



Promoting choice and value
for all gas and electricity customers

Innovation & Integration The UK's Approach to DG

Distributed Electricity Generation & Smart Grids
17 October - Vienna

Gareth Evans, Technical Directorate, Ofgem

Innovation & Integration

The UK's Approach to DG

- Introducing Ofgem
- The DG challenge
- Working together on DG issues
- Ofgem's DG initiatives
- Promoting Innovation

Introducing Ofgem

About

- Total staff currently ~300
- Principal disciplines:
 - Economists 50%
 - Finance/Admin 15%
 - Legal 6%
 - Social/Environmental 6%
 - Technical 6%
- Overall Budget ~£30m

per year

*Ofgem's main office near
Houses of Parliament*



+ small office in Glasgow

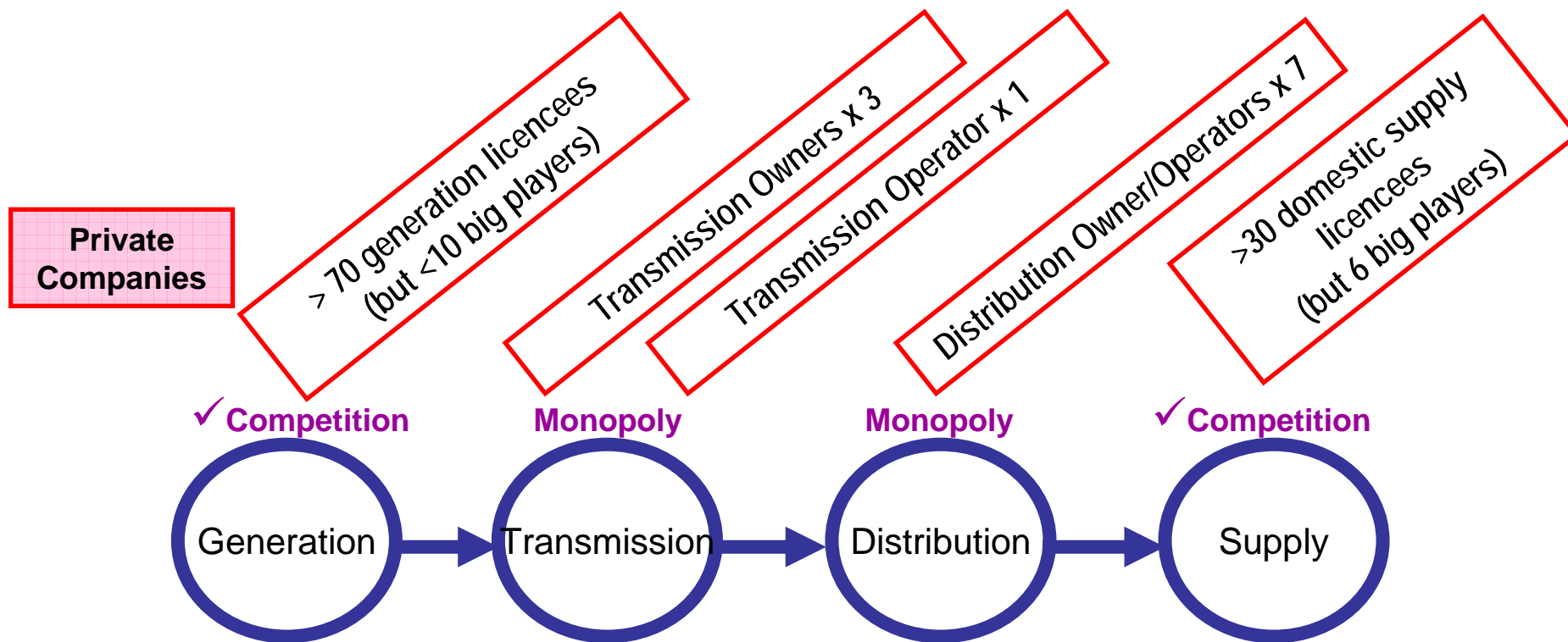
Principal objective

- Our first priority is to protect the interests of consumers **now** and for **the future**. We do this by:
 - **promoting markets/competition** wherever appropriate, and
 - **regulating effectively** the monopoly companies which run the gas and electricity networks

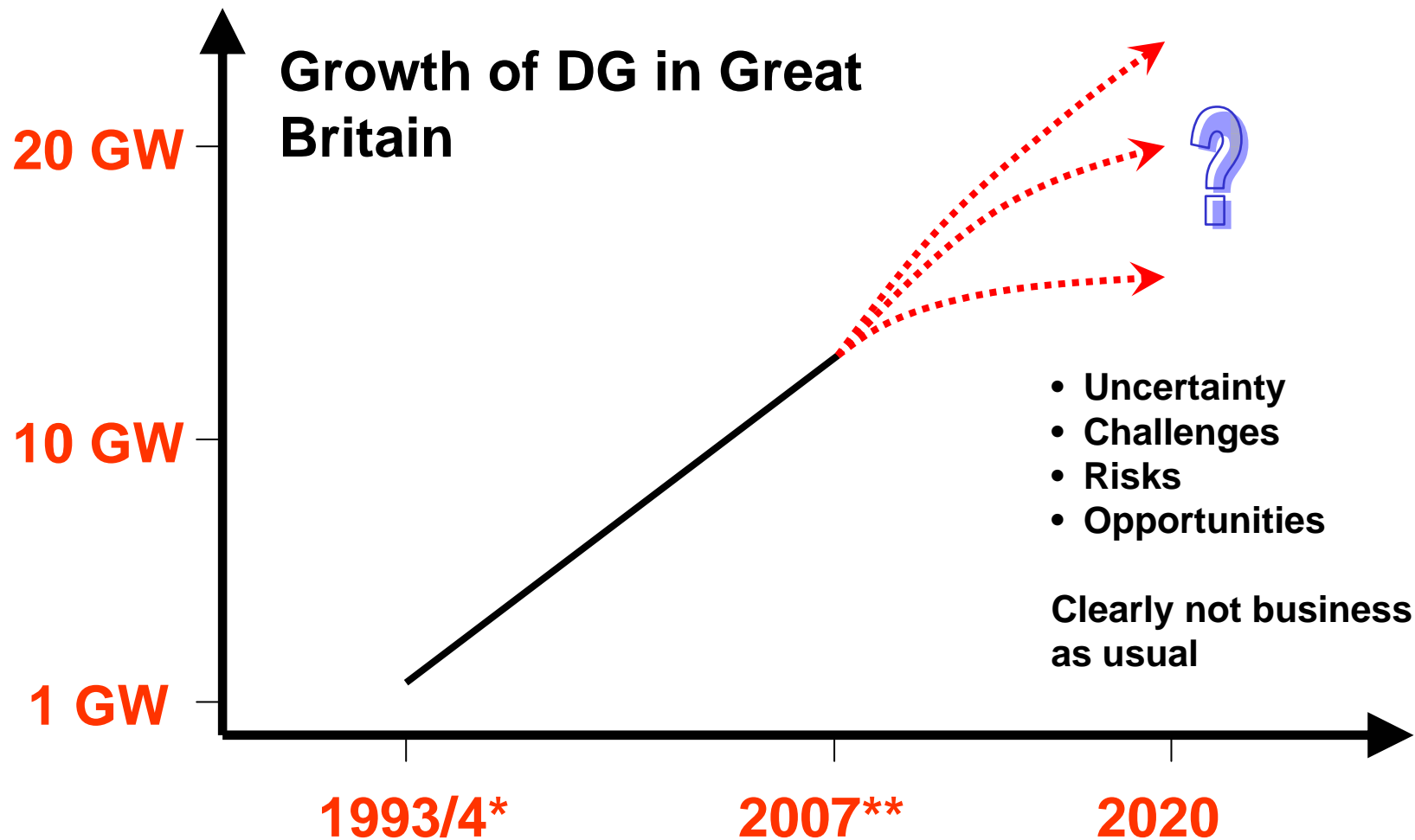
Other duties

- We have other priorities too. We:
 - help secure **Britain's energy supplies**
 - help energy markets and industry achieve **environmental improvements**, and
 - take account of the needs of **vulnerable customers**

Today's GB Electricity Sector



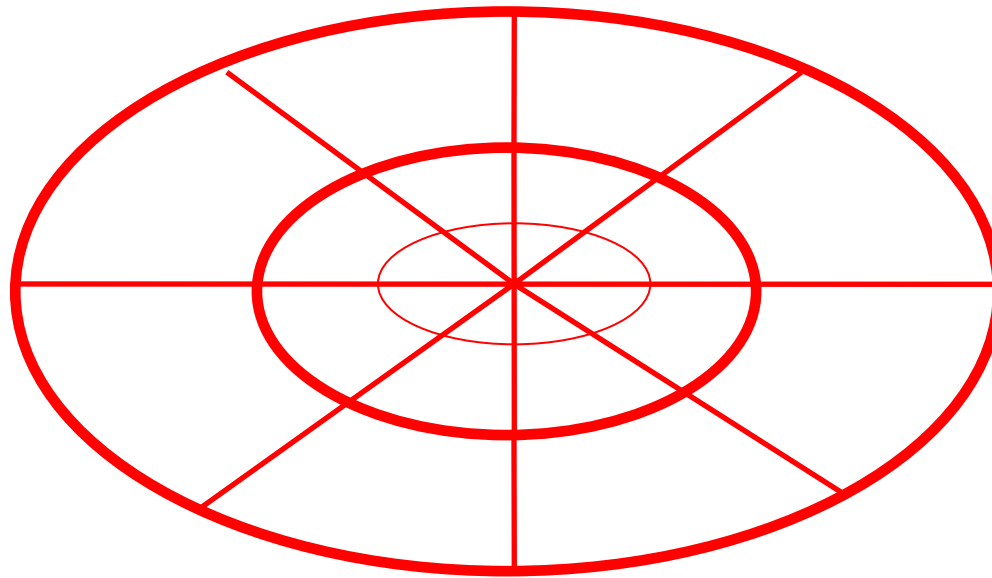
The DG challenge



* 1.2 GW embedded independent generation – NGC SYS, March 1994 – excludes Scotland

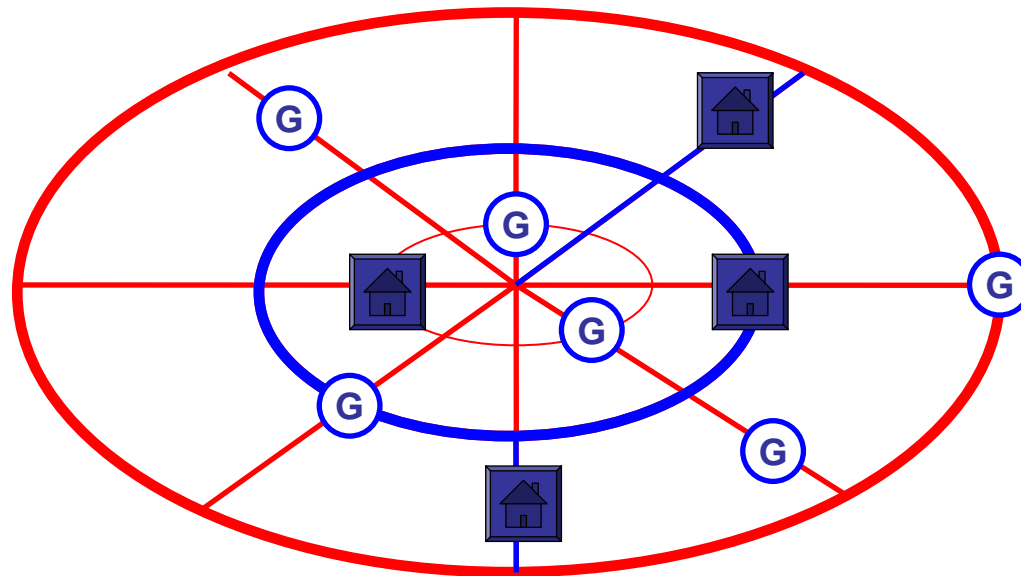
** 12.8 GW – ENA data for March 2007 – includes Scotland

Networks....



Critical role in facilitating low carbon system...
...this is now being widely understood

...and the challenges ahead

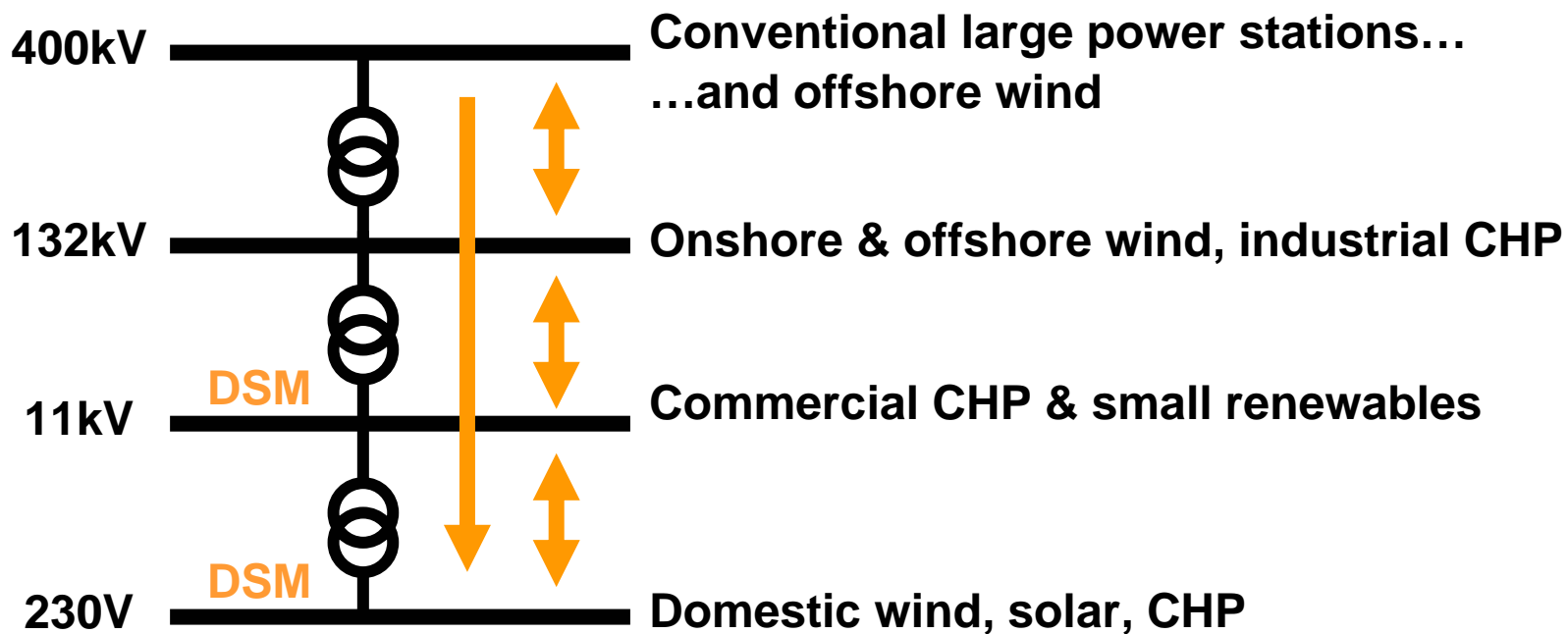


Maintain existing assets...

...renew assets efficiently

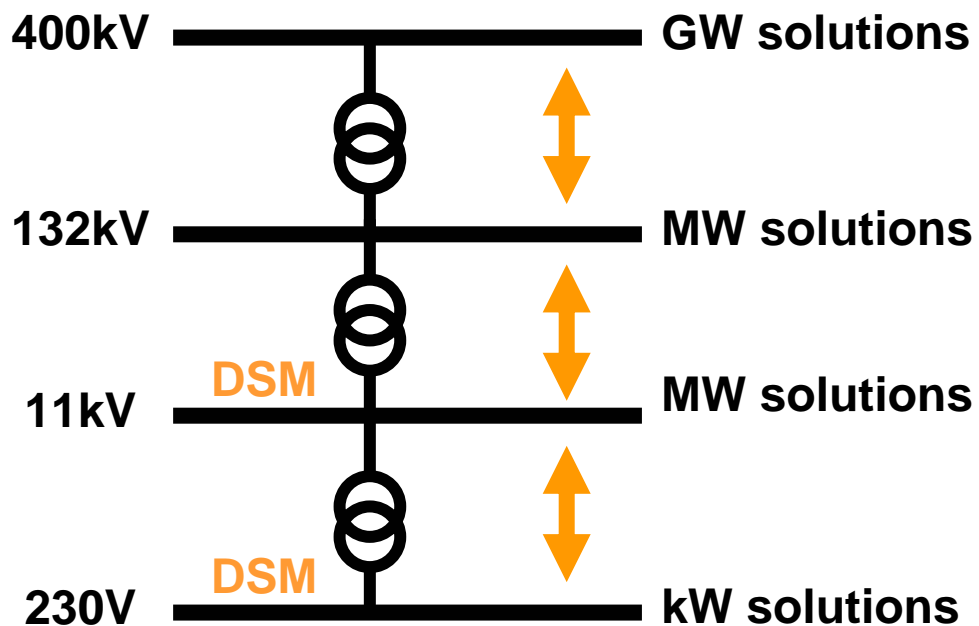
...facilitate new generation & DSM

Which generation technologies will grow?



Note: this is not intended to be an exhaustive list of generating technologies

Which generation technologies will grow?



The Future of the Supply Chain

For the first time, different generation technologies of radically different sizes could all be part of the optimum solution

Facilitating change

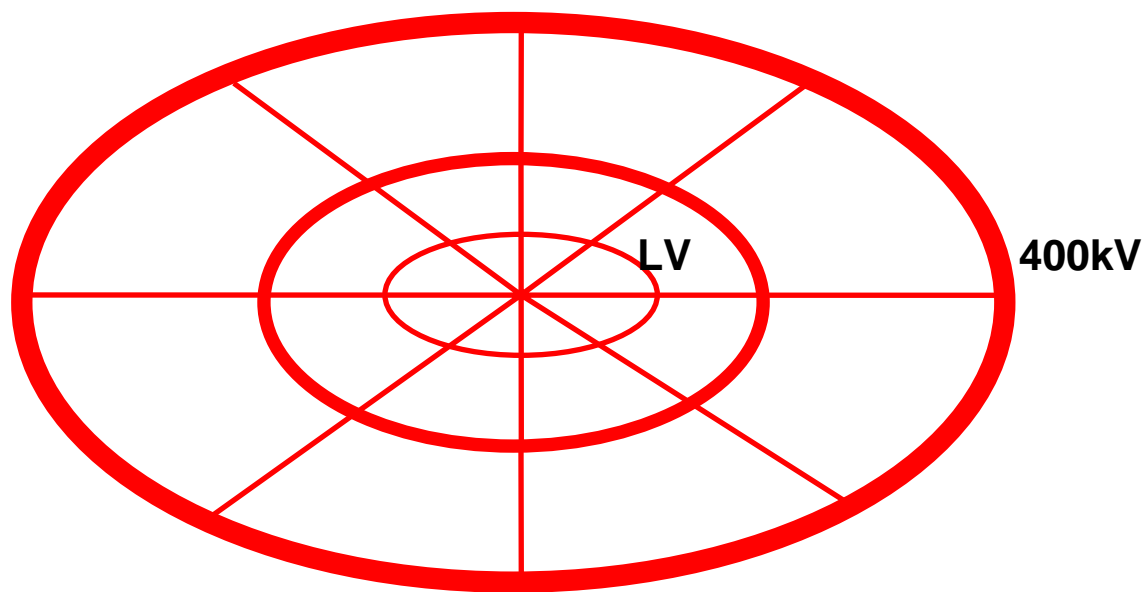


The challenge for the network companies is to facilitate the development of the generation base in an efficient way



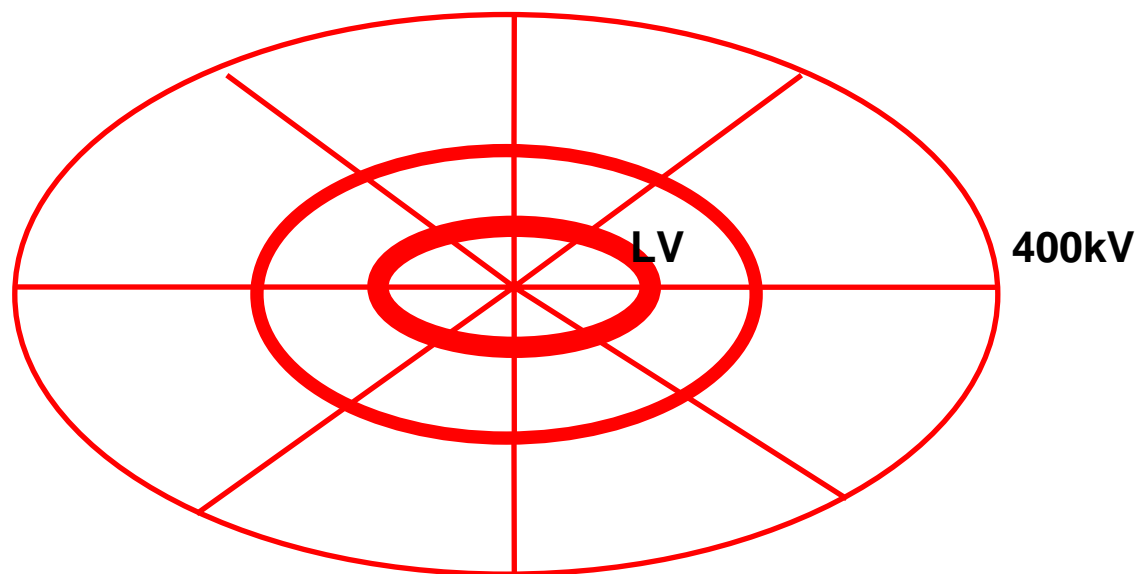
Sources: Capstone, Whispergen and Windsave

Development Scenarios



More of the same?

Development Scenarios



Or could the system turn on its head?

“Decarbonising the UK”

“the relative dominance of centralised supply is reduced from that of today in all scenarios”

“an element of centralised supply emerged, to varying degrees, as an important facet in all of them”



Development Scenarios

If the basic system structure does prove to be robust we will need...

- Strategies to allow capacity to be increased at the voltage levels that call for it
- Communication options to allow
 - efficient control and protection of the system, so that supply safety and reliability is maintained or improved
 - markets to operate to meet the needs of all demand and generation customers

Working together on DG issues

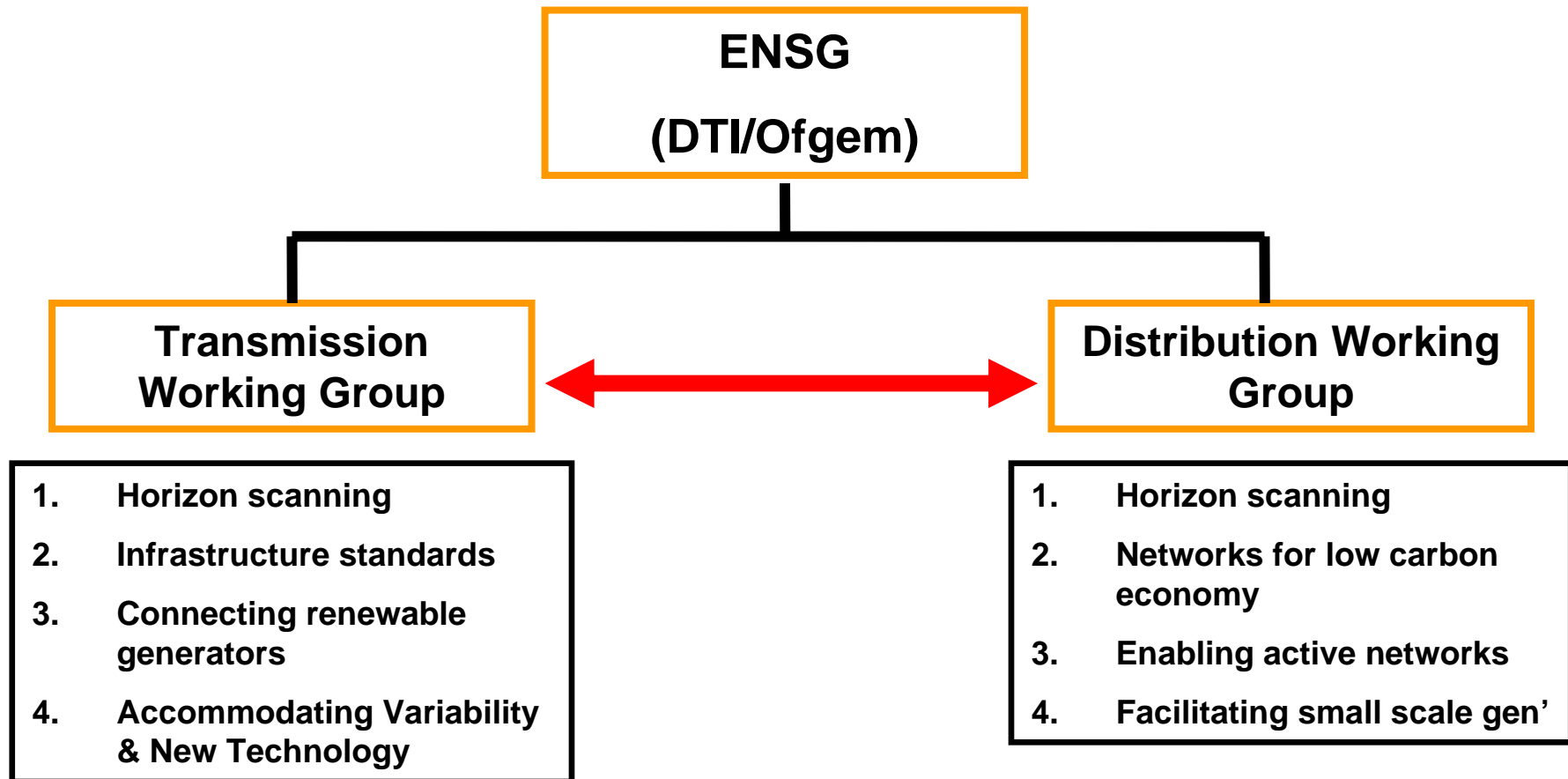
Ofgem & Distributed Generation

- Ofgem is technology neutral – we do not try to pick winners
- The last distribution price control introduced the DG Incentive – it applies to all relevant DG
- It also introduced the IFI & RPZ – more later
- Ofgem has been focusing on DG since 2000 – Embedded Generation Working Group (jointly with DTI)
- The Distributed Generation Coordinating Group followed
- In 2006, the Electricity Networks Strategy Group was established

**Industry, Ofgem & Government working together
to address the challenges of DG**

The Electricity Networks Strategy Group

www.ensg.gov.uk



DE Timeline

July 2006 – Energy Review - *identifies need to look at barriers to DE*

2006/2007 – DTI/Ofgem DE Review - *call for evidence*

May 2007 – Energy White Paper - *sets out key policies*

Where DE defined as distribution connected low carbon electricity generated on a community scale and good quality CHP

UK Energy White Paper

24 May 2007

- Joint DTI/Ofgem report on DG to support the Energy White Paper
- Addresses the barriers and incentives to affecting the growth of DG in the UK
 - Markets & licensing
 - Export reward
 - Better information
 - Easier connections
 - CHP



<http://www.dti.gov.uk/files/file39025.pdf>

DE Timeline

July 2006 – Energy Review - *identifies need to look at barriers to DE*

2006/2007 – DTI/Ofgem DE Review - *call for evidence*

May 2007 – Energy White Paper - *sets out key policies*

May 2007 – working group - *to review market and licensing arrangements*

Autumn 2007 – DTI/Ofgem Consultation on proposed measures

End 2008 – Measures implemented

Where DE defined as distribution connected low carbon electricity generated on a community scale and good quality CHP

Objective of the working group

- The overall objective of the group is to:
“develop measures and identify workable solutions that address the key barriers to the greater take up of DE projects, within either the market or licensing arrangements.”
- These measures will:
 - Seek to simplify the system for potential generators and suppliers
 - Ensure that DG receives appropriate rewards for the benefits that it provides; and
 - Ensure that consumers are adequately protected.
- They will not:
 - compromise the integrity of the competitive market; or
 - impose unnecessary costs or complexity on DG generators, or parties that seek to purchase from them;

Ofgem's DG initiatives

The main DG incentive mechanism

- Hybrid incentive for DG-related distribution investment
 - pass-through 80%
 - supplementary incentive £1.5/kW/yr for DG capacity connected (£2.0/kW/yr for Scottish Hydro)
 - cap (2 times cost of capital) and floor (cost of debt) for overall returns
 - incremental unit cost above £200/kW paid in DG's connection charges
- £1/kW/yr for O&M
- Further incentive for the provision of ongoing network access
 - £0.002/kWh default rate (subject to further development)

Registered Power Zones

A mechanism to encourage DNOs to develop and demonstrate new, more cost effective ways of connecting and operating generation that will deliver specific benefits to new distributed generators and broader benefits to consumers generally.

RPZ 1 – CN East Coast *

Connection Requirement

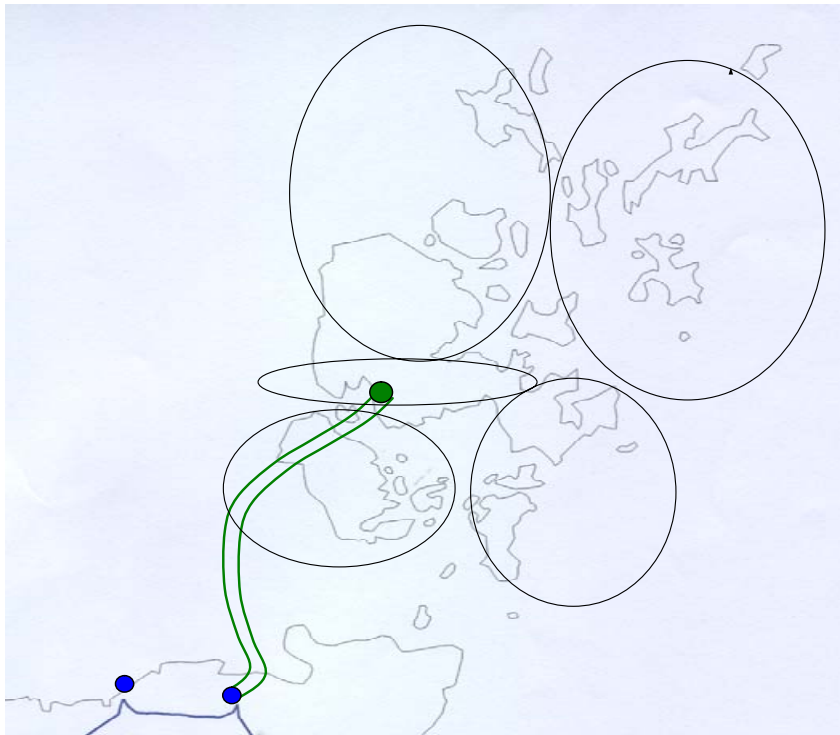
- 191 MW of wind generation connected/accepted within RPZ boundary
- Further four applications totalling 77.5 MW.....but remaining network capacity 35MW
- 132kV line reinforcement would cost £3 to £5 million

Technical Innovation

- Novel software application to provide
 - Active export control
 - Real time load measurement
 - Dynamic circuit ratings
- Dynamically optimises the thermal capacity of the network to increase the generation connection capacity
- Introduces contracted output constraints for the generators

* Information courtesy of Central Networks

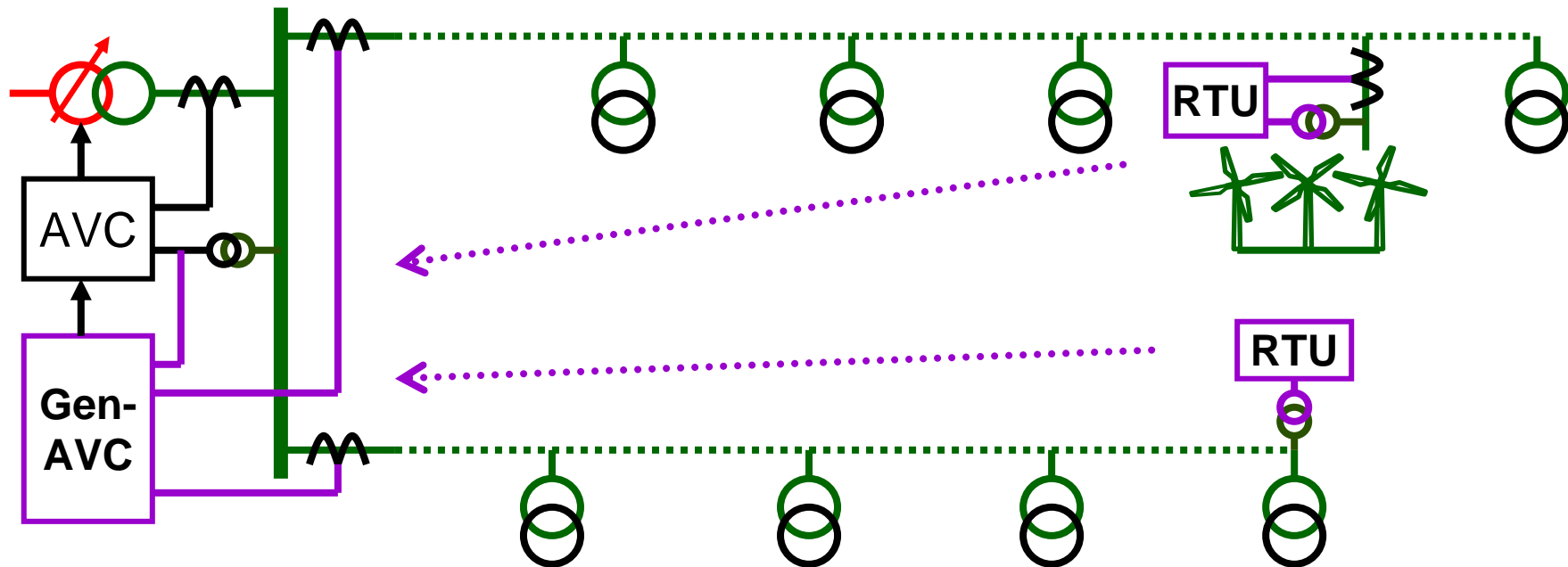
RPZ 2 – Active Network



- Circuit power flow monitoring
- Intelligent responses identified
- Generator control actions initiated
- Responses monitored and acted on

Graphic courtesy of Scottish & Southern Energy

RPZ 3 – Enhanced Voltage Control



Remote voltage measurements are sent to an intelligent voltage control device (GenAVC) that interfaces with a conventional AVC scheme (11kV network)

Promoting Innovation

Innovation

Why is the Regulator interested?

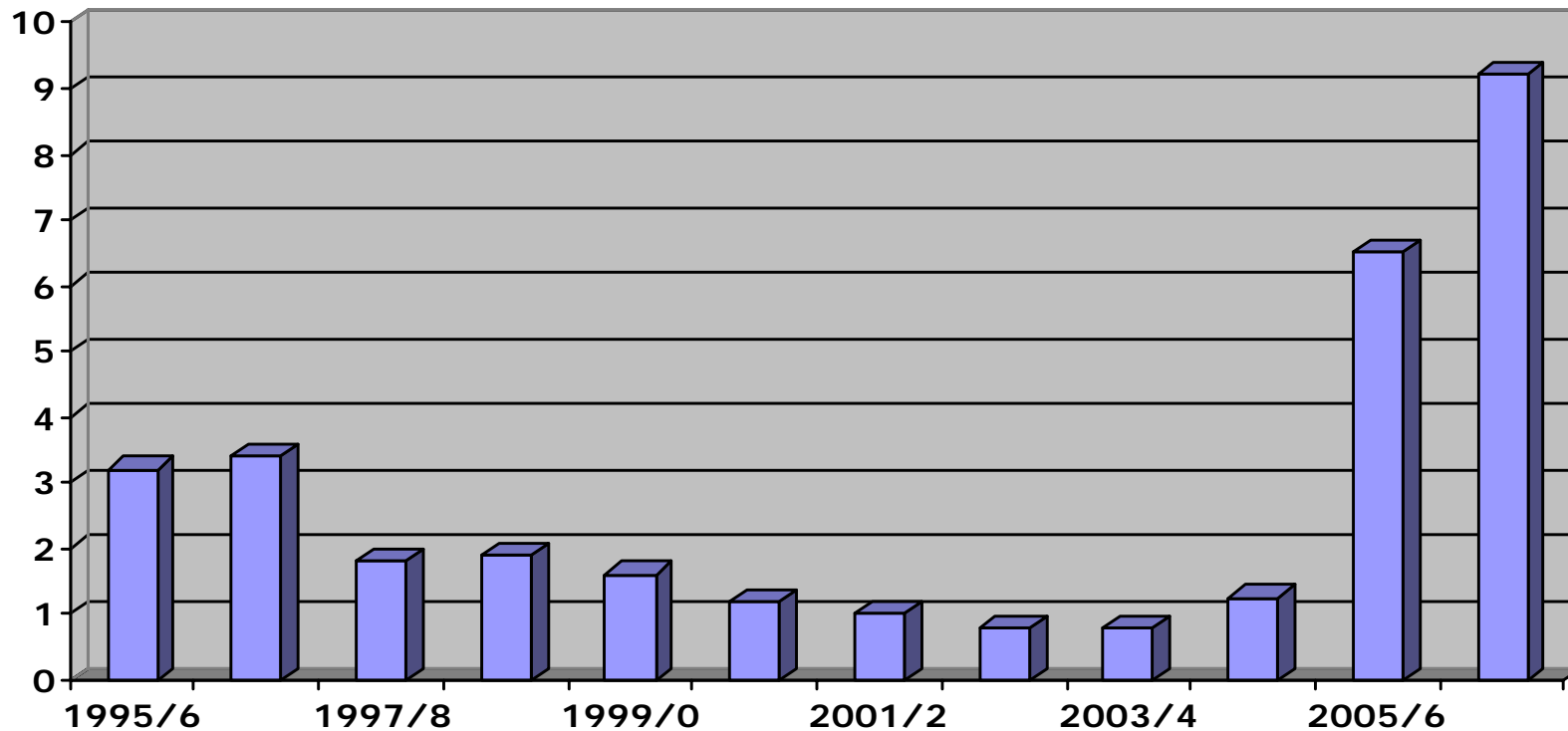
- investment levels are far beyond recent experience
- diverse new challenges for networks
- the issues are Europe-wide and beyond

- Ofgem's primary duty is to customers, both today and in the future
- we wish to see effective and efficient investment, with
- innovation where it adds value, and
- evidence of effective deployment and technology management

Innovation Funding Incentive

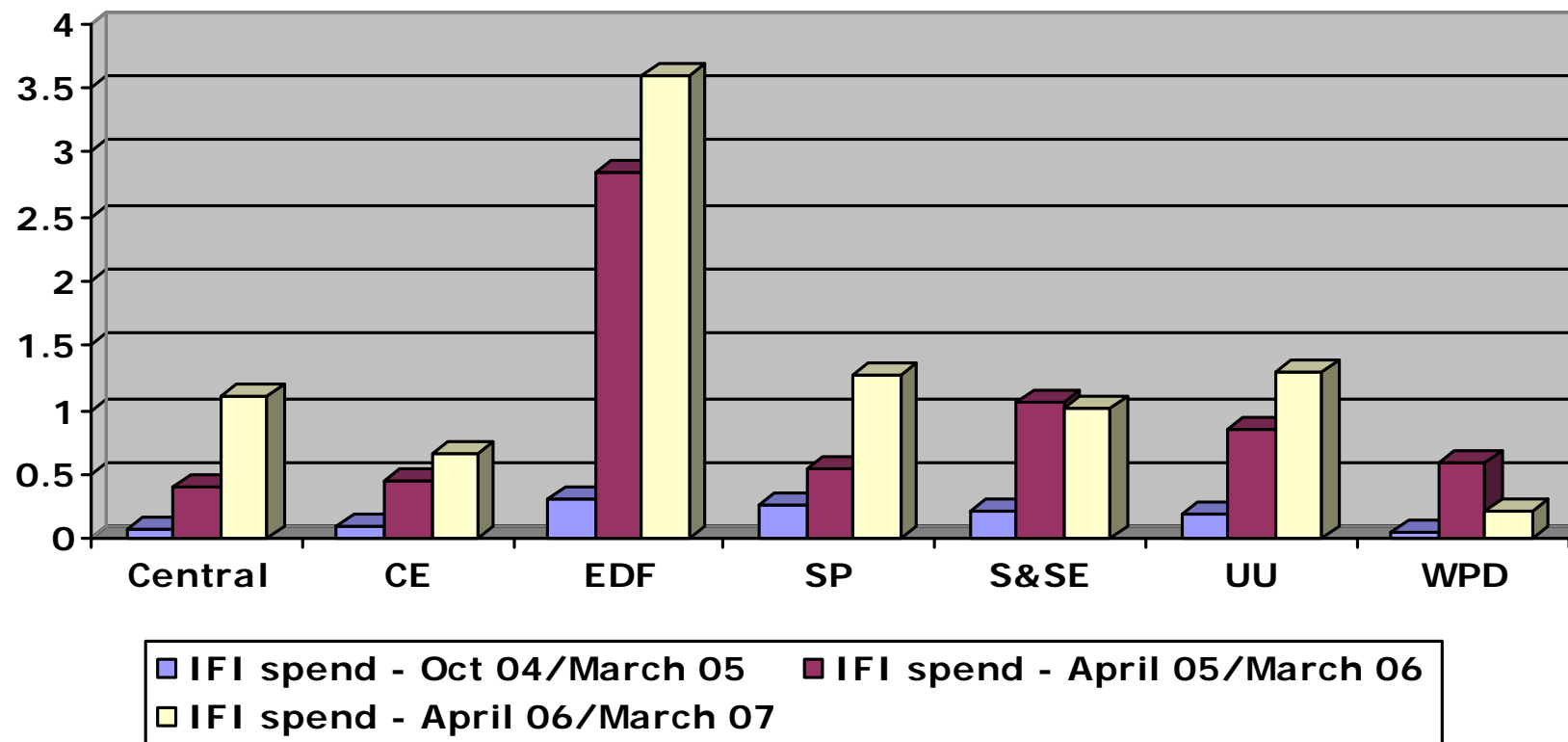
A mechanism to encourage DNOs to invest in appropriate R&D activities that focus on the technical aspects of network design, operation and maintenance. The principal objective of the IFI is to deliver benefits to consumers by enhancing network efficiency in operating costs and capital expenditure.

DNO Investment in R&D (£m)



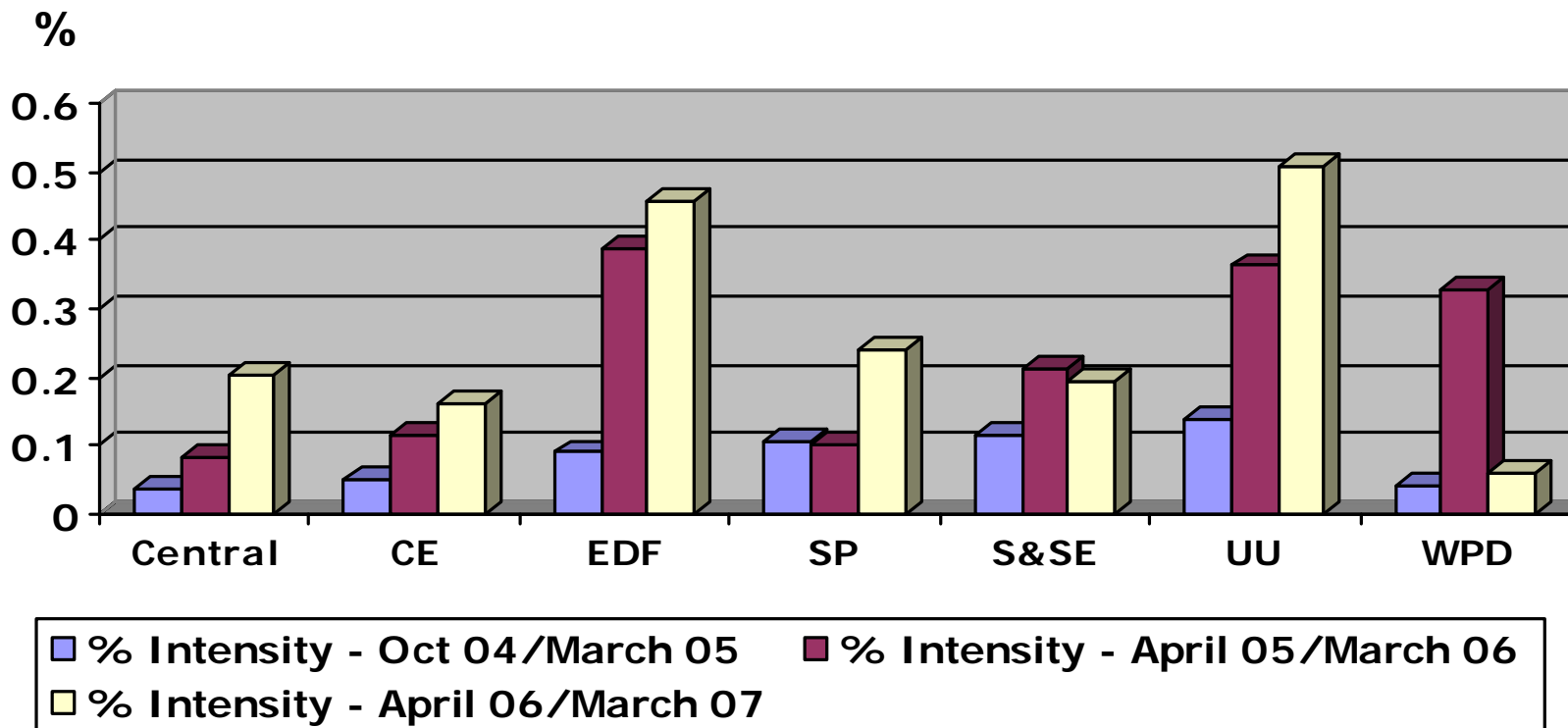
Data to 2003/4 is the collaborative spending on R&D amongst the DNOs through a single a single provider. The data for 2004/5 is for the first 6 months of the IFI scheme.

Investment in IFI by DNO (£m)



R&D Intensity by DNO

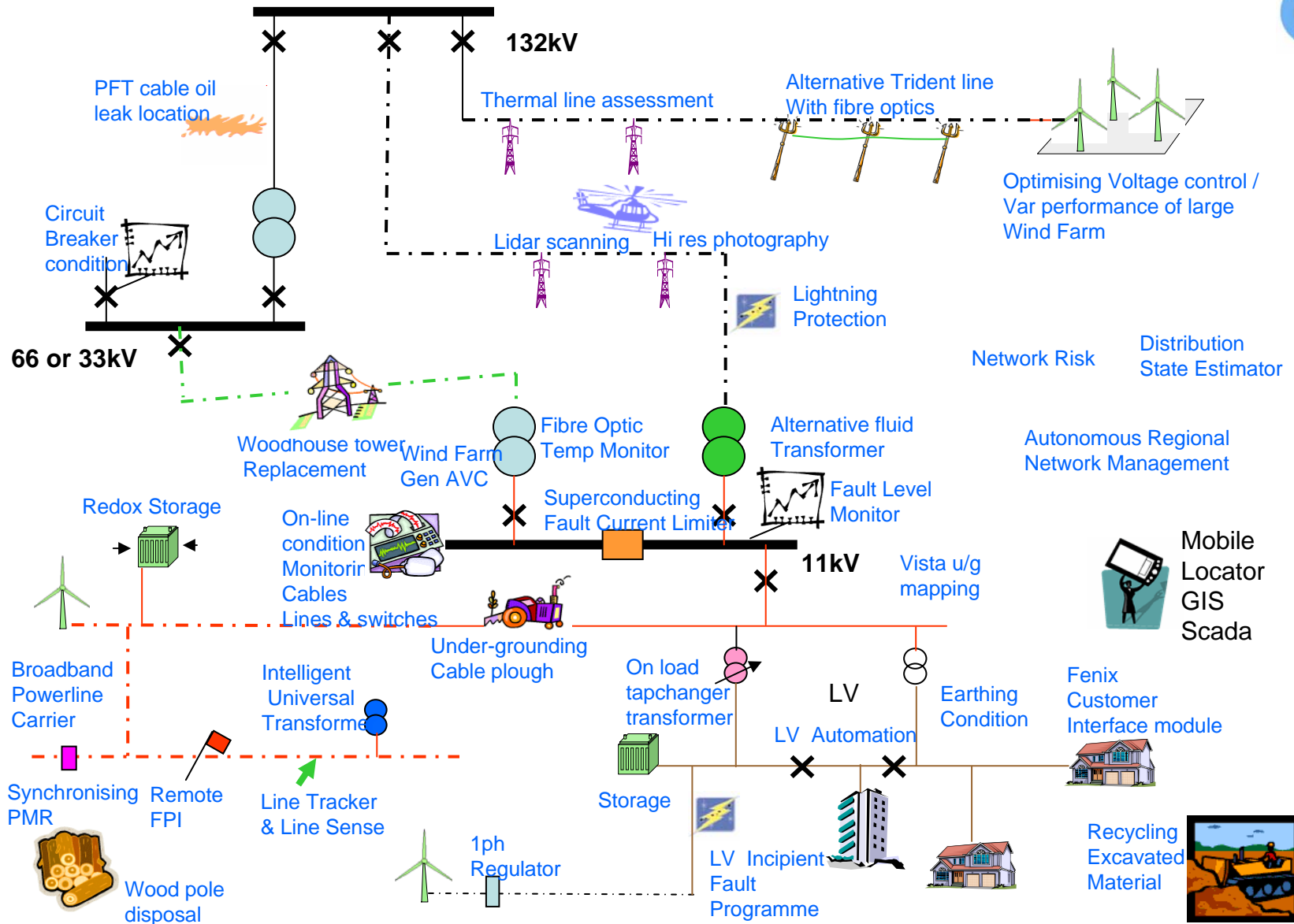
(IFI expenditure expressed as a %age of turnover)





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www.innovationsolutions.co.uk



Concluding remarks

- **Ofgem is committed to removing barriers to DG**
- **Distribution price control measures put in place in 2005**
- **Worked closely with DTI (now BERR) on the DG Report for the Energy White Paper**
- **Leading the DE Working Group**
- **Continuing support of ENSG & innovation**
- **Now seeking views for the next distribution price control**



ofgem

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