

# Stop Kingsnorth no to new coal power



## Briefing

As soon as April John Hutton may decide if Kingsnorth in Kent will see the first new coal-fired power station in the UK for decades. This should be ringing alarm bells for anyone concerned about climate change because burning coal is the biggest threat to the climate<sup>1</sup> and in the UK has wiped out any progress in cutting greenhouse gas emissions since 1998<sup>2</sup>. Solutions to capture carbon from power plants are at a trial stage and not deployable until the 2020s.

EON proposes to spend £1.7bn on two 800MW ‘supercritical’ coal units. It says the plant will be marginally (20%) more efficient than what is there now with a small reduction in CO<sub>2</sub> emissions to 8m tonnes a year. It also says the plant will be ‘capture ready’ in preparation for carbon capture being “considered as an option”<sup>3</sup> at some later date. To this end the proposal sets aside some land.

The UK’s electricity companies are at different stages of planning new coal plants in Scotland, Tilbury in London, Fiddler’s Ferry in Lancashire, Ferrybridge in Yorkshire and Blyth in Northumberland. These amount to c10.6GW of new and entirely unabated coal capacity.

### Coal and climate

Burning coal is more damaging in climate terms than oil and gas.<sup>4</sup> Professor James Hansen of NASA and Columbia University, who has brought world attention to the impact of coal, states: “enough oil and gas remain to take global warming close to, if not into, the realm of dangerous climate effects. But coal and unconventional fossil fuels such as tar shale contain enough carbon to produce a vastly different planet, a more dangerous and desolate

#### Kingsnorth timetable

All large electricity generators must be consented by the Secretary of State under section 36 of the 1989 Electricity Act  
**January** – Medway Council raise no objection on local planning grounds but call for a Public Inquiry. – DBERR officials begin process of assessing the application and preparing a report for John Hutton  
**March to May** – possible final decision - the report is presented to John Hutton. He has the power to turn it down, to consent it or call a public inquiry  
**Autumn** – possible public inquiry  
**Early 09** – possible final decision



The chart shows overall UK CO<sub>2</sub> emissions in grey overlaid by the pattern of coal burning over the same period. It shows a close fit indicating that coal is more significant than anything else in its impact on overall CO<sub>2</sub> performance. Data from DEFRA & DBERR

<sup>1</sup> Hansen, J. (2007). Letter to Gordon Brown from Jim Hansen, NASA Goddard Institute for Space Studies. <http://www.cesum.edu>

<sup>2</sup> DEFRA official climate data show where emissions reductions have been achieved (principally from non energy industry), they have followed a 1998 meratorium on building new gas-fired power plants.

<sup>3</sup> EON’s application states: “Deployment of carbon capture and storage (CCS), which involves the removal of CO<sub>2</sub> from the flue stream as an option for GHG emission reduction at the Kingsnorth site by E.ON UK, at a later date. This will be subject to the process of CCS the process being overcome so that proven technology becomes available for the process of capture and storage. With this in mind the proposed units will be designed ‘capture ready’ to allow retrofit at a later date.”

<sup>4</sup> IPCC Working Group III, chapter 4, table 4.3 shows supercritical coal plants emit 710g CO<sub>2</sub>/kWh compared to 500g CO<sub>2</sub>/kWh.

*planet, from the one on which civilization developed, a planet without Arctic sea ice, with crumbling ice sheets that ensure sea level catastrophes for our children and grandchildren, with shifting climate zones that cause great hardship for the world's poor and drive countless species to extinction, and with intensified hydrologic extremes that cause increased drought and wildfires but also stronger rain, floods, and storms... agreement to phase out coal use except where the CO<sub>2</sub> is captured is 80% of the solution to the global warming crisis."*

Unabated burning of coal is therefore the most significant single risk to the climate. Atmospheric intensity of greenhouse gases is already driving climate change and the IPCC has indicated the next ten years face the threat of 'tipping points' that may accelerate global warming and so this period is critical for turning the corner towards low carbon solutions <sup>5</sup> Professor Hansen says: "If we burn most of the available coal without CO<sub>2</sub> capture, even with the lowest estimates of available coal reserves, it will be impractical if not impossible to avoid passing climate tipping points with disastrous consequences.". These tipping points become much more likely if atmospheric intensity of CO<sub>2</sub> goes above 350ppm. Presently levels are assessed as 280-385ppm and the IPCC has made the case for stabilising the climate system at 450ppm. To have any hope of averting tipping points new unabated coal plants must be avoided.

Coal use globally is increasing every year - 3,090 million tonnes of oil equivalent in 2006, an increase of 4.5 percent over 2005<sup>6</sup>. Half of the excess CO<sub>2</sub> from fossil fuels in the air today is from coal<sup>7</sup>.

Burning coal in the UK has halted the decline in emissions seen in the 1990s following the 'dash for gas' and has thereby wiped out progress from other sectors in cutting emissions. The 50mt CO<sub>2</sub> that would be emitted from six new coal plants will wipe out, for instance, DBERR's projected energy efficiency gains of 25mt- 42mt CO<sub>2</sub> a year.<sup>8</sup>

In terms of overall climate policy, the UK operates within the European Union which has strengthened its commitment to an interim near term target of a 20% reduction in emissions by 2020. However, the EU has already signalled in international negotiations that it will go to a 30% target if others will too. The 20% target, therefore may quickly be accelerated to 30% which in turn will mean the UK having to achieve more than the present target of 15% of energy from renewables by 2020.

### **Carbon Capture and Sequestration**

The UK government is planning demonstration plants to capture carbon to stimulate development of the technology with the hope of being able to deploy it in the UK in the 2020s. The IPCC's sober assessment is that CCS will only be realistically deployed around the world in the second half of the century.<sup>9</sup>

Capturing carbon from coal plants after the coal has been burnt is not easy. Flue gas from coal contains many impurities, CO<sub>2</sub> is not very

#### **CCS facts**

- At present no coal plant anywhere in the world has CCS.
- CCS is promising, but has technological barriers to overcome before it can demonstrate viability
- The UK, according to DBERR, will not see commercial deployment of CCS until the 2020s.
- EON says it will not consider CCS without incentives and there is no infrastructure in place or being planned for CCS.
- None of the new coal plants being proposed in the UK have concrete plans to prepare for CCS beyond setting aside land.
- CCS was projected in 2005 by the IPCC to cost US29-\$51 per tonne of CO<sub>2</sub>.
- There is no accepted definition of 'capture-ready'

<sup>5</sup> Hansen, J. (2007) Letter to Gordon Brown from Jim Hansen, NASA Goddard Institute for Space Studies, SF

<sup>6</sup> Russell, J. (2007) Coal Use Rises Dramatically Despite Impacts on Climate and Health. Worldwatch Institute, New York

<sup>7</sup> Hansen, J. (2007) Letter to Gordon Brown from Jim Hansen, NASA Goddard Institute for Space Studies.

<sup>8</sup> Ministerial statement: <http://www.publications.parliament.uk/pa/cm200708/cmhansrd/cm080110/dobitxt/0110-0003.htm#0801107000007>

reactive (compared for instance to SO<sub>2</sub>) and is a relatively small proportion of the waste. Capturing CO<sub>2</sub> on the necessary scale has not been brought to demonstration stage yet. Once captured CO<sub>2</sub> must be compressed then transported either by tanker or through the construction of a new pipeline network. Injection of gas into geological storage has been demonstrated (for instance in oil fields to enhance oil recovery). The UK has the potential to exploit the North Sea for this purpose. Monitoring will be required for many generations.

Centrica has said it will not build a coal plant unless it has CCS from the outset. It is opposed to supercritical plants being built 'capture ready' because it believes it is not the best technology: *"Supercritical technology, while cleaner than technology at existing coal plants, does not represent the cleanest form of clean coal generation without a carbon capture and storage solution, and would still be nearly four times more emitting than IGCC technology with carbon capture. It should also be noted that several clean coal projects proposed in the UK have to date only committed to their plants being "capture ready", rather than developing an integrated carbon capture and storage solution at the same time as the new generation plant. Almost any generation plant can be altered to capture carbon. .. We believe that government support for clean coal technology should be limited to those plants actually implementing carbon capture and storage, rather than capture-ready."*<sup>9</sup>

The supercritical coal plants planned by the UK utilities are intended to be retrofitted with carbon capture technology rather than have it integrated from the outset (the latter is too uncertain at the moment they argue). There is an open question as to whether retrofitting CCS technology will be mandatory and how it will be paid for. The EU is about to consult on its proposed CCS Directive<sup>11</sup>.

### **UK electricity context**

Low carbon electricity is the foundation of a low carbon economy. Not only is decarbonising electricity the biggest single action the UK can take to cut carbon emissions, but electricity is also the solution to the climate impact of road and rail transport and residential heating. Following announcements in January of commitments to reach 40%-45% of electricity from renewables by 2020 and on nuclear power, UK energy policy is in a period of dramatic upheaval.

The UK has 76GW of electricity capacity to meet a typical demand of 40GW and peak demand of 63GW<sup>12</sup>. 8.6GW of coal plants are retiring by 2015. 4.5GW of oil plants (which have barely been used) are also retiring. 7GW of nuclear plants are retiring by 2020. On the other side of the balance sheet, 16GW of new gas CCGT has recently been consented or is applying for consent<sup>13</sup>. 10.3GW of onshore wind and 5.3GW of offshore wind are now in advanced development<sup>14</sup>. The government believes 33GW of offshore wind in all can be built by 2020 and a further pulse of onshore. The Renewable Energy Association (which includes the mainstream UK utilities) believes 49% of UK electricity can come from renewables by 2020 with the right support. Coal CCS and nuclear are not deployable until the 2020s. 70% (and rising) of coal burnt in the UK is imported – the biggest source is Russia<sup>15</sup> Some natural gas is now imported to the UK and the biggest source is Norway.

<sup>9</sup> IPCC special report on carbon capture and storage: [http://www.ipcc.ch/pdf/special-reports/srecc/srecc\\_wholereport.pdf](http://www.ipcc.ch/pdf/special-reports/srecc/srecc_wholereport.pdf)

<sup>10</sup> Centrica comments in: W<sup>3</sup>W<sup>3</sup> (2007). *The UK, Power Giants Talking Climate Change*. [http://www.wwf.org.uk/filelibrary/pdf/uk\\_power\\_giants\\_wwf01.pdf](http://www.wwf.org.uk/filelibrary/pdf/uk_power_giants_wwf01.pdf)

<sup>11</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:2008:0013:FIN:EN:PDF>

<sup>12</sup> D<sup>B</sup>E<sup>R</sup>A<sup>E</sup> Energy White Paper <http://www.berr.gov.uk/energy/whitepaper/page39534.html>

<sup>13</sup> D<sup>B</sup>E<sup>R</sup>A<sup>E</sup> New Build Electricity Generating Plants in Britain report 2007.

<sup>14</sup> <http://www.bwva.com/statistics/>

<sup>15</sup> D<sup>B</sup>E<sup>R</sup>A<sup>E</sup> Energy Markets Outlook <http://www.berr.gov.uk/energy/energymarketsoutlook/pages1859.html> Russia is now a bigger source than the UK.

Given the requirement to build renewables at a fast rate, the green light for nuclear and the large amount of gas CCGT in the pipeline, there is no case for building new coal plants on the basis of need. The reason for new coal plants coming forward is more to do with utilities being familiar with returns on coal, seeking a balanced investment portfolio and there being no policy bar to unabated coal plants. Carbon trading has not proved to be a sufficient bar to bringing forward plans for new unabated coal plants across Europe.

The government presently has no specific policies on coal plants other than to encourage CCS. It believes:

- The European carbon trading scheme (ETS) is a sufficient tool to encourage the market to decarbonise
- It does not want to put a cap on any technology
- It believes if the UK does not have to only decarbonise domestically because it can offset overseas and can meet its renewable electricity targets by paying for renewables overseas

The EU announced its energy package on 23 January 2008 and this proposes a 15% target for the UK for renewable energy<sup>16</sup>. Because residential and transport options are limited, electricity will have to derive 45% of its electricity from renewable sources by 2020. The UK presently derives only 4% of its electricity from renewable sources. Energy Minister Malcolm Wickes says: “our position is a poor one and that’s because since the ‘60s we’ve been reliant on oil and gas from the North Sea”<sup>17</sup>. This is an important statement because it indicates progress on renewables is systematically undermined by availability of fossil fuel capacity. The UK is now required through international commitments to embark on a major investment in renewables akin to the 24GW of gas CCGT and £3.5bn investment in grid infrastructure built in the 1990s.<sup>18</sup>

### Economics of coal

The economics of coal are changing<sup>19</sup>. In the 60s and 70s when the UK’s coal plants were built the context was state owned capacity, a cheap and abundant fuel source, familiar technology and abundant steel and mechanical engineering

capacity. Now the picture is different. The rapid growth of transition economies has created a crunch on steel and mechanical engineering for major infrastructure projects, already holding up coal build<sup>20</sup> and also potentially nuclear, wind turbines or CCS infrastructure. Coal prices are presently volatile having doubled in two years<sup>21</sup>. Carbon is also now subject to regulation and this is a major factor in decisions over coal. Coal power stations will be faced with increasing carbon costs under the ETS – indeed this is already preventing coal plants being

SDC Electricity fuel source cost projections			
Technology	Cost in 2020	Confidence in estimate	Cost trends to 2050
<b>Conventional Fuels</b>			
Coal (IGCC <sup>sm</sup> )	3.0 – 3.5 p/kWh	Moderate	Decrease
Gas (CCGT)	2.0 – 2.3 p/kWh	High	Limited decrease
Fossil generation with CO <sub>2</sub> capture & sequestration	3.0 – 4.5 p/kWh	Moderate	Uncertain
Large CHP (gas)	Under 2 p/kWh	High	Limited decrease
Micro CHP (gas)	2.5 – 3.5 p/kWh	Moderate	Sustained decrease
Nuclear	3.0 – 4.0 p/kWh	Moderate	Decrease
<b>Renewables</b>			
Onshore wind	1.5 – 2.5 p/kWh	High	Limited decrease
Offshore wind	2.0 – 3.0 p/kWh	Moderate	Decrease
Energy crops	2.5 – 4.0 p/kWh	Moderate	Decrease
Wave	3 – 6 p/kWh	Low	Uncertain
Solar photovoltaics	10 – 16 p/kWh	High	Sustained decrease

<sup>16</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:2008:0019:FIN:EN:PDF>

<sup>17</sup> Malcolm Wickes on BBC Newsnight 20 November 2007

<sup>18</sup> Dale, L., Milborrow, D. and Stark, B., (2003). *A shift to wind is not unfeasible. Power UK*, issue 109.

<sup>19</sup> MIT, 2007, *The Future of Coal*. <http://web.mit.edu/coal/>

<sup>20</sup> <http://uk.reuters.com/article/environment/News/idUKI3081324230080130>

<sup>21</sup> See BEB Energy Markets Outlook for regular reporting of market conditions and UBS Investment Research, UBS Investment Research, *European Utilities "Half of coal generation shut by 2015"*, 22 Feb 2008. [uk.reuters.com](http://uk.reuters.com)

built<sup>22</sup>. This commodity and carbon context is leading the market to question coal margins<sup>23</sup>. CCS retrofit may also be made mandatory given pressure on regulators to achieve significant CO<sub>2</sub> cuts.

At the same time technologies, not subject to rising carbon costs will move into maturity. For instance, onshore wind is now a mature technology that competes favourably with conventional capacity – typical costs are 3.0p/KWh for CCGT compared to 3.2 p/KWh for onshore wind.<sup>24</sup> California took the decision at the end of 2006 to constrain new coal plants for both environmental and economic reasons - to protect Californian ratepayers from anticipated costs of CCS retrofitting, carbon price and offsetting.<sup>25</sup>

### Why is consenting Kingsnorth a problem?

- **Impact on climate:** Building a new coal plant emitting 8mt CO<sub>2</sub> a year threatens to push the climate beyond critical tipping points. It undermines progress towards global emissions targets. It will substantially undermine the prospects of the UK reaching near term (2020) and mid term (2050) emissions reductions through domestic action. This is because the burning of coal is more significant than any other activity in determining the UK's emissions. It will leave the UK vulnerable to having to pay for unreliable overseas carbon offsetting.
- **Liability:** Despite the 'clean coal' hype and wide support for the concept and necessity of trialling CCS, what is being proposed at Kingsnorth is marginally more efficient coal with no prospect of abatement until the 2020s and then only if incentives are in place. The plant proposed does not have integrated carbon capture technology from the outset and would therefore be subject to substantial rebuild in the 2020s making it a significant liability on the path toward low carbon electricity. In addition, given 16GW of gas CCGT have been consented and are in development, there is no demonstrated need for new coal plants.
- **Missed opportunity:** The once-in-a-generation opportunity to decarbonise electricity identified by the CBI will be lost. The CBI said: "*In the run up to 2020, the emphasis must be on much higher energy efficiency together with preparations for a major shift to low carbon energy sources in the years to 2030 and beyond. The big opportunity here is that a third of our generating capacity will become obsolete over the next 25 years, and must be replaced. This opens the way to a smaller carbon footprint.*"<sup>26</sup> Instead of replacing retiring high-carbon coal plants with low carbon options, coal will be 'locked-in' as 40% of UK electricity capacity for 30-50 more years.
- **Undermine renewables investment:** Building new coal plants will put major investment behind high carbon capacity and frustrate impetus and investment in renewables and CHP just as the government is grappling with how to achieve 40%-45% of electricity from renewables.
- **Pressure on other sectors:** Through failing to decarbonise electricity by removing a large proportion of the most damaging fuel, pressure will be increased for more renewables to counterbalance coal and for other sectors of the economy to decarbonise quicker and deeper.

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<sup>22</sup> <http://www.alertnet.org/thenews/newsdesk/L2360971.htm>

<sup>23</sup> UBS Investment Research, *European Utilities "Half of coal generation shut by 2015"*, 22 Feb 2008 Lokander.

<sup>24</sup> See Carbon Trust research on renewables <http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=CTC610> and Sustainable Development Commission research on wind: [http://www.sd-commission.org.uk/publications/downloads/Wind\\_Energy\\_Nov052005.pdf](http://www.sd-commission.org.uk/publications/downloads/Wind_Energy_Nov052005.pdf)

<sup>25</sup> See [http://www.cpuc.ca.gov/FUC/energy/electric/ClimateChange/070411\\_gbgeph.htm](http://www.cpuc.ca.gov/FUC/energy/electric/ClimateChange/070411_gbgeph.htm)

<sup>26</sup> CBI (2008). *Climate Change: Everyone's Business*. CBI, London.

- **Weak ‘capture ready’ precedent:** Once the government consents coal plants on the basis of capture readiness as presented by EON at Kingsnorth, it will be difficult to apply a tougher standard that requires the market to take the costs of CCS into account from the outset. A weak regulatory regime around ‘capture readiness’ will be established in the UK just as the EU begins consulting on what standard it should establish on this.
- **Lack of understanding of consequences:** Despite the momentous decision represented by Kingsnorth as the first coal plant for many years with the prospect of more plants following soon after, there has been no strategic environmental assessment of the impact of new coal plants on the climate or climate policy. No assessment of the impact on international progress towards deep emissions reductions. There will have been no public consultation akin to that for nuclear. There will also have been no assessment of the impact on achieving the UK’s 40% renewables target.
- **Public signal:** The signal to the public will be at the least confusing. At the same time as ministers are encouraging the public to reduce their personal climate footprint, consenting the most polluting coal plants will send out a ‘do as I say, not as I do’ message from government. According to analysis of the 23 most recent opinion polls on fuel options, the public favour efficiency and renewables, are against fossil fuels and are ambivalent about nuclear.<sup>27</sup> Public opposition to new coal plants is also growing eg with regular demonstrations now taking place against Kingsnorth and EON.
- **International signal:** The UK is not alone in planning new coal plants, China, India, the US, Germany and other countries are also planning significant new coal build<sup>28</sup>. Consenting Kingsnorth will send a clear international signal that the UK is not serious about tackling unabated coal and do nothing to slow down coal build elsewhere.

## Solutions

Other countries and states have adopted practical policies to tackle coal in this critical period before CCS is demonstrated. California has adopted a minimum CO<sub>2</sub> emission performance standard for every significant new power plant investment<sup>29</sup>. This works with market dynamics as it allows the market to choose which technology to deploy, it encourages investment in CCS, renewables and CHP (and nuclear) and discourages unabated coal. It also works alongside cap and trade, energy efficiency and renewables targets. Overall it sets a clear framework that makes a carbon choice, but avoids specific technology choices. Denmark has a moratorium on new coal plants and New Zealand a moratorium on new fossil fuel plants<sup>30</sup>.

There is no silver bullet for the problem of coal. An alternative strategy to building new unabated coal plants in the UK would comprise:

- Policy constraint now on new coal without CCS. Market-driven R&D strategy for CCS. Signal of mandatory retrofit programme for CCS when deployable.
- Coherent strategy to achieve 45% of electricity from renewables by 2020 with rapid scale-up of energy efficiency and highly efficient CHP.

<sup>27</sup> Parliamentary Office of Science and Technology (2007). *Public Opinion on Electricity Options*. <http://www.parliament.uk/documents/upload/postpns24.pdf>

<sup>28</sup> See <http://www.greenpeace.org/international/press/reports/coal-fired-power-stations-and> and [http://www.examiner.com/2007/0321/p01004\\_wgqi.html](http://www.examiner.com/2007/0321/p01004_wgqi.html) for instance

<sup>29</sup> The detail on how California is delivering the standard can be found at: [http://dccc.cpuc.ca.gov/published/FINAL\\_DECCF3COV24074.htm](http://dccc.cpuc.ca.gov/published/FINAL_DECCF3COV24074.htm)

<sup>30</sup> [http://www.nzherald.co.nz/section/3/story.cfm?c\\_id=3&objectid=10469420&num=0](http://www.nzherald.co.nz/section/3/story.cfm?c_id=3&objectid=10469420&num=0)