

The background features a large, stylized white arrow pointing right, overlaid on a collage of images including solar panels, a large white turbine, and a close-up of a blue gear. The overall color palette is light and airy, with soft blues and whites.

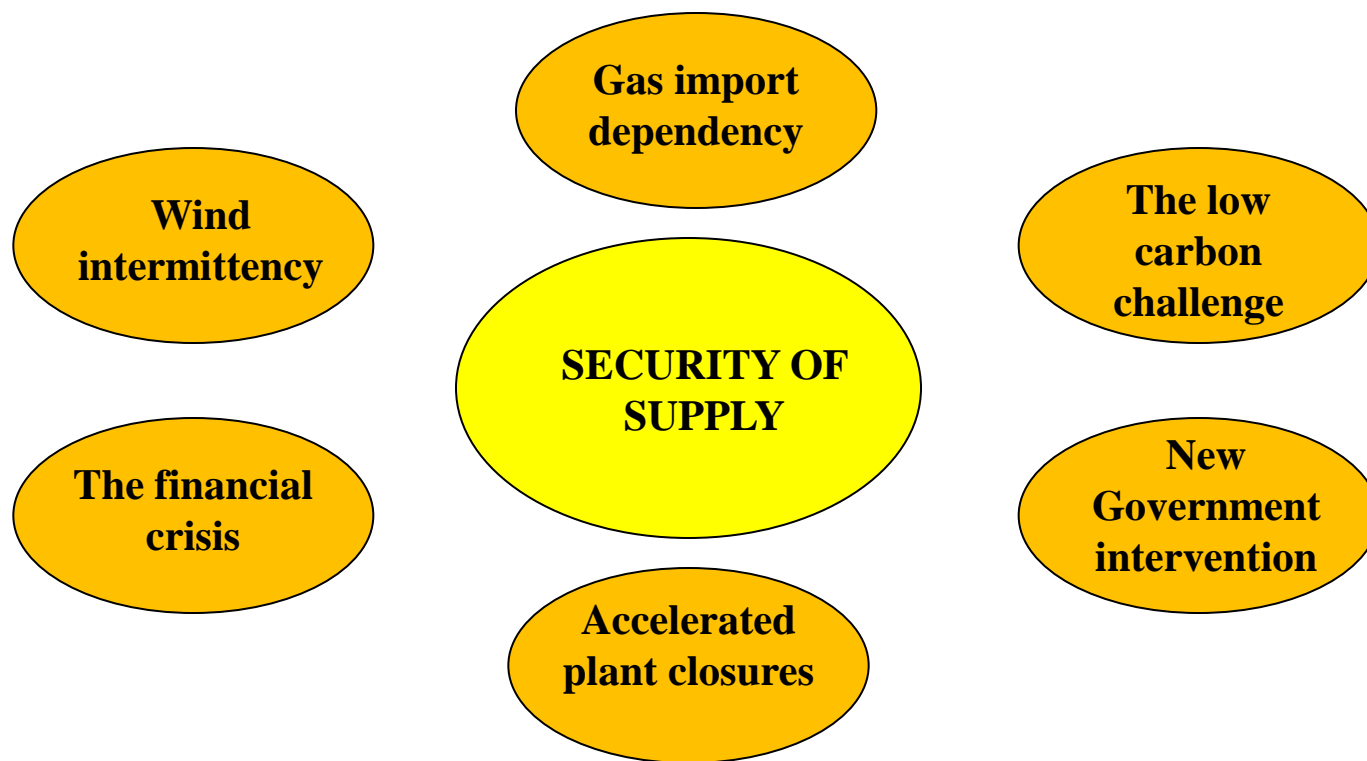
Project Discovery

DSWG 9th February 2010

Ben Woodside

PROJECT DISCOVERY

Can GB markets deliver secure and sustainable energy supplies?



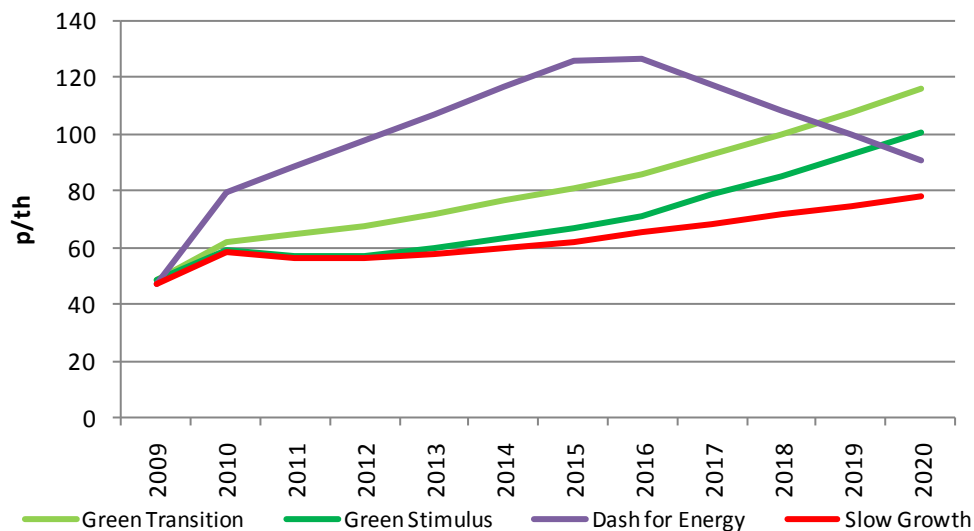
LATEST COMPLICATION IS OUTCOME OF COPENHAGEN

PART 3: FEBRUARY 2010 – UPDATE ON SCENARIOS

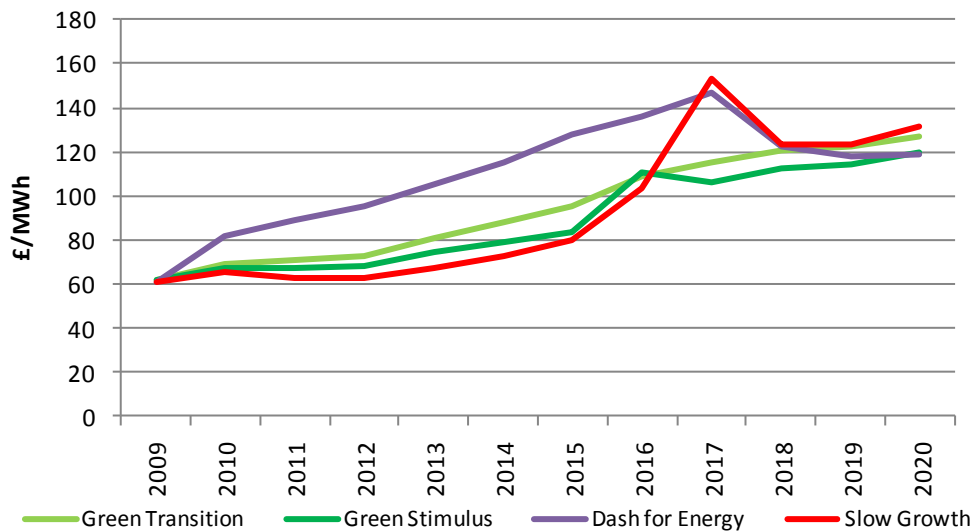
	Green Transition	Green Stimulus
Key supply risk:	Generation variability	Generation variability
CO2 impact:	Down 33% by 2020	Down 46% by 2020
Impact on bills:	Up by 23% by 2020	Up 13% by 2020
Inv't required:	£194bn	£190bn
	Dash for Energy	Slow Growth
Key supply risk:	Gas import dependency	Deferred investment
CO2 impact:	Down 14% by 2020	Down 19% by 2020
Impact on bills:	Up 26% by 2020 (52% by 2016)	Up 19% by 2020
Inv't required:	£110bn	£95bn

I&C FUEL COSTS

GAS:



ELECTRICITY:



Highly sensitive to costs assumed in initial (base) year

HEADLINE THEMES FROM FOUR SCENARIOS

Good news: Emissions down in all four (-14% → -46%, from 2005 levels).

Bad news: Bills up in all four...

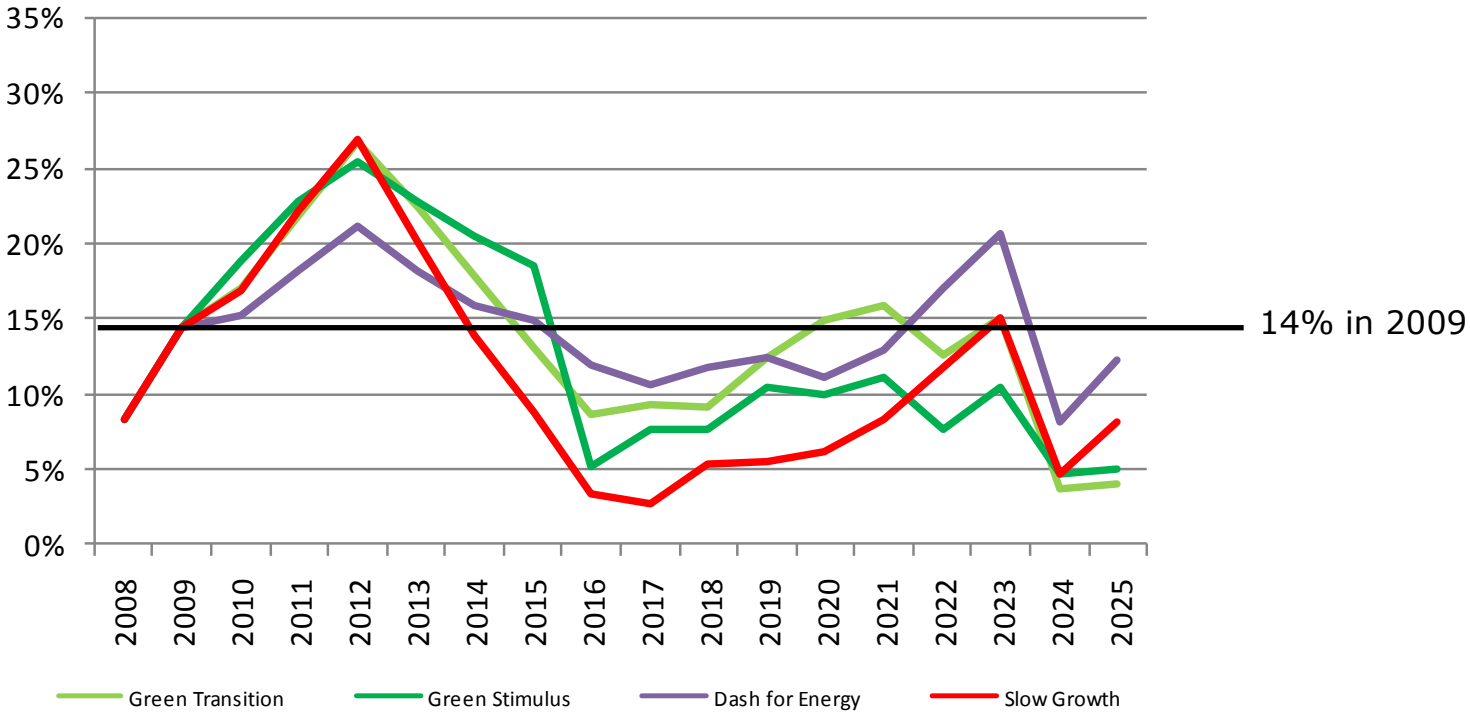
- domestic, by 2020: +13% → +26%, from 2009 levels

- I&C, by 2020: +94% → +115% in elec; +64% → +139% in gas

Thematic news:

- (1) Gas import dependence up in all four – but in two we have stable import demand from the middle of the next decade.
- (2) Investment up in all four (£95bn - £194bn).
- (3) In two out of four significant risk to 2020 climate change objectives and new nuclear not of much impact.
- (4) The two Green Scenarios assume new nuclear and CCS are operational by 2020.

DE-RATED CAPACITY MARGINS (PRE STRESS TESTS)



TIGHT MARGINS IN ELECTRICITY UNDER SOME SCENARIOS

STRESS TESTS - TRAFFIC LIGHTS

Stress test	Period	Today	Green Transition	Green Stimulus	Dash for Energy	Slow Growth
Re-direction of LNG supplies	1-in-20 severe winter					
Russia-Ukraine dispute	1-in-20 severe winter					
Bacton outage	1-in-20 peak day					
No wind output	1-in-20 peak day					
Electricity interconnectors fully exporting	1-in-20 peak day					

Low impact Moderate impact High impact

THE "REDS" CONTINUE TO OUTWEIGH THE "GREENS"

FINDINGS OCTOBER-FEBRUARY

Respondent feedback: themes

- There was overwhelming support for our approach to modelling uncertainty through scenarios and stress tests.
- Respondents highlighted some key challenges for the security of energy supplies over the next 10-15 years, including:
 - regulatory uncertainty, especially for carbon limits and prices.
 - Financial crisis making it more costly to obtain funds.
 - obstacles posed by building/planning requirements.
 - renewable technology's relatively higher cost and variability.
 - additional risks from oil price shock, gas quality and investment/construction delays.

KEY FINDINGS FROM THE APPRAISAL

Finding 1: There is a need for unprecedented levels of investment to be sustained over many years in difficult financial conditions and against a background of increased risk and uncertainty.

Up to £200bn of investment required by 2020

Finding 2: The uncertainty in future carbon prices is likely to delay or deter investment in low carbon technology and lead to greater decarbonisation costs in the future.

Significantly higher emissions or reduced capacity margins

Finding 3: Short term price signals at times of system stress do not fully reflect the value that customers place on supply security which may mean that the incentives to make additional peak energy supplies available and to invest in peaking capacity are not strong enough.

Greatest risk in scenarios with high gas imports & wind generation

Finding 4: Interdependence with international markets exposes GB to a range of additional risks that may undermine GB security of supply.

Greatest risk in scenarios with highest gas import dependence

Finding 5: The higher cost of gas and electricity may mean that increasing numbers of consumers are not able to afford adequate levels of energy to meet their requirements and that the competitiveness of industry and business is affected.

Consumer bills could rise by up to 50%

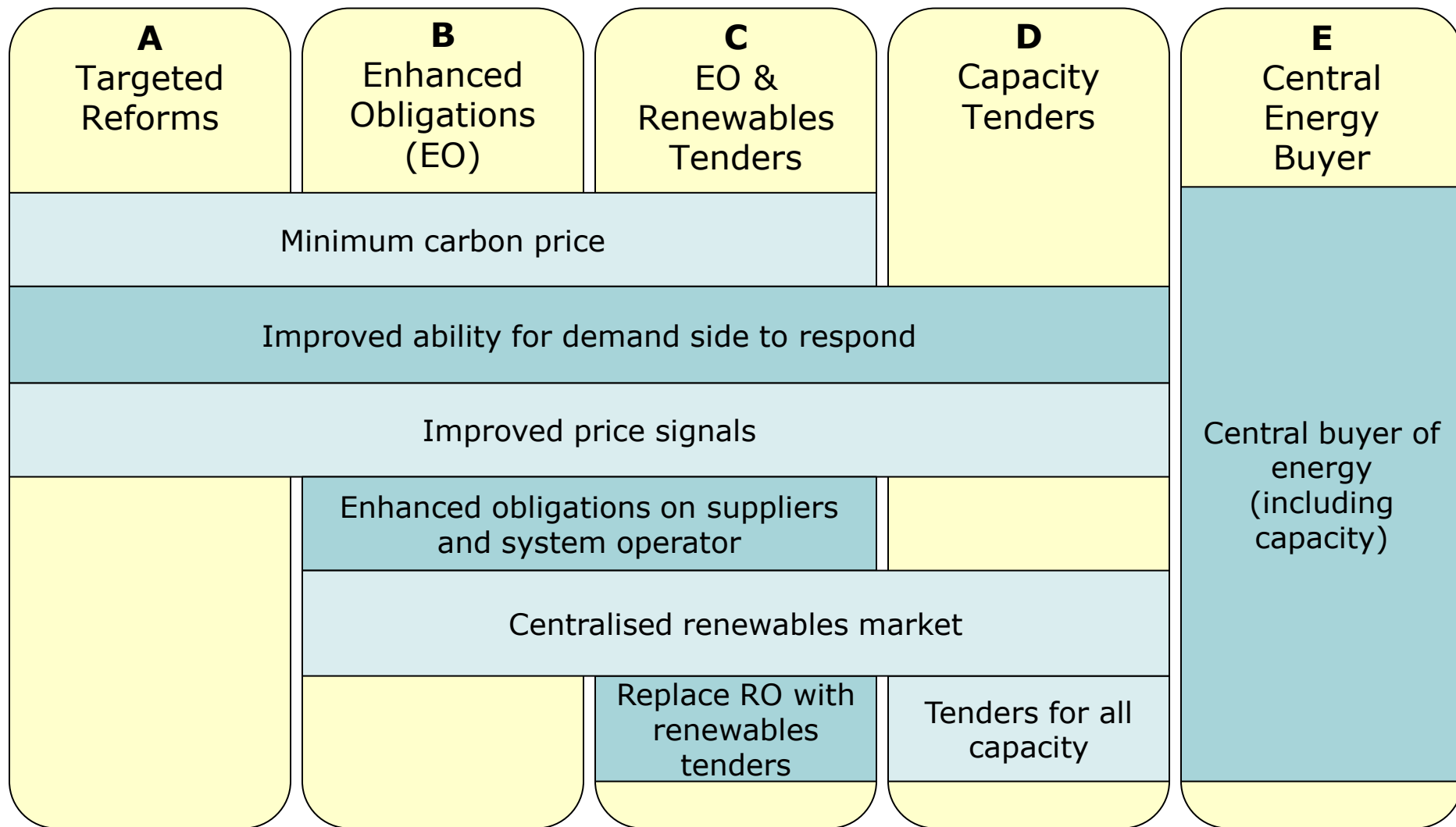
COMBINATION OF FACTORS CAUSES CONCERN

RANGE OF POSSIBLE POLICY MEASURES TO DEAL WITH ISSUES

<p>Scale and timing of investment</p> <ul style="list-style-type: none"> • Improve price signals • Supplier obligations • Centralised renewables market • Capacity tenders • Central energy buyer 	<p>Uncertain future carbon price</p> <ul style="list-style-type: none"> • Carbon price intervention • Tender for low carbon plant • Central energy buyer
<p>Weakness of short term signals</p> <ul style="list-style-type: none"> • Improve price signals • Supplier obligations • Improve ability for DSR • Short term capacity auctions • Liquidity measures • Central energy buyer 	<p>Risks from inconsistencies with international arrangements</p> <ul style="list-style-type: none"> • Improve price signals • Supplier obligations • Storage capacity tenders • Central energy buyer

MEASURES CAN BE PACKAGED IN VARIETY OF WAYS

OPTIONS FOR CONSULTATION

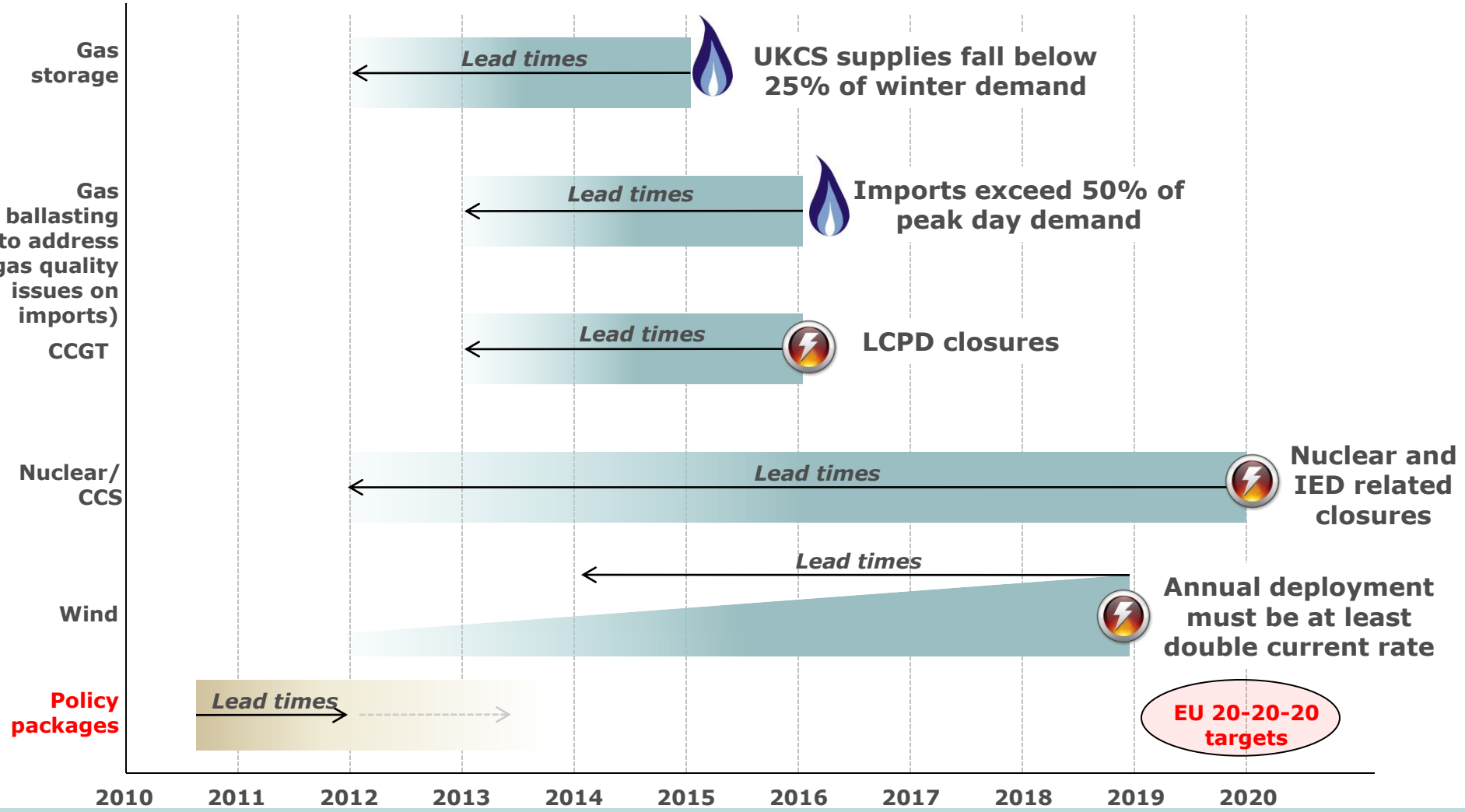


KEY BENEFITS AND RISKS OF THE PACKAGES

	Key Benefits	Key Risks
Targeted Reforms	Increases incentives to invest whilst retaining the benefits of competitive markets	May not be sufficient to address the financing challenges and therefore deliver secure and sustainable supplies
Enhanced Obligations	Puts onus on industry players to deliver a specified level of security of supply	May not be sufficient to address the financing challenges and achieve renewables and climate change goals
Enhanced Obligations and Renewables Tenders	Puts onus on industry players to deliver a specified level of security of supply and enhances probability of efficiently meeting renewables targets	May not be sufficient to address all the financing challenges and achieve longer term climate change goals
Capacity Tenders	Facilitates raising finance thus accelerating investment in pre-determined levels and types of low carbon generation and storage	Customers exposed to risk of any poor decisions surrounding the type and scale of capacity required. Small-scale options and supply side may be overlooked
Central Energy Buyer	Underwrites long term contracts giving increased confidence of specific outcomes and access to lower cost finance	May stifle innovation and customers exposed to the risk of any poor contracting decisions Existing European legal framework would limit what is possible under this approach

TRADEOFFS EXIST ACROSS THE PACKAGES

KEY TIMINGS



INVESTMENT DECISIONS NEED TO BE TAKEN IN NEXT TWO-THREE YEARS

The background of the slide is a composite image. On the left, there are rows of solar panels under a bright sun. On the right, a hand is shown holding a white document. In the bottom left corner, a blue gas burner is visible. The overall theme is energy and customer service.

ofgem

Promoting choice and value
for all gas and electricity customers

ADDITIONAL SLIDES

WHAT IMPACT HAVE MODEL CHANGES HAD?

Green Transition – a recap	Green Stimulus – a recap
<p>In this scenario....</p> <ul style="list-style-type: none"> • There is a rapid economic recovery and significant new investment globally • A global agreement on tackling climate change is reached • Energy efficiency measures are effective • New nuclear and CCS demonstration projects come on-line before 2020 • Gas prices are moderate, carbon prices are high, and coal prices are relatively low as demand is suppressed by the high carbon prices • GB gas demand falls but electricity demand grows on the back of wider deployment of heat pumps and electric vehicles 	<p>In this scenario....</p> <ul style="list-style-type: none"> • There is a slow recovery from recession and restricted availability of finance • A global agreement on tackling climate change is reached and governments implement 'green stimulus' measures • Energy demand falls globally in the near term • Fuel prices are relatively low • The combination of relatively high carbon prices and direct government support to nuclear, CCS and large scale renewables promote rapid decarbonisation of the generation sector
<p>Key revised features</p> <ul style="list-style-type: none"> • Total investment costs between 2009-2020 have reduced to £194bn instead of the £200bn reported in October. 	<p>Key revised features</p> <ul style="list-style-type: none"> • Carbon dioxide emissions from the electricity and gas sectors: down 46% from 2005 levels as opposed to 43% previously reported in October. • Domestic consumer bills: increase by 13% by 2020 as opposed to 14% previously reported in October.

WHAT IMPACT HAVE MODEL CHANGES HAD?

Dash for Energy – a recap

In this scenario....

- Global economies bounce back strongly
- Security of supply concerns prevail over environmental concerns: there is no global agreement on tackling climate change
- Gas supply is tight and fuel prices are high
- Investment is forthcoming but not always timely
- Significant expansion of CCGT generation capacity
- Planning and supply chain constraints prevent new nuclear plant becoming operational before 2020
- Planning delays push back storage investment

Key revised features

- Carbon dioxide emissions from the electricity and gas sector: down 14% from 2005 levels. This is higher decrease than the 12% previously reported. This is still insufficient to meet targets.
- Domestic consumer bills: rise with high and volatile commodity prices, increasing by nearly 52% by 2016 before falling back. In October this increase was at 60%.

Slow Growth – a recap

In this scenario....

- Impact of recession and financial crisis continues
- Low levels of investment
- Low commodity and carbon prices, reducing incentives for renewables, nuclear and CCS
- Generation build is dominated by CCGTs
- Energy efficiency measures have limited impact but demand is low initially due to slow economic growth

Key revised features

- Carbon dioxide emissions from the electricity and gas sector: down 19% from 2005 levels. This is higher than the 18% reported in October. This is still insufficient to meet carbon budgets.
- Domestic consumer bills: relatively low in early years but increase by 19% by 2020 as market tightens. This is a reduction from the 22% reported in October.

CONSUMER ENGAGEMENT (1)

1) Omnibus Survey

- Ipsos Mori conducted a 1,961 quota controlled face-to-face interviews in December 2009
- Data is weighted to the known demographic profile of the population
- 8 questions, including on generation mix, import dependency, and responsibility

Results (charts in Appendices)

- Coal least preferred source for generation (below nuclear)
- All green sources score highly (Offshore wind and hydro most favoured)
- Price most important issue, then affordability for everyone
- 69% of people very or fairly concerned that gas would be coming from overseas (similar % fairly concerned GB might run out of gas)
- Government most popularly accountable for ensuring secure supplies (followed by energy suppliers): 57%
- Some appetite for changing consumption habits (if energy cheaper)

CONSUMER ENGAGEMENT (2)

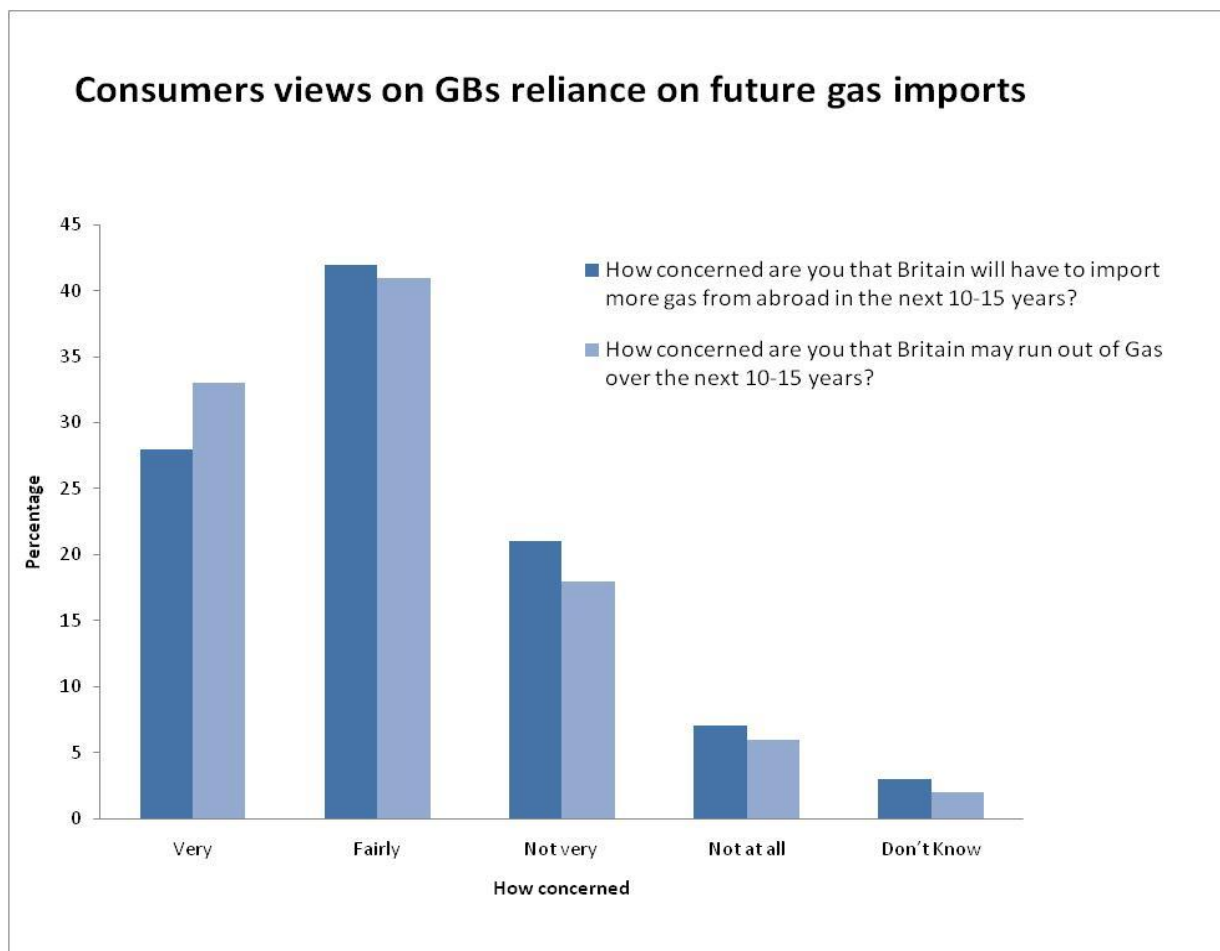
2) Consumer First Panel

- 5 Panel sessions conducted by Opinion Leader across GB in January 2009
- Panel discussed some of the key risks associated with security of supply
- Participants iteratively discuss the key issues over the course of the Panel session, making their views relatively more informed

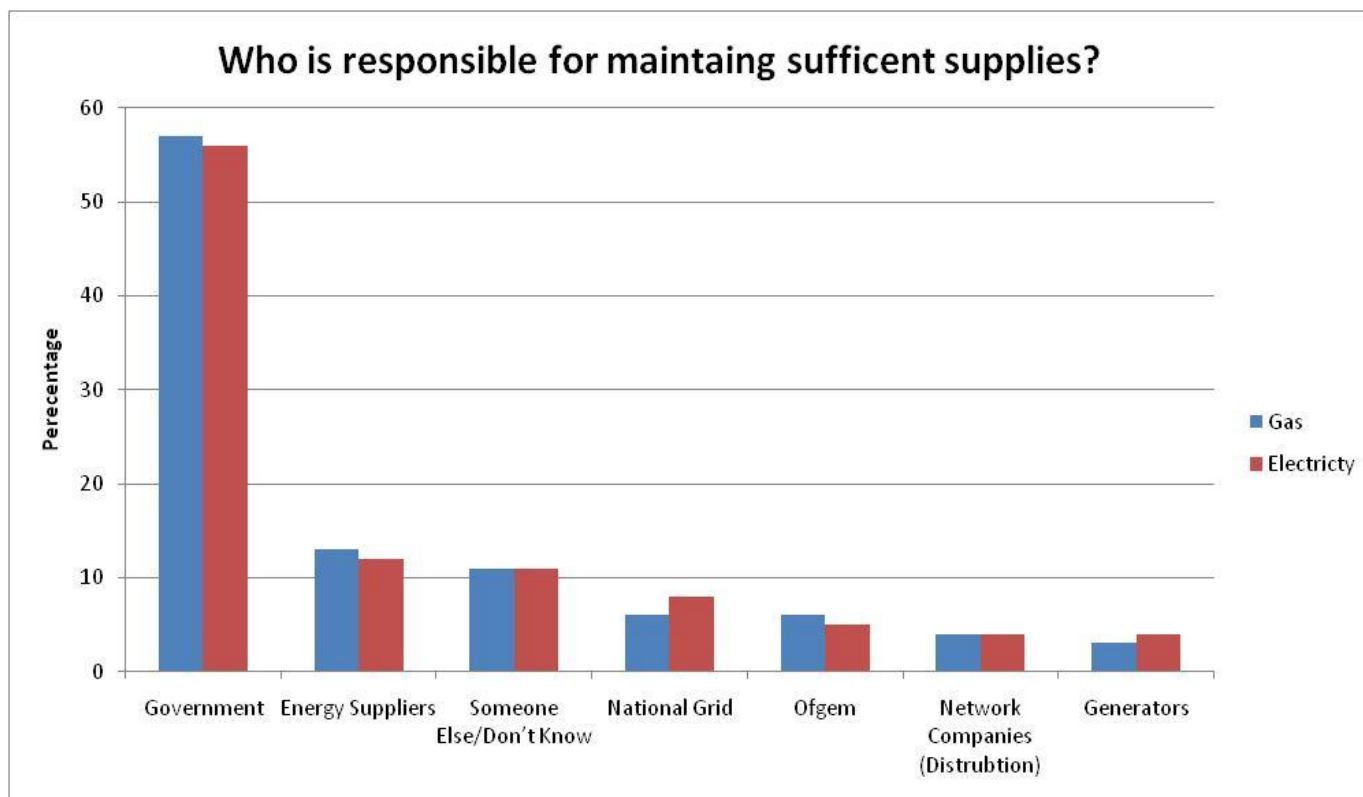
Some initial results

- Overall responsibility for ensuring security of supply was seen to rest with the government rather than energy companies
- Renewable technologies generally favoured over fossil-fuel based (nuclear was around middle of the pack), however preferences changed somewhat when informed of the relative costs, with nuclear and gas in particular moving up the rankings
- When informed of the trade-offs between security of supply, cost, and environmental objectives, general response was that 'keeping the lights on' is paramount, even if it could mean slightly higher prices

CONSUMER ENGAGEMENT: Survey results (1)



CONSUMER ENGAGEMENT: Survey results (2)



CONSUMER ENGAGEMENT: Survey results (3)

