

# EPA Decision on CO<sub>2</sub>

28<sup>th</sup> December 2008

The following is available from <http://www.theoil drum.com/node/4758>.

## **Breaking News: EPA Ruling - Coal Plants Must Limit CO<sub>2</sub>?**

Posted by [Nate Hagens](#) on November 13, 2008 - 5:37pm

Topic: [Environment/Sustainability](#)

Tags: [climate change](#), [coal](#), [energy cost](#), [environment](#), [epa](#), [sequestration](#), [sierra club](#), [sustainability](#) [[list all tags](#)]

Tomorrow we continue looking at the IEA WEO 2008. Tonight there is a [press release](#) by the Sierra Club. (Hat tip Jerome)

In a move that signals the start of the our clean energy future, the Environmental Protection Agency's Environmental Appeals Board (EAB) ruled today EPA had no valid reason for refusing to limit from new coal-fired power plants the carbon dioxide emissions that cause global warming. The decision means that all new and proposed coal plants nationwide must go back and address their carbon dioxide emissions.

### [Huge Legal Ruling Blocks US Coal Development](#)

The ruling in the Bonanza coal plant permitting case ([pdf](#)) ruled with the Club's lawyers that since the Mass. v EPA Supreme Court ruling said Carbon Dioxide is a pollutant under the Clean Air Act, new coal-fired power plants must implement "Best Available Control Technology" (BACT for short) for CO<sub>2</sub>.

Here is some more mainstream press on this news event:

<http://www.usatoday.com/money/industries/energy/2008-11-13-coal-plants-e...>

<http://blogs.wsj.com/environmentalcapital/2008/11/14/environmental-bonan...>

The EPA ruling wasn't a clear smackdown of the coal plant, but more of a punt. In its ruling, it basically told its regional office to rethink the permitting process, and this time to keep in mind the Supreme Court ruling.

But for all practical purposes, the EPA's decision does mark a sea change.

[http://www.sltrib.com/news/ci\\_10982551](http://www.sltrib.com/news/ci_10982551)

Despite initial rhetoric from anti-coal and coal friendly blogs (of which we are neither...;-), here is what the [actual ruling](#) (pdf) said (thanks Rembrandt):

#### 5. Summation Regarding the CO2 BACT Limitation Issue

Thus we find no evidence of a Congressional intent to compel EPA to apply BACT to pollutants that are subject only to monitoring and reporting requirements. Nevertheless, as explained in detail above, we conclude that the Region's 2 rationale for not imposing a CO BACT limit in the Permit – that it lacked the authority to do so because of an historical Agency interpretation of the phrase “subject to regulation under this Act” as meaning “subject to a statutory or regulatory provision that requires actual control of emissions of that pollutant” – is not supported by the administrative record as defined by 40 C.F.R. § 124.18. Thus, we cannot sustain the Region's permitting decision on the grounds stated in the Region's response to comments

We also decline to sustain the Region's permitting decision on the alternative grounds it argues in this appeal, that regulations promulgated to satisfy Congress' direction set forth in section 821 of the 1990 Public Law are not “under” the CAA. As we explain above, this argument is at odds with the Agency's prior statements regarding the relationship between section 821 and the CAA, including statements in EPA's Part 75 regulations, and those statements preclude our acceptance of the Region's argument in this proceeding.

Accordingly, we remand the Permit for the Region to reconsider 2 whether or not to impose a CO BACT limit in light of the Agency's discretion to interpret, consistent with the CAA, what constitutes a “pollutant subject to regulation under this Act.” In remanding this Permit to the Region for reconsideration of its conclusions regarding 2 application of BACT to limit CO emissions, we recognize that this is an issue of national scope that has implications far beyond this individual permitting proceeding. The Region should consider whether interested persons, as well as the Agency,

would be better served by the Agency addressing the interpretation of the phrase "subject to regulation under this Act" in the context of an action of nationwide scope, rather than through this specific permitting proceeding.<sup>64</sup> In any event, the Region's analysis on remand should address whether an action of nationwide scope may be required in light of the Agency's prior interpretive statements made in various memoranda and published in the Federal Register and the Agency's regulations. The Region should also consider whether development of a factual record to support its conclusions may be more efficiently accomplished through an action of nationwide scope, rather than through this as well as subsequent permitting proceedings. (See, e.g., Kenneth C. Davis & Richard J. Pierce, Jr., 1 Administrative Law Treatise at 262-64 (3rd ed. 1994))

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15<sup>th</sup> November 2008.

**The problem is, politicians and judges don't understand physics and have trouble understanding that the business of carbon capture is inherently much more difficult than the usual chemical pollution measures. As far as I know, the "Best Available Control Technology" currently is... none. Carbon capture has never been implemented in a power station, full stop, not even as a proof-of-concept prototype, and there's reasons to think it wouldn't be doable except maybe in power stations sited in places with very particular geology. I don't know if any power station is currently sited or projected for such a location.**

Cheers,

Doly García

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15<sup>th</sup> November 2008.

**Hullo Everyone,**

**Re Doly's email:**

**Some comments on the carbon capture issue, etc.**

**Firstly, the simplest idea is to switch as quickly as possible to energy systems that do not make carbon in huge amounts, such as Wind turbines, Tidal power, hydro power, Geothermal, Solar (A million Solar roofs in Germany!!).**

**This can be done over about 15 years. Add hyper-efficient batteries for vehicles, and veggie diesel from waste, (UK can generate 50% of its liquid fuel needs from agricultural waste, all green) and other measures, such as major energy saving programs, and we can squeeze through.**

**More to the point, existing power stations can be retrofitted, within five years, (in many cases, but not all) with oxygenator units which burn the fuel (coal, oil, gas) with 50% more efficiency, reducing the fuel consumption to 65% at a stroke. There are other technical measures that would reduce this even further, to give us half the fuel consumption and half the carbon. After switching to green energy, they would have only a small role in UK generation. In 15 years, we could be in a stable, secure, long-term sustainable energy situation whatever happened in the World, with just 20% of the carbon outputs, (including net energy return in/out) and 80% cuts in the UK output of carbon from energy production. (This is now, re climate bill, Government policy).**

**But of course: Pork might aviate, hell might encounter heating problems, and the moon change a strange colour, before the UK Government grasps any of this and actually does something. The New Labour Dogma, "That Free markets will solve everything" is the problem. In the crisis that is unfolding, we are all on our own.**

**Comments, anyone?**

**Graham Ennis**

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**15<sup>th</sup> November 2008.**

**There is a working CCS station in Germany now:**

**<http://news.bbc.co.uk/1/hi/sci/tech/7584155.stm>**

**[http://www.engineerlive.com/articles\\_powerEngineer/?/IT\\_Automation/2008/11/06/21069/Pilot\\_plant\\_tests\\_carbon\\_capture\\_and\\_storgage\\_by\\_oxy-fuel\\_firing/](http://www.engineerlive.com/articles_powerEngineer/?/IT_Automation/2008/11/06/21069/Pilot_plant_tests_carbon_capture_and_storgage_by_oxy-fuel_firing/)**

**Smallish scale but I think it is accepted as a proof of concept. Other projects at the bottom of this link:**

**<http://www.climatechangecorp.com/content.asp?contentid=5748>**

**I think the best thing about the (possible) implications of the EPA decision is the shift it could put on the investment case - something politicians and judges are more used to dealing with - for coal vs. renewables. The case for energy efficiency should be further strengthened.**

**Regards**

**[a contributor]**

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15<sup>th</sup> November 2008.

Hi Graham

Can I query your second point re: "oxygenator"? What exactly is this and how would it improve the efficiency of a CCGT such as Shoreham?

Thanks

[a contributor]

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15<sup>th</sup> November 2008.

Hi [contributor],

**Oxygenators are rather terrific.**

**What they do is this:**

**Ordinary air is pumped through a filter stack.**

**The filters are plastic membranes on meshes, closely packed.**

**Every filter membrane is a molecular sieve. They let through more oxygen molecules than they do nitrogen ones.**

**So, at the end of the stack, the "Air" coming out is about 30% oxygen, not 20%.**

**This oxygen enriched air will burn violently. The chemistry of coal combustion is changed. You get about 50% more burn out of the coal, as there is more oxygen. You use just 65% of the coal to get the same amount of energy.**

**The coal is combusted to a very fine ash. The nasty compounds are burnt out.**

**The coal plant now produces, for the same output, about 65% of the carbon. (CO<sub>2</sub>).**

**You then scrub the exhaust gas through a water filter, and the heated gas is pumped through an algae stack. (lots of glass/plastic tubes). The algae remove at least 30% of the exhaust CO<sub>2</sub>. (using solar input) You are now down to just 40% of the carbon output, or less, for the same energy.**

**But you can also improve the turbine efficiency by using a mixed ammonia/waste turbine, in double stages.**

**Efficiency goes up to 70%. (Yes, really!!).**

**Usual efficiency is about 50%.**

**So the final ratio is about 25% of the carbon, for the same output.**

**The point is, the algae scrubber can be improved. It makes oily algae, that can be food oils/protein, or veggie diesel.**

**The veggie diesel is worth another 10% off the net carbon.**

**All of the above also applies to both oil and gas power station boilers.**

**The final net carbon would be about 15% of the present output.**

**This buys us time.**

**Hope this has been useful.**

**Oxygenators have been run experimentally on car engines, at 30%. (In Australia). Worked just fine. That means that the 50% of UK liquid transport fuels that organic waste could produce, in bio-reactors, would be stretched another 50%, to around 75% of fuel requirements. Switching to hybrids and other fuel saving technologies would give us a fully sustainable green energy supply of around 150% of requirements for transport fuels.**

**Hope that this is useful.**

**Graham Ennis**

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**15<sup>th</sup> November 2008.**

**Thanks Graham - It's all new to me but I'll check it out.**

**Regards**

**[a contributor]**

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**15<sup>th</sup> November 2008.**

**OK.**

**It really does what it says on the tin.**

**But the UK Gov is totally opposed to this kind of innovation.**

**Can't understand why.**

**Graham Ennis**

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**16<sup>th</sup> November 2008.**

**"The veggie diesel is worth another 10% off the net carbon".**

**No, that doesn't work out like that, because the carbon of the veggie diesel came from coal in this case. So when you burn the veggie diesel, that carbon gets released in the atmosphere. It's a plus carbon, not a minus carbon.**

**Cheers,**

**Doly García**

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16<sup>th</sup> November 2008.

Hi,

The Ammonia liquid used to be used in millions of fridges. Not many people gassed!.

Actually I use the term "Ammonia" generically. It's been replaced by special liquid compounds, which are safer than CFC's, (zero ozone problems) and twice as efficient thermally.

Now, there are patents, (expired) for combined water/ammonia turbines, they were never of interest, in the time of cheap fuel. Can be used today, in an upgraded mode.

The carbon in the algae from the coal is converted into algae by the reaction of CO<sub>2</sub>/Sunlight/photosynthesis, which yields actually a very rich specialized algae, very oily, (60%) and full of carbohydrates and proteins. You can make veggie burgers from it, that are perfectly edible, plus synthetic organic flour, etc, etc. Millions of tonnes of edibles, per year, theoretically. Soylent green!!.

You are right that the carbon from the coal gets recycled in veggie diesel. But the vehicles burning veggie diesel are recycling the carbon, again, rather than using fresh carbon from liquid fossil fuels. So there is a saving (of sorts).

Jim Adams was very interested in the carbon/algae scrubber. He verified it works. You can ask him. Google MIT algae for power stations. etc.

The oxygenator is standard technology. It's used at home, by patients that need oxygen, rather than bulky expensive oxygen cylinders.

Regards

Graham Ennis

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16<sup>th</sup> November 2008.

“There is a working CCS station in Germany now”.

OK, that's quite recent, I didn't know about it. I'd like to know what is the EROEI for it. I'd also like to know what are the guarantees that the carbon dioxide will never escape (otherwise, this wouldn't be avoiding climate change, just delaying it by an unknown amount of time).

Cheers,

Doly García

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16<sup>th</sup> November 2008.

Hi,

**A quick observation. About half the waste heat recoverable, (25% of output of heat) can be "Heat pumped" to a high temperature, using about 5% of the power station output, and a gain of 15% or more from running a Freon turbine and small alternator.**

**So the efficiency goes up then, (If we use an Ammonia/water turbine as well, to about 85%, it's more useful to use the small remainder for local heating in Portslade and East Shoreham, (about 60MW of recoverable heat) and then the total efficiency is about 90% or so. Add to this the previous technology, like oxygenators, etc, and a staggering amount of energy is saved, (50%+) in the first place, and about 90% the actual energy used is recoverable as power/heat. So the improvement is about four times, the reduction in carbon is about four times, and further carbon scrubbing gains are to be had.**

**Basically, we then have a power station that burns half the fuel, produces one quarter of the carbon, has the same electric power output, and is nearly twice as energy efficient as the standard old power technology.**

**If the spare heat and the carbon dioxide was pumped to a large greenhouse operation, nearly all the remaining carbon would be transformed, and massive amounts of organic veggies/horticulture as well as the food from algae, make this a very interesting business proposition. It's very green, it's very commercial, it is non-polluting green economic growth, and everyone benefits.**

**Absolutely no chance, of course, of this happening, in a country like England.**

**Regards**

**Graham Ennis**

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19<sup>th</sup> November 2008.

**"However I think the prevailing view is that if the oil/gas fields have been impermeable to methane that they will be the same for CO2".**

**In principle, yes. But then, we drill holes in them to get the gas out. Reminds me of what I read in a manual of boat repairs: "GRP hulls are a wonderful thing, the way they are made they're perfectly watertight. And the next thing people do, they start drilling holes in them... That's where practically all the leaks are."**

**Cheers,**

**Doly García**