strategic Enabling Authority would provide a vehicle for resolving the strategic issues facing a new nuclear programme and increase the likelihood of a successful build programme.

The capability and capacity of the UK and Global supply chains to support a new nuclear build programme in the UK

- If you would like a copy of IBM's Point of View on the capability and capacity of the UK and global supply chains to support new nuclear please send an email to:

  jamie.houghton@uk.ibm.com