**Video Title : “Did I get it COMPLETELY wrong last week?”**

**Right, you've read the title on the thumbnail, which is presumably why you clicked on the video. So, what's it all about then?**

**Well, you may have watched last week's video featuring a new scientific paper suggesting that agriculture and land use was a far larger contributor to global warming than fossil fuels.**

**And I think it's fair to say that that video got a bit of a reaction, some of which was, you know…quite robust!**

**So, as a consequence, this video is NOT the video I'd planned to bring you today, because there are a couple of things I think I need to clarify ...**

**Hello and welcome to Just Have a Think,**

**Now, the first job of the day is to make one thing absolutely clear – the overwhelming scientific consensus is that FOSSIL FUELS are the biggest greenhouse gas emitter and therefore the clear main cause of the additional warming that is now accumulating in our atmosphere and oceans.**

**So, anyone who might have taken last week’s video as some kind of get out of jail free card to allow the world to continue burning coal, oil and gas is I'm afraid completely barking up the wrong tree. Or maybe just completely barking! Even the author of last week's paper, Gerard Bisshop, has in no way suggested that the combustion of fossil fuels is NOT a cause of atmospheric warming. That general scientific principle has been settled for well over a hundred years now.**

**What Bisshop IS challenging is the measuring methodology used by established climate science bodies like the Intergovernmental Panel on Climate Change or IPCC and, although I did allude to those methodologies in last week’s video, with the benefit of hindsight it’s clear that I didn't really give enough time over to really understanding WHY those organizations use the criteria that they do, which meant the overall video didn't reach the standard of objectivity and transparency that this channel has always been based on.**

**In other words, I screwed up. So, while I have no intention of relitigating the entire debate here, I AM hoping to at least redress the balance that was missing last week.**

**If you really want to immerse yourself in the scientific weed garden, then I've left links to, and brief explanations of, a bunch of peer reviewed scientific papers and commentary pieces that have been offered to me during the course of the last seven days that provide information on all the various aspects of the science.**

**So, let’s start with my opening statement last week…**

***“ ‘What human activities have caused present-day warming?’***

***Most of us would probably say it’s mainly the combustion of fossil fuels. And we would certainly be right to highlight the enormous impact that the burning of oil, gas and coal have had on our atmosphere. But we would be basing that assertion on the greenhouse gas accounting conventions set out by the Intergovernmental Panel on Climate Change, or IPCC, almost three decades ago.”***

**And then I went on to explain one or two of the apparent shortcomings in scientific knowledge that existed back then. Now, that implied that the IPCC had not updated any of their data in the ensuing years, which is a bit unrepresentative. In fact, the organisation provides periodic Assessment Reports every six or seven years or so based on literally thousands of peer reviewed papers from field researchers all over the world, many of whom use bang up to date technologies to do their work. If you’ve been a regular viewer of this channel over the years, you’ll know that I’ve examined every one of those IPCC reports going back to twenty-thirteen.**

**The methodology in the paper I featured last week differs from IPCC methodology in three main ways.**

**Firstly, in the way land-based carbon emissions are accounted for.**

**Secondly, in quantifying the cooling effects of aerosol particulates created predominantly from industry and transport pollution.**

**And thirdly, in the metric used to assess the warming EFFECT of each sector in our atmosphere.**

**Here’s my commentary on net carbon accounting from last week**

***“The IPCC has a category called Land Use/ Land Use Change and Forestry, or LULUCF which essentially says that on managed land the uptake of carbon by newly planted trees and crops can be set AGAINST the release of carbon from tree felling or forestry burning or any other land management practices that RELEASE carbon into the atmosphere. In number terms that means that while one hundred percent of emissions from fossil fuels are counted in the global emissions inventory, only ONE THIRD of the carbon released by land use is added in.”***

**That distinction is a well-accepted methodology in mainstream climate science, mainly because an industrial complex or machine burning fossil fuel, whether it’s a power station or a factory or car or a truck is, essentially, a one-way street. It can emit carbon dioxide, but it has absolutely no way whatsoever of drawing that carbon dioxide back down again. By contrast, trees and plants and soil, can and do draw down huge quantities of carbon dioxide as vegetation grows, which offsets the emissions from the die off of older growth. That’s been happening naturally as part of the carbon cycle for millions of years. BUT, we humans also have a certain amount of agency over that process. In other words, we can actively plant more trees or engage in regenerative agriculture or even set aside designated areas of land to allow nature to rewild them. We can’t do any of that with industrial fossil fuel producers, so the IPCC say that regardless of where the atmospheric carbon dioxide molecules originated from, it is scientifically logical to set land-based carbon drawdown against land-based carbon emissions.**

**So, what about the discrepancy on the cooling effect of aerosols then?**

**Well, first and foremost, EVERYBODY agrees that pollution particulates are a real blight on the lives of millions of people all over the world, as I mentioned in last week’s video**

***“According to UNICEF about eight million people die each year from air pollution and tens of millions more suffer from chronic pollution-related health conditions.”***

***“I should just stress here that this paper’s authors are not remotely suggesting we continue killing millions of people each year just to retain the benefit of having reflective pollution particulates in our atmosphere. That would be insane.”***

**So, there’s no argument there.**

**The reason the IPCC places less emphasis on the COOLING effect of aerosol particulates is not that they are poorly understood – they are in fact well known and they are reported on in IPCC assessments. No, the reason, according to the IPCC, is that they have to be accounted for not just in terms of their cooling effect but also their longevity, because that’s how all emissions are counted in the consensus science – effect AND longevity, whether they’re warming emissions OR cooling emissions. That’s the accepted metric that allows climate scientists to compare apples with apples, if you like.**

**Aerosol particulates are extremely SHORT-lived in our atmosphere, typically in the order of a few days to a couple of weeks as they either settle back down to ground due to gravity or get rained out. The IPCC logic is that the aerosol cooling effect rapidly diminishes when their emissions cease, so although you see an upward spike in temperatures when this happens, as has been seen recently, it is nevertheless a short-term, unstable factor compared to the extremely long term and very stable atmospheric warming effects of greenhouse gases like methane, which stays up there for about twelve to twenty years, and carbon dioxide which can stick around for centuries. So, the accepted scientific thinking is that applying the effect of a drop out of aerosols would skew the numbers in a way that did not reflect long-term real-world conditions. And again, there are papers referenced in the description section that delve much more deeply into the physics should you wish to drill down a bit further.**

**The third difference between Gerard Bisshop’s paper and the consensus science is this thing about so-called Global Warming Potential or GWP versus Effective Radiative Warming or ERF. The IPCC uses GWP and Bisshop proposes we should use ERF. The science bods tell us that ERF is indeed a perfectly valid way to compare the radiative forcing effects of different emissions. In fact, this chart showing the major components of that forcing can be found in the IPCC’s 5th assessment report from twenty-thirteen, and it's one that I’ve referenced several times in previous videos on this channel.**

**But again, while this shows how effective each component is, it doesn’t show the LONGEVITY of each component in the system, so the IPCC and the majority of climate scientists argue that it doesn’t provide the TWO crucial metrics that I mentioned earlier that allow scientists to do apples with apples comparisons.**

**Now again, I’m not here to go round and round in circles providing counter-arguments to counter arguments ad infinitum. Suffice to say the paper I featured last week differs in its methodology to the IPCC and the consensus science regarding the warming effects of the various sectors of modern human activity. You can read the papers linked in the description for more information and there are countless others that I haven’t referenced if you really feel like embarking upon your own information odyssey.**

**What we don’t have here though, is ANY fundamental disagreement that our planet IS warming far more rapidly than should be happening in the natural cycle, and that human-induced greenhouse gases are unequivocally the cause of that warming.**

**You can disagree about the semantics of measuring systems, but for the absence of any doubt whatsoever I will repeat what I said right at the start of the video - the overwhelming scientific consensus is that FOSSIL FUELS are the biggest greenhouse gas emitter and therefore the clear main cause of the additional warming that is now accumulating in our atmosphere.**

**And in fact, regardless of how you choose to cut the cake, or the pie chart, on a real world practical level the most accessible and rapidly achievable route for reducing greenhouse emissions is to pursue the electrification of pretty much everything that we rely on to run our modern society, so that fossil fuels can be eradicated from our energy systems. That transition is already well under way, and it requires almost zero sacrifice from you and me. It’s just happening, in the background and broadly speaking making things better, not worse. Does that mean we should ignore the challenges of modern agricultural practices and massive amounts of deforestation. No, of course not. Addressing both will be essential to the long-term survival of our species. Here's what I said right at the end of last week's video...**

***“Does that mean we can relax and not worry so much about a rapid transition away from coal, oil and gas towards renewable technologies like solar, wind and batteries?***

***No, of course it doesn’t. It means we need to accelerate that progress as aggressively as possible AND ALSO take a long hard look at the way we produce food, especially the industrial processing of livestock, and the way we strip out forestry land for other industrial processes like mining, logging and the production of biomass and biofuels.”***

**That's a statement that I hope we can ALL get behind, and I think that's a good place to wrap up.**

**So, thanks for sticking around until now. Have a great week and, as I have had to remind MYSELF in the last few days, remember to Just Have a Think.**

**See you next week.**