

Regulating for innovation – the energy experience

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Strategy & Regulation

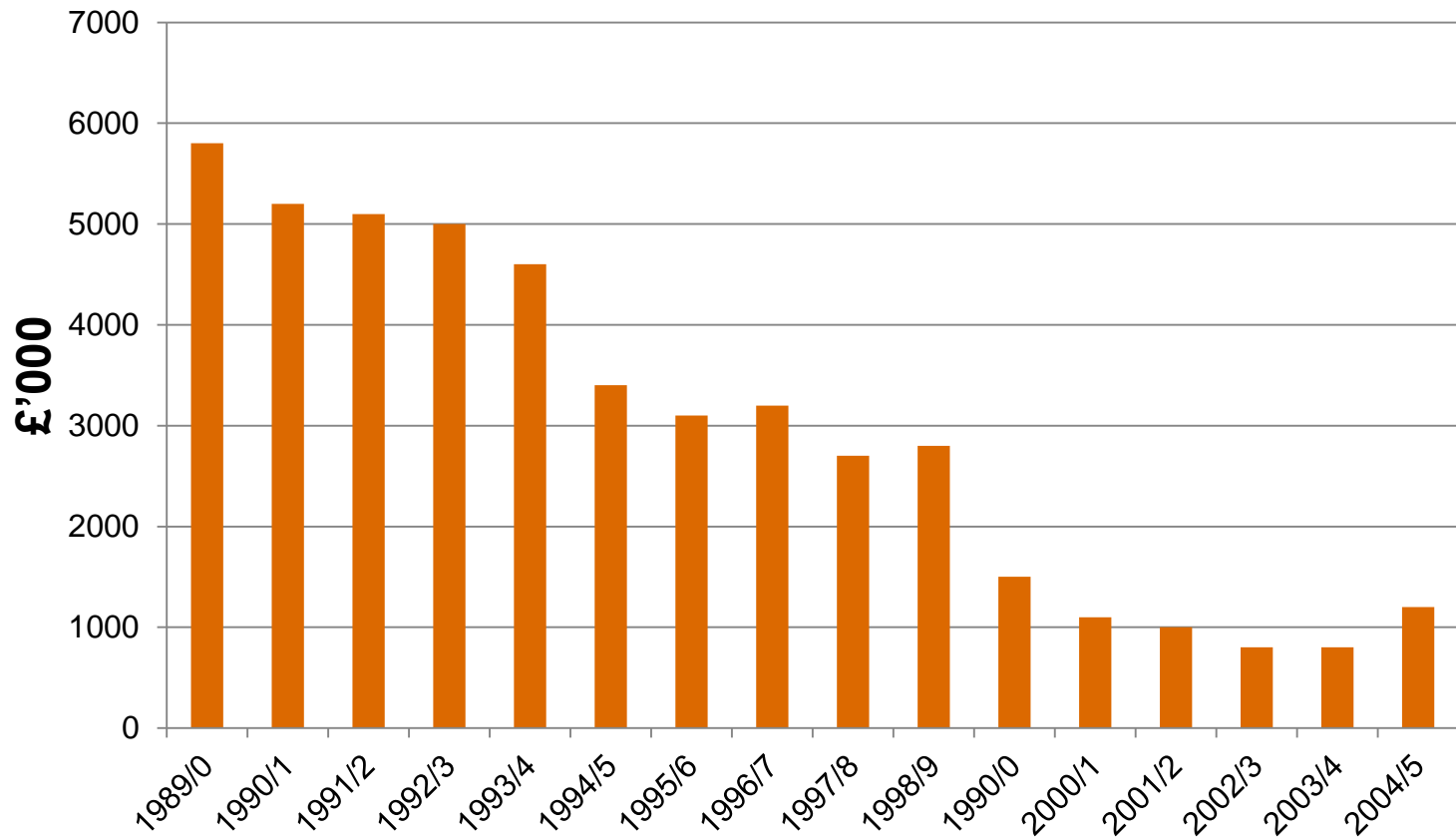
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Overview

1. Ofgem worked hard to reverse the declining trend in R&D spend
2. There is much to be positive about - the Low Carbon Networks Fund (LCNF), and its successor the Network Innovation Competition (NIC), has stimulated network innovation.
3. But, we may need to work harder.

Ofgem's innovation stimulus sought to reverse the trend in declining R&D

UK electricity distribution R&D spending



Source: Ofgem

Ofgem considered existing regulations would not deliver what was required

“A step change in innovation is likely to be needed to facilitate the move to a low carbon economy.”

Existing regulations not expected to deliver:

- **Benefits dilution** - The *“expected benefits of innovation may accrue to a wide range of parties, beyond the innovator itself”*
- **Grid access** - It is difficult to run trials on the networks
- **Uncertainty** – Lack of clarity over the way profits and losses will be treated
- **Risk appetite** – Orientation of the DNOs towards a *“low risk, business as usual ethos”*

Ofgem proposed two complementary stimuli

**Innovation Funding
Incentive**

Technical R&D

**0.5% of regulated revenue
(around £100m) over five
years)**

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Technical R&D

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Low Carbon Networks Fund

Annual competitions for trials of commercial arrangements and existing technology (rather than R&D)

£500m over five years, including £16m pa funding (for small projects) and £100m discretionary award.

Introduction of a technical or commercial application that:

- accelerates the development of a low carbon electricity system
- directly impacts the performance of a DNO's network
- delivers benefits to existing and/or future customers that are expected to exceed the costs of the project, and
- generates new knowledge that can be shared amongst all GB licensed electricity DNOs.

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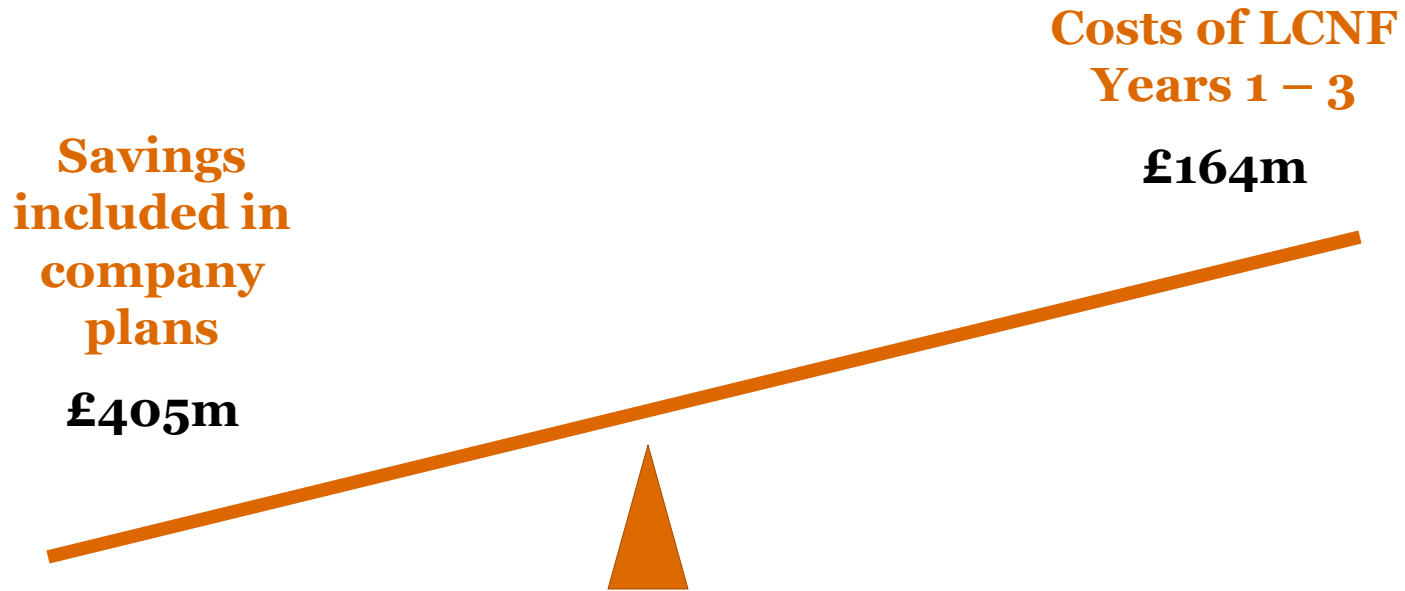
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To date, trials have focused on customer behaviour, new devices and new processes

Focus of the trials	First Year	Second Year	Third Year	Fourth Year	Total
Customer behaviour / smart metering	2	5	1	2	10
New network devices	3	2	2	2	9
Processes & ways of working	1	4	3		8
Commercial arrangements	1		2		3
Use of data / IT		1		1	2

Note: some trials had more than one foci.

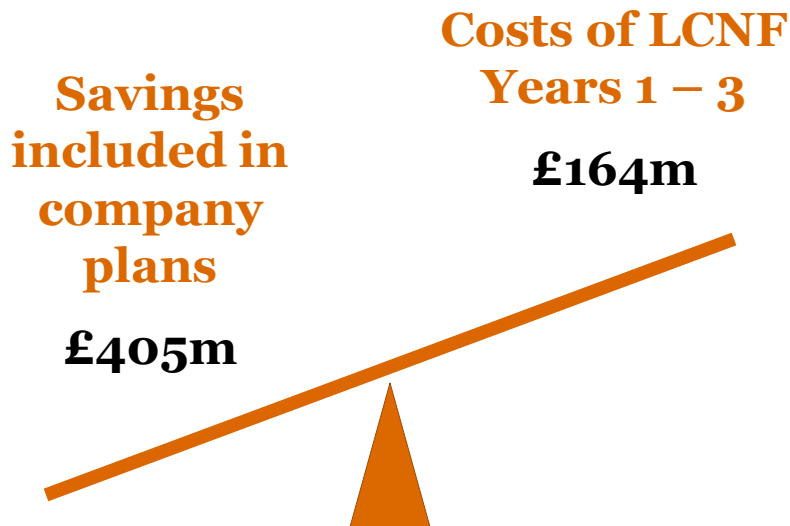
And benefits look to be exceeding costs ...



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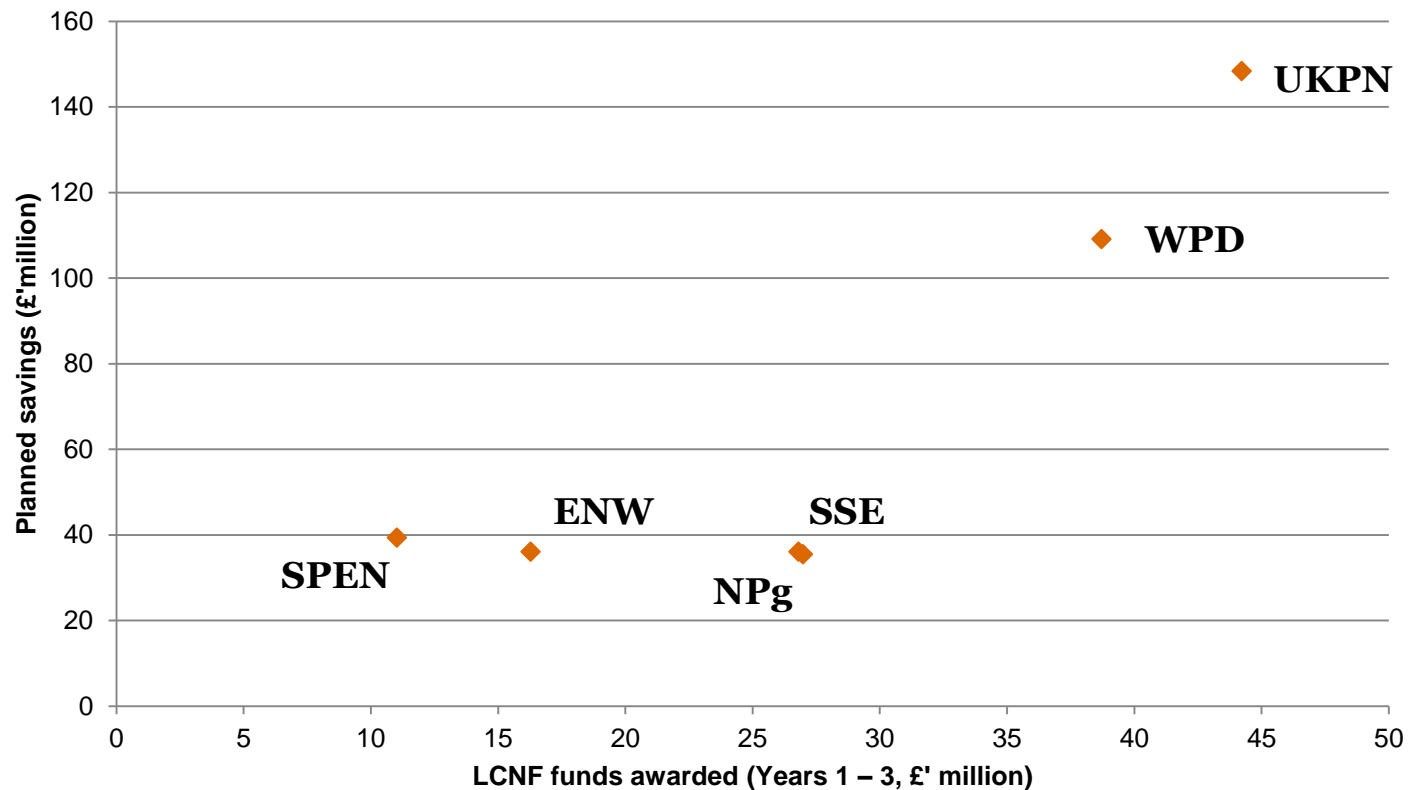
Ofgem appears to have concerns ...



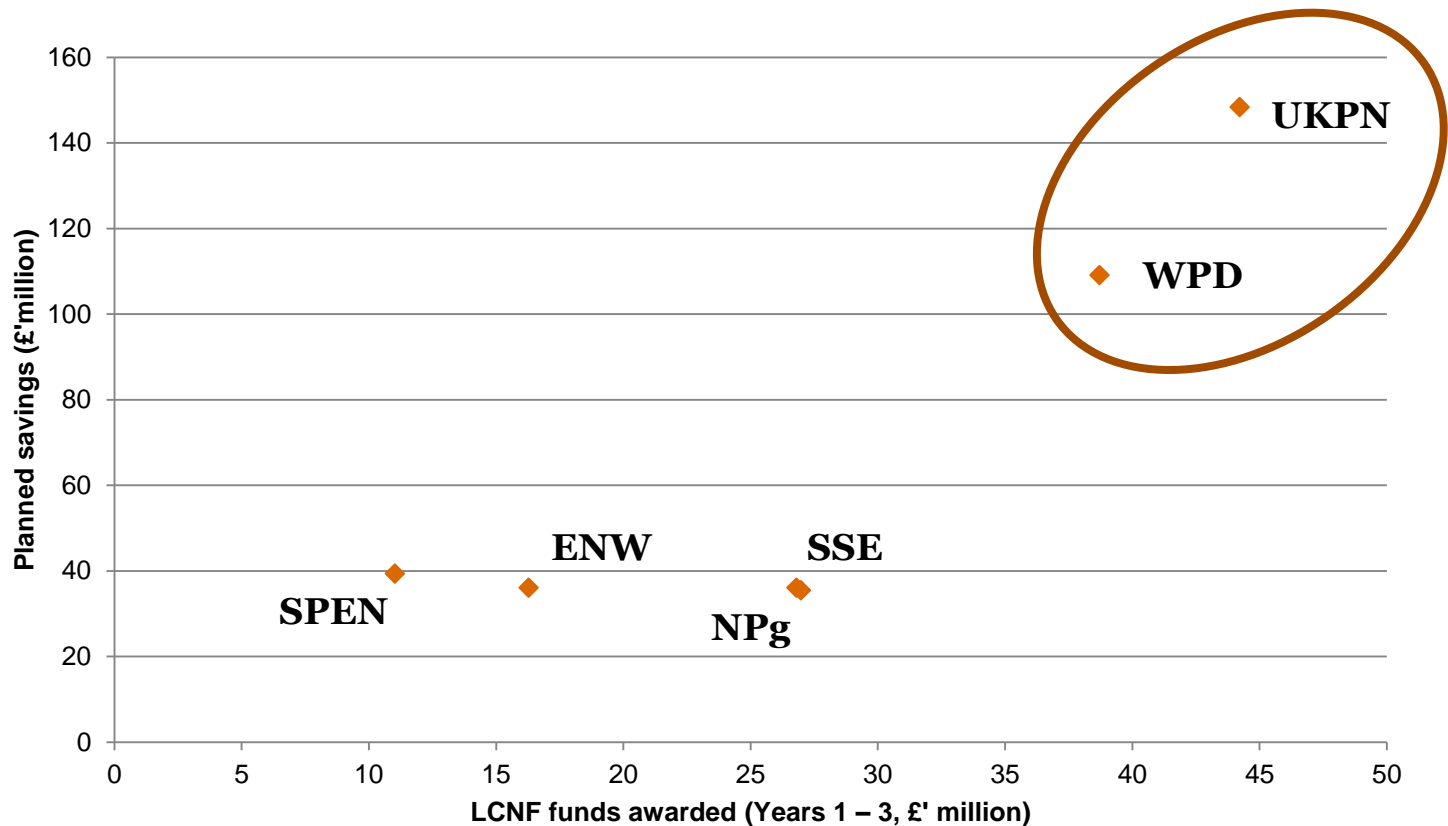
- “We do not consider that the £405m savings from the use of smart grids and smart meter data ... is sufficient. We do not believe that any DNO has taken account of the full potential of smart grids”
- “... we believe the industry could have reasonably included £943m savings from smart grids and smart metering in its business plans”

Ofgem’s view - driven by top-down analysis

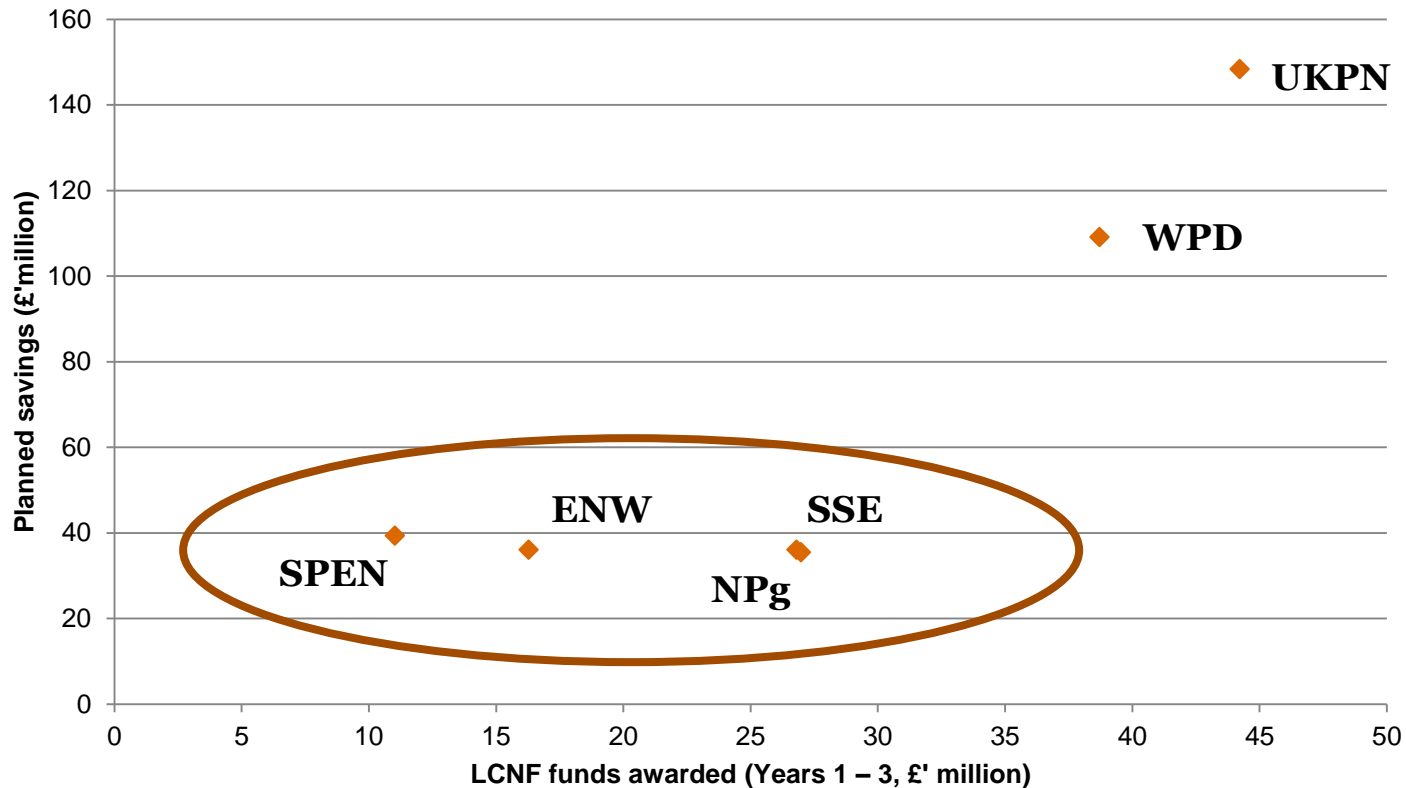
Certainly, there appears to be only a limited relationship between awards and savings



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And, the scale of ambition seems to be decreasing

Total Awards

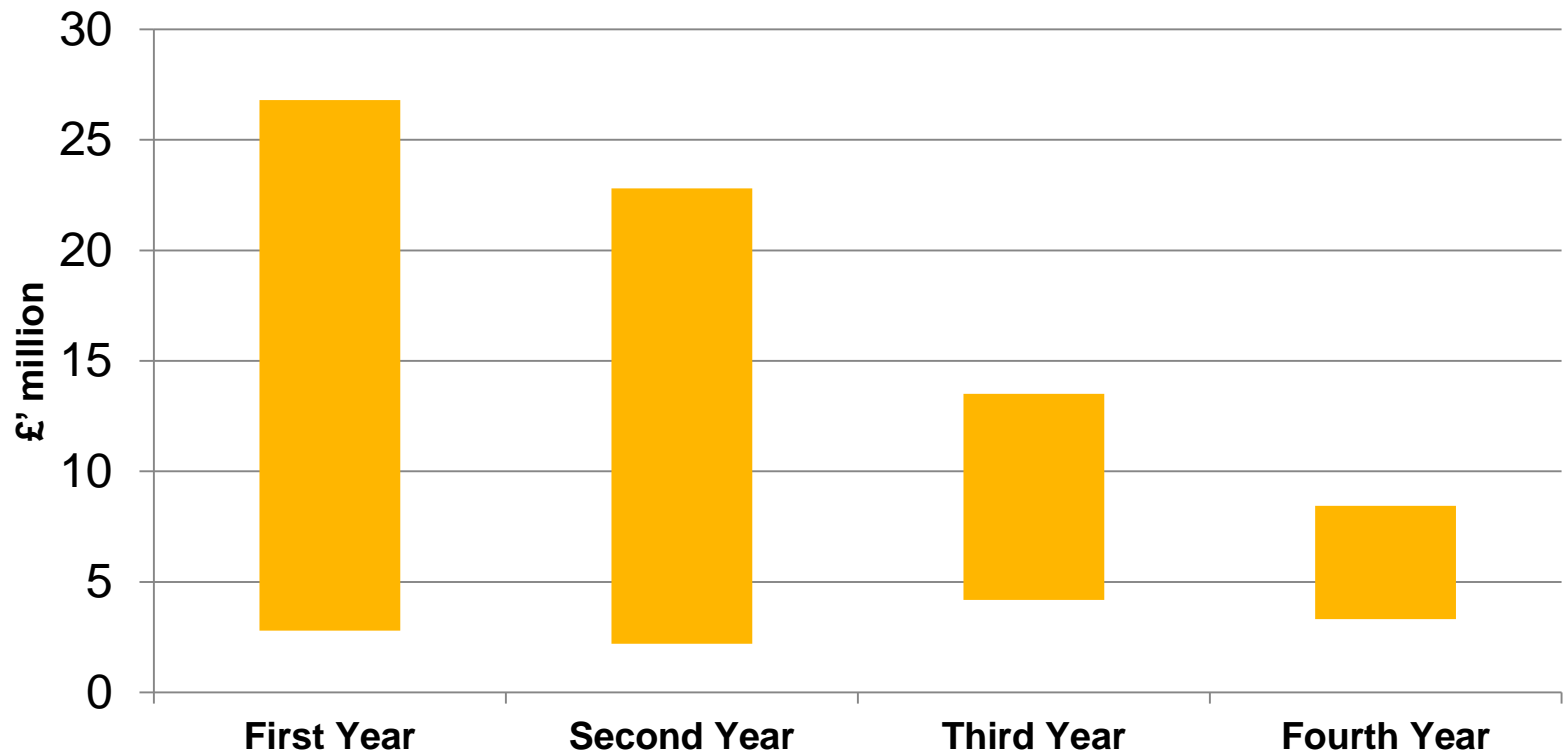
£61.7m

£56.8m

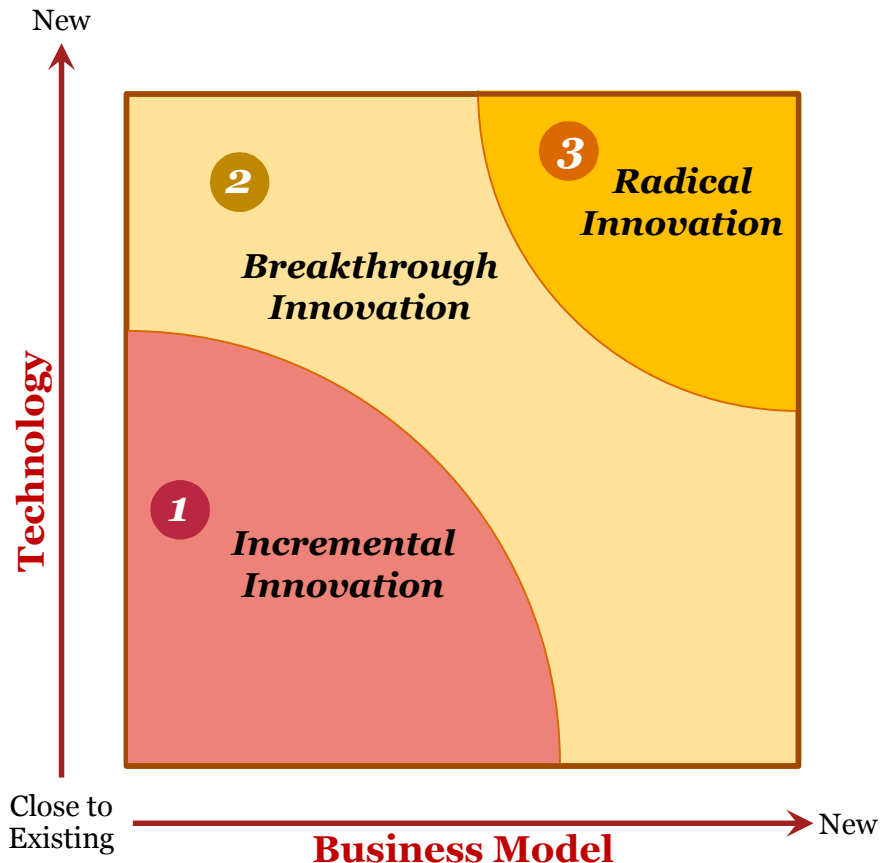
£45.5m

£26.6m

Range of funding for individual projects (£' million)



Have we been ambitious enough?



1 Incremental Innovation

- Better, faster, cheaper products and services

2 Breakthrough Innovation

- Significant change to either the technologies or business model

3 Radical Innovation

- Creates new regime for existing markets, or defines entirely new markets
- Substantial changes to both technology and business model
- Typically introduces new value to customer, new players in the value network, and new technologies for making and delivering the product/service

Should we expect non-incremental innovation from energy?

24 future industries

Atmospheric water harvesting	Solar power
Commercial drones	Mass energy storage
Software developers	Micro grid conversion
Mobile apps	Hyperspeed transportation
One trillion sensor future	Contour crafted houses
3D printing	Driverless everything
Cancer immunotherapy	Bio factories
LEDs	Micro colleges
Big data	Smart homes
The internet of things	Senior living
Natural gas for fleets	Home delivery
Wind power	24-hour cities

Source: Thomas Frey, *the Futurist Magazine*

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Non-incremental innovation relies on three things

A clear innovation strategy

Effective collaboration

The right type of regulation

Non-incremental innovation relies on three things

A clear innovation strategy

79% of the top innovators have a well-defined innovation strategy (47% for the least innovative companies)

Key characteristics

- A compelling vision
- The right balance between incremental, breakthrough and radical innovation
- Deciding whether to “play to win” or “play not to lose”?

CASE STUDY – Google’s 10X thinking

- **The challenge:** *“how can we improve what we do by a factor of 10 times, rather than by 10%”*
- **Their goal:** *“to get you the right information at just the right time ... without you having to ask first.”*

Non-incremental innovation relies on three things

Effective collaboration

The top 20% of innovators: are twice as likely to consider corporate venturing; and co-create almost twice the proportion of their new products and services

CASE STUDY – Duke Energy Innovation Centre

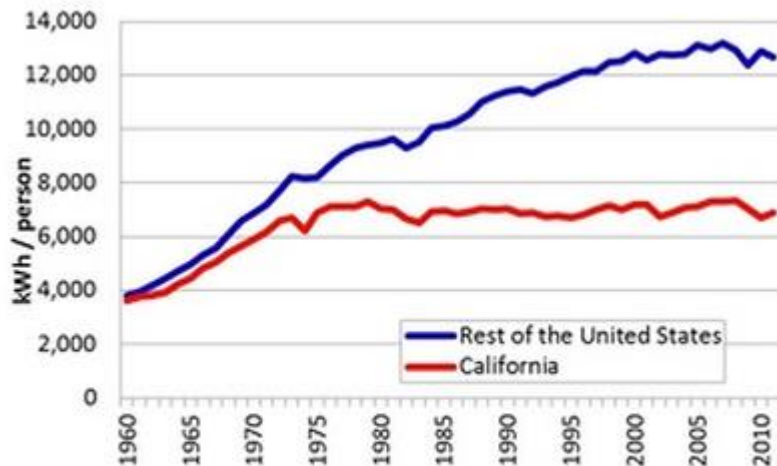
- Partnering with the City of Hartsville, Clemson University and others.
- Supporting new technology companies.
- First “graduate” is FME Nuclear Solutions – an app to track maintenance equipment and foreign material going into a nuclear reactor

Non-incremental innovation relies on three things

The right type of regulation

Is a carrot is better than a stick?

Per capital electricity consumption



Source: U.S. Energy Information Administration

What did California do differently?

- California law requires that utilities look first to energy efficiency (before using other sources of energy to meet the needs of their customers)
- Utilities share the benefits of energy efficiency improvements

How does this compare with GB?

A clear innovation strategy

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Effective collaboration

✓

The right type of regulation

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In conclusion: four questions

- 1. Are we guilty of a failure in ambition?**
- 2. Have we focused too much on the stick, rather than the carrot?**
- 3. Are we doing enough to facilitate and encourage collaboration?**
- 4. Have we created arbitrary divisions and unmanageable complexity?**

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