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Understanding the true cost of Green Transition

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In 2009, Ofgem carried out Project Discovery to simulate energy market scenarios that explored the various prospects for achieving secure and sustainable energy supplies over the next 10-15 years. The favoured 'Green Transition' scenario put the estimated cost of delivering the necessary infrastructure at £199 billion. This is, clearly, a massive sum. To put it into perspective, it is roughly equivalent to funding 21 Olympic Games, building 33 new Queen Elizabeth aircraft carriers and clearing the entire UK budget deficit, corporation tax and stamp taxes for one year. Given our current era of austerity, and increased energy prices, it is imperative that this expenditure be subject to real scrutiny by both the public and energy authorities. Moreover, Ofgem's cost estimates were based on pre-recession market conditions and contained a number of assumptions around the growth and development of global energy markets. All would agree that the world has changed since then.

Foreword

This paper offers a review of the underlying assumptions of the Green Transition plan, with a particular focus on three main areas:

1. **The true financial cost and efficiency;**

2. **The principles of the Green Transition Plan; and**

3. **The likely impact on the economy.**

Contents

The analysis and findings of this paper are the authors' alone and should not be taken to represent the views of either the EPC Advisory Board or of the Senior Fellows.

As the UK settles into a new era of fiscal austerity, increased prices do not go unnoticed. So it should come as no surprise that both businesses and consumers are already anticipating a dramatic rise in the price of power. And so they should. In part, this is because global markets have been pushing up the so-called 'input costs' of energy generation (coal, oil and gas to name a few). But for UK consumers, there will also be a new set of costs that may soon be creeping into their electricity bill.

The catalyst of these costs is the UK government's admirable – yet often conflicted – energy policy. The government hopes to achieve three main goals over the next decade or so – meeting emissions reduction targets of 34 percent by 2020 (against a 1990 baseline), eradicating fuel poverty and ensuring security of supply.

Executive

In early 2009, Ofgem initiated Project Discovery to examine the prospect for secure and sustainable energy supplies over the next 10-15 years. Following a consultative process, the organisation went on to detail its preferred scenario (Green Transition). Requiring an estimated investment of £199 billion, the scenario places a heavy emphasis on renewable energy investments and conservation. These are flanked by strong support for nuclear power in an effort to reduce the dominance of gas and coal generation (the current workhorses of the UK generation fleet).

But this ambitious plan also bares significant risks. For one, the programme represents a dramatic shift away from the country's current generation mix. But it is also a massively expensive and complex programme that could be severely compromised if any of the key assumptions fail to materialise. As a result, the UK may find it is forced to revert back to much more predictable power sources such as coal and gas (the very fuels that the investments are striving to marginalise).

And while the UK is currently developing new nuclear generating capacity, the recent and tragic events in Fukoshima, and Germany's subsequent about-face on their own nuclear programme, indicate that the UK may struggle to meet its 'go-live' targets. At the same time, the pace of development in the renewables market has started to slow and planned energy efficiency measures – while promising significant savings in the future – are still in the early stages of development.

For their part, UK consumers seem to agree with the need for greater energy security and tougher carbon reduction targets, but are largely unwilling (or unable) to take on the additional expense of delivering those goals.

So while the ambitious plans – if successful – would provide the UK with power sources that are both secure and achieve emissions reduction targets in the short-term, it is more likely to create massive inflation within a core commodity we all rely on: **power**.

This paper takes an inquisitive look at the assumptions underpinning the UK's energy investment, with a particular focus on the risks and costs associated with Ofgem's chosen plan.

Based on the findings of this report, we believe that the time has come to re-open the debate on energy in the UK.

We simply can't afford to wait.

Summary

The UK's energy policy seeks to address three guiding principles which often have conflicting decision making criteria. It is underpinned by a trilemma: balancing strong commitments to reduce emissions; eradicating fuel poverty; and generating secure and sustainable energy. To achieve each of these objectives, the UK has set ambitious targets: reduce overall CO_2 consumption by 34 percent by 2020 and 80 percent by 2050 (against a baseline of 1990); eradicate fuel poverty by 2016; and ensure energy security through a combination of measures, primarily the development of renewable energy capacity which is to account for 15 percent of the UK's energy supply by 2020.

Background

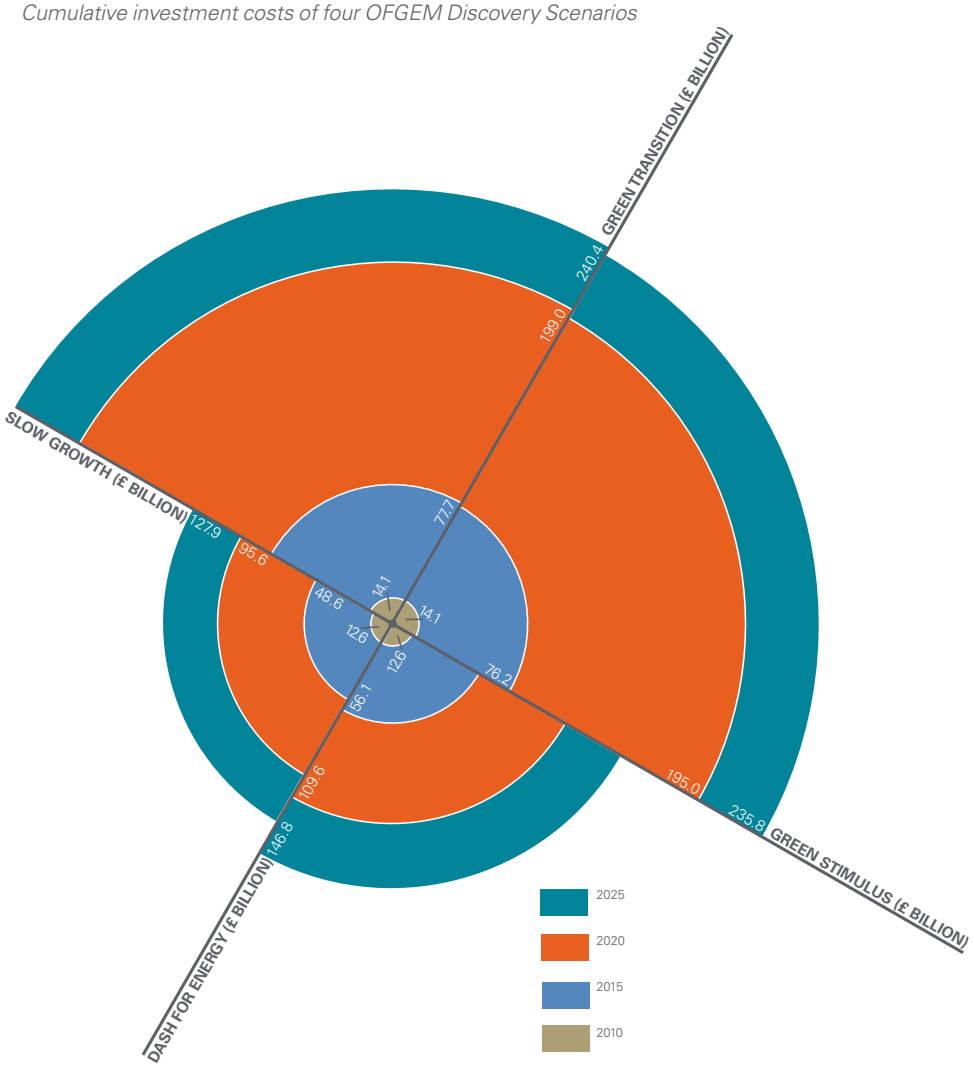
Whilst each of the individual goals are both ambitious and sensible, they are lacking in natural alignment. Indeed, taken together, they often create a conflict in decision-making criteria and ultimately tend to balance each other out. For example, the UK still has a relative abundance of coal, so achieving medium-term energy security could be relatively starightforward by increasing the use of this fossil fuel. But any additional reliance on this carbon-heavy fuel would make it virtually impossible to achieve the stated carbon reduction ambitions.

Rather than provide a clear investment path, this conundrum of guiding principles instead generates a complex set of interdependencies.

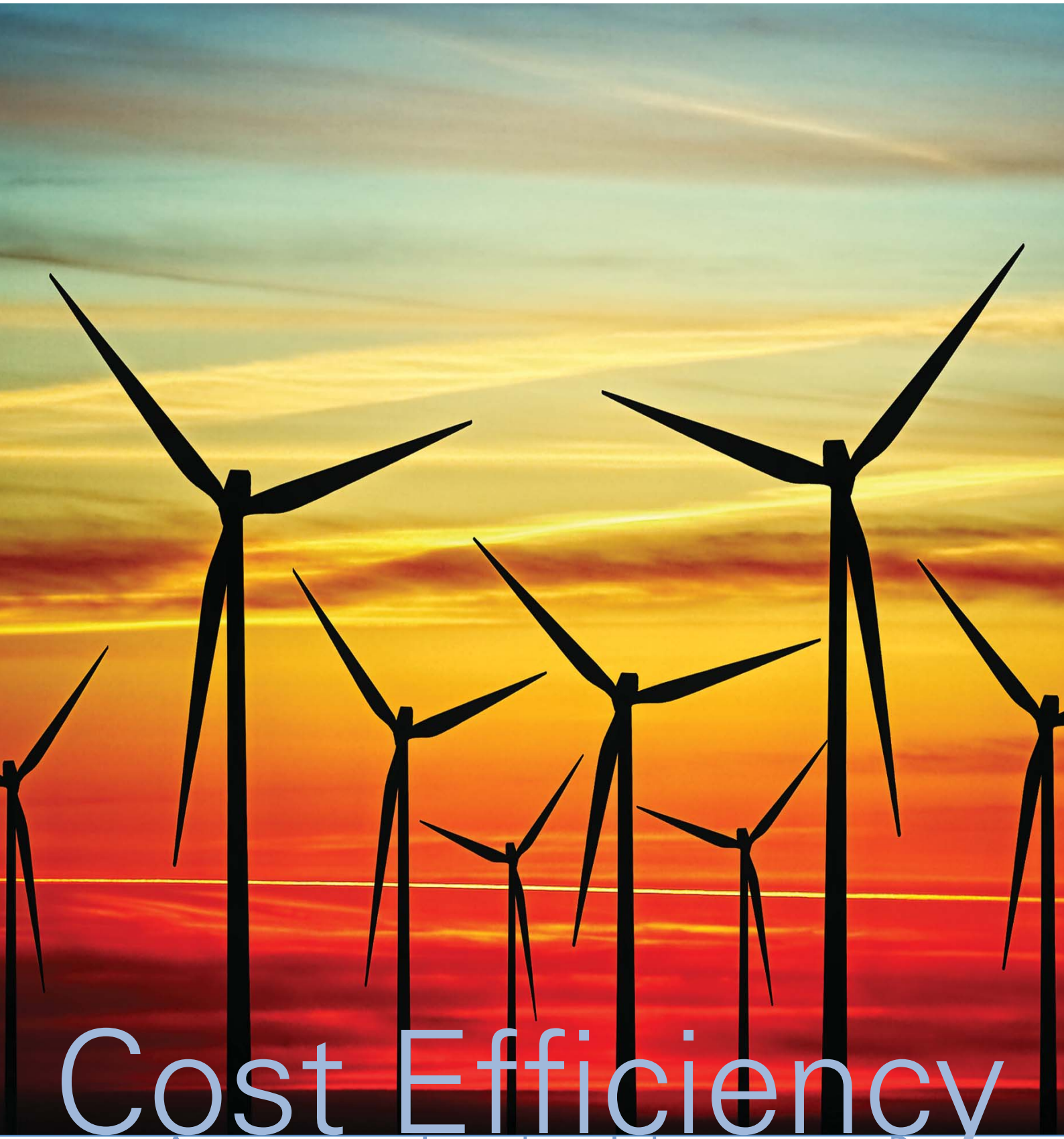
Against this backdrop, Ofgem undertook Project Discovery in 2009 in an effort to map out the scenarios for delivering the UK's future energy requirements within these overarching objectives.

In October 2009, Ofgem released its *Project Discovery Energy Market Scenarios*. This paper explored the different prospects for energy security and sustainability over the next 10 to15 years, within the framework of the UK's regulatory environment. In the consultation document, Project Discovery developed with four different scenarios: Green Transition, Green Stimulus, Dash for Energy and Slow Growth. The most optimistic (and expensive) of these was the Green Transition scenario which totalled the needed investment at £199 billion. It is worth noting that the oft-cited media number of £200 billion is somewhat inaccurate (though with numbers this large, the distinction is more of a quibble than a controversy).

Figure 1
Cumulative investment costs of four OFGEM Discovery Scenarios



Ofgem's favoured energy scenario estimates that the UK will need to invest £199 billion in energy infrastructure by 2020



Cost Efficiency

Are we paying the right amount?

Nuclear £6.4 billion investment

Renewables £59.5 billion investment

Will rise in order to meet the financing requirements

massive change in the way UK power markets operate

ARE WE PAYING THE RIGHT AMOUNT?

The Green Transition Plan aims to reduce energy consumption and generate lower carbon emitting forms of energy

How cost effective this scenario is within today's environment

Will test utilities, regulators and consumers alike

Could lead to a dependence on gas and coal

Heavily geared towards renewable energy sources

£110 billion is allocated to renewable investment

The Green Transition plan aims to reduce energy consumption and generate lower carbon emitting forms of energy. But how cost effective is this scenario given today's economic environment. To answer this question, we examine the plan's proposed investment in both generation and energy efficiency, and shed some light on potential challenges.

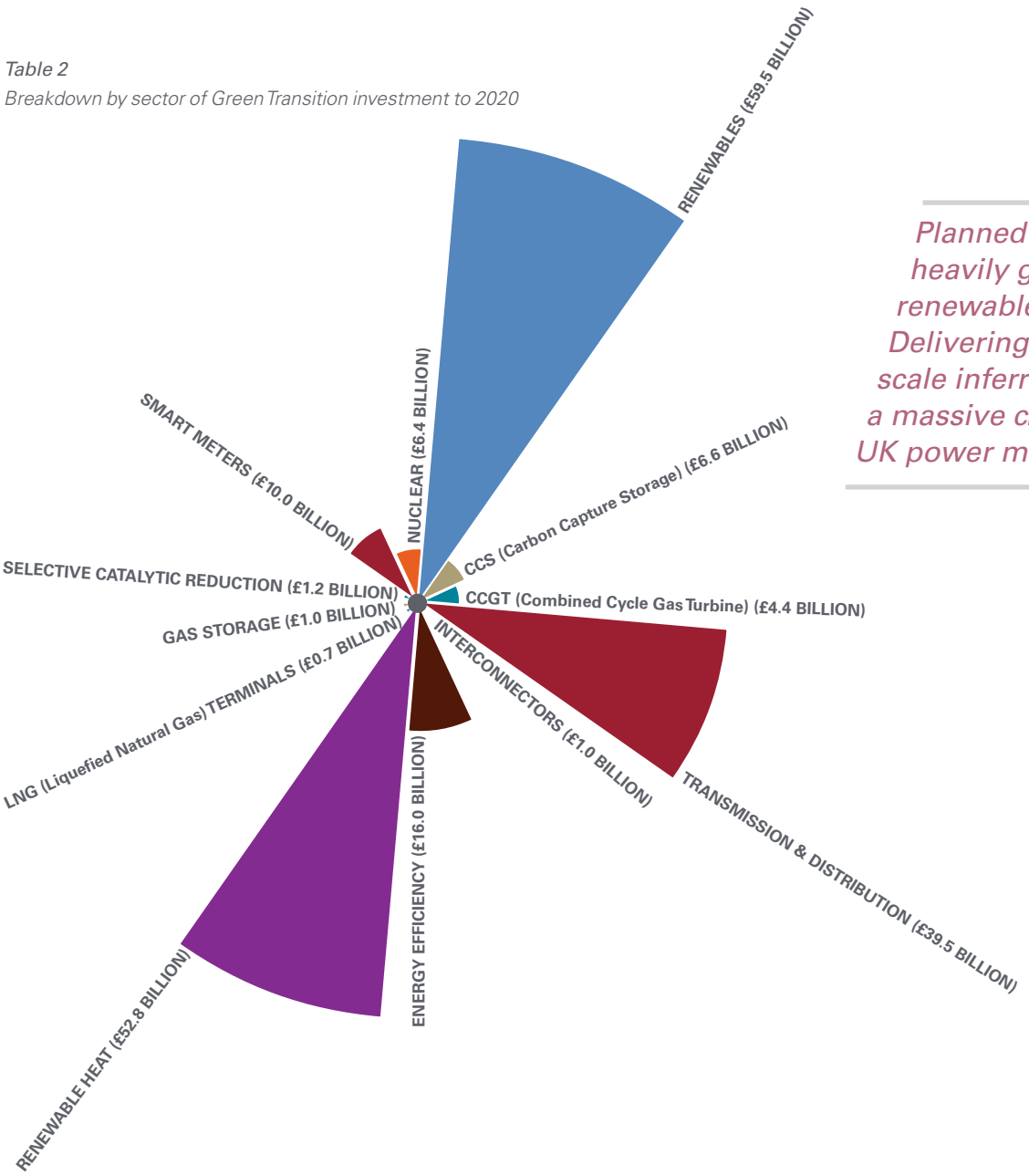
Cost Efficiency

Are we paying the right amount?

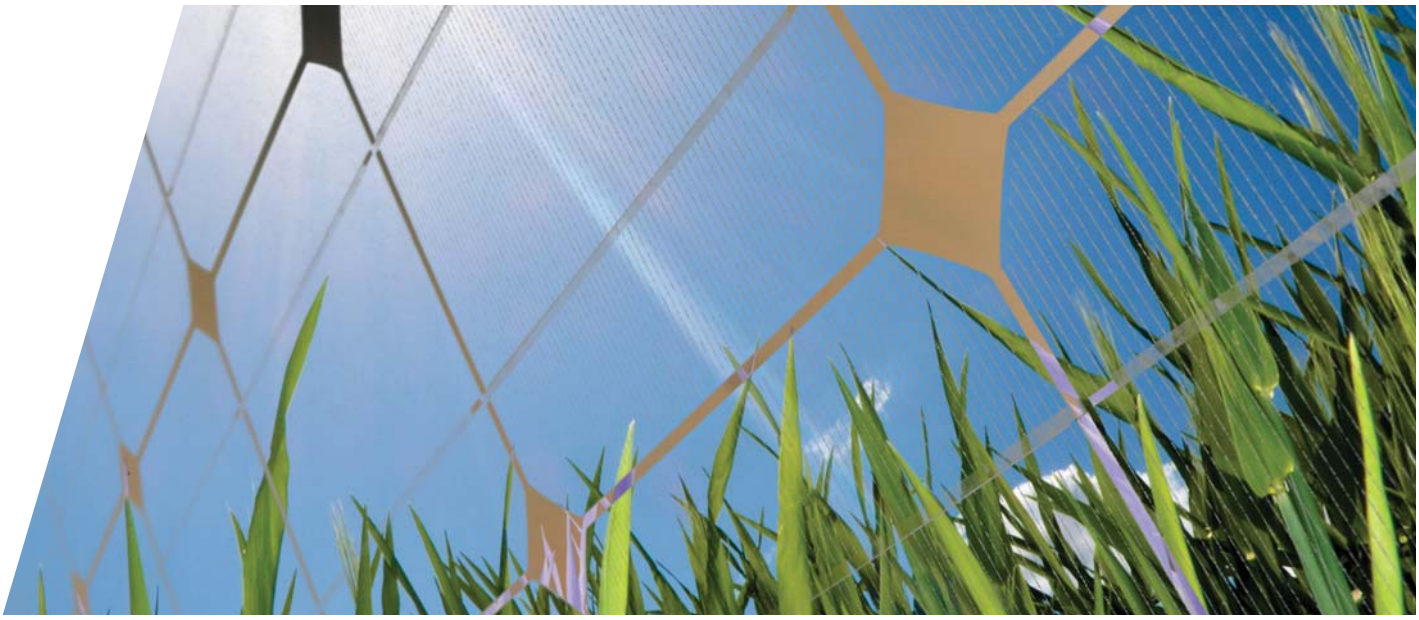
1

Energy Generation –
meeting the UK's energy requirements for the next decade

Table 2
Breakdown by sector of Green Transition investment to 2020



Planned investments are heavily geared towards renewable energy sources. Delivering renewables on the scale inferred will represent a massive change in the way UK power markets operate



Looking at the breakdown of investments, it becomes immediately apparent that a majority of funding (£110billion) is allocated to renewable investments.

With a wind capacity of only 5 GW, the UK has already reached the point where National Grid is asking – and paying – windfarms to switch off their turbines. The problem is that National Grid are currently unable to match their power output with existing demand in real time. The first time this happened was on 30th May 2010 when Scottish Power was paid £13,000 to shut down two farms at a cost equal to £180 per megawatt hour[1].

To make sure this does not become a common occurrence, the development of a smart grid and other balancing technologies will be vital. In response, the Green Transition scenario allocates £40 billion to grid upgrades. But given the £112 billion that has been earmarked for renewable energy construction it will be critically important that delivery is assured and the smart grid investments deliver the optimum value.

The allocation identified for renewable heat investment (£52.8 billion) also looks particularly ambitious. And, since biomass and related generation projects have generally failed to take off in recent years, it seems unlikely that such expenditure will be forthcoming from private investors without strong incentive (likely on the back of government subsidies).

By contrast, the conventional carbon generation investment component represents just £10 billion (or around five percent) with £6.6 billion of that allocated to Carbon Capture and Storage (CCS) projects, where the technology is not fully developed.

That leaves a comparatively modest amount – just £4.4 billion – allocated for Combined Cycle Gas Turbine (CCGT) plants, which are the current workhorse of the UK generation sector. This sum equates to around 9 GW of new CCGT capacity.

Historically, the UK has depended upon coal-fired plans which, from the 1960's, have been complemented by both oil and nuclear. But since electricity privatisation

Cost Efficiency

Are we paying the right amount?

Without careful co-ordination and integrated timing, there is a real risk that the UK's current trajectory could lead to a dependence on gas and coal, the very fuel sources the Green Transition plan was designed to marginalise

in the 1990s, most major investment in new generation has been gas-fired.

There is little doubt that the UK's energy infrastructure will need to change. But the levels demanded in the Green Transition plan will very likely test the limits of utilities, regulators and consumers alike.

Without careful co-ordination and integrated timing, there is a real risk that the UK's current trajectory could lead to a dependence on gas and coal. Clearly not the intentions of the Green Transition Plan.

According to, National Grid's central case projection, peak electricity demand is to remain relatively stable at around c60 GW. And while currently, the UK's generation capacity stands at 85 GW, deductions must be made to reflect the closure of approximately 12 GW of coal and oil-fired capacity by 2016 and up to 7 GW of nuclear capacity by 2020.

Offsetting these expected closures are 9 GW of capacity that is currently being built and a further 11 GW of capacity that has secured planning approval but has yet to be built; almost 7 GW of this latter figure is gas-fired.

These figures broadly balance when viewed against an expectation that peak demand will remain at around 60 GW as predicted. But it is clear that the UK's net population is set to rise, electric cars will likely proliferate, and domestic technology usage will only increase. Against this backdrop, the prediction can only be reconciled on the basis of a (massive) assumption that planned energy efficiency measures will be effective.

Even assuming that the 60 GW demand peak level remains consistent, the UK is still in a precarious position. Delays in the new nuclear build seem inevitable and the roll out of renewables is rapidly falling behind the required up-take to meet targets. In this environment, any premature plant closures would mean that the National Grid might well face serious problems in meeting demand. It goes without saying that the situation becomes ever more tenuous if the UK sees a rise in demand.

The real knack will be in co-ordinating the various components of the PKN to ensure that none are delayed or – worse – missing altogether. From the installation of the smart grid to the successful roll out of renewables at scale any failure would leave the UK with little alternative but to retain existing and predictable power sources that can be utilised to meet peaks in demand. The options are very limited in this space, meaning the UK would almost certainly revert to a dependence on gas or coal usage, the very fuel sources the Green Transition plan is trying to marginalise.

The probability of this is a substantial risk for the UK and a very real threat.

Considering the country is set to invest £199 billion to achieve ambitious energy and carbon targets, ending up in the same place we are today would not be a positive outcome.

2

Energy Efficiency – *altering the way we use energy*

Alongside securing low carbon and sustainable sources of energy, Ofgem's strategy places emphasis on reducing the UK's overall energy consumption

As might have been expected, the UK's recession reduced energy demand substantially as people and companies went out of their way to cut costs. But many believe that greater energy efficiency will only diminish energy consumption for a short period of time. This is because energy saved in the micro-economy, rebounds as expenditure on goods and services, ultimately, driving energy costs up elsewhere. In the recovery year of 2010, UK electricity supplies rose by 1.5 percent to 363,126 GWh[2] and gas consumption reached a new annual high of 104.3 bcm.

Given that the Department for Energy nd Climate Change (DECC) does not reflect this indirect rebound effect to the macro-economy, the fact that increased energy efficiency does not always yield lower energy consumption may become a perennial surprise.

In any event, the existing DECC policy is only meant to model the direct rebound effect for some (and not all), energy efficiency measures such as cavity and loft insulation.

Based on the assumption of an increasing population and a consumption trend that is only moving upwards, it will require a phenomenal effort for the UK economy to buck this trend and achieve sustainable success in reducing overall consumption.

The Smart metering roll-out forms a central component of the Green Transition Plan. The scope of the programme is truly ambitious and, if successful, would represent the largest implementation of this kind of technology in the world. With an ultimate aim to reduce overall energy consumption the smart grid relies on a number of key enablers that, by 2020, must be installed. UK mandate and EU directives dictate the following installations:

- 27 million smart electricity meters
- 23 million smart gas meters
- 27 million real time displays
- 27 million communications hubs (HAN – Home Area Networks and WAN – Wide Area Networks).

With an official cost of around £10 billion, the UK's Smart meter programme is expected to save 2.6 million tons of CO_2 per year. If we assume a (generous) lifespan of 15 years for the 100 million pieces of new electronic kit and balance costs against the government's expected annual emissions savings, then each ton saved is costing the UK around £256. And given that the UK government has artificially set the price of a ton of CO_2 at £12 under the CRC scheme, the savings achieved from the Smart meter programme look like – a very expensive way to reduce emissions.

With the Governments rapidly progressing Green Deal set to take effect in 2012, paving the way for massive investments in energy efficiency, it is imperative that standard investment measures be applied to ensure the most cost effective solutions are the ones being driven.

Many UK observers are starting to voice concerns that the costs could significantly exceed £10 billion, the energy savings could be much less and it is still unclear how any decreases in consumption will be made sustainable.

Whilst undoubtedly expensive, a smart-grid does open up a number of opportunities for the UK power industry, not least of all the ability to efficiently manage renewable power inputs and better balance the energy load. But to achieve this the UK has to remove and dispose of some 50 million existing 'dumb' meters by 2020 – This entails individually

Cost Efficiency

Are we paying the right amount?

The Smart Metering roll out provides an ambitious but potentially costly method of reducing energy and carbon consumption although there is still a lot of scepticism surrounding the costs and benefits of smart metering

removing a huge variety of meter types, complex wiring conventions spanning fifty years and then the new devices need to be installed. The smart meter roll-out is going to require a massive amount of organisation and management. And with only half a million smart-meters already installed, there is a long way to go.

As with any technology, advances over the last ten years have rendered once cutting edge metering technologies obsolete. The assumption in Project Discovery is that a lifespan of 15 – 20 years will be delivered from the roll-out. But obsolescence is a real prospect since the endurance of the technology is completely untested over periods far shorter than 15 years, bringing the assumed value to be delivered and the annualised costs into serious question.

And much like the roll-out costs and the durability of the technology, the amount of energy to be saved as a result of smart meters is also based entirely on assumptions. In fact a majority of studies show that short-term reductions in energy usage generally creep back to normal levels over time.

Smart metering's main success lies in linking customers to their energy use. While there is much attention being paid by new market entrants, keen to seize the opportunities offered by the coalescing of real-time energy data and two way communications, there is still significant uncertainty as to how this market will be structured and what barriers to entry will exist. What is clear is that to maximise the benefit from smart-meters, new entrants must have acess to the platform in order to develop technologies that drive consumption down for good.

Smart meters are essential for balancing the UK's energy load with the variable energy supply that renewables will ultimately generate.

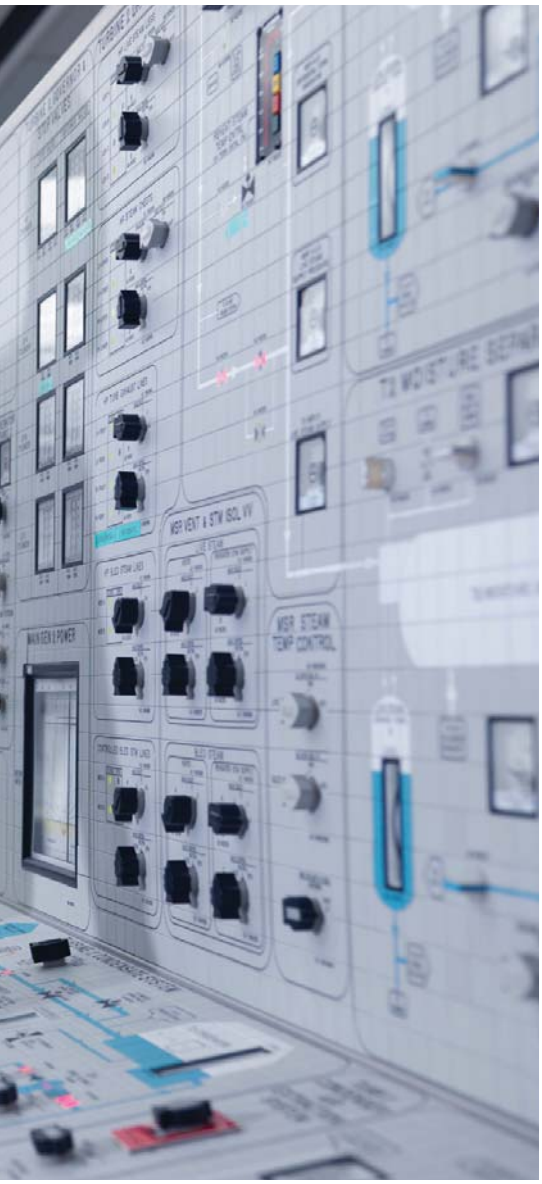
But to justify the £10 billion investment, it will be vital that energy savings are also achieved in the short-term and sustained over the long-term.

3

Could we achieve our goals for less? –

Cost Efficiency

Are we paying the right amount?

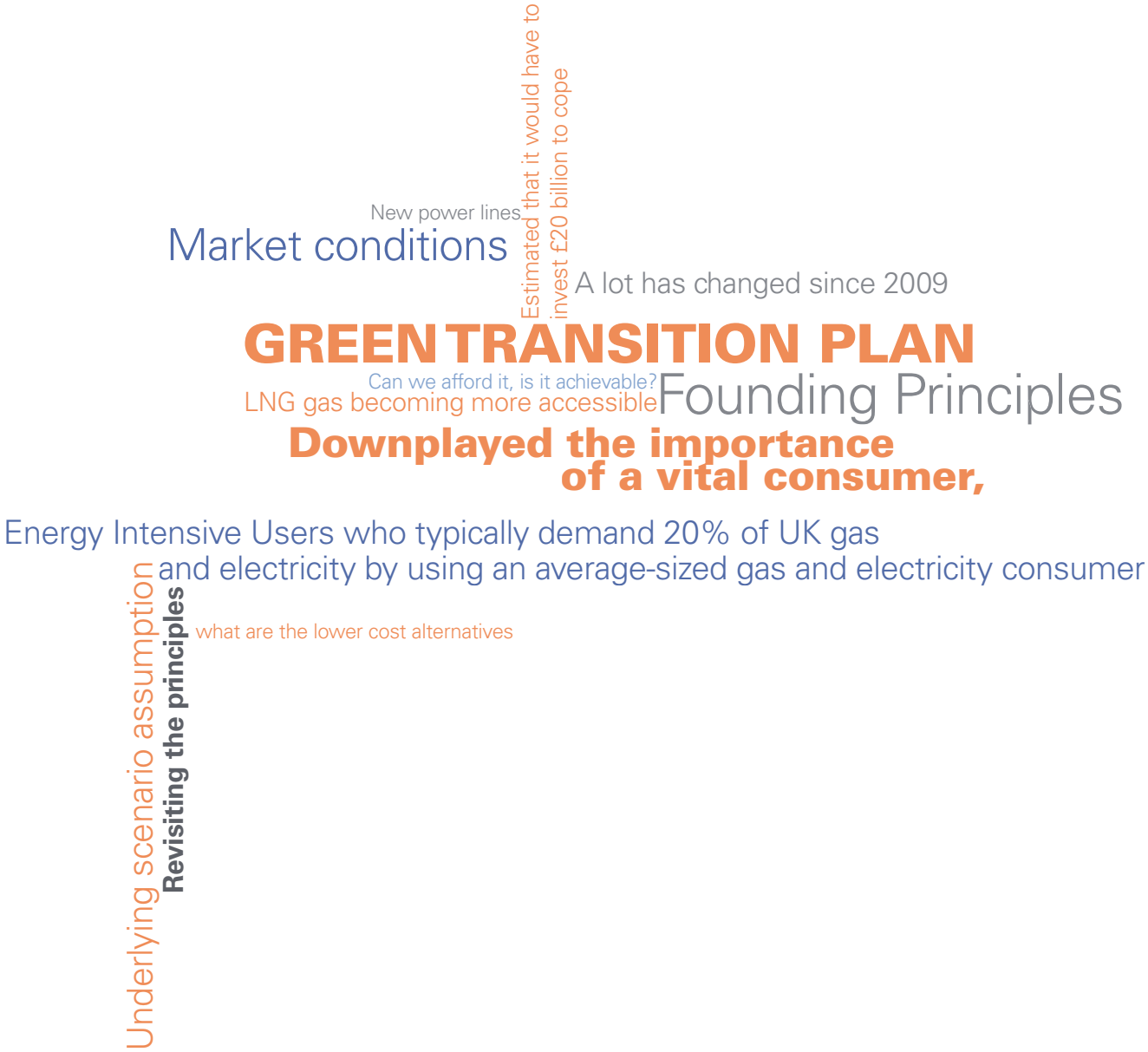


Looking at the Green Transition Plan through a cost efficiency lens, there are significant variations in immediate and lifetime costs of the proposed energy generation or energy saving solution. It is also apparent that no standard business case assessment method is in place to compare these solutions. Standard metrics of cost per kWhr power generated / saved or cost per ton of CO_2 saved would no doubt yield interesting results and highlight potentially extortionate economic decisions. And while we agree it is imperative the UK strives to achieve its trilemma of goals the current economic environment forces two fundamental questions:

Are we trying to do too much?

Could we achieve our goals for less?

Revisiting the of the Green Transition Plan



principles

This section reviews some of the underlying scenario assumptions that drove the development of the Green Transition plan. How does OFGEM describe the '£200 billion' Green Transition scenario?

Revisiting the of the Green Transition Plan

- The UK economy enjoys a rapid recovery and a significant expansion in investment in green measures;
- A global agreement on tackling climate change is reached leading to the EU implementing a 30 percent reduction target for CO_2 emissions from 1990 levels by 2020;
- The EU 2020 renewables target is met and deployment reaches 30 percent and 12 percent in the electricity and heat sectors respectively;
- Energy efficiency measures are also effective, and carbon dioxide emissions reduce rapidly;
- New nuclear and Carbon Capture and Storage (CCS) demonstration projects are operational by 2020, supported by high carbon prices and/or additional subsidy;
- Total energy demand is lower towards the end of the next decade;
- Against the backdrop of economic recovery, investment in gas and electricity infrastructure world-wide is significantly higher than current levels;
- Gas demand falls but electricity demand increases on the back of increasing electrification of the heat and transport sectors;
- There is some rebound in the supply of pipeline gas from outside the EU and of indigenous gas production from recession levels;
- As a result, the LNG market is tight into the medium term, but demand later falls back as renewables investment comes through; and
- There are high gas and carbon prices but relatively low coal prices due to the shift to cleaner forms of thermal (i.e., gas and coal) production.

A lot has changed since 2009 and a number of the founding principles are now substantially off the mark

principles

Further review of the system costs for supporting renewable energy is required to ensure investment doesn't spiral

A lot has changed since 2009 and a number of the founding principles are off the mark.

Few would characterise the UK's economic recovery as a rapid one. There is no binding global agreement on tackling climate change in the offing, and according to the European Energy Commissioner, Guenther Oetlinger[3], Europe will not reach its 2020 renewables targets without doubling annual spending to EUR 70 billion. What's more the growth of CCS demonstration projects seem to have stalled and carbon prices are far from being high (at the time of printing around EUR 15 per ton[4]). Indeed, at times they have completely collapsed, thanks to a surplus of permits in the EU's Emissions Trading Scheme and uncertainty about the rolll over into the 2013-2020 period. Instead of falling, UK gas demand broke a new record in 2010 reaching 104.3 billion cubic metres (bcm)[5]. And if we assume that 'medium term' in this case means 2015 onwards, then we really must also factor in a huge amount of unconventional and LNG gas becoming more accessible through exports from North America and other countries. For its part, electricity consumption reached a plateau in 2005 (at 348,645 GWh), dropping each year slightly (to 341,853 GWh in 2008) before dropping off a cliff in 2009 to 322,417 GWh.

So whilst, the UK pays more for its LNG than any other country in Europe, the LNG market is anything but tight and is destined to become more liquid and as the decoupling of gas to oil prices continues. As a case in point, the recent £2 billion deal between Centrica and Qatar was not linked to the oil price but rather to the UK's wholesale gas prices – known as the national balancing point[6].

Finally, deep within the Discovery Analysis Tool the underlying commodity price range assumptions for this scenario do not match the current reality. And it certainly does not take into account the impact of widespread unrest in the Middle East. For 2011, Crude Oil Prices were given a range of US$65 - US$100 per barrel. On Thursday 24th February, they touched $119. Gas Prices were allocated a range of 41-72 pence per therm, carbon prices from 15-18 euros per ton and coal at between 66 and 142 dollars per ton.

It is clear that the UK economy and prevailing market conditions are significantly at odds with the assumptions that underpin the Green Transition plan.

Revisiting the of the Green Transition Plan

The modelling of future energy scenarios is very complex and should not be underestimated. However, a shortcoming of the report was that it did not include all of the associated additional system costs that may need to be incurred (although it did attempt to include the grid reinforcement costs). Nor did it include the locked-in increased costs from the additional systems such as new power lines. And indeed unattributed costs are already popping up: National Grid recently estimated that it would have to invest £20 billion to cope with the expected increase in wind power[7] by 2020.

In its estimate of the impact of the programme on non-domestic energy consumers, the report also chose to model their estimates based on an average-sized gas and electricity user rather than the Energy Intensive Users who are vital customers and typically demand 20% of UK gas and electricity. This provides somewhat misleading results since the impact of investment programme on individual businesses will be proportionate to the energy intensity of the user.

None of this is to criticise OFGEM for producing a model and a range of scenarios which have served to inform the public and catalyse debate.

But now is the time to sensibly ask, can we afford it, is it achievable and what are the lower cost alternatives?

principles

PAYING THE RIGHT AMOUNT?

ELECTRICTY PRICES will rise in order to meet the financing requirements

Energy and climate change policies and bills

The consumer will feel the bite **between 18% anda33% by 2010 for domestic consumers**

It is clear that consumers are going to have to pay for the UK's new energy infrastructure

Estimated impacts

Inevitable debts

but is it clear what they are paying for?

What does this mean for the economy

How much, and can we afford it?

Duty to the average consumer

What does this mean for the economy?

Investment is needed within the UK's energy infrastructure and this almost certainly means electricity prices will rise in order to meet the financing requirements. Ask a dozen energy analysts about the cost of such a programme to the consumer, and you are sure to get a dozen different forecasts, based on a variety of different assumptions (and in some cases, with big omissions). What is clear is that energy prices look set to rise. At the top end of the forecasts is uswitch.com who predicted in June 2009, that household combined electricity and gas bills could reach £4,733 by 2020 from £1,243, effectively moving many households into fuel poverty.

What does this mean for the economy?

This figure was reached by taking into account pricing trends over the previous five years, (when bills doubled from £580) anticipated volatility in wholesale energy prices and a rollout of the investment programme forecast from February 2009 – which amounted to £234 billion by 2025. In July 2010, DECC produced its own report entitled the *Estimated impacts of energy and climate change policies on energy prices and bills*[8]. Looking ahead to 2020, it puts the cost of these policies at between 18 percent and 33 percent for domestic consumers and 24 percent and 43 percent for medium-sized non-domestic consumers.

The government is hoping that the "Big 6" energy providers and other major utilities will invest in the UK's future energy infrastructure. But, whatever the source of funds, it is clear there must be a payment plan in place to service the inevitable debts. So while the money needed to repay such a massive capital expenditure will be raised through a combination of measures, both direct and secondary, it is inevitably the consumer that will feel the bite in their pocket.

Prices are almost certain to rise, the question is by how much, and can we afford it?

With prices on the rise, both consumers and businesses face pressures.

As purse strings tighten, it becomes increasingly likely that the impact of higher energy prices will have direct implications for the UK economy as a whole.

Energy intensive industries, (particularly manufacturing) are already seeing increasing pressures associated with energy prices and any further rises could seriously impact the ability for this fragile market to maintain and grow its position.

The Government clearly hopes that the resulting decrease in job demand and competitiveness in certain sectors will be more than offset by the UK's push to be leaders in the green economy; To support this goal the government has earmarked a huge number of jobs over the next decade to new industries with an announcement from Chris Huhne (Energy Secretary) in September 2010 stating that, the Green Deal "could support over a quarter of a million jobs over the next 20 years".[9]

With prices on the rise, both consumers and businesses face pressures

Time will tell if this sector yields jobs at scale, but it is the immediate cost pressures that are of real concern to the consumer and which pose the most risk to spending power.

The multiplier effect of this reduced consumer spending has the potential to impact the economy as a whole, as all businesses are directly or indirectly linked to consumer spending. The question remains – will the new jobs created in the green economy will outweigh those lost trying to develop it?

It is clear that consumers are going to have to pay for the UK's new energy infrastructure, but is it clear what they are paying for?

Whether directly through increased energy bills or stealth taxation, it is the consumers' disposable income that will be most impacted by the cost of developing new energy infrastructure. But almost regardless of the route chosen, energy pricing will be a key tool in raising the necessary capital.

When balancing investments to achieve the 'trilemma' of energy goals, the UK expects to spend £110 billion to develop new renewable sources and around £26 billion to help reduce consumption.

What does this mean for the economy?

One common assumption in the public arena is that renewable energy sources are the pre-requisite for achieving the UK's carbon reduction targets. What is often not made clear to taxpayers is that there are other alternative solutions which could be employed. For example, increasing the nuclear baseload and retaining gas as a balancing agent could be an overly simplified solution to achieving our carbon targets. While this would have implications for our security of supply and dependence on uranium, it would almost certainly reduce the overall cost of achieving our carbon reduction goals by tens of billions.

When considered in pure economic terms, would it be cheaper for the UK to lessen its forefront position on renewables? This may allow the country to minimise some of the risks associated with this technology lessens the financial impact on the economy, whilst still achieving our carbon targets through other grid mix options.

It is clear that consumers are going to have to pay for the UK's new energy infrastructure, but do they know exactly what they are paying for?

With a renewable roll-out on the scale the Government has committed to, the risks are sizeable and costly. So are we paying a premium to massively increase our reliance on a risky and costly method of achieving our carbon emissions targets? If asked, would consumers value the same priorities as those driving the current energy policy?

Decisions on energy investment are worth getting right, not only to fulfil the duty of ensuring that taxpayers money is efficiently and effectively invested, but also for the future competitiveness of the UK's economy as a whole.

Modelling energy requirements and developing appropriate policies is an incredibly complex process and one that few markets, if any, seem to have solved. With the right answer only becoming clear decades into the future – the optimum solution for the next decade is murky. As such the risks surrounding the current strategy now demand a thorough review before we proceed with what could potentially be very costly decisions.

Conclusions

Dilemma No. 1:
Cutting carbon is not the same as increasing renewables

We need a new approach that understands cutting carbon and increasing renewables are not mutually exclusive, and done simultaneously, very hard to afford.

Hitting the UK's carbon emissions targets could be achieved through a number of investment combinations, each with their own trade-offs. For example, it may be possible for the UK to meet its emissions targets by generating power through a purely nuclear baseload and gas as a balancing agent to meet peak demand.

It is not clear what the optimum generation mix for UK will turn out to be, however it is clear that against the backdrop of the current economy, the proposed investments in renewable energy need to be revisited from a cost, security and risk perspective.

Dilemma No. 2:
Balancing the trilemma

With the current conflicting decision-making criteria driving energy policy, a standard metric of assessment must be established so that appropriate investments can be made across the entire energy industry. In order to achieve this, decisions need to be made as to what will be the priority driver for energy policy: security of supply; emissions reduction; or affordability.

Dilemma No. 3:
Risk versus achievability

The final dilemma is one of risk versus achievability. For example,the Renewable Heat Programme in the Green Transition scenario stands out as overly-optimistic, making up for a full quarter of the £199 billion. And based on the fact that Ofgem only allocated £9.5 billion for this strategy under their 'Slow Growth' scenario (versus £52 billion in the current Green Transition version) one might assume that the risk of it not happening must be significant.

We see that the UK's energy policy is facing three main risks:

Risk 1:

The composition of the Green Transition Plan requires the simultaneous investment in a number of major components (such as renewable energy, smart grid, new nuclear and energy efficiency).

Failure to deliver to time and scale on any of these pieces of the jigsaw could directly increase the demand for gas and coal, the very fuel sources the policy is trying to marginalise.

Risk 2:

The security and price uncertainty of gas is a concern for the economy; and one that has helped drive the Green Transition Plan's thinking. However it is rarely recognised that through CCGTs and other mechanisms gas does provide a realistic means of achieving the country's carbon emissions targets. It is important that an economy has a balanced energy portfolio that is not overly dependent on one fuel source.

The cost and ambition surrounding renewable energy in the UK both look to be heading in the same direction, fuelled by ambitious emissions reduction targets. Energy policy makers must ask themselves at what point the cost of renewable energy starts to outweigh the risk of gas; and if we are in danger of leveraging our energy supply too greatly towards renewable technologies?

Risk 3:

The UK is clearly seeking to be at the forefront of the new 'Green' economy. It has earmarked hundreds of thousands of jobs from the sector, largely driven by the renewables and energy efficiency markets.

Clearly, there will be growth in this space but have the full economic implications been considered for the economy as a whole? Will the reduction in consumer spending power and the potential for reduced competitiveness in the manufacturing industry be outweighed by long term growth in the 'green economy'?

This paper has touched on a number of areas relating to the direction of the UK's energy policy. Given the government's trilemma of energy objectives, this is undoubtedly a complex topic influenced by a number of interacting forces. No one can predict exactly what the optimum energy mix for the UK will be over the next 20 years. What is clear, is that the chosen path represents one of the world's boldest solutions. Indeed by placing such a huge emphasis on renewable technologies the country can expect to experience change in the power industry, the likes of which have not been seen since de-regulation in the 1990's.

Conclusions

To be clear, there are significant indications that our current trajectory is both expensive and fraught with risk. If there are delays in the nuclear roll-out, if renewables don't reach the target generation or if we don't manage to reduce overall energy consumption, there is every possibility the UK will revert back to the fuel sources our energy policy was trying to marginalise. Addressing energy efficiency and enabling consumers to have a better understanding of efficiency would ultimately create the push required – we are a long way off this however. At a time when the economy is struggling to recover and consumers are facing increasing cost pressures on all fronts, the magnitude of the proposed £199 billion investment can't be ignored.

It's time to start this debate.

The UK and its consumers can't afford to wait.

1 See *Firms paid to shut down wind farms when the wind is blowing* – Daily Telegraph 19th June 2010

2 See Monthly Electricity Statistics, December 2010 http://www.iea.org/stats/surveys/mes.pdf - UK Electricity Supplied grew from 357,793 GWh in 2009 to 363,126 GWh

3 See http://www.eaem.co.uk/news/investment-renewable-energy-must-double-meet-eu-2020-targets

4 The record price for carbon thus far in Europe was EUR 34.20 in April 2006 – See Bloomberg http://www.bloomberg.com/news/2011-02-28/eu-says-carbon-price-isn-t-encouraging-clean-energy-systems-1-.html

5 See BBC – How the UK meets record gas demand http://www.bbc.co.uk/news/business-12338189 - 15th February 2011

6 See http://www.independent.co.uk/news/business/news/centrica-signs-1632bn-gas-deal-with-qatar-2223861.html

7 See Environmental Data Interactive – National Grid backs wind but coal still has a big role – 2nd March 2011 http://www.edie.net/news/news_story.asp?id=19491&channel=0&title=National+Grid+backs+wind+but+coal+still+has+a+big+role+

8 See http://www.ey.com/UK/en/Newsroom/News-releases/Power---09-02-24---Energy-cos-new-investment

9 See Green Deal to Create Green Jobs – DECC Press Release, 21 September 2010 (http://www.decc.gov.uk/en/content/cms/news/pn10_104/pn10_104.aspx)

References

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