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Intergovernmental Panel on Climate Change (IPCC) Report

Our investment approach stays close to the science and that is confirmed in the latest IPCC report. On April 4th this year, the IPCC third working group released the final contribution to their Sixth Assessment Report. The 3000-page report echoed prior assessments, including that the planet remains on path for 3.2°C warming. This amount of warming would be a climate disaster with severe impacts on people, ecosystems, and wildlife. The findings of the IPCC can sound dramatic however they are likely quite sober. As atmospheric scientist Katherine Hayhoe stated, “climate scientists and physical scientists in general are inherently conservative, they tend to go with the least alarming, the least dramatic.”¹ This conservative bias is so common a phenomenon, there is an acronym for it, ESLD, “err on the side of the least dramatic.”²

While repeating the dire warnings of the past, this report differed from prior ones by focusing on pathways forward. One of the main tools used were energy-system models. The models are computer simulations that produce roadmaps to reduce our carbon emissions while meeting our energy needs. To keep the planet below 2°C will require “rapid and deep reductions in energy system and GHG emissions.”³

Digitization and solar were both identified as being key pathways to mitigation. The attention on digital technologies is consistent with the analysis at Redwood Grove. Past quarterly letters have discussed the increasing role digital technologies will play in enabling a more efficient society. The IPCC notes this overlooked trend in their report: “digitalization can enable emission reductions....[it] can contribute to mitigation of climate change and the achievement of several sustainable development goals (high confidence). For example, sensors, Internet of Things, robotics, and artificial intelligence can improve energy management in all sectors, increase energy efficiency, and promote the adoption of many low-emission technologies, including decentralized renewable energy, while creating economic opportunities (high confidence).”⁴

¹ <https://www.reuters.com/business/environment/new-un-climate-report-tackle-reining-emissions-2022-04-01/>

² <https://www.reuters.com/business/environment/new-un-climate-report-tackle-reining-emissions-2022-04-01/>

³ <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>

⁴ https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf

One of the trends Redwood Grove identified at its inception was the growing need for and importance of digitization to create energy efficiencies. This trend has been reflected in the portfolio for the past five years. Even without the adoption speed necessary to keep the planet under 2°C of warming, it means significant tailwinds for certain companies, for example, Qualcomm. In the company's most recent quarterly earnings they re-iterated that they see their total addressable market growing seven-fold in the next decade. As Qualcomm's CEO Cristiano Amon stated on the April 27th, 2022 quarterly investor call, "these trends, which include the enterprise transformation of the home, convergence of mobile and PC, merging of physical and digital spaces, the digital transformation of industries, connectivity and processing at the edge, the automotive digital chassis and 5G, have only continued to accelerate." Trends like the adoption of interconnected homes, electric and autonomous vehicles, increased renewable energy, and smart cities are all built using Qualcomm's technologies. Qualcomm is changing from a communications company for the mobile industry into a connected processor company for the intelligent edge. As Amon says, "We're just busy executing on one of the biggest opportunities in our history." We believe the market is just beginning to recognize their growth potential and when viewed through the lens of climate mitigation the urgency, speed and scope may prove even larger.

Not surprisingly the IPCC also talks about renewable energy's potential. With cost reductions and regulatory support solar power generation has the greatest potential impact of any technology.⁵ Absent stable regulation, the most important driver for renewable energy adoption is continued cost cuts. The report states that "most striking, the cost of solar PV has fallen by a factor of 5-10xs in the decade since the IPCC Special Report on Renewable Energy" and "the IEA (2020) World Energy Outlook described PV as now 'the cheapest electricity in history.'" Solar also has a clear technological pathway to continued cost reductions. Other forms of renewable energy like wind will play an important role but their ability to continue to cut costs are less clear. Redwood Grove has been compelled by solar energy's potential for significant adoption, however historically high valuations have made investing in the space a challenge.

Regulation: Tariffs and Labor Law

The war in the Ukraine has reminded us that energy can be used as a weapon. There is a term for a country's energy policy called Energy Trilemma.⁶ It refers to a country's ability to balance its energy sustainability, security, and affordability.⁷ A "perfect" balance between the three is difficult to achieve. Germany, due to its desire to improve relations with Russia, lower its cost of energy and move toward "cleaner" natural gas, certified Nord Stream 1 in 2012. To have a more sustainable and affordable energy supply Germany unknowingly increased their security risk. Factors like a particularly harsh winter last year and reduced gas reserves have exacerbated their

⁵ <https://www.power-technology.com/analysis/ipcc-report-iii-energy-systems-future/>

⁶ <https://www.arup.com/perspectives/publications/promotional-materials/section/five-minute-guide-to-the-energy-trilemma>

⁷ <https://www.glasgowsciencecentre.org/our-blog/the-energy-trilemma>

dependence on Russian energy. Nonetheless, since the invasion of Ukraine, Germany and Europe's dependence on Russian gas has become a clear security risk.

Why do we mention this in the context of solar? The United States and China have been in a 10-year long trade war around solar manufacturing. While the silicon solar photo-voltaic (PV) cell was invented in the United States in 1954, in the past decade China has come to dominate its manufacturing. This manufacturing imbalance started in 2011 when China prioritized solar manufacturing and built out capacity in the Xinjiang province where among other competitive advantages, they had access to Uyghur slave labor. This enabled China to produce PV cells much more cheaply than in the U.S.. The U.S. responded by placing tariffs on Chinese solar panels. China retaliated by putting a tariff on U.S. polysilicon. At the time, the U.S. produced 24% of the world's polysilicon the key material for PV panels.⁸ The result was fairly one sided, China succeeded in developing their solar manufacturing but managed to virtually decimate U.S. polysilicon production. The U.S. went from a net exporter of solar panels in 2011, to importing 80% of its solar panels.⁹ While the United States ceded manufacturing, the KWh cost of solar electricity declined dramatically which increased domestic adoption of solar. The "cost" was China's stronghold over the world's PV cell manufacturing.

Until the past six months, little had been done by the U.S. to meaningfully challenge this dynamic. That changed recently with a spate of protectionist policies designed to protect domestic solar manufacturing and to hurt China. First, in February the Biden administration extended tariffs on solar imports on crystalline silicon photovoltaic cells. This was an extension of the tariff originally put in place by the Trump Administration in 2018. Second, on December 23rd 2021, the Uyghur Forced Labor Prevention Act was signed into law. The law directs a federal task force to identify and prevent importation of goods mined, produced, or manufactured using forced labor in China. With implementation details pending, the law includes what is called a "rebuttal presumption" which shifts the burden of proof to the importer. The importer must demonstrate that no materials in the finished product were sourced from Xinjiang region using forced labor.

Highly complex global supply chains, reliant on third party manufacturers make it very difficult to have perfect clarity upstream. This is particularly true when 80% of the world's polysilicon comes from China, and 50% comes for the Xinjiang region. Details on how exactly to demonstrate a clean supply chain are pending and are expected to be submitted to Congress on June 21st, 2022.

These two threats are less concerning than the Commerce Department's willingness to take up a small U.S. solar company's, Auxin, anti-circumvention petition. The result is an investigation into whether solar panels imported from Southeast Asia are circumventing the Chinese tariffs by assembling Chinese produced components and shipping the completed panels from neighboring countries. Because 80% of solar panels used in the United States are imported from Southeast Asia and approximately 30% of the cost of utility scale solar projects are panels this could have a

⁸ <https://www.solarpowerworldonline.com/2021/08/u-s-solar-china-polysilicon-battle/>

⁹ <https://theconversation.com/to-understand-why-biden-extended-tariffs-on-solar-panels-take-a-closer-look-at-their-historical-impact-177528>

significant impact on a project's viability.¹⁰ Any new tariffs could be retroactive to late 2021 and can range from 50-250%. The Solar Energy Industry Association (SEIA) and Woods Mackenzie believes that the implications of this review alone are already very damaging to domestic solar development.

These three policies and reviews have weighed heavily on utility scale domestic solar supply companies. Their valuations have decline upwards of 70%. Firms like Array and FTC, solar tracking companies reliant on domestic solar deployment growth have guided to over 50% year over year revenue growth as recently as early April.¹¹ Nonetheless investors appear concerned that company guidance does not account for the impact from the anti-dumping investigation at the Commerce Department. Array for example is trading at 60% forecasted next year sales. This is a sharp decline from Array's historical valuation which has averaged 3.5x's sales.

The market's concerns are understandable, particularly over the short term. We believe the individual regulatory threats to solar imports will be resolved and the long-term prospects for utility scale solar remain bright. While not assured, the amount of solar needed to meet our energy goals is massive. To reach Biden's goals of zero carbon emission from electricity, for example, would require a quadrupling of solar installations annually from now through the end of the decade.¹² The solar industry has seen these types of regulatory challenges before and has always overcome them albeit in fits and starts.

The extension of the Trump tariffs is unlikely to meaningfully slow growth, as it is a reduction from prior tariff levels, does not include bifacial panels and the quota has been doubled from 2.5 MW to 5MW. Even during the time of the higher Trump's tariffs, more solar capacity was installed than in any other time in history. What the solar industry needs more than lower tariffs is clarity. Regarding the Uyghur bill, Customs has also already shown signs that it is working to unlock any delays. Even before the final guidelines are set in June, solar sourcing protocols have been established and in recent months Customs has started issuing advance rulings so that importers can have greater confidence that solar panels will not be held at the border.¹³

This U.S. Department of Commerce's review of the Anti-Dumping petition is the most opaque in the short term. However, they have reviewed several Anti-dumping petitions, rejecting one as recently as four months ago. The current petition is more wholistic, covering four southeast Asian countries and because of its ability to be retroactively implemented, has already slowed the importation of solar panels. SEIA believes solar installations could be down as much as 50% in 2022. However, we are talking to people at Rocky Mountain Institute (RMI), solar developers, and manufacturers to have a better understanding of the likely outcome. As value investors, this give us an opportunity to participate in an area with attractive long term growth prospects but with a

¹⁰ <https://www.greentechmedia.com/articles/read/key-2020-us-solar-pv-cost-trends-and-a-look-ahead>

¹¹ <https://ir.arraytechinc.com/news-events/investor-calendar>

¹² <https://www.energy.gov/sites/default/files/2021-09/Solar%20Futures%20Study.pdf>

¹³ <https://solarbuildermag.com/news/solar-module-importing-what-to-know-when-requesting-an-advance-ruling-from-customs/>

near term outlook that is a challenge. While patient we believe the current valuations represent attractive long term entry points.

Closing thoughts

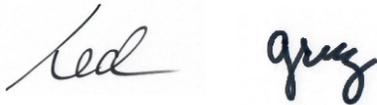
The IPCC also discussed ESG investing in their report. They point out that “markets for green bonds, ESG (environmental, social and governance) and sustainable finance products have expanded significantly since AR5.” Despite this growth they state that, “challenges remain, in particular around integrity and additionality.”¹⁴

To that point, the IPCC’s assessment of the financial markets can maybe be boiled down to one simple observation, “public and private finance flows for fossil fuels are still greater than those for climate adaptation and mitigation.”¹⁵ In other words, despite the urgency to transition from fossil fuels, the growth of sustainable investing and ESG strategies, and attention on renewable energy and electric vehicles, investors in public and private markets are still investing more in fossil fuels than mitigation and adaption.

The IPCC discusses the capital markets because even as climate scientists they understand the important role public and private markets must play in facilitating a transition to a low carbon economy. The IPCC also recognizes where financial flows and products have come up short. Once again, we are in complete agreement with their assessment, “ESLD” as it may be.

As always, thank you for your continued trust in us. If you have questions, concerns or comments please do not hesitate to reach out.

With gratitude,

Two handwritten signatures in black ink. The first signature is 'Ted' and the second is 'Greg'.

¹⁴ <https://www.ipcc.ch/report/ar6/wg3/>

¹⁵ <https://www.ipcc.ch/report/ar6/wg3/>

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