



## **Renewable Energy in the UK**

*The challenges of balancing supply and demand*

### **Titles:**

Managing energy supply from variable renewables to ensure it meets demand is one of the key challenges in a transition to a renewable future.

### **Narrator:**

While the government has adopted a range of targets for renewable energy and carbon reduction, there is still a lot of work to do to ensure the targets are met. As the UK installs increasing numbers of renewable electricity generators, many of them in remote locations, there's an increasing need for new transmission lines to connect them to the National Grid. And because wind and solar power output is variable, new ways of balancing supply and demand are being developed. These involve a mixture of demand management, storage, backup from conventional power stations, and new grid connections to other countries.

### **Dr Alastair Martin, Flexitricity:**

Over the years renewable generators have faced huge difficulties in getting their generators connected to the network. Various innovation projects and various incentives on distribution network operators have improved that situation, there's still a lot to do. Beyond that, it's about supply demand balance as the renewable components of the energy infrastructure grows. Energy storage can help with that. Demand response can help with that. And contingency provided by fossil fuelled power stations will still be part of that picture for quite some time. But if the Demand Response part, the energy efficiency part and, hopefully, the energy storage part can come together, then the need for that contingency reserve will remain really just a theoretical need most of the time.

### **Niall Stuart, Scottish Renewables:**

We're at the very early stages of a transformation. If we look just at Scotland, for example, five, six years ago, renewables and a form of hydro provided 20% of our electricity. This year it will be over 40%. Scotland has fantastic wind, wave and tidal resources. For other countries to really take forward that level of renewable energy, we need to see technological advances and greater interconnection; we need to see Europe connected up as one grid, for example, where we can transport wind, wave and tidal power from the North of Europe to the South of Europe.

Where we can export solar power from North Africa, Southern Europe, and we also need to see a greater focus on storage. So how do we convert electricity when it's generated, when renewable sources are high? How do we convert that? How do we store it? And then how do we transport it and use it when it's needed? Those are the challenges that we have to unlock if renewables is to become our absolute principle source of energy.

**Narrator:**

Over a continent as large as Europe, the varying climate conditions are a key driving force in planning a renewable future. There may be high winds and cloudy skies in Scotland, but at the same time the Mediterranean could see strong sunshine and gentle breezes. To take advantage of this complementary balance of resources, Europe will need to add to the existing networks of interconnectors that link countries' electricity systems.

**Alastair Martin:**

The interconnectors that are there presently -- to the Netherlands, to France, to Northern Ireland and to the Republic of Ireland, are important features of both the GB system and the systems that they're connected to. In the future, there will be more interconnectors. There will be common codes that define how interconnectors are used. Demand response, along with renewable generation, will therefore be transnational and there will be cross border flows. So for example, if you have a minor crisis in the UK but a major crisis across in France or the Netherlands, then you're going to rely on resources in the UK to support the UK, but also to do more than that, and to support through the interconnectors. Interconnection allows that. In the same way, a high resource availability; let's say for example, there's a lot of photovoltaic availability in continental Europe, but not so much in Britain, that could happen, the interconnectors are there to allow us to share in that resource.

**Narrator:**

Most of Europe's existing grid interconnectors involve undersea power transmission cables linking to grid nodes on land. But there are new proposals to build a European "Offshore Supergrid", with grid connection nodes located in the middle of the North Sea, the Baltic and the Bay of Biscay.

**Andrew Hiorns, National Grid:**

Clearly we need to look at National Grid's role in developing offshore Super-grids and in developing these projects.

Presently National Grid's role is for the wires in England and Wales, in operating the system, and our licence prohibits us from building interconnectors.

But after saying that, we are part of the solution. We have been part of a number of working groups looking into the benefits of these solutions. There's a initiative being undertaken by the governments, the North Sea Offshore Grid Initiative, National Grid have played a key part of that. That's looked at what the networks would look like at 2030 and how would you get there. What's that demonstrated? If you do need significantly more interconnectors, and you need a lot more offshore wind, the significant benefit in actually creating a North Sea Grid. It's a challenge. But it's a challenge that I believe, they're achievable, depending of the pace we go to get there.