**Hello and welcome to the first of a new series of videos that I’m calling Just Have Another Think.**

**You may already have been following our weekly Sunday Just Have a Think videos, which mainly focus on the amazing developments rapidly coming online in the world of sustainable technology.**

**Those developments are remarkable. They demonstrate human ingenuity and collaboration at its finest and I strongly believe they should be celebrated and promoted.**

**But I also think it’s crucial that we don’t lose sight of the ecological, environmental and social challenges that climate change will bring to all of us as we struggle to find our way in the twenty first century.**

**So, a couple of times a month from now on – roughly every other Wednesday, I’m going to Just Have Another Think, so that I can learn more about those challenges and what actions are being taken to reduce the impact we humans are having on the planetary life support systems that keep us and every other species on earth alive.**

**To kick us off, we’re going to look at the latest analysis on the state of our global climate and find out what further changes our scientists are predicting over the coming decades.**

**On the 8th January 2021 the European Copernicus Climate Change Service or C3S as it’s known, published a climate update based on information collected from across the planet over the whole of 2020.**

**Copernicus is an Earth observation programme that accumulates vast amounts of continuous high quality global data from satellites and from autonomous ground-based, airborne and seaborne measurement systems.**

**That data shows that 2020 was the warmest year on record in Europe, and globally it was the sixth year in a row that experienced exceptionally warm temperatures, making the last ten years the warmest decade on record.**

**The average 2020 temperature across the entire planet tied 2016 for warmest year ever recorded.**

**That’s doubly shocking because 2016’s temperatures were amplified by a strong El Nino event in the equatorial Pacific which warmed those waters and added extra heat to the planet’s atmosphere.**

**2020 had no such help. In fact, the opposite conditions, known as La Niña, developed during the second half of the year causing slightly lower than average temperatures in parts of the Southern Hemisphere. But that local cooling effect was obliterated by the very high Northern hemisphere temperatures.**

**Compared to the 1981 to 2010 average, Europe was one point six degrees Celsius warmer in 2020 and parts of the Arctic region averaged as much as six degrees Celsius warmer.**

**Overall, our planet was one point two five degrees Celsius above the commonly used 1850 to 1900 baseline.**

**It’s worth pointing out here that some climate scientists argue we should really be comparing current temperatures to the 1750 to 1850 average instead of 1850 to 1900, because 1750 is when the coal powered, steam driven industrial revolution first got going. Their assertion is that if we used 1750 as our starting point then we’d already have reached an average global temperature about one point four five degrees Celsius above pre-industrial times. That’s a topic we’ll have a closer look at in a future video, but for today, we’ll stick with the timelines that Copernicus have used.**

**Now you might have heard news reports throughout the course of last year suggesting the silver lining to the monstrously dark cloud of a COVID 19 pandemic was the fact that at least our vastly reduced levels of human activity had kept CO2 emissions at bay.**

**Well, no. Not according to data from Copernicus which found that although the rate of increase did slow while we all stayed at home, the actual number still went up by another 2.3 parts per million to an averaged maximum of four hundred and thirteen ppm.**

**Lots of things contributed to that of course, including the ramping up of industrial activity in China, Europe and the States following the first lockdown. But record wildfires in many parts of the world also had a big impact. Just in the Arctic Circle alone Copernicus recorded fires releasing two hundred and forty-four million tonnes of carbon dioxide in 2020, over a third more than the previous record set just a year earlier in 2019.**

**And let’s just remind ourselves that atmospheric CO2 levels remained incredibly stable at about two hundred and eighty parts per million for twelve thousand years or so following the last ice age, right up to the point where we started burning fossil fuels. Some folks still cling onto the misguided notion that four hundred parts in every one million is so negligible that it makes no difference, which completely misses the point about the relative effects of each constituent element in the mix. CO2 molecules trap photons of infra-red light which heats them and the area immediately surrounding them up. When the photons are eventually released they go off in any random direction, sometimes up into space and sometimes back down to earth again. That’s how the warming is happening. Upping the presence of that warming element from two hundred and eighty to four hundred and thirteen parts per million is a forty seven point five percent increase. That’s why we’re seeing such dramatic effects on temperature, and it’s why every additional part per million of CO2 counts.**

**The director of the Copernicus Monitoring program, Vincent-Henri Peuch, had this to say about it**

**“While carbon dioxide concentrations have risen slightly less in 2020 than in 2019, this is no cause for complacency. Until the net global emissions reduce to zero, CO2 will continue to accumulate in the atmosphere and drive further climate change.”**

**So, what is the current prognosis for our future. Are we going to hit one point five degrees or even the dreaded two degrees Celsius that scientists tell us would start to bring catastrophic consequences? And if so, when might that happen?**

**Well, that’s a seriously complicated question, and well beyond my brain’s computing capacity, so to help find the answer, I turned to this superb report by Zeke Hausfather, published in December 2020 on the website Carbon Brief. The report is based on the latest generation of climate models being produced for the Intergovernmental Panel on Climate Change, or IPCC. The models have the catchy title of CMIP6 and they’ll be used as part of the IPCC’s sixth climate assessment report which is due for publication sometime in 2021 or early 2022.**

**Now, Zeke points out that there is some variation between observational temperature records from different agencies around the world, so a fair and balanced analysis has to have a spread of possibilities from least to worst case scenario. And natural events like El Ninos or volcanic eruptions can make any single year as much as nought point two degrees cooler or warmer than it would otherwise have been, as a result of long-term human activity.**

**The World Meteorological Organisation reckons there’s a twenty percent chance that one of these events could result in a single year showing a one point five degree Celsius increase before 2025, but that would most likely not be representative of the prevailing average.**

**So Carbon Brief took an approach that removes these short term variations and focusses instead on the likely future temperature rises based on the results of those CMIP3 models.**

**First of all you have to track atmospheric warming from 1850 to the present day. Fortunately, those temperatures have been fastidiously recorded every year by several agencies all around the world, and this chart shows a smoothed out average of all those data points.**

**Then we add a bit of spaghetti on the end just to really confuse the issue. So, what’s all this lot in aid of?**

**Well these colourful lines represent the range of possible atmospheric temperature increases based on what the IPCC so helpfully refer to as SSP2 and RCP4.5.**

**I did an explainer on what these abbreviations all mean back in 2018 when the IPCC released their Special SR15 Climate Report and you can click up there to jump back to that video.**

**In a nutshell though, SSP stands for Shared Socioeconomic Pathway, which essentially means how we all choose to behave ourselves as a global society in the twenty first century. RCP stands for Representative Concentration Pathway, which is the predicted increase in greenhouse gas emissions based on how we choose to behave.**

**Both of these measures are graded from best case to worst case scenario.**

**To keep things reasonably balanced, Carbon Brief used the midpoint scenario of SSP2 and RCP 4.5, which is the trajectory that the International Energy Agency says the world is currently following.**

**You’ve got that wide spread of possible projections that I talked about earlier, but none of them are great, are they?**

**All of them continue to push relentlessly upwards as we move through the coming decades. The steepest line takes us through 1.5 degrees Celsius in about five years and on past two degrees about a decade or so later.**

**Based on that modelling, if the world doesn’t immediately start to drastically reduce emissions then the ambition of the Paris Agreement to keep the world below 1.5 degrees of warming is almost certainly already unachievable.**

**If we all we manage to do is stop increasing the level of emissions and only pump out the same amount each year, then the world will exceed two degrees at some point between 2040 and 2070. But if we keep increasing our emissions levels as we’re currently doing (notwithstanding the weird 2020 lockdown aberration), then we’ll hit that catastrophic milestone as early as the 2030’s and almost certainly no later than the 2050’s**

**Most of the heavy lifting on emission reductions in the coming decades will absolutely need to be done by our governments, via incentives like subsidies for green enterprises and penalties like a carbon tax between a hundred and two hundred dollars per ton. Forward looking businesses know this is coming and the best of them are already fundamentally reorganising the way they operate to ensure they don’t fall behind in what will be a very different looking market place.**

**What can you do as an individual? Well here’s a few suggestions, some of which we’ll delve into in more detail in future videos. You might think that adapting your lifestyle along these lines will be just a drop in the ocean, so why bother right?**

**But to quote a well-worn cliché, each individual action might look like a drop in the ocean, but oceans are made up of drops, so if we all get involved, using our collective consumer power as leverage, then things will start to change very quickly indeed.**

**So, there we are folks. A little bit of extra food for thought.**

**Thanks very much for listening, and I’ll see you on Sunday.**