

1. Responder feedback to October consultation

- There was overwhelming support for our approach to modelling uncertainty through scenarios and stress tests.
- Industry felt our modelling of CCS was optimistic in relation to:
 - technology risk
 - lead times
 - cost.
- Additional concerns that are relevant to CCS include:
 - regulatory uncertainty, especially for carbon limits and prices.
 - obstacles posed by building/planning requirements.
 - renewable technology's relatively higher cost and variability.

2. 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 and 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 high gas imports and wind generation |
| 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% |

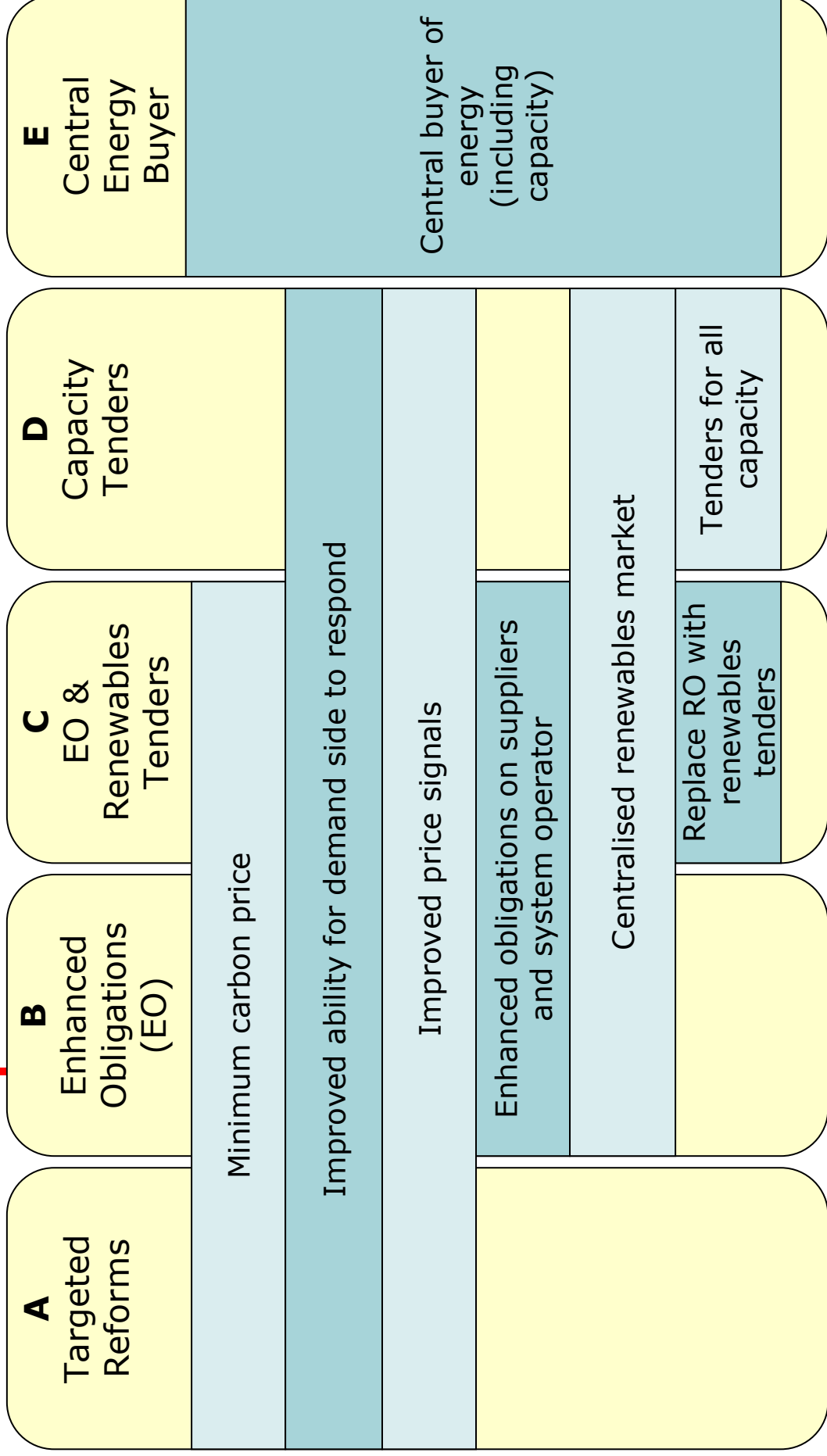
COMBINATION OF FACTORS CAUSES CONCERN

3. Range of possible policy measures to deal with issues

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

3. Options for consultation



3. Key benefits and risks of the

| | 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

Next Steps

We welcome responses to this consultation by **31 March 2010**.

In particular, we are seeking respondents' views on:

- our appraisal of current arrangements;
- our policy packages and assessment of them;
- whether other policy measures should be considered;
- the extent to which early actions should be considered.

Breakout session questions:

- Do you think we been **modelling** optimistic or pessimistic in our modelling assumptions about CCS? For example, in relation to:
 - technology risk?
 - cost? and
 - lead times?
- If you believe different assumptions are appropriate, please explain why.
- What is the economic and technical viability of gas CCS (relative to coal CSS)?
- What are the commercial incentives and regulatory framework necessary for the transport and storage of CO₂?

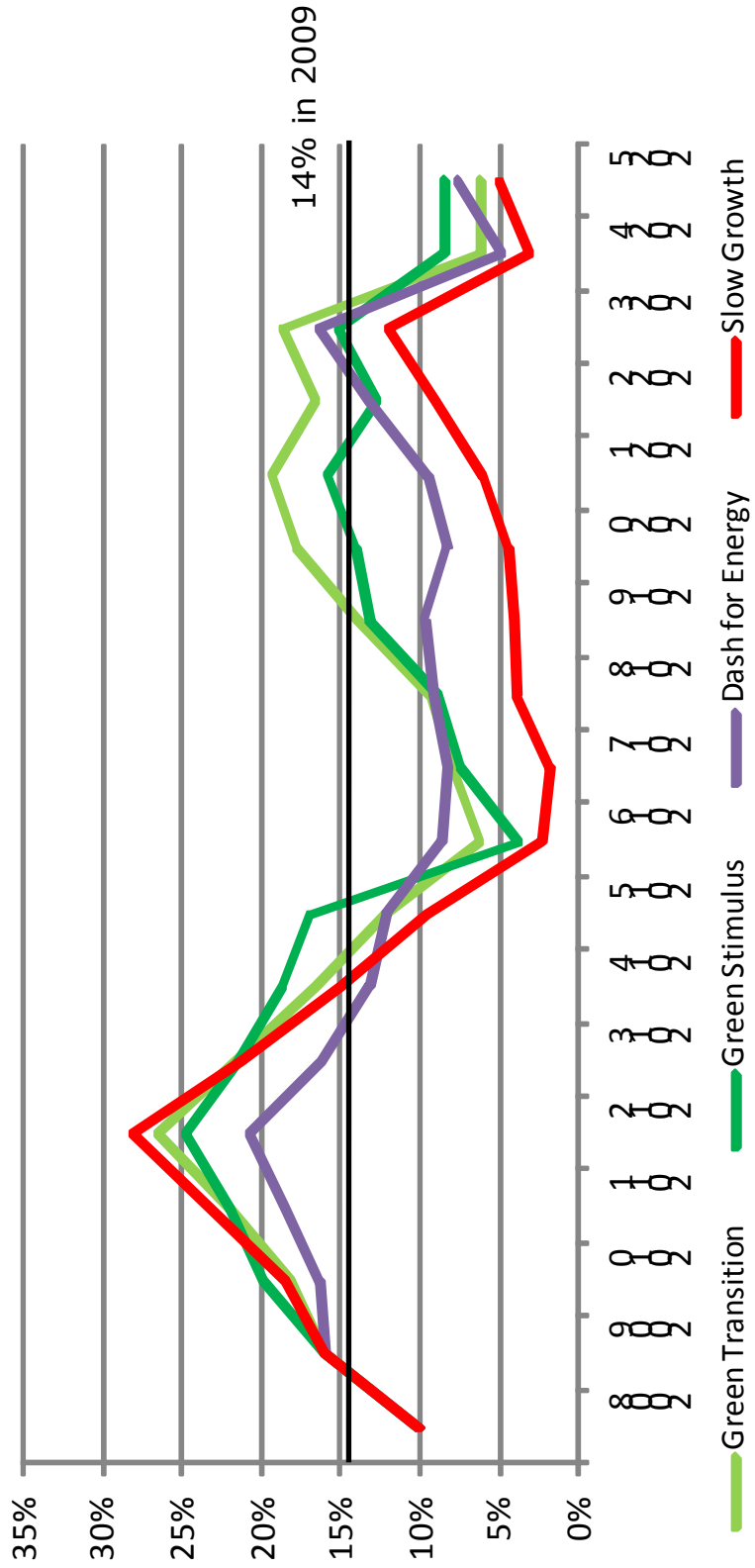
Breakout session questions: policy

- What are the likely impacts of current government CCS policies upon investment in other technologies i.e. coal and CCGT, nuclear and renewable?
- Which policy measures from the February Discovery document would you advocate for CCS (see slide 13)?
- How do these policy measures differ from those that might promote secure and sustainable energy supply more generally?

Questions?

Appendices

GB DE-RATED CAPACITY MARGINS



TIGHT MARGINS IN ELECTRICITY FOLLOWING LCPD CLOSURES

IED derogations

| Green Transition/Dash for Energy/Slow Growth | | | |
|--|------|-----|---|
| No. of units | Coal | Gas | |
| TNP | 4 | | 6 |
| Fit SCR | 19 | | 4 |
| LLO | 20 | | 3 |
| Close | 0 | | 9 |
| Green Stimulus | | | |
| The Green Stimulus scenario assumes plants make different decisions under the IED as the commodity and carbon prices in this scenario are less favourable to coal. | | | |
| No. of units | Coal | Gas | |
| TNP | 8 | | 7 |
| Fit SCR | 6 | | 4 |
| LLO | 12 | | 4 |
| Close | 17 | | 7 |

KEY POINT: WE HAVE ASSUMED CZECH PROPOSALS

Consumer Bills

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | % of electricity bill in 2020 |
|-------------------------|---------|---------|---------|---------|---------|---------|-------------------------------|
| Green stimulus | £ 2.08 | £ 3.09 | £ 5.87 | £ 5.80 | £ 8.48 | £ 9.21 | 2% |
| Total | £439.55 | £485.59 | £516.55 | £509.78 | £514.14 | £520.65 | 100% |
| Green Transition | £ 0.99 | £ 0.97 | £ 1.92 | £ 1.90 | £ 4.47 | £ 7.67 | 1% |
| Total | £473.73 | £501.55 | £527.92 | £537.07 | £540.52 | £545.99 | 100% |

ROC SUBSIDIES, SMART METERS, T&D CHARGES DRIVE INCREASES IN BILLS

WHAT IMPACT HAVE MODEL

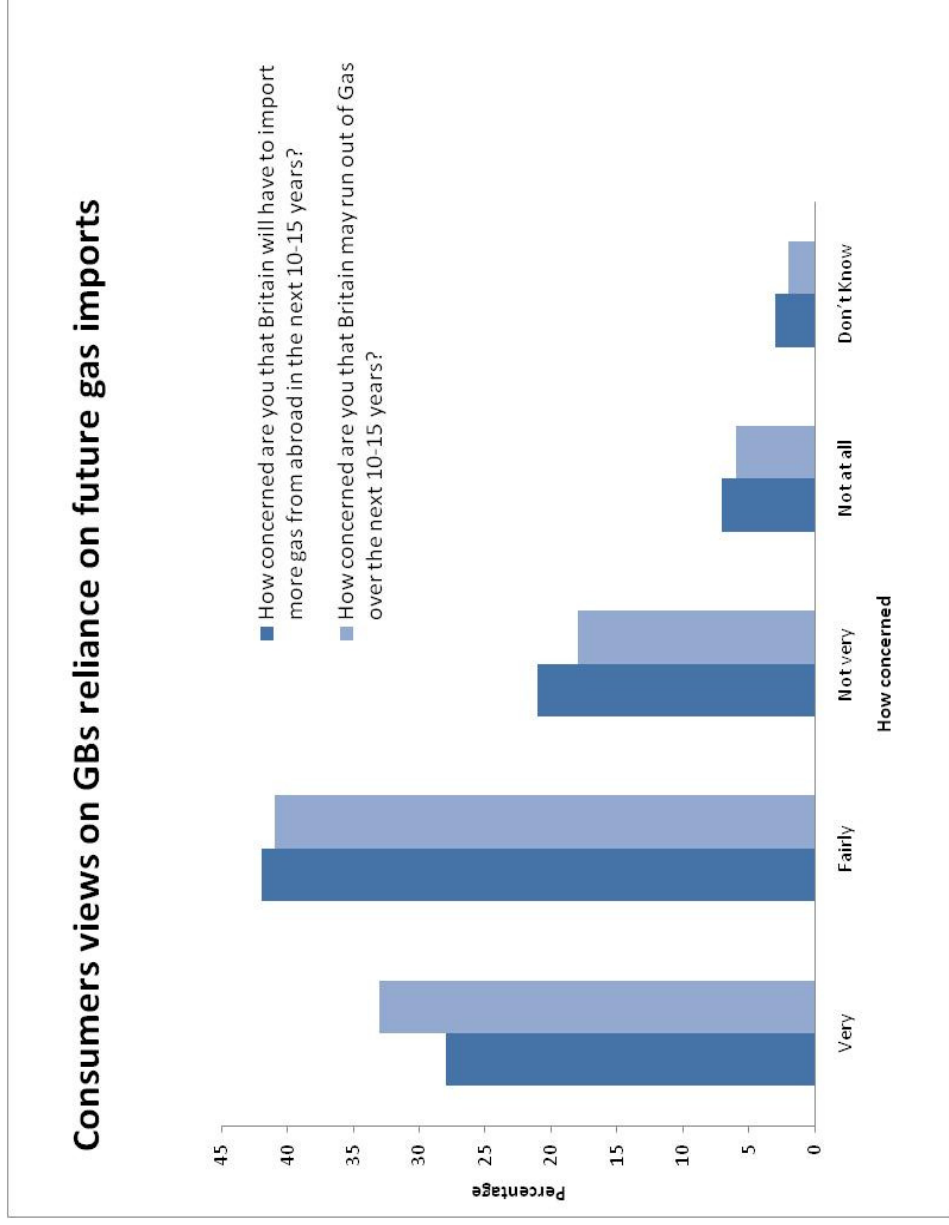
CLIMATE FOR LEADERS

| | |
|--|---|
| <p>Green Transition – a recap</p> <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>Green Stimulus – a recap</p> <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. |

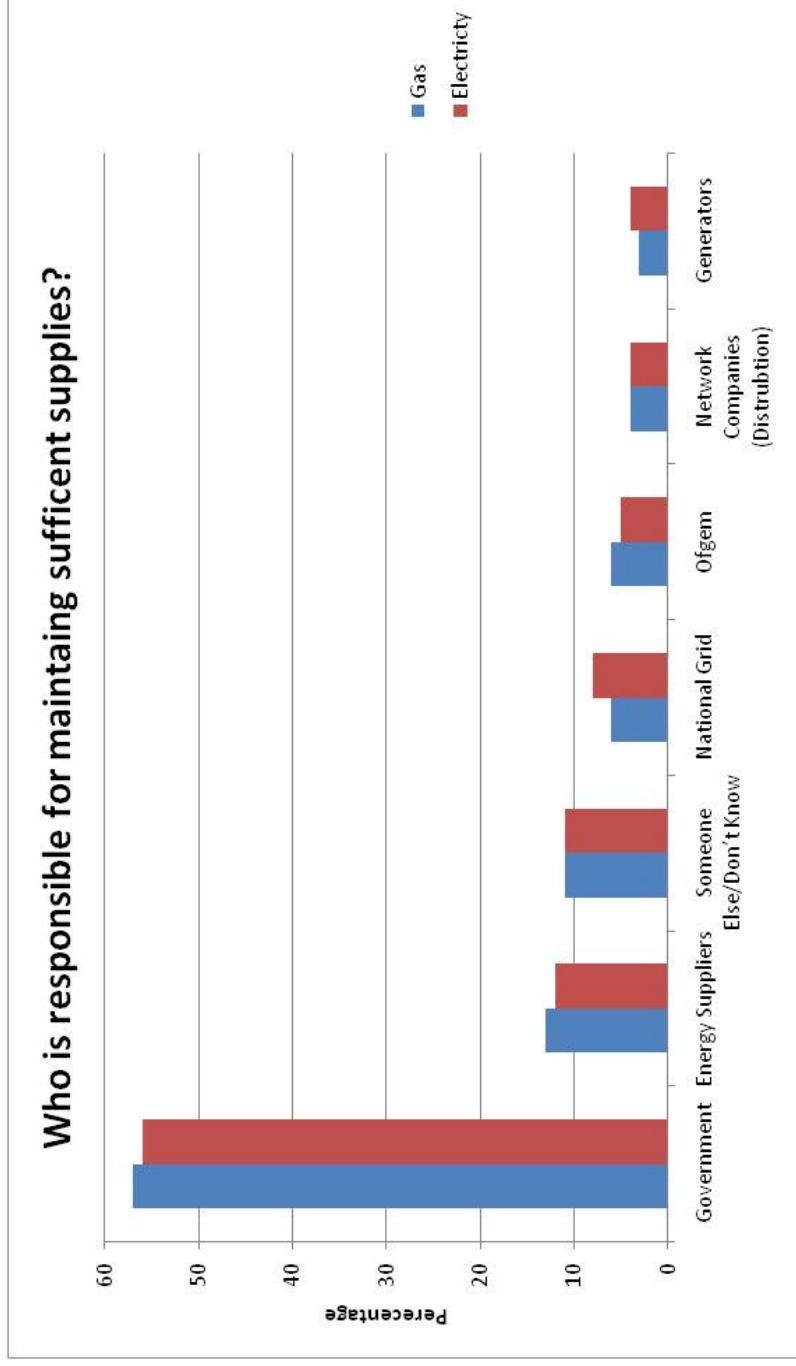
WHAT IMPACT HAVE MODEL CHANGES HAD?

| | |
|---|--|
| <p>Dash for Energy – a recap</p> <p>In this scenario....</p> <ul style="list-style-type: none"> •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 | <p>Slow Growth – a recap</p> <p>In this scenario....</p> <ul style="list-style-type: none"> •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 |
| <p>Key revised features</p> <ul style="list-style-type: none"> •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%. | <p>Key revised features</p> <ul style="list-style-type: none"> •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: Survey results (1)



CONSUMER ENGAGEMENT: Survey results (2)



CONSUMER ENGAGEMENT: Survey results (3)

