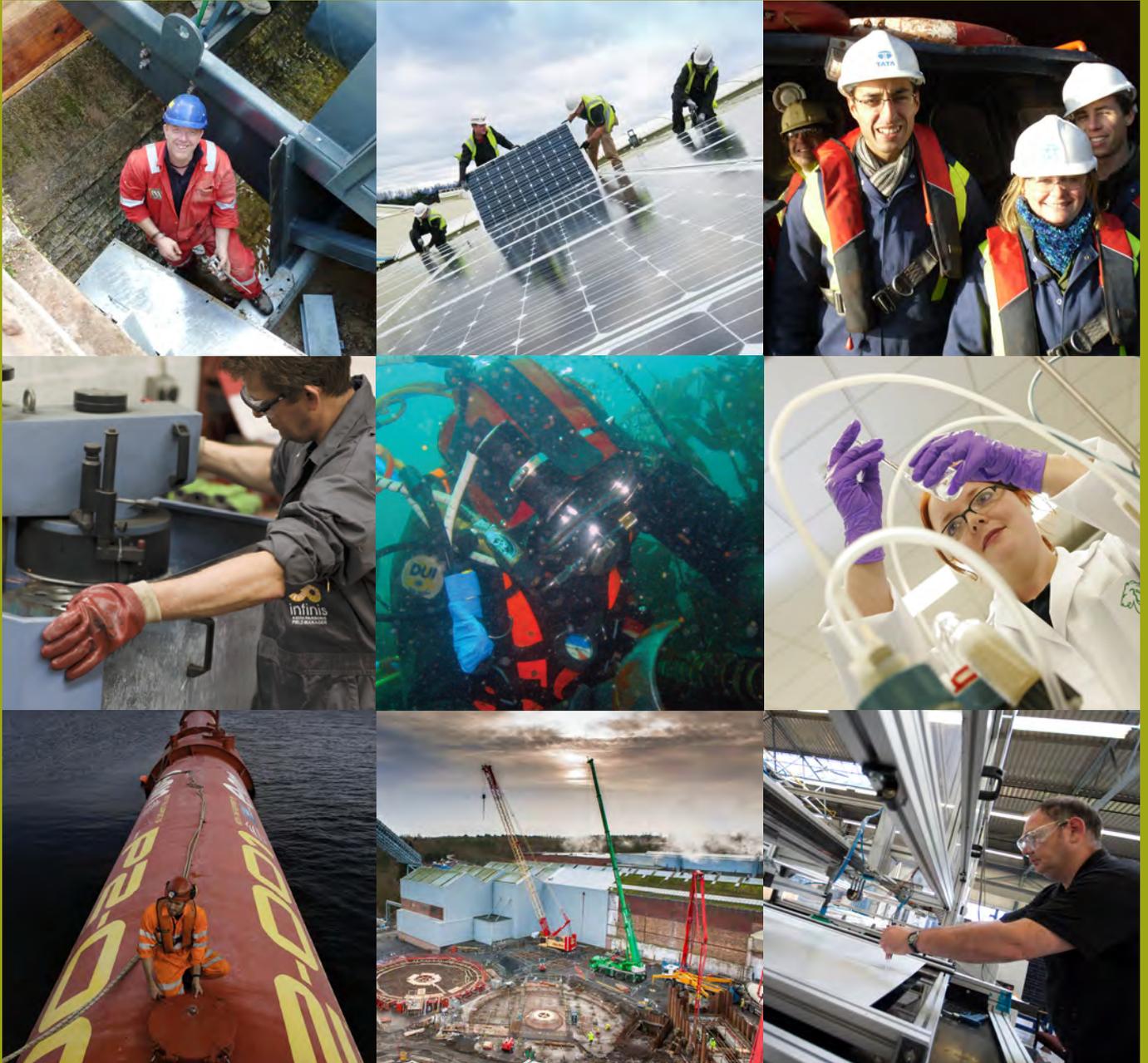


# Renewable energy: **MADE IN BRITAIN**

Jobs, turnover and policy framework by technology (2012 assessment)



"Around the world, from China to Germany, our competitors are waging a historic effort to lead in developing new energy technologies... Nobody is playing for second place. These countries recognise that the nation that leads the clean energy economy is likely to lead the global economy."

Barack Obama

# Gaynor Hartnell Foreword

Chief Executive of the Renewable Energy Association (REA)

The Locomotive Act of 1865 restricted steam engine vehicles to 2–4mph and obliged a man waving a red flag to walk 60 paces ahead. British engineers had patented combustion engine and electric motor vehicles by 1882 but they were not developed thanks to the powerful railway and carriage industries' success at winning and maintaining such highly restrictive legislation. Karl Benz, meanwhile, started selling his motor vehicles in Germany in 1888. It wasn't until 1896 that the UK speed limit was raised to a breakneck 14mph<sup>1</sup>, enabling the beginnings of a domestic market. The rest, as they say, is history.



Renewable energy promises a technological transformation no less radical today, and the above anecdote serves as a warning; established interests can be strong enough to stymie progress; politicians can tend to favour protecting existing, rather than promised, industries and employees. But it also shows us that technological advance is ultimately irresistible and highly profitable for those brave enough to take the leap.

Germany is renowned for its quality car-making, yet in its government's own words its renewables industry is now 'on the verge of challenging the German

automotive industry's status as the flagship of German manufacturing<sup>2</sup>. We draw huge inspiration from Germany, not because it is one of the top performers on renewables in Europe – it isn't by a long way – but because it sets out a path the UK could follow. Like the UK, Germany started from a low base – just 3% renewables as a share of total energy 12 years ago. Like the UK, Germany is a major economy with a large population. In just over a decade it has increased its production of renewable energy nearly four fold. Joining-up energy, economic and industrial policy is key to its success. Their renewables sector today employs over 370,000 people and invests around €30 billion per annum – money that circulates in the German economy. It can be done.

Indeed it must be done. The OECD estimates that without new policies the world faces a 50% increase in greenhouse gas emissions. The International Energy Agency warns the window of opportunity to steer away from the brink is closing. These warnings come thick and fast and from the mainstream. Yet despite the critical role of renewable energy in our future prosperity, this vital sector remains marginalised in the broader UK policy framework. In emerging industrial policy, the high-tech agenda, skills and 'The Plan for Growth' renewables receive precious little attention and the sector is

poorly articulated in Westminster – that is no longer the case in Scotland. Not before time, we hope this report will put the spotlight firmly on renewable energy technologies in their own right. We're fiercely proud of our work at the REA because we know our members are mobilising the most important technologies in the world.

We're delighted to have worked with Innovas and our Sector Groups to finally put a figure of over 100,000 on the number of people employed across the whole UK renewables industry and its supply chains today. We want to triple that figure in the next decade. Energy made in Britain means diverse jobs, rural and urban. It means safe and secure energy, a rebalancing of our economy, new manufacturing and export opportunities and a better balance of trade. We want to work with the Coalition Government to put renewable energy right at the heart of its growth, skills and employment agendas. Together we can make the leap. A renewable energy revolution means we can be confident that 100 years from now there will not just be a proud history to be told, but a hopeful future.

<sup>1</sup> [www.direct.gov.uk/prod\\_consum\\_dg/groups/dg\\_digitalassets/@dg/@en/@motor/documents/digitalasset/dg\\_180212.pdf](http://www.direct.gov.uk/prod_consum_dg/groups/dg_digitalassets/@dg/@en/@motor/documents/digitalasset/dg_180212.pdf).

<sup>2</sup> Renewable Energy: Perspectives for a Sustainable Energy Future, German Environment Ministry, 2011.

## John Sharp

Managing Director of Innovas Solutions

The UK and devolved governments are tasked with many responsibilities on behalf of their citizens. The top responsibility these days is surely sustainable economic growth, supported by strong exports, a secure energy system, a more balanced economy and employment of UK nationals across all skill levels.



This is challenging enough when times are good, but especially so when navigating protracted stagnation following the economic eruptions

which began in summer 2008. On the positive side it has focussed attention on the fault-lines in our economy and the UK has been searching for new sectors to support which will bring both short and long term economic benefits. But there have also been worrying signals from part of Government that the green agenda cannot be afforded. Innovas's work on the booming low carbon sector suggests the opposite is true.

In the last few years the renewable energy sector has seen considerable growth over and above that seen in the UK as a whole. This report shows in 2010–11 it was a sector worth £12.5

billion. The UK renewable energy market is growing at a slower rate than most of the developed and major developing nations, where Innovas estimates global growth across the sector and its supply chains is forecast to increase market value from £360 billion in 2010–11 to £770 billion by 2020. The increase in global market value of £410 billion in that period (which is a conservative growth estimate) provides the UK with additional opportunities to export its not inconsiderable expertise and manufacturing capability.

(continued overleaf)

If the UK were to take a rather modest share of 3% of the increase in the global market value this would provide an additional £12 billion in international trade revenues and potentially a further 90,000 jobs in higher value manufacturing and service jobs. The UK could do even better.

Other areas of the world are taking the lead in areas where the UK has the capability to develop its own world leading companies. Whether or not they are interested in climate change abatement, what drives these countries is the compelling economic benefits, including jobs. There is no doubt that the majority of renewable energy technologies provide long term jobs across all skill levels at a regional and

local level. This is in sharp contrast to other energy generation technologies i.e. gas, nuclear, where much of the economic benefit will be seen overseas rather than in the UK.

When the UK gets it right, such as in offshore wind, long term support and planning is known and highly visible. Investment is then forthcoming and companies work together to develop the area. However when strategy and support is volatile (as with solar PV Feed-in-Tariffs), or technologies are hampered by lack of understanding or neglect, this creates uncertainty and leads to investors moving to other areas where the value of their investment is more certain. It also makes the development of

specific skills training for UK staff very difficult, as there is little long term visibility for training organisations to plan against.

It has to be said that the devolved governments, in many ways, are more advanced in their thinking and have seen the opportunities provided by renewable energies in economic and environmental terms more clearly than UK national government, especially in terms of jobs at a local level for people across all skill levels. Yet central government is key to providing the enabling framework. This report hopes to enrich understanding, technology by technology, of the renewable energy sector as a major engine of growth and employment.

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# Will Hutton Introduction

This report could hardly be more timely. The government which aspired only two years ago to be the “greenest ever” is wobbling badly. In fairness it remains committed to ambitious targets to lower carbon dioxide emissions. But it balks at willing the means. While energy intensive industries complain at expensive tariffs, parts of the media – purporting to speak in the names of ordinary householders – drum up scare stories about sensible energy policies, from renewables to the Green Deal (or ‘conservatory tax’). On both the Government risks running up the white flag.

Yet a number of inviolable truths remain. The age of cheap fossil fuels is over, and peak oil production has either arrived or is close to arriving. The combination of a rising world population and rising living standards can only mean that we are collectively on a path to burning unsustainable amounts of fossil fuels – unless energy sources are changed and the intensity of energy use reduced.

Declining fossil fuel reserves are not the only problem. Exponential growth of carbon in the atmosphere will trigger a rise both in global temperatures and in the volatility of our weather. The victims will all too often be the weakest in our society and the weakest countries internationally. The quest is on to produce power from other sources – and that must include renewables, the subject of this impressive report.

This is too often presented as the preoccupation of a fringe who ignore the interests of the mainstream, but the logic of economics is relentless. Supply is called forth by demand, and demand for renewables exists at such growing levels not because of political correctness, but because business needs diverse sources of energy supply at predictable and stable prices. One of the drivers of the Industrial Revolution was the certainty that come what may people wanted to get from A to B faster and more reliably with cheaper clothes on their back – hence the case for the railway and the cotton mill. There is another revolution in the making: come what may business and society need diverse and resilient sources of energy that are independent from the



political and geological vagaries of fossil fuels.

Renewables are part of that mix. The report shows their variety and the strength of their growth. This is an important industry in its own right that deserves to be taken seriously – and for its obstacles to be recognised and as far as possible addressed quickly and effectively. It is one of the hotspots for industrial and business innovation; Britain must be part of it.

In part this requires leadership and conviction from Government, along with a readiness to stand up to cynical vested interests that find an all too ready ear from a media that likes to create narratives – whether true or false. There is even an extreme narrative on climate change that states it is a dishonest ruse got up by leftists and planners across the globe using dodgy science against the interests of ordinary people.

One of the strengths of this report is the matter of fact way it dismisses such narratives and shows effectively that renewables are about diversity, innovation and growth – a response to a market need. It would be perverse if many of the climate change sceptics who profess love of markets and competition successfully use state power to suppress the growth of such demand. That is the prospect – and to counter it we need stronger voices from the mass of people and from business arguing for common sense. This report will contribute to helping that voice better express itself – and I very much welcome it.

# Executive summary

## The renewable energy sector and its supply chains employ at least 110,000 people in the UK today

Innovas data shows renewable energy employed just over 99,000 people in the 2010/2011 financial year. This number will have increased to over 110,000 today, not least given the global and national boom in solar power last year. The total UK turnover for all renewables and their supply chains in 2010/11 was around £12.5 billion. Publicly funded incentives for renewables deployment have therefore been highly effective at leveraging private investment. The weighted average market value increase from 2009/10 to 2010/11 was 11%. This is far greater than national economic growth rates of 1.4% over the same period. The total export value for all renewable technologies was just under £1.6 billion in 2010/11.

Projections are notoriously difficult, but based on Innovas' conservative assumptions and historical performance, the sector's turnover is estimated to reach over £24 billion by 2020. If a direct proportional relationship between generation and employment is assumed, REA estimates over 400,000 jobs are needed to deliver the legally binding EU target of 15% of UK energy from renewable sources in 2020. The turnover associated with this rate of growth would be nearer £50 billion.

Offshore/onshore wind power and its supply chain account for most employment, at 31,400. Wind had the greatest turnover, at just over £4 billion in 2010/11 and the highest value of exports at nearly £500 million. In terms of sector turnover, solar power had by far the largest growth rate from 2009–2010 at 56%, which was dwarfed by growth from 2010–2011 estimated by REA at 280%. Towards the latter half of 2011, solar power is estimated to have employed around 25,000 people. Taken together, all bio-energy technologies employ nearly as many as wind at 31,200, with a combined 2010/11 turnover of £4 billion and exports of £430 million. Mixed waste-to-energy technologies and hydro saw the lowest 2009–2010 market growth at 2.6% and 2.8% respectively. Solar thermal had

the highest ratio of exports as a share of UK sector turnover, at nearly 26% for 2010/11. On average, exports represent approximately 13% by value of the UK renewable energy sector's turnover.

## Jobs in renewable energy are nationwide and incredibly diverse – from highly skilled to manual

Innovas' regional analysis shows a good distribution of employment opportunities throughout the country. Regional initiatives can help to boost growth. From organic waste collectors to electrical engineers; geologists to biochemists; pipefitters to crane operators; welders to helicopter pilots; salespeople to factory workers. The sector's need for diverse skills can satisfy ambitious graduates and create new opportunities for the unemployed or those trapped in low-paid jobs.

## International evidence shows current employment could boom by 2020

Germany, a similar sized economy to the UK, employed over 370,000 people in its renewable energy sector and delivered 11% of its total energy consumption from renewables in 2010. Renewable energy is the fastest growing energy sector in the world attracting over \$250 billion of technology investment in 2011. Around 1.5 million people are employed in renewable energy across Europe.

The decentralised nature of much of the renewable energy sector means increasingly close linkages with traditional sectors of our economy, including farming, waste management, forestry, energy management and construction. As an example, almost a third of Building Service Engineering companies are now involved in installing renewable energy technologies. SummitSkills estimates over 800,000 training opportunities are required this decade in the Building Services Engineering sector alone to ensure the UK has a workforce able to meet the demands of a low-carbon built environment.

## However, the UK risks failing to fulfil its potential

Renewable energy accounts for over 12% of energy across Europe, and over 16% of global energy supply. Yet it accounts for just 3% of our energy supply here in the UK. Most EU countries intend to exceed their 2020 renewable energy targets. The Prime Minister's assertions that 'we are falling behind our competitors' in delivering 21st century infrastructure and that we need a 'horizon shift' is certainly the case for renewable energy. It should not be like this given we benefit from both world-class renewable energy resources and have a world-class engineering tradition on which to build.

Some technologies require urgent policy attention. Only offshore wind and marine technologies are categorised in this report as 'green' (meaning broadly positive) in terms of satisfaction with the policy framework. Of particular concern are policy failures, or lack of political support for: biomass CHP, onshore wind, solar thermal, liquid biofuels, on-farm anaerobic digestion and deep geothermal. Likewise some important mid-sized investors, including the commercial and public sectors, risk falling through the emerging policy framework which is polarised towards targeting either big utility or micro domestic investors.

There are many examples of the UK failing to build on early leads on renewable technologies and these failures cannot be afforded today. However, even where a lead has been lost, as the case studies in this report prove, there are exciting opportunities for innovation and new manufacturing.

## The benefits of renewable energy must be understood and championed

Renewable energy technologies and their broad benefits for the economy are still relatively poorly articulated in Westminster and Whitehall and this needs to be addressed urgently. This report has been produced to improve understanding of the breadth of renewable heat, power, gas and transport technologies and their

employment and broader economic benefits.

Major economic benefits are not being routinely quantified. For example, the UK is increasingly dependent on imports of fossil fuels. Meeting the renewable energy targets will therefore deliver a balance of trade benefit estimated at £60 billion cumulative by 2020. This is money that, instead of being spent overseas importing oil and gas, could be more wisely invested here, delivering domestic jobs in renewable energy generation as well as improving our energy security. Such pronounced economic benefits need to be routinely understood and communicated alongside costs.

Parts of the media, and some politicians, persist in equating renewable energy solely with climbing household energy bills. Both nationally and globally, renewable energy receives far less subsidy than fossil fuels receive in subsidies and tax breaks. Renewables draw relatively modestly on household energy bills compared to fossil fuel driven price inflation. Credible analyses, including DECC's own 2050 Pathways Calculator, show that a renewable energy pathway is not more expensive than one which follows business-as-usual. From a macro perspective, the benefits already outweigh the costs.

### The threat of acute skills shortages needs to be transformed into a national opportunity

Skills shortages are a major challenge for the sector. BIS could transform this threat into a vast national employment opportunity. Given market failures, the current approach to the skills challenge is inadequate and risks failing to optimise employment benefits for UK citizens at a time of worrying outlook for unemployment. At the high-skills end of the renewable energy sector we face a demographic time bomb. More care is needed to provide clear career entry paths into renewable energy for young people, unemployed people and those transferring from the traditional energy industries. As with many engineering and infrastructure sectors, renewable

energy falls short with respect to recruiting women and ethnic minorities.

### There is a far more inspiring story to tell a supportive public – so tell it!

Public support for renewable energy remains high despite distortions in the media and political discourse fostered by well-resourced vested interests and anti-renewables groups. The renewable energy targets, ageing infrastructure, diminishing energy security, poor economic growth and high unemployment are a circle crying out to be squared. The Government's 'balanced energy mix' narrative doesn't do justice to the power of the renewable energy agenda for economic and social transformation. The renewable energy industry wants to work closely with the Coalition Government to develop a stronger

and broader national investment case that better articulates to the public the myriad of benefits of renewable energy, made in Britain.

Perceptions of renewable energy can lag behind reality. This is the fastest growing and most innovative energy sector in the world. REA and its 950 members are keen to help improve understanding of the renewable energy sector and the many benefits and opportunities it offers UK citizens. We hope this report helps. If you need more information get in touch. We are particularly keen to hear from decision-makers and from educational establishments including schools, colleges, universities and training centres. Contact: [madeinbritain@r-e-a.net](mailto:madeinbritain@r-e-a.net)



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## Glossary

AD	Anaerobic digestion
BIS	Department for Business, Innovation and Skills
BSE	Building Services Engineering
CCC	Committee on Climate Change
CHP	Combined heat and power
CNG	Compressed natural gas
CRC	Carbon Reduction Commitment
DCLG	Department for Communities and Local Government
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DPM	Deputy Prime Minister
EMR	Electricity Market Reform.
FIT	Feed-in Tariff
GDP	Gross Domestic Product
GIB	Green Investment Bank
GHG	Greenhouse gas emissions
GW	Gigawatt
HMT	Her Majesty's Treasury
HVAC	Heating, ventilation and air conditioning
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt-hour – a unit of electricity
MW	Megawatt
NASA	National Aeronautics and Space Administration
NPPF	National Planning Policy Framework
NSAET	National Skills Academy for Environmental Technologies
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
ORED	Office for Renewable Energy Deployment
PM	Prime Minister
PV	Photovoltaic
REA	Renewable Energy Association
REAL	Renewable Energy Assurance Limited
RPR	Reserves-to-production ratio
RHI	Renewable Heat Incentive

RHPP	Renewable Heat Premium Payment
RO	Renewables Obligation
ROC	Renewable Obligation Certificate
RTFO	Renewable Transport Fuels Obligation
STEM	Science, Technology, Engineering and Mathematics programme
UKCES	UK Commission for Employment and Skills

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## About the REA

The Renewable Energy Association represents around 950 renewable energy companies and is the voice of the renewable energy industry in the UK. A not-for-profit industry association, the REA promotes the use of all forms of renewable energy, uniquely representing the full range of renewable energy technologies across power, heat, transport and renewable gas. Ever-increasing corporate membership ranges from major multinationals and manufacturers through to service providers and sole traders. The REA also runs a wide range of highly regarded seminars and workshops. For more information see [www.r-e-a.net](http://www.r-e-a.net) and for regular up-dates follow us on [twitter @REA\\_News](https://twitter.com/REA_News).

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Will Hutton



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