**In early April 2022 the IPCC published the third of three reports as part of their sixth assessment of the state of our climate. That third report was all about mitigation. In other words, what can we do to prevent the worst consequences of the climate emergency we’re now facing? And the IPCC made it clear that we need very radical root and branch change in every aspect of society, industry and commerce, not by 2050, but by 2030, if we’re to stand any chance of keeping global temperatures within safe limits.**

**The most common questions I’ve received from you folks since that report came out are ‘how exactly is this apparent revolution going to be achieved?’ and ‘how will it be measured so that countries and corporations are held accountable for their actions?’**

**They are tricky questions, that’s for sure. And they’re questions that are currently taxing far greater minds than mine.**

**One of the global organisations wrestling with the problem and seeking solutions is the International Renewable Energy Agency or IRENA.**

**They’ve just published this report, focussed ONE HUNDRED PERCENT on what needs to be done in the next EIGHT YEARS and HOW it can be achieved.**

**So, let’s just dive straight in and see what they say.**

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

**IRENA is an intergovernmental body established in twenty eleven, which is now a fully integrated sister organisation to the globally recognised International Energy Agency. The IRENA mission statement tells us that its purpose is to provide the principal platform for international co-operation in driving action on the ground to advance the transformation of the global energy system towards the use of all forms of renewable energy.**

**And energy really is what it’s all about. Not just the way we produce it in the first place, but also the way we consume it and the way we distribute it equitably around the world. If we get that right, then pretty much everything else slots into place behind it.**

**This latest report shows us the fastest path to emissions reductions, prioritising existing solutions and those with the best chance of becoming viable before twenty thirty. And it demonstrates how a holistic global policy framework, coupled with some serious investment and more concerted international co-operation can lead to the creation of millions of new jobs, a more inclusive global economy, and a more equal world.**

**Now, if you live in Ukraine, or Yemen, or Afghanistan, or Syria, or Sri Lanka or any one of a host of catastrophically afflicted nations around the world, then you’d perhaps be forgiven for thinking that IRENA’s position is hopelessly idealistic, given the state of our current geopolitical turmoil. But then again, if the world COULD, SOMEWHOW, find a way to achieve what IRENA sets out in this report, then it may actually prove to be the fastest and most effective way to make those regional conflicts become a thing of the past. The first step on that journey though is to properly quantify the challenges and opportunities.**

**So, here’s some headline numbers from the report to kick us off.**

**By 2030, the share of direct electricity in total final energy consumption, or TFEC, will have to go from 21% in 2019 to 30% by 2030. Sixty five percent of that electricity generation will need to be from renewable sources, compared with only twenty-six percent in 2019. That equates to an additional eight thousand gigawatts of renewable capacity within eight years.**

**On shore wind capacity will need to increase to three thousand gigawatts, more than four times what it was in twenty-twenty.**

**Offshore wind capacity will have to be eleven times more than the 2020 number, reaching three hundred and eighty gigawatts by 2030.**

**3:53 Solar PV is targeted to reach five thousand two hundred gigawatts of capacity by the end of the decade. That’s more than seven times 2020 levels.**

**IRENA also says we’ll need a thirty percent increase in hydropower to fifteen hundred gigawatts, plus a six-fold increase in some of the more controversial technologies like hydrogen power, Carbon Capture and Storage and Bioenergy with carbon capture and storage, all of which we’ll come back to later.**

**On top of all that, there’ll need to be at least a two hundred and fifty percent improvement in energy efficiency through far more stringent standards in new building construction and widespread retrofitting of existing buildings, as well as massive process changes in industry that, among other things, fully embrace the principles of a truly circular economy. That means at least a nine-fold increase in direct investment by 2030 compared with 2019 levels, according to the report’s analysis.**

**Even though fossil fuels will still be in the mix at the end of this decade, their role will have been greatly reduced and emissions from the energy sector will have fallen from thirty-seven billion tonnes to twenty-five billion tonnes if all the numbers we’ve just looked at are achieved.**

**So, let’s just talk about those controversial technologies I mentioned a moment ago, starting with hydrogen. There’s been an awful lot of media hype around hydrogen in recent years. It’s already produced in large volumes, mainly for chemicals and fertilizers, via the process of steam reforming methane, or from the gasification of coal, both of which release enormous quantities of carbon dioxide into our atmosphere. The fossil fuel industry says it’s developing technologies to capture all that CO2 to produce what they call Blue Hydrogen. There’s a lot of scepticism about this approach which I talked about at length in that video there, so I won’t labour the point here. Suffice to say, producing hydrogen from fossil fuels plays absolutely no part whatsoever in any of the IRENA pathways. Instead, the report tells us that clean green hydrogen, produced by splitting water molecules in massive, industrial-scale electrolysers, powered by wind and solar, will need to be ramped up significantly in the coming years. The world produces less than a million tonnes of green hydrogen today, compared to more than 60 million tonnes from fossil fuels. By the end of the decade, green hydrogen production will need to hit more than a hundred and fifty million tonnes. Achieving that goal would result in a reduction in carbon dioxide emissions of nearly four billion tonnes a year, driven by a drop in the cost of industrial electrolysers that’ll be very similar to the precipitous falls in the price of wind and solar that we saw in the last ten years. By 2050, IRENA projects that hydrogen will be contributing 12 percent of total final energy consumption. It’ll also account for twelve percent of energy consumption in transport, mainly in large vehicles like trucks, trains, boats and planes, and another eight percent of transport energy will come from hydrogen derivatives like ammonia, methanol, and synthetic fuels. That means a market moving from roughly zero dollars in 2019 to more than a hundred and thirty billion dollars by 2030 and nearly a hundred and eighty billion by twenty fifty, with a massive opportunity for existing net energy importing countries with lots of sunshine and wind to become future green hydrogen exporters.**

**Arguably, far greater challenges exist around increases in the use of bioenergy with carbon capture technologies. Technically, bioenergy already makes up about fifty percent of energy from renewable sources, although there are many people who argue that calling biomass a net zero renewable resource is highly questionable in the very short timeline we’re now dealing with. It’s another subject I’ve touched on in a previous video, which you can jump back to by clicking up there.**

**Bioenergy would make up as much as a quarter of total primary energy supply in IRENA’s 2050 1.5 degree Celsius scenario. That represents a three-fold increase on 2019 levels. By their own admission that’s a challenging scale up effort. In fact, IRENA dedicates and entire chapter of the report to discussing the implications.**

**There’s not enough time in this video to go into all of that minute detail, but in essence, the kind of expansion that IRENA are proposing would need policies that promote strong, evidence-based sustainability governance procedures and regulations aimed at minimising adverse impacts including competition for land, emissions caused by land-use change, deforestation, biodiversity loss, and air pollution. Those are all massive sustainability risks that present a challenge to the bioenergy industry and its investors, and which are, quite understandably, discouraging policy makers from making bioenergy a pillar of their strategies for reaching their own 1.5° degrees Celsius targets.**

**And by the way, there’ll be a link in the description section to the full report, so you can scrutinise that chapter at your leisure.**

**IRENA also spends a whole chapter discussing Critical Materials, which are rare metals like lithium, nickel, and copper, all of which are found in most lithium-ion batteries, as well as rare earths like neodymium and dysprosium which are used to make the permanent magnets essential to products like electric vehicle motors, wind turbine generators and electronic devices like hard disc drives.**

**Right now, despite some effort by the biggest companies to implement ethical and environmental best practice in their sourcing procedures, the global regulatory framework looks a bit like the wild west. IRENA argues that governments need to rapidly get to grips with the complex issues involved and work alongside industry to devise effective strategies that not only build massive efficiencies into the supply and processing chains to reduce bottle necks, but also fully address the challenges of what they describe as ‘sustainable exploitation, safe working conditions, local economic development, respect for cultural and natural heritage, and net zero carbon emissions.’**

**They can do that, says IRENA by mobilising finance to support new suppliers entering the market while creating more efficient, globally enforceable regulatory and licensing procedures that enable the mining industry to react more effectively to unexpected and sudden demand increases.**

**Product innovation will also play a pivotal role in minimising how much of these materials we dig up in the first place. In their latest quarterly earnings statement, for example, Tesla Motors confirmed that half of all the cars they produced last quarter used lithium iron phosphate batteries, which contain no cobalt or nickel at all. Now, let’s be clear eyed here – they’ve done that to reduce their own cost base, not as some kind of benevolent contribution to safeguarding the environment, but nevertheless it demonstrates a clear path towards eradicating these materials from lithium batteries as production increases exponentially over the coming years to provide the grid scale energy storage that’ll be crucial to the roll out of intermittent power sources like wind and solar.**

**And of course, the recycling of critical materials must be enshrined in law as well, and supported by globally agreed state incentives. Those recycling technologies have already been developed, and they’re common practice for metals like copper and nickel, but governments need to make sure it becomes economically viable for recyclers to carefully separate batteries and other electronic devices into their myriad constituent components to cost-effectively liberate each one of them for future use, as part of the circular economy we’re constantly being told about.**

**And on top of specific polices like those, IRENA argues that we’ll need a broader global policy framework that takes a much more holistic view of the interconnections between energy, societies, economies and the planet’s ecosystems.**

**The report compares the current set of global policies, which they call Policy Basket Zero, or PB zero, against two of their own policy proposals, which they call PB-A and PB-B, both of which contain strategies for keeping us within the 1.5 degree Celsius scenario.**

**Current policies have resulted in minimal carbon pricing and negligible genuine international climate collaboration, despite all the fine words from our political leaders at COP 26 in Glasgow last year. Current global distribution is completely inequitable with broad stroke income tax breaks predominantly benefitting the highest income earners in society.**

**PB-A imagines a scenario with very high carbon prices but with quite limited international co-operation as a result. PB-B suggests lower carbon prices but with a much better flow of international co-operation. But both policy baskets phase out fossil fuel subsidies and introduce regulatory mandates for technologies. And they both include lump sum tax break payments that overwhelmingly benefit the lowest earners in society resulting in welfare gains of about twenty percent by 2030 compared to existing policies.**

**But at the same time, both PB-A and PB-B scenarios generate a net increase in the number of jobs AND growth in global GDP by 2030 that’s more two percent better than current policy projections.**

**In practice that means that while the rapid phase out of fossil fuels combined with reductions in nuclear energy will result in something like fifteen million losses in those industries by 2030 compared to the current Planned Energy Scenario, those redundancies are more than offset by almost fifty million new jobs in the renewable sector and other energy transition-based technologies, resulting in a net increase of workers in the energy sector by 2030 from a hundred and six million in the planned energy scenario to hundred and thirty-nine million in PB-A or PB-B.**

**“Achieving universal access to modern energy by 2030 is a vital pillar of a just and inclusive energy transition aligned with the 1.5 degree Celsius goal. “**

**The report tells us.**

**“An estimated seven hundred and fifty-eight million people were living without electricity globally in 2019. Two point six billion had no access to clean cooking fuels and technologies.”**

**“2022 is presenting new challenges” says IRENA**

 **“with concerns about rapidly rising energy prices and energy security. At the same time, the one point five degrees Celsius climate goal is slipping farther out of reach. Short of dramatic and immediate action, it will slip away for good.”**

**Now, a 15 minute video can only give you a snap shot of all the detailed information provided by IRENA in this comprehensive analysis so, as I mentioned earlier, I’ll leave a link in the description section below to both the twenty page Executive Summary and the three hundred and fifty two page full report. And of course as usual, if you’ve got views or practical experience that you can share with us all on this subject then jump down to the comments section below and leave your thoughts there.**

**That’s it for this week though. Thanks, as always to our amazing Patreon supporters who not only enable me to keep this channel running but also keep it one hundred percent independent and completely ad free.**

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**As always, thanks very much for watching, have a great week, and remember to Just Have a Think.
See you next week**