Cleantech and the UK growth opportunity

Time to deliver

December 2010
Defining cleantech

Clean technology encompasses a diverse range of innovative products and services that optimise the use of natural resources or reduce the negative environmental impact of their use while creating value by lowering costs, improving efficiency or providing superior performance. In referring to investment in cleantech, our definition includes renewable energy generation and the enabling infrastructure.
Introduction

The UK has a once in a generation opportunity to establish a new platform for economic growth through supporting and investing in the clean technology (cleantech) sector. To find out if UK industry believes it can really capitalise on this opportunity, Ernst & Young has carried out research among 323 industry professionals to establish how ready the UK is to achieve its potential in this emerging sector.

Assuming it is incentivised appropriately and capitalised at the right level, the industry could become a key contributor to long-term economic growth, sustainable job creation, and the emergence of a raft of new world-class British companies over the next decade and beyond. In addition, the cleantech sector can bring about increased energy and resource security and efficiency, a conclusion supported by an overwhelming 97% of our survey respondents.

The UK has begun to demonstrate its potential to be a global leader in cleantech. The UK has emerging leadership in areas such as offshore wind, illustrated by the official opening in September of the Thanet wind farm, the world’s largest offshore wind project.

As the economy emerges from the depths of the financial crisis, with the Coalition Government committed to be the ‘greenest government ever’, and in light of the recent Comprehensive Spending Review which left cleantech comparatively unscathed, the UK ought to be well poised to seize this opportunity.

Yet only 3% of our survey participants believe we have established the conditions for success and 76% feel that urgent or decisive action needs to be taken to establish a clear policy direction and stable long term policy framework to create the conditions for the cleantech sector to be truly successful.

Clearly, there is much work to do, and the barriers to be overcome are substantial. Our study identifies three critical inter-related barriers – policy, capital and infrastructure, which together threaten to prevent the UK from fully exploiting the cleantech growth opportunity. This raises the prospect of the UK standing by as China, the US, South Korea and others power ahead as they focus on cleantech as a national strategic growth priority.

There is time to ensure this doesn’t happen, but not much. We believe the Coalition Government will need to set out a transformational policy agenda by the summer of 2011 to accelerate the shift to a low carbon, more resource efficient economy to take full advantage of the potential for economic growth. The announcement of the ‘Green Deal’ is a welcome and encouraging step in driving this agenda forward.

Ernst & Young has been a leader in the cleantech and renewable energy sector for many years, providing support to industry stakeholders including government officials, utilities, regulators, cleantech growth businesses, independent renewable energy developers and finance providers.

Through this independent study we seek to provide recommendations on how the UK can realise this unique growth opportunity.

Distilling the views of over 300 senior industry stakeholders and decision makers we outline the UK cleantech environment as it stands today, the barriers impeding growth and success, and the actions that could be taken to establish the UK as a world leader in cleantech delivering economic growth and energy security as we accelerate the shift to a vibrant low carbon, more resource efficient economy.

We intend to revisit the findings in this report in 2011 to gauge progress. For now, I hope you find the report a timely and useful catalyst for constructive debate and action.

Steven Lang
UK&I Cleantech Leader
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Cleantech offers unique potential to deliver long-term economic growth, sustainable job creation, energy security and cutting edge competitiveness to the UK economy over the next ten years and beyond as we transition to a low carbon more resource efficient world.

The UK’s strong engineering, science, technology, research and development heritage, highly sophisticated financial services sector and substantial investor base, coupled with its unique profile of natural resources should position the country well in exploiting this unique growth opportunity.

Confidence in the potential of cleantech to deliver long-lasting economic growth to the UK has gathered momentum during the last few years. Almost two thirds of surveyed respondents stated that their confidence in cleantech driving economic growth and competitiveness over the next decade has either increased or significantly increased compared with 2009.

However, a number of important barriers must be overcome if the UK is to realise this opportunity. Survey respondents argue that incoherent and opaque policy is the most significant barrier to growth, followed closely by a lack of capital and a poor infrastructure planning regime. In the event that we fail to address these barriers the likelihood is not that the UK’s natural resources will not be developed – they will be, but the benefits arising from this development may not fall to the UK.

Consider offshore wind capacity and the scenario that, unless we establish the conditions for success in the UK, this resource could be developed using turbines manufactured by a Chinese company, in a German plant and installed by a Norwegian shipping firm.

Maximising UK economic growth is by no means a lost opportunity. Indeed the Coalition Government’s positioning around being the ‘greenest government ever’ is encouraging. However, there is much work to do and the UK needs to move quickly.

The South Korean Government announced in July that it plans to double its investment in cleantech R&D in the next few years – to $2.9 billion by 2013. Indeed a staggering $85 billion is being committed to cleantech projects by the South Korean Government between 2009 and 2013, equating to 2% of annual GDP. This includes the ambition of establishing the world’s first national smartgrid.

China invested almost $35 billion in cleantech last year alone, nearly double the US at $18.6 billion. It is clear that the race is on to capture the growth opportunity cleantech offers. Even in the midst of the global recession, worldwide investment in cleantech in 2009 reached $162 billion, and promises to exceed $200 billion in 2010.
Yet despite the scale of the opportunity, only 3% of our survey participants believe we have established the conditions for success in the cleantech industry in the UK. We are faced with massive capital investment needs to develop infrastructure at a time of acute national deficit. Other countries who are less financially constrained are prioritising cleantech as an industry of national strategic importance and investing in it accordingly.

It is not surprising therefore that 76% of respondents feel that urgent or decisive action is needed in the UK to establish a clear policy direction, a stable long term policy framework and efficient delivery mechanisms to enable the cleantech industry to grow.

Three significant barriers stand in the way of growth – Policy, Capital and Infrastructure. These barriers are interdependent. Without a stable long term policy framework conducive to investment, capital is unlikely to be invested at the scale needed and so infrastructure will not be built at the rate required to enable growth. To break this cycle, the key enabler for success is a coherent long term policy framework, that is shaped around clear long term national objectives for growth, jobs, energy security, and carbon reduction, that is conducive to confident and patient investment at scale.

Our study indicates that the UK has not yet managed to establish a clear competitive advantage in any of the main cleantech subsectors. For some sectors this will be due to their nascent state. For others it may be due to the UK’s historical aversion to ‘picking winners’. As a result of this, survey respondents feel that policy and investment have been diffused across too wide a range of areas, preventing any individual technologies from establishing a conclusive competitive advantage.

There are signs that this emphasis is changing with the Comprehensive Spending Review (CSR) providing more directive support in areas such as offshore wind and carbon capture and storage (CCS). Our survey indicates a number of subsectors well poised to offer the UK the prospect of achieving a world leading position, those sectors being offshore wind, energy efficiency, biomass, waste management and emissions reduction, including CCS. Wave and tidal energy were also frequently cited, which is understandable given the enviable natural resources we have in this area. No country has yet developed a manufacturing presence in the wave and tidal sector given its early stage, making this sector potentially valuable for future job creation in the UK.

However, more decisive action needs to be taken in the first half of 2011 if the UK is to carve out a market leading niche in these highlighted sectors. Our survey reveals that the CSR, whilst seemingly positive for cleantech, materially deflated optimism and confidence in the UK’s ability to deliver the opportunity. With the Coalition Government facing a potentially turbulent political environment as it attempts to deal with the ramifications of deficit reduction, survey participants believe it should use its current position of relative strength to act quickly in developing transformational policies that fully unlock the growth potential of these markets.

In analysing and drawing the findings together we propose four priority areas of recommendation to unlock the opportunity. These are summarised below and further detailed in the ‘Grasping the opportunity – time to deliver’ section of this report:

1. Establish 2050 targets that balance economic growth, job creation, carbon reduction and energy security.
2. Implement a transformational policy framework and delivery mechanisms to unlock capital at scale, and accelerate critical infrastructure.
3. Increase support for a select range of technologies in which the UK can establish comparative advantage and enable the whole ecosystem around these.
4. Drive public awareness of the cleantech growth opportunity.

A once in a generation opportunity is within our grasp and with decisive action it is one we can fully realise, but time is against us.

It’s time to deliver.
Cleantech and the UK growth opportunity — time to deliver
Methodology

Our research is based on 300 quantitative survey responses and 23 qualitative interviews supplemented by extensive desk-based research carried out between June and October 2010. We interviewed organisations across various stakeholder groups and sizes:

Quantitative survey programme – undertaken by Verdantix on Ernst & Young’s behalf:

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<tr>
<td>Investors</td>
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Qualitative interview programme – undertaken by Ernst & Young:

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► Verdantix
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► Tom Haynes, MBA student from Imperial College
► Eco-Connect

We would also like to thank the 323 stakeholders who took part in both the qualitative and quantitative interview programmes that form the basis of this report.
Clear agreement that the UK has strong potential to deliver ‘clean’ economic growth

Cleantech has the dynamic potential to deliver long-term economic growth, sustainable job creation and cutting edge competitiveness to the UK economy over the next 40 years. The next five to ten years are critical in determining the scale of the opportunity realised by the UK compared to other countries competing for the same growth opportunity.

The UK’s strong technical, engineering, science and technology base, sophisticated financial services sector, combined with its deep and diverse investor pool should position the country relatively well in exploiting its abundant natural renewable resource base. According to our survey, 97% of respondents ‘agree’ or ‘strongly agree’ (see Figure 1) that cleantech will become an increasingly important part of the UK economy leading to economic growth, jobs and international competitiveness.

Indeed UK government analysis demonstrates the size of the opportunity – an additional 400,000 jobs could be created in low carbon1 by 2015 (compared to 2008).

Figure 1. To what extent do you agree with the following statement: “Cleantech represents important future industries to the UK in terms of their potential to contribute to economic growth, jobs and competitiveness”

Confidence in cleantech gathered momentum in 2010

Confidence in cleantech delivering long-lasting economic growth to the UK has gathered momentum during the last few years. As depicted in figure 2 (overleaf), two thirds of survey respondents stated that their confidence in cleantech driving economic growth and competitiveness over the next decade has either increased or significantly increased compared to 2009. Corporates are the most optimistic stakeholder group, with 78% indicating that

1. ‘Low carbon environmental goods and services: an industry analysis’, Innovas/Department for Business, Innovation and Skills, July 2008
their confidence has improved. Confidence amongst the investor community has also increased, but to a lesser degree than corporates, with 58% of surveyed investors indicating an increase in confidence.

**Figure 2.** Comparing now and 2009, how has your confidence changed that cleantech sectors will become essential drivers of UK economic growth and competitiveness over the next decade?

The UK has an opportunity to lead in cleantech internationally

Survey respondents are confident that the UK can establish an internationally competitive position in the cleantech sector during the next ten years, with 65% indicating they are optimistic that this can be achieved (see figure 3).

**Figure 3.** Thinking about the next 10 years, how optimistic are you that the UK can achieve an internationally competitive position in the cleantech sector?

Since the beginning of 2010, growing confidence among the investor community has been reflected in increased investment volumes. Total investment from angels, venture capitalists and private equity funds in the cleantech sector averaged £304 million per quarter during the first three quarters of 2010. This represents almost twice the quarterly average of £159 million over 2009.

Furthermore during the last decade 349 UK-based investors have been active in the cleantech sector, more than double Germany (143), and Scandanavia (136), approximately four times France (91), and around seven times Spain (55) and Italy (41).

New projects and an improving economy are fuelling this optimism

UK confidence in cleantech is increasing for a variety of reasons, ranging from the completion of a series of major renewable projects during 2010, planned investment in offshore wind, and energy efficiency over the next 15 years and the improving macro-economic environment. Survey respondents often indicated that increased environmental awareness from all stakeholders, is helping build confidence.

Energy efficiency, offshore wind and low carbon construction are most frequently cited as the potential future sectors of excellence in the UK

“Over the last 12-18 months it is clear that all different aspects of cleantech in UK are quite market leading”

*Innovator*

“The levels of activity are increasing and the UK is well positioned to benefit from this”

*Innovator*

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2. Clean Energy pipeline venture capital and private equity transaction database
Clear agreement that the UK has strong potential to deliver ‘clean’ economic growth

Major renewable energy project developments during the last year included the construction of the world’s largest operational offshore wind farm (Thanet Offshore Wind Farm) situated off the Kent coast, completed in September 2010. This increased the UK’s total offshore capacity to 1,341 MW, compared with 1,100 MW across the rest of the world.

The improving economy, while fragile, is also beginning to support optimism. Although uncertainties remain over the economy’s ability to grow whilst absorbing the deepest budgetary cuts in decades, economic conditions are more positive than in 2009. GDP growth has resumed with Q2 showing the strongest quarterly growth since 2001 at 1.2% and Q3 growth at 0.8% double market expectations. According to the Ernst & Young ITEM Club3 full year growth is expected to be 1.4% compared to a decline of 5.0% in 2009. Growth is forecast to accelerate to 2.2% in 2011 and then to 2.9% every year until 2014.

Increasingly clear areas in which the UK could seize competitive advantage

To date, the UK has not managed to develop a clear competitive advantage in any of the main cleantech subsectors (see figure 4) although we are making progress in offshore wind. Survey findings suggest that policy and investment have been diffused across too wide a range of sectors, preventing any individual technologies from establishing a conclusive competitive advantage.

This position contrasts with a number of other countries that have more overtly focused on specific subsectors. Germany is benefitting from a clear and demonstrable commitment to two core areas, onshore wind and photovoltaic solar power. By the end of 2009 total installed solar capacity in Germany with 9.8GW, nearly half of the total 21GW installed globally. German wind installation reached more than 25GW at the end of 2009 compared to 4GW in the UK. In 2010, Italy’s decision to focus on solar photovoltaics has resulted in substantial growth and it expects to double its total capacity to 2.5GW by the end of the year, with additional annual growth of 1.5GW anticipated over the next three years.

A further influencing factor is the nascent stage of many of the cleantech subsectors. We are simply not yet at the point in the technology lifecycle at some subsectors where any given country would be expected to have established a clear advantage. Tidal and wave energy would be one such case. As such, there is still much to play for.

3. Ernst & Young ITEM Club, October 2010. Ernst & Young is the sole sponsor of the ITEM Club, which is the only independent economic forecasting group to use the HM Treasury model of the UK economy. Its forecasts are independent of any political, economic or business bias.
Looking ahead, as revealed in figure 5, the sectors that offer the most promise for UK competitive advantage are offshore wind, energy efficiency, biomass, waste management and emissions reduction, which includes the use of carbon capture and storage alongside fossil fuels.
Clear agreement that the UK has strong potential to deliver ‘clean’ economic growth

In each of these technologies the UK has considerable natural resources. Scotland alone is estimated to hold 25% of Europe’s potential total off-shore wind energy capacity.4

Interviewees cited offshore wind as a major driver for the UK cleantech sector

“The UK was too late in the game to lead in onshore wind but has a credible opportunity to be the market leader in off-shore wind.”

Major utility company

Tidal and wave energy is another area in which UK installed capacity exceeds that of the rest of the world. A Renewable UK report5 in March 2010 calculated the country’s current wave and tidal generating base at 2.4 MW, with a further 27 MW of capacity having received planning consent and another 77.5 MW of projects at the planning stage. A further 700 MW is expected to be built out in the Pentland Firth area to drive total wave and tidal capacity to 1-2 GW by 2020.

Wave and tidal energy are both sectors where other nations have yet to develop a dedicated manufacturing base, which makes this sector potentially valuable in terms of job creation

Carbon capture and storage (CCS) is also a natural fit given the UK’s existing coal and natural gas infrastructure and reserves. Industry analysts believe it could generate 100,000 jobs and £6.5 billion annually by 2030.6 As with offshore wind, tidal and wave power, no country has yet developed CCS technology at a commercial scale, which means the UK can still establish first mover advantage in this sector. In March 2010 the Labour Government ruled that no new coal-fired power station could be built in the UK without employing CCS, a ruling that shows no sign of being reversed under the Coalition Government.

Energy efficiency also represents a compelling opportunity due to the continuing presence of dynamic early-stage companies in the UK and a continued willingness on the part of venture capital and private equity firms to invest in this sector in the UK, given its lower levels of capital intensity and often lower technology risk. Early stage investment in the UK energy efficiency sector reached £107 million for the first three quarters of 2010, 35% ahead of the £79 million invested in 2009.

In the low emission vehicles sector, the UK already plays host to advanced-stage innovators and benefits from strong links to large British and European automotive manufacturers that can deploy electric vehicles in the mass commercial market.

Despite these clear ingredients for success and a growing sense of confidence, this confidence is very brittle, as demonstrated by the reaction of survey respondents to the recent CSR, as we discuss later.

The Comprehensive Spending Review (CSR) dealt a worrying blow to confidence

On the face of it, the CSR represented a good deal for cleantech. The Department of Energy and Climate Change’s (DECC) budget was cut by only 5% annually over the next four years, a relatively small reduction compared to other high profile departments such as Defence and the Home Office. Furthermore, funding was committed to a number of cleantech initiatives, most notably including the establishment of the Green Investment Bank with £1 billion of capital, £1 billion in funding for a new CCS project, £860 million for the Renewable Heat Incentive, protection of the feed-in-tariff scheme, and £200 million in funding to develop offshore wind technology and manufacturing at port sites – an initiative that was widely thought to have been at risk.

However, there was also disappointment. According to our analysis, the Green Investment Bank is capitalised at a lower level than industry analysts believe is necessary with no clarity on quantum or timing of public sector asset sales to top up the £1 billion initial funding7; additionally, the CCS funding will not be sufficient to build the four CCS installations originally anticipated by the Labour Government. In October, E-ON announced that it has dropped out of the contest to build the UK’s first CCS plant “for economic reasons” and that it will focus its CCS development efforts on a facility in the Netherlands.

In the immediate aftermath of the CSR, we repeated our questions on market confidence. Our findings were striking, showing that while a number of the CSR measures were welcome, confidence has been dealt a significant blow.

7. Capitalising the Green Investment Bank, Sowing the seeds of success’, Ernst & Young, October 2010
Whereas before the CSR, 65% of interviewees were optimistic that cleantech could deliver economic growth, only 39% were optimistic following the announcements (see figure 6). Equally, before the CSR 65% believed the UK would achieve an internationally competitive position in cleantech. This declined to 38% post the CSR (see figure 6). On both questions, almost twice as many participants stated they were now pessimistic as a result of the CSR. This provides a clear indication that the market is looking for a more radical approach to enabling growth and creating the conditions for success in the sector than the Coalition Government has so far announced.

**Figure 6. CSR reactions**

How optimistic are you that in the next year the cleantech sector will deliver economic growth in the UK?

Thinking about the next 10 years, how optimistic are you that the UK can achieve an internationally competitive position in clean energy and clean technology?
Clear agreement that the UK has strong potential to deliver ‘clean’ economic growth

Significant barriers stand in the way of the market opportunity

Numerous barriers must be overcome for the UK to realise the economic growth and job creation potential of cleantech. Some of these, whilst not insurmountable, are substantial. Not addressing these obstacles will undoubtedly result in other countries seizing opportunities to develop subsector leadership ahead of the UK. Confidence among respondents was frequently caveated with the notion that a clearer policy direction and framework are urgently required, combined with more investment and greater clarity on infrastructure planning.

Qualitative data from our interviews highlighted six factors that are critical in underpinning cleantech growth – policy, capital, infrastructure, innovation, skills/talent and consumer demand.

Our study has identified three of these factors as the principal barriers to success in the UK – policy, capital and infrastructure (see figure 7):

► **Policy**: 46% of survey respondents see significant or very significant policy barriers, citing the lack of a clear long term policy framework, as well as lack of consistency and stability, and a susceptibility to wavering and policy change with limited lead time as the key reasons for this.

► **Capital**: 48% of respondents see significant or very significant capital barriers. A massive amount of capital needs to be invested to enable cleantech infrastructure between now and 2025 – we estimate some £450 billion8. At a time of acute budget deficit and given the severity of the financial crisis, closing this funding gap represents a steep mountain to climb.

► **Infrastructure**: 44% of respondents see significant or very significant infrastructure barriers, citing, as the primary reason, complex, opaque and inefficient planning and consenting process as well as issues surrounding grid connectivity.

![Figure 7. Thinking about each factor, how significant are the current barriers to successful growth of the UK clean energy and clean technology sectors?](image)

![Figure 8. The inter-locking barriers — policy, capital and infrastructure](image)

The three critical barriers – policy, capital and infrastructure – are interdependent (see figure 8). The key to unlocking growth lies in policy. A stable, transparent, long term policy framework, conducive to confident investing is critical to unlocking a flow of capital at scale, which in turn is required to develop the infrastructure on which many, though not all, cleantech segments are dependent.

8 Ernst & Young report – Capitalising the Green Investment Bank – sowing the seeds of success
Policy – the lack of a clear and transparent policy framework is impeding progress

The key barrier to growth in the cleantech sector is the fractured and overly complex policy environment currently in place in the UK – resolving and simplifying this is critical to unlocking capital and better enabling infrastructure development.

According to our study, only 3% of respondents believe that the conditions for success in the form of a stable policy framework have been established to enable growth and 77% call for urgent or decisive action to establish a clear direction and stable policy framework (see figure 9).

The fiscal retrenchment of unprecedented post-war proportions has inevitably impacted the Coalition Government’s spending plans and therefore its ability to drive investment into the enablement of the cleantech sector. The overwhelming priority for the Coalition Government since its election has been to reduce the record deficit. Accordingly, in the current environment, all policy initiatives are considered in light of their impact on the deficit – i.e., they are being framed though a ‘deficit prism’.

Figure 9. Which of the following statements best reflects your view on the extent to which the UK government has established the conditions for success for the cleantech sector?

- 29% Clear direction, policy framework and efficient delivery
- 26% Making progress establishing conditions for success
- 18% Needs to act decisively to establish policy framework
- 4% Urgently establish direction and stable policy framework
- 2% Don’t know

“At the moment, it’s all about the cuts”

UK policy-maker

This deficit prism potentially constrains the UK’s ability to establish ambitious policies to unlock growth, given the levels of investment that delivery of such policies would require.

In addition to financial constraints, survey respondents highlight that the policy framework in the UK surrounding the cleantech sector is fragmented and unstable. The strong sense from our study is that the Energy Act 2008, the Climate Change Act 2008 and Energy Act 2010 do not, together, provide the market with a clearly defined overarching direction and strategy.

An example is the Renewable Obligation (RO) programme through which UK electricity suppliers are obliged to source an increasing proportion of electricity from renewable sources. Since its introduction in 2002 the RO has been successful in boosting UK renewable electricity production from 1.8% to 6.6%.

In 2007 the Labour Government announced the biomass sector would receive 1.5 Renewable Obligation Certificates (ROCs) support. Numerous developers moved in. Subsequently DECC communicated that this support was not guaranteed throwing many large projects into limbo. In July 2010, ROCs support and grandfathering was finally confirmed. This delay left UK based biomass developers unable to access project financing in the interim years.

When survey respondents cite ‘lack of clarity in policy’, this is what they mean. The UK drives cleantech development through two separate mechanisms, one that has existed for less than a year and one that was only suitably modified in 2009 to reflect technological diversity. Neither mechanism has ever received definitive backing.

Central to the policy obstacle is the way it has evolved. Primarily energy and climate change policy have been driven by climate change concerns and carbon reduction commitments. Subsequent policy has been more informed and influenced by energy security concern as evidenced by Chris Huhne’s comments in August 2010 where he remarked that he has “no intention of the lights going out on my watch”9. Compared to carbon reduction and energy security, the opportunity for economic growth, job creation and international competitiveness has had a surprisingly muted influence on policy. As other countries, such as China, the US, Germany and South Korea, prioritise cleantech in large part because of its economic growth and job creation potential, the UK has arrived at a critical juncture where all stakeholders need

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9 Chris Huhne speaking on the BBC Today programme, 9 August 2010
Clear agreement that the UK has strong potential to deliver ‘clean’ economic growth
to reframe the transition to a low carbon more resource efficient economy more overtly as a major opportunity rather than just a necessary cost.

A transformational policy agenda will be required to ensure we don’t lose a grasp on this opportunity, one that ensures radical, catalytic interventions that accelerate our realisation of it and recognise its potential scale and importance in driving international competitiveness for the UK.

“Not providing a clear policy direction has a knock-on effect on private sector investment. The private sector does need more certainty to make significant investment. It needs to have clear signalling from government to invest”
UK-based academic

Capital – a daunting funding gap to address

It is not surprising that the lack of capital, or ‘the funding gap’, has been identified as a major barrier to growth. Our recent research estimates that the total funding requirement needed for UK PLC as a whole to implement its low carbon agenda is £450 billion between now and 2025. Traditional sources of capital (utilities, other corporates, project finance and infrastructure funds) could provide £50-£80 billion over this period\(^\text{10}\). Even with active participation from institutional investors such as pension and insurance funds, the estimated funding gap is £360 billion.

At the individual company level the funding gap can be daunting. Investment volumes in cleantech in the UK may have increased in 2010. However, cleantech companies, particularly those at early stage, are finding it increasingly difficult to raise financing, with 48% of surveyed respondents believing the market has significant or very significant finance barriers, particularly related to supporting technology commercialisation. As shown in figure 10, over two thirds of respondents believe capital is available for the cleantech sector but access is limited; only 14% regard capital as being both available and accessible.

The funding gap is an issue that is confronting cleantech project developers and growth businesses, with early-stage companies the most obvious victims. Scarcity in early stage funding has been compounded by many non-specialist venture capital investors fleeing the early-stage arena and targeting later-stage, less risky investments. In parallel, a number of private equity firms which had previously invested at an early-stage to gain exposure to the sector have moved back to their traditional investment roots. From the project developers’ perspective, raising project financing is also harder than it was 12 months ago. Investors in renewable energy projects are becoming increasingly cautious about investing in pre-construction phase projects due to uncertainties over the planning and consenting process and uncertainties over securing power purchase agreements.

Projects that deploy proven technologies are understandably favoured by the investment community. In contrast, projects that rely on technologies unproven at a commercial scale and reliant on a fragmented supply chain ‘ecosystem’ for implementation are often being sidelined. Capital is also difficult to secure for projects with a long payback period and large capital requirements.

“Investors don’t like the level of risk. The return on investment is poor and this is based on assumptions on the future policy landscape as the market is entirely based on intervention and regulation”
UK policy-maker

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\(^{10}\) Ernst & Young report – Capitalising the Green Investment Bank – sowing the seeds of success
Furthermore private equity and venture capital funds typically demand much shorter investment timeframes than the payback period on many cleantech investments.

Cleantech can also, although not always – as in the case of energy efficiency – be highly capital intensive. Companies seeking funding cannot of course expect government alone to bridge the funding gap. Instead they must look at a wider pool of potentially more patient sources of capital, such as insurance companies, pension and sovereign wealth funds, considering how best to position their businesses with a more diverse range of investors.

**Infrastructure – complex planning and consenting process hindering growth**

Over 44% of surveyed respondents believe there are significant or very significant barriers to effective planning and delivery of infrastructure. Following the proposed abolition of the Infrastructure Planning Commission in June 2010, it is perhaps unsurprising that our study reveals an uncertain planning system as a major barrier which is causing significant investment uncertainty.

This uncertainty will only be addressed once the Coalition Government provides detail on its proposed reforms to the infrastructure planning and consenting process.

> “The whole planning regime is a blocker on the market functioning fully.”
> *Corporate*

Accessibility to the grid is also a critical issue. There is general consensus that difficulty in gaining access to the national grid is hindering clean technology deployment. The intermittent nature of electricity produced by cleantech sources requires a sophisticated smart grid that can handle irregular energy generation. “The UK has a relatively robust grid, albeit the grid will require significant investment going forward that allows for renewable energy assets and has the capacity to manage key challenges such as the intermittency from renewable energy assets,” explained a UK utility.

> “Currently the planning system is a blocker on the market functioning fully.”
> *Corporate*

Other barriers – innovation, skills and talent, and consumer demand – are less significant

Other barriers appear to be less acute although in certain areas there are issues. Some companies argue there is an urgent requirement for more engineering graduates given the imminent retirement of a significant tranche of experienced engineers. However, one private equity firm felt that market forces would resolve skill shortages.

> “20% of consumers will buy clean energy whatever the cost but the remainder will be swayed by the cost and are highly-price sensitive. There has to be a price incentive for consumers to switch”
> *UK policy-maker*

Neither is consumer demand considered to be a significant barrier although survey respondents frequently commented that there is scope for government policies to further incentivise ‘green’ consumer demand. Observers commented that if the policy framework becomes more established, consumer demand and investment should naturally follow. Other interviewees remark that while consumers are generally in favour of cleaner energy, householders remain price sensitive.
Clear agreement that the UK has strong potential to deliver ‘clean’ economic growth

Innovation and research and development are seen as the least problematic barriers, unsurprisingly given the UK’s historic focus on advanced manufacturing and the development of innovative products.

Stakeholders expect some progress in removing barriers but are not convinced it will be enough

There is muted optimism that some progress will be made in overcoming the key barriers in the next 18 months, however, it is unlikely to be enough to fully unlock the growth opportunity. As outlined in figure 11, only 16% expect most or all policy barriers to be removed and only 21% expect most or all capital barriers to be removed relating to infrastructure to be addressed.

Opinion is split on whether financing conditions will be established in the next 12 months to enable capital to flow at scale into cleantech enablement. As seen in figure 12, roughly a third is optimistic, a third pessimistic and a third undecided. This may well reflect the expectation that the Coalition Government will announce further measures to stimulate investment – in effect a sense that the ‘jury’s out’

Given improving economic conditions, although still fragile, it is not surprising to find that most (61%) (see figure 13) of survey respondents expect investment in cleantech to increase in 2011 compared to 2010. The investment community is the most positive, with 76% expecting growth. However, companies frequently caveat these findings. One company remarked optimism was founded on the “right regulatory and policy framework” being in place.

Where will investment come from?

Over the last few years, not only has there been an increase in the amounts of capital being deployed into cleantech, there is also an increase in the range of sources of capital. Cleantech investments are no longer the sole preserve of utilities, infrastructure funds and project financing. An increasingly diverse mix of investors is rounding on the sector including traditional VCs, family offices, sovereign wealth funds, corporates, financial institutions and governments.

In particular the level of corporate capital being deployed into cleantech is increasing as evidenced by Google’s announcement that it will invest in a $6 billion transmission cable installation project in the US to connect future offshore wind farms to the grid.
Corporate participation goes beyond companies like Google. Swedish retail giant Ikea has stated it plans to source the entirety of its energy needs from renewable sources and has already acquired 93 MW of wind generation capacity. It is also setting up a cleantech venture arm as are many corporates across the utilities, technology, automotive and telecoms sectors with the aim of acquiring early stage cleantech businesses that represent future sources of revenue growth and business model differentiation.

Institutional interest is also on the increase. Our study indicates that pension funds are starting to grasp the cleantech opportunity. “We are seeing more and more interest from pension funds who recognise that sustainability is a potential return driver over the long run. I am very optimistic that more and more pension funds will come to these types of investments,” explained one investor.

However, such institutions tend to be highly conservative and will only fully commit to cleantech investments when returns are more certain and when the technologies they wish to invest in have reached a greater level of maturity and stronger track record.

Other potential sources of capital include overseas export credit agencies seeking to support their companies’ UK activities and multilateral financial institutions such as the European Investment Bank.

Despite the increased mix of capital providers and the expectation of increased investment levels, only 17% believe this investment will be sufficient to give the UK competitive advantage (see figure 14). 76% believe it will be either insufficient or so low that the UK’s competitive advantage will decline.

**Figure 14.** Thinking about 2011, will there be sufficient investment in the UK to enable competitive advantage in clean energy and clean technology?

> “The amount of finance will not be enough to create any competitive advantage”
> **Investor**

> “There needs to be much clearer direction. It is difficult to pick out what the barriers are because there is not a clear framework to follow. Once there is a much clearer plan put in place we will be able to follow it to achieve results but until then we are stuck in limbo”
> **UK policy-maker**

The jury’s out on whether the Coalition Government will establish the conditions for success

Stakeholders are divided on whether the Coalition Government will establish the conditions for success in the cleantech sector in the next 12 months with an equal proportion (38%) optimistic as pessimistic (see figure 15). This suggests that the Coalition Government’s messaging and commitment to being the ‘greenest government ever’ has the market waiting with baited breath in the hope that it will follow through with decisive policies and delivery mechanisms to realise this ambition.

**Figure 15.** How optimistic are you that the Coalition Government will establish the conditions for success in the cleantech sector in the next 12 months?
Cleantech in the UK – at a critical turning point

The UK cleantech market is at a critical juncture – a new government is in office, the economy has yet to emerge completely from recession and the deficit is driving policy initiatives. At the same time, we face an enormous challenge in funding the shift to a low carbon, more resource efficient economy. Yet this challenge also represents a once in a generation opportunity to drive new frontiers of economic growth, jobs and international competitiveness.

The barriers standing in the way of the UK realising this opportunity will only be fully overcome through decisive, bold and radical government intervention. As other countries accelerate ahead of the UK in realising the cleantech growth opportunity these transformational interventions are required now.

The Coalition Government has, in its early months, demonstrated its ability to set out a radical policy agenda as evidenced by the CSR and the reshaping of the welfare state. It is with the same vigour, ambition and urgency that the growth opportunity in cleantech now needs to be seized. The opportunity cost of not doing this far outweighs the investment required in the short to medium term to enable growth in the sector.

With the Coalition Government facing a potentially turbulent political environment as it attempts to deal with the ramifications of deficit reduction, it will need to use its current position of relative strength to deliver transformational growth enablement policies for cleantech, while it still has the political capital to do so.

To ensure the UK takes advantage of this unique opportunity, the UK must establish the conditions for success now or we will likely begin to lose a once in a generation opportunity to maximise the creation of new private sector jobs in cleantech, generate considerable export potential, and develop new sources of competitive advantage.
Grasping the opportunity — time to deliver

We find ourselves at a point in the development of the cleantech market where 77% feel that either urgent or decisive action is required to establish a clear and stable policy direction and framework. This clear call to action is tempered with a note of optimism, with 38% of respondents believing that the Coalition Government will establish the conditions for success in the next 12 months.

So what should be done to realise this unique and compelling growth opportunity? Our analysis has enabled us to draw out four key recommendations. Each of these areas should be addressed with urgency as well as rigour.

1. Establish 2050 targets that balance economic growth, job creation, carbon reduction and energy security

The Coalition Government has already developed potential pathways to 2050 which focus principally on carbon reduction targets and the energy mix alternatives that contribute to meeting this target.

What these pathways don’t address however is the economic growth and domestic job creation implications of different routes that we may pursue.

This report calls for a rebalancing of objectives around four interrelated areas each of which should be assessed in a 2050 context (see figure 16):

► Economic growth including inward investment and export potential
► Domestic job creation potential
► Energy and natural resource security and independence
► Carbon reduction.

Potential in each of these areas should be modelled and quantified with dependencies and trade-offs between the areas fully explored so that clear targets can be set. This could cover modelling the percentage of GDP that could be delivered by cleantech, the number of new jobs created annually, the level of exports generated annually, the percentage of energy that is UK sourced, the level of inward investment in the sector and the number of cleantech companies listed on the FTSE, for example.

Our assessment of these areas would enable us to determine clearly the scale of investment that needs to be made in the next few years under different scenarios and would provide a more complete context for this investment than a single carbon reduction target.

In establishing these targets we will be able to clarify the relative importance of each of the four factors. Technology areas could then be assessed against each of these four criteria to determine which technologies best deliver against these relative priorities.

These targets could be reviewed and adapted on an annual basis to reflect technological developments as well as evolving a greater understanding of how resource security and climate change issues are manifesting themselves.

![Figure 16 Rebalancing policy around four key 2050 objectives](image-url)
2. Implement a transformational policy framework and delivery mechanisms to unlock capital at scale, and accelerate infrastructure

To illustrate the role of government in stimulating private sector investment and to frame what we mean by ‘transformational’ we turn again to South Korea. According to a recent UN report, approximately 80% of South Korea’s economic recovery spending is earmarked for cleantech projects. On the back of such an ambitious cleantech growth policy, the top 30 industrial groups in South Korea, including Samsung and LG are planning to invest $18.5 billion in clean energy and technology projects between 2011-2013 – a 48% increase over the last three years. Samsung is committing $19 billion to new cleantech projects up to 2020 including solar cells and electric vehicle batteries. LG is committing around $17 billion in the same time period to technologies which reduce greenhouse gas emissions and improve energy efficiency.

Whilst the UK may not be able to match the levels of funding being put up by the South Korean Government, it is important that we establish a long term and stable policy framework which transforms the amount of capital flowing into the sector in a similar way. Once established, the framework needs to remain in place for several parliaments to come. As technology develops, the framework should be reviewed and adapted to ensure it is serving to deliver combined 2050 objectives for growth, jobs, resource security and carbon reduction, but it should not be fundamentally changed or redesigned.

The framework should be heavily geared towards providing an attractive investment environment such that institutional capital can be deployed at scale with greater certainty over returns and lower levels of risk.

A specific critical area where government could provide greater investment is the Green Investment Bank. While it has allocated £1 billion of initial capital, our report “Capitalising the Green Bank”, published in October 2010, indicated that a minimum £4-6 billion is required. Acceleration of asset sales may close some of this gap. There could also be a channelling of carbon tax revenues into the GIB to ensure an ongoing inflow of capital.

Other specific areas where the government could provide greater certainty for the market are:

- **Carbon pricing**: our survey respondents felt strongly that the Coalition Government could provide greater market certainty by bringing forward the setting of a floor price for carbon, and that this floor price should be set at a relatively high level to provide a transformational lever enabling the shift to a low carbon economy. Indeed this was a commitment in the Coalition Agreement of May 2010.

- **Infrastructure planning**: infrastructure planning has emerged from our survey as an area desperately in need of reform across the entire cleantech industry. One potential solution for streamlining the infrastructure planning process would be to retain some form of a centralised agency to accelerate planning and permitting of critical infrastructure as the Coalition Government has proposed.

- **Tax policy**: tax policy could lend itself more favourably to creating the growth and focus on the cleantech opportunity in the UK. The ethos behind the current environmental tax regime is to create positive behavioural switches – to encourage innovation, to switch to supplies of zero carbon energy or to reduce emissions, and to encourage offset mechanisms. The nexus between one and the other is currently very weak. The system is opaque and with a lack of consistency between international tax regimes, it is difficult for businesses to adopt a global corporate approach and to ascertain easily their exposure to taxes. Indeed, many UK businesses will not be aware of their total environmental tax bill as many of the taxes sit above the line. A more transparent and directional tax framework is needed.

**Private sector also needs to up its game**

At present, debt providers, private equity and pension funds are averse to high-risk technology like offshore wind due to the lack of an established track record. While government support through the Green Investment Bank can potentially provide risk reduction products to attract these institutions to financing projects at their crucial earlier stages, the onus is also on companies and project developers to improve their risk profiles independently. In offshore wind, this may require an evolution in how projects are developed. For example, banks are highly uncomfortable about financing large projects being undertaken by multiple contractors, which
naturally increases risk. The industry may have to develop new models that allow the entirety of the construction phase to be undertaken by single engineering, procurement and construction (EPC) contractors.

Another even more basic point of necessity for project developers is to ensure the quality of projects that they bring to the market. One of the most common refrains from financiers is: “Good projects always tend to get funded, bad ones don’t.” The cleantech sector simply cannot afford to put forward offshore wind projects with poor wind capacity yield, or tidal projects promising hundreds of megawatts of capacity with technology not yet sufficiently mature to deliver. This also applies to technology and product developers. A company seeking funding for capital-intensive technology such as a new wind turbine or wave converter model must understand that the financing required to transition from early stage to test and commercial-scale production will be exceptionally difficult to attract unless that company can leverage strategic partnerships to successfully demonstrate its viability.

**Bold delivery mechanisms**

There are currently numerous obstacles that government and the private sector need to work on collectively where responsibility should be split across both the public and private sectors. We recommend the Coalition Government establishes a body with the private sector to oversee these challenges.

Representing government — ministers and officials — and private sector representatives — SMEs, investors, corporates and academics — this body, which would be politically neutral, would oversee the UK’s responses to these key challenges, with an ambitious remit and clearly defined targets in terms of growth and job creation.

This body could follow the lines of the Ministerial Advisory Group on Manufacturing that was established to deliver and oversee UK manufacturing policy and strategy, only with shared responsibility across the public and private sector.

**3. Increase support for a select range of technologies in which the UK can establish comparative advantage and enable the whole ecosystem around these**

Given constrained financial resources the UK will need to adopt a more directive stance to support a range of technologies in which the UK can realistically establish a leading position, rather than support a high number of technology families.

The challenge the UK faces, as with other countries, is the very wide range of cleantech subsectors. Supporting all equally would mean that the UK will find it difficult to build competitive advantage in any particular subsector. Other countries, in recognition of this have been more directive in their support for specific subsectors — as Denmark and China have done in wind, as Germany and Italy have done in solar and as Israel is doing with water technologies.

Developing a clear understanding of which technology ‘families’ offer the UK the optimum mix of economic growth, exports and job creation, contribution to energy and resource security and progress towards meeting carbon reduction targets, is critical in determining where we should prioritise and direct investment. Only by doing this will we establish true competitive advantage in key cleantech subsectors.

We recommend the development of a methodology to profile technologies according to their potential to create jobs, drive growth and exports, positively impact resource security and to reduce carbon. We would then recommend that this methodology is applied across all clean technology areas such that investment can be directed to those technologies that together make the maximum combined contribution. As new technologies emerge they should be assessed the same way in order to determine the degree of support they receive.
According to the survey responses, the areas in which we should direct most investment are offshore wind, energy efficiency, biomass, waste management, emissions reduction including CCS, wave and tidal energy. In addition, there are other less obvious areas in which UK companies are developing potentially world leading technologies including advanced industrial materials, battery and energy storage technology and water treatment and purification technologies.

In enabling specific technology areas it is critical to take a whole ‘ecosystem’ view — one that takes into account the supply chain that needs to be developed to support the technology as well as enabling infrastructure. Government has a critical role to play in enabling the ecosystems within which our preferred technologies can be commercialised. The Coalition Government’s recently announced Ports Infrastructure investment is a good example of enabling the offshore wind industry. We recommend therefore the development of specific plans that address the entire supply chain around those technologies that are deemed to be most critical to the UK.

4. Drive public awareness of the cleantech growth opportunity

Major investment will need to be made in cleantech alongside significant cuts in public spending. This represents a major political challenge for the Coalition Government.

The reality is that unless substantial amounts are invested to close the funding gap, particularly in the next five years, we will, to some degree, place a ceiling on the long term economic growth opportunity.

The policy message now needs to shift to growth and the potential lost opportunity for exports and jobs if we fail to invest at the right level in enabling the cleantech industries of the future.

Levels of public awareness are relatively low around the growth opportunity, the scale of investment required to realise it and the urgency with which we need to attract this investment. Public support for a radical growth policy is critical to establishing the long term political will needed to implement these policies over the next five to ten years. As such, a significant increase in the level of public debate around the growth imperative is called for.

Conclusion

As other countries aggressively step up their investment in the cleantech sector as a means to drive future economic growth, so we must do the same in the UK. The opportunity is substantial and the ingredients for success lie in our unique natural and human resource base. But major policy, capital and infrastructure obstacles stand in the way of the growth opportunity.

These obstacles will only be removed by transformational policy interventions and the creation of a bold, long term policy framework that establishes a stable platform for the private sector to fully commit investment at scale.

Actions taken now will set the trajectory towards growth and will determine the extent of the opportunity realised by the UK and the extent to which we cede this opportunity to others.

The next six months are critical in establishing a clear direction and a transformational policy framework that unlocks growth.

This is an opportunity within our grasp – now is the time to deliver.
Ernst & Young’s cleantech practice

How we can help
Ernst & Young has established a global network of over 300 dedicated cleantech professionals providing assurance, advisory, tax and transaction services. Working together, and drawing on our 141,000 people around the world, we bring a focus and dedication to the unique needs of all those involved in the cleantech arena.

Whether working with cleantech growth businesses, established international renewable energy businesses, finance providers and cleantech funds, or government, our professionals draw upon their extensive experience, insight and global resources to help businesses raise finance, drive commercial scale at speed, create value and manage risk in this exciting growth sector.

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To receive regular updates, please email orussell@uk.ey.com

This report suggests products that could be provided or facilitated by the Green Investment Bank and considers structural options.

The 2010 Ignition Summary Report explores the latest advances and the critical factors impacting success of the electric vehicle industry.

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