



## Balancing out Support to Existing vs Emerging Infrastructures

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Science and Technology Facilities Council - UK  
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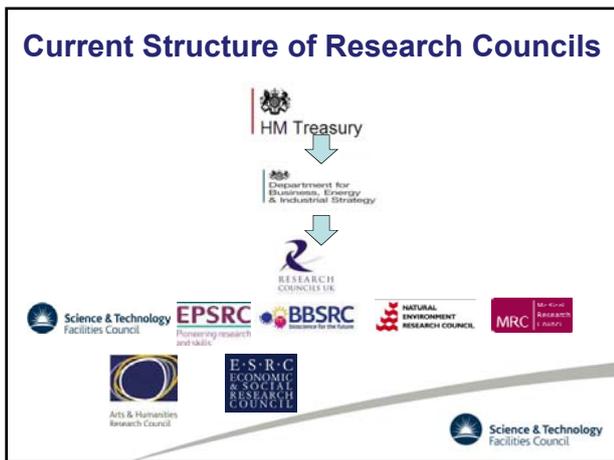
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### Examples of infrastructures (not comprehensive).

- **Biotechnology and Biological Sciences Research Council** – funds users of synchrotrons, neutrons, lasers, HPC, and funds NMRs, FELS beamline, ELIXIR.
- **Engineering and Physical Sciences Research Council** – funds users of synchrotrons, neutrons, lasers, and funds NMRs, FELS, manages the national HPC facility, 'mid range' facilities based in Universities.
- **Medical Research Council** – funds users of synchrotrons, neutrons, lasers, and funds NMRs, FELS beamline, INSTRUMENT, Sequencing hubs.
- **Natural Environment Research Council** – funds and operates ships, aircraft, atmospheric facilities, earth observation facilities.
- **Science and Technology Facilities Council** – funds and operates UK national synchrotron, neutron and laser facilities and manages the UK membership of related international facilities, eg ESRF, ESS and ILL. Funds the UK contribution to international infrastructures in particle physics, astronomy and nuclear physics, eg CERN (LHC), gravitational waves, ESO (E-ELT).

All Councils – e-infrastructure




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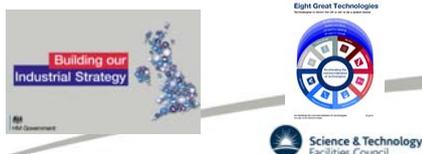
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### Planning the landscape

- Infrastructures are long term activities – need to have long term strategies and plans without losing responsiveness and flexibility.
- Not all/only about what new infrastructures we want, important to tension this with closing or upgrading existing ones.
- Planning must be ambitious but potentially affordable – sometimes this is about options.
- Planning starts with bottom up research priorities from the research community, but for the larger national infrastructures must also take into account industrial needs, input from charities, the international context – what other infrastructures exist and what might be accessible to the UK community.
- There will always be top down steers from government strategy.




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### Balancing existing and emerging infrastructures.

STFC has three 3 prioritisation frameworks – for all programme areas, not just infrastructures.

- a) Strategic review of a specific subject area, which could be an infrastructure provision eg neutron science, free electron lasers, computing.
- b) Programme evaluations - within a programme area eg particle physics
- c) Balance of programmes – across related activities eg particle physics /nuclear physics/astronomy

For areas with major infrastructures this will influence UK strategy, not just STFC, therefore involvement of relevant stakeholders is essential.




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### a) Strategic review of a subject area

- Reviews the landscape in an area and develops a strategy for its future development, typically over a 10 to 20 year timeframe.
- Scopes the research needs, and opportunities for the future.
- Input from research community, through consultations, expert panels, town meetings etc. Need to find the 'visionaries'.
- Identify option(s) to deliver the research needs, implications and risk.
- In developing the strategy, options are assessed against
  - a) Expected research outputs
  - b) Technological feasibility
  - c) Value for money
  - d) Affordability
  - e) Broader impact and timeliness
  - f) International context
  - g) Skills development and community capability




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## FEL Strategic review

STFC completed a Free Electron Laser Strategic review <http://www.stfc.ac.uk/files/fel-report-2016/> with the aim to

- identify the key science challenges that require FEL access;
- identify the requirements for FEL access in terms of both capability and capacity;
- identify opportunities for meeting these access requirements;
- provide a roadmap for user community development;
- identify the requirements for any underpinning technology or skills / capability needs noting where such development may also be important for other types of facility.



In this instance the UK does not currently have a FEL, access is through international facilities.




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## Neutron strategy

STFC is undertaking a review of neutron science strategy, with the aim of developing;

- a) a 15-20 year vision for the UK science requirements for neutrons and the facilities needed and
- b) a 10-year strategy for UK access to neutron facilities, including underpinning technology, skills and community development

The review will take input from the research community on the key science challenges to: -

- Explore where neutron scattering offers unique capabilities
- Identify the highest priorities for scientific impact from neutrons
- Identify the facility access requirements for capability and capacity
- Consider options for existing facilities, upgrades and new capabilities/infrastructures
- Recommend a best approach to a sustainable UK neutron community.

It will consider facility opportunities, the advantages and disadvantages and technological feasibility and the skills needed to deliver, and the potential capital and operating costs, including decommissioning.




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## b) Programme evaluations

- Subject specific reviews that consider the projects and activities within a programme area - carried out every 4 years. eg particle physics
- Planning for 5 – 10 years
- In depth evaluation of individual projects – both current and new opportunities
- Implications on facilities and infrastructure but includes exploitation support and R&D.
- Starts from current plans and takes input from community, and advisory panel roadmaps.
- Outputs feed into strategy development within UK and eg ESFRI.




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### c) Balance of Programmes

- Programme planning activity at a high level across related subject areas eg particle physics/astronomy/nuclear physics
- To identify the most appropriate balance between R&D, construction and scientific exploitation both across the programme and in each subject area.
- Recommend financial planning (normally for at least 5 years) that will ensure provision for STFC's highest strategic priorities.
- Recommend the appropriate balance of programme for the following financial scenarios



Flat cash and + / - 5%




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### c) Balance of Programmes

**CRITERIA**

- Strategic value and synergies – which key science challenges does it address, alignment with programme and corporate strategies, coherence and synergies with other programmes including international subscriptions, importance to key stakeholders.
- Excellence – scientific importance, timeliness, international relevance
- Leadership – level of UK leadership and track record, leverage, policy influence
- Possible impacts of changing landscape eg community changes, major discoveries
- Boundary conditions eg international subscriptions.




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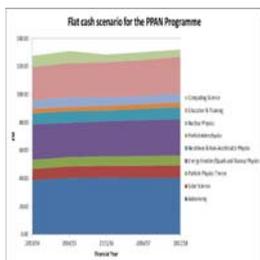
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### c) Balance of Programmes

- Programme balance should: -
- Reflect the strengths of the community
  - Maintains their position
  - Include a balance between research programme and skills development
  - Provision for new areas and sunsetting of others.
  - Considers if any areas below critical mass.
  - Balance breadth with depth in subject areas.




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### Monitoring and evaluation

All projects and infrastructure have formal oversight and monitoring.

Monitoring encompasses a) performance and b) outputs

a) Performance measures differ between infrastructures but typically include user satisfaction, down time, number of experiments, user days, student training days.

b) Output measures include publication numbers, bibliometric analyses, theses, IP, spin out companies, and impact studies.

These feed into future evaluations and strategic development.



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### General issues

- A long term vision is needed for the research that will be carried out at the infrastructures - essential to understand research community long term vision of the future of their fields (not just more of the same).
- Operators of the existing facilities are the experts on how their own facilities could develop – where are the experts on what new capabilities, technologies and infrastructure could offer ?
- Sustainability of infrastructures is very important – but risk in making them so sustainable and secure that really difficult to close them, need to balance with responsiveness to new opportunities.
- Political considerations always come into play – need to make that 'not inconsistent' with the bottom up priorities?
- Funding for operations/capital construction/decommissioning might not be equally easy to access, and may come from different bodies.



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### General issues

- Weighting the interests of different constituencies or bodies – e.g. host countries, research communities, operators, industry.
- Decommissioning costs and other liabilities –too expensive in the short term to close an infrastructure?



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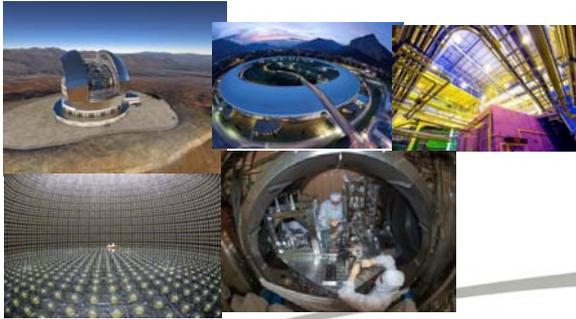
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## Questions?



Science & Technology  
Facilities Council

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