



SUSTAINABLE SOLUTIONS IN ENERGY

Ian Graves, Power Director at Costain, looks at decarbonisation, energy storage and encouraging efficiencies

While there has been fierce debate over the years about what the concept of sustainability actually means, we find that for many of our stakeholders it is increasingly clear.

They are looking for sustainable solutions that ensure long-term viability through meeting economic, environmental and social challenges. At Costain we employ our leading-edge engineering skills to embed sustainability in everything we do.

The sector is actively working to meet three closely-linked objectives:

- Maintain security of supply: keeping the lights on.
- Decarbonise the energy grid: to minimise the impact of climate change.
- Ensure affordability of supply: for business as well as consumers.

Finding balance between these objectives is difficult because of the complex energy equation, which encompasses generation, transmission and distribution and demand management.

Generation

The UK Government has set challenging targets, including the reduction of carbon emissions by 80% by 2050. Shorter-term, the target is to have almost 15% of energy delivered from renewable sources by 2020.

Key to this is reform of the electricity market. Costain is actively working in all three

areas of decarbonisation, energy storage and encouraging efficiencies.

1. Decarbonisation. Innovation is beginning to provide some answers:

- Carbon capture and storage (CCS) - We are working on a project (with some of the UK's top universities) which will help make CCS more affordable, including one which aims to develop a carbon capture pilot plant capable of capturing 95% of CO₂ emissions.
- Offshore wind farms - We are partners in a joint venture which has devised a new form of turbine base which avoids the need for specialists and expensive marine equipment.
- Tidal - We are working with a customer to develop a tidal lagoon project in the UK.

2. Storage. The success of many renewable technologies (such as wind power) depends on being able to store the resulting energy. Some ground-breaking technologies are emerging, including the use of liquefied air or liquid nitrogen as a storage medium. But more investment is critical. Costain is working with three UK SMEs to support this development.

3. Encouraging efficiencies. Our customers recognise the need to upgrade and extend the life of existing plant. Costain is adopting new processes and flexible working arrangements, as well as optimising current plant performance for our customers.

Transmission and distribution

Assets need to be replaced in the UK's ageing transmission and distribution system but it also needs to evolve into a more 'dynamic' network, capable of managing increased interconnection as well as new forms of generation.

We see the beginnings of a more sustainable solution with the introduction of 'smart' grids which will be reliable, efficient and sustainable. Smart metering will assist in unlocking this potential.

Demand-side management

If we wish to continue to develop a modern economy there needs to be an equal focus on reducing the energy we use. There are a number of interesting developments, including grid balancing services, also known as demand response. Our new COdemand venture is an example of where new revenues can be unlocked through a smart approach to managing energy loads. We look forward to sharing this with more customers soon.

None of this will be easy, of course. But we are excited about the potential these and other innovative developments have, to solve the UK's energy challenges.

For more information email: power@costain.com
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