Welcome to the future of energy

Sustainable

Innovation

Jobs
The Energy Systems Catapult - why now?

Our energy system is radically changing. The challenges of decarbonisation, an ageing infrastructure and shifts in societal expectations require a rethink in how we supply, manage and consume energy.

Stronger consensus about the path forward, and finding the right solutions along the way, will benefit everyone. Government will make more informed policy decisions. Major suppliers and utility operators will find opportunities in a system that is more joined-up. Innovators and smaller businesses will be encouraged to enter a market that is easier and less costly to navigate. And consumers will enjoy more choice and better value for money.

The prize will not just belong to the energy sector. Energy is the backbone of the economy, and a primary influence upon our environment. Make energy cleaner, more affordable, more secure and more commercially sustainable, and we all win.

The future of energy begins now.

Creating the opportunities begins with the right approach

It is absolutely right that any debate about the future direction of energy focuses on the energy trilemma (reliability, affordability, sustainability). But the spotlight on the sources of energy we use endangers a proper analysis of energy transformation. Furthermore, commercialising innovation in today’s market is difficult, as incentives tend to be engineered by policy in the absence of dynamic and flexible commercial markets.

What we need is a whole systems approach, devoid of emotional, political or business bias. It begins by bringing everything to the table. Only by understanding the entire of the energy system - the transmission and distribution infrastructures, market mechanisms, data flows, regulatory frameworks and consumer behaviours - can we discover the right pathways and opportunities.

Drivers of radical change

CO₂ - Decarbonisation
Security of supply
New technologies
Ageing infrastructure
Consumer needs

Catapults - a new approach for transformation

Catapults - Government sponsored innovation centres – are ready to help tackle some of the most pressing issues facing the UK. Knowledge and data is shared, innovators are welcomed and their new ideas explored, and the voice of the customer is heard. A new spirit is emerging, with the know-how and the will to make a difference.

Our vision for the Energy Systems Catapult is clear; a whole systems, multi-vector approach for how we transition to future energy. Working alongside Government, business, utilities, academia and other players in the sector, we will research, test, model, demonstrate and measure new ideas; we will uncover insights and share knowledge; and we will explore and then exploit new ways of producing, delivering and funding the supply, management and consumption of energy.

Economic benefits of energy transformation in the UK:

- £8 billion saving per year to the UK customer
- up to £19 billion in system cost savings
- up to £46 billion contribution to UK GDP

A UK energy market worth £1.6 trillion

Sources: Low Carbon Innovation Coordination Group (LCICG), TINA (Technology Innovation Needs Assessment) Reports, National Infrastructure Commission 2016 report “Smart Power”
Making the switch - key triggers of the new whole systems approach

- Siloed & competing verticals
- Isolated tests
- Barriers to entry
- Policy led

Old vs. New

- Consensus on direction of travel
- Segregated technologies
- Open for business
- Collaborative

Three core components of the whole systems approach

Our whole systems approach is defined by three core components. Each is targeted at specific areas where we believe intervention will have greatest impact. In practice these three components work together to produce a coordinated response to unlocking opportunities. Coordination also takes place at a stakeholder level, with the Energy Systems Catapult (ESC) the convenor of a collaborative ecosystem of stakeholders. These stakeholders include National and Local Government, policy and regulatory bodies, business, trade bodies, not-for-profits, the innovation community and SMEs, network and utility operators, academia, regional partners, and consumers and community groups.

A whole systems energy approach - an interconnected environment that brings knowledge, energy sources and end-user products together.
1. Convening expertise

The first component builds deep knowledge of the energy systems and uses this expertise to help decision-making. It fills a gap identified by policy makers and industry alike for a consensus on the direction of travel for the energy sector. The ESC will help bring about that consensus, and then continue to examine its validity.

This consensus, reached through intellectual rigour and accessibility to information, will test assumptions and future scenarios not only on their own merits, but also how they compare to other energy system models. Such consensus is a hallmark of a mature sector. It underpins strong policy choices, informs the prioritisation of innovation and budgets, and is a requisite for confident investment.

We are well underway with engaging with a broad set of key stakeholders in the power sector through participation in cross industry programmes such as the Future Power System Architecture programme (FPSA) for the Department of Energy and Climate Change. The FPSA, in which we’re collaborating with the Institution of Engineering and Technology, represents a very important piece of sector enabling work. The first phase was delivered in December 2015 to acclaim from industry, academia and Government.

2. Linking innovation and business

The heart of the ESC’s vision links innovation and business opportunity to the direction of travel. We will build tools that help innovators connect with the system, and indeed help shape it, and encourage new entrants to the market. We see the role of SMEs as particularly vital to the future of the energy sector, and so will have a focus on how best to support them. We will also make the business case for an inter-disciplinary approach to innovation, that the role of social sciences and the psychology of human behaviours should be as much a focus for the energy sector as techno-economic considerations.

Essentially, this is about identifying the good ideas, and navigating them to the point of fruition. So alongside the innovation of technology, we will look at new business models, how innovators can access data and knowledge, new research and analysis, and so on. Innovators will become fully integrated with the whole system and there will be a more fluid transition from idea to live operation.

Innovation management will focus on three key capability areas, as well as generating assets and products for use by the sector.

Under a new collaboration agreement with the Energy Innovation Centre (EIC) we are building closer access to the SME community. The EIC works with around 100 SMEs a year, and the new relationship will enable us to reach this community with information and opportunities. We are currently assessing options to deliver some early wins to support smaller companies, including the development of alternatives to performance bonds and assistance to new players in accessing and using test and demonstration facilities to validate their technologies faster and cheaper.
3. Building capability

The third component builds capability throughout the system by creating real world demonstration environments for new technologies, products and services. Through these demonstration environments we will be able to assess assumptions and experiment with innovations, thus providing the capability to develop large-scale deployments.

A key outcome of these demonstration environments will be a better understanding of what energy services people value and prefer. We will be able to recruit consumers into trials, so that new ideas can be tested, iterated and improved.

Our capability in this area will initially build on the Smart Systems and Heat Programme (SSH), which we are delivering for the Energy Technologies Institute (ETI). The SSH demonstration activity plans to cover up to 6,000 households in three cities. Crucially we will enhance this model so that demonstration can take place in a whole systems environment.

We are working alongside the ETI, EDF and Hitachi to develop tools to enable large scale trial and demonstration of smart residential energy systems. We are also collaborating with DECC and local authorities in Bridgend, Greater Manchester and Newcastle to scope Europe’s largest smart residential energy demonstrators, which will involve many thousands of homes and consumers from 2018.
Our new home

Embedding a whole systems approach is as much a human challenge as a technical and economic one. It is people who will spark the new ideas and innovations that will drive the sector forward. It is people who will ultimately create the collaborative spirit to ensure the best solutions are developed, deployed and scaled. And it is people who will ensure the discipline and rigour that must underpin the system.

We see ourselves as a trusted convener in this new relationship-driven culture; and it will guide how we are organised and how we work.

Our new home, Cannon House in the heart of Birmingham, is ideal for creating the environment we want. The location itself; a large city, central location with easy access to a major railway station (New Street), was a deliberate choice to encourage stakeholders to come and see us, use our facilities and work together on projects. The ergonomics of the new space have been considered to stimulate new thinking and sharing of ideas. It is also large enough to host events, such as conferences, presentations and consultations, or simply to celebrate success.