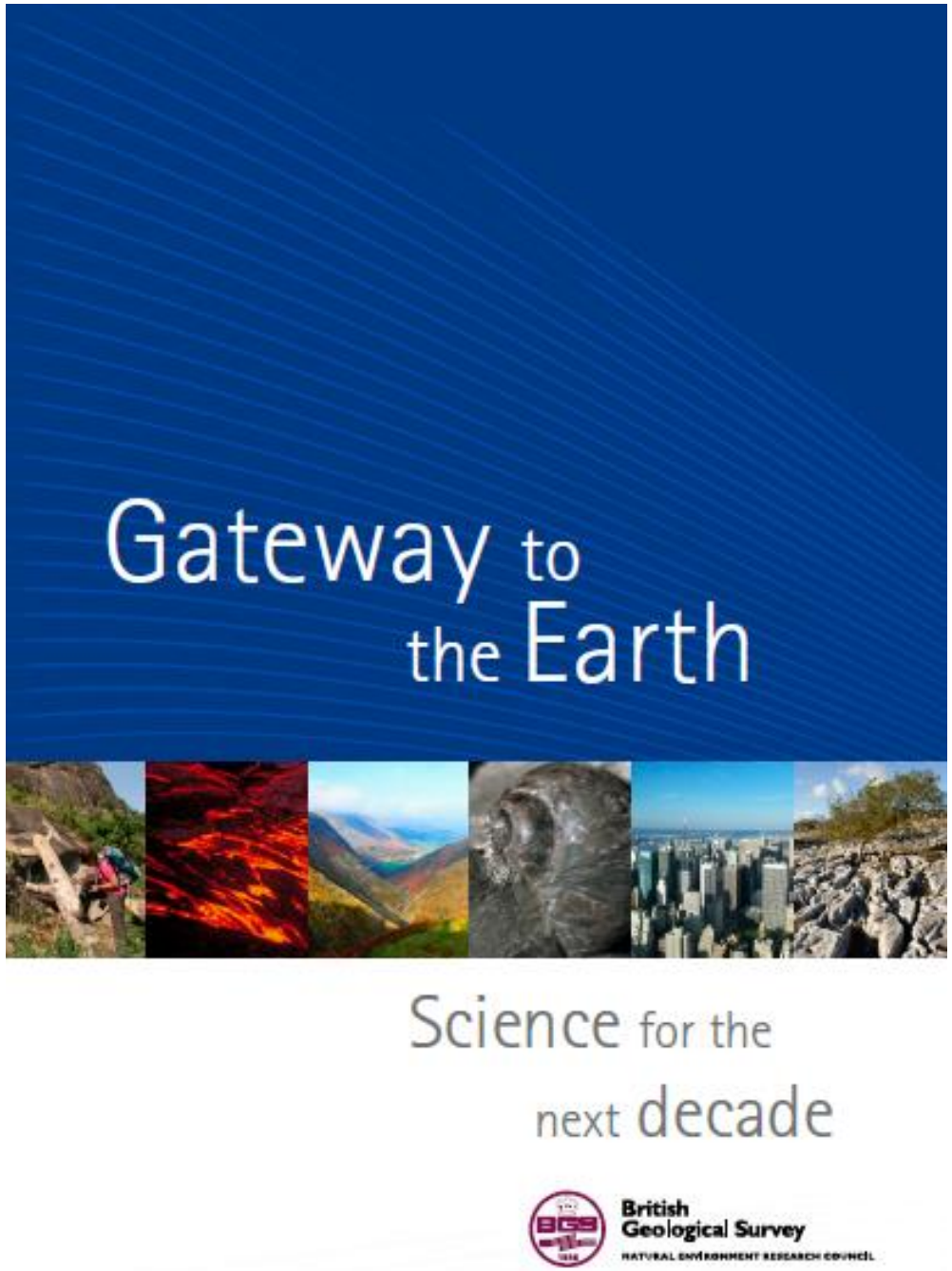
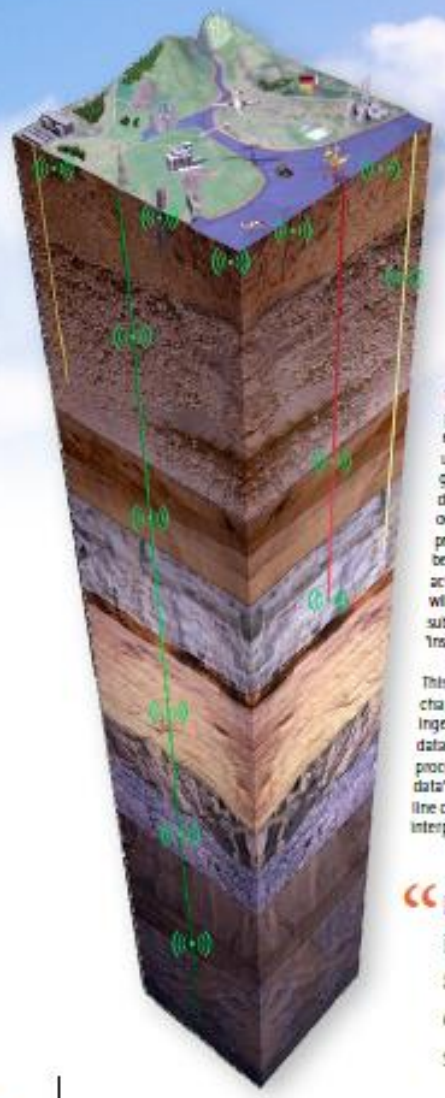


National Geophysical Survey

Mike Stephenson

What we'll do



Instrumenting the Earth

In the past, geological surveys concentrated on the solid subsurface but in the decades to come we will need to monitor processes below ground in real time.

Weather and river water quality are already monitored continually, and some geological processes (volcanoes and earthquakes) are monitored in real time, but deeper subsurface processes are monitored episodically, if at all. Our future use of the subsurface – for groundwater, energy and waste disposal – depends on improving our understanding of subsurface processes. This will make us better at managing these activities safely and sustainably. It will require much greater effort in subsurface monitoring, essentially 'instrumenting the Earth'.

This approach implies a step change in the way that BGS ingests, processes and serves data. We will need more processing power for the 'big data' we will generate, and a clear line of sight between collection, interpretation and modelling. This will benefit our own scientists and the global scientific community.

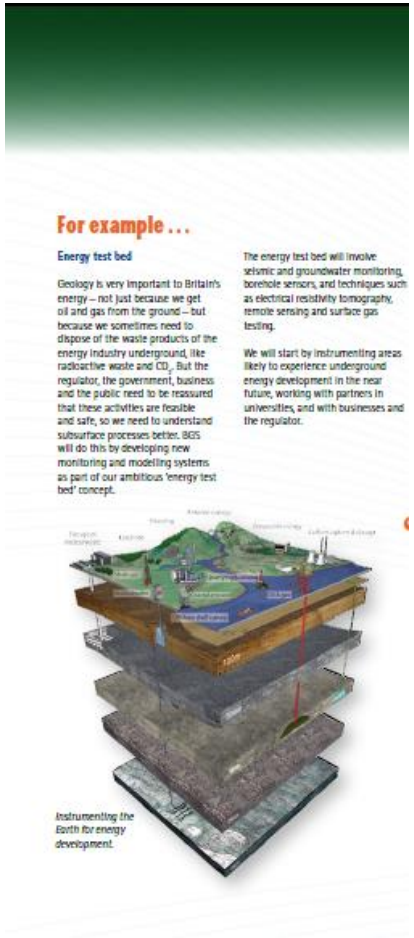
The National Geological Model

Instrumenting the Earth will need a 3D model. In the next decade BGS will complete the National Geological Model and start to take it offshore. The model will underpin our understanding of the subsurface onshore for groundwater, radioactive waste disposal and shale gas. Offshore, it will support our work on oil and gas, and on carbon capture and storage.

Going global

Resources, environmental change and hazards are global challenges, and so BGS needs to think globally. We will work with European platforms on the sensing and prediction of hazards and reach out by providing a global geological data warehouse and geological research to other nations.

> "In the next decade BGS will research the interactions between subsurface flows and the solid rock matrix at timescales consistent with human usage of the subsurface."



For example ...

Energy test bed

Geology is very important to Britain's energy – not just because we get oil and gas from the ground – but because we sometimes need to dispose of the waste products of the energy industry underground, like radioactive waste and CO_2. But the regulator, the government, business and the public need to be reassured that these activities are feasible and safe, so we need to understand subsurface processes better. BGS will do this by developing new monitoring and modelling systems as part of our ambitious 'energy test bed' concept.

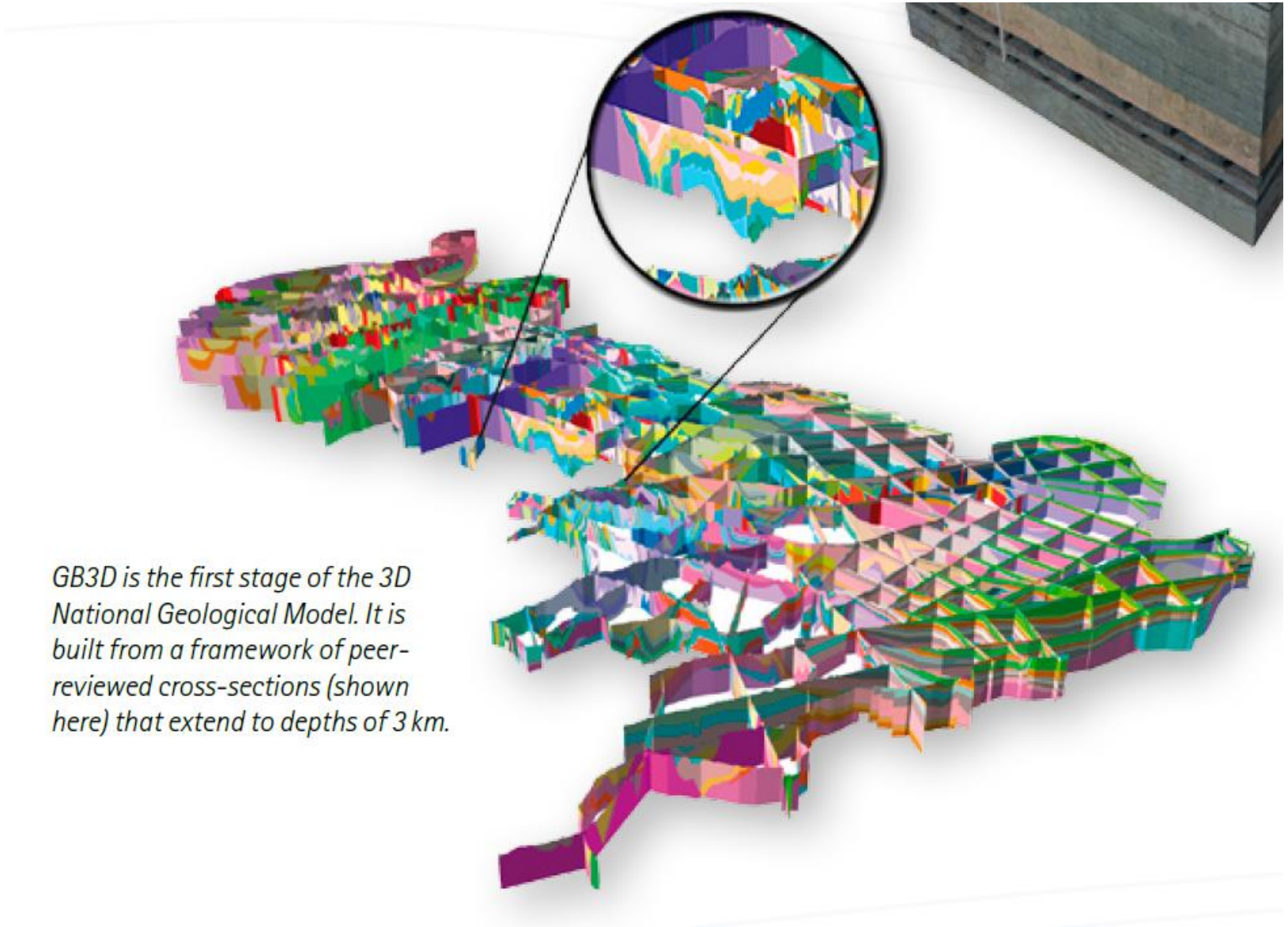
The energy test bed will involve seismic and groundwater monitoring, borehole sensors, and techniques such as electrical resistivity tomography, remote sensing and surface gas testing.

We will start by instrumenting areas likely to experience underground energy development in the near future, working with partners in universities, and with businesses and the regulator.

Instrumenting the Earth for energy development.

BGS has £31 million to set up the first Energy Test Bed for the UK

National Geological Model



GB3D is the first stage of the 3D National Geological Model. It is built from a framework of peer-reviewed cross-sections (shown here) that extend to depths of 3 km.