

ESG Now Podcast

“Pondering Peak Emissions in China”

Transcript, 12 April, 2024

SK Kim

Hello, everyone. Welcome back to another episode of ESG Now Podcast, your go-to source for all things environmental, social and governance. I'm SK Kim, coming to you all the way from MSCI's office in Seoul, South Korea.

It's a big day for me as I host the podcast for the very first time, but I promise not to panic, as long as you don't either. We have a great group of analysts across the MSCI ESG Research team, but my heart and my laptop really belong to the Asia-Pacific region. So, I'm going to work to bring new stories from my awesome colleagues in Beijing, Shanghai, Hong Kong, Tokyo, Singapore, Seoul and Sydney, just to name a few.

On today's show, we'll be talking about greenhouse gas emissions in China. We'll be looking at China's climate targets and ambitions, and the relationship between fossil fuels and renewables in the country's energy sector. For investors, it's a relationship that brings both risks and opportunities. We'll also ask whether China's emissions might just hit their peak sooner than anticipated, a development that would shake up the global climate action scene. Let's begin.

You might think that trying to cover China's climate ambitions and its energy sector in one episode is a bold strategy, which it is. So, I'm going to tackle this in three parts. First up, we'll take a brief look at China's emissions to-date, which, spoiler alert, have been falling. We'll look at some of the reasons why and ask how long-lasting these factors will be. Then, we'll look at China's climate ambitions, where the country wants its emissions to map out into the future. It's a trajectory that will rest heavily on clean energy. And last, we'll take on the elephant in the room: China's coal-fired power plants. They're critical to the economy and a key challenge to the country's decarbonization target.

Let's start this off by taking stock of where China is currently, how its emissions have shaped out in the past few years. To help me with that, I've got Cody Dong coming out of MSCI's Shanghai office, and for Cody, emissions are tied fundamentally to energy demand and China's economic growth.

Cody Dong

The structure of China's economy is transitioning from more manufacturing to more service. On top of that, energy usage efficiency is increasing. These two factors will really contribute to China's climate efforts. However, China has not peaked its energy demand yet. As the economy rebounds, there will be sizable incremental energy demand.

More and more of this is being met by renewable energy. If you look at the latest number, renewable energy accounted for nearly 18% of total energy consumption in China, but renewable energy

accounted for over 30% of incremental energy consumption in the country. I think these two ratios are both expected to further increase.

SK Kim

Okay, so economic growth drives higher energy demand, and typically, that has meant higher emissions too. But how the rising demand is met, well, that can change. An economy rebound doesn't necessarily mean that emissions are going to scale up at the same rate. If China can better decouple economic growth from emissions, the future will look a little different.

And in some areas, China has really been at the forefront of decarbonization. In the space of just 10 years, electric vehicles went from just 1% of newly-sold vehicles to 30%, and that change is really striking. But a more widespread decoupling of emissions from growth would require a more systematic shift, and particularly one in clean, or low-carbon energy.

Cody's argument is that China has been incrementally growing its share of renewable energy in its overall power mix, not just hitting 18% of the total power consumption, but also making up nearly a third of incremental consumption, which is where I move into the second part of this episode, China's emission ambitions and what that actually means for renewable energy companies and investors too.

To lift the lid a little more on renewable energy, I turn to Siyao He out of MSCI's Beijing office. And yes, it turns out that renewable energy consumption is interesting, but the real change has been in the growth in new installed capacity. And for companies and their investors, this has also seen some players really jumping at new opportunities coming from this change.

Siyao He

We saw actually, last year, that for the first time in history, China's renewable energy installed capacity has overtook non-renewable capacity. There is definitely vast growth in terms of renewable energy supply, and correspondingly, we also saw Chinese companies showed this quick growth on low-carbon technologies and low-carbon solutions. So, in the past 10 years, the total number of low-carbon patents has increased over 15 times. Some of the highlighted areas, including renewable and clean energy, PV applications, wind turbines, and also electric vehicles in transportation, and batteries in the field of energy efficiency.

SK Kim

So, even though fossil fuel might still be driving a majority of energy consumption in China today, renewables are taking off more and more of new installed capacity, and there is policy support for these changes. China's government has targeted to have 20% of total energy consumption from non-fossil fuel sources by 2025, and to nudge that up to 25% by 2030. But for that shift to happen, there will need to be bottom-up changes in what kind of energy companies produce and use, and the types of products and services they offer.

Siyao He

The targets need to be backed up with technology, and there are normally two dimensions we can check when you talk about technology development. One is the speed, meaning how fast companies are developing patents and technologies. The total number of patents has increased in the last 10 years. So has the patent quality score. Sorry, I'm using this technical term. The quality score showed that Chinese companies have also increased over 15 times in the last 10 years.

SK Kim

But it's not only that there are more patents, but we've also seen a shift in the patents themselves, something that we assess using one of our in-house metrics, the patent quality score. This score uses a combination of factors, like market reach and the number of forward citations, so how often it is referenced by later patents.

The patent quality score is a proxy for the patent's influence, value and potential for licensing. And as Siyao notes, over the last decade, the average patent quality score for Chinese companies has increased by more than 15 times. But of course, having IP or the potential for clean energy solutions doesn't necessarily translate into commercial opportunities. So next, Siyao told me about scalability, or how well these technologies are coming to market.

Siyao He

Basically, Chinese companies have around 5% of average revenue derived from the positive environmental impact projects, including alternative energy, green buildings, waste management, and that number is around 0.8% higher than the global peers. Solar can be a really good example here for the scale. So, over the last decade, China's policy support, strategic focus and growing demand, all these drove the development of solar PV, and the cost has decreased more than 80%. And China's share in all manufacturing stages of solar panels also exceeded 80%.

SK Kim

So, Siyao is seeing some evidence that Chinese companies are capitalizing on clean tech opportunities. 5% revenue on average from positive environmental contributions is solid, sure. It may be slightly higher, but not drastically different from global peers. And given policy support from China's government and these signs that Chinese companies are developing patents and bringing more solutions to market, you might be thinking that clean energy is on the up and up with nothing standing in the way.

But there are headwinds too. See, China's policy support initially attracted many local players to the market. The renewable energy industry saturated quickly. And with high levels of competition and overcapacity, we then saw margins getting squeezed, and to make smaller margins work, companies look to scale up and to do it faster than their competitors. And some of the more successful companies were those with integrated production processes. These enabled the necessary scaling up while maintaining cost competitiveness and efficiency. So, for those outside China, the rapid rise of its presence in renewable energy, particularly solar, might look like a simple story, but it did not happen without intense competition in its local market.

And then, in terms of how renewable energy has rolled out locally in China, well, that hasn't been smooth sailing either. In particular, the reliability of energy supplied from renewable sources is still a little tricky. Overall, energy sources like hydro, solar and wind can be less stable and efficient compared to conventional options like coal and natural gas. And in a pretty ironic twist, physical climate hazards are adding further challenges into the mix, making it trickier to rely on low-emission power sources that would help to actually mitigate climate change in the first place.

Siyao He

Climate change are actually adding pressures. First, the rising energy demand. Electricity need during hot summer days or cold winter days are much higher. And then, on the supply side, again, extreme

weather and climate hazard, making it harder to maintain the power generation. Solar and wind energy very much rely on weather conditions. PV cells are also sensitive to temperature. Extreme heat or river flows can affect hydropower. And even when we talk about thermal power, it is also becoming less efficient during hot days, because coal power plants need water to cool the steam in the generators, and the higher cooling water temperature will reduce the overall efficiency.

And finally, even on the grid system, the electricity transmission lines are also less efficient due to higher resistive losses. So, basically, there are several challenges for renewable energy to expand. And I think physical risks are bringing challenges in the same three aspects, so the energy supply, the energy demand and also the grid system.

SK Kim

So, the outputs from renewable energy have direct relationships to the weather: sunlight and wind drive solar PV cells and massive wind turbines, and hydro installations in the southern part of China rely on flowing rivers and mega dams, both of which have suffered under prolonged drought conditions.

As China's government saw a heatwave depleting hydropower reserves, the government increased coal power supplies to prepare for peak electricity demand season. Our own data shows us how climate change might worsen these types of challenges. Projecting forward under a three-degree warming scenario, more than 80% of southern China will be at risk from extreme heat, and 22% from fluvial flooding, which is how we come to our third and final piece.

To recap where we are up to, China's emissions are decreasing. If economic activity does pick up, it doesn't necessarily mean that a scaling up of emissions is a given. Policy support for renewables, and companies leaning into their opportunities, could help decouple energy demand from emissions.

But rolling out wide-scale renewable energy will not be without its challenges. Siyao touched on some of the efficiency challenges, but in this final piece, we come back to Cody to talk about coal.

For climate-focused investors, shifting away from coal power tends to hang out near the top of their priority list. For China, as per many developing markets, coal remains a key contributor to the overall energy mix. Our data shows that emerging market utilities increased their coal-fired capacity by over 45% between 2015 and 2022.

And power companies in the MSCI China Index still had development plans for approximately 55,000 megawatts of new coal power capacity. That will be a 13% increase on 2022's installed thermal coal capacity. And even as new coal power plants are being built, the average age of coal power plants in China is only 13 years. For comparison, the average of European coal power plants is 34, and in the US, it's 41. So, unless there is a drastic policy shift, it looks like coal is destined to be a long-lasting contributor to China's energy mix.

For investors, that will matter. Coal power in China will ripple through into many global supply chains. For some, there's an increasingly harder line being drawn between their investments and fossil fuel. For others though, this is not just a binary yes or no, but a more nuanced question about how economies can transition away from emission-intensive activities. And as Cody explains, chipping away at China's reliance on coal is going to be a complex task.

Cody Dong

There are two angles I want to talk about, energy stability and social stability. Back in 2021, China faced a very notable electricity shortage during the summer peak season and downstream manufacturing was severely affected. I think this is a lesson learned, and that's why we see more supply of coal from the mining sector, more addition of coal power plants in recent years.

So, energy stability is key to ensure the economy runs smoothly. Though some analysts predicted that China will reach peak emissions soon because of the economic slowdown and many power-hungry sectors like steel, cement and aluminum are under pressure due to the real estate sector weakness. But the economy is cyclical. The Chinese economy may pick up. And on top of that, we have seen more and more extreme heat and unusually hot summers. So, rising energy demand in the short-term will inevitably cause for more coal consumption.

Renewable energy sources may not be able to meet all of the incremental demand. So, before the 2030 government target for peak emissions, I think in the short-term, there will be some fluctuations of emission levels. And though we are reaching a climate inflection point, the real large and meaningful reduction of emission may likely take some time.

The other stability I want to briefly touch on is the social stability side, which is surprisingly not a topic very much discussed in China. This relates to "Just Transition." We're looking at more than 10 million fossil fuel related jobs in China. The potential loss of employment will create some headaches. If you look at where solar, wind and hydro energies are abundant, and where fossil fuel related companies are located, these locations don't perfectly match. So, there will be jobs affected. I would say the speed of coal phase down, and emission reduction will also be influenced by the need to ensure social stability.

SK Kim

So, at the start of this episode, we asked if China had hit peak emissions and whether 2024 was going to be an inflection point, and well, maybe. But also, maybe not. Things are delicately poised and investors will be keeping tabs on many moving pieces. As these macro trends move through China's economy, companies may end up seeing big changes to both their risk landscape, but also their opportunity set. Decarbonizing value chains may offer competitive advantages, and those companies that can capitalize on demands for clean energy could see that translating into revenue growth.

At a much broader level, it's clear that there is momentum to both accelerate clean energy development and uptake, but also to retain coal-fired power sources. Balancing emission reduction efforts with economic growth is going to be tricky, and moving decisively in either direction will have widespread implications globally for climate change, but also for China's population and its economy.

And that's where we will end things for this week. A special thanks to Cody and Siyao for their takes on the news with an ESG twist, and hooray for me for hosting this first episode. I'm definitely looking forward to some more in the near future, so do stay tuned. I'm also supposed to plug the show now, so if you like what you heard, tell a friend, tell a colleague or even your family member if you think it'll be interesting for them. Thanks for listening, and be sure to do the same again next week.

The MSCI ESG Research Podcast is provided by MSCI ESG Research, LLC, a registered investment advisor, under the Investment Advisors Act of 1940, and a subsidiary of MSCI Inc. Except with respect to any applicable products or services from MSCI ESG Research, neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any

issuer, securities, financial products or instruments, or trading strategies, and MSCI's products or services are not intended to constitute investment advice or a recommendation to make or refrain from making any kind of investment decision and may not be relied on as such. The analysis discussed should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction.

The information contained in this recording is not for reproduction in whole or in part without prior written permission from MSCI ESG Research. Issuers mentioned or included in any MSCI ESG Research materials may include MSCI Inc., clients of MSCI, or suppliers to MSCI, and may also purchase research or other products or services from MSCI ESG Research. MSCI ESG Research materials, including materials utilized in any MSCI ESG indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body.

The information provided here is as-is, and the user of the information assumes the entire risk of any use it may make, or permit to be made of the information. Thank you.

About MSCI

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 50 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process. To learn more, please visit www.msci.com.

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the "Information") is the property of MSCI Inc. or its subsidiaries (collectively, "MSCI"), or MSCI's licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the "Information Providers") and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or disseminated in whole or in part without prior written permission from MSCI. All rights in the Information are reserved by MSCI and/or its Information Providers.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors.

Information containing any historical information, data or analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction. Past performance does not guarantee future results.

The Information should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. All Information is impersonal and not tailored to the needs of any person, entity or group of persons.

None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy.

It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, "Index Linked Investments"). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments.

Index returns do not represent the results of actual trading of investable assets/securities. MSCI maintains and calculates indexes, but does not manage actual assets. The calculation of indexes and index returns may deviate from the stated methodology. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities

underlying the index or Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance.

The Information may contain back tested data. Back-tested performance is not actual performance, but is hypothetical. There are frequently material differences between back tested performance results and actual results subsequently achieved by any investment strategy.

Constituents of MSCI equity indexes are listed companies, which are included in or excluded from the indexes according to the application of the relevant index methodologies. Accordingly, constituents in MSCI equity indexes may include MSCI Inc., clients of MSCI or suppliers to MSCI. Inclusion of a security within an MSCI index is not a recommendation by MSCI to buy, sell, or hold such security, nor is it considered to be investment advice.

Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research LLC and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.

MSCI receives compensation in connection with licensing its indexes to third parties. MSCI Inc.'s revenue includes fees based on assets in Index Linked Investments. Information can be found in MSCI Inc.'s company filings on the Investor Relations section of msci.com.

MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc. Neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies and MSCI's products or services are not a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such, provided that applicable products or services from MSCI ESG Research may constitute investment advice. MSCI ESG Research materials, including materials utilized in any MSCI ESG Indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body. MSCI ESG and climate ratings, research and data are produced by MSCI ESG Research LLC, a subsidiary of MSCI Inc. MSCI ESG Indexes, Analytics and Real Estate are products of MSCI Inc. that utilize information from MSCI ESG Research LLC. MSCI Indexes are administered by MSCI Limited (UK).

Please note that the issuers mentioned in MSCI ESG Research materials sometimes have commercial relationships with MSCI ESG Research and/or MSCI Inc. (collectively, "MSCI") and that these relationships create potential conflicts of interest. In some cases, the issuers or their affiliates purchase research or other products or services from one or more MSCI affiliates. In other cases, MSCI ESG Research rates financial products such as mutual funds or ETFs that are managed by MSCI's clients or their affiliates, or are based on MSCI Inc. Indexes. In addition, constituents in MSCI Inc. equity indexes include companies that subscribe to MSCI products or services. In some cases, MSCI clients pay fees based in whole or part on the assets they manage. MSCI ESG Research has taken a number of steps to mitigate potential conflicts of interest and safeguard the integrity and independence of its research and ratings. More information about these conflict mitigation measures is available in our Form ADV, available at <https://adviserinfo.sec.gov/firm/summary/169222>.

Any use of or access to products, services or information of MSCI requires a license from MSCI. MSCI, Barra, RiskMetrics, IPD and other MSCI brands and product names are the trademarks, service marks, or registered trademarks of MSCI or its subsidiaries in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and S&P Global Market Intelligence. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and S&P Global Market Intelligence.

MIFID2/MIFIR notice: MSCI ESG Research LLC does not distribute or act as an intermediary for financial instruments or structured deposits, nor does it deal on its own account, provide execution services for others or manage client accounts. No MSCI ESG Research product or service supports, promotes or is intended to support or promote any such activity. MSCI ESG Research is an independent provider of ESG data.

Privacy notice: For information about how MSCI collects and uses personal data, please refer to our Privacy Notice at <https://www.msci.com/privacy-pledge>.