About Frazer-Nash – company overview

At Frazer-Nash, we help organisations deliver innovative engineering and technology solutions to make lives safe, secure, sustainable, and affordable.

With over 800 staff working from offices across the UK, we use cutting edge techniques such as data analytics, artificial intelligence and modelling, underpinned by traditional engineering principles.

In an uncertain world, we contribute to national security and society in a huge number of ways. We help make sure that power is generated and distributed to everyone who needs it. We support moving people and goods around and between the big cities of an increasingly urbanised society. We work to make the world a more sustainable place. We ensure governments save time and money when public spending globally is under huge pressure. And we help our clients wrestle with the challenges and opportunities of an ever-accelerating digital revolution.

Our people use their combined strengths to deliver technical solutions to some of the most challenging problems out there. Sometimes these challenges are difficult technical issues, and sometimes they are difficult because of the environment our clients operate in. Our great strength is our ability to rise to these challenges and deliver.

Our Systems Approach

Our Systems Approach helps us respond to your challenges. We work with you to understand the whole range of financial, operational, organisational, people and other issues that surround your technical needs. And we use this understanding to deliver demonstrable business and technical value.

The depth of our knowledge base means we can transfer the skills, experience and best practice from one area to benefit our clients in other fields.

Our expertise comes not from a single engineering perspective, but from detailed knowledge of a broad range of disciplines and their application across different markets.

We work across a range of market sectors including defence, nuclear power, renewable energy, transport and agri-tech. We support clients in the public and private sectors.

Our people cover a wide array of technical and academic disciplines including:

- Environmental assurance and sustainability
- Safety and security engineering
- Cyber security
- Data science and artificial intelligence (AI)
- Behavioural science
- System modelling and mapping
- Technology management
- Project, programme and change management
- Mechanical and electrical engineering

This prospectus provides an overview of the people, processes and tools we are able to offer policy makers to help address the 'Futures' challenge.

For more information on our capabilities please contact our Tender Support Partner, Vicky Hannigan or Andy Spears, our Government Practice Lead, using the details on page five.

Portfolio of skills and specialisms

At Frazer-Nash, we can employ a wide range of approaches to conduct Futures work.

Key techniques we can deliver are listed in the blue boxes. These can be combined into standard 'Pathways' or deployed in a more bespoke manner to meet your specific needs.

As part of the 'Reactor Design: Safety and Security Programme', the Department for Business, Energy and Industrial Strategy (BEIS) tasked us to deliver a Cost Benefit Analysis methodology to support the Security Modelling and Assessment work stream. We have designed an eight step process which includes Driver Mapping through techniques like PESTLE analysis to quantify the benefits of specific investment opportunities and policy decisions

Exploring nuclear innovation

Using our broad base of skills and expertise we develop scenarios employing both quantitative and qualitative metrics to fully explore key policy drivers.

Developing policy

- Policy stress testing
- Back-casting
- Road-mapping
- Business model design
- Strategy analysis
- Time-lining
- Innovation foresight
- Disruptive foresight
- Future design
- Prototyping
- Wind tunnelling
- Speculative design

Gathering intelligence

- Horizon scanning
- Web analytics
- Seven questions
- Issues papers
- Delphi
- Data acquisition
- Data visualisation
- Literature review

Describing the future

- Scenario development
- Quantitative scenarios
- Deductive scenarios
- Visioning
- SWOT analysis
- Project and change management
- Risk assessment and management
- Facilitation and workshops
- Expert panel management

Frazer-Nash undertook an option study on behalf of the UK Ministry of Defence (MOD) to evaluate potential battery technologies for use in a UK submarine programme. The study involved defining technical performance, safety, spatial integration, and cost. A roadmap and cost model were developed to allow the customer to implement the options identified.

Road-mapping a submarine battery

To assess the risk associated with Commercial Shipping around UK waters we conducted a full review of available relevant literature. This included infrastructure risk, vessel density, environmental hazards, and the socio-economic impact of vessel disablement. From this review, a cost/benefit analysis for the introduction of publicly-funded emergency towage vessels was produced for the Maritime and Coastguard Agency (MCA)

Gathering intelligence on maritime risk

Exploring change

- Driver mapping
- Axes of uncertainty
- Uncertainty analysis
- Trend analysis
- Trend forecasting
- Systems mapping and modelling
- Describing and explaining complexity

Frazer-Nash delivered two studies assisting BEIS in understanding the feasibility of transitioning the UK domestic gas network from natural gas to hydrogen. This project involved interpreting future policy, complex stakeholder engagement and in-depth technical knowledge. We convened and managed targeted stakeholder engagement workshops to develop consensus between industry stakeholders and describe what the future might be like

Workshopping a hydrogen future

We work in multi-disciplinary teams combining such skills as engineering, modelling, economics and behavioural science. This approach allows us to consider the full range of long term issues and challenges that shape the development of policy.

Core team members and case studies

With over 800 full time staff, spanning a range of disciplines, we design teams to meet our client's specific requirements and challenges. To support the Futures Framework we have designated a Core Team (outlined below) who will be supported by other experts in our business depending on the nature of your requirement.

David R McNaught MEng CEng MIMechE MINCOSE – Principal Analyst and Team Lead

David is a chartered engineer with 10 years' experience of a diverse range of projects across the energy, defence and aerospace industries. He has practical experience of both technical and managerial roles within demanding projects. He is an able leader of technical teams, dependably delivering complex and interdependent work packages.

He is a specialist systems engineer with a skill set including whole systems modelling, multi-criteria decision support and requirements capture and management. He provides advice on how to apply systems life cycle processes to technology projects, helping his clients get the best out of their most challenging and uncertain projects.

Recent relevant experience:

▸ Key resource for the Energy Systems Catapult's Future Power Systems Architecture Project; providing knowledge area consultancy on future UK transmission and distribution policy and strategy.

▸ Provision of understanding of readiness and development of 'grid edge' systems, technology road mapping, stakeholder workshops and delivery of a systems engineering framework to inform DECC network policy to 2030.

▸ Provided innovation strategy advice to Ofgem on its Low Carbon Network Fund innovation competition. Responsible for providing technical advice to its expert panel, to facilitate decisions on assigning the £60 million innovation fund.

Case Study: BEIS, Nuclear Innovation Programme

David is a Project Leader for several Nuclear Innovation Project (NIP) research and development strands for BEIS. For the topics of 'Safety and Security' and 'Thermal Hydraulics' he has delivered research and development (R&D) programmes amounting to millions of pounds and consisting of:

▸ Stakeholder workshops to develop consensus between experts in industry and academia and to scope initial research proposals.

▸ Research and data gathering, using interviews, questionnaires, surveys, expert panels and literature review, which require community support and engagement to deliver.

▸ Fostering a network of collaborating organisations (including academics, National Labs, original equipment manufacturers (OEMs) and other consultancies) to deliver the technical R&D strands.

▸ Disseminating the research to industry participants through conference papers and presentations, engagement with industry participants, policy makers and regulators and a dedicated website (http://www.innovationfornuclear.co.uk/home).

Sam White MBA BA (Hons), MIED – Senior Analyst

Sam is an economist with 15 years' experience of successfully leading teams through all stages of the project life cycle. He has developed expertise in economic impact assessments, feasibility studies and programme evaluations – providing high-quality solutions to complex challenges for clients covering a wide spectrum of industries.

Sam has developed an impressive portfolio of socio-economic research projects across several sectors and disciplines. His area of expertise is in assessing the economic and social impact of significant infrastructure projects, with extensive experience designing HM Treasury's Green Book compliant economic impact models and five-case business models.

Recent relevant experience: Shipping Risks and Emergency Towage Provision in the UK exclusive economic zone (EEZ):

▸ Sam was a key member of a team that delivered a complex and innovative study into the risks to (and from) commercial shipping in the UK EEZ.
Sam carried out detailed cost and benefit modelling, including a valuation of the UK coastline for a range of social, economic and environmental factors, including tourism, fishing, power generation, aquaculture, port/ferry terminals, and environmentally sensitive areas.
This information was used alongside a modelled forecast of shipping – considering gross domestic product (GDP) growth and shipping vessel trend data – to inform a risk-based cost/benefit analysis of emergency towage solutions up to 2025.

Case Study: National Infrastructure Commission (NIC), Better Delivery

Frazer-Nash was tasked by the National Infrastructure Commission (NIC) to undertake research into rail and road freight transport practices, with the aim of illustrating zero-emissions scenarios for the future.

In order to develop these scenarios a literature review was undertaken, that allowed for the baselining of carbon emissions and air pollutants in the UK and five European countries identified as the main freight trading partners of the UK. Several alternative fuels and technologies were assessed for their technical maturity and their environmental benefits (or drawbacks). This included their life cycle emissions of carbon and other air pollutants such as Nitrogen Oxides (NOx), Sulfur Oxides (SOx) and fine particulate matter.

The scenarios and roadmap we developed were used by the NIC in their 'Better Delivery' report on de-carbonising the UK haulage sector.

William Barnes MEng AMIMechE – Consultant Analyst

Will has broad experience of providing technical leadership to major programmes in the public sector in both the civil and defence domain. He brings a broad technical expertise to the team as well as experience in technical project and programme delivery and effective risk management.

Recent relevant experience: ASPIRE Programme – Technical Coordinator

▸ Will was responsible for integration and coordination for 19 technical projects in the ASPIRE Programme to actively identify and manage project and programme level risks. This five-year change programme aims to standardise the way Air Safety is managed across Defence Equipment and Support (DE&S) Air, both ensuring it is as effective as possible, and in line with Military Aviation Authority regulatory publications (MRP).

Michael Hall MSc Economics – Junior Analyst

Michael is an environmental economic consultant with significant experience of developing and assuring business cases in accordance with HM Treasury's Green Book. He has particular expertise in the economic assessment of natural capital, environmental impacts and environmental risk management projects.

Recent relevant experience: Regional Growth Fund Lead

▸ Working on behalf of The Ministry of Housing, Communities and Local Government (MHCLG), Michael was the lead quality assurer of the economic cases for two submissions to the Housing Infrastructure Fund which seeks to help unlock the development of up to 650,000 houses. He ensured the economic cases were robust, demonstrated value for money and were in accordance with HM Treasury's Green Book.

▸ Michael was a lead in the econometric analysis of the impact of the Regional Growth Fund. The analysis involved linking monitoring data on supported businesses to government administrative data, using sophisticated econometric techniques such as propensity score matching and the Cox proportional hazards model.

Anna Will MEng, AMIMechE, AMIAM – Assistant Analyst

Anna is involved in Frazer-Nash's Asset Management service offering, with experience of authoring Asset Management policy and strategy. She is currently developing her skills in road-mapping, concept generation and assessment, decision support and risk management. Anna is continuously looking to advance and expand her experience and competencies.

Recent relevant experience:

▸ Anna has been working with the Whizz-Kidz Charity to develop the future of powered wheelchair design and to show the art of the possible.

Case Study: Whizz-Kidz, Bringing Ideas to Life

Frazer-Nash has been supporting charity Whizz-Kidz as it brings children's Dream Wheelchair ideas to life. The Dream Wheelchair competition is part of Wheels of Change, a £1 million project funded by players of People's Postcode Lottery through its Dream Fund initiative. Wheels of Change is a partnership between Whizz-Kidz, Duchenne UK and the University of Edinburgh, and is researching and developing new technology, design and innovation to integrate with and enhance mobility equipment.

Whizz-Kidz ran a competition asking young people to design and describe their #DreamWheelchair. A winner was chosen from each of three age categories. As part of the prize, we used our cutting edge Additive Manufacturing capability to '3D print' the winning designs. Our prototyping capability is just one of the ways we can help describe and explain complex futures, and develop a vision recognisable to all stakeholders and policy makers.

Read more about the #DreamWheelchair competition at http://www.whizz-kidz.org.uk/about-us/news/tom-fletcher-and-actress-samantha-renke-award-young-dreamwheelchair-winner.

For enquiries, please contact:

Andy Spears or Vicky Hannigan

Email: futures@fnc.co.uk

Phone: 01925 404000   **www.fnc.co.uk**