

# Executive Summary

9

“The routine provision of meaningful benefits to communities hosting wind power projects is likely to be a significant factor in sustaining public support and delivering significant rates of wind power development.”

Hassan, 2005.

11

The UK Government’s commitment to cost-effective renewable energy as part of a diverse, low-carbon energy mix is as strong and supported as ever. Renewable energy provides energy security, helps communities to meet decarbonisation objectives and brings green growth to all parts of the UK.

(A1)

6

The country has made great progress against the 15% target introduced in the EU Renewable Energy Directive (2009). Using the methodology compulsory by the EU Renewable Energy Directive, 4.1% of UK energy consumption in 2012 came from renewable sources (DECC, 2013).

7

The importance of wind power to the UK’S renewable electricity supply is predicted to increase in the coming years. Together with this greater reliance on wind power there is a greater need for understanding the characteristics of the UK’s wind resource, especially the local communities that surround wind power developments.

(B1)

7

This white paper presents information on the characteristics of the UK wind resource, barriers and previous action options undertaken by the Government, and new policy recommendations that allow the local communities surrounding wind power development to benefit.

The UK Government is determined to enable the sector to succeed and flourish under fair policy and for all stakeholders to have an opportunity to be involved in the world’s fastest growing type of renewable energy now and in the future.

01 May 2015

# 1 The Challenges

---

3

## Climate Change And The Need For Action

1.1 The 21<sup>st</sup> century has seen a significant increase in climate change, threatening stability of the world's climate, economy and population. The IPCC Fifth Assessment Report (AR5, 2013) concluded that *"Most of the observed increase in global average temperature since the mid-20<sup>th</sup> century is extremely likely due to the observed increase in anthropogenic greenhouse gas concentrations."*

1.2 Whilst the ultimate solution for action should be a collective global effort, national governments need to focus on increasing the amount of energy from renewable and low-carbon technologies, helping countries like the UK to have a secure energy supply, reduce greenhouse gas emissions to slow down climate change and stimulate investment in new jobs and businesses (DCLG, 2013). In turn, communities hosting low-carbon technologies must understand the issues of climate change, the need for renewable energy sources and be provided with meaningful benefits to preserve public support.

## Energy Demand & Security: The Bigger Picture Of Development With Clean Energy

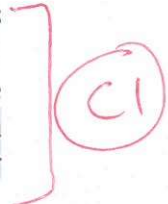
22

1.3 There are numerous possibilities for lowering GHG emissions from the energy system while still sustaining the national demand for energy services in the UK. To deliver this, a strategy needs to be implemented to:

- Save energy;
- Develop cleaner energy supplies; and
- Secure reliable energy supplies at prices set in competitive markets

(DTI, 2007)

1.4 One <sup>8</sup> the UK Government's key elements for this strategy is answered under the Climate Change Act (2008) and the previous EU Energy and Climate Chan<sup>8</sup> Policy (2005) that supports renewable energy, to cut yearly GHG emissions by half by 2025, compared with 1990. This requires a power sector that is virtually carbon-free by the mid to late 2020s.



1.5 To add to this, <sup>3</sup> increased competition for resources will see international trade in fossil fuels double by 2030. Risks to energy security and prices are all associated with resource competition, for example:

- <sup>3</sup> Abuse of market power;
- Poor energy market information;
- Infrastructure security risks; and
- Regulatory uncertainty (chiefly concerning government actions to tackle climate change)

<sup>3</sup> As natural resources decline, and become only partly replaced by indigenous supplies of energy such as wind, the UK will become more dependent on imported fuels to meet its energy demand. By 2020, around 80% of fuels are likely to come from overseas.

(DTI, 2007)

<sup>6</sup> 1.6 The UK has made great progress against the 15% target introduced in the EU Renewable Energy Directive (2009). Using the methodology compulsory by the EU Renewable Energy Directive, 4.1% of UK energy consumption in 2012 came from renewable sources (DECC, 2013). This is up from 3.8% in 2011, an increase of 0.3 per cent.

<sup>4</sup> 1.7 Wind power is viewed by many Authorities in the UK <sup>8</sup> be one of the prime technologies for fully meeting the targets set. With this in mind, the matter of wind energy deployment becomes a choice between this and other low-carbon energy sources, not between wind energy and fossil fuels (CCE, 2012).

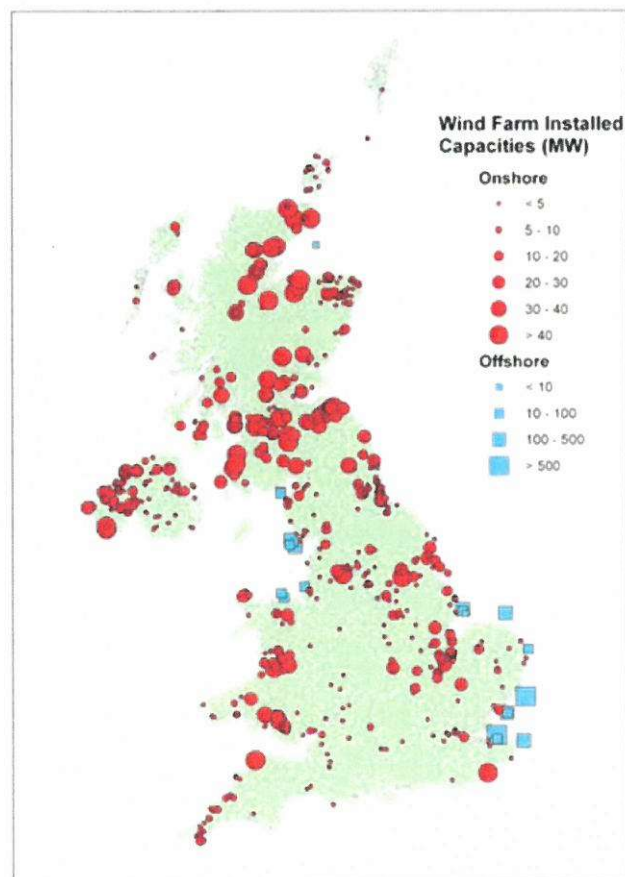
} C2

## 2 The Strategy

### Renewable Electricity Statistics: Utilising Onshore and Offshore Wind Power

**2.1** Wind energy is the world's fastest growing renewable energy type and its importance to the UK's electricity supply predicted to increase significantly in coming years. Presently the UK is ranked as the world's sixth largest producer of wind power with substantial contributions already being made to over 805 projects.

**2.2** Current figures estimate the UK has 4,853 onshore wind turbines and nearly 1,200 offshore (Fig. 1).



**Fig.1.** Onshore and Offshore wind farm locations as of 2014. (Dr Barnes, Bangor Scientific and Educational Consultants)

**2.3** Record amounts of clean electricity, 29,536,828 MWh, were generated by wind power in 2014. Nearly 50% of this total power was from onshore and offshore wind. Other official statistics from the National Grid displayed:

- 8,146 Onshore Capacity (MW)
- 4,049 Offshore Capacity (MW)
- 7,089,600 Homes Powered Equivalent
- 12,779,430 CO<sub>2</sub> Reductions (pa) in Tonnes

**2.4** In 2014, 28.1 (Ter<sup>33</sup> Watts an hour) of energy were generated, which contributed to 9.3% of the UK's electricity requirement – that is the equivalent of just over 25% of all UK homes annually.

**2.5** Wind power stands as the UK's largest source of renewable electricity, and the second largest source of renewable energy after biomass.

18

#### Onshore wind

- Onshore wind, as one of the most cost-effective and proven renewable energy technologies, has an important part to play in the UK energy policy.
- <sup>20</sup> During 2013, the UK Government announced that it would continue to provide a stable long-term investment framework for the sector.
- <sup>13</sup> The UK Government recognises that some people have concerns about onshore wind developments, and it remains committed to ensuring that projects are built in the right places, with the support of local communities and that they deliver real local economic benefits.

|DI

|EI

### Offshore wind

- <sup>12</sup> Offshore wind is an ideal technology for the UK where shallow seas and strong winds make it an important national asset, playing a key role in enabling the UK to meet its legally binding 2020 renewable energy target.
- <sup>9</sup> The UK is currently the world's biggest offshore wind market with more capacity deployed than any other country.
- <sup>5</sup> As it becomes a more mature technology and costs fall, it has the potential to play a very significant role in the 2020s and out to 2050 alongside other low-carbon technologies. The draft Electric Market Reform Delivery Plan (2013) showed potential deployment of up to 16 GW of offshore wind by 2020, and up to 39 GW by 2030.
- <sup>19</sup> Additionally, it has the potential to become one of significant strategic economic importance to the UK, supporting a competitive and quality UK supply chain and exporting expertise and technology worldwide.

/G1

/A2

/G2

<sup>5</sup> 2.6 The UK has done more than any other country to support the development of a sustainable and ambitious wind industry. It is the world's most attractive destination for investment in the wind sector.

/G3

<sup>4</sup> 2.7 In order to implement new wind farm projects, planning permission is required, either from the Local Authority or from the Government through the Secretary of State for Business, Enterprise and Regulatory Reform (DECC, 2013).

/H1

<sup>4</sup> 2.8 For the majority of wind farm schemes, planning permission will require the presentation of an Environmental Impact Statement (EIS), which identifies the environmental, social and economic impacts of the development. This is used as a decision tool when determining whether planning permission should be granted (Stevenson, 2006).

/H2



<sup>2</sup> 2.9 Wind developments can produce significant benefits - financial, environmental and social. They also produce impacts, most obviously on the local terrestrial and/or marine environment (Hassan, 2005), which is an enduring concern for communities.

| 51

<sup>2</sup> 2.10 A study for the Renewable Advisory Board (2005) concluded that more significant benefits were increasing to local communities in the vicinity of wind farms in EU countries, which have enjoyed much higher rates of deployment than the UK. It also revealed that these benefits were the result of country-specific policies relating to local taxation and local and regional opportunities for ownership. However, these policies were not immediately transferable to the UK.

| 52

## Wind Power Planning and Development Barriers: Policy Recommendations For More Local Community Benefits

3.1 Barriers encountered when using wind power, both onshore and offshore alike, are issues faced by developers routinely. These can include planning, development and economical considerations of wind farms. The local community can also share these barriers, but can also reap from the benefits.

3.2 Policy makers can benefit by acting with a range of appropriate stakeholders involved in wind power development to diminish these barriers. Barriers can range in scale from site-specific to regional and national levels.

3.3 Barriers likely to be encountered (planning, development and economic considerations from a community perspective) and policy recommendations for development are listed below. Most of these policies have already been considered and/ or accepted, however many UK communities are not aware they are in place. The Government needs a simple, effective way to inform people of

existing key policies and the operational benefits they have to all involved.

### Planning considerations

**Barrier:** *Imbalance between environmental protection and development* (Marris, 2007). (i.e. Ecology in the vicinity disturbed/damaged, environmental regulation or lack of baseline data)

K1

#### Policy Recommendations:

- Conduct Strategic Environmental Assessment (SEA) on regional/ national basis
- Develop national research projects to address general concerns
- Assign national body to resolving disputes
- Current EU legislation to reduce impact on local habitats, birds and other organisms
- Maintain balance between pragmatism and environmental considerations

K2

K2

**Barrier:** *Concerns that wind turbine operation may interfere with communication systems.* (i.e. Defence radar potential; Civil aviation, telecoms or meteorological radar potential)

K3

#### Policy Recommendations:

- Assign military authorities to map areas of constraint and encourage early consultation
- Establish policies for minimum distance standards for civil aviation, meteorological facilities and wind farms

K4

## Development considerations

**Barrier:** *Connection to grid is constrained. (i.e. Transmission/distribution grid owner may not wish to connect; offshore connection costs may be prohibitive; connection fee; local opposition; point of connection disputed)*

K5

### Policy Recommendations:

- Regulate monopoly control to allow access for Independent Power Producers (IPP)
- Educate local population on benefits of wind power (GHG reduction, green jobs)
- Consider underground power lines
- Regulate system operators to ensure rates reflect costs
- Distinguish connection costs from grid reinforcement costs and assign appropriately
- Engage with local community to manage trade-off between new grid infrastructure and benefits of wind power (Warren and McFayden, 2008)

K6

**Barrier:** *Operational aspects. (i.e. health and safety; decommissioning costs, repowering demands grid upgrades, shortage of qualified personnel for operation and maintenance)*

K7

### Policy Recommendations:

- Interface with planning process to avoid conflicts and provide contact point for local community
- Ensure wind energy policy addresses end-of-life issues (decommissioning)
- Develop high school and university curricula, advanced degree, and training to meet skill requirements of the wind energy sector OR;
- Ensure that training programmes exist at national or regional level consistent with the desired level of wind energy deployment

K8

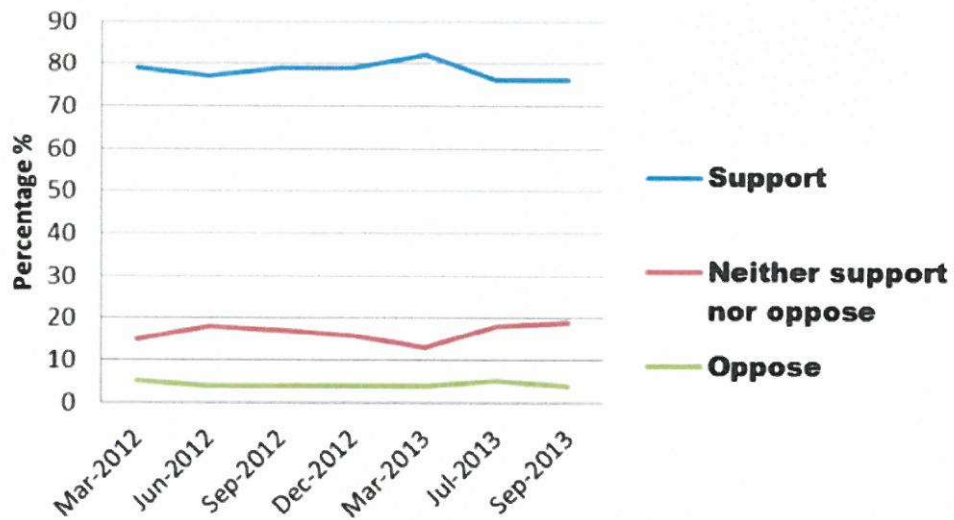
## Economic considerations

**Barrier:** *Lack of finance for wind farm developments. (i.e. project developer unable to provide equity; lack of bond finance; investment banks may be unwilling to offer project finance; shortage of investors; utility financing of project scarce)*

**Policy Recommendations:**

- Mandate public bank to support investment in wind energy projects
- Institute government intervention to reduce costs of loans through grant funding, credit guarantees, tax incentives
- Urge government to support development of domestic or regional bond market in low-carbon goods
- Build utilities' confidence via long-term policy certainty

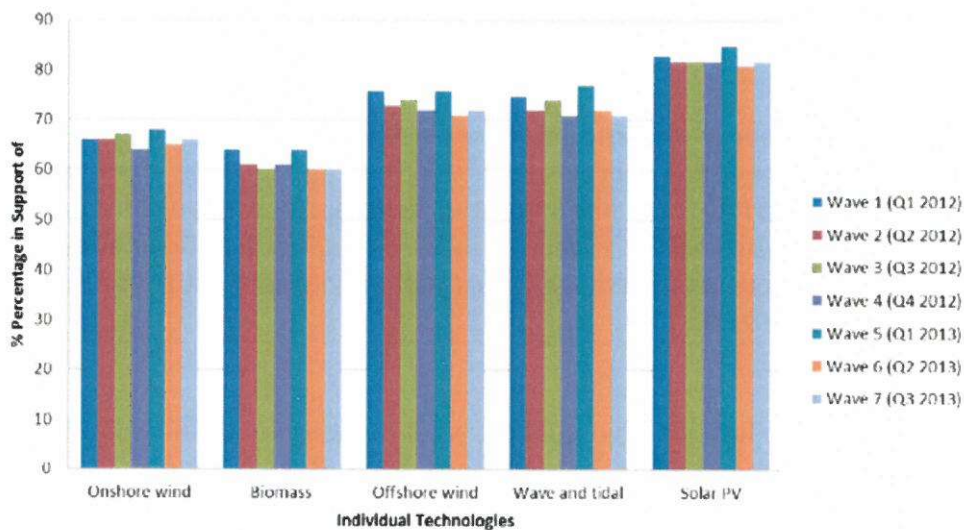
With many of these policy recommendations put in place, community support seems to be increasing. A tracking survey conducted quarterly for DECC has shown consistently high levels of public support for the use of renewable energy. Interviews conducted with 2,103 UK adults in September 2013 showed 76% of respondents support the use of renewables to generate the UK's electricity, fuel and heat (DECC, 3013). Only 4% opposed (Fig. 2).



Base: UK adult population, 2000+ respondents per wave

Fig. 2. Public support for renewables. (DECC, 2013)

In a recent survey almost three-quarters of the community supported offshore wind (72%) and almost two thirds supported onshore wind (66%) (Fig. 3).



Base: UK adult population, 2000+ respondents per wave

Fig. 3. Public support for individual technologies. (DECC, 2013)

In order to maintain this level of support, understanding why low-carbon technologies such as wind farms are needed now and in the foreseeable future is vital. It will help individuals understand between their own actions, CO<sub>2</sub> emissions, climate change and wind power. These are the new policy recommendations being put forward, taking into consideration previous barriers, action options and the needs of local communities in the UK:

**3.6** Engage the community through new educational broadcasts, brochures (etc.) like the “Act on CO<sub>2</sub>” campaign several years ago, connecting to the younger generation through social media.

**3.7** Develop more high school and university curricula, advanced degrees, and training to meet skill requirements of the wind energy sector and the increasing demand for skilled labour.

**3.8** All new builds and households that have requested from May 2008, where technically feasible, had an electricity meter put in free of charge. No free electricity meters need to go in all households that display real-time information about electricity consumption, cost and meet a performance requirement of 95% accuracy in the normal range of energy use by a household.

**3.9** As energy demand increases with more people living in the UK there is a need for energy security. Where appropriate, both approval of future wind farm planning and development should be given by the Local Authorities rather than involving Central Government (for both onshore and offshore). This will encourage faster development and secure more jobs.

**3.10** To further the policy recommendation made in 3.9, local communities need to benefit from these developments. The use of locally manufactured content, the use of local contractors during construction, land rental to land owners and potential involvement in the development process by local landowners, groups or individuals must be priority before seeking help from further afield. The employment of local people in the operation and maintenance of the

LI

wind farm development is another benefit to this policy recommendation.

**3.11** More power needs to be put into public hands. The promotion of local ownership (through their own investment, a profit-sharing or part-ownership scheme designed to tie community benefits directly to project performance), the enhancement of public subsidies, and buying shares or other investment opportunities for local residents and businesses can be implemented dependent on the amount of development and spending. If this is not feasible, a lump sum or regular payments into a fund for the benefit of the public should be given.

**3.12** Continuing conservation and improvements to the local environment and wildlife habitats that surround the development (both terrestrial and marine), with an annual survey assessing impacts organised by the wind farm developer. Findings should be published and presented to Local Authorities as well as the community.

**3.13** The creation of visitor centres, educational days, school support systems, and tourist facilities built around the theme of sustainable living and low-carbon technologies, benefitting the nation. These should be created around larger sites at onshore developments but must also include information about offshore wind farm sites.

## 4 Summary

---

10

**4.1** In 2013, the UK Government has been working to develop the UK's onshore and offshore wind industry and provide the tools necessary to support large-scale investment in the UK supply chain, raise awareness of the commercial opportunities in the UK for local communities and also deliver the innovation and competition needed to bring down costs for consumers.

G4

**4.2** To conclude in order to maintain public support, understanding why low-carbon technologies such as wind farms are needed now and in the foreseeable future is vital. Taking into consideration previous barriers, action options and the needs of local communities in the UK wind sector, we need to:

- Encourage support and benefits through educational media and social media campaigns
- Develop renewable energies and low-carbon technologies into the education curricula to create skilled labourers
- Free electricity meters for all households
- Approval of future wind farm planning and development should be given by the Local Authorities rather than involving Central Government
- Involvement of local landowners, local labourers and manufacturers in the planning and development process
- Promotion of land ownership, public subsidies and buying shares, or lump sum or regular payment if this is not feasible
- Annual survey assessing impacts organised by the wind farm developer. Findings should be published



01 May 2015

and presented to Local Authorities as well as the community

- Creation of visitor centres, educational days, school support systems, and tourist facilities built around the theme of sustainable living and low-carbon technologies

30

**4.3** The policy recommendations put forward in this white paper recognise the fact that the goal now is to drive the development of the wind power industry as well as tackle barriers to deployment, benefitting not just developers, the Local Authority and Central Government, but local communities across the country for a brighter, more sustainable future.

## References

---

Centre for Sustainable Energy (2009) Delivering community benefits from wind energy development: A Toolkit for the Renewables Advisory Board. [Access on: 07 May 2015] [Access at: <http://www.cse.org.uk/downloads/toolkits/community-energy/planning/renewables/delivering-community-benefits-from-wind-energy-toolkit.pdf> ]

Department of Energy & Climate Change (2013) UK Renewable Energy Roadmap Update 2013. [Access on: 07 May 2015] [Access at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/255182/UK\\_Renewable\\_Energy\\_Roadmap\\_-\\_5\\_November\\_-\\_FINAL\\_DOCUMENT\\_FOR\\_PUBLICATION\\_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255182/UK_Renewable_Energy_Roadmap_-_5_November_-_FINAL_DOCUMENT_FOR_PUBLICATION_.pdf) ]

Devine-Wright, P., (2005) Beyond NIMBYism: towards an integrated framework for understanding public perceptions of wind energy. *Wind Energy* 8 (2):125–140.

Environmental Change Institute (DTI) (2005) Wind power and the UK wind resource. [Access on: 01 May 2015] [Access at: <http://www.eci.ox.ac.uk/publications/downloads/sinden05-dtiwindreport.pdf> ]

International Energy Agency (2014) How 2 Guide for Wind Energy: Roadmap Development and Implementation. [Access on: 08 May 2015] [Access at: <https://www.iea.org/publications/freepublications/publication/How2GuideforWindEnergyRoadmapDevelopmentandImplementation.pdf> ]

Marris, E., Fairless, D. 2007. Wind farms' deadly reputation hard to shift. *Nature* 447(7141):126.

01 May 2015

Renewable UK (2015) UKWED Figures Explained. [Access on: 15 April 2015] [Access at: <http://www.renewableuk.com/en/renewable-energy/wind-energy/uk-wind-energy-database/figures-explained.cfm> ]

Sims, S., Dent, P., Oskrochi, G.R. 2008. Modelling the impact of wind farms on house prices in the UK. *International Journal of Strategic Property Management* 12(4):251-269.

Toke, D. 2005. Explaining wind power planning outcomes: some findings from a study in England and Wales. *Energy Policy*. 33(12):1527-1539.

UK Government (2014) Chapter 6: Renewable sources of energy. [Access on: 04 May 2015] [Access at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/337684/chapter\\_6.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/337684/chapter_6.pdf) ]

Warren, C.R., McFadyen, M. 2010. Does community ownership affect public attitudes to wind energy? A case study from southwest Scotland. *Land Use Policy* 27:204-213.

# Late submission - extension given?

## ORIGINALITY REPORT

**40%**

SIMILARITY INDEX

**38%**

INTERNET SOURCES

**3%**

PUBLICATIONS

**24%**

STUDENT PAPERS

## PRIMARY SOURCES

1	<a href="http://www.record.org.za">www.record.org.za</a> Internet Source	6%
2	<a href="http://www.renewables-advisory-board.org.uk">www.renewables-advisory-board.org.uk</a> Internet Source	4%
3	<a href="http://www.berr.gov.uk">www.berr.gov.uk</a> Internet Source	3%
4	<a href="http://gse.cat.org.uk">gse.cat.org.uk</a> Internet Source	3%
5	Submitted to The Robert Gordon University Student Paper	3%
6	Submitted to Staffordshire University Student Paper	2%
7	<a href="http://www.eci.ox.ac.uk">www.eci.ox.ac.uk</a> Internet Source	2%
8	<a href="http://www.cccep.ac.uk">www.cccep.ac.uk</a> Internet Source	2%
9	Submitted to University of Glamorgan Student Paper	1%
10	Submitted to Brunel University Student Paper	1%

---

11	Submitted to University of Strathclyde Student Paper	1%
12	Submitted to University of Birmingham Student Paper	1%
13	<a href="http://www.n-somerset.gov.uk">www.n-somerset.gov.uk</a> Internet Source	1%
14	<a href="http://www.livosenergy.com">www.livosenergy.com</a> Internet Source	1%
15	<a href="http://www.ontario-sea.org">www.ontario-sea.org</a> Internet Source	1%
16	<a href="http://www.africa-platform.org">www.africa-platform.org</a> Internet Source	1%
17	<a href="http://www.redwoodconsulting.co.uk">www.redwoodconsulting.co.uk</a> Internet Source	1%
18	Submitted to Greenwich School of Management Student Paper	1%
19	<a href="http://www.marinerenewableskills-beems.eu">www.marinerenewableskills-beems.eu</a> Internet Source	1%
20	Submitted to University of Sheffield Student Paper	1%
21	Submitted to Imperial College of Science, Technology and Medicine Student Paper	1%
22	<a href="http://www.uncclearn.org">www.uncclearn.org</a> Internet Source	1%

---

---

23	<a href="http://www.mediander.com">www.mediander.com</a> Internet Source	<1 %
24	<a href="http://windfarm.info">windfarm.info</a> Internet Source	<1 %
25	<a href="http://www.blue-energyco.com">www.blue-energyco.com</a> Internet Source	<1 %
26	<a href="http://www.middevon.gov.uk">www.middevon.gov.uk</a> Internet Source	<1 %
27	<a href="http://www.dawn.com">www.dawn.com</a> Internet Source	<1 %
28	<a href="http://purlinmachine.igragame.com">purlinmachine.igragame.com</a> Internet Source	<1 %
29	<a href="http://www.gza.com">www.gza.com</a> Internet Source	<1 %
30	<a href="http://www.geos.ed.ac.uk">www.geos.ed.ac.uk</a> Internet Source	<1 %
31	77.68.107.10 Internet Source	<1 %
32	<a href="http://ec.europa.eu">ec.europa.eu</a> Internet Source	<1 %
33	<a href="http://en.wikipedia.org">en.wikipedia.org</a> Internet Source	<1 %

---