

# BGS Business Plan 2016 to 2019



To complement our strategy  
*Gateway to the Earth*

[www.bgs.ac.uk/about/strategy.html](http://www.bgs.ac.uk/about/strategy.html)



**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



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# Executive summary

The British Geological Survey (BGS) is the UK public sector research establishment with the prime function of compiling national inventories of geological resources and managing the resource environment. We provide essential research and baseline evidence to support policy on energy supply, natural resources, infrastructure planning and environmental management. This influences almost all major sectors of society, the national economy, and the private sector. Topical examples include:

- assessment of shale gas resources from hydraulic fracturing ('fracking')
- development of carbon capture and storage
- advice to the Nuclear Decommissioning Authority on geological disposal of radioactive waste
- site selection for major projects such as the Olympic Games or the third runway at Heathrow
- natural hazards (volcanoes, earthquakes, space weather, sink holes, flooding)
- mining subsidence
- maintaining the UK as a leader in global geoscience.

This requires us to map, observe and model the landmass, which is done in close association with government,

private sector stakeholders and the universities. This collaboration is essential to provide robust testing of data and models through research. We must develop deeper partnerships with ecologists, sociologists, economists and the public, and our data is available to share for a multitude of uses via digital media.

This business plan aims to underpin our activities for 2016/17 to 2018/19. It includes key objectives and indicators of success and provides a forward look for new markets and research directions.

The BGS strategy *Gateway to the Earth* was published in 2013<sup>1</sup> and sets out our vision and aspirations to be a pre-eminent research-active global geological survey, working with new technology and data to understand and predict the geological and environmental processes that matter to people's lives and livelihoods.

This will be achieved by combining new technologies with our existing expertise in geology, geochemistry, geophysics, informatics and data management so that we understand how geological processes act in real time and can predict their effects on geological resources (energy, minerals and waste), geohazards and environmental change.

We will continue to operate a mixed funding model which involves public national good science, research, innovation funds and capital funds from NERC or other government sources. The model also includes competitively won non-NERC income which currently represents approximately 50 per cent of our total budget.

We anticipate that during the financial years 2016/17 to 2018/19 we will change our relationship with our current parent body, the Natural Environment Research Council (NERC). We hope to gain greater independence with the appropriate flexibilities to evolve in line with our aspirations and the direction of travel of other nationally important bodies, such as the National Physical Laboratory, the Met Office, the Ordnance Survey, Radioactive Waste Management Ltd and the National Nuclear Laboratory.

The BGS restructured its workforce between 2010 and 2014 with a reduction in headcount of 97 full-time equivalent (FTE) posts and a significant re-profiling of the staff demographic. Overall, our scientific expertise is more in tune with current demands, but to optimise our workforce, the BGS plan involves a further net reduction in headcount to 568 with a significant reshaping of our abilities in informatics and data science.

<sup>1</sup> <http://www.bgs.ac.uk/about/strategy.html>

In line with the move to real-time geological data delivery, we will develop and resource two major capital investments in energy science: the Energy Security and Innovation Observing System (ESIOS) through NERC and the Energy Research Accelerator (ERA) in partnership with the higher education institutes in Midland Innovation. These will require a refocusing of our science objectives and enhanced partnerships with higher education institutes and industry, and the possibility of refurbishing our laboratory facilities.

A new research centre, the Sir Charles Lyell Centre (the Lyell Centre), has been established in Scotland in partnership with Heriot-Watt University. Initially our research at the Lyell Centre will be focused on marine geoscience, geohazards and geo-energy as well as housing our geological survey services for Scotland. Similarly we will clarify the BGS function in Northern Ireland and in Wales, and locate our operations on key university campuses.

The BGS aims to be increasingly open with its data and we will need to enhance our capabilities in a growing market underpinned by a greater public awareness of environmental concerns. We will increasingly offer data products and extend our models through value-added resellers including close association with partnerships such as the UK Catapults <https://www.catapult.org.uk/>. We

are developing globally relevant and marketable data products and data management systems and will take a lead role in Europe and internationally.

We are a nationally and globally strong brand and focus on key science areas that are at the forefront of UK Government and international agendas, but which are also vital to the private sector especially in energy, infrastructure development and data informatics. Market analysis suggests that we can grow our non-NERC sources of funding. There are significant opportunities in the built environment, geodata systems, low-carbon geo-energy, conventional oil and gas, radioactive waste disposal, carbon capture and storage (CCS), and unconventional gas.

In general we anticipate working closely with similar organisations providing public national good science for government, while maintaining a research profile within Research Councils UK (RCUK), Europe and elsewhere. We will have a stronger global presence which we will enhance through relationships with the Department for International Development (DfID), the Global Challenges Fund and the Newton Fund. We will develop key joint ventures with universities and research centres in the UK, Europe and globally and we will provide key infrastructure for research in subsurface processes related to geo-energy, infrastructure and geohazards.





# 1 Introduction

## 1.1 Context and drivers for change

The NERC Council has asked the NERC Executive to consider the case for granting its research centres greater independence, including examination of options outside the public sector. This is driven by the need for centres to have greater financial and operational freedoms and flexibilities to enable them to be more financially sustainable in a challenging funding scenario after the next Comprehensive Spending Review (CSR) period and possibly beyond.

The BGS will define its 'public task' for the public national good which will set out clearly what we deliver on behalf of government. By sustaining our role as a world-leading geological survey and trusted impartial advisor on geoscience, we will undertake research that underpins UK economic development and will maintain ourselves as the custodian of the nation's geological archive. This requires us to define science research lines and deliverables to underpin our public national good role and develop output and impact metrics for public national good science that will commonly be supported by competitively funded science projects.

We also need to keep our science and support functions tuned to the current and future needs of society and from 2011 to 2014 we reskilled and refocused efforts in key areas. These activities will be continued through

2016/17 with a further restructuring programme aimed at strengthening our capabilities in informatics and geodata, providing new expertise in the geohazards area, and resourcing a new infrastructure programme aimed at geo-energy systems, in particular ESIOs and ERA.

In Scotland, the BGS has opened a new centre with Heriot-Watt University. The Lyell Centre will provide us with an opportunity to refocus our science and survey activities in Scotland. Similarly we will develop our offices in Northern Ireland and Wales both in terms of the provision of survey services and the development of research partnerships with Queen's and Cardiff universities respectively.

The BGS, as a self-managed body, will be more able to decide science priorities and to interact with its stakeholders and customers in a free and unencumbered way. We will be able to define our own destiny in a similar way to the National Physical Laboratory, the Met Office, the Ordnance Survey, Radioactive Waste Management Ltd, and the National Nuclear Laboratory.

## 1.2 Overview of the BGS

BGS personnel are based in permanent offices in England, Scotland, Wales and Northern Ireland and work globally (Figure 1). At the time of writing, we employ 476 full-time

equivalent scientific staff supported by 147 administrative and technical staff. Of our core income of £48.04 million in 2015/16, approximately 50 per cent came from NERC. Within this, the BGS has agreed an apportionment of the national capability (NC) funding between public national good science and research as approximately 70:30 per cent.

We work with more than 40 universities and institutes, manage (and in some cases house) five NERC services and facilities (including the NERC Isotope Geosciences Laboratory and the NERC Laser Ranging Facility), and run 40 bespoke scientific laboratories in geochemistry and applied earth sciences.

Our scientific outputs, data delivery, and economic and social impact place the BGS in the top tier of national geological surveys. We are widely considered to be a model to emulate in Europe and globally. The BGS vision is:

'to be the pre-eminent research-active global geological survey, working with new technology and data to understand and predict the geological and relevant environmental processes that matter to people's lives and livelihoods.'

In order to achieve our vision, we will harness new technology to instrument the Earth to enable us to

understand how geological processes act, on societally relevant timescales. We will use our understanding and existing research capability to rise to challenges across the world, and help society to:

- use natural resources responsibly
- be resilient to environmental hazards
- manage environmental change.

We will make this happen by:

- developing our staff
- strengthening partnerships with universities, institutes and industry
- capitalising upon our core strengths in geology, geophysics and geochemistry
- maintaining the National Geological Data Centre

- remaining a trusted, impartial voice for the geological sciences in the UK and internationally.

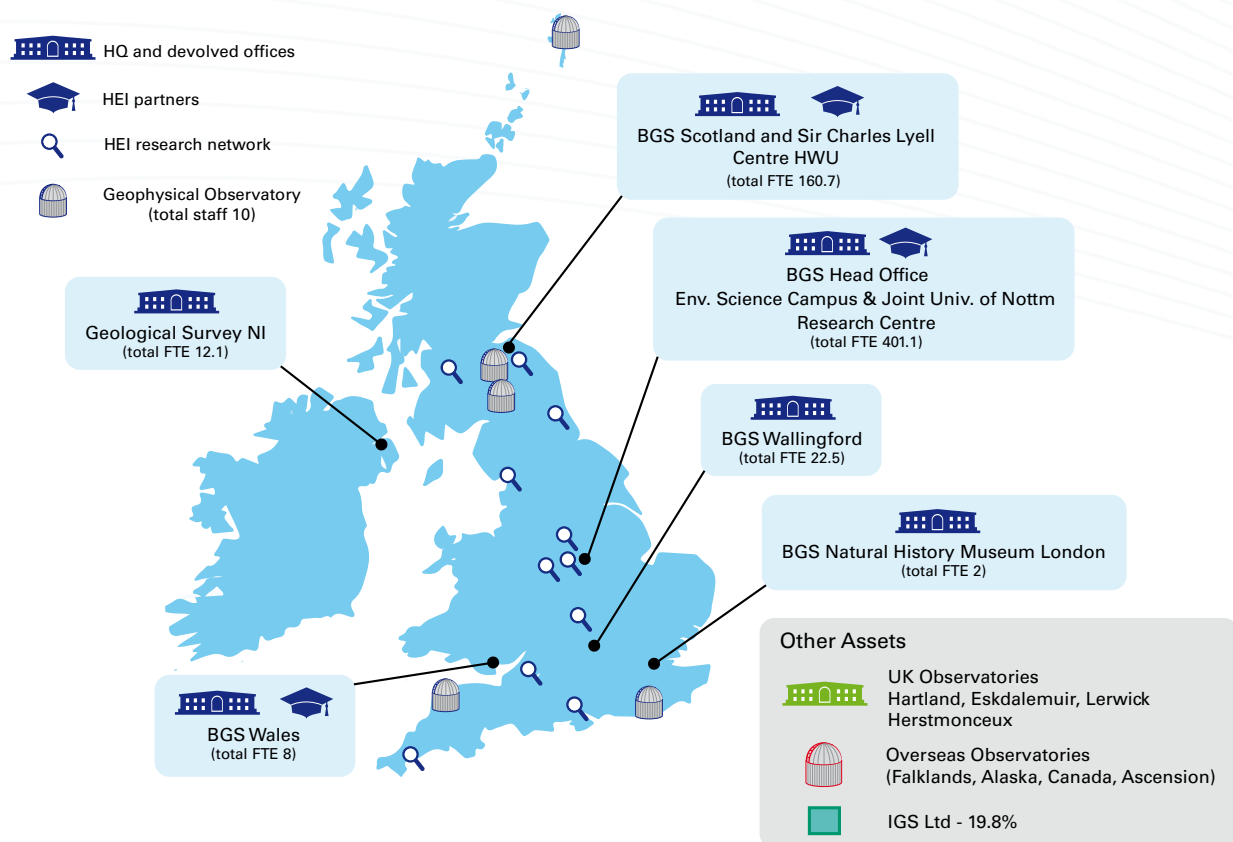


Figure 1 Location of BGS sites.

### 1.3 The BGS science offer

The BGS science strategy for the next decade, *Gateway to the Earth*, was published in 2013 <http://bgs.ac.uk/research/instrumentingTheEarth.html>. It contains the vision of harnessing new technology to instrument the Earth so that we understand how geological processes act in real time. We will use our new understanding and existing research capability to rise to challenges across the world, and help society to use its natural resources responsibly, manage environmental change and be resilient to environmental hazards. These three scientific areas map broadly onto NERC strategy and are carried out in BGS themes focused on geological resources (energy, minerals and waste), geohazards, and the impact of environmental change. These areas are underpinned by expertise in geological, geochemical and geophysical survey, informatics and data management.

We will refine our science strategy:

- to maintain the strength of research and development to meet the challenge of research assessments such as the Research Excellence Framework (REF)
- to develop high-value commercial research opportunities – research lines (RLs).

Research lines are peer-reviewed, distinct lines of research supported for up to five years that will result in highly cited applied science publications as well as corroborated impact stories. To maintain the quality and relevance of our public national good science we continuously analyse, reassess and commission new programmes of science, including long-term monitoring and measuring, as the needs of society change.

Research lines and public national good science are mutually connected at the BGS – feeding cutting-edge

science into our public-good role. The documented aims and contents of the research lines and public national good science will serve as a clearly defined set of activities developed with our stakeholders that will ensure a high-quality offering to our present owner, future owner and ultimately the tax payer.

The BGS is responsible for the management and development of the UK National Geoscience Data Centre and National Geological Repository. We are responsible for 21 value-added dataset services and in some cases there are legislative requirements, such as the Petroleum Act, which mandate the collection and holding of certain geological data and physical assets. These data and assets underpin our own activities and are made available to industry and the scientific community. In some cases there is a fee for these transactions and yearly income to NERC is £2 to 3 million.

Historically, geological surveys concentrated on the structure of the underlying bedrock. In the decades to come, we will measure and model processes relating to the use of Earth resources over societally important timescales. The current BGS strategy sees BGS as a provider of new data to model and forecast the geological processes that matter to lives and livelihoods, in cities and rural areas, in the UK and internationally. Our future use of the subsurface, for groundwater, energy and waste disposal, depends on much greater understanding of interaction and subsurface processes. A greater understanding will allow us to better manage these activities in a safe and sustainable way. In order to achieve this it will require greater effort in subsurface monitoring, essentially 'instrumenting the Earth'. It implies a step change in the way we monitor the subsurface and also in the way that we take in, process and serve data and models. We will need more processing power for the 'big data' we will generate, and a clear line of sight between collection, interpretation and modelling for our own scientists and the global scientific community.



Research lines will be developed from the following list of strategic activities

1. The value of the subsurface
2. Critical metals in magmatic–hydrothermal ore deposits and their links to global tectonic cycles
3. Permafrost and glaciation: fingerprinting the past to predict future impacts of climate on deep subsurface systems
4. Impact of microbial activity in pristine and anthropologically disturbed geological environments
5. Coupled-flow processes in low-permeability natural and engineered systems
6. Fluid and sediment flow through hydrofracture systems in sedimentary basins
7. Advanced reservoir monitoring to determine the fate of CO<sub>2</sub> following subsurface injection
8. Pressure responses in aquifers from CO<sub>2</sub> injection
9. Multiparameter measurement and modelling of seismicity induced by fluid injection and extraction
10. Anisotropic rock physics: theory and application
11. Numerical simulation of flow and transport processes and their impacts on the environment
12. Groundwater resource security: research to manage the impacts of environmental change
13. Biogeochemical cycling in the subsurface
14. Development of near-surface geo-electrical tomography (and allied technologies) for the high-resolution characterisation and monitoring of the critical zone
15. Understanding physical and mechanical anisotropy in rocks and rock masses and their influence in deformation and failure modes
16. Fracture systems — de-risking critical volumes
17. Integrated and generic approaches to uncertainty in earth sciences: models and information
18. Potentially harmful substances in the surface environment
19. Environmental geochemistry for sustainable human development
20. Integrated earth observation for earth system monitoring
21. Geomagnetism Research Programme
22. Critical zone functions: from pore to catchment scales
23. Controls on organic matter in mudrocks: from pore to planetary scale
24. Environmental response to climate, policy and land-use change
25. Coastal change over decadal to centennial timescales
26. Data-driven geoscience
27. Storage, manipulation and query of 'long-tail' big data

The development of the Lyell Centre in Scotland with Heriot-Watt University provides the BGS with an opportunity to focus on geoscience in partnership with a technology-focused university while maintaining our most fruitful collaborations with the University of Edinburgh and other higher education institutes in Scotland.

We will develop other key partnerships and reinforce existing relationships including those with the University of Nottingham.

### *BGS peer-reviewed papers: a brief survey*

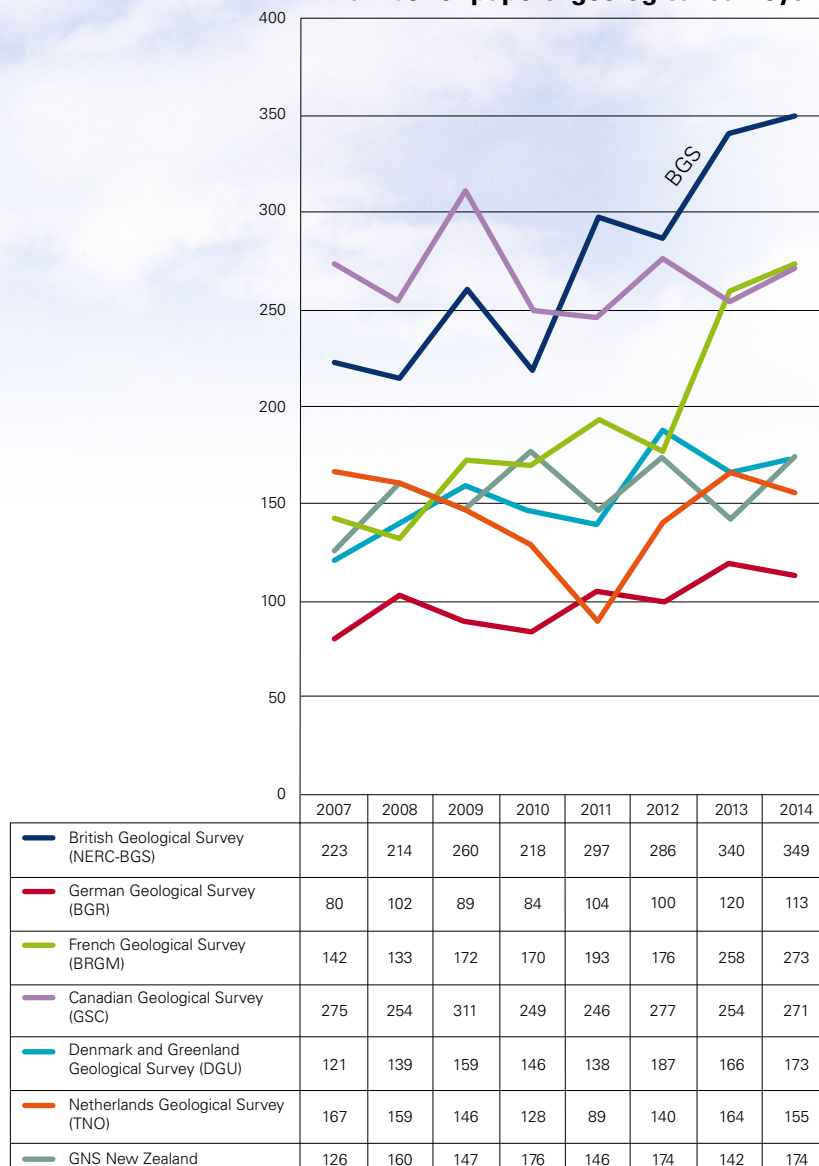
The BGS has made great progress in publishing its science in the last few years, particularly in comparison to other geological surveys of similar size and outlook (Figure 2). Apart from the USGS, whose size and variety of activity is much greater than other national geological surveys, we could be said to be the most productive research geological survey in the world, and one that still appears to be on an upward trajectory. One trend that does appear to be happening across all the geological surveys is an increase in peer-reviewed paper output.

Similar increasing trends in publication are seen across the leading British university geology departments with the BGS holding its own in terms of rate of increase.

### **1.4 BGS partnerships and innovation**

The BGS will build partnerships that will enable us to undertake science that meets our core objectives. Working with the BGS Executive and Science Directors, the new Head of Partnerships and Innovation will foster existing partnerships and develop new ones to deliver our strategy, for example the Lyell Centre and ESIOS.

**Number of papers: geological surveys**



**Figure 2** BGS publications compared with other geological surveys.

The focus will be on partnerships that enable us to deliver our science, help increase external income, complement our research and allow us to develop new opportunities, for example in the areas of sensor development and fluid- and gas-flow processes (ERA and ESIOS). Several directorates could benefit from developing collaboration and partnerships on a European and international scale, for example with geological surveys and international research bodies such as GeoForschungsZentrum, Istituto Internazionale di Vulcanologia and the Commonwealth Scientific and Industrial Research Organisation.

The BGS has a good track record in innovation with approximately £2 million of our national capability work classified as innovation. We need to identify existing innovation projects better in order to position ourselves for a more competitive innovation funding environment, as well as targeting potential areas for future innovation. In addition it will be crucial to measure the success of innovation projects by tracking their evolution through technology readiness levels. There is a strong drive from the research councils and industry to develop science that generates and supports innovation.

This presents an opportunity for us, particularly through initiatives such as ERA and ESIOS, which will provide the capital to support innovation. For example ESIOS will allow the development of new data systems, and ERA will support the Sutton Bonington Geo-energy Test Bed in developing new sensors and modelling processes. The Lyell Centre presents opportunities to develop new collaborations which enhance our science innovation in environmental science, marine science and the built environment.





# 2 Funding drivers

The BGS budget in 2015/16 is about £48.3 million, of which about 60 per cent is pay. As discussed in the finance section, the NERC funding is around 56 per cent and is expected to reduce as the external income percentage increases over the transition period.

We will maintain a mixed funding model which is broadly divisible into three categories:

- NERC allocation (or allocation from a future owner)
- research funding won through grants (RCUK, EC and other)
- external income won from other sources (largely government and private sector) – see Figure 3.

Overall a balance of income is expected from BGS directorates where the aspiration is that at least 20 per cent of the funding is obtained from any one of the categories.

Based on the current list of directorates and facilities, the BGS needs to adjust its funding balance in the following ways:

- More external income should be obtained in Informatics and Environmental Modelling (IEM) and Geological and Geophysical Survey (GGS). The external income in the GGS category is largely related to a large contract to run the Geological Survey of Northern Ireland (GSNI).
- More research funding should be expected in IEM and GGS.

- More flexible funding models need to be developed for the NERC Services and Facilities of which the BGS specifically owns the NERC Isotope Geoscience Laboratory and the NERC Laser Ranging Facility.
- The NERC national capability and innovations allocation could be more evenly spread towards an approximately 40 per cent base load per directorate.

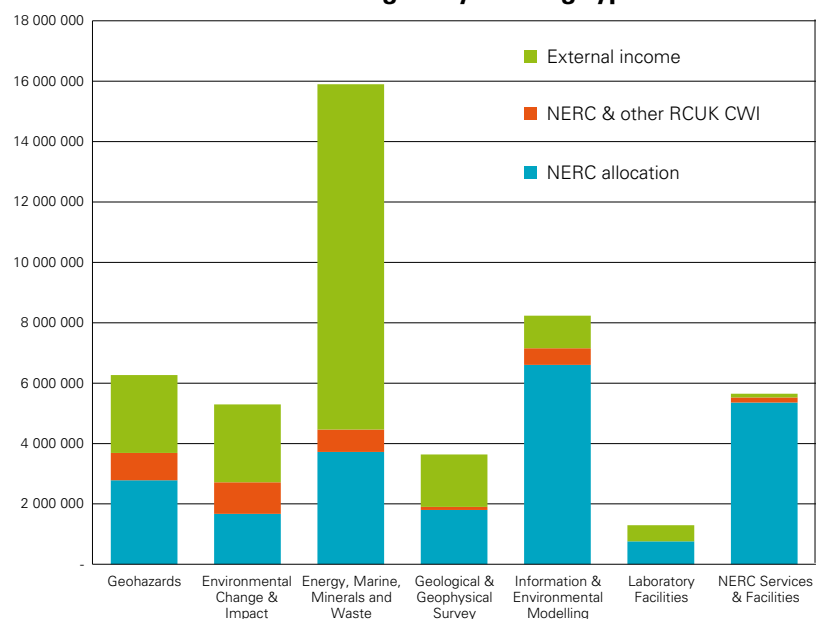
an increase in competitively won income of £1 to 2 million and at the same time will be generating further growth as part of a longer-term strategy. The section below outlines how we expect future markets for our services to evolve.

In order to achieve our strategic objectives we will need a clear focus on the markets that are aligned to our strategy and that provide us with the opportunity to grow our revenues. This will help us manage any downturn in funding and generate profits that we can invest back into our science. We need to ensure that our science is seen

## 2.1 Market overview

To maintain funding levels and headroom to operate, the BGS requires

**Budgets by funding type**



**Figure 3** Budgets by funding type for the BGS in 2015/16.

as competitive with other institutions so that we can attract high-paying customers and develop long-term mutually profitable relationships. The following narrative looks at where the BGS could focus over the next five years under public sector funding constraints.

**Global construction** is forecast to rise significantly by 2030. Infrastructure projects are becoming more complex and there are heightened concerns around their environmental impacts and safety. Many emerging-market countries lack the advanced geological knowledge and technologies to support this growth in infrastructure and mitigate the associated risks.

Globally, the demand for **resources** is forecast to rise and increasingly there are concerns about the UK's long-term security of supply. While in absolute terms exploration for resources, such as oil and gas, is declining, the UK oil and gas industry is promoting increased exploration activity. This increase in exploration activity will require a greater understanding of geology, and assistance in exploration management to 'de-risk' activities as well as increasing efficiency of production. Strong science (including high-quality staff and publications) will be developed and maintained in the highly competitive area of hydrocarbons in order to secure market share.

There are ever-growing pressures on global water resources including

groundwater. **Groundwater science** will continue to be important in the agricultural science sector because of the need for sustainable intensification of agriculture, increasing water resource demands, the impacts of reduced water quality and the need to provide water as a basic commodity under a changing climate.

Internationally there is a strong focus on **geohazards**. Consequently there is a market for knowledge-based services in particular disaster risk reduction and planning, and mitigation around earthquakes, landslides and volcanoes. There is a rise in importance of other geohazards such as space weather, ground instability (e.g. sink holes), pollution and groundwater flooding, which affect lives and livelihoods. These hazards need to be mitigated and this creates opportunities for insurers/reinsurers to develop new more sophisticated catastrophe modelling products which require geological data, analysis and expert inputs in order to reduce risk and preserve margins.

## 2.2 UK perspective

The BGS will continue to pursue public national good science and research funding in the UK, although we expect this to be more competitive because it will be tensioned against other national capability funding categories. There is demand for advice in areas

such as the safe geological disposal of radioactive waste, particularly in initial site screening, but continuous long-term monitoring will also provide opportunities. Improved assessments of seismic hazard in the UK will help inform regulatory decisions in the nuclear new build market. Rising energy demands and a desire for sustainability of supply have precipitated research into conventional hydrocarbons in the North Sea and are creating interest in unconventional energy sources such as shale gas and methane hydrates. In these competitive but highly profitable areas, we will again need to demonstrate strong niche science including staff employment and high-quality publications.

Environmental regulations are putting pressure on energy suppliers to reduce emissions and invest in new technologies to capture carbon dioxide and store it underground and research in this area is expected to continue. The ESIOs and ERA projects are geared towards facilitating innovation in these areas, with a view to exporting knowledge and technology overseas. These opportunities require geological advice and research to support business decisions and government policy. Although the driving forces for both radioactive waste disposal and unconventional hydrocarbon markets are reliant on implementation of new policy, they represent potentially significant shifts in the geoscience services market. Government spending

on research related to minerals regulation has declined, but a growing economy is generating demand for indigenous minerals which in turn, is generating income from bodies such as The Crown Estate.

The declining budgets from Government make it imperative that all the science we do is of benefit to society and competitive with the consultancy and higher education sectors. Further, the processes by which we decide the science we do must be transparent so that we can demonstrate good value for tax payers' money.

### 2.3 International perspective

The creation of the Global Challenges Fund in UK Research and the expected contribution from DfID funds to enhance research funding, will require the BGS to consider spending baseline funds overseas on projects of strategic national importance and in areas targeted for global development.

The EU Horizon 2020 programme is expected to make a significant contribution to UK research, with universities, research centres and businesses receiving up to £2bn over the next two years, a proportion of which will be spent on geoscience. In Europe an increased focus on security of supply for metals and minerals means there is demand for research on how these can be effectively recycled and reused to

reduce dependency on imports. Other overseas governments continue to seek geological advice, surveys and consultancy within the urban and future-cities environments, infrastructure, and geodata management sectors. We are currently active across all areas of our science strategy in the Far East, Middle East, South America and Africa with the aim of developing long-term relationships in these regions. In response to both international and domestic pressures, China is committing greater resources to mitigating environmental change, which is significantly affecting food and water resources as well as the quality of life to a growing middle class in the urban environment.

Internationally, we are seeing an increase in the role of geoscience research in reducing the impacts of hazardous events and environmental degradation and in reducing risks at local to global scales. There is also international interest in

- informatics (including smartphone app development)
- building institutional capacity to help alleviate poverty in developing countries
- understanding food security and protecting food production from exposure to potentially harmful contaminants
- efficient application of fertilisers and agricultural techniques
- understanding of mineral deficiency in developing countries.

To ensure that we are the partner or provider of choice and that our international science is competitive with other geological surveys, consultancies and higher education institutes, we need to sharpen our science through continuous renewal, review and publication.

### 2.4 Market size and opportunities for growth

Based on an analysis of the BGS's ability to compete within a particular market, and the attractiveness of that market, we have identified three groups of opportunities:

Group 1: primary opportunities for the BGS

- **Infrastructure and the built environment** represent attractive markets with a growth in large infrastructure projects. Our ability to compete is well-established in existing mapping activities, enabling us to exploit an established brand and go to market immediately.
- Despite the current dip in prices, **oil and gas** markets will remain significant as population growth and technological developments increase the demand for energy and increase society's reliance on oil, gas and low carbon geo-energy. The BGS is well positioned to offer mapping and consultancy services by promoting and improving its



scientific expertise and existing track record in the market.

- The **radioactive waste disposal** market is expected to grow with the development of policy on disposal in the medium-term. The BGS is well positioned to compete due to scientific expertise and previous experience. Similarly the market for **recycling of metals and minerals** is expected to grow.
- The collection, curation and delivery of **geoinformation** are becoming a vital components of the 'big data' revolution. The BGS is a world leader in data and information management (data workflows, database systems, end-user solutions) and knowledge exchange, and is in demand to provide these services to geological

surveys and other organisations around the world. There are significant opportunities for us to develop innovative high-value data products which capitalise on the big data revolution such as application programme interface (API) delivery platforms.

- **Food** security, contamination, pollution and mineral deficiency in developing countries represent significant markets for our skills.

Group 2: secondary opportunities – *the BGS will need to wait until the market becomes more attractive or take steps to stimulate demand*

- The **shale gas and CCS** markets are currently beginning to display signs of future potential. If they increase

in size under favourable policy conditions or if we can stimulate demand for niche products, we will be well positioned to exploit future opportunities. However, we must retain our capabilities and continue to keep our science competitive in a developing, aggressive market place.

Group 3: secondary opportunities – *the BGS will need to improve its ability to compete and/or take steps to stimulate demand*

- The **data products** (including insurance) market is attractive given the increased frequency of extreme events and increased vulnerability and exposure to geohazards. These create opportunities in security and open-source catastrophe



models which help fulfil the Sendai Framework for Disaster Risk Reduction. Our ability to compete is currently enhanced by our existing value-added reseller (VAR) relationships but this may also hinder us going to market independently.

- The **foreign public sector** is relatively attractive due to an increased number of funders with interests relevant to our research; however, projects in the sector commonly have a long lead time and are sensitive to political change in-country.
- We will continue to build on a **strong scientific reputation** based on reports and publications as well as previous successes and experience gained winning Horizon 2020 grant calls, whilst minimising the cost of bidding and delivering, especially where full cost recovery is not permitted.
- The **UK public sector** is expected to reduce its overall budgets for science in absolute terms. However we must continue to exploit NERC and other research council grant opportunities to build our highest quality international-standard research and help us to attract and retain the best scientists. Only by utilising a world-class workforce will we remain scientifically competitive in an increasingly aggressive market.

Significant groups of competitors for market share include:

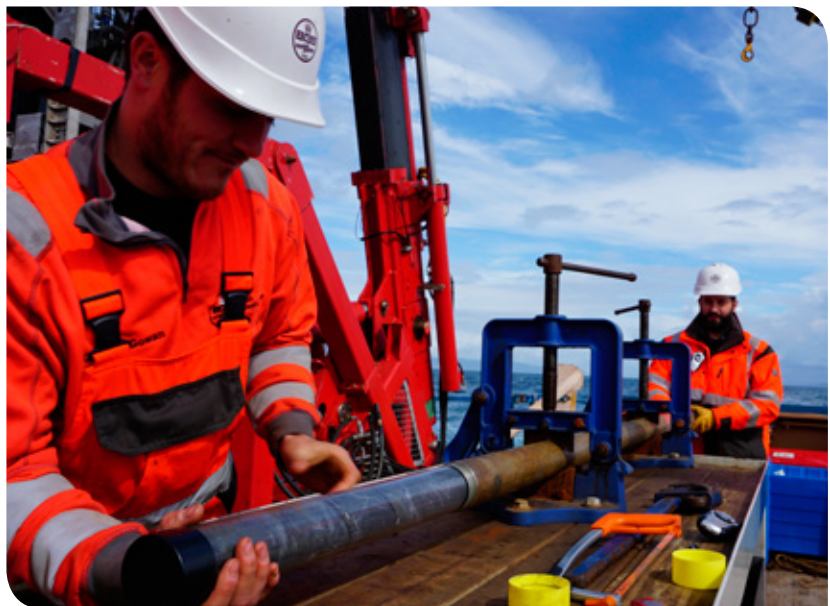
- generalist firms like Arup and Atkins that focus on project planning, project management, capacity building, and policy guidance across multiple sectors
- the newly formed Oil and Gas Authority (OGA) because it aims to maximise and encourage re-investment in offshore oil and gas in the North Sea
- specialist consultancies that include monitoring and other geoscience specialists, e.g. Fugro, Deltares and data suppliers such as Homecheck
- other national geological surveys like BRGM (France), GTK (Geological Survey of Finland) and GNS (Institute of Geological and Nuclear Sciences New Zealand) that actively market their services

internationally; they are keen to export their know-how, and are, in some cases, able to waive their fees

- universities that are increasingly commercialising and are looking for opportunities to collaborate with both national and international bodies.

## 2.5 Marketing strategy

In order to compete effectively in our target markets, the BGS will continue to develop a number of strategies in five areas which are geared to ultimately develop deeper client relations. These include government and research agency clients and are described below:





1. **Build knowledge of BGS capabilities** This will be achieved by

- increasing our publications, reports and articles; renewing and reviewing our science programmes
- attendance at trade fairs and conferences
- capitalising on partner or client networks to gain exposure
- joining knowledge networks
- maintaining our public profile through the media.

2. **Increase awareness of BGS science, services and products** This will be achieved predominantly by developing a better and more intuitive web presence supported by marketing materials and our corporate communication strategy. This will be supplemented by increasing our usage of industry information days and workshops on industry-specific themes.

3. **Generate and convert opportunities** such that clients want to buy from or employ the BGS. This will be evidenced by

- maintaining a competitive science portfolio
- increasing requests to join client consortia
- direct approaches for proposals
- business development meetings to discuss and align needs
- responding to tenders and joint tendering/bidding with other UK-based organisations, such as the Met Office and Arup.

4. **Build long-lasting partnerships** This will include an increase in focus on client service excellence through

- dedicated relationship teams
- strategic partnerships or joint ventures
- preferred supplier status
- multiservice agreements in particular with UK and international governments and agencies supporting policymaking, shaping market regulations and designing tender processes.

5. Use our **infrastructure** (e.g. ESIOs, ERA), seismic networks, deep drilling and data (European Plate Observing System, EPOS), to develop new science, commercial opportunities and innovation.

## 2.6 Investment required

In order to capitalise on market opportunities we will need to develop:

- systems to renew and review our science programmes
- clear and focused marketing materials, information packs, etc.
- dedicated business development teams that also understand scientific content and can support greater involvement and integration of science directors
- commercially effective pricing capability
- strong business support areas (legal, IT, finance, contracts, etc.)
- capital investment to ensure



we maintain state-of-the-art analytical laboratory and survey facilities to underpin research and development

- investment in IT infrastructure in order to provide the necessary stepping-stones to larger facilities possibly to include:
    - the JASMIN super data cluster
    - the European Grid Infrastructure
    - the European Collaborative Data Infrastructure
    - National Geological Repository extension
    - new laboratory facilities.
- Proposals are in place through ESIOs and EPOS and further opportunities are being explored through ERA.



# 3 Assets

The BGS has a significant number of assets at its disposal to help target the identified markets. These assets are:

- our people
- sites and laboratories
- observatories
- large-scale test and experimentation infrastructure
- other assets.

The following sets out how we will use these assets to achieve our strategic objectives.

## 3.1 Our people

The BGS must remain an attractive place for scientists and support staff to work. In consultation with staff we undertook a review of our core values, and reaffirmed our values as shown below.

The new ownership and governance model must provide flexible remuneration regimes and a vibrant scientific and research environment which will allow us to reward and retain our staff. This is particularly important in areas where there is close competition with the engineering and oil and gas sectors and, to a lesser extent, the academic sector.

The BGS will continue to diversify its employment model to bring in specialist skills and to promote flexibility. We have a strategic approach to collaboration including joint appointments with universities, the Research Fellowship Programme and the appointment of people with specialist skills linked to specific contracts. We have a functional

structure that groups employees together and promotes cross-working and staff flexibility within the organisational structure, which is managed through a resource management system.

Prior to this business plan a number of initiatives have been implemented:

- an embedded workforce planning process
- a BGS People Strategy and associated Action Plan
- a refreshed annual staff-review process where Science Directors and Heads of Unit review the skills and career progression of all staff in their area
- strategic awareness of skills gaps and surpluses to enable proactive resource management and resource planning.

## BGS core values

Defining our culture | guiding how we work together | informing our decision-making

### Impartiality

- Our professional competence enables us to be objective
- We provide scientific evidence to enable our clients to make informed decisions

### Knowledge

- We continually develop and apply our geological and technical expertise
- We are committed to acquiring, expanding and disseminating scientific data and information

### Societal impacts

- We work for the benefit of society
- We meet the changing needs of society with responsive, innovative and interdisciplinary science

- a focus for scientific staff in leadership roles to devote more effort into winning income from competitive funding streams and to enhance the wider impact of their science
- a more commercial and grants-focused cadre of mid-career scientists who can lead the delivery of high-impact, partnership-based science and this needs to continue

In the previous workforce plan we identified the need to keep staff numbers and salary costs under review. We continued our assessment of staff resources in areas that were not targeted in the 2013/14 workforce plan. Through management of normal turnover and focused replacement of additional exits we have managed to further reduce financial risk. We closely managed recruitment requests to focus on areas of income potential or key skills. We have already reduced our salary bill from £31.80m to £28.281m over the current CSR period and have seen a reduction in staff numbers from 694.6 to 627.9 full-time equivalents over the same period. Continuing the same approach over the current Centre Activity Resource Plan (CARP) period would result in a further reduction in the salary bill to £27.463m in 2017/18 with a workforce of 567.6.

The plan will ensure that we create headroom to reduce the salary bill further and recruit staff with additional skills.

### 3.1.1 Workforce planning

In 2015/16 the BGS undertook a programme of restructuring/reskilling which resulted in a further reduction in headcount and salary costs. This was achieved by a programme of 45 voluntary exits to address skills surpluses and a limited recruitment of 17 new positions to fill identified skill gaps. In the event that the number of agreed voluntary exits does not reach the target number we will review the position and if necessary discuss alternative options

with NERC. Updated analysis of both finances and scientific deliverables will continue to be reviewed as we assess whether further reshaping and adjustment to staff levels are required.

The staff profile in full-time equivalents at 30 September 2015 is shown in the table below alongside the forecast numbers after completion of the 2015/16 restructuring:

FTE	2013/14	2014/15	2015/16	2016/17	2017/18
Band 1	1.0	1.0	1.0	1.0	1.0
Band 2	2.0	2.0	2.0	2.0	2.0
Band 3	18.6	18.2	19.8	19.8	19.3
Band 4	76.2	78.5	67.7	59.6	59.6
Band 5	115.0	112.5	111.6	112.1	112.1
Band 6	178.5	171.9	182.4	181.5	178.5
Band 7	147.9	138.4	131.3	118.6	117.8
Band 8	103.7	94.6	83.3	71.6	70.3
Band 9	5.0	4.9	5.0	5.0	5.0
Other	14.0	6.0	5.0	2.0	2.0
<b>Total</b>	<b>661.9</b>	<b>627.9</b>	<b>609.2</b>	<b>573.1</b>	<b>567.6</b>

### 3.1.2 Learning and development strategy

Our learning and development section will continue to support the acquisition and improvement of skills at all levels. It will facilitate knowledge transfer in response to our evolving scientific, business and organisational challenges. Resources for personal and organisational development will be focused on tailored support for leadership development and business management including development of capability in proposal writing and consortium building, research skills and scientific writing.

Improved numeracy skills and the ability to process, model and visualise our numerical data continue to be a top priorities across the BGS. This includes the provision of training in statistical methods, models and software, the use of parallel processing, and high-performance computing clusters for processing of numerical data. Key training priorities continue to include 3D geological modelling systems and the development of skills in GIS programming and data visualisation.

Developing, updating and transferring key field skills in diverse environments and using varied methods remain critical parts of our training programme with initiatives in sedimentology, gas geochemistry and data collection using unmanned aerial vehicles.



Training is given using a range of methods including further education (PhDs and MScs), external specialist courses, internal specialist courses, one-to-one knowledge transfer and on-the-job training. Details of planned activities can be found in a separate document: the *BGS learning and development plan*.

### 3.2 Sites and laboratories

The BGS has extensively renewed its facilities in Keyworth and Edinburgh – notably the recent opening of the BGS–Heriot-Watt University Lyell Centre. Much of the laboratory stock at Keyworth is between 25 and 40 years old and

further investment, possibly via co-funding, will be required to complete a new laboratory facility and finalise Phase 3 of the Keyworth campus redevelopment.

We anticipate that funding from various sources will be utilised for the rebuild of the Keyworth laboratories including:

- a request to NERC as part of the services and facilities renewal for NIGL
- use of ESIO funds for core-handling laboratories and IT hardware
- upgrade of physical and geochemical tracer laboratories from ERA funding.



In addition, the development of ERA at the Sutton Bonington site and ESIOs at the University of Chester (Thornton Science Park) will provide further opportunities for underground characterisation, but will also represent challenges for estate management.

The BGS also intends to relocate its Cardiff office to the University of Cardiff Campus and is negotiating a move for the GSNL office to Queen's University Belfast.

We have undertaken a review of health and safety and quality assurance in our laboratories. The notion of a well-funded, well-managed lab is vital to us.

### 3.3 Observatories

The BGS has observatories and instrument networks in the UK and across the globe and is part of a number of global observation networks such as Intermagnet (as part of the European Space Agency Swarm Satellite programme), Global Volcano Model, Global Earthquake Model and EPOS.

### 3.4 Large-scale test and experimentation infrastructure

The BGS has recently been awarded £31 million of capital as part of ESIOs that will be invested in a distributed

monitoring infrastructure network across the UK to include pilot operations, test sites, laboratories and equipment, and dense sensor networks. We will operate this infrastructure with higher education institutes and industry, enabling and ensuring the sustainability of subsurface operations associated with shale gas, CCS, geological nuclear waste disposal and geothermal development.

### 3.5 Other assets

The BGS NGR operates the largest drill-core facility in the UK at Keyworth, Nottingham. It has recently been extended and now has space for over 18 000 pallets of drill core and 80 000 trays of samples.

The BGS National Geoscience Data Centre holds a unique archive of collections and information on the subsurface of the UK, used for academic and commercial purposes. The value of these assets is hard to define, but their commercial use can lead to significant wealth creation for UK plc, for example from commercial entities that wish to test rock samples or undertake basin-wide seismic surveys.

The BGS has developed 21 value-added dataset services which are generated from about 400 datasets; the revenue from these datasets to BGS in 2014/15 was approximately £3 million.

However, the full value of these datasets to the UK economy is significantly greater than our revenue, as the datasets are exploited by both us and our clients to create further downstream economic, environmental and social benefits including:

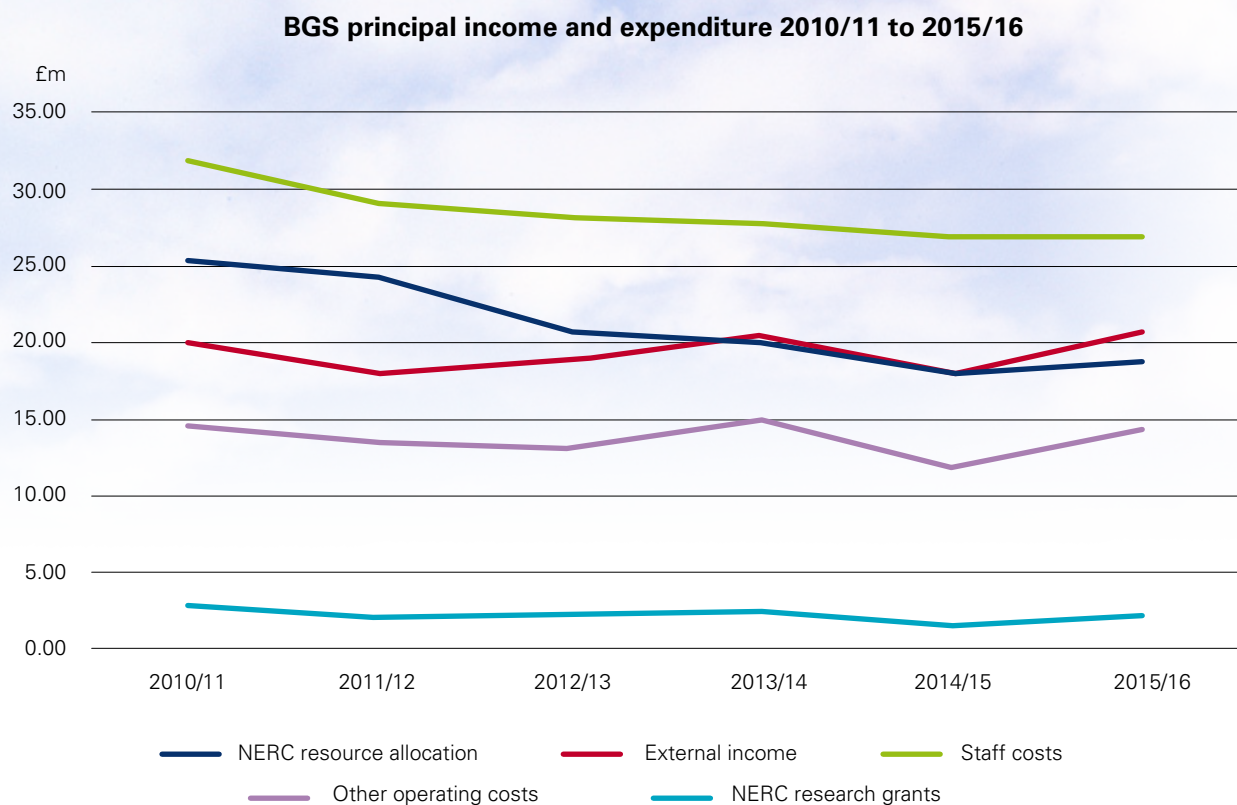
- the use of data for further scientific research
- the use of data in supporting other datasets
- informing and educating the public and improving policymaking
- the use of the data to improve environmental and other social outcomes.

We also maintain the NERC earth science sector research database, and this is maintained by a 3.5 per cent levy on all research grants awarded by NERC to higher education institutes and other institutions.

Further revenue and added value is generated through distribution by data partners.

Intellectual property assets cover computational models, technologies and patent generation – we have 17 patents granted or in development.

# 4 Finances



**Figure 4** Five-year summary of BGS funding (does not include the services and facility allocations).

The five-year summary to 2014/15 plus 2015/16 estimate is shown in Figure 4 (this excludes services and facilities run on behalf of NERC). Funding lines are shown in mid blue, red and light blue. Over the five years to 2014/15 the total NERC allocation has reduced by 25 per cent from £25m to £18m. Over the same period the funding from external sources has

remained broadly stable. The level of competitively won NERC research grants and other service-level agreements has also remained broadly level.

Expenditure lines are shown in green (staff) and purple (all other operating costs). The staff costs have also reduced over the five-year period due to a decline in headcount from 694.6

to 627.9. However, there have been increases in pay costs over this period due to increases in both employee pay and also employer contributions. Other operating costs include a large element of estates costs and other fixed costs.

The BGS has achieved a balanced or small surplus position in all years except in 2014/15 where an unfortunate

coincidence of income streams dipped at the same time contributing to a significant deficit of £1.3m.

The external income position has largely recovered, however there are significant payroll pressures on the cost base for the organisation, these are discussed below.

In order to create headroom and allow the organisation to recruit staff with the relevant skills to take advantage of future opportunities, a restructuring

exercise has taken place, continuing into 2016/17.

#### 4.1 Summary of financial position over the transition period to 2017/18.

A summary of the February 2016 CARP tables which review the medium-term planning to 2017/18 is included below.

The 2015/16 base year shows a small deficit position of £268k; from this

point we have implemented the modelled restructuring adjustments and had modest external income increases. The statements show the three-year planning to 2017/18 and will be reviewed following the 2015 CSR and further knowledge about governance.

During this three-year period, we have modelled increased payroll costs to include the potential impact of increased pension contributions, and the removal of the National Insurance

BGS CARP February 2016			
Income and expenditure includes NERC services and facilities			
£M	Forecast 15/16	Forecast 16/17	Forecast 17/18
<b>Income</b>			
NERC resource allocation (BGS)	19.129	18.028	18.089
NC-NERC services, facilities and data	3.903	4.376	4.376
NERC internal income and grants	4.108	3.333	3.283
External income	20.9	21.629	22.025
<b>Total income</b>	<b>48.04</b>	<b>47.366</b>	<b>47.773</b>
<b>Expenditure</b>			
Staffing costs	26.906	26.615	26.411
Other operating costs	16.426	15.519	16.147
NERC scientific facilities—pay	1.233	1.361	1.385
NERC scientific facilities—non pay	3.742	3.816	3.800
<b>Total Expenditure</b>	<b>48.307</b>	<b>47.311</b>	<b>47.743</b>
<b>Surplus/Deficit</b>	<b>-0.268</b>	<b>0.055</b>	<b>0.03</b>
IODP third-party funding. Income and expenditure in addition to the figures above.	2.641	5.764	





(NI) rebate. These payroll pressures will add to costs and have been phased in between 2016/17 and 2017/18. Our estimates include NI rebate removal (£499k) from 2016/17 and pension increases (£398k) from 2017/18. These are outside of our control and would have an impact on costs irrespective of governance model.

#### 4.2 How will the BGS meet the funding challenge?

Funding challenges will be addressed by removing staff costs from the

BGS base through the restructuring programme outlined in 'Our people', Section 3.1 above. This will remove £1m from the cost relating to staff in the NERC-funded line. The reduction in staff will result in a reduction in activities funded through NERC because a flat cash settlement over the five-year period is a reduction in real terms. This will slightly increase the percentage of our external income from 42.9 per cent in 2014/15 to 46.1 per cent in 2017/18.

In addition we anticipate that there will be a modest increase in the

overall level of external income by an additional £500k to £729k per annum – from £18.7m in 2014/15 to £22m in 2017/18. Previous work undertaken in conjunction with Deloitte and the BGS Science Directors included a more accelerated growth plan which has been revised pending discussion on our future ownership and governance. The increase in external income includes both volume increases and price optimisation.

Further efficiency savings will be necessary to achieve a financial surplus because the contribution

towards fixed costs from NERC reduces in line with the overall flat-cash scenario and the impact of increased costs puts significant pressure on our financial position. As external income from the growth areas increases, the staff required to deliver this activity will increase, this is included in the model.

The support-staffing level will stay at a similar level to now. This is to enable us to assimilate additional tasks which are, and will continue to be, transferred back to us as a consequence of the NERC RC project and the RCUK efficiencies programme.

#### 4.3 Capital expenditure

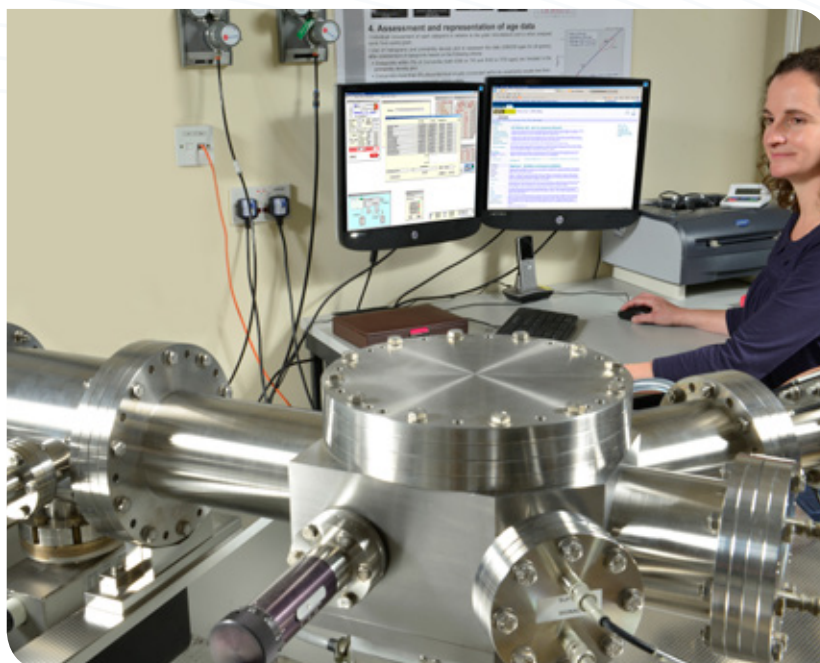
In addition to the investment at the Lyell Centre, we will need additional capital investment to ensure we maintain state-of-the-art analytical laboratory and survey facilities to underpin research and development. These will be funded from a mixture of potential sources and will result in laboratory infrastructure in Keyworth, Sutton Bonington and Thornton Science Park. They are not included in the budget as the amounts are yet to be determined and agreed with various funders.

The major funding for ESIOs is covered in section 3.4 above.

#### 4.4 Investment to support transition to a new corporate form

The continued success of the BGS in winning commercial income depends upon the excellence of its staff. Resources (about £1.5m) will be required to invest in specific areas of scientific delivery and some staff will need to be redirected away from national capability work; others will need to be recruited. We have assumed there will be one-off transition costs which will initially be dominated by the purchase,

configuration and installation of new IT and enterprise management systems, and the cost of consultants and internal experts – new staff will form a project transition management team. These costs are not included in the current forecasts. Once embedded, expenditure will be focused on the on-going maintenance of these systems, and the bearing of costs new to BGS as a separate entity, including insurance, statutory compliance and various subscriptions.





# 5 Risk management

The BGS business plan carries some risks since the changes envisaged will introduce a considerable degree of uncertainty to the organisation. A risk is defined as an uncertain event which will have an impact on the implementation of the business plan. It is important to note that these uncertain events can either be positive (opportunities) or negative (threats), but both need to be controlled through risk mitigation. The following table considers the causes, impacts and likelihoods of these categories of risk materialising. They can be categorised as:

- **Operational:** risks around the day-to-day-running of the organisation.
- **Markets, products and services:** risks around our offerings and current and potential clients' willingness to work with us.
- **Financial:** risks around funding and day-to-day operations of the business.
- **Scientific and reputational:** risks around how we might be perceived and our ability to continue to meet our vision, including scientific impartiality and competitiveness.
- **Talent:** risks around culture, staff retention and morale.

For each risk identified, a mitigation action has been described (Table 1). The risk logs do not cover some specific risks associated with the ownership and governance project such as timings, legislation, the actual extent of any funding reductions and transition cost support. These are considered out of scope for the business plan and we only have limited ability to influence them.

Risk type	Risk
Operational	• Partnerships with other organisations to deliver BGS offerings are not effective or fail to generate value for us
	• The BGS is unable to invest to ensure its infrastructure is cutting edge
	• Government-owned Board has too much influence in day-to-day BGS operations
	• Internal BGS processes do not facilitate cross-working and silos develop
	• Increased number of clients and complexity of offerings makes delivery more challenging
Markets, products and services	• Opportunities in nascent markets do not materialise
	• New opportunities emerge that the BGS cannot take advantage of
	• New BGS offerings are not well articulated and attractive to clients
	• The BGS does not have an effective means of tracking, ranking and prioritising new opportunities
	• Loss of existing established client base and revenue streams
Financial	• Forced to put all data and products out for free
	• Inaccurate financial budgeting and forecasting due to a more uncertain and complex commercial environment
	• Increased financial risk exposure due to independence
Scientific and reputational	• New costs from being a government-owned entity must be covered
	• The BGS loses its essential balance between research focus and commercial endeavours
	• Negative public perceptions towards the BGS from working with contentious issues
Talent	• The BGS loses its distinctive identity and becomes too much like a consultancy
	• The BGS fails to recruit sufficient numbers of staff to fill capacity or capability gaps
	• The BGS faces higher than planned-for staff attrition
	• Staff cannot adapt to new government-owned entity working environment and culture, and have low morale and poor productivity



**Table 1** Risk log and mitigating actions.

Mitigating actions
<ul style="list-style-type: none"> <li>• The BGS conducts a detailed due diligence of all potential partner organisations and agrees clearly defined roles and responsibilities</li> </ul>
<ul style="list-style-type: none"> <li>• The BGS puts in place costed capital expenditure plans and all equipment procured should be flexible enough to be upgraded or repurposed</li> </ul>
<ul style="list-style-type: none"> <li>• Clear roles and responsibilities of Board members are outlined in the articles of the BGS; careful selection of Board members that understand and support the BGS</li> </ul>
<ul style="list-style-type: none"> <li>• Internal communications to disseminate projects; central business development team to actively connect science teams</li> </ul>
<ul style="list-style-type: none"> <li>• Projects build contingency into budgets and consider innovative ways of working, e.g. virtual working</li> </ul>
<ul style="list-style-type: none"> <li>• The BGS engages with policymakers to influence decision-making; establish teams that are flexible across different opportunities/offerings</li> </ul>
<ul style="list-style-type: none"> <li>• Horizon scanning to identify new opportunities earlier and teams that are mutually interchangeable to take advantage</li> </ul>
<ul style="list-style-type: none"> <li>• Pilot client offerings and constantly refine</li> </ul>
<ul style="list-style-type: none"> <li>• The business development team creates a pipeline qualification process</li> </ul>
<ul style="list-style-type: none"> <li>• Maintaining effective dialogue with policymakers, clients and research partners</li> </ul>
<ul style="list-style-type: none"> <li>• Engage with policymakers to influence decision-making</li> </ul>
<ul style="list-style-type: none"> <li>• The BGS implements improvements to the customer relations management platform and have time codes in place and incentives to correctly record time</li> </ul>
<ul style="list-style-type: none"> <li>• Realistic estimates of external income by science directors.</li> </ul>
<ul style="list-style-type: none"> <li>• Effective client due diligence and budget contingencies in all projects</li> </ul>
<ul style="list-style-type: none"> <li>• Finance team uses scenarios and the BGS strengthens its risk management policies</li> </ul>
<ul style="list-style-type: none"> <li>• Finance team obtains estimates well in advance and builds into cost base</li> </ul>
<ul style="list-style-type: none"> <li>• Effective qualification of opportunities to ensure they align with our vision</li> </ul>
<ul style="list-style-type: none"> <li>• Continuous renewal and review of science programmes</li> </ul>
<ul style="list-style-type: none"> <li>• Create stronger incentives for balance between commercial and non-commercial income</li> </ul>
<ul style="list-style-type: none"> <li>• Encourage staff to see that high-quality competitive science contributes to commercial attraction</li> </ul>
<ul style="list-style-type: none"> <li>• Overall, the BGS seeks to have a balanced portfolio and engage with the public to demonstrate benefits</li> </ul>
<ul style="list-style-type: none"> <li>• Embed BGS objectives into staff's personal objectives and incentive structures to ensure our vision is achieved</li> </ul>
<ul style="list-style-type: none"> <li>• The HR team begins recruitment exercise well in advance</li> </ul>
<ul style="list-style-type: none"> <li>• Tailor job descriptions</li> </ul>
<ul style="list-style-type: none"> <li>• Ensure BGS has the freedoms and flexibilities to attract the best staff</li> </ul>
<ul style="list-style-type: none"> <li>• Maintain an attractive, vibrant research and science environment</li> </ul>
<ul style="list-style-type: none"> <li>• Succession planning in place</li> </ul>
<ul style="list-style-type: none"> <li>• Clear internal communications to explain change</li> </ul>

# 6 Implementation plan

In the short term, the BGS is taking steps to address capability gaps and work with NERC to begin to clarify assumptions around transition to a new more independent entity.

- We will:
  - continuously renew and review our science programmes, refine our client offerings and our pricing models, and undertake some limited market testing
  - confirm our preferred organisational and governance structure
  - initiate staffing and infrastructure changes as part of the current resource plan.
- We will also work with NERC and other government stakeholders to prepare for a change in ownership and governance, including:

- clarifying the NERC's timelines and key milestones
- resolving any outstanding issues and establishing a process for corporate form transition
- supporting the development of the NERC business case for independence to HM Government
- refining financial modelling assumptions
- developing stakeholder communications.

The BGS cannot progress fully and freely unless everything is in place for it to operate successfully as a new independent entity; this includes agreeing transition arrangements with the NERC and finalising any outstanding corporate form and governance issues with the Department for Business Innovation

and Skills. We would prefer to implement the transition to a new ownership and governance model even if the other NERC centres are still developing their implementation plans. The implementation will have a number of activities occurring simultaneously, reflecting the fact that we can undertake many activities independently. However, for us to progress further, we require the NERC and other organisations to complete their respective activities (over which we have limited influence). Our ability to begin activities such as recruitment and investment relies on having certainty on transition arrangements, corporate form and other governance issues.

# 7 Longer-term outlook

The BGS will be firmly established as the leading geological survey in a number of areas by the end of the current CSR (2020). There are a number of key indicators of us achieving this plan:

**Governance and management** We will have reached our goal when we

- maintain a balanced budget through continued refining of workforce and income streams
- have a workforce of 550 to 600 with an increased number of staff for external contract work
- have an income stream that consistently generates a modest surplus
- are a government-owned or sponsored company
- have freedom and flexibility to manage our own budgets
- are able to receive directed funds from government departments and ResearchUK
- have clearly defined our public good remit and public tasks
- have a strong devolved presence in Scotland (with the Lyell Centre), in Wales and in Northern Ireland.

**Infrastructure** We will have reached our goal when we

- manage and develop a suite of national facilities in the earth science sector
- have enhanced and extended the National Geological Repository
- have built the phase three

laboratory suite in Nottingham (Keyworth and Sutton Bonington)

- have delivered two ESIOs sites and negotiated a further two sites
- have, as part of ERA, developed the £60m funding into £250m with equivalent matched funds
- are the core services provider for, and are key to, the delivery of European data Infrastructure
- are recognised for energy test beds for energy security research and for observatories for geohazard management in the UK and Internationally
- have renewed our role as the delivery organisation for marine ocean drilling in the European Consortium for Ocean Research Drilling.

**Science and partnerships** We will have reached our goal when we

- have established excellent impact evidence, and research and public national good science metrics
- have completed a REF with a better outcome in the research area and maintained excellent impact
- established close collaboration and partnerships with higher education institutes on host campuses (Nottingham and Heriot-Watt) and have met Lyell and Nottingham key performance indicators (KPIs)
- have developed a strong higher education institute partner base with existing and new partners
- have a strong research network with European Geo8 partners, EPOS and EuroGeoSurveys.

- are present in international arenas through geodata provision and applied geoscience research
- achieve a 25 per cent success rate (3 per round) in non-sanctioned NERC discovery grants
- have won innovation grant funding from NERC and Innovate UK
- have increased our proportion of competitively won income with industry and other funders to about 70 per cent of total income
- developed a suite of products and services that at least double current income in this sector.

**People** We will have reached our goal when we

- have an embedded leadership-development programme
- have a revised talent-management strategy
- have developed and increased apprenticeship opportunities
- have achieved silver rating from Athena Swann
- have increased the number of staff who are professionally accredited
- have delivered the *Growing Future Leaders* programme for NERC
- have a commercially focused training programme
- are a place where talented people want to work and develop
- provide a positive, stimulating and productive environment that values diversity.



# List of abbreviations

BRGM	The French geological survey
CARP	Centre Activity Resource Plan
CCS	Carbon capture and storage
CSR	Comprehensive Spending Review
DEFRA	Department for Environment, Food and Rural Affairs
DfID	Department for International Development
EI	External income
EPOS	European Plate Observing System
ERA	Energy Research Accelerator
ESIOS	Energy Security and Innovation Observing System
FTE	Full-time equivalent
GSNI	Geological Survey of Northern Ireland
NC	National capability
NERC	Natural Environment Research Council
NGR	National Geological Repository
OGA	Oil and Gas Authority
PNG	Public national good
RCUK	Research Councils UK
REF	Research Excellence Framework
RL	Research line





**British  
Geological Survey**

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