Which emerging markets will be the winners and losers from energy transition?

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The race to decarbonise the global economy has the potential to turn the commodities market upside down. And this will have wide-ranging implications for emerging markets (EM). Most of the world’s largest economies are targeting “net zero” emissions of carbon dioxide by the middle of the century. Demand for fossil fuels will fade over time and instead re-orientate towards base metals, which are key inputs to equipment used to generate renewable energy, along with new technologies such as electric vehicles and batteries. This “energy transition” could have a seismic impact on EM, many of which are either significant producers or consumers of natural resources.

Producers of fossil fuels face the harrowing prospect of long-term declines in export and fiscal revenues, and will have to write-off trapped assets. Net importers of energy should eventually benefit from a structural improvement in their balance of payments, and some may even begin to export renewable energy. However, the big winners from this new paradigm are likely to be those EM that export the base metals that will be in high demand in the decarbonised global economy. Or those that manufacture equipment used to generate, store and consume renewables.

The implications for investors are clear. Those EM that face a substantial loss of fossil fuel export revenues will have to adapt their economies and public finances to the new, low carbon economy, or face economic and market stress. This will be a major issue for EM that have little in the way of savings from past exports. A permanent improvement in the balance of payments of EM that are net importers of fossil fuels should be supportive of currencies and structurally lower interest rates in the long term. But the biggest opportunities for investors will probably be found in those EM that export much sought-after commodities in the new world, which should boost returns across the board.

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The drivers and implications of energy transition

Now that President Biden has brought the US back into the fold, most major countries are signed up to the Paris Agreement, which aims to slow the rate of global warming. Most countries aim to reach net zero carbon emissions by the middle of the century. Indeed, ahead of the UN Climate Change Conference (COP26) in Scotland later this year, key stakeholders such as the US, China and the UK have announced more ambitious goals to accelerate the reduction in emissions. And even the International Energy Agency (IEA), which was founded in the 1970s to ensure the security of oil supplies, has called for an end to exploration of new sources of fossil fuels. Instead, the IEA suggests that greater investment in renewables should be a priority.

“Decarbonising” the global economy requires a complete redesign of the infrastructure for energy generation. This will involve a shift away from the burning of fossil fuels and towards cleaner, renewable methods such as wind, solar, and nuclear power. Meanwhile, the consumption of energy will also be revolutionised. For example, many countries plan to ban the sale of cars with internal combustion engines within the next decade in favour of electric vehicles.

Energy transition will have a major impact on the global commodities market. Although powering the machinery to build renewable sources of energy could boost consumption of fossil fuels such as oil, gas and coal in the near term, achieving net zero carbon emissions implies a long term, structural decline in their use. As a result, the value of fossil fuels is likely to decline over time, and many of these resources will ultimately be left “trapped” in the ground. By contrast, demand for key inputs used in the new green economy is set to rapidly increase (figure 1). For example, the batteries used to power electric vehicles alone will ramp-up demand for the various industrial metals needed for production. This is just a drop in the ocean, given that the construction of new clean energy generation will also require a lot of industrial metals. These should provide long-term support to demand for many metals, and could even lead to a twin-speed super-cycle in the global commodities market. This is a scenario in which the prices of fossil fuels decline over time, while those of industrial metals increase.

This will be a big deal for EM. Many are either major producers or consumers of commodities, meaning that the traditional drivers of economic growth and returns from financial markets will change in the long term. In the following analysis we aim to identify the probable winners and losers from energy transition.

Figure 1: The green revolution will boost demand for industrial metals

The end of fossil fuels will leave a black hole in the balance sheets of many EM

Perhaps the most obvious place to start is with those EM that have built their economic models around the export of fossil fuels, and seem destined to lose out from energy transition. For example, according to data produced by the World Bank, net energy exports in the Middle East – that is exports minus imports – are equivalent to over 25% of GDP in several Gulf Cooperation Council (GCC) countries such as Saudi Arabia, net energy exports in the Middle East – that is exports minus imports – are equivalent to over 25% of GDP in several Gulf Cooperation Council (GCC) countries such as Saudi Arabia and Qatar (figure 2). And net energy exports are equivalent to almost half of national output in other GCC countries such as the United Arab Emirates and Kuwait. Net energy exports are also important in other EM such as Russia and Colombia, along with frontier markets like Angola, Azerbaijan and Nigeria.

Indeed, energy accounts for the lion’s share of all exports in these EM as extractive industries have tended to crowd out others such as manufacturing by absorbing large amounts of capital investment. As figure 3 illustrates, energy accounts for 80% or more of total exports in most GCC countries, along with Angola and Nigeria.

Figure 2: Some EM rely heavily on energy exports

http://example.com/figure2.png
The energy sector is also the overwhelming source of public sector revenue in many EM (figure 4). However, measuring the contribution of the natural resources sector to public finances on a consistent basis is complex in EM. This is because revenues comprise a combination of direct payments from state-owned enterprises (SOEs), royalties and corporation tax. The IMF conducted a study of this in 2011, and while the figures may have altered since then the overarching story, that the energy sector is the key source of public sector revenues in most major oil exporters, has not.

For example, in the GCC, where the energy sector is operated by SOEs, the proceeds from the sale of fossil fuels account for 80-90% of public sector revenues. These revenues are then redistributed to the wider economy through public sector employment, subsidies and other benefits such as pensions. In other EM where the energy sector is operated by private sector companies, governments collect revenues through the auction of exploration rights, and collect royalties or corporation tax from subsequent output.
Even in some EM that are no longer net exporters of energy, the sector remains an important source of public sector revenues and state subsidies. An obvious example of this is Mexico. Long-term underinvestment and large transfers to the government from the SOE, Petróleos Mexicanos – known locally as Pemex – has seen oil production and refining capacity dwindle over time. This is to the extent that the country has become a net importer of energy, despite having large proven reserves. But while that has seen Pemex rack up large debts, equivalent to about 10% of GDP at the end of 2020, it is still a major contributor to the public purse, as figure 5 shows.

There are many other examples across Latin America, such as YPF in Argentina and Petrobras in Brazil, and in Asia, such as Petronas in Malaysia, that provide a large chunk of public sector revenues. And other EM derive significant tax income through royalties charged to private sector operators.

In addition, many EM have failed to adjust public spending to the reality of lower prices following the prolonged period of $100+ per barrel oil prices during the first half of the 2010s. So even after the recovery in crude prices this year, several EM still need energy prices to increase further in order to balance the public sector budget (figure 6). Indeed, our rough estimates show that Colombia and Nigeria need a sustained Brent crude oil price of about $100 per barrel in order to balance the books.

And major oil exporting states such as Saudi Arabia and the UAE are only breaking even from a fiscal point of view with crude at the $60-70 per barrel mark.

Accordingly, the phasing out of the global consumption of fossil fuels has the potential to leave a black hole in the external and fiscal accounts of many EM.

All other things equal, the loss of export revenues would cause the trade balance of oil producers to deteriorate, putting depreciation pressure on currencies. In turn, unless these countries are able to replace the lost export revenues with new sources, or run down savings, they will ultimately be forced to reduce the size of their import bill; either substituting domestically-produced goods or reducing domestic demand and thus economic activity. This would be negative for growth-sensitive assets.

Similarly, unless tax revenues and receipts from the auction of exploration rights can be replaced, either with new sources or by running down savings, then public sector spending will have to be cut significantly. That would also be a drag on economic activity, while any deterioration in public debt dynamics would be likely to incur higher bond yields. Cutting public handouts could also lead to civil unrest and overhauls of political systems. And for those EM with heavily indebted SOEs in the energy sector, such as Mexico, the public sector may also have to assume those obligations in the long term (figure 7).

The size of the challenge for oil-exporting EM to restructure their economies should not be underestimated. It could be argued that the loss of energy exports would be a force for good in these economies: potential GDP growth is typically low in commodity-based economies and decarbonisation could force governments to go back to the drawing board on economic policy. However, long-term crowding out of manufacturing means that it is probably unrealistic to expect these EM to be able to build high tech industries capable of competing on the global stage. Transitioning to more services-based activity will probably be easier to achieve. However, not every country in the world can become a global financial centre, and the reality is that a lot of service sector activity is relatively low value and unproductive, which is negative for long-term economic and income growth. And all of this will come at a time when strains on the public finances will limit the ability of governments to manage the process, while historically
weak institutions raise question markets over the ability of policymakers to drive significant change. As such, there will be a temptation for at least some of these EM to continue using fossil fuels, or to demand compensation from the rest of the world for their “stranded” assets.

**Savings in sovereign wealth funds can smooth energy transition**

Some countries are clearly better equipped than others to tackle the transition. For example, while GCC states rely most heavily on the energy sector to generate export and tax revenues, they have at least amassed large savings in sovereign wealth funds (SWFs). Data on SWFs are opaque, but these savings are somewhere in the region of 50% of GDP in Saudi Arabia right up 300-400% of GDP in smaller Gulf states such as Kuwait and the UAE. These savings would evaporate in a matter of years if the authorities elected to fully offset lost net energy exports of 25-50% of GDP per year. However, they do provide some buffer against lost future export revenues and could also provide the capital to fund investment in new industries and sectors. The authorities in countries such as the UAE and Saudi Arabia have become proactive in trying to redirect their economies more towards sectors such as financial services and tourism. The jury is out on whether that transformation can fully offset the loss of energy exports, which have funded large programmes of public spending and subsidies. The emergence of new drivers of these economies could offer opportunities to investors. However, any decline in large external surpluses and public sector revenues would raise questions about the current tight spreads on hard currency sovereign debt in the region. And this could also challenge the suitability of managed exchange rate regimes against the US dollar in the long run.

**EM energy exporters with no savings are vulnerable**

However, many other EM have not built up such large savings from energy exports, and will therefore be less able to spend their way through energy transition. For example, in Russia combined SWF and foreign exchange reserve savings of almost 50% of GDP are still sizeable but would not be able to offset the loss of oil revenues for long. At least in the case of Russia, public debt is low and the external position is starting from one of relative strength.

Other energy exporters such as Colombia and Nigeria, however, are far worse off and have very little in the way of savings, along with structurally weak external and fiscal positions. Indeed, Colombia has run large, persistent current account deficits for several years alongside structural budget deficits and a rising government debt ratio. Meanwhile, Nigeria has been forced to use capital controls in recent years to shore up the balance of payments and support its currency, the naira. In the absence of deep structural changes, this seems to be a recipe for these EM to underperform in the long run.

There would be an obvious risk of moral hazard in these EM, if economic hardship meant that they resorted to burning more fossil fuels in order to provide cheap energy. But the loss of energy exports could ultimately be a force for good in these EM if it means that other sectors such as manufacturing are no longer crowded out and governments are forced to adopt new economic models. The energy sector typically requires heavy investment. If this can be redirected to more productive areas then energy transition could eventually help to raise the potential rate of GDP growth in energy-exporting EM, which tends to be low. For example, Russia’s economy has mustered average growth of just 1.7% over the past decade and this has been a common theme across many energy producers. Achieving this will require good policymaking which has historically been relatively poor in such EM.

**Other EM stand to benefit from energy transition**

However, it is not all doom and gloom and other EM stand to benefit from energy transition. Aside from those that would welcome a deceleration in climate change, which we have written about extensively in the past and will not discuss in this paper, other EM will benefit from more direct macroeconomic changes. These are likely to be EM that will see large energy import bills reduced, or that export the equipment or raw materials crucial to the new green economy.
Many EM will save money on energy imports

There could in theory be a direct positive spill over from energy transition to those EM that will no longer need to import fossil fuels. As we have already seen earlier in figure 2, many of the major EM that we track are net importers of energy. This is to the tune of 2-3% of GDP a year in EM such as China, South Africa and India, right the way up to 5% of GDP in others such as South Korea and Thailand. If these EM were able to replace all of the imported energy with locally-produced renewable sources then large savings could be made to improve external balances. Meanwhile the money could be used to pay down debts or fund investment and consumption.

That being said, it will still be very costly and time consuming to transform energy networks that use relatively cheap and abundant fossil fuels to entirely renewable sources. And there would still be ongoing costs associated with running and maintaining these new networks. Again, successfully managing this process will require good policymaking, which has not always been a strength of EM. The greatest benefits are likely to be felt in those EM such as South Korea where the reductions in energy imports will be largest, high domestic savings can fund investment in energy transition, and relatively strong institutions stand a chance of being able to drive change.

The impact on financial markets would depend in large part on how savings on energy imports were deployed. If the savings were instead used to import consumer goods then there would be little structural improvement in external positions, economic activity or market performance. By contrast, if the savings are used to fund capital investment, energy transition could eventually help to raise long-run potential growth. Equally, using the savings to pay down debt would help to lower bond yields.

Rising demand for key industrial metals will buoy some EM

Energy transition implies that long-run demand for fossil fuels will fall, but it also suggests that consumption of the raw materials required to generate and consume energy in a cleaner way will rise in the long term. As figure 8 below shows, energy transition will require a diverse range of industrial metals. Aluminium, copper and nickel are used in a wide range of products. Lithium is a key input to batteries. Silver is also used in the manufacture of batteries, along with solar energy generation. And a wide variety of rare earths are essential inputs across a broad range of industries.

Figure 8: Industrial metals are key inputs to a broad range of clean energy

<table>
<thead>
<tr>
<th>Metal</th>
<th>Wind</th>
<th>Solar photovoltaic</th>
<th>Concentrating solar power</th>
<th>Carbon Capture and Storage</th>
<th>Nuclear power</th>
<th>Light emitting diodes</th>
<th>Electric vehicles</th>
<th>Energy storage</th>
<th>Electric motors</th>
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<tr>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Chromium</td>
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<td>X</td>
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<td>Cobalt</td>
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<td>X</td>
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<td>Copper</td>
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<tr>
<td>Manganese</td>
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<td>X</td>
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<tr>
<td>Molybdenum</td>
<td>X</td>
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<tr>
<td>Neodymium (proxy for rare earths)</td>
<td>X</td>
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<tr>
<td>Nickel</td>
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<td>X</td>
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<td>X</td>
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<td>Silver</td>
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<td>X</td>
<td>X</td>
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<td>Steel (Engineering)</td>
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<tr>
<td>Zinc</td>
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<td>X</td>
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Source: Carbon Brief, as at 12 April 2018.
Figures 9-12: a handful of countries dominate export markets for some key metals

Source: Trademap.org, as at 6 July 2021.
Energy transition is set to drive profound change in commodity markets

If governmental commitment to climate change mitigation investment is as high as we anticipate, then on a five to ten year time horizon, we expect copper, aluminium, nickel, cobalt and lithium prices to be significantly higher as demand and supply factors combine to create material shortfalls.

As figure 13 illustrates, the scale of new supply investment needed to meet the demand created by climate change mitigation policies is unprecedented. This will take time to come onstream, particularly as environmental permitting and jurisdictional risks are rising, meaning prices could be pushed meaningfully higher as demand accelerates.

The majority of these commodities are located in emerging markets. For example, in copper, six of the top ten global exporters are emerging or frontier markets. Those economies which are net exporters of these metals should be beneficiaries. But it is also important to consider the economic significance at the country level, in particular the contribution of exports to GDP.

In aluminium, production can be highly carbon intensive. Around 60% of global aluminium production uses power generated using fossil fuels or thermal coal, particularly in China. This creates an additional opportunity. The relative winners are likely be those markets with material access to renewable resources to power current or incremental smelting capacity. Russia stands out. And the real winners may also be the exporters of aluminium ore, or bauxite aluminium’s raw material, particularly if they are able to develop renewable resources. Guinea is the world’s key exporter, with a 50% global share.

Nickel is a metal where global exports are relatively concentrated, with Indonesia and the Philippines constituting almost 50%. The outlook here is more complex, because a significant proportion of long term supply is in Indonesia, and a large proportion of this faces uncertainty due to ESG challenges. Assuming these can be overcome, Indonesia could be a major winner. Indeed, significant investment in capacity expansion over recent years means nickel has becoming increasingly important to the trade balance. Should ESG challenges prove too difficult to overcome, the major beneficiaries are likely to be current emerging market producers who have more conventional nickel supply, such as South Africa or Russia.

The net losers from energy transition would be those which don’t have access to these resources. China is the key market in this aspect. Although it may rank in the top ten copper producers globally, low production relative to domestic usage means it is a net importer of the metal. And a large share of China’s current aluminium production is based on thermal coal. That said, heavy investment in resource rich regions over the past 20 years, notably Africa to which it is the region’s largest trading partner, should alleviate any major concerns.

When it comes to hydrocarbons, net exporter markets are expected to be long term losers from energy transition. However, the timing could be further out than is currently envisaged. Oil production is likely to peak and shrink before oil demand peaks and falls. Shortages could drive near term crude prices much higher. Perhaps policymakers are comfortable with this outcome, as it could accelerate the relative profitability of renewables and the energy transition itself. Either way, we believe there is a strong probability that we see quite a powerful spike higher in oil prices over the next five years, owing to artificial compression of supply.

Also worth noting are the repercussions across other commodity markets, notably in agricultural products. Take renewable diesel, or Hydrotreated Vegetable Oil (HVO), a fuel used in vehicles to reduce carbon emissions by up to 90%. It is produced using feedstocks including oilseeds such as soybean oil. However, along with demand from other biofuels, this has ramifications for oilseed prices, which have increased sharply. And given the large government subsidies in place, most renewable diesel producers are still profitable. This is a good example of how the focus on ESG and sustainability causes unintended consequences in food markets. The obvious beneficiaries would be Latin American producers, Brazil and Argentina, and Russia.
Strong, long term demand for these industrial metals could boost export revenues of those EM that produce them. As can been seen in figures 9-12 a small handful of EM control global trade in some of these key metals. For example, the Democratic Republic of Congo was the source of 84% of global cobalt exports in 2019, while South Africa shipped 76% and 50% of all chromium and manganese ores respectively.

The story for aluminium is a bit more complicated. Guinea was the source of over half of global exports of bauxite – the ore used to produce aluminium – in 2019. However, difficulties in processing bauxite in order to make aluminium, which is complicated and very power-intensive, means that it is not an exporter of aluminium itself. Instead, producers of final aluminium are far more diverse. Part of the explanation is access to cheap and plentiful supply of energy, which is why some EM such as Bahrain and the UAE are major producers of aluminium despite having no real deposits of ores. China is also a major player in the aluminium trade once processing is taken into account. It is similar in the copper industry, but Chile and Peru dominate the sector.

Meanwhile, as figure 14 shows, China dominates global production of other minerals known as rare earths, which are also required for the manufacture of many new energy goods.

Figure 14: China dominates global production of rare earths

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>China</td>
<td>57.57%</td>
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<tr>
<td>United States</td>
<td>15.63%</td>
</tr>
<tr>
<td>Myanmar</td>
<td>12.34%</td>
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<tr>
<td>Australia</td>
<td>6.99%</td>
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<tr>
<td>Madagascar</td>
<td>3.29%</td>
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<tr>
<td>India</td>
<td>1.23%</td>
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<tr>
<td>Russia</td>
<td>1.11%</td>
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<tr>
<td>Thailand</td>
<td>0.82%</td>
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<tr>
<td>Brazil</td>
<td>0.41%</td>
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<tr>
<td>Vietnam</td>
<td>0.41%</td>
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<tr>
<td>Burundi</td>
<td>0.21%</td>
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</tbody>
</table>

Source: Statista, as at 6 July 2021.

These metals exports are not always economically significant. For example, as figure 15 shows, despite South Africa’s dominance in the chromium and manganese markets, these exports were equivalent to only 1.5% of 2020 GDP. As such, in the absence of astronomical price increases, strong long term demand for chromium and manganese will have only limited spill over to wider economic growth in South Africa. By contrast, while Zambia is a relative minnow in the copper market, ranking at only eighteenth place in the 2019 global export list, those shipments were worth around 30% of 2020 GDP.

It is not only economic benefits that EM metals exporters may enjoy in the future. After all, the world’s reliance on fossil fuels has meant that energy exports have tended to be important when it comes to geopolitics, as the world’s super powers have sought to secure future supplies. So whereas oil exporters for example in the GCC could conceivably lose influence on the global stage in the long term, those that dominate the production of in-demand metals could gain influence. To a large extent, China’s heavy investment in regions such as Africa in recent years means that it has already stolen a march on the rest of the world in this regard. Coupled with its dominance in the product of rare earths (figure 14), this threatens to be another face of long term tensions between China and the US.

That being said, energy transition will not impact all industrial metals equally. Research by our commodities team shows that despite strong demand from energy transition, the steel and zinc markets are likely to remain in surplus over the long term. This means prices are unlikely to rocket, and could even fall in the long run. By contrast, other metals such as aluminium, copper, nickel, cobalt and lithium, which are used in a broad spectrum of products, are likely to see a big mis-match between supply and demand. The prices of these metals have the potential to rise significantly over time and provide a windfall for those EM that export them.

Exports of aluminium ore (bauxite) were equivalent to almost 25% of Guinea’s GDP in 2020 and so it seems that its economy should benefit significantly from strong demand in the future. Similarly, as figure 16 shows, the export of copper and related products generates double-digit revenue as a share of GDP in Zambia, Chile and DRC. And exports of nickel and related products are equivalent to close to 5% of GDP in Zimbabwe.

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Higher prices would improve external positions. For example, in Guinea, all other things equal, a 10% increase in the price of aluminium would generate additional foreign exchange revenue equivalent to 2.5% of GDP for the same volume of exports. That improvement in terms of trade would allow for a greater volume of imports to be purchased without a deterioration in external balances. And while imports do weigh on overall GDP growth, increased use of intermediate and capital goods, or simply higher consumption, would be likely to lift overall economic activity. Economic growth would probably also be boosted by additional investment in the sector, in order to raise future production volumes of key industrial metals.

Indeed, overall GDP growth is closely correlated to changes in the prices of key metals exports in EM such as Chile that rely heavily on commodities exports. And growth was very strong during the decade-long commodities boom that began in 2003. A commodities-driven boom in economic growth would not be a completely free lunch. As the close correlation between GDP growth in Chile and changes in global copper prices clearly illustrates (figure 17), while periods of high and rising prices can lift economic activity, flat or falling prices have the opposite effect on growth. Energy transition has the potential to give long term support to the prices of industrial metals. But they will still be at the mercy of swings in the global economic cycle, raising the risk of boom-bust GDP growth. Moreover, just as has been the case with the fossil fuels sector, heavy investment in the extraction of industrial metals would be likely to crowd out capital spending in other sectors.

Despite these risks, there is clearly a case that EM investors could profit from energy transition by allocating to those markets that stand to benefit most from the paradigm shift. As figure 18 clearly shows, the performance of assets in Chile and Peru are closely correlated with movements in metals prices.
Smaller metals exporters in the frontier market space are not as easy to gain exposure to given relatively shallow and inaccessible domestic financial markets. Perhaps the best way to get exposure at the country level to these smaller markets is through hard currency sovereign bonds (figure 19).

Figure 19: Some metals exporting frontier markets issue hard currency debt

By market of company headquarter. Totals measured in tons (polysilicon), gigawatts (cells, modules).

Source: Refinitiv Datastream, as at 26 May 2021.

Manufacturers of clean energy equipment
The final group of EM that stand to benefit from energy transition are those that manufacture and export equipment that will be used in the new green economy.

Few will be surprised that, like in many industries, China is a major producer of equipment used to generate clean, renewable energy. For example, after targeting the solar sector in recent years, China now controls the lion’s share of solar panel production (figure 20). Exports of these goods ought to flourish in the future as the global economy transitions towards renewable energy. So while China will continue to rely on imports of key metals – as it has done throughout its economic boom over the past couple of decades – its relatively nimble and competitive manufacturing sector so benefit from energy transition.

Figure 20: China dominates industries such as the manufacture of solar panels

The really big winners seem destined to be the countries and companies that manufacture products such as semiconductors. These are already an important input in many electronic products but they will become essential to a broader range of industries such as transport and the internet of things as the world transitions to a smarter and cleaner economy. For example, electronic components such as semiconductors are expected to account for about half of the cost of new motor vehicles by the end of the decade (figure 23).
Emerging market companies play an important role in the clean technology supply chain. These span various industries, all of which are forecast to see strong demand growth as part of the energy transition. Manufacturers of electric vehicles (EVs), EV batteries, and renewable energy systems, including solar panels and wind energy equipment, play a direct role. Semiconductor manufacturers play a more indirect role, but their products are an essential component in green transport such as EV, and in improving the energy efficiency of industry.

And it’s not just a supply story. Emerging markets are set to be major drivers of rising demand for these technologies. Take solar for example, where China is set to account for almost a third of capacity growth in the next few years, as illustrated in Figure 21. This is being driven in part by China’s goal to transition its energy mix and decarbonise, in order to achieve net zero emissions by 2060. India, Latin America and the Middle East are also investing significantly in solar. In the case of EVs, China already has 4.5 million electric cars on its roads, more than any other country or region. This, combined with the government’s target for EVs to account for 25% of new car sales by 2025, suggests that strong demand looks set to continue.

On the supply side, the significant domestic demand for solar alongside technology leadership has allowed the Chinese producers to gain scale and become dominant across the photovoltaic cell component supply chain, from raw materials such as glass, through to producers of polysilicon, wafers and module assembly. And within wind power, where China installed over 60% of the world’s new capacity in 2020, this provides scale for the second largest producer of wind turbines in the world, Goldwind.

Within EV batteries, China and South Korea are the industry leaders. China’s Contemporary Amperex Technology (CATL), and South Korean companies LG Chemical, Samsung SDI and SK Innovation have a combined global market share of 67% in private vehicle and commercial EV batteries as at 31 March 2021. In EVs, six of the top 10 global manufacturers are emerging market companies, including a mix of pure EV and traditional car manufacturers transitioning to EV, such as Korea’s Hyundai and Kia.

In semiconductors, South Korean and Taiwanese companies lead the world, through Samsung Electronics and TSMC respectively. In revenue terms, both rank among the top three semiconductor producers globally. But these are by no means the only players in the two countries.

**Figure 21**

Source: BNEF, Wood Mackenzie, IEA, Bloomberg, Schroders, as at 31 March 2021.
As investors in emerging markets, we see plenty of opportunities in these areas, given strong and consistent forecast demand growth. But it is not simply about adopting a buy and hold approach to companies; there is much more to consider, be it ESG, market competition, geopolitics, or valuations.

For example, understanding production processes and supply chains, their impact on the environment and people is essential to evaluating these investments. Our integrated investment process, drawing on Schroders’ deep sustainability resources, enables us to gain greater assurance with regard to these issues. In particular, answers to questions such as; are plant power sources renewable, or do they still draw on fossil fuels? Is water required for production and how is this managed sustainably? Are working practices of a high standard with regard to health and safety? These are all important pieces of the puzzle. Company disclosure and transparency has never been more important, and it is improving. But there is work still to do, and we as investors are uniquely placed to identify where companies fall short, engage and help to drive change.

The competitive environment is a further factor to monitor across all of these industries. Low cost of capital and subsidies for some industries has resulted in high levels of competition. For example, solar development in China was boosted by subsidies such as feed-in tariffs which lock in an above market electricity rate for a fixed period; these peaked at 80 cents per kilowatt-hour in 2010 based on figures from the Paulson Institute. This has led to overproduction and erosion of returns for shareholders. With the cost of energy now more competitive when compared to traditional fossil fuel sources, as Figure 22 shows, a lot of projects are profitable and government subsidies are easing. Against this backdrop consolidation in the solar segment is now taking place.

Figure 22

Source: BNEF, IEA, IRENA, Schroders, as at 31 March 2021.

Geopolitics can also change the trajectory for supply and demand, and ultimately profitability at the company level. Take semiconductors, for example. Taiwanese and South Korean companies dominate production, but given the industry’s dependence on US technology, this has led to restrictions on exports and production (some of these companies have foundries in China) as US-China tensions have escalated. In the long term, the risk that semiconductor supply chains split into two competing streams, revolving around the US and China, is a concern. This would undoubtedly lead to less efficient allocation of capital.

The scale of the opportunities in clean technology in emerging markets is significant. Unsurprisingly given its magnitude, China is important in many of these areas, but there are opportunities across a range of emerging markets, from South Korea and Taiwan through to Brazil. Being active, engaging with companies and grasping the complexity of the opportunities is essential to generating sustainable shareholder returns and generating a positive impact.
However, there are only a handful of countries and companies capable of producing the most advanced semiconductors used in new technologies. Indeed, as things stand, the industry is largely a duopoly between Samsung in South Korea and the Taiwan Semiconductor Manufacturing Company (TSMC). As we have discussed in the past, China is of course trying to develop its own semiconductors, accelerated by US sanctions that have restricted its access to those semiconductors produced in South Korea and Taiwan using American technologies. And the US is also encouraging TSMC in particular to set up facilities in America in order to diminish geopolitical risk of supply chain disruptions. But all of this is likely to take some time, meaning that in the near term these companies ought to enjoy strong demand and pricing power with positive spill overs to the broader economies and markets of South Korea and Taiwan.

What does this mean for investors?
The bottom line is that investors need to position themselves for the long run impact of energy transition on the performance of financial markets.

The initial construction of the necessary infrastructure will probably boost demand for fossil fuels in the near term, but beyond that the bigger picture is EM that rely on energy exports will have to find new drivers of economic growth or face long-term decline. Some EM will benefit from improvement in their balance sheets if they are to replace costly energy imports with cheaper alternatives. But the biggest winners are likely to be those EM that will benefit from strong and sustained demand for the commodities and technologies that are central to the green revolution.

And even within all of this, new opportunities for investors will emerge as countries and companies adapt to the decarbonised global economy. This will clearly need careful management.

As the green shaded area in the chart below shows, the big winners in EM from energy transition are likely to be those countries that have built their economic models around the export of metals that will be in particularly high demand – aluminium, cobalt, copper and nickel. Most of these should also enjoy a long-term reduction in energy import bills. On an absolute basis, Guinea and the Democratic Republic of Congo are set to be the biggest winners. However, difficulty in accessing these markets means that investors are more likely to get exposure to these trends at the country level through EM such as Chile, Peru and perhaps some Eastern European issuers.

The losers are equally easy to spot, highlighted in the red box of figure 24 where several EM rely heavily on exports of fossil fuels. Demand for fossil fuels may remain strong in the near term in order to power energy transition, but these countries will need to prepare for a long term decline in exports of fossil fuels. And while large savings equip several Gulf states such as Saudi Arabia, Qatar and the UAE to drive diversification of their economies many other frontier markets such as Angola and Iraq will struggle to achieve this. This is also true for EM such as Colombia and Nigeria, albeit the orders of magnitude are much less.

Beyond this, the story becomes more nuanced (and harder to observe on the same scale!). As the bottom left quadrant of figure 25 shows, many EM have the potential to benefit significantly from savings on energy imports. But they will...
remain reliant on imports of metals, and will still need to fund capital-intensive energy transition to reap the rewards of becoming self-sufficient by generating their own energy. Those that can achieve the feat should enjoy an improvement in external positions and free-up funds to either pay down debt or spend, all of which could have some positive spill over to asset prices.

Perhaps the biggest winners here are to be found in Asia. South Korea and Taiwan stand to make significant savings on energy imports, have large capital stocks to fund heavy investment for energy transition and also export semiconductors which will be crucial in the new, decarbonised world. Strong institutions are also relatively well placed to drive long term energy transition. Similarly, while China will remain heavily dependent on imports of industrial metals, it has at least built alliances with many metals-producing EM and controls large swathes of the market for rare earths. Moreover, it is likely to remain a major producer of equipment used to produce and consume renewable energy which will support the external sector over time.

Figures 25: Many EM will benefit from lower energy imports

![Diagram showing energy transitions and benefits](https://example.com/diagram)

Source – Trademap.org, IMF.
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