# AT: Advantage CP

## AT: Artificial Tress Fail

#### It takes 100 years to fully develop artificial trees till they start working aan making an impact

McDermott 9 (Mat, October 8, Mat edits the Business and Energy sections of TreeHugger, as well as writing about resource consumption, animal welfare issues, and the response of religious communities to our current environmental problems. , CO2 Scrubbing Artificial Trees Won't Save Us - Need Massive Investment, Colossal Infrastructure, <http://www.treehugger.com/natural-sciences/co2-scrubbing-artificial-trees-wont-save-us-need-massive-investment-colossal-infrastructure.html>)

First of all, though the tech has been tested on a small scale, we're probably five years away from a small scale deployment and two decades from wide scale implementation. And then, if the high costs can be overcome (more on this further down...), according to oceanographer John Sheppard, who led the Royal Society's recent examination of different geoengineering schemes, you'll need "100 years of deployment before you start to see the effect your looking for." If there ever was a quote that places this into the Plan C category of emission reductions, I'm not sure what it would be. Not that it shouldn't be investigated, but don't hold out hope that this is an emergency response to emission reductions -- more like a long term strategic response to supplement other reduction strategies.

#### It cost trillions of dollars to implement a strategy of artificial trees

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Which brings us to cost: Author David Biello reminds us that the Royal Society estimates that the infrastructure required to deploy the millions of the these CO2 scrubbers required to 650 billion tons of carbon from the atmosphere by 2100 to keep CO2 to 450 ppm (not the increasingly recommended 350 ppm) will be "as large, or larger than, that of the current fossil fuel extraction." James Hansen estimates that to cost be 50 ppm of CO2 removal to be in the range of $20 trillion. Yes, trillion.

#### Artificial Trees cause more CO2 and Cost an Insane amount of money

Biello 9 (David, October 8, an associate editor at Scientific American., Pulling CO2 from the Air: Promising Idea, Big Price Tag, <http://e360.yale.edu/feature/pulling_co2_from_the_air_promising_idea_big_price_tag/2197/>)

“The cost estimates for capturing CO2 from ambient air are gross underestimates,” says principal research engineer Howard Herzog at the Massachusetts Institute of Technology. “It’s actually still a question whether it will take more energy to capture CO2 than the CO2 associated with [fossil fuel] energy in the first place.” Even if artificial trees do prove capable of pulling large amounts of CO2 from the air, scientists then face the problem of what to do with that carbon dioxide. Underground sequestration — one possible solution — is still in the experimental stages. And deploying such artificial trees on a mass scale will have significant environmental costs, including producing the electricity needed to run them, the large land area the air capture devices would occupy, and the manufacture and installation of devices using resins, plastics, and other substances that could release air pollutants. As the Royal Society report notes, air capture could “require the creation of an industry that moves material on a scale as large as (if not larger than) that of current fossil fuel extraction, with the risk of substantial local environmental degradation and significant energy requirements.” In short, to extract enough CO2 from the atmosphere to begin to lower temperatures would require decades of building millions of air-capture devices that have been refined to minimize their environmental impact. Political scientist Roger Pielke, Jr. of the University of Colorado-Boulder estimates that 650 billion tons of carbon will need to be disposed of by 2100 to keep atmospheric concentrations of CO2 around 450 parts per million, a level that could easily lead to temperature rises of 2 degrees C (3.6 F) or higher. “You need 30 years of development time and 100 years of deployment before you start to see the effect you’re looking for,” says oceanographer John Shepherd, who led the Royal Society study of air capture and other geoengineering technologies.

## Warming Updates

#### Global Warming is real; People who have denied its existence are now switching to the other side

Banerjee 12 (Neela, July 30, writer for Tribune Washington Bureau, Prominent climate change denier now says he was wrong, <http://www.csmonitor.com/Science/2012/0730/Prominent-climate-change-denier-now-says-he-was-wrong>)

The verdict is in: Global warming is real and greenhouse-gas emissions from human activity are the main cause. This, according to Richard A. Muller, professor of physics at the University of California, Berkely, a MacArthur fellow and co-founder of the Berkeley Earth Surface Temperature project. The United Nations Intergovernmental Panel on Climate Change and hundreds of other climatologists around the world came to such conclusions years ago, but the difference now is the source: Muller is a long-standing, colorful critic of prevailing climate science, and the Berkeley project was heavily funded by the Charles Koch Charitable Foundation, which, along with its libertarian petrochemical billionaire founder Charles G. Koch, has a considerable history of backing groups that deny climate change. In an opinion piece in Saturday’s New York Times titled “The Conversion of a Climate-Change Skeptic,” Muller writes: “Three years ago I identified problems in previous climate studies that, in my mind, threw doubt on the very existence of global warming. Last year, following an intensive research effort involving a dozen scientists, I concluded that global warming was real and that the prior estimates of the rate of warming were correct. I’m now going a step further: Humans are almost entirely the cause.” The Berkeley project’s research has shown, Muller says, “that the average temperature of the earth’s land has risen by 2½ degrees Fahrenheit over the past 250 years, including an increase of 1½ degrees over the most recent 50 years. Moreover, it appears likely that essentially all of this increase results from the human emission of greenhouse gases.” He calls his current stance “a total turnaround.” Tonya Mullins, a spokeswoman for the Koch Foundation, said the support her foundation provided, along with others, has no bearing on results of the research. “Our grants are designed to promote independent research; as such, recipients hold full control over their findings,” Mullins said in an email. “In this support, we strive to benefit society by promoting discovery and informing public policy.” Some leading climate scientists said Muller’s comments show that the science is so strong that even those inclined to reject it cannot once they examine it carefully. Michael E. Mann, director of the Earth System Science Center at Pennsylvania State University, said Muller’s conversion might help shape the thinking of the “reasonable middle” of the population “who are genuinely confused and have been honestly taken in” by attacks on climate science. On his Facebook page, Mann wrote: “There is a certain ironic satisfaction in seeing a study funded by the Koch Brothers — the greatest funders of climate change denial and disinformation on the planet — demonstrate what scientists have known with some degree of

confidence for nearly two decades: that the globe is indeed warming, and that this warming can only be explained by human-caused increases in greenhouse gas concentrations. I applaud Muller and his colleagues for acting as any good scientists would, following where their analyses led them, without regard for the possible political repercussions.”

## AT: Iron Dumping CP

#### Iron Dumping Won’t Solve; Plankton

Seattle Times 97 (April 2, Fisheries Depletion—Dumping Iron Fillings In Ocean I Not a Sound Solution, http://community.seattletimes.nwsource.com/archive/?date=19970402&slug=2531831)

The op-ed by Dennis T. Avery ("Fertilize the ocean, restore fisheries with iron filings," March 27) correctly diagnosed a major illness of the marine realm, but then prescribes a cure that could actually make things worse. He got it right in naming overfishing as a major problem. Indeed, many marine biologists consider overfishing the greatest threat to the sea. But Avery's "cure" - to dump iron "filings" in the sea to fertilize it as a way of producing more fish - is bad policy and bad science. If overfishing is the problem, we need to catch fewer fish, allow fish stocks to recover and then catch only as many as can be sustained permanently. Dumping iron in the sea might or might not stimulate growth of plankton that fishes eat. Marine food webs are very complex, and nobody has come close to demonstrating that fertilizing the ocean with iron leads to better catches of species we've overfished. It could just as easily have the opposite effect, for example, a population explosion of jellyfishes that eat fish larvae.

#### Iron Dumping is costly and it is unproven what it does to the enviroment

Carrington 12 (Damian, July 18, Dumping iron at sea can bury carbin for centuries, study shows, http://www.guardian.co.uk/environment/2012/jul/18/iron-sea-carbon)

A dozen other experiments have shown that iron can prompt phytoplankton blooms, but this is the first study to show that the carbon the plants take up is deeply buried. Other researchers recognise the significance of this but warn of other issues that might prevent the iron fertilisation of the ocean as being a useful geoengineering technique. "The ocean's capacity for carbon sequestration in low-iron regions is just a fraction of anthropogenic CO2 emissions, and such sequestration is not permanent — it lasts only for decades to centuries," said Ken Buesseler, at the Woods Hole Oceanographic Institution in the US. Smetacek said ocean iron fertilisation could bury at most 1 gigatonne of CO2 per year compared to annual emissions of 8-9Gt, of which 4Gt accumulates in the atmosphere. But sequestering some CO2 could make the difference between crossing a climate "tipping" point, where feedback effects lead to runaway global warming, he said: "I don't see what will stop Arctic sea ice from decreasing." Michael Steinke, director of marine biology at the University of Essex, said: "Will this open up the gates to large-scale geoengineering using ocean fertilisation? Likely not, since the logistics of finding the right spot for such experiments are difficult and costly." Smetacek responded that ocean iron fertilisation is much cheaper than other possible geoengineering techniques. He acknowledged more experiments were needed over longer periods to examine, for example, how many of the diatoms were eaten by krill, and then by whales, meaning they did not fall to the ocean floor. On the ethics of geoengineering, Smetacek, who is a vegetarian, told the Guardian: "We could reduce emissions significantly and increase the scope for sequestration on land [by freeing grazing land for forestry] if we managed to convert the global population to vegetarianism. Would that be geoengineering?"