

Rosefinch Research | 2022 Series # 25

Rosefinch CIO Perspectives on Carbon-Neutral Opportunities



China's economic growth theme is now centered around technological innovation and high-quality transformation. The new five-year plan included key sectors like digital economy, green economy, and biobased economy. Our CIO Mr. Liang Yuejun believes that the green economy sector has the strongest competitiveness, longest developmental track, and relatively lower investment risk. Rosefinch has a good track record of identifying future stars. Back in 2013, before the new energy investments was in vogue, Rosefinch was already a top-10 shareholder of a small photovoltaic company with under 0.5 billion USD market cap. That company now has market cap of 68 billion USD, and we remain a shareholder to this day. The Rosefinch research team strives to research deeply across the entire industry value chain, so we can identify the future stars today and grow with them to fulfill their potential. Below are some key themes that our CIO Mr. Liang shared ahead of our launch of the new Carbon-Neutral 3-year equity mutual fund last week. His list of top 6 investment opportunities is on page 5.

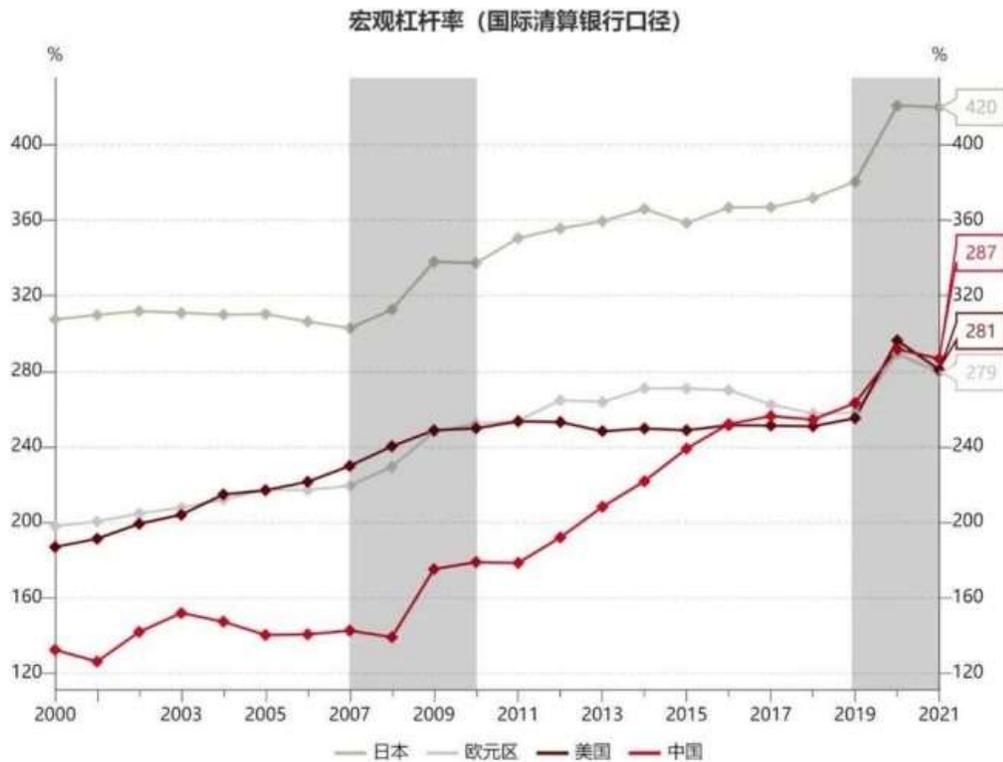
Carbon-Neutral is the main driver to escape stagflation.

Right now, there's a global stagflation situation as European and US economies face their highest inflations in 40 years, while US has two quarters of negative economic growth. Europe also faces severe pressure on its economy, and Chinese economy is under the pandemic stress. In this situation, how do we escape stagflation and achieve sustained growth? We believe, one of the most important drivers is Carbon-Neutral.

Why Carbon-Neutral? Because on the one hand, Carbon-Neutral theme has a large investable space, with total investments over multiple-trillion USDs. On the other hand, Carbon-Neutral can pull consumer end as well, and stimulate economic growth. **The core theme of Carbon-Neutral is the substitution of traditional energy with new energy.** The current inflationary pressure is largely due to high energy prices, which means such pressure will ease as more new energy substitution takes place. From this perspective, Carbon-Neutral investment is indeed a historical opportunity.

The best-case scenario is steady economic growth with stable macro leverage

The national macro leverage measures how the total debt from household, enterprise, and government measure as a ratio over GDP. Please find below the national macro leverage from China, US, Europe and Japan since 2000. Notice the upward trend across all economic entities:



数据来源: wind

Source: Wind. China (last 287),US (281), Europe (279), Japan (420).

China's macro leverage was steady at about 130-140% throughout the early 2000's, while the others were in a gradual climb. After the 2007-08 financial crisis, China's macro leverage climbed to 180% till 2011. It then went up to current 287% from 180% in the past 10 years. Looking at macro leverage ratios across these economies over the past 20 years, most saw a steady climb. Even when there was relatively flat ratio, the economies tend to be stagnant, with one exception: China saw double-digit growth in the

early 2000's despite having a stable macro leverage ratio. There was a specific historical factor there: China joined the WTO in 2001, which coupled with urbanization and industrialization generated significant growth of the Chinese economy. This actually gives us an example of the ideal situation: steady macro leverage ratio with steady economic growth.

The Chinese government has been seeking such a scenario. **As early as 2017's annual government report, it called for Chinese economy to transform from high-growth phase to high-quality developmental phase.** In the 5 years from 2012 to 2017, China saw fast growth in macro leverage with household leverage doubling from 30% to 60%, and enterprise leverage growing from 120% to 160%. Despite this, the economic growth remained under pressure with annual growth rates decreasing from double digits to 7-8% to near 6% per year. Therefore the Chinese government called for high-quality developments, specifically to deleverage and push for supply-side reform. In 2017-2018, China initiated supply-side reform, as well as deleveraging on economic level, including reforms in asset management industry. But these reforms were distracted by a tough external environment: by 2018, the Trump administration had initiated US-China trade tensions. And by end of 2019, the Covid-19 pandemic hit and constrained the 2020 economic activities. After 2020, our macro leverage increased along other major economies, yet economic growth remained suboptimal. Therefore, it's clear that the most important driver of economic growth is not debt or leverage, but innovations.

High-Quality development and macro leverage supports a gradual bull for A-share market.

The previous economic growth achievements centered around government policies, drove by real estate and infrastructural spending, and financed indirectly from banks. Under the high-quality development framework, it's centered around industry or enterprises, driven by technological innovation, and financed directly by capital market. **This is a new paradigm shift, with the distinguished feature of capital market directly supporting technological innovation.** Technological innovation requires big R&D investments with large risks. Only capital market can provide such risk capital efficiently. This is recognized by the central government, who pushed for structural reforms that included registration-based IPO for ChiNext and STAR Market, launch of Beijing Stock Exchange to promote "expert, quality, special, new" companies. In future, the registration-based IPO process may apply to Shanghai and Shenzhen main markets, which will lay the solid foundation for a bullish capital market.

Aside from the capital market, the macro leverage will also support the A-share market's gradual bull run. In 2018, we did supply-side reform and deleveraging, which made the capital liquidity tight. After 2019, PBOC managed both the monetary policy tools and the structural support to provide sufficient and reasonable liquidity for the economy. Recently, we've noticed some household asset allocation shifts. In 2019, China urban households had 59% of assets in real estate, and only 2% in stocks or funds. In comparison, US households only have 27% of assets in real estate, and 36% in stocks or funds. There is therefore huge room for growth as Chinese households shifts assets towards equity assets, and plenty

of funding for the capital markets. The high-quality development in the current capital market should drive a structural trend, which is more likely a gradual bull market.

A-share market's structural characteristic reflects clearly in digital economy, green economy, and biobased economy

In the past 3 years, A-share market's structural trend showed up most clearly in three areas. The first is digital economy, which includes semi-conductor, internet, artificial intelligence. The second is green economy, which includes Carbon-Neutral and Carbon-Peak related fields. The third is biobased economy, which includes agriculture and biopharmaceutical. These areas are all driven by technological innovation which is the essential fuel for their development. For digital economy, the more critical component is the upstream semi-conductor. From the global semi-conductor industry chain perspective, China does not yet call the shots. After US-China tension escalated, China is facing further sanctions on the semi-conductor area. This is a risk factor from investment perspective. As for the biobased economy, China has done a lot of R&D and strategic reserve in agriculture and seeds. But when compared to global giants, China is still some ways off. Biopharmaceuticals did well on the CXO wave, but when it comes to original innovation, China is again far off the global leaders. **The bright spot is the green economy, where China has the clearest competitive advantages, longest growth track, and smallest investment risk.**

Carbon-Neutral is a global consensus

Some people may ask: with Chinese economy under so much pressure today, shouldn't we prioritize economic growth over Carbon-Neutral initiatives? This century, China had a great economic growth period from 2000-2007, largely thanks to China joining the WTO to monetize the benefits of globalization. But after Trump administration, US-China trade tensions changed the dynamic. In fact, the global developed nations are contemplating new trade guidelines. For example, Carbon-Neutral was initially proposed by Europe. As early as next year, those exporting to Europe may be subject to Carbon-tax if the products release excessive carbon in the manufacturing process. If we do not engage Carbon-Neutral now, we may be able to get by for 3-5 years, but after that, our economy will be under tremendous pressure. Carbon-Neutral is therefore a key factor in China's medium- to long-term economic development.

In addition, we must look at Carbon-Neutral from energy security perspective. After the Russia-Ukraine conflict this year, oil and natural gas prices skyrocketed. European nations are facing energy crisis due to their natural gas shortage. China also has a high-reliance on oil and natural gas imports. Pushing substitution of traditional energy by new energy can improve our energy security. For China, it's a national priority to achieve energy self-reliance. Achieving Carbon-Neutral will also push structural reforms in the economy. The core essence of Carbon-Neutral is structural upgrade, which will transform China's economic, energy, financial, and even social structures.

Carbon-Neutral address the issue of global climate warming. Recently we're paying more and more attention to global weather, especially the unusual high temperatures in the Northern Hemisphere. Achieving Carbo-Neutral will therefore support humankind's long-term development. Carbon-Neutral is not just a temporary fad, but a global consensus.

The six major investment opportunities under the Carbon-Peak & Carbon-Neutral theme

There are six major investment opportunities under the Carbo-Peak & Carbon-Neutral theme: photovoltaic, energy consumption, energy storage, Hydrogen energy, CCUS, and smart EV.

1. Photovoltaic – Three Key Areas of Focus

Last year, the global newly installed photovoltaic capacity was 170GW, with annual global consumption around 25 trillion watts. It's estimated that by 2050, global electricity generation will be 60 trillion watts. If we assume 45% of the global electricity capacity will come from photovoltaic, it'll require generating capacity of 22755GW, or annual capacity increase of 1140GW. If we consider additional applications of photovoltaic energy in hydrogen energy or other scenarios, it'll further open up growth potential. Overall, we'd estimate that by 2030, the annual installation capacity may be 1000-1500GW. In other words, the industry's annual growth will be 9-10 times within 10 years. Because of this significant demand, we're seeing massive influx of capital across all links of the industry supply chain. This actually has created some excess supply capacity in some links.

The first area to focus from investment perspective is fully integrated company that can more easily absorb cost fluctuations and respond to future price competitions. The second area for investments is on applications. Over time, as solar electricity prices go down, there will be more end-user applications with good investment opportunities, such as BIPV and distributed photovoltaics. **The third area for investment is around evolving photovoltaic technologies.** Photovoltaic market leaders have been busy rolling out new technology. We expect new production developments on that front by end of 2022. Because these new production lines will lead to changes in materials, it will bring new investment opportunities as well. Even though photovoltaic sector has outperformed recently, there is still massive upside to the sector. Furthermore, future technological developments will bring about new changes that will give rise to more investment opportunities.

2. Energy Consumption – a Tight Market with Strong Certainty

New energy like solar or wind generated electricity is very seasonal and inherently uncertain. On top of that, there may be mismatches between the new energy electricity supply timing and the consumption needs. For example, photovoltaic energy is generated during daytime, with no generation in the evenings.

Wind energy is generated only when there's wind, therefore the intermittent electricity flow presents a challenge to the electricity grid integration. Therefore consumption is a key link in efficient utilization of new energy electricity, and a key component on how new energy replaces traditional energy complex. Currently, wind and solar electricity generation is about 12%, with a forecast to 15% by 2025. As the ratio of new energy increases, the electric grid's stability will also be challenged. While the government has called for massive wind or solar farms, the policy has also called for distributed power generation. The electricity grid must therefore be able to engage both concentrated and distributed new energy power generation, thus requiring an upgrade in the grid capabilities. **Overall, there will be many opportunities for the consumption link in the power transfer, electrical equipment, and intelligent grid sectors.** Even though photovoltaic may see some risk of overinvestment, consumption remains a critical link and therefore enjoys a high certainty.

3. Energy Storage – “New energy generation + Storage” Will be the Most Important Energy Model in Future

Energy storage can be an effective method to address the new energy consumption issue. Since new energy generation is intermittent, even though we can upgrade the grid to link up new energy directly, we still need to store the excess energy when new energy power generation is too high. By 2025, the global energy storage demand is expected to be around 230 GWh. Given the 2020 global energy storage capacity is less than 20 GWh, we are looking at an annualized +50% growth in this sector. Looking ahead towards 2030, in order to replace traditional energy with new energy, it's essential to have significant reduction in energy storage cost. **According to Rosefinch estimates, the 2030 energy storage scale may be 20 times the current scale. Therefore the future 20X growth of energy storage sector is even larger than the 10X photovoltaic growth.**

4. Hydrogen Energy – a Sector with Upside of Tens or Even Hundreds of Times

Why do we pay special attention to hydrogen energy? Because as a new energy source, hydrogen energy has unique characteristics of zero-carbon emission, high energy density, long storage time, and no geographic constraints. **Therefore in the long-term development of clean energy and low-carbon new energy eco-system, hydrogen is indispensable.**

In China, there are some large wind and solar farms that are located in the Western half of the country. Once electricity is generated, there must be consumption pathway to the electricity grid. Any excess electricity that can't be uplinked must be stored efficiently. This problem may be addressed by hydrogen energy. We can use the excess electricity generated by the solar or wind farms in an electrolysis process to produce hydrogen. By storing this excess electricity in an alternative form of hydrogen energy is another way of energy storage.

Hydrogen can also be applied in industrial usage. The steel furnace requires very high temperature which typically can not be achieved using electricity and is traditionally done via coking coal. But hydrogen has high energy content and can reach high temperature required, so it can replace the coking coal in the industrial steel making process. So why don't steel mills use hydrogen to produce steel today? Because the cost of producing green hydrogen needs to be further reduced to be financial competitive. From application perspective, large transportation vehicles such as airplane or heavy trucks can be good candidates. From investment perspective, there are literally tens or even hundreds of times of future demand for green hydrogen.

5. CCUS – Focus on Carbon-Reduction's Upstream Material Opportunity

CCUS stands for Carbon Capture, Utilization, and Storage. CCUS can use carbon-reduction technology to capture some carbon-dioxide and utilize the captured CO₂ in chemical or industrial process. This has applications in petrochemical, cement production, steel smelting, and fire power generation. Currently, some petrochemical companies are already making the necessary technical preparations, while others have already made industrial applications. We focus on these sectors because of the carbon-reduction technology. **The new technology innovations will impact upstream materials prices, therefore creating new investment opportunities.** We're closely monitoring this space and have positioned accordingly.

6. Smart EV – Huge Potential in Intelligent Vehicles

Another investment opportunity is with the electric vehicle. EV related investments have been closely followed in the capital market in the last three years. Most key links along the industry value chain command relative high valuations, with some even reaching into the hundreds. We believe the future transformation of the car industry will come from increased intelligence. In the previous industrial evolution, the car industry had been very slow to change. The internal combustion engine's thermal efficiency only increased 10% in the last 60 years, which is glacier speed compared to other technological advancements. The electrification of cars only changed the power system, which is a change in the manufacturing process. **The change from electrification to intelligent cars will completely change the fundamental structure of the car industry. Car will change from a manufactured product towards a information technology product.**



Source: Tesla

The global leader in intelligent car, Tesla, captured tremendous profit margin by being the sole seller of FSD software. In China, the FSD package costs about 10,000 USD, with increases every year. Thanks to the software sales, Tesla's gross profit is now above 25%, much higher than Volkswagen, Toyota, BMW who still rely on scale to capture margins. As self-drive capabilities improve, car industry's reach will extend into travel via driver-less taxi. If we use the current pricing schedule of car-hailing, a driver-less taxi that costs about 300,000 RMB with relative robust utilization rate can generate gross profit of over 50%. When the car-hailing companies can use driver-less cars, they will become highly profitable companies. The commercial model of car industry will also evolve as intelligent cars' capabilities increase. Market is paying close attention to the hardware related to intelligent cars. For example, basic hardware like lidar, nano-radar, and car camera related companies will be good investment opportunities.

Overall, while the electrification phase has run its course, the intelligent car phase is only beginning and will bring in much bigger growth potentials.

Beware of speculative investments on small-cap stocks

Photovoltaic industry stocks performed well recently, especially some small-cap names. Some company announced their investment in panels, other announced investment in specific links in the value chain. Many times, market pushes up stock prices after such grand announcements. This reminds me of the internet bubble days where many company try to attach to the internet-theme. Yes, there are huge growth potential in photovoltaic market, but it doesn't mean you can choose casually any opportunity that comes along. In the last 10 years, the driver of photovoltaic market is technological innovation. Because of innovation, unit costs are reduced continuously, which leads to viable and sustainable alternative to traditional power generation, and finally the explosive growth in photovoltaic demand. The starting catalyst is technological innovation.

A closer look at many companies' core competency will show that they do not have true innovation. Most are simply going with the trend, invest on the hot topics, and try to freeride on the new energy wave. The risk is that if there's technological change, they will be investing into excess supply capacity of

an expired technology. Therefore it's worth having extra prudence when comes to small-cap companies. We should look at them from the industry value chain perspective. For example, will their investment represent the future development direction of the industry? Can they capture the future industry innovation trends? If they can, then there's room for growth; if not, then they are taking substantial risk.

Thank you! Please contact ir@rosefinch.cn with any follow up questions or meeting requests.

Disclaimer

The information and data provided in this document is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of any financial products or services. This document is not intended for distribution to, or usage by, any person or entity in any jurisdiction or country where such distribution or usage are prohibited by local laws/regulations. The contents of this document are based upon sources of information believed to be reliable at the time of publication. Except to the extent required by applicable laws and regulations, there is no express or implied guarantee, warranty or representation to the accuracy or completeness of its contents. Investment returns are not guaranteed as all investments carry some risk. The value of an investment may rise or fall with changes in the market. Past performance is no guarantee of future performance. This statement relates to any claims made regarding past performance of any Rosefinch (or its associated companies') products. All rights are reserved by Rosefinch Fund Management Co. Ltd and its affiliates.