



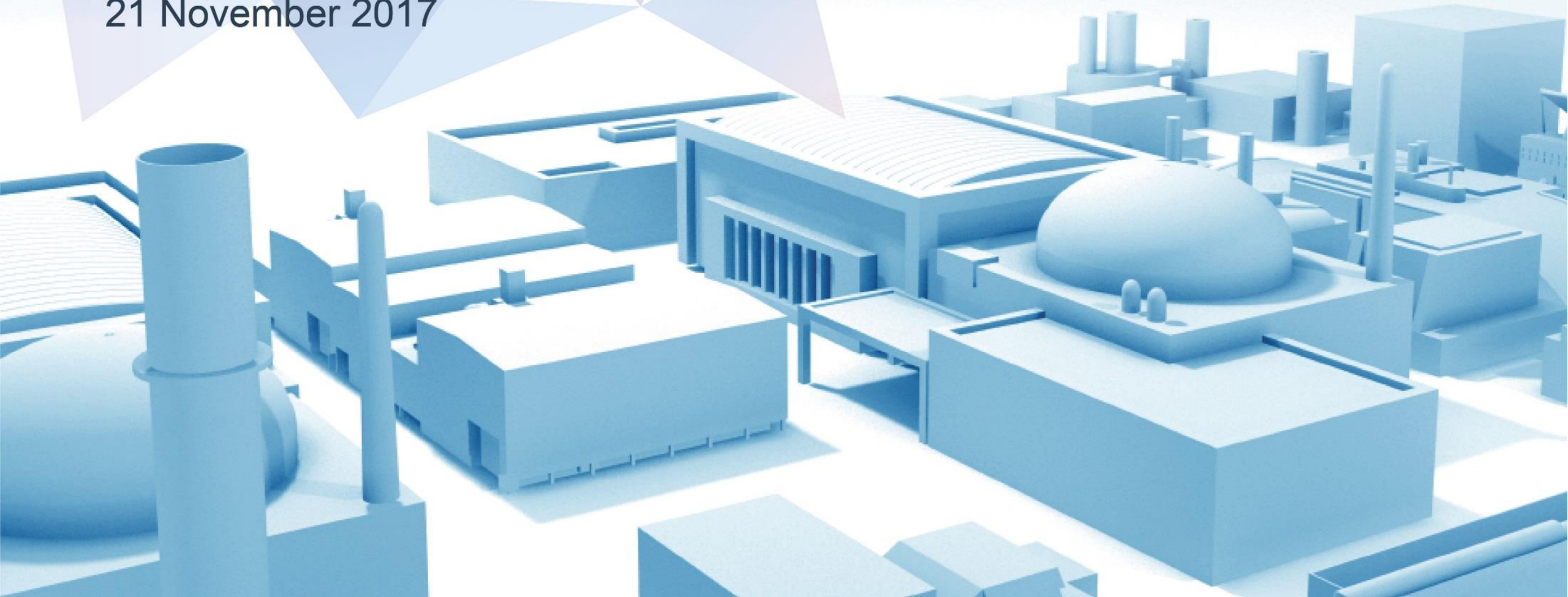
# Power Plant Siting Study

---

Jenny Kirton  
Atkins

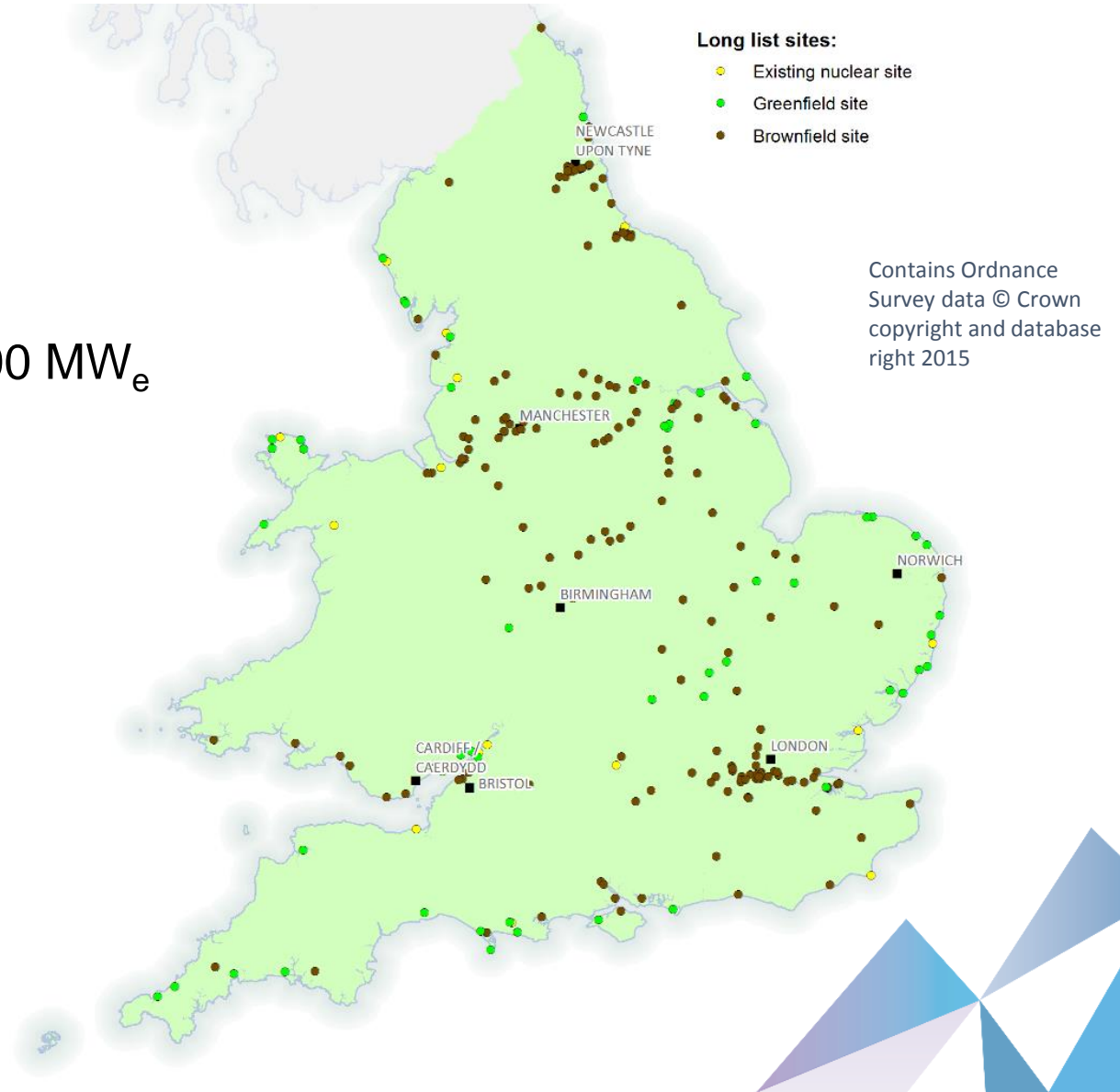
# Power Plant Siting Study

21 November 2017



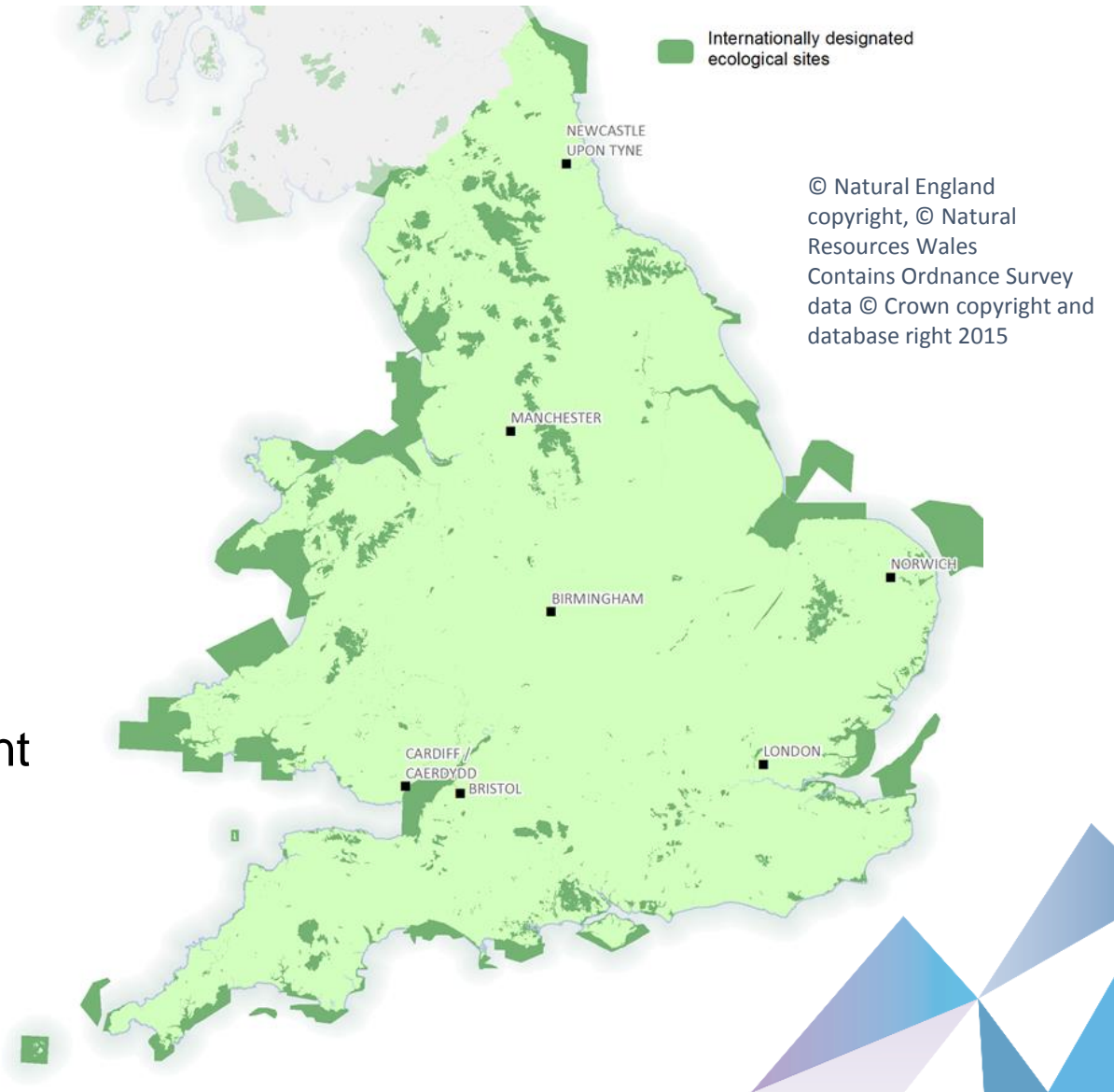
# Introduction

- Nuclear expansion scenarios of 40 GW<sub>e</sub> or 75 GW<sub>e</sub> by 2050
- Considered large (up to 1,650 MW<sub>e</sub>) and small (300 MW<sub>e</sub>) units
- Small modular reactor (SMR) represented by 300 MW<sub>e</sub> pressurised water reactor (PWR) derivative
- Considered long list of sites
- Assessment methodology closely based on Strategic Siting Assessment criteria
- First stage of multi-stage assessment process



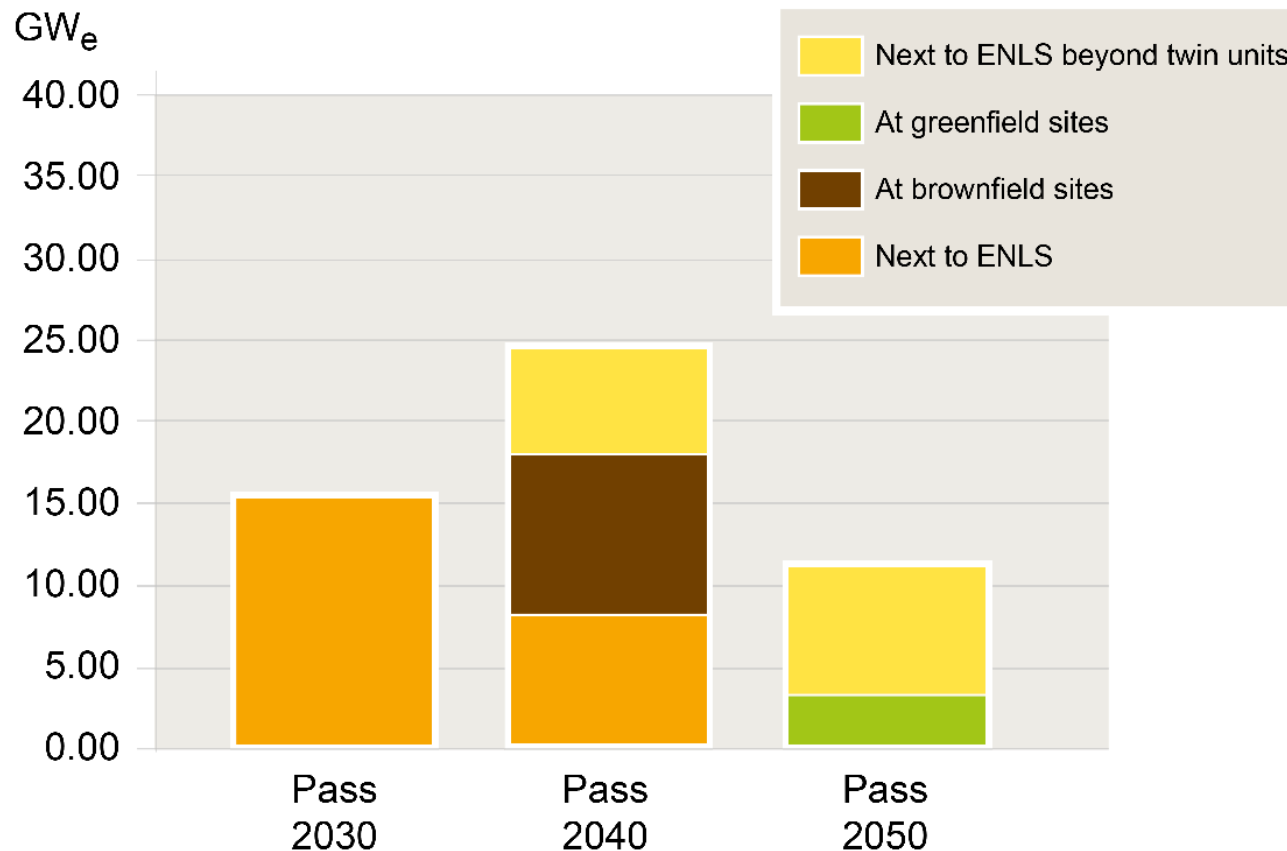
# Aims of project

- Does site availability limit potential nuclear capacity (and extent of limitation)?
- Does carbon capture and storage (CCS) conflict with nuclear for potential sites?
- Identify siting constraints with greatest impact on potential capacity
- Identify opportunities to enable inclusion of additional sites
- Possible to satisfy heat demand networks (HDN) identified in Alternative Nuclear Technologies project in conjunction with significant development of large units?
- Identify candidate sites for early development of twin unit SMR



# Large units

Total potential maximum capacity = 52 GW<sub>e</sub>



- Considered direct and indirect cooling
- Sites on long list and extensions to existing nuclear licensed sites (ENLS), both initial and further
- Three inland sites reserved for CCS and three extensions for Generation IV
- Allocated assumed development dates (2040 or 2050)

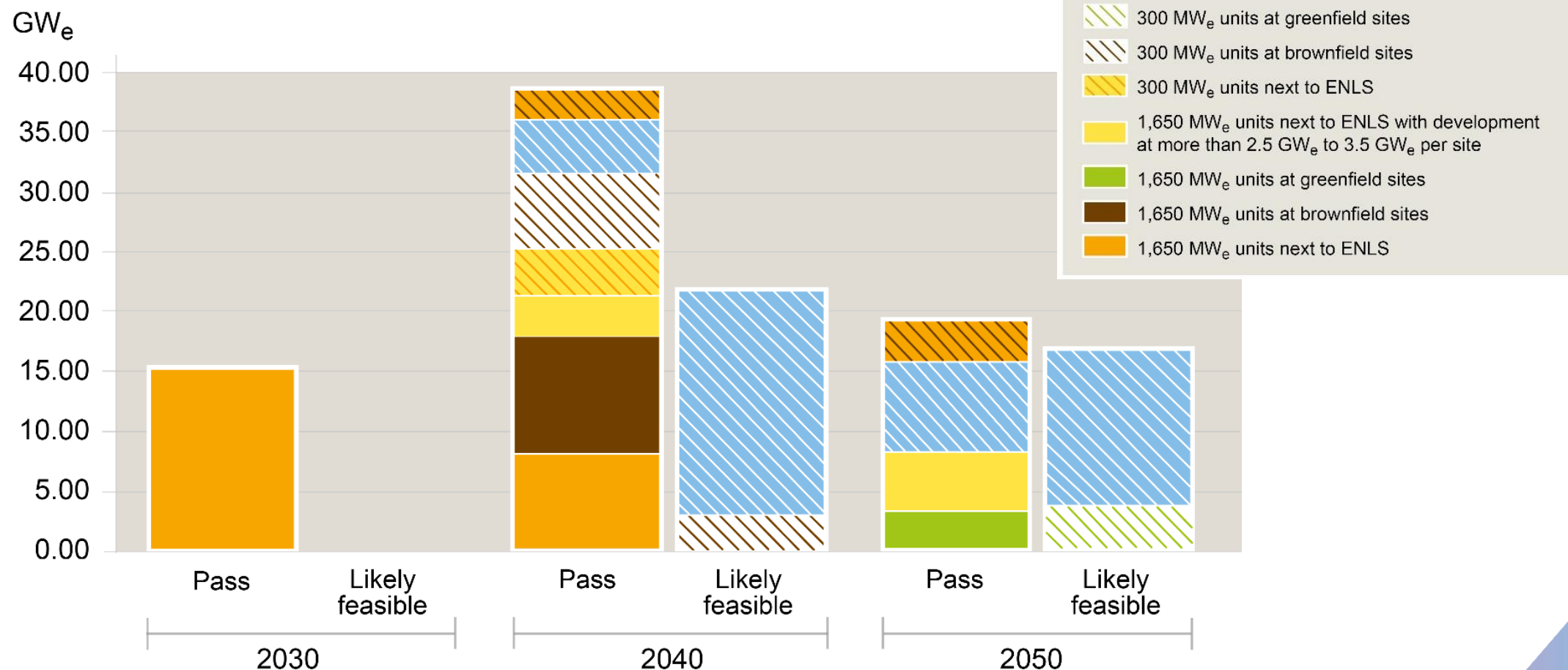
# Small units

- Long list sites and extensions to ENLS (up to fourth)
- Regions and additional sites identified in project
- Sufficient sites to satisfy HDN twice over
- Possible to satisfy HDN once over using small units, in conjunction with significant development of large units for baseload electricity
- Total potential maximum capacity of 68 MW<sub>e</sub>



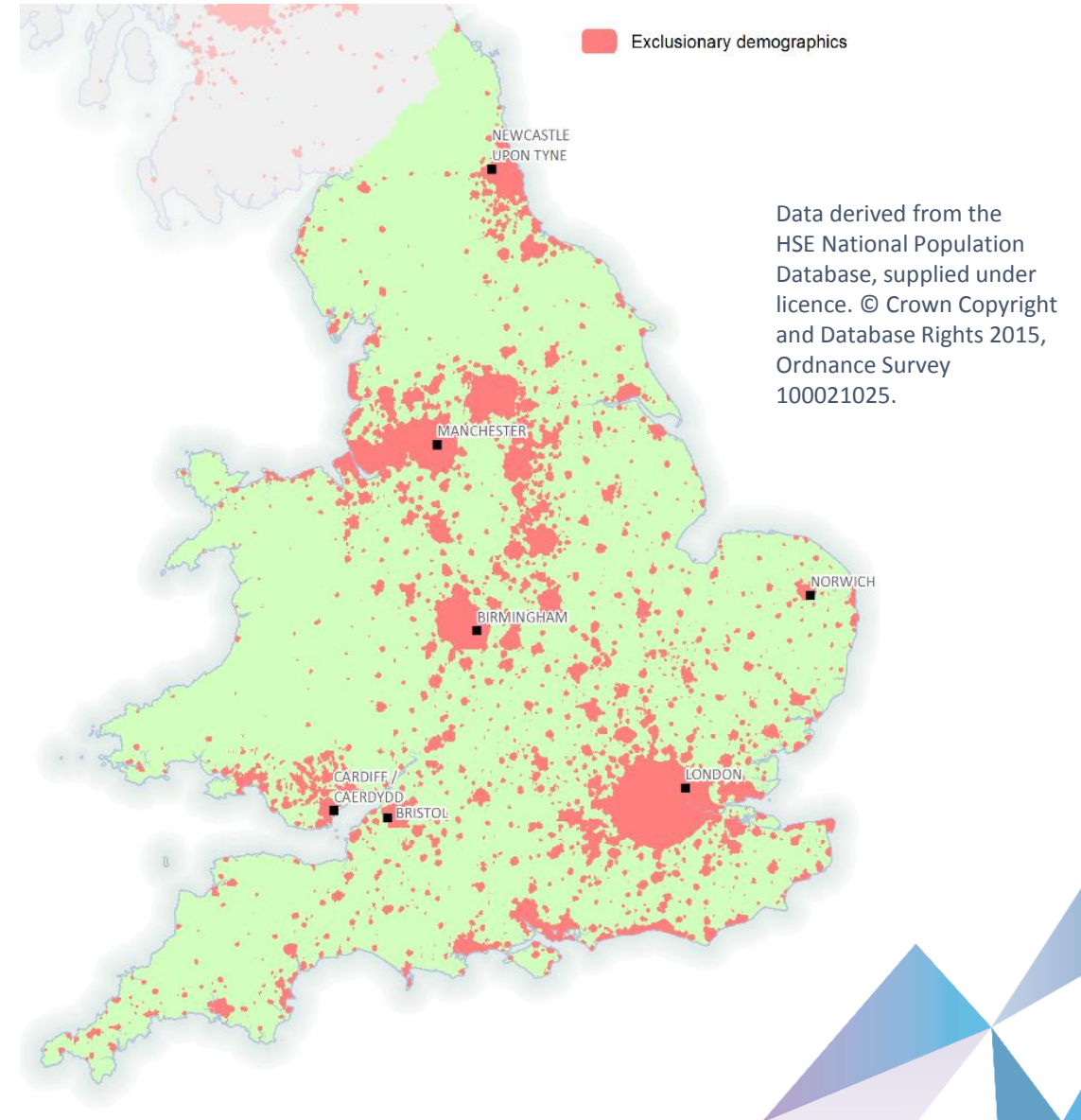
# Total potential capacity whilst satisfying HDN

Total potential maximum capacity = 113 GW<sub>e</sub> (45 GW<sub>e</sub> + 68 GW<sub>e</sub>)



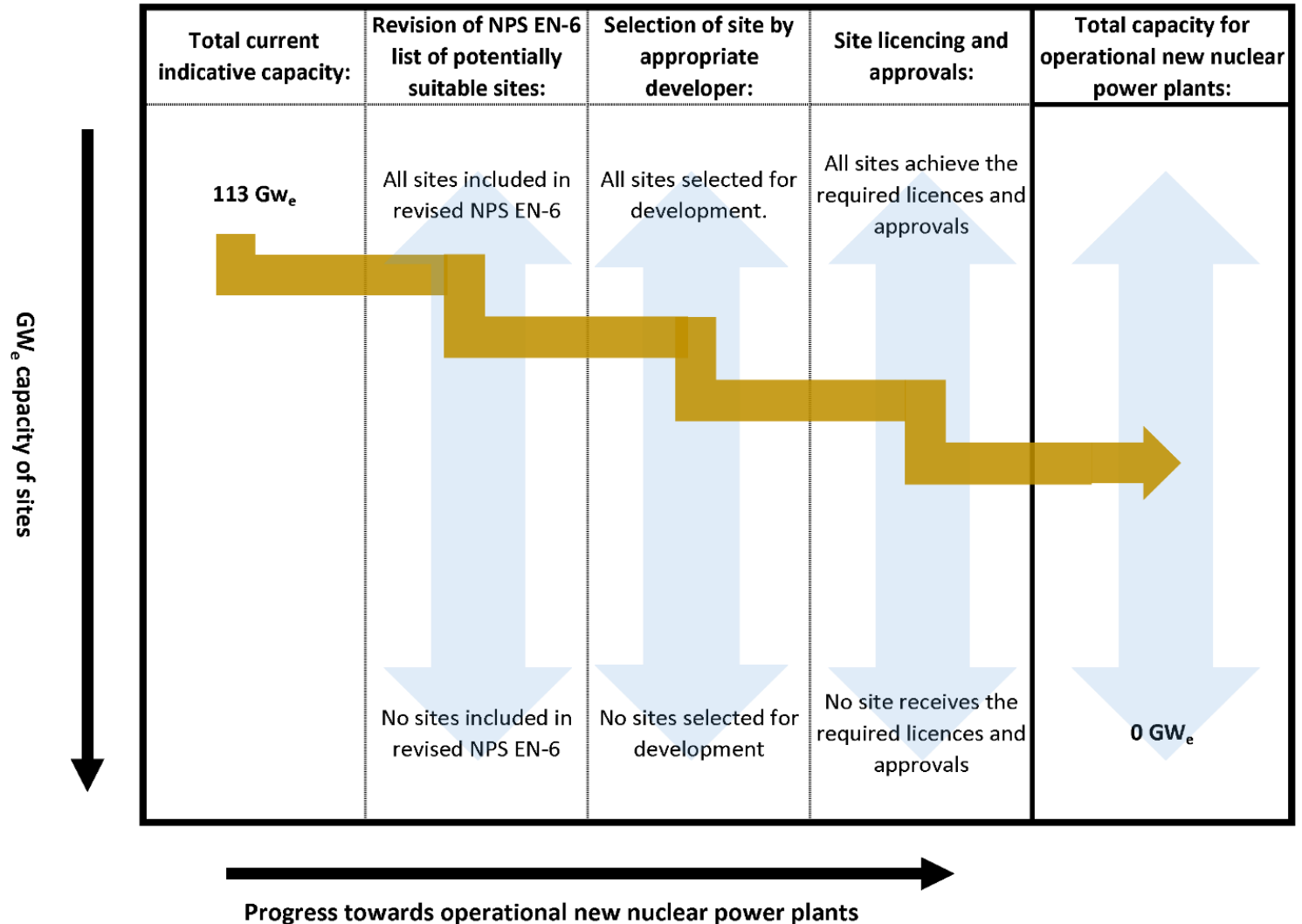
# Siting constraints with greatest impact

- Exclusionary criteria:
  - demographics
  - size of site
- Discretionary criteria:
  - proximity to internationally designated ecological sites
  - areas of amenity, cultural and heritage value
  - access to suitable sources of cooling water
- No significant change in constraints anticipated



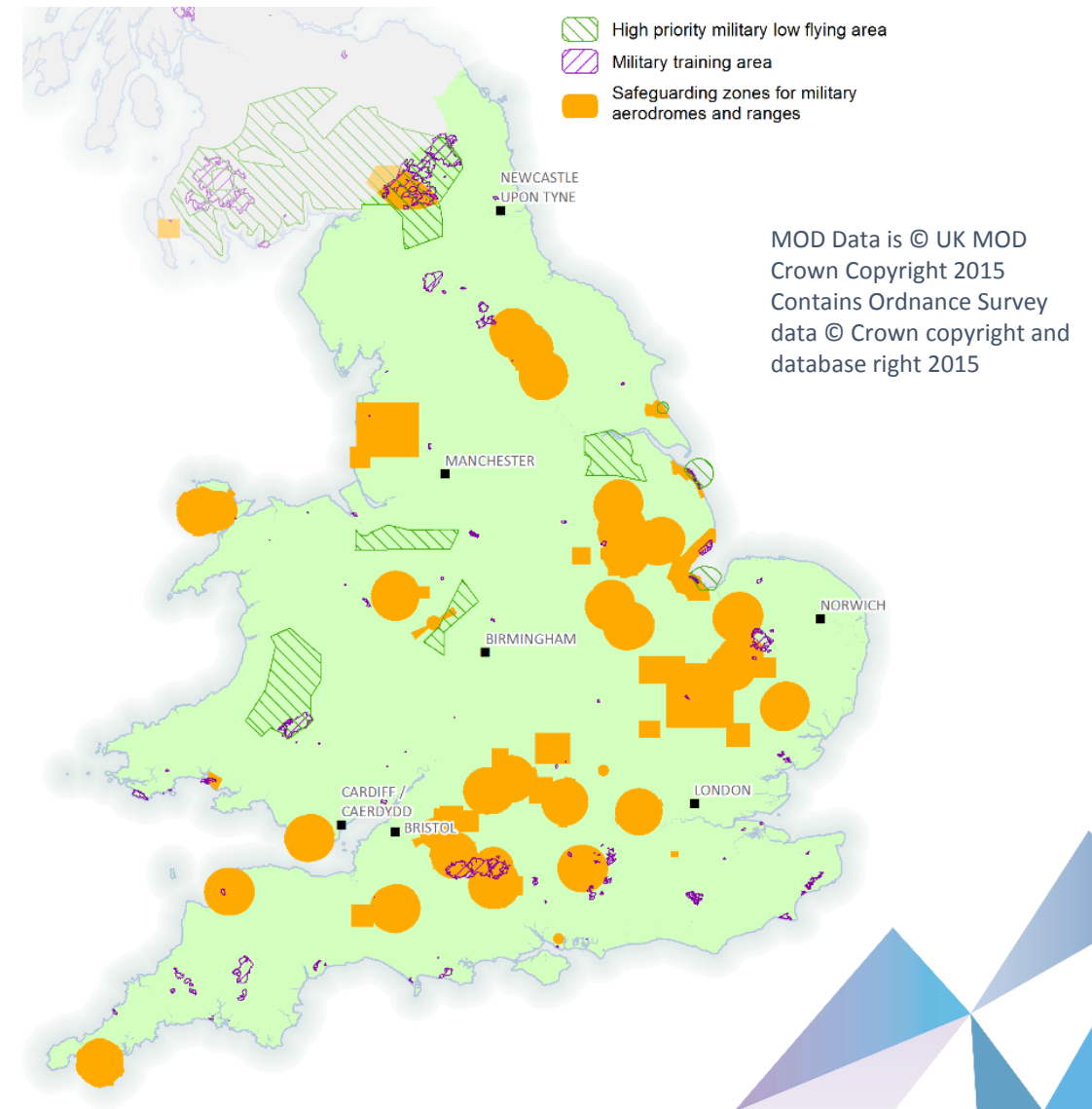
# Progress towards operating plants

- First stage of multi-stage assessment process
- Factors likely to reduce number of sites:
  - procedural and regulatory requirements
  - site specific characteristics
- Three main procedural and regulatory steps during progress



# Potential conflicts with CCS and other opportunities

- Focused on English sites on east coast and estuaries for CCS
- In principle, should not be an issue concerning competition between CCS and nuclear
- However three inland sites reserved for CCS
- Two MOD sites scheduled for disposal offer opportunities on timescale up to 2050
- 22 sites (on coast and estuaries) within rest of MOD estate offer opportunities beyond 2050
- MOD ENLS offer no access to cooling water



# Candidate sites for early development of twin unit SMR

- Eight extensions to ENLS considered
- Several had potential for early development
- Some more suitable than others for first of a kind development
- Inclusion in National Policy Statement and absence of competing development may offer advantages
- Developers and key stakeholders have scope to influence success



# Experience of working with ETI



- Went well:
  - project presentation to audience wider than ETI members provided good opportunity for broader exchange of views
  - ETI Project Manager was very supportive and enthusiastic
- Could have gone better:
  - ETI contracts team took a very long time to produce project contract

