Latimer Alder 012424

[00:00:00]

Introduction and Background

Latimer: when you look at the actual data, you get a very different picture from what you're told in the narrative

Hello everybody and welcome to my presentation today on energy data for dummies. I'm Latimer Alder. You can find me on Twitter on at Latimer Alder as shown on the screen. And I thought I'd give you some background to start with about how this presentation came about. I'm an independent commentator on climate and energy.

Tom Nelson found me on Twitter where I spend a lot of my time. And two or three months ago, he kindly asked me to do a presentation for him about climate data, because that was one of the things that I'd been spending a lot of my time tweeting about. And I made that presentation and it was very well received.

And so. He asked me again to do another one on energy, and again, I'm going to call it energy data for dummies.

The Concept of Energy for Dummies

Latimer: And the [00:01:00] reason I call these two presentations such and such for dummies, is not because I think the audience is stupid or really dummies, but because they're, it's a tribute to that great series of yellow books you find in the bookshops.

It used to be in the kind of IT section, but now in, in other sections as well. For example, windows for dummies. And what they try to do, and are very successful at doing, is to take relatively complicated subjects and make them available and accessible to ordinary people. And by ordinary people, I mean people like you and me, and the people on the bus, and the lady you meet in the shop, and the dentist, and the doctor, and the person you meet in the sports club, and at the golf club, and wherever else it might be.

Just ordinary people who are not specialists. in the topic that we're talking about. We don't have PhDs and degrees in numerical analysis or written climate models or [00:02:00] working in the energy sector. Just ordinary people like you and me who want to understand a little bit about these topics of great current interest.

If you want to learn a little bit more about me and the approach I take, please watch the first ten minutes of Climate Data for Dummies. First ten minutes talks about myself and me. How we can look at data and draw some conclusions from it. It's the same for energy data, and I didn't want to go through the stuff that you may have already have seen before.

Uh, but please do, I've asked Tom to put the link in the, in the, um, discussion beneath this in, in the YouTube, uh, video.

Understanding Energy Data

Latimer: The, the link itself I've also put below here let's start with some real data and these two charts are probably, if you're going to take one thing away from tonight's, today's presentation, take away these two charts because they really summarize probably everything we [00:03:00] really, with these you can, you can work out everything else that happens in energy and what it is, they tell us in quantifiable terms What we already intuitively know, what we already intuitively know is the more energy you have available to yourself, the better your life.

And we can, we can think of that with a very simple example that a great, great guy called Jeff Hill, um, an African journalist told me about. He says just think of being able to pump water up a hill. If you can pump water up a hill. Make a reservoir of water, put it in a water tank, then once you've got a head of water you can let it run down and you can have piped water in your village or town or whatever.

The Role of Energy in Health and Sanitation

Latimer: If you've got piped water, running water in your town or village, you can keep yourself clean much better than you could [00:04:00] if all you had was a stagnant water in a pond with no, no head of water in it. And if you keep yourself clean, you're probably going to be better health outcomes. You're not going to have parasites and so forth.

Fewer of those nasty things that are going to give you nasty diseases. And if you've got pipe running water, you can also run for collective sanitation. You can run sewerage and so forth. And that helps you with things like avoiding cholera, that terrible waterborne disease. I mean, I live near London and the history of London was transformed when the sewerage system came in Victorian times and that people and cholera was no longer the big threat to so many people.

The Importance of Energy in Daily Life

Latimer: And you get that because you have enough energy just to be able to pump water uphill. And that's just one example. And you can go to many, many, many more examples of what you can do. If you use energy and on the left hand side here, [00:05:00] you can see this is a chart.

The Correlation Between Energy Usage and Wealth

Latimer: It's, um, it's a logarithmic scale up here of the amount of energy people use.

So it doesn't go 1 to 3. It goes 1 to effectively 1 to 48 16 32 and along here it shows the amount of money, the GDP, the gross domestic product people have per capita. So it's basically saying how rich you are. And very simply, all these little dots represent. different countries. They're all slightly different, but you can see that they're all on roughly the same trend.

So you start in the bottom left. If you don't use a lot of energy, you don't have a lot of money. Your GDP, your GDP, your wealth is low. If you go up and you use a lot of energy, you're up in the top right hand corner here. You use a lot of energy. And you are wealthy. It's GDP, 100, 000 per capita. That's a lot of money.

And they've broken this down by The sorts of [00:06:00] countries, and they've chosen to say high income countries, upper middle income countries, lower middle income countries, and low income, whatever.

The Impact of Energy on Economic Status

Latimer: That's quantifiable, that shows that this trend is for real. Um, and the first thing to note is people know this. If you're in a low income country, or a lower middle income country, you do not have to be Einstein, you do not have to be a political leader of great, you know, insight to say, look, over there The people using a lot of energy are rich.

We're not using so much energy. We are poor. Let us use more energy because we want to be rich too. And there aren't many people in the world who don't want to be rich too. There are some in some of our developed countries for whom a vow of poverty. Usually about poverty for somebody else is something that they, they think is virtuous and so forth.

But they're in the minority, they might be a rich minority, but they're in a minority. So that's true. And over [00:07:00] here on the right hand side, we've got the similar graph. Whereas this one looked at total energy, per capita energy. This one looks, the one on the right looks at electricity. Electricity, well I'll have some more words to say about electricity later in the presentation.

But for the moment, let's um, try and look at just two things here. And I chose this one because it's got two, it's got one very interesting example that we might want to look at. It's a graphic example. And down here in the bottom left is a country called Haiti. Haiti doesn't have a lot of electricity and it isn't very rich.

It's down here with Nigeria and Ethiopia and places that we would think of as being poor countries. But up here. You can just see where I'm screwing now is the Dominican Republic, and the Dominican Republic is a lot more energy than Haiti, something [00:08:00] like 20 50 times, and is a lot richer, it's 5 or 10 times richer.

Well, you might say, so what Latimer, you might say, well says Latimer, the reason this is important is that these two countries, Dominican Republic and Haiti, are on the same island. They are both in the Caribbean and they're on the island of Hispaniola. Shown here in the, the map, it's just off the tip of Cuba.

It's between, uh, Cuba and, and South America and it for political reasons. It's split down the, not quite the middle between Haiti, which has one system of government and energy, and the Dominican Republic, which has the other system of energy. And you can see here's a satellite picture to taken from space.

You can see the difference. Dominican Republic on the right. where my cursor is pointing right now. Lots of light, lots of places, lots of energy being used, a [00:09:00] prosperous country, relatively prosperous country. Haiti, no energy, a poor country, very few lights and so forth. And that's a real graphic, you can see it from space, this stuff, that's the point I'm trying to make here.

And on the right hand side here is the classic one that we've all probably seen before, this is the the world's first net zero country, and it doesn't show up on the satellites because it's North Korea, and North Korea here has no lights, South Korea has plenty of lights. North Korea has very little energy, South Korea uses a lot of energy and is a rich country.

And there's a great American humorist, a lady called Dorothy Parker, and she once said, uh, quite remarkably, she said, I've been rich, and

I've been poor. Rich is better. But we could take that now, and we could add into that, we could say, you can be energy rich, or you can be energy poor. [00:10:00] Being energy rich is better.

And as I say, people know this. Right. I'm going to talk about energy.

The Science Behind Energy Production

Latimer: Well, I'm a, by training a physical chemist and physical chemistry, we talk a lot about something called thermodynamics, which sounds pretty complicated and frightening stuff. Thermodynamics is really a bit of science that came out of trying to understand the early, early people.

How to make steam engines work better and the word thermo thermodynamics means thermo from heat dynamics how heat moves and they started out looking 200 years ago, how does heat move, how can we make a steam engines produce more power, how can we do things and as they followed through that science. It all got a little bit more abstracted from heat from steam engines to something called heat engines to heat to to to and eventually they came up with three laws of thermodynamics.

And the three laws of thermodynamics are [00:11:00] profound laws that tell us, effectively, why does the universe change? Why do we not have a static universe? What governs change in the universe and what pushes it? There's all sorts of technical things we could do, and it all can get very mathematical. There's Boltzmann equations, and entropies, and entropies, and entropy, and Gibbs free energies, and so forth, and you'll be relieved to know I won't be setting a quiz.

But I will be leaving you with one simple summary of the three laws of thermodynamics, There is no such thing as a free lunch, and though this is a trite remark, it's also a profound remark. Um, if you've heard of perpetual motion machines and you've ever wondered why people have never made a perpetual motion machine, well the reason people have never made a perpetual motion machine is you can't.

Um, there is no such thing as a free lunch, in energy terms, in any [00:12:00] terms. And a perpetual motion machine would be getting a free lunch. Why I've put this here is we will see when we look at energy in the world, that there's an awful lot of people who still seem to think that if only we could look harder or try harder or spend more money or whatever, that free lunch is there waiting for us.

We can find the pot of gold at the end of the rainbow, the energy that nobody's ever found yet, that we can get for nothing and will make all our lives fantastic. Well, got to say the bad news is.

The Future of Energy Consumption

Latimer: There isn't any. It's not going to be there. It's foolish to think there is. And we'll see that what it really means is there are trade offs.

Whatever you do, there are trade offs in the energy.

The Reality of Energy Consumption

Latimer: Okay, let's go look now at some real energy data. And this is a chart I'd like you to spend a few moments, spend a few moments on. And this is going to be our framework. For what we're going to talk about for the rest of the presentation [00:13:00] this chart looks at global primary energy consumption by source So it's telling us How does the energy of the world and we're going to stay today with the world for nearly everything I talk about Because individual countries do individual things and you know, this podcast gets watched around the world So I don't want to concentrate on one and miss out whatever else is but at the world level You can see from 1997 here.

So this is time going along this axis, 1997 to 2020 22. You can see that the total amount of energy in the world has been going up and continues to go up. There's a little blip here, and that was covid. You ever think covid? Well, how big a difference did locking down the world make to the world's energy difference?

Well, energy usage, well, actually not very much at all. It's a tiny little blip, and as soon as the lockdown kind of ended. The growth continues. So the amount of energy being used is [00:14:00] growing. And the colored segments represent where the energy, uh, is coming from. And there's, there's 10 categories here.

There's something called biomass. There's coal, oil, gas, nuclear hydropower, and a lot of other stuff. Up here, this is the units we use to measure energy. This is, they're called TWH, terawatt hours. Don't really need for you to understand what those terawatt hours actually represent. They are, they are just the units.

So when you see terawatt hours, it's a unit, don't worry too much about it. One last point, not all energy sources are the same in terms of effectiveness and the proponents of the renewable energy will tell you that their energy is more effective than other forms of energy. And to an extent they're right.

If you, if you make, if you take a solar panel and you get some electricity out of it, you put it, you can use that electricity and you can get one, [00:15:00] nearly 100 percent of it. to, to actual useful use. You could power a car or something. Because of thermodynamics, the things we burn, so biomass, coal, oil, gas, do not get 100 percent of their effectiveness out again.

Thermodynamics says there is no such thing as a free lunch and the cost you pay. So the way we correct for that is to adjust the amount that we apparently have using something called the substitution method. And this is using the substitution method. So that difference between renewable energy and fossil fuel conventional energy is taken into account in these figures.

We don't need to debate it any further later because it's there already. What I'm going to do now, oh sorry, I, I, I've, if we go back to this, you can see that down here is what was going on in 2022. [00:16:00] Um, on the right hand side, I've just broken that down, and I'm sorry about the garish colours, they're a little bit, uh, something I can't do much about, by source in a pie chart.

So we can see that of all the energy in the world, 30 percent comes from oil, 25 percent from coal, 22 percent from gas, and the rest come down here in, in the little bits. What we're going to do now is just go through each of these in turn. And make some comments about what they are and why they're like they are.

30 percent of the world's energy, that's the red slice here, 30 percent comes from oil. And it's very interesting, a lot of people get excited about oil because they say, Well, oil companies are bad, evil, profitable. places and therefore we shouldn't, uh, we shouldn't deal with them. And the Arab sheikhs, for example, whoever has the oil and we shouldn't deal with them and they're [00:17:00] very rich.

And that's kind of putting the cart before the horse. The reason these guys are very rich is not necessarily because they're evil and profitable and so on. It's because they have a product that people There's 8, 000 million people in the world and they all want to buy it. Oil is very popular. Um, that's not because oil companies are bad.

It's because their product is very good and very attractive for lots of things. It's a very versatile product. The other things about it is it's storable. We can stick a can of petrol, a tank of petrol. We can You know, bunker up lots of diesel for a ship, we can control it, it's a very controllable thing, you run it on aeroplanes, you can land an aeroplane within You know, half an inch using the throttles on the thing and it's reliable huge numbers of advantages of why people like it and that's why it's very profitable and that's why it's 30 percent of the way people [00:18:00] use.

But people say it's a fossil fuel. Well, indeed, it is. It's fossil fuel. Fossil fuels are finite and it's going to run out. True. Um, and I just did a little bit of work before we came here to check how long have we got left with oil? It's about 50 years of. Proven reserves. You might think, well, what's a proven reserve?

Proven reserve is oil they know is there and they're 90 percent certain they can get it out profitably, uh, economically. So it's oil fields that have already been explored, have already been surveyed, have already been prospected. Now, going back 50 years, I was a young teenager and my Saturday, Sunday and evening job when I was at school.

Was to work as a pump jockey, filling up cars with petrol. And I had the happiness to be filling up cars with petrol in 1973, when the world's first oil crisis came along, then OPEC suddenly [00:19:00] raised the price of oil by. 10 or something and the world fell apart. Everybody kept thought this was the end of the world point I'm making here is that one, as soon as the supply of oil became, they thought became restricted, there was big political ructions.

But the second thing was at that time, people said, we are at peak oil. This is the peak of oil production. There is now from, from now on oil will be going downhill. Well, it didn't, uh, that's 50 years ago or oil is still the top. Use the top fuel energy maker in the world. Not going to say to Oh, yeah. And the other the last thing is I'm 50 years.

If you're 50 years remaining, you probably don't go very hard to go and look for the next 10 or 20 years. When you get it down to 20 years remaining, you've got a big incentive to go and see if you can find another 10 or 20 years. So don't take that 50 years as being this is all there is. What it is is [00:20:00] this is all that we properly looked for so far, which is a different thing.

Next on the list is everybody's best, least favorite, um, fossil fuel coal, which seems to get everybody hates, but a lot of people still use it. And that this is the red, red section here, and that's 25 years worth of coal. And here's a picture of a heap of coal. Um, it's got most of the characteristics of oil.

It's storable, it's controllable, it's reliable. The thing it isn't is liquid. And if it's not a liquid, it's a bit more difficult to move around, and it's a bit heavier, and you can't pump it, and it's a bit dirtier, and all those things, but it does have its uses, and here's a particularly good use of it, this is a use in a, power station to make electricity.

And though you may not believe it, when you come to look at what is the biggest, [00:21:00] what makes most of the world's electricity, well, 40 percent of it still comes from coal. And coal, despite rumours of its death and so forth, is still going great guns. People in India, people in China are all going hugely to increase the amount of coal they use.

Despite what everybody thinks about them all going to renewable energy. They may be doing that, but they're still going big guns for coal. The other thing about coal is there's just proven reserves we know about. There are 400 years remaining. So even if the oil ran out, I've got a funny feeling people would, for the next 350 years, be finding new ways of using coal.

The next one, 22 percent, comes with natural gas. Natural gas primarily is the gas of methane, and it comes along usually with the coal and sometimes with the oil as a fossil fuel itself. In the UK at least, it's what's keeping me [00:22:00] warm today. It's a cold night out there, and this is a gas central heating boiler.

We use that for heating. We also use it hugely for industrial purposes. Um, our friends in Germany, for example, used to have a bloody great pipeline of natural gas coming from Russia, uh, that fell foul of the Ukrainian conflict. And by cutting off the supply of gas, Germany's economy is in. Deep trouble. Uh, it was a big mistake to rely on gas from somewhere else, particularly from a regime that perhaps wasn't, uh, as stable and as, uh, benevolent as we might like it to be.

The gas we've got also about 50 years remaining, and it's got the same things as, as oil, it's storable, it's controllable, it's reliable. And it's pumpable. You can, uh, you can pump natural gas. And that leads me just on a little [00:23:00] side one, maybe not a side track, but. An observation, if you really want to keep your energy going, you want to keep your houses warm and your industry going.

In Europe, people have taken against the thing called fracking. Whereas in America, USA, it's accepted and used greatly. And fracking just says, if you get a gas well, you can increase the yield of the gas well by putting a little shock down into the rocks where the gas lives. And thereby getting more or more gas out of it.

The price you pay for that is, you have to put the shock in, so there's a sort of earth tremor effect. But the benefit here you can see is, in America where they do this, the price that you get, you'll buy your natural gas at, is about one fifth. It's always less than in Europe. The Europe [00:24:00] line is the white one.

The United States is the sort of beige one. It is always cheaper to buy your gas in the United States than in Europe. And they would think it's a good price to pay that small, excuse me, that small earth tremor to get gas for so many uses at a much lower price. The other thing to note is that in Europe people get very excited about it because of all the apparent environmental disasters they, they believe has happened with fracking.

But when you come to look at it, and I have asked many, many, many people to talk about, to tell me not just about the story they've heard that fracking is so bad and that people have died and water courses have been polluted and whatever it might be, but to not just talk about this sort of thing in general, but to show actual examples.

If you've got corpses, [00:25:00] You should be able to point to a corpse and say this guy died because of fracking. Or if you've got polluted watercourses, you should be able to name the, name the river that is polluted. And when I come to ask it, none of them have been able to do so. It's one of those things that seems to be old wives tales.

It's not real problems, it's imagined problems. And I'll just put, throw this in for you to think about as a, will fracking ever make it into Europe? I've got a funny feeling it probably will. Uh, time goes on purely on the basis that if you're getting the gas out of the ground in your own country, it's under your control.

And if you're getting out the gas out of the ground in your own country under your control, a quarter the price that you need to pay on an international market, that's got to look like a very attractive thing at some point in the political nature of the place. Right, so that's covered. Fossil fuels, the [00:26:00] first three, the fossil fuels of today, and we've seen that that is in total oil, gas and coal represent 77%.

That's the big red segment here of all the energy produced in the world, used in the world comes from fossil fuels. You might think that's not quite what I'm expecting in the renewables revolution, but we've seen the numbers and that's what they are. So let's just spend a little moment reminding ourselves about.

fossil fuels and how, how they form and so forth. If you watch the climate data video I did earlier for Tom, you will have seen this chart before. It's about photosynthesis. It tells you about how does a plant grow and how does a plant grow? Very simply, you need three things. You need light, sunlight, heat energy, photons, if you want, from the sun.[00:27:00]

You need carbon dioxide from the air. and you need water. And if you take those three things, the wondrous nature of this bit of clever chemistry called photosynthesis turns that into plants. into carbohydrates. Carbohydrate, the plants exist, then if we're animals, we tend to eat the plants, or eat the little green single cells if we're in the sea, not in the land.

Um, and so it goes. We take that, these are effectively what gives us our energy when you eat something, this is, you're effectively getting back the energy that was put into it. But how does some of that, not all of that gets eaten, of course, some of it dies and goes down into, just lies on the ground and if you let something lie on the ground long enough, other things will come on top of it.

And the first thing you get if you're on the land is you're making peat. [00:28:00] You know peat bogs, you've got peat bogs in Ireland and many other places. And if you leave the peat long enough, then it gets more and more deeper and the pressures build up and the pressures build up and the heat builds up. And over a very long period of time, a very long period of time, heat and pressure will take all that greenery that you started with and turn it into coal.

And you can see that this has happened. If you look in, you know, big old coal seams, hundreds of millions of years old, you can see where the original leaves were. The leaves, the impression of the leaves, the big leaves from 300 million years ago is left in the coal. In the ocean, it's a little bit more difficult.

a little bit different. The greenery drops, and usually this is, these are smaller plants and small little animal creatures, drop to the bottom of the sea, not on the sea, other things, and then the same process applies. Other things come on top of them. The heat builds up, the pressure builds up, and [00:29:00] over a period of time you get oil and gas, coal, oil and gas.

They're all formed in roughly the same way. And after millions of years, these fossil fuels are there for us to dig up and use, okay? We dig it up and use it, and what happens? We burn them. And this is just a very simple piece of chemistry. Don't be scared by it. I think most of you'll be able to understand it.

We say we, here is our hydrocarbon or our carbohydrate that we made back in the first, uh, step. The one called photosynthesis with a picture of the plant, cx, HY. It's got carbon in it and c it's got hydro, uh, hydrogen in, uh, h we add oxygen to it. We got, we're very lucky. We got lots of oxygen in the atmosphere.

210,000 parts per million. And we set fire to it. And what happens when we set fire to it? We get carbon dioxide, CO2, we get water, and we get [00:30:00] heat and light. Hang on a minute, go back here, what did we put, put in first of all? We put in carbon dioxide, water, and heat and light, and now we get it back again.

And that is the whole thing about fossil fuels. They're not something out of the ordinary, they're just It's just, we're getting back what we all, what nature has already put in. And if you want to be really cynical about it, you could go back to this chart with the bag of coal and say this is, this chart here, the pile of coal, this is Mother Nature's solar battery.

It's a 100 percent organic, vegan solar battery that she has left for us to use. Now we don't, people don't often look at it that way, but it's actually true. The, the photosynthesis going, making plants, turning them into fossil fuels and burning them again is a [00:31:00] cycle. What will happen next is this carbon dioxide will be absorbed by another plant.

And in 500 million years or whatever, it too will go through that cycle. It's called the carbon cycle. I just thought it was worth emphasizing that point because people do get a bit hung up about that. They're not realize it's a cycle. Right. What else do we burn? What else do we make, um, energy from? Well, here's something called biomass.

Biomass is wonderful because it used to be called firewood. But it's had a rebrand, as often happens in the energy world. And I don't know if you know the Christmas carol, Good King Wenceslas looked out. And here's a picture of Good King Wenceslas looking out. And in there he meets a yonder peasant, who is he gathering winter, winter fuel in the carol.

Well, in today's, uh, if this was updated for today's carol, he would be a biomass. collector rather than gathering winter fuel, but it's the [00:32:00] same stuff. He's digging up. He's fine. He's in the forest. He's finding some firewood and you can burn the firewood and yeah, you get energy from it. And still quite a lot of the world does that six or 7 percent of the energy comes from biomass.

It's also, by a mass catch all term, it also covers something that we, in older days, would have called dung, animal dung. You can burn animal dung. Animal dung is mostly plant based. If you dry it out, you can set fire to it. And a lot of people, unfortunately, have to do that today in the poorer countries of the world.

Just to do their cooking, uh, and people say many people die of air pollution. Yeah, they do. They die of air pollution because they've got to set fire to dung in their houses to do their cooking because we don't let them have any proper forms of energy. So, um, the other thing to notice about biomass is Um, it's exactly [00:33:00] what our ancestors in the stone age would have done.

Firewood and burning dung. Once they'd invented fire, or once they'd discovered fire rather, then the first thing, these would be the first two things they would find easy to, easy to find and easy to burn. It's biomass. Hydro. Hydro is great. If you have the geography to do it, and some countries are great for hydro because they have lots of mountains and lots of rain.

A flat country with no rain is no good for hydro. But let's take a few moments to think about how hydro works. And this is just a picture I took on holiday last year of the, um, Moulin de la Berne in the Dordogne in France.

Understanding the Water Wheel

Latimer: And it's a water wheel. And the idea is that here's the water race. The water comes down from here.

It's running down from the mountains of the Dordogne to get down into the The river Vézère and then down into, um, the Garonne, [00:34:00] the Dordogne and the Garonne at Bordeaux. As it passes the water wheel, it turns the wheel. Once you've got a turning wheel, the wheel has a shaft. The shaft is turning and in the hut here, in the mill, whatever you might want to call it, that turning shaft can be turned to, made to do some work.

And there's all sorts of different work it can be done. You can make a sawmill from it. I know one place in Hampshire where they had a fulling mill which where they bashed bits of cloth, bits of wool to make it um, more amenable. You can grind corn with it and you can, on the end of this turning shaft, you can stick an electrical generator and you can make electricity with it.

Doesn't matter what goes on the other side of this, what matters is it's the water coming down, turning the wheel, turning the shaft, that gives us the energy that we can then use to do something else. [00:35:00] And you can call this a water wheel, or you could, if you redesign it, same job, turned by running water, you can call it a water turbine, doesn't really matter, they all work exactly the same way in principle.

Harnessing the Power of Hydro

Latimer: And hydro is great. If you're in Norway, I think nearly 100 percent of their electricity comes from hydro, because Norway is like that. That's how Norway exists. There's plenty of places for it. The only problem that we might want to bear in mind is we've known about this stuff, about hydro for several thousand years.

And we know the land that we're on pretty well. So it's very likely that all the good hydro sites have already been either tried Or are in use already. Unlikely we can suddenly go out of our front door, turn right and say, Oh look, we could do a hydro at the end of the road.

And nobody in the previous thousand years has noticed and thought of [00:36:00] that.

So that, that's kind of hydro.

The Controversy of Nuclear Energy

Latimer: Nuclear, nuclear is, still makes, uh, I think 4 percent of our total energy in the world. fallen out of fashion a little bit, and it's a bit like fracking, I think. It's fallen out of fashion for reasons that aren't actually very good, but it's just a fear factor. We had Chernobyl, we had Fukushima, they had Three Mile Island.

If you actually look at the number of casualties and deaths and so forth from these incidents, they were tiny, um, but unfortunately that's not helped with the idea of Nuclear, it's tarnished in people's minds if they don't think about it very hard by the fact it is possible to make something called a nuclear bomb.

Well, yeah, but that's not what you're doing in a nuclear power station. Nonetheless, for completeness we put nuclear in, that's 4 percent of the world. [00:37:00]

The Debate on Wind Power

Latimer: And now, if you follow me on Twitter, you will know that wind, wind power is my, my best noir, so I, I cannot get on mentally with wind power. It makes about 3 percent on this adjusted basis that we talked about earlier.

Let's look at wind. Here on the top right is a, an etching of a windmill. This was made in 1340. Remember what I said about a watermill that you make a turning shaft and what goes on the other side of the shaft really, you know, you can do anything you like once you've made the turning shaft. Well, a windmill is exactly the same idea as a watermill, only instead of water turning a water wheel, It's wind turning the wind vanes.

Once you've done that, you've got a turning shaft. Once you've got a turning shaft, you can do whatever you like with it. You can make electricity, you can grind corn, you can run a sawmill, you could do anything else that needs a turning shaft and therefore have some energy for it. [00:38:00] And even then, back in 1340, you can see this thing was pretty decrepit, and this is probably an illustration, maybe from Don Quixote or something, I'm not quite sure.

Bottom right, It's a picture of Kinderdijk in the Netherlands and you will know that the Netherlands, the Netherlands, the lowlands as it's called, um, much of it is well below sea level. So pumping water is something the people of the Netherlands are very good at. Why are they very good at? Because they have to be.

They weren't very good at pumping water, they drowned. So it is a technology at which they are justifiably and reasonably world leaders. And Kinderdijk There's a whole set of windmills, or in fact they're really called wind pumps, because they were used for pumping water to keep the Netherlands dry. But, 200 years ago, we invented the steam [00:39:00] engine, and as soon as they reasonably could, people took the wind, the water pumping away from Kinderdijk, and used steam engines to do it, to keep the Netherlands dry.

And the basic reason was steam, uh, steam engines are far better at doing this. anything than any windmill ever, ever has been. Reason is they work when you want them to work, not when the wind wants you to work, and they are controllable. They are reliable. You don't have to wait for a wind. Similarly, 200 years ago, every commercial sailing ship was powered by wind.

It was because they had nothing else. That was the only thing they could have done. Sooner steam engines, small enough and adaptable enough to fit into commercial boats. Sailing ships, commercial sailing ships, disappeared. They didn't last 100 years. [00:40:00] Military ships didn't last 40 years before they were all overtaken by steam and now by diesel.

And we saw back in the chart about oil, you know, the bloody great container ship there being powered by diesel. And again, same reasons. Wind is a dreadful way of getting energy and we abandoned it 200 years ago because it was obsolete. So I personally find it incredibly mad. That people nowadays say, aha, tell you what we'll do Latimer, we'll call them wind turbines, not windmills.

Exactly the same technology, exactly the same technology. We'll stick them in the middle of the sea. What? You're mad? Full of, full of salt and marines and gales and storms. And we'll pretend that we can save the world. with this renewable energy. Well, sorry, mate. You're bonkers, is all I can say about it. [00:41:00] It really is one of the biggest cons going.

And here's a, here's, I hope you can see this, here's the summary of why it's such a bad idea. And what the guy is pointing to here is he's pointing to a wind turbine in the middle of the sea. And he's saying, if you've got one wind turbine and no wind, you get zero power. No wind, no power. Now he's asking, if you put a hundred in the middle of the sea and you've got no wind, how much power do you get?

And the answer is exactly the same. It's, it's no wind. And these guys just down here are making some, uh, rather stupid remarks. You know, this is, you must be a climate denier for thinking this. We know this is true. We did it 200 years ago. We abandoned wind power. We should have never thought of reviving it.

It is not fit for purpose, but say the, uh, proponents of wind power. Do not worry. We will have something called [00:42:00] energy storage. And when the wind isn't blowing, we've got, we will, we will store up the energy for when the wind isn't is blowing, and we'll give it back to you for when it isn't blowing. And we use that with something called energy storage.

The Limitations of Battery Power

Latimer: And there's a lot of different ways people talk about doing energy storage, but batteries is probably the big one that that's, uh, talked about now. Well, here, let's look at, let's look in detail with some numbers here. Here on the top. Right. Is the biggest battery, when it was opened last year, the biggest battery in Europe.

It's a place called Cottingham, which is in the north east of England. And it covers about 5 acres, that's 20, 000 square meters, I think, of space. And you can see it's a big installation. This little thing here is a big earth moving truck. That little thing over there is a, you know, 10 or 20 ton truck.

These [00:43:00] are cars, minivans. That's a car, that tiny thing there. This is a shedware, presumably a canteen for the workers or something like that. This is a big installation. It cost 75 million British pounds. So call it 100 million US dollars for, uh, for purpose. And it can hold about 200 megawatt hours of energy.

If you think of, we looked at the, just, just think of, bear in mind the number 200 megawatt hours. That's all it can contain. It'll give you, you can charge it up to 200 megawatt hours and it will give you back 200 megawatt hours if you ask. Here is a jet fuel bowser that you might see at your local airport.

You've probably seen them anyway. This contains, when it's full, about 250 megawatt hours [00:44:00] of energy. So you've got something 5 acres big, 100 million quid, 100 million dollars to store 200 megawatts of energy. This is a bit bigger. 250 megawatt hours of energy. But you've got the scale of it. And if you take the 250 megawatts of energy, And you put, you charge that into filling up this lovely aeroplane, the A320.

Um, you've got 250 megawatt hours there, so slightly more energy in one full aeroplane than in all of that put together. And this aeroplane is clearly on its way, it's just taken off from Gatwick in London, and it's going to Madeira. Uh, where I went on my holiday with EasyJet, not necessarily in this aeroplane, but a very similar one a couple of weeks ago, and I had a lovely time.

Thank you very much, Reeds Palace Hotel. It was lovely. Um, this gives you some idea of the scale of things we're talking about with battery power. [00:45:00] Battery power is not anywhere near big enough to do the job we sort of wanted. And we can, we can just discuss two things from here. First thing, if you ever wanted to make an electric aeroplane that could do this job, and this job is to fly 3, 000 miles over an eight hour shift and take about 160 people to Madeira and back.

To do that, with this amount of power, you'd have to get the same amount of energy and presumably the same amount of batteries. All of this stuff, which we've seen is quite big, into something the size of this aeroplane. So you'd have to squeeze it down a lot. Now, squeezing down batteries is bad news.

Electrons repel each other. Very hard to do, makes it very hot. But let's assume you could do that. Let's assume you could put 200 megawatt hours of batteries into the airframe for this aeroplane. Big problem! The airframe for this airplane would now [00:46:00] weigh 40 times more than the airplane could ever get off the ground under its own power.

So we are already seeing that batteries here are 40 times less good than jet fuel fueling things, and we've had 223 years of development of batteries to get to this still 23 years since. The Italian physicist Volta, whose name gave us the, the, the, the unit of electricity volt, first invented a battery.

And 223 years later, we're 40 times away from getting something that could even begin to power the sorts of things that jet fuel powers any time you like. And these are traveling hundreds, hundreds or thousands of times a day, just anywhere around Europe. And the second thing we can learn is if we say, well, we're going to use these batteries to cover up the gaps in [00:47:00] intermittent supplies like wind.

Well, that's great. We know. Let's just do a quick sum. This is 200 megawatt hours. We know how much electricity is used in the UK grid. It's about 40 gigawatts for 40, 000. megawatts. How long would this battery last if we had to run the entire UK electric grid off it? And the answer is 15 seconds. Wow. So we're 15.

This thing would keep us going for 15 seconds. And if we look at the statistics, when we look at wind Wynne has a thing called a Dunkelflaute, which is a lovely German word. Dunkelflaute means a dark period, a dark period of several days and sometimes weeks, particularly if you get a big anti cyclone over there.

How many of these would you need in a week to cover a week? [00:48:00] The amount of money involved is huge. You're talking about hundreds of billions of pounds to do this stuff. That does nothing other Then cover for the fact that these wind turbines don't work. They're, they're, it's an additional cost to put into all that, all the investment you have to put into this wind, which we've already known is obsolete.

So the fact, I just throw my hands up and I just say, you guys are all bonkers, there is no way this works. And you ought to be able to do this by doing, know this by doing no more arithmetic than I've done already today. But people don't. Right, solar energy.

The Truth about Solar Energy

Latimer: Solar's fantastic. Solar energy is kind of a branch of transistors.

Here we go, we get some, we shine a light, we shine the sunlight onto an appropriately, um, made up transistor. We use something called the photoelectric [00:49:00] effect, which incidentally was the analysis of this was what Albert Einstein got his Nobel Prize for it, it wasn't about relativity he was for the photoelectric effect, he was a very clever guy.

And when you, you can make some electricity in here, they've shown a, a, a, a lamp being, um, illuminated by the sun and the solar thing. You might ask yourself, if the sun's out, why do you need a lamp anyway? And that's the, that's the thing I always think about solar is, yeah, if you want a reading lamp at midday in June, solar's your stuff.

It's great. What it won't do is give you any power at midnight in December because there's no solar light. And it's the same reason it's dark is the fact that that's why you need the light. So it's the bank manager who lend you an umbrella when it's not raining.

The Reality of Biofuels

Latimer: We've got biofuels and this is a weird, again, I think this is a weird idea where you just, just say, well, instead of making fuel [00:50:00] using the fossil fuels, we'll grow maize or something and make bioethanol or some weird idea like that.

In the UK, at least, we now have a, I think 10 percent of our fuel, petrol fuel is biofuel. Is is mixed with biofuel and some people say you can't make notice the difference. Well, we did when it went from 5 percent to 10 percent back last September, suddenly the petrol consumption of my BMW changed dramatically, uh, went from about 42 miles a gallon to 36.

So I think it does make a difference and it's making yourself, making things less effective. And we've got, in the last place, the last of our things, we've got other renewables.

The Potential of Tidal and Geothermal Energy

Latimer: And on the top right here is Tidal. Tidal is everybody's favourite renewable for talking about and nobody's favourite renewable for actually doing.

This thing up here is a picture of the, the, one of the very [00:51:00] few tidal things that's actually in existence and working. And it's the River Reims in France, and the Saint Malo, and by chance I happened to visit this with my parents on holiday when I was a young teenager, probably in the 60s. And it's great, it works, the geography is right, you can make tidal power, uh, and you've got, um, 240 ish megawatt hours.

megawatts of, um,

of power coming out of this thing. So roughly, if you took that, that's about one, two hundredths of the sort of power you would need to power the UK. Much less so in France, because France has a very big fleet of nuclear, so it gets an awful lot of electricity that way anyway. But it's a good idea in places where it works, but there's an enormous number of places where it doesn't work.

It's been tried for hundreds of years, and there's a handful only working in [00:52:00] the world. It's a great thing for environmentalists to talk about, but as soon as they actually come to try building it, it doesn't work. And the last one we'll look at here is a picture of Aquae Sulis. This is Bath in, uh, in England.

And these are the warm waters, the Roman baths of Bath. And this is what we would call geothermal. Geothermal is great. If you can find nice hot springs, you've got some energy there that you should be able to exploit. Um, people say, well, you could drill down 25, 000 feet, blast out the rock, and build up and send up hot water.

The, if these guys don't like tracking, because every now and then there might be a small earth tremor, they sure as hell ain't gonna like geothermal. But, I, I don't know, I think, uh, maybe there are places where it'll work. But, but as a general thing it's not the answer to all our problems. We're back to there is no such thing as a free lunch and that, that will recur.

The Misconceptions about Energy and Electricity

Latimer: [00:53:00] Just a word here about energy and electricity. And I put this in as a cautionary note. There are an awful lot of people who like to tell you that renewable power Is giving us 50 percent of our electric of our energy at the moment, or 25 percent or wind gets you 30%. And you either they are deluding themselves or they're trying to delude you, because they are making a distinction.

between energy, and they're trying to blur the distinction between energy as a whole and electricity. Some of you, some of the world is electrified in terms of we can do things with electricity, but an awful lot isn't. A car is, most conventional car is not electric. Industry is rarely electrified.

Aeroplanes are not electrified. Shipping is not electrified. And if we look at the actual numbers, [00:54:00] and they come again, I've got the chart behind if anybody wants to see it. It's over the world, it's 16 percent of the total energy of the world comes via electricity and 84 percent doesn't. So when somebody says so much of the energy Is coming from renewables.

Make sure they know what they're talking about. Make sure they're not really talking about electricity and it's very likely they have been either deluded themselves or they're trying to delude you make that distinction clear. And here we've got a way of coming back to this thing.

The Reality of the Renewables Revolution

Latimer: People always tell me about the renewables revolution.

Well, is it here? Renewables can really only do one thing and that's make electricity so wind and solar. And hydro don't do anything else. You can't, you can't install a hydro plant in a car and say a container ship and say, take me to China. It's not going to work what it can do. All they can do is [00:55:00] make electricity and here a similar graph to when we saw for all of energy.

But this is just for electricity in the world. Same time scale 1997 to

2022. Up here we've got the same scale of terawatt hours. This is where we get the 16 percent from. And you can see in 25 years the amount of electricity in the world has gone up quite considerably. It's gone up from just under 15 to just under 30, so it's doubled.

But you can also see that what's been using, what's been making the electricity remains as it was. We've got coal, we've got gas, we've got oil, they're all increasing. We've got nuclear, that's increasing. We've got hydropower. And here we've got two little slivers. The dark blue sliver is wind, and the sort of yellowy beigey sliver is solar.

Those two ones there. And that, the change from down here where [00:56:00] those didn't exist, to here, that, It is the only tangible evidence of any renewables revolution. That's it. That's all it is. It's those two bits there. So if you really, really, really think the world is being changed by the renewables revolution, bear in mind that you're talking about electricity, which is only 16 percent of the world, less than a fifth, about a sixth, in fact, in some.

And these two tiny bits here, not even 10 percent of that between them. And that's the revolution that we've had apparently in the last 25 years. Do not be fooled. A lot of people are betting their careers and their money and their free lunch. on the thing that, that this is what's going to take over the world.

Well, maybe it is, but I don't see any evidence in the actual data that it's doing it right now. [00:57:00] And that leaves us to three conclusions and a summary, and then we're done. Right, first conclusion. Fossil fuels still rule okay. And when we look, if we look back to 2012, just, I took 10 years for arbitrary reasons, but just whatever.

2012 fossil fuels made 79 percent of the energy of the world. In 2022, it's made 77 percent in the energy world. That's just about a rounding error between the two, but there is no collapse of fossil fuels. There is no overtaking by other things. It's hype and talk and so forth, but no actual data. Now, one of the reasons people want to do, uh, renewables is to talk about a thing called net zero and the reduction of emissions.

And you can learn a lot more about that in the climate data video I mentioned. But we've been, people have been meeting together now for 30 years and signing protocols and saying, [00:58:00] Oh, they'll reduce emissions, they'll cut, cut. Well, we'll go to this thing that in some countries we have called net zero, where we're going to totally reduce all carbon emissions to nothing.

You might think from that photosynthesis chart, you mean you want to kill all the plants? But that's maybe a different thing. And here is how successful we have been in cutting emissions. And all the talk and all the hype and social. Um, this is CO2, the total amount of carbon dioxide in the atmosphere, and it's still going up, and we've had 20, well this was written when there were 26, we've had 28 climate conferences that have made absolutely no difference whatsoever to the trajectory of the amount of carbon dioxide in the atmosphere.

It has been, all this stuff is a complete flop. People are very happy to go and talk. Talk is cheap. But doing things is [00:59:00] expensive. Remember, there's no such thing as a free lunch, and going to renewable energy and so forth. Cost money just like anything else, and people don't see a good reason to do so. Net zero is a flop.

And if we come to that conclusion, then Oh, forgive me. If we come to that conclusion, seems to me we should, instead of spending our money and our resources trying to fight climate change in whichever countries we are, but it's perfectly clear the rest of the world really is not bothered about it.

They're going to continue making emissions and so forth. We should. overall use our money to adapt to climate change. And the climate data video will tell you that probably overall climate change is going to be a good thing. But clearly there is no such thing as a free lunch. It doesn't come without a cost.

And we should be using our money to pay that cost and adapt to any bad things about climate change. [01:00:00] rather than futilely spending it on trying to stop climate change, which isn't going to happen. And I'll leave you with my final chart. First thing, believe the, don't believe the hype, believe the data, because as you've seen today and as we saw in the climate thing, when you look at the actual data, you get a very different picture from what you're told in the narrative, in the media, and in the discussions in the pub and on all those things.

The data is the thing that tells you what has actually happened. The journalist or the campaigner or the just stop oiler is not the person who tells you that. They just know the story, which is very different. And I keep saying it. There is no such thing as a free lunch. And that's the end of the presentation.

So, Tom, thank you very much.

Tom: A one third of U. S. corn is used to produce ethanol. Uh, how crazy is that?

Latimer: Crazy, crazy, crazy. Why are you doing this? That's the question. Why are you making [01:01:00] ethanol when you can dig oil out of the ground?

Yeah, that's a big deal. I need

Tom: to look it up to see how many acres of corn we grow here, but it's a big, big, big deal.

Latimer: Big, big, big. But one thing you might want to bear in mind is I'll bet that corn is growing an awful lot better 20 years because there's more carbon dioxide and it's a little bit warmer than it was.

If I, if you look back in the climate data thing, I think there's a chart of crop yields versus time and go back 20 years and you'll see that the crop yields has increased hugely. So yeah, maybe that isn't such a bad idea after all.

I think you'll find that ethanol itself, if what you're buying is ethanol, it certainly burns. I mean, you, you can set fire to things with vodka. It's a very, it's a very expensive way of setting fire to something. So it does work, but I'm guessing it would have a lower calorific or unit of energy value than [01:02:00] something like methane or whatever.

The reason there is you've got, um, in ethanol, you've got an OH, a hydroxyl bit on the end of your. Nice bit of carbon, uh, hydrocarbons. So there's something there that's not going to burn in the weight.

Tom: I'm hearing all sorts of people say that the ethanol is causing problems for their small engines, for their lawnmowers, et

Latimer: cetera, that I can, I can well imagine.

You, you, you build an engine for a particular fuel in mind and if you put something different in it, it's not gonna work so well. I, people in the UK at least can modify a diesel engine that'll run on, um, used oil that people use in a fish and chip shop to make, to, to fry their deep fry, their fish and chips, you know, and that one of our national dishes.

Um, you can yeah, but you have to modify the thing because it wasn't designed for that fuel It'll be designed for something

Tom: else. I think king charles was doing that I don't know how that scales up to try to uh, power lots of cars on uh, use cooking Nothing

Latimer: chuck windsor [01:03:00] does surprises me anymore

Tom: Um any other uh items you want to bring up here before we go ahead and wrap up?

Latimer: I think that was it tom. I've i've tried to In that presentation, I've tried to show you the real data about energy at a global level. And I hope that that will give you some perspective to think about what's happening in your country. A lot of different countries have lots of different policies that kind of come all in the same boat about energy and to see whether it makes sense.

And I think you'll find. In many, many cases, it doesn't make, it makes sort of political sense if you have this vow of poverty and the virtue signaling that I want, we want to show everybody how goody two shoes we are. But that only works, to my mind, in the rich Western world. And if you go back to the very first chart I showed, [01:04:00] top left to bottom right from low energy, low, low wealth to high energy, high wealth.

And the people in the bottom left want to get to the top right, and that's not going to change, and they aren't going to sacrifice themselves. on the altar of, uh, we will show you how, how poor we can, how poor we can be in energy. The people of Haiti already do that. And I got a funny feeling the people in North Korea would much rather be up in the top right and be thought to be wasteful than in the bottom left and to be thought to be poor, which they are.

Tom: All right. Very good. Uh, Latimer Alder, I really enjoyed both of your presentations and thank you for taking the time to do it. I'll have to talk to you again next time. Thanks,

Latimer: Tom. Goodbye.