BEYOND CHINA
The Future of the Global Natural Resources Economy
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Citi was one of the first to call the death of the Commodities Supercycle, but while most now accept that the “Long Boom” has ended, there has been limited effort devoted to mapping what comes next. This report presents Citi’s view of the next decade for commodity markets and repercussions for natural resource economies.

The structure of global economic growth is once again undergoing a fundamental transition, shifting away from the prevailing model of China as the world’s factory and advanced economies as the drivers of consumer demand. In its place, a more heterogeneous, multipolar framework is emerging with both manufacturing and final consumption more broadly spread across the globe.

Whereas the Commodities Supercycle was characterized by rapid, synchronized global demand growth centered on the rise of China, we expect the coming decade to feature slower, more geographically diverse, less synchronized demand growth. The drivers of natural resources demand are spreading across the globe in new ways. For oil, demand growth should increasingly come from the Middle East. For coal, the same is true of India. Only in base metals does China’s predominance look to remain unchallenged. As a result, the traditional practice of analyzing commodities demand based on the US, China and Europe will become less relevant as the drivers of incremental demand come increasingly from the “Emerging 5”: India, ASEAN, the Middle East, Latin America and Africa.

However, no large emerging market is likely to rise up to the point where China has now come to a landing. The most cited potential successors, India and Brazil, are based on democratic institutions unlikely to provide the consensus required to sustain high fixed asset investment levels. Japan and Europe could do this from the 1950s through the 1970s due to the imperative of post-WWII reconstruction. The “Asian tigers” also succeeded, but under what were initially authoritarian systems.

Moreover, growth in the “Emerging 5” is unlikely to prevent structurally slower commodities demand growth. This is due partly to slowing global population growth, partly to China’s slowdown, and partly to elevated base effects following China’s rise. Technological innovation also plays a role, particularly for energy.

Trade flows are expected to slow as China’s demand growth decelerates and as natural resource exporters focus on developing domestic downstream industries. At the same time, the US energy revolution is transforming the world’s largest energy importer into an exporter, even if lower prices slow production growth. Commodities flows are thus redirecting away from the US and Europe, growing less rapidly to China, and instead focusing on the “Emerging 5”.

Economies highly dependent on natural resource exports (which were among the fastest growing during the Commodities Supercycle) now face structural economic, social and political challenges. In response, these countries are likely to invest in downstream manufacturing sectors, resulting in more diversified domestic economic profiles and more diversified global commodities demand.

While the highly cyclical character of natural resources supply is unlikely to change, reduced reliance on the US and Europe for consumer demand, as well as on China for manufacturing and infrastructure investment, is likely to lead to more stable, less synchronized and less cyclical demand.
Falling Chinese Demand Affects Global Commodity Demand Growth

But “Emerging 5” will offset some of the decline

Source: BP, IEA, EIA, IHS, World Steel, NBS, CISA, Wood Mackenzie, Citi Research
FASTEST GROWING ECONOMIES SHIFTING AWAY FROM COMMODITIES EXPORTERS

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<td>Australia</td>
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Source: IMF, Citi Research
Contents
The Post-Supercycle Multipolar Natural Resources Economy 7
China’s Structural Transition 12
Rise of the “Emerging 5” 22
India – Growth Revival 28
ASEAN – Rebalancing Towards Investment & Export Driven Growth 35
Middle East – Strong Demand Growth Despite Lower Oil Prices 44
Latin America – Beyond the Commodity Boom 50
Africa – Electrical and Agricultural Revolutions Needed 55
Russia – Move from Rising Demand to Net New Supplier 61
New Patterns of Commodity Trade 70
New Paradigm for Natural Resource Economies 85
Globalization 3.0 90
The Post-Supercycle Multipolar Natural Resources Economy

Globalization 2.0 and the Commodities Supercycle

The period from 2002 to 2010 has come to be known as the Commodities Supercycle or “Long Boom”. During this Supercycle, the DJUBS commodity index rose 441% to its peak in 2008 and finished the period up 328% with copper the single best performing asset globally during the mid-2000s. Commodities are a cyclical sector and periods of strong price increases are not uncommon. However, the extent of this upcycle was unprecedented as it was driven by a structural shift in the pattern of global growth, combined with a nearly unique simultaneous positioning of virtually all commodities at the bottom of the cyclical investment cycle.

Figure 1. Commodities outperformed nearly all other asset classes during the Supercycle

![Figure 1: Commodities outperformed nearly all other asset classes during the Supercycle](source: Bloomberg, Citi Research)

With China’s continued economic liberalization and accession to the World Trade Organization (WTO), the 2000s saw a reorientation of the pattern of globalization prevalent post-World War II. China emerged as the factory of the world, with the economies of much of the remainder of the world focusing either on natural resource exports to fuel such growth (Australia, Saudi Arabia, Brazil, etc.) or consumers of the finished products exported by China (the US, Europe, etc.).

The period saw near unprecedented sustained, synchronized global growth, resulting in a massive increase in demand for commodities – centered on China.

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1 There have been many waves of what could be termed globalization, from humans’ initial migration out of Africa, to the 15th and 16th century “Age of Discovery” to the wave in the 19th and early 20th century. In this report, we limit our discourse to post-World War II patterns.
Globalization 3.0 and the multipolar natural resource economy

In contrast to the Commodities Supercycle, the coming decade is likely to be characterized by decentralized, desynchronized, multipolar growth. There is no single replacement for China as the world’s factory, nor as the global engine for commodities demand. Rather, manufacturing activity is likely to be more disbursed from Vietnam to Indonesia, Bangladesh and Mexico. Similarly, commodities demand growth will be increasingly driven by the “Emerging 5”: India, ASEAN\(^2\), the Middle East, Latin America and Africa.

Another feature of the coming decade is that Chinese demand growth is structurally slowing. For natural resources demand, this is dual blow. First, overall economic growth in China is slowing. Second, the commodity intensity of the economic growth is falling rapidly such that each increment of a lower level of growth generates even less demand for metals and energy than was seen during the Supercycle.

Moreover, while demand from new regions will increase, it will be unable to offset slower growth from China, leading to slower demand growth globally for commodities as well as weaker global trade flows.

One of the consequences of this shift is that commodities demand is likely to become less synchronized, and particularly less China-dependent. Similarly, the traditional method of analyzing commodities demand based on the US, Europe and China will become increasingly relevant as demand swings are increasingly driven by the “Emerging 5”.

\(^2\) ASEAN is the Association of Southeast Asian Nations consisting of Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam
Figure 3. The global economy of the next decade is likely to be significantly multipolar and far less synchronized.

Economies dependent on natural resource exports are likely to face economic, social and political pressures from lower commodity prices and a decreased ability to grow exports of raw materials to China. In response, these economies are likely to look to grow downstream processing and manufacturing sectors, contributing both to the diversification of commodities demand and a reduction in trade flows.

For oil, this trend will be especially noticeable as demand is increasingly driven by traditional net exporters – particularly in the Middle East. Combined with the rise of North American supply, the result is likely to be a significant slowdown in global trade, which we now believe to have peaked at the start of this decade.

For bulk commodities metals and grains, exporters are expected to increasingly focus on India, ASEAN and the Middle East as major drivers of import demand growth.

Figure 4. Commodities prices are unwinding from the “Long Boom” *(Real prices, US CPI deflated)*

Source: Citigroup
What does this decrease in demand mean for commodities?

China’s economic transition and the inability of other emerging markets to pick up the slack are driving slower demand growth across the commodities complex. However, the extent of slowdown is likely to vary by commodity.

Hardest hit are the bulk commodities: thermal coal and the steel complex (steel, iron ore, coking coal) due to their massive exposure to China’s manufacturing, infrastructure, and real estate sectors. Emerging market steel demand grew by more than 11% annually over 2001-2011 on the back of China’s explosive growth. However, this is forecast to slow to around 2.5% over 2020-2025. Similarly, emerging market thermal coal demand grew by 7% annually over 2004-2011, but is expected to slow to around 2% over 2020-2025.

Demand for base metals is expected to fare somewhat better, with emerging market demand growth in the 3-5% range into the 2020s. Partly this is due to strong demand from “Emerging 5” infrastructure, real estate and consumer sectors, and partly due to better leverage to China’s power and consumer sectors compared to bulk commodities. In fact, copper is a beneficiary of a number of China’s structural and environmental initiatives, including shifting from coastal coal based power plants to inland renewable power and the growth of alternative energy vehicles.

Aluminum demand growth is forecast to remain among the most rapid of all commodities. Offsetting this though are supply headwinds including massive capacity expansion in China increasing recycling rates and a huge inventory overhang from financial deals.

Copper is expected to see more moderate demand deceleration, with emerging market copper demand growth forecast to slow only around 2.5 percentage points when comparing 2020-2025 with 2011-2014. Given also copper’s favorable supply dynamics, its overall outlook looks preferable to aluminum.

Global oil demand growth is slowing inexorably, a phenomenon no longer confined to advanced economies. In fact, we forecast emerging market oil demand growth to slow steadily from 3.9% over 2001-2011 to 2.9% over 2011-2014, 2.6% over 2014-2020, and 2.3% over 2020-205. Much of this slowdown is being driven by China, but most of the remainder of emerging market oil demand is concentrated in net natural resource exporters (Middle East, Latin America, and Russia). Weaker growth in such countries is also expected to contribute to slower demand growth.

Moreover, energy intensity of GDP has been falling in emerging markets in tandem with a slightly more rapid fall in advanced economies and oil intensity of GDP has been falling faster than electricity intensity. This should set the stage for significantly more moderate oil prices in the decade ahead.
Additionally, given the energy intensity of other commodities, a more moderate price outlook for oil spells a more moderate price outlook for other commodities. A significant factor in the recent Supercycle was the forced correlation between energy prices and energy intensive commodities, a factor that has already dissipated considerably.

Natural gas demand is an outlier thanks to improving global infrastructure (particularly for LNG), the shale revolution and an environmental push towards natural gas in place of coal and oil. In fact, while emerging market natural gas demand slowed sharply in recent years, we forecast somewhat of a rebound over the coming decade, averaging 3.6% annually to 2025 compared to 2.3% over 2011-2014.

Grains demand is forecast to slow somewhat, but more due to demographics and a slowdown in the pace of conventional biofuel capacity expansion than anything else. Global population growth is expected to slow from 1.2% over 2001-2011 to 0.9% over 2020-2025. Moreover, grains demand growth during the Supercycle never reached the heights of the industrial commodities – emerging market wheat demand grew by only 1.4% annually over 2001-2011. As a result, the slowdown in grains demand should be more moderate than for industrial commodities.

<table>
<thead>
<tr>
<th>Positively Affected</th>
<th>Negatively Affected</th>
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<td>Coal</td>
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<td>ASEAN Agriculture Sector</td>
<td>Liquefied Petroleum Gas</td>
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<td>Steel sector in Middle East, ASEAN and India</td>
<td>Naphtha</td>
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<td>“Emerging 5” Infrastructure Sectors</td>
<td>Freight</td>
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<td>“Emerging 5” Construction Sectors</td>
<td>Commodity Exporter FX &amp; Government Bonds</td>
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<td>“Emerging 5” Power Sectors</td>
<td>European, Japanese &amp; Korean Oil Refiners</td>
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<td>Renewable Energy Sector</td>
<td>Chinese Infrastructure Sector</td>
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<td>LNG Logistics Sector</td>
<td>Chinese Construction Sector</td>
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<td></td>
<td>Chinese Manufacturing Sector</td>
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</table>

Source: Citi Research
China’s Structural Transition

That China’s economy is undergoing a structural shift is no longer in doubt. The topic is not new as the need for such a transition has now been discussed for over a decade and it has been nearly eight years since former premier Wen Jiabao’s declaration that China’s economy had “unstable, unbalanced, uncoordinated and unsustainable structural problems.” However, the scope and nature of this transition, as well as its impacts on various commodities sectors warrant closer examination.

Capital misallocation

At the heart of China’s economic transition is a change in the way capital is allocated. As it currently stands, the vast majority of investment has been ultimately channeled into either real estate or infrastructure development. Similarly, capital has been funneled primarily into government projects and state owned enterprises (SOEs) rather than the private sector. This has resulted in over-investment in lower returning projects – including those which are unable to repay debts and investors – as well a stifling of growth capital to more dynamic private sector endeavors.

To rebalance the economy, the government is taking several measures:

- **Real estate**: While the central government has attempted to cool the real estate market on-and-off since 2006 (only seven years after its creation in 1999), we believe a structural shift took place in 2014. While real demand from urbanization, upgrading and reconstruction will remain, investment demand is unlikely to ever return in force outside of tier-1 cities. This is being driven both by the proliferation of domestic investment alternatives (wealth management products, money market funds, etc.) and the increasing ease of investing in overseas property.

- **Infrastructure**: The central government has barred local government financing vehicles – the primary channel by which local governments had financed infrastructure projects – from raising additional debt. Instead, local governments are being encouraged to use more transparent capital raising structures, while banks are under pressure to more critically evaluate infrastructure projects.
Figure 7. Capital needs to shift away from infrastructure and real estate, which together accounted for at least 44% of bank loans as of 2012.

Note: “Other” includes some categories which may partially fall under infrastructure or real estate.

Source: PBoC, Citi Research

Figure 8. The central government is focusing on slowing the growth of local government debt, which has surged in recent years.

Source: National Audit Office, Citi Research

“Shadow banking”: Credit outside of traditional bank loans (what has become known as “shadow banking”) has grown rapidly since 2006 and surpassed bank loans by 2013. Much of this credit has been funneled into local governments, reaching RMB 8 trillion ($1.3trn) by June, 2013, up 246% from 2010. In response, the central government has increased regulatory pressure on non-traditional lending channels, leading to net declines in credit outstanding for trust loans and letters of credit, among others, in the second half of 2014.

Changing local government & SOE behavior

One of China’s distinctive features is the blending of a highly centralized political and government system with considerable local autonomy. On the one hand, all local government officials and heads of state owned enterprises are party members with positions subject to change at any point at the discretion of the Central Organizational Department in Beijing. On the other, local government officials regularly flout central government initiatives resulting in missed targets for capacity closures, environmental savings, etc.

3 This includes foreign currency loans, trust loans (essentially securitized investment vehicles), entrusted loans (channeled corporate lending), letters of credit, peer-to-peer lending and, in some categorizations, foreign currency loans, corporate bonds, and non-financial stock offerings, among others.

4 In the words of the traditional Chinese proverb: “The mountains are high and the emperor is far away”.
These failings stem in large part from two factors, both of which are changing. The first is the lack of top level political consensus in the Hu-Wen administration, which has been replaced by much more decisive leadership in the current administration. The second is the criteria used for local government officials’ annual evaluations, which have historically stressed GDP growth and job creation, incentivizing local officials to prioritize new investment and resist closing company facilities even in the face of negative longer term economic or environmental consequences.

While government evaluations are not public, the central government has increased pressure on local officials to implement environmental measures, increase energy efficiency, reduce overcapacity and generally advance reforms (including through increased top-down oversight) supporting talk that evaluations now place greater emphasis on such factors at the expense of traditional economic criteria. Local government officials have responded by increasingly championing measures to reduce pollution and combat overcapacity, among others.

Similar to local governments, state owned enterprises have enjoyed considerable autonomy despite their leadership being appointees of the central government. SOEs have similarly enjoyed preferred access to capital, which has generally been utilized in a less efficient manner than in the private sector. The central government has also sought to shift SOE behavior, by introducing pilot projects to make SOEs more market driven, raising the dividends SOEs are required to remit and increasing the share devoted to social spending rather than re-investment within the SOE sector.

**Massive shift from investment to consumption**

While it is well known that China’s growth has been largely driven by investment rather than consumption, the scope of the needed economic rebalancing is less understood. China’s ratio of gross capital formation to GDP is the highest for a major country in the World Bank’s database at nearly 50%. For comparison, the peak achieved by Japan and South Korea was around 40%, and South Korea has the highest current level of any major developed economy at only 29%.

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5 This may well moderate with the dramatic shift in configuration of the politburo standing committee expected in 2017.

6 Measures have included the creation of committees (“small groups”) dedicated to “deepening reform” at all levels of the central and local government, as well as the expansion of regional offices and personnel for the Ministry of Environmental Protection.

7 Indonesia has the highest level of any major emerging market economy outside of China at 34%.
Figure 9. The shift away from investment-led growth will be a massive undertaking: at nearly half of GDP, investment's share of GDP in China is 10 percentage points higher than the highest seen in Japan or Korea and 28 points above the global average.

Source: NBS, World Bank, Citi Research

To begin rebalancing and bring investment's share of GDP down to 40% by 2020 would require investment growth around three percentage points lower than overall GDP. To reach South Korea’s current level of 29% by 2025 would require investment growth around four percentage points lower than GDP (e.g. 7% GDP and 3% investment growth). Given the exposure of most industrial commodities to Chinese investment growth, this has profound implications for commodities demand.

Moreover, such rebalancing places heavy pressure on overall GDP growth rates. Net exports have actually contributed negatively to GDP growth in recent years, but even assuming 1% growth going forward, consumption growth will be hard pressed to prevent a significant slowdown in overall GDP growth.

Rebalancing investment to 40% of GDP by 2020 would require 9.5% consumption growth to maintain 7% GDP growth, while 8% consumption growth would yield 5.6% GDP growth. Rebalancing investment to 29% by 2025 would yield only 5% GDP growth for 8% consumption growth.

Figure 10. Rebalancing China's economy suggests low growth rates for investment and places a heavy burden on consumption growth (even assuming net export growth improves to 1%)

<table>
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<tr>
<th>GDP Growth</th>
<th>Net Exports Growth</th>
<th>Investment to 40% by 2020</th>
<th>Investment to 29% by 2025</th>
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<td></td>
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<td>Consumption Growth</td>
<td>Investment Growth</td>
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<tr>
<td>3.0%</td>
<td>1.0%</td>
<td>0.4%</td>
<td>5.2%</td>
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<td>4.0%</td>
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<td>8.0%</td>
<td>1.0%</td>
<td>5.3%</td>
<td>10.5%</td>
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Source: NBS, Citi Research

8 Consumption growth has ranged between 7.8% and 10.9% in recent years.
From export manufacturing to services

China’s explosive growth during the period between its accession to the WTO in December 2001 and the financial crisis was spurred to a significant degree by growth in export manufacturing. In fact, net exports rose from 2% of China’s GDP in 2001 to 9% in 2007. However, in this respect China has already begun to rebalance to a significant degree, with this ratio having fallen back to 2.4% in 2013.

![Industrial production growth has slowed but has yet to grow significantly slower than overall GDP, a shift necessary for rebalancing](image1)

![Capital investment in the manufacturing sector has slowed dramatically](image2)

One of the consequences of this shift has been a sharp slowdown in capital formation in the manufacturing sector, with real fixed asset investment in the sector slowing from over 25% in 2004-2009 to around 12% in late 2014. Another has been a slowing in overall industrial sector growth, which along with investment, is one of the two main demand drivers for non-agricultural commodities. Although industrial sector growth remains around the level of aggregate GDP, in order to fully rebalance towards services, growth in the industrial sector will need to fall below that of overall GDP.

Though this transition is painful for a manufacturing sector accustomed to rapid growth and for commodities demand, it does not have nearly the same negative consequences on employment. In fact, services are far more labor intensive – 19% more so in 2013, according to National Bureau of Statistics (NBS) data.9 Moreover, while services in China already account for a larger share of total employment than industry at 39% the proportion is far lower than the 70-80% common in advanced economies.

Urbanization rates remain policy dependent

The great remaining driver of Chinese commodities demand is urbanization. At 55% by the end of 2014, China’s urbanization rate remains low compared to advanced economies at 80%+ and even countries at comparable GDP per capita levels. Continued urbanization should therefore support commodities demand, but the pace at which China urbanizes will be crucial in determining the growth rate of commodities demand.

9 GDP per employee in 2013 was RMB 93,092 (~$14,900) for services compared to RMB 110,837 (~$17,700) for industry.
This in turn is dependent in large part on policy choices. The current administration has moved more rapidly than expected on two fronts:

- **Residence permit (hukou) liberalization**: 2014 saw the complete liberalization of the household registration system for small cities, and partial liberalization for larger cities, which should increase migration from the country’s rural areas to its urban areas. Moreover, the contrast between liberalization for small cities and continued restriction of social benefits (healthcare, unemployment insurance, pensions and public education) in large cities will encourage greater migration to smaller cities. Such growth is more commodity intensive given more sprawling development patterns and lack of economies of scale.

- **Rural land reform**: All land in China is owned by the government, with most farmers currently holding 30-year leases. Traditionally, families that left the countryside would forfeit their lease without compensation. However, today farmers are increasingly able to rent this land to commercial farming operations, reducing the disincentive of urbanizing.

These moves should encourage continued strong migration rates over the next few years, but prospects beyond that remain dependent on further policy decisions.

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**Commodities demand growth exhibiting a structural break**

Chinese commodities demand exploded in the 2000s on the back of China’s accession to the WTO, creation of a private housing market, cleanup of the banking sector and booming global growth. That demand growth is now slowing is not surprising given a decrease in investment growth, manufacturing growth and real estate construction. We believe this represents a structural break in commodities growth rates. Moreover, even with a higher base of consumption, demand in volumetric terms is also lower for most commodities.
Figure 15. Chinese commodities demand exploded in the 2000s, seen best by metals demand, but growth is now slowing as the economy transitions.

Figure 16. Though less spectacular, similar patterns can be seen in demand growth for other commodities, including oil and corn.

Figure 17. Chinese commodity demand growth has slowed, a trend that is expected to continue.

Figure 18. But perhaps what matters more than growth rates is the annual volumetric increase. Despite higher base effects, the slowdown in Chinese demand growth is apparent from this angle as well.

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<td>Natural Gas</td>
<td>16.9%</td>
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<td>Thermal Coal</td>
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<tr>
<td>Primary Aluminium</td>
<td>18.1%</td>
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<td>Corn</td>
<td>4.1%</td>
<td>5.6%</td>
<td>3.1%</td>
<td>2.8%</td>
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<td>Wheat</td>
<td>0.0%</td>
<td>3.2%</td>
<td>1.0%</td>
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</table>

Source: NBS, China Customs, BP, CISA, Wood Mackenzie, USDA, Citi Research

Commodity winners and losers

Bulk commodities, including coal, steel and iron ore, are clearly the biggest losers from China’s transition. In fact, the slowdown in growth rates for these commodities has already begun, and by 2025 we expect demand growth to have peaked across the bulk commodities space. This is largely due to the sector’s significant exposure to real estate, infrastructure and heavy manufacturing. In the case of thermal coal, it is also a result of a shift in China’s power mix to renewables and natural gas.

Copper and aluminum demand are also both slowing, but should maintain substantially better growth rates than bulk commodities. In fact, in volume terms, demand growth may remain relatively stable for both commodities through 2020 compared to recent years. While both will be affected by the slowing real estate and industrial sectors, copper and aluminum are expected to benefit from aspects of China’s environmental transition. Copper in particular benefits from the shift from coastal coal power plants to inland renewable energy, as well as the development of the electric and hybrid auto industry. Aluminum should benefit from substitution away from copper in wire & cable and away from steel in autos, as well as from ultra-high voltage power transmission and continued stronger growth of consumer demand.
Figure 19. That copper demand should hold up better than steel demand over the course of China’s transition is not surprising given other countries’ experiences

Source: UN, Penn World Tables, IMF, World Steel, Wood Mackenzie, Citi Research

Oil demand is also slowing considerably, from 7.3% over 2001-2011 to 2.5% over 2013-2025, driven by industrial products such as diesel, fuel oil and bitumen. Overall growth should remain better than bulk commodities though thanks to continued strong growth in transportation fuels (gasoline and kerosene) on the back of continued solid income growth, trading up demand and development of China’s tourism industry (see also: China’s Thirst for Oil – Waning and Changing).

In contrast, natural gas demand is expected to be far more resilient as it displaces diesel and fuel oil in industrial applications, liquefied petroleum gas (LPG) and kerosene for residential use and thermal coal in power generation. It is also benefitting from the development of natural gas vehicles, though these face stiff competition from electric and hybrid autos.

Corn demand is also expected to remain firm as meat consumption rises thanks to urbanization and continued real income growth as the economy rebalances. However, wheat demand should remain lackluster, with some growth thanks to population expansion, but hurt in part by substitution to other foodstuffs.
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New Demand Horizons
Rise of the “Emerging 5”

There are three important fundamental trends we see developing over the next decade with regard to natural resources demand:

- Global commodities demand growth will be substantially slower than during the past decade;
- The drivers of demand are becoming more diverse, with a focus on China, the US and Europe no longer sufficient to capture global demand shifts; and
- China’s title as the largest contributor to natural resources demand growth is passing to the “Emerging 5”: India, ASEAN, Middle East, Latin America and Africa.

With the end of the Supercycle, commodities demand has slowed and prices have fallen. This has largely reflected a normalization from the exceptional conditions of the preceding decade. At over 4% of global GDP, the cost of oil consumption was creating headwinds for the global economy and even more so in China, where steel costs at nearly 10% of GDP were clearly unsustainable. In 2015, we expect oil consumption as a share of GDP to fall to a more normal level below 2% and Chinese steel consumption to remain below 3%.

While we expect the “Emerging 5” to increase consumption in commodities, this is unlikely to be sufficient to fully offset the slowdown in China. We forecast combined China + “Emerging 5” consumption growth to slow from 4% over 2001-2011 for oil to 2.7% over 2014-2020 and 2.3% over 2020-2025. Similar patterns are expected for other commodities, with steel and aluminum experiencing the largest decelerations. Global commodity demand growth is set to be even slower given slow to negative economic growth in advanced economies.
Demographics suggest slower global demand growth

Global population growth is slowing, with the UN forecasting a decline from 1.2% annually during the Commodities Supercycle to 1.1% over 2014-2020, to 0.9% over 2020-2025. Urban population and working age population growth is expected to exhibit even larger slowdowns. This will create unavoidable headwinds for commodities demand over the next decade.

However, the composition of the slowdown is uneven. China is expected to experience one of the sharpest shifts, with working age population growth falling from 2% in 2003 to negative territory by 2016. Chinese urban population growth, which had been among the world’s fastest during the 1990s and 2000s, is also slowing significantly.

In contrast, growth rates should remain more robust in certain other emerging economies. First among these is Africa, where population growth is forecast to slow only modestly, and remain the fastest in the world. Growth in India and the Middle East is also expected to hold up relatively well, with urban population growth in India forecast to remain particularly strong thanks to continued urbanization.
Figure 24. Slowing population growth is creating headwinds for commodities growth globally

Source: UN, Citi Research

It is also worth noting that the “Emerging 5” demand regions collectively represent a far larger population block than China. Together, they represent over half the current global population, 2.8x larger than China’s, with urban populations 2.5x that of China.

Figure 25. Urban population growth has been one of the main drivers of Chinese demand, but is now moderating, while growth in Africa and India remains more robust

Source: UN, Citi Research

Figure 26. Working age population growth turning negative will be a huge challenge for China, while slowing growth will be a challenge for many other regions with the exception of Africa

Source: UN, Citi Research

Reordering of the global demand framework

Over the past decade, global natural resources demand – as with global GDP – has generally been assessed by examining the “Big 3” economic units: the US, China and the EU (with the sometimes addition of Japan). We believe that such a framework will no longer be effective as changes in commodities consumption become driven to a larger extent by the “Emerging 5”.

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While China has been the largest source of incremental demand for most commodities over the past decade, this is unlikely to be the case over the coming decade. Instead of being concentrated in a single country, we expect demand growth to be spread across a host of economies. The Middle East is forecast to be the largest source of oil and gas demand growth, while India is likely to take the mantle for coal. For steel – perhaps the commodity that most embodies the China story – we expect demand growth to be roughly equally spread across the Middle East, ASEAN, India and China.

Figure 27. The drivers of global commodities demand are becoming more diverse

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Supercycle</th>
<th>2015-2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>China</td>
<td>Middle East, China</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Middle East</td>
<td>Middle East, China</td>
</tr>
<tr>
<td>Thermal Coal</td>
<td>China</td>
<td>India</td>
</tr>
<tr>
<td>Steel</td>
<td>Beijing</td>
<td>Middle East, ASEAN, India, China</td>
</tr>
<tr>
<td>Copper</td>
<td>China</td>
<td>China</td>
</tr>
<tr>
<td>Aluminium</td>
<td>China</td>
<td>China</td>
</tr>
<tr>
<td>Corn</td>
<td>China &amp; US</td>
<td>China</td>
</tr>
<tr>
<td>Wheat</td>
<td>Africa &amp; India</td>
<td>Africa &amp; China</td>
</tr>
</tbody>
</table>

Source: IEA, BP, World Steel, Wood Mackenzie, USDA, NBS, CISA, China Customs, Citi Research

Base metals are the major exception, with China’s near 50% global market share likely to allow the country to remain the largest source of demand growth. But even there, the gap between it and the “Emerging 5” is expected to shrink significantly.

From a global perspective, this means that China’s historical ability to drive global demand growth (sometimes single-handedly) will be greatly reduced.

Figure 28. Another way of looking at this shift is the contribution of the respective regions to global demand growth. China is expected to do far less to drive global growth higher in the future than in the past, with global demand growth rates likely to slow as a result

Moreover, while we expect growth from the “Emerging 5” to remain strong, it will be insufficient to prevent a decline in global demand growth rates. Beyond slowing population growth and the expected slowdown in Chinese demand, we do not expect the “Emerging 5” to be able to replicate the prior boom in global demand driven by China. This is partly due to elevated base effects following China’s rise.
For example, in 2000 the US was the world’s largest consumer of copper at 20% of the global total. Today, China is the largest at around 45%.

Figure 29. While China currently accounts for around half of global steel demand, by 2025 demand from the “Emerging 5” regions will be nearly as large as China’s

Source: World Steel Association, NBS, CISA, China Customs, Citi Research

One of the most dramatic transitions is set to take place in the steel market, where China represents nearly half of global demand and where its massive consumption growth has driven strong global demand growth. However, Chinese steel demand is expected to peak by 2025 while growth in the “Emerging 5” accelerates. By 2025, the “Emerging 5” are expected to account for nearly as much demand as China, with massive implications not only for steel markets, but also for iron ore, coke and coking coal.

In oil markets, though China represents a smaller fraction of global consumption than in bulks or metals, it has traditionally been the largest driver of incremental demand. However, we expect the Middle East to overtake China over the coming decade despite lower oil prices leading to slower growth in that region.

Figure 30. While China has been the largest source of global oil growth in recent years, the Middle East is expected to surpass China

Source: BP, Citi Research
In fact, the “Emerging 5” collectively is far more important for global oil demand growth than China. Over 2014-2020, the “Emerging 5” is forecast to contribute around 950-k b/d annually of new growth compared to around 330-k b/d from China, with the gap only widening thereafter.

The potential for demand growth from the “Emerging 5” remains tremendous with the aggregate currently consuming only 3.0 barrels/person per year compared to 11-25 for most advanced economies. Moreover, at 53% of the world’s population, small changes in per capita consumption have massive implications for global balances.

**Figure 31.** Commodity consumption in the “Emerging 5” remains generally low on a per capita basis

**Figure 32.** The same chart weighted by population hints at the potential for the “Emerging 5” to drive global commodity demand

Source: BP, UN, IMF, Citi Research

Source: BP, UN, IMF, Citi Research
India – Growth Revival

Following the liberalization of the economy in 1991, India enjoyed a sustained period of rapid expansion. During 2003-2008 GDP growth averaged 8.7%. The growth story was interrupted by the Global Financial Crisis and subsequently by domestic policy paralysis, with GDP growth slowing to 4.5% by financial year (FY) 2013. With the Modi government assuming power with an absolute majority, the reform momentum has received a boost. India is largely a ‘self-help’ story, aided by the new political will and an active central bank. As a result, we expect GDP growth to accelerate towards 7% by FY17 and inch towards 7.5% over the longer term.

What will drive growth? Despite rapid growth, India’s per capita GDP (on a purchasing power parity basis) at $5,400 continues to lag behind its emerging market peers ($15,000 average for other BRICS nations). Some of the factors that could catalyze recovery are:

- **Political stability and reforms**: The visionary leadership of Prime Minister Modi and Reserve Bank of India (RBI) Governor Rajan is likely to create a policy environment conducive to higher growth and moderate inflation. As the government focuses on policy reforms and execution, the productivity of capital (ICOR) could be returned to 2002-2007 levels.

- **Demographics**: India with its 1.25 billion population enjoys a demographic advantage with the proportion of working age population set to remain high (>50%) and likely to increase further in the coming years.

- **Urbanization and infrastructure push**: India’s urbanization rate has been steadily rising, but remains low at 30%. With the government focus on developing urban infrastructure (smart cities, transportation networks, industrial hubs etc.), the pace of urbanization could increase.

- **Commodities demand** – In order to sustain a growth rate of 7-7.5% over the longer term, India’s demand for energy and industrial commodities would need to increase substantially. Among major trends, the share of natural gas in India’s energy mix is expected to rise to 20% in 2025 from 14% currently, while that of oil could decline to 25% from 30% currently. As for coal, given that India has one of world’s largest reserves, the recent ordinance with enabling provision for commercial mining by the private sector, could expand production significantly. Demand for metals will also continue to be buoyant to support infrastructure, urbanization and manufacturing growth.

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**Figure 33. Indian commodity consumption to increase rapidly over the coming decade**

<table>
<thead>
<tr>
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<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Oil (k b/d)</td>
<td>3,319</td>
<td>3,488</td>
<td>3,685</td>
<td>3,727</td>
<td>3,827</td>
<td>3,941</td>
<td>4,071</td>
<td>4,218</td>
<td>4,374</td>
<td>4,536</td>
<td>4,704</td>
<td>5,587</td>
<td>4.1%</td>
<td>3.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Natural Gas (Bcm)</td>
<td>63</td>
<td>61</td>
<td>59</td>
<td>51</td>
<td>52</td>
<td>57</td>
<td>61</td>
<td>66</td>
<td>71</td>
<td>76</td>
<td>82</td>
<td>115</td>
<td>5.1%</td>
<td>7.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Thermal Coal (Mt)</td>
<td>523</td>
<td>548</td>
<td>607</td>
<td>649</td>
<td>713</td>
<td>775</td>
<td>830</td>
<td>888</td>
<td>950</td>
<td>1,016</td>
<td>1,093</td>
<td>1,569</td>
<td>6.9%</td>
<td>7.4%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Steel (Mt)</td>
<td>66</td>
<td>71</td>
<td>73</td>
<td>74</td>
<td>75</td>
<td>82</td>
<td>88</td>
<td>96</td>
<td>104</td>
<td>112</td>
<td>120</td>
<td>173</td>
<td>7.5%</td>
<td>8.2%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Refined Copper (kt)</td>
<td>447</td>
<td>448</td>
<td>470</td>
<td>478</td>
<td>506</td>
<td>538</td>
<td>571</td>
<td>605</td>
<td>641</td>
<td>680</td>
<td>720</td>
<td>965</td>
<td>4.2%</td>
<td>6.1%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Aluminium (kt)</td>
<td>1,501</td>
<td>1,601</td>
<td>1,725</td>
<td>1,731</td>
<td>1,772</td>
<td>1,855</td>
<td>1,985</td>
<td>2,118</td>
<td>2,266</td>
<td>2,425</td>
<td>2,594</td>
<td>3,639</td>
<td>7.4%</td>
<td>6.6%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Corn (Mt)</td>
<td>15</td>
<td>18</td>
<td>17</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>19</td>
<td>19</td>
<td>20</td>
<td>20</td>
<td>22</td>
<td>22</td>
<td>2.7%</td>
<td>2.1%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Wheat (Mt)</td>
<td>78</td>
<td>82</td>
<td>81</td>
<td>84</td>
<td>94</td>
<td>94</td>
<td>86</td>
<td>87</td>
<td>88</td>
<td>89</td>
<td>91</td>
<td>97</td>
<td>3.2%</td>
<td>-0.6%</td>
<td>1.5%</td>
</tr>
<tr>
<td>GDP Growth (following FY)</td>
<td>9.4%</td>
<td>7.7%</td>
<td>4.8%</td>
<td>4.7%</td>
<td>5.6%</td>
<td>6.5%</td>
<td>7.0%</td>
<td>7.1%</td>
<td>7.1%</td>
<td>7.4%</td>
<td>7.5%</td>
<td>7.5%</td>
<td>7.5%</td>
<td>7.1%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Source: BP, India Coal Comptroller, World Steel, Wood Mackenzie, USDA, IMF, OECD, UN, Citigroup Research
A Quick Recap: Tracking the India Story

While the liberalization of the Indian economy began in 1991, it was not until the 2000s that the investment rate increased meaningfully. In the early 1990s, despite economic reforms, the private sector was weighed down by elevated levels of debt and a lack of internal accruals. However, as firms de-leveraged and began to generate free cash flow towards the end of the 1990s, it provided a fillip to investment in the 2000s – only to be interrupted by the Global Financial Crisis in 2008.

- **Early 2000s saw investment led upturn:** Real GDP growth accelerated from 4.3% in FY01 to 9.3% in FY08 (see Figure 34) largely on account of double digit investment growth. As seen in Figure 35, the strong upturn in investment saw the investment rate rise from 23% of GDP in FY01 to 34% of GDP in FY08. Correspondingly, the share of private consumption declined from 65% of GDP in FY01 to 58% in FY08.

- **Post-Global Financial Crisis saw a global crisis and policy paralysis:** GDP growth decelerated in this phase from 9.3% in FY08 to sub 5% in FY13/14. Investment growth first collapsed in the aftermath of the Global Financial Crisis, and following a brief recovery fell to sub-1% levels due to domestic policy-related issues on clearances (both land and environment) and fuel supply. The slowdown in consumption growth from 9.4% year-over-year in FY08 to 4.7% in FY14 was moderate when compared with an investment slowdown from 16% to -0.2% over the period.
Growth Driver #1: Political Stability & Reforms

Mandate for pro-business Modi government bodes well

After three years of policy paralysis, we believe that the clear mandate for the pro-business Modi government for the next 5 years is likely to speed up policy reform. The Bharatiya Janata Party’s (BJP’s) absolute majority has so far been accompanied by success in various state assembly elections, which is crucial for Rajya Sabha (upper house of Parliament of India) strength. The following initiatives by Prime Minister Modi are likely to have a transformative impact on the Indian economy:

- **“Make in India”**: The “Make in India” campaign aims to promote manufacturing in India, which currently constitutes only ~15% of overall GDP compared to a 25% target. This campaign outlines the government’s priorities in developing India into a manufacturing hub in the years to come. Key features include: (1) job creation, (2) skill development and (3) clarity on policy. The Prime Minister also reiterated India’s strength – the unique combination of democracy, demography and demand which make it a suitable destination for manufacturing. To facilitate the manufacturing sector, the government aims to improve India’s ranking in the World Bank’s “Ease of Doing Business” survey to 50 from 142 (out of 189 countries).

- **Jan-Dhan scheme**: The rollout of Jan-Dhan Yojana (the People’s Money Scheme), which aims to provide banking services to 75 million unbanked households, has made rapid progress in a short time (66 million accounts opened as of October 2014). Financial inclusion through this scheme is likely to have a multiplier effect on the economy. Also, when combined with a program to issues Aadhaars (unique identification numbers) to residents, it could become an efficient and transparent mechanism to carry out social schemes and transfers.

- **Foreign policy aimed at economic ties**: Right after assuming office, PM Modi engaged in discussions with leaders of Japan, China and the United States. The dominant theme of these meetings has been economic ties in the areas of investment, infrastructure development, trade, energy and skill development. As a result, investment to the tune of $100 billion could be realized over the next 5 years.

**Changing dynamics at the RBI – financial sector reforms**

While the change in the central government is significant, the appointment of Dr. Raghuram Rajan as RBI governor also helped to increase investor optimism and policy momentum. In his own words, Dr. Rajan’s vision for India’s financial sector is summarized as “given the right environment, financial sector reforms can add between a percentage point and two to the economic growth rate”. As soon as Dr. Rajan assumed charge as RBI governor, he began implementing regulatory and policy reforms in the form of five pillars, namely: (1) clarifying and strengthening the monetary policy framework, (2) new entry, expansion of the banking sector, (3) market broadening and deepening, (4) financial inclusion; and (5) mechanisms for debt restructuring/recovery non-performing asset management.

**Bottom line**: The visionary leadership of Modi and Rajan is likely to create a policy environment conducive to higher growth and moderate inflation. As the government focuses on policy reforms and execution, the productivity of capital (ICOR) could return to 2002-2007 levels, enhancing growth dynamics further.
Growth Driver #2: Demographics

India with its 1.25 billion population enjoys a demographic advantage with the proportion of the working age population remaining high (>50%) and likely to increase further in the coming years. This contrasts with other emerging markets, particularly China, where the working age population is likely to shrink. Favorable demographics impact the economy in multiple ways:

- **Demand side:** The growth in India’s population at 1.1% annually for the next 10 years is likely to provide a boost to aggregate demand. The penetration of products and services (e.g., consumer durables) remains low, which makes it an attractive market for investors/industries. The UN also projects India to overtake China as the world’s most populous country by 2030.

- **Supply side:** Given that the working age population in India is likely to grow at 1.3% per year over the next decade (faster than the overall population), the productivity of labor could increase during this period of demographic transition. In addition, India’s population remains largely young (median age <30 for another 10 years), which could support high levels of savings (currently 30-31% of GDP), which in turn provide capital for investments.

- **Other impacts:** Other impacts of demographics include: (1) Increased representation of women in the labor force – likely to reduce the dependency ratio and enhance productivity; (2) faster population growth in northern states like Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan etc. compared to slower population growth in southern states is likely to equilibrate/increase migration; and (3) increased urbanization to optimize resources and raise labor productivity.

**Bottom line:** Given the addition of close to 13 million workers to India’s labor force annually, the expansion of the labor intensive manufacturing sector will be crucial. To that effect, the Modi government’s focus on skill development, “Make in India,” and creation of urban infrastructure is likely to realize the demographic dividend India offers.
Growth Driver #3: Urbanization and Infrastructure Push

Urbanization – steadily rising, smart cities

- **Urbanization trend to continue**: India’s urban population has been rising at a 2.5% annual rate over the past 20 years compared to overall annual population growth of 1.6%. As a result, the proportion of the Indian population residing in cities has increased from 26% to 32%. In comparison, the rate of urbanization has been relatively faster in China where the proportion of urban population has increased from 30% to 53% in the same period. Indian cities are estimated to account for roughly 40% of the Indian population by 2030, as the urban population grows by 2.3% or 10 million people annually. India’s large states such as Tamil Nadu, Gujarat, Maharashtra, Karnataka and Punjab will soon have more population residing in cities than in villages.

- **Positive for GDP**: Urbanization is key for sustainable growth. It is estimated that cities will account for 70% of India’s GDP by 2030. According to a McKinsey study, urbanization could increase average national income by four fold. On the investment side, the growth of cities implies a better transportation network and infrastructure development, with the roads sector a particular beneficiary.

- **Policy favors urbanization**: The current government intends to build 100 new ‘smart cities’ with a focus on technology, infrastructure and sustainability. It will also work on projects like twin cities and satellite towns. In its maiden budget, the government announced an outlay of Rs706 billion ($11.4bn) for the development of smart cities. Many of these are to be located along the Delhi-Mumbai Industrial Corridor (DMIC). The government is currently working on identifying the cities and will then co-ordinate with state governments to develop them. Moreover, in recent discussions with China and Japan, PM Modi established partnerships to develop the ‘100 smart cities’ initiative such as (1) building the cities of Dholera and Shendra Bidkin in partnership with Japan and (2) establishing a ‘sister-city’ relationship between Delho-Beijing, Mumbai-Shanghai, Bengaluru-Chengdu and Kolkata-Kunming.

Figure 42. Urbanization rate – India (%)

Figure 43. Urbanization rate – EMs (%)

Source: United Nations
**Bottom line:** India’s urbanization rate has been steadily rising, but remains low relative to its emerging market peers at 30%. With the government’s focus on developing urban infrastructure, the pace of urbanization could increase. Rapid urbanization would be the optimal way to harness India’s demographic advantage and be an enabler of sustained growth.

**Impact on Commodities**

In order to sustain a growth rate of 7-7.5% over the longer term, India’s demand for industrial commodities would need to expand substantially.

- **Oil:** As the economy expands, oil demand will continue to grow, albeit at a projected 3-4% rate compared to GDP growth of 7-7.5% given declining energy intensity and improving productivity. Rising auto ownership, overseas trade and airplane travel will also support demand growth. Thanks to the initiation of the New Exploration Licensing Policy (NELP) in 2000, which ended the government’s monopoly in oil exploration, various foreign and private sector firms have been participating in the bidding procedure for oil blocks, which could enhance domestic production. India currently imports ~80% of its petroleum consumption needs.

- **Natural gas:** Natural gas is emerging as the preferred fuel of the future in India as it is viewed as being both environmentally friendly and economically attractive. It is gradually replacing oil in the energy mix, with the share of natural gas likely to rise to 20% in 2025 from 14% currently, while that of oil likely to decline to 25% from 30% currently. Consumption growth remains constrained primarily by supply bottlenecks, though recent reforms on natural gas pricing and increased incentives for deep gas drilling are likely to provide a boost.

- **Thermal coal:** Coal is the dominant fuel in India. About three quarters of the country’s coal is consumed by the power sector and the balance by industries such as steel, cement, fertilizers, chemicals, paper and transportation. Renewables and gas fired power are likely to expand, particularly as PM Modi seeks to promote the solar industry and international cooperation over nuclear power has improved. However, the government’s prioritization of 24/7 electricity for all is likely to be very supportive of coal demand. Despite having one of the largest coal reserves in the world, domestic production by Coal India has been unable to meet demand. The government is making significant efforts to boost domestic production – both by Coal India and other sources – but imports are likely to continue to grow as demand outstrips supply.

- **Metals:** Demand prospects are robust for industrial metals thanks to continued urbanization, prioritization of infrastructure development – particularly the electrical sector – rising motor vehicle ownership and rebounding manufacturing activity (including a developing focus on electronics). India has substantial reserves of iron ore and bauxite, with substantial expansion of downstream processing (steel and aluminum) likely. For copper, India has limited ore resources, but is currently a net exporter of refined metal, a pattern likely to reverse within the next decade.
- **Grains**: Indian corn demand is expected to increase at around a 2% annual rate. Unlike most countries where corn is used as feed for pigs and cattle, in India consumption is primarily as chicken feed due to religious considerations. Animal protein consumption remains quite low though, and as incomes rise, per capita consumption should increase as well – on top of population growth. Wheat consumption is also likely to see some continued growth, but given higher current per capita consumption and less sensitivity to rising incomes, we see less scope for growth than for corn.
ASEAN – Rebalancing Towards Investment & Export Driven Growth

We expect the ASEAN-6 economies\textsuperscript{10} to grow 4.8% annually between 2014-2025 on an aggregated purchasing power parity (PPP) basis, moderating from 5.2% between 2006-2013, with the pattern of growth shifting away from debt-driven private consumption towards fixed investments and net exports. Private consumption is expected to slow to 3.8% over the next decade (from 4.9% in 2010-2013), bringing its share of ASEAN-6 GDP to 48.7% by 2025, from 54.5% currently. Fixed investments spending should also moderate, but to a smaller extent (to 5.9% in 2014-2025 and 7.3% in 2010-2013), allowing its share of GDP to rise to 27.9% by 2025, from 24.5% in 2013. Higher productivity investments in net exporting sectors, especially in manufacturing, will feature more prominently over the next decade. This in turn should lift net exports from just under 10% of GDP in 2013 to 14% by 2025.

These aggregate numbers mask the considerable variation between individual countries. Vietnam and Indonesia are expected to see the fastest GDP growth rates of 5.8% and 5.5% respectively, as a recovery in manufacturing and infrastructure investment is further reinforced by the demographic dividend. At the other end of the spectrum, growth in Singapore is expected to moderate to slightly under 3%, reflecting an aging population, deleveraging in the consumer sector and a gradual hollowing out of manufacturing. Thailand, with growth of 3.6% also suffers from slower population growth and consumer deleveraging, but maintains its competitive advantage in manufacturing. Malaysia and the Philippines, at 5.3% and 5% growth respectively, are in the middle of the spectrum. Malaysia’s continued demographic dividend and influx of export-oriented manufacturing foreign direct investment (FDI) are offset by fiscal consolidation and consumer deleveraging, while Philippines’ growth will be driven primarily by infrastructure investments “crowding in” private investments in manufacturing and services.

\textsuperscript{10} ASEAN-6 refers to: Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam. The full membership also includes Brunei, Cambodia, Laos and Myanmar. We focus our analysis on the ASEAN-6 as these countries represent the overwhelming majority of ASEAN commodities demand (as well as 95% of nominal GDP and 88% of the population).
Overall population growth in the ASEAN-6 is expected to slow to an average of 1.0% over 2014-2025 vs 1.4% in 2010-2013, with an attendant slowdown in the working age population growth from 1.5% to 0.8%. That said, ASEAN should still experience a rise in the share of working age population from 67% in 2013 to 68% in 2020-2024, giving rise to a demographic dividend. The demographic dividend is most apparent in the Philippines, Indonesia and Malaysia, where the working age population is forecast to continue to grow well beyond 2040. The demographic dividend may also be helped by a rise in the female labor force participation rate, which is quite low in Malaysia, and to a lesser extent Indonesia and Philippines.

The outlook for commodities demand looks bright, particularly for bulk commodities and industrial metals. The shift towards infrastructure and export manufacturing are precisely those that led to rapid commodities demand growth in Japan, Korea, Taiwan and China. In fact, we expect ASEAN to be one of the three fastest growing regions for steel demand. A shift in ASEAN’s power generation mix is likely to benefit coal at the expense of oil and gas, and ASEAN is expected to be the second largest source of coal demand growth globally over the coming decade.
Figure 49. ASEAN commodity demand is forecast to experience strong growth, particularly in bulk commodities and metals

<table>
<thead>
<tr>
<th>Year</th>
<th>Ocean Cargo (Mt)</th>
<th>Oil (k b/d)</th>
<th>Natural Gas (Bcm)</th>
<th>Thermal Coal (Mt)</th>
<th>Steel (Mt)</th>
<th>Coal (Mt)</th>
<th>Refined Copper (kt)</th>
<th>Aluminium (kt)</th>
<th>Corn (Mt)</th>
<th>Wheat (Mt)</th>
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<td>5,393</td>
<td>5,494</td>
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<td>6,943</td>
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<tr>
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</tr>
</tbody>
</table>

Source: BP, IEA, EIA, IMF, World Steel, Wood Mackenzie, USDA, OECD, UN, Citi Research

Trend #1: Rising Urbanization

Southeast Asia should continue to steadily urbanize, with sizeable opportunities in Indonesia, the Philippines and Vietnam. The United Nations (UN) expects the urbanization rate of ASEAN-6 will increase to 55.5% by 2025 from 46.6% in 2010, or an additional of 94.9 million people between 2010 and 2025, of which slightly over half will be in Indonesia. This is larger than the 90.5 million added over 1995-2010, with the acceleration due primarily to Vietnam and the Philippines. A separate forecast by McKinsey predicts even more rapid urbanization in Indonesia, from 50% in 2010 to 71% in 2030 compared to the UN’s forecast to 60% in 2025.

Urbanization will be a major driver for metals demand, including steel, copper aluminum and zinc. According to Metal Bulletin, construction is already the largest steel end-using sector for Asia’s emerging economies, accounting for around 75% of demand for long products and some 18% for flat products.

Coal is also likely to benefit via cement demand growth. Cement is the second largest demand sector for coal in ASEAN. Indonesian cement consumption grew by 7% per year over the past decade, and with budget and subsidy reform in the cards, we expect cement sector growth to accelerate in the medium term.

Figure 50. Urban populations (thousand persons)

Figure 51. UN projections of urbanization CAGR (%)

Source: UN Population Division, Citi Research

Source: UN Population Division, Citi Research

Trend #2: Plugging ASEAN’s Infrastructure Gap

Governments will need to invest heavily in infrastructure to alleviate bottlenecks in a number of areas – clean water, waste management, energy supply and public transport – where the increase in demand and gaps in supply could be particularly acute as urbanization takes off. The Asian Development Bank (ADB) has estimated ASEAN infrastructure needs at $60 billion per year through 2020, with the ASEAN Infrastructure Fund (AIF) expected to plug only $4 billion of this gap, rising to $13 billion after 70% cofinancing by the ADB. A number of countries have laid out aggressive infrastructure plans over the next 5-10 years.

- Thailand has plans for linking industrial zones and key ports via enhancing the efficiency of railway links and enlarging sea port capacities.
- The Philippines is undertaking several big-ticket infrastructure projects under its Public Private Partnership (PPP) program to improve roads, airports and water supply. The government has bid out Php133 billion ($3bn) worth of PPP transport projects recently with more to come.
- Indonesia has crafted plans for over 1,000 kilometers of new toll roads to move goods faster across the vast archipelago. There are vast plans for new power plants, as well as investment in airports, seaports, railways and water facilities.
- Malaysia in its recent budget placed an emphasis on improving transport infrastructure with around $23 billion allocated to railways and expressways, concentrated around the capital and on Borneo Island.

Infrastructure investments should help spur demand for metals, while energy infrastructure build-out should also boost fossil fuels demand, particularly coal. The International Energy Agency (IEA) predicts that Southeast Asia will require around $1.7 trillion of energy infrastructure investment through 2035, with almost 60% of this in the power sector. This is particularly positive for coal, which is likely to be the dominant source of incremental power capacity, and copper for use in cables and transformers.

However, investments in public transport infrastructure may not be as favorable for oil demand. While the build out of road networks will provide some help, a focus on railways could crowd out potential oil demand growth. In Indonesia, efforts to revitalize the colonial-era railway network, the integration of it with seaports and water-based transportation, plus the development of Jakarta’s mass rapid train system will ultimately reduce the reliance on road transport and private vehicle usage. Likewise, Malaysia has laid plans to develop the Mass Rapid Transit system in the Klang Valley, which should dampen demand for private road transport.

Trend #3: Revival of Export-oriented Manufacturing

Rising labor costs in China are diverting manufacturing FDI, providing ASEAN a narrow window to improve export competitiveness (see ASEAN Long View). Data from US firms suggest that manufacturing has delivered double the returns on investment of non-manufacturing in ASEAN economies. Thus far, investment has been more export-oriented in the more open economies such as Malaysia and Thailand. Indonesia and the Philippines have yet to fully realize their potential for export-oriented manufacturing although this may change as existing infrastructure bottlenecks are resolved and capacity reaches critical mass.
The share of Vietnam's FDI-dominated manufacturing sector will probably gradually rise as banking sector deleveraging has now slowed. Pending Free Trade Agreements (FTAs) with the EU and Korea (its second and fourth largest trading partners) provide potential for substantial additional boosts. The manufacturing sector will remain driven by light manufacturing (garments/textiles still big), machinery parts and electronics. The exception in ASEAN is Singapore, where a hollowing out of resource-intensive segments is expected to see manufacturing's share of GDP fall.

The machinery and vehicle manufacturing sectors will likely grow in size and importance. Thailand's role as a major vehicle manufacturing hub for Japanese companies is well known, but Indonesia is also attracting increasing FDI in the sector. While Indonesia's auto production has initially catered to the domestic market, as production reaches critical mass and bottlenecks in infrastructure, logistics and human resources are resolved, we expect a growing emphasis on exports. Malaysia's automotive manufacturing sector is also currently overwhelmingly for the domestic market, with the government targeting production of 1.35 million vehicles by 2020, with at least 200,000 units to be exported and exports of components to reach a minimum of RM10 billion ($2.8bn) by 2020.

The automotive sector will not only provide a source of demand for oil, but will also boost demand for metals including steel, aluminum, copper, zinc, lead and platinum group metals (PGMs). Much of this will be imported, including steel autosheet, which due to demanding specifications is imported from Japan and Korea.

In fact, the increase in demand for commodities associated with a manufacturing revival has sparked export restrictions on commodities, especially in Indonesia. Exporting natural resources, especially those that are expected to be needed domestically, such as minerals, coal and gas will likely face increasing political resistance, with regulations on natural resource exports expected to tighten further. Governments in the region, including Indonesia, Vietnam and the Philippines are increasingly focused on developing domestic downstream industries rather than simply exporting raw materials.
Trend #4: Evolving Energy Mix

Energy demand in ASEAN has historically been heavily dependent on oil and natural gas, but this is shifting towards coal and renewables. According to the IEA, the share of oil and gas in ASEAN-4’s\(^\text{12}\) primary energy demand is expected to fall from 60% in 2011 to 55% in 2025, while the share of coal is expected to rise from 17% to 26%, with renewables expected to see marginal gains.

Figure 54. Primary energy demand composition from ASEAN-4

![Figure 54: Primary energy demand composition from ASEAN-4](chart)

Note: Bioenergy comprises both traditional and modern sources
Source: IEA, Citi Research

Fuel subsidy reform to reduce demand for diesel and gasoline

The IEA estimated that fossil fuel subsidies in ASEAN-10\(^\text{13}\) amounted to $51 billion in 2012 or 2.2% of nominal GDP, while the International Monetary Fund (IMF) estimated energy subsidies for Malaysia, Indonesia and Thailand at 2-4% of GDP in 2011. However, governments have seized the window of opportunity provided by falling crude prices to undertake substantive subsidy reforms. Indonesia raised gasoline and diesel prices by 31% and 36% respectively in November 2014, which should deliver close to Rp96 trillion ($7.5bn) of fiscal savings, and introduced a floating price/fixed subsidy system from January 1, 2015. In Malaysia, following the 9% hike in fuel prices in October 2014, the government took the historic step of abolishing subsidies on 95 octane gasoline (RON95) and diesel from December 1, 2014, with prices to be determined by a managed float system every month. Thailand’s new government also plans to implement energy pricing reforms to improve the fiscal position and stabilize energy demand, where we could see potential floating of liquefied petroleum gas (LPG) and compressed natural gas (CNG) prices.

\(^{12}\) Indonesia, Thailand, the Philippines, Malaysia.

\(^{13}\) ASEAN-10 includes the full constituents of ASEAN
Fiscal and subsidy reform may boost economic growth and infrastructure investment, supporting commodities demand. While the direct impact of subsidy reforms is clearly negative for oil demand, the implications for broader commodities demand – particularly metals – are more positive. A reallocation of subsidies will increase the capability of governments to fund infrastructure projects, particularly in Indonesia. In Malaysia, savings on fuel subsidies could be re-allocated towards targeted cash transfers for the poor, as well as higher spending on rail transport.

Electricity generation is shifting to coal

For ASEAN-10, the IEA expects coal generation to rise from 31% of total electricity output in 2011 to 41% in 2020 and 49% by 2035. In Indonesia, coal once generated only 28% of electricity output, but this has risen to 52%, with plans to increase this further to 66%. Similarly, the share of coal in Malaysia’s electricity mix has jumped from 6% in 2000 to 42% today, and is expected to rise to 50% by 2035, helped by progressive reduction in gas subsidies. Meanwhile, Thailand’s coal-fired generation is set to reach 36% of output by 2035 from 22% in 2011. In the Philippines, power generation capacity is expected to almost triple from 19 GW in 2011 to 55 GW in 2035, of which coal will account for two-thirds of incremental output.

Demand for coal will be driven primarily by lower generation costs. Cheap coal from Indonesia with low energy content can be consumed in new boilers with low transport costs. Lower natural gas prices could challenge this dynamic, but we expect coal power plants to remain more cost effective in the region.
Figure 56. Electricity generation costs in ASEAN, 2020-2035

Source: IEA

**Renewables build-out to limit fossil fuel demand growth**

Efforts are currently underway to boost the use of hydroelectric, geothermal, biomass and solar power sources. According to the IEA, renewable sources currently account for 14% of ASEAN’s power generation (of which hydro and geothermal account for 10% and 3%), but this is forecast to rise to 20%. Indonesia for example, intends to raise the use of renewable energy to 15% of power generation by 2020, from 12-13% today, primarily by developing geothermal sources. Thailand has plans to raise the share of renewable energy in power generation from 7% today (primarily hydroelectricity) to 29% by 2030. Malaysia has efforts to expand the use of hydroelectricity, which accounted for 7% of electricity generation in 2012. In particular, the state of Sarawak is constructing several sizeable dams which will take the share of hydroelectricity in Sarawak’s power generation from 35% in 2012 to 80% by 2020, replacing much of its natural gas-fired capacity.

*Indonesia and Malaysia have also actively promoted the use of biofuels in transportation*, leveraging their combined 85% global market share in palm oil production. In Indonesia, biodiesel consumption is expected to grow after the government mandated 10% biodiesel usage in the industrial and transportation sectors and 20% of diesel used in the power sector by 2014. In Malaysia, new biofuel mandates should significantly boost demand and production, with some analysts estimating that Malaysia’s biodiesel production capacity could be up to 40% of US production capacity. That said, the shift to biodiesel could be hindered by lower gasoline and diesel prices and in Indonesia by high inter-island transport costs.
Figure 57. Electricity generation mix by fuel type

Source: IEA
Middle East – Strong Demand Growth Despite Lower Oil Prices

In recent decades, the Middle East has become one of the fastest growing regions in the world in terms of commodity consumption. This has been due to a number of factors which have been mutually reinforcing.

The first of these is the rapid rate of population growth. Fertility rates in the Middle East have remained high by global standards, while mortality rates have declined in line with the rest of the world. Added to this has been the extraordinary inflow of immigrants from outside the region into the booming Gulf oil economies. Indeed, in 1970, the population of the 6 Gulf Cooperation Council (GCC) countries was just eight million people, and mostly comprised locals. By 2010, this number had risen to 45 million, almost half of whom were foreign migrants. This represents an annual population growth rate over the period of 4.5%, three times the global average and fifteen times that seen in Europe over this period.

Equally important has been the sharp rise in regional wealth. The primary driver of this has once again been the Gulf economies, which have experienced one of the greatest income windfalls in history. In 1970, average annual income per capita (in today’s money) in the GCC was just $1,250, around 25% of US average income per capita at the time. The oil booms of the 1970s and 1980s transformed these relatively poor desert states into one of the wealthiest regions in the world. At the height of the second oil boom in the early 1980s, GCC income per capita was over 80% higher than that of the United States, and in the first decade of this century rose from 50% to 100% of US per capita income.

But while the GCC was undoubtedly the epicenter of rising Middle Eastern wealth, the impact was felt across the region as a whole. Middle East migration to the Gulf swelled, with an estimated 16 million Arab workers calling the GCC their home in 2008, the height of the GCC boom years. These migrant workers remit vast amounts of money to their homelands – in Egypt, Jordan and Lebanon, remittances accounted for around 20% of GDP in 2013 alone. In addition to remittances, Gulf money has made its way to its more hydrocarbon-challenged neighbors through expanding demand for their products, as well as rising Gulf tourism and investment.
Rising regional wealth has boosted purchasing power and consumption per capita, and fed back into population growth.

Moreover, the Gulf is a relatively inhospitable environment for the kind of population growth it has witnessed. Water resources on the Arabian peninsula are the lowest in the world, arable land is virtually non-existent and temperatures soar close to 50°C (122°F) during the long summers. The intensity of commodity consumption, particularly in energy, is thus among the highest in the world (Figure 60). Moreover, with the exception of oil and gas, reliance on commodity imports (especially food) is among the highest in the world. These features are structural of the Gulf economies and are unlikely to change as they continue to grow.

Commodity Consumption Outlook to 2025

We expect the drivers for commodity consumption growth in the Middle East to remain the same over the next decade, although the pace at which these will drive growth is likely to slow. This is mainly due to three factors:

- As wealth has risen, populations have ballooned and infrastructure has been built out, the marginal growth in consumption has already begun to slow due to the large base effect and a rising propensity to save.

- We believe economic growth is likely to slow over the medium term given our expectation that the coming decade will be characterized by a significantly lower oil price environment than has been the case over the past decade. Indeed, the sharp fall in oil prices during the second half of 2014 has resulted in a commensurate fall in our growth expectations for the region as a whole, with expected cuts to infrastructure spending putting downward pressure on commodity consumption growth.

- Energy pricing reforms reducing fuel and electricity subsidies will decrease the energy intensity of Middle Eastern economies and encourage investment in renewables. Lower oil prices and weaker fiscal balances for oil exporters are providing a strong catalyst for such reforms.

Our commodity consumption forecasts are based on a slowdown in population growth to a long-run average of around 2% annually for the region as a whole. GDP growth is likely to moderate in the GCC, but gains elsewhere in the region (such as Iraq and Iran) are likely to mean growth for the Middle East as a whole will hold up in the 3% range, not vastly different to historic averages. We have also factored in some of the potential upside of a possible opening of the Iranian market, and expect demand in Turkey to continue to support overall growth.

Demand growth for grains are likely to moderate in line with regional population growth. In the GCC, we expect a significant slowdown in population growth as governments prioritize jobs for locals and reduce immigration. The rest of the region, by contrast, should see relatively steady population growth, driving steady demand for food commodities.
Focus on the GCC energy challenge

We forecast the Middle East, alongside China, to be one of the two largest growth regions for oil and gas demand globally over the coming decade. On the oil side, most of this growth is concentrated in the GCC countries, which is also the largest global oil exporting region. But as domestic consumption rises, some are at risk of becoming net energy importers in the coming decades, or else seeing their growth significantly constrained by lack of energy for domestic consumption.

Nowhere is this problem more acute and of more significance than in Saudi Arabia. The Kingdom today consumes over 3 million barrels per day of oil. Much of this is spent on electricity generation – in Saudi, almost half of total electricity generation relies on burning crude oil (with additional use of diesel and fuel oil). Heavily subsidized power is raising demand for feedstock at an unsustainable rate and eroding exportable oil. At current growth rates, and assuming steady but moderate growth in Saudi oil production capacity, the Kingdom would become a net oil importer within the next thirty years.

Will this happen? Most likely not, as Saudi Arabia, like other GCC countries, is currently pursuing measures to ensure the long-term sustainability of its energy balance. But the analysis highlights the importance of addressing this challenge.

One area where this needs to happen is energy efficiency: reducing consumption is key to making GCC energy balances sustainable. This goal can be achieved by a number of means, such as improving public transportation, enhancing the energy efficiency of buildings and vehicles, adapting better urban planning practices and adjusting energy tariffs to reduce waste.

The last of these is perhaps the most important, yet the most challenging of energy efficiency reforms. Adjusting energy tariffs is not only the key to cost recovery for energy providers, but would also reduce some of the wasteful practices of GCC residents with respect to gasoline, electricity and water consumption. But energy tariff reform is not without its risks, as is evident across the world: raising tariffs can flare social tensions and create public resentment of the government.

Nevertheless, lower oil prices are likely to encourage Middle Eastern economies to reduce or eliminate subsidies for fuel and electricity, both due to deteriorating fiscal positions and lower switching costs for consumers. The necessity to implement reforms has increased following the fall in oil prices and massive fiscal hit to oil exporters. Removal of energy subsidies could be crucial to helping cushion this blow. Moreover, lower oil prices reduce the impact on consumers from removing fuel subsidies. In fact, countries such as India, Indonesia and Malaysia have already taken advantage of lower prices to remove subsidies.
The region is likely to remain a hub of energy intensive industries such as aluminum and oil refining given the region’s energy resources are among the world’s best, though cost competitiveness is likely to be somewhat eroded. But more fundamentally, higher tariffs should encourage improved energy efficiency and lead to slower energy demand going forward.

**Shifting power mix**

Raising energy tariffs could also promote investment in alternative energy sources, particularly in the power sector, another critical component in making energy balances sustainable. Currently, around 85% of Middle Eastern power generation is derived from oil and gas, with virtually all other forms of primary energy also from hydrocarbons.

However, **GCC countries are investing heavily in renewable energy**, especially in solar energy technologies, with ambitions to increase their contribution to total power production substantially over the coming decade. Nuclear power is seen as the big game-changer in the GCC, with Abu Dhabi and Saudi Arabia both well advanced in plans to establish the Arab World’s first nuclear generators in the coming years.

In other parts of the Middle East, the picture is somewhat different. **Turkey remains committed primarily to coal power**, which is projected to expand by around 3.5% per year over the coming decade. This is expected to be the primary driver of thermal coal demand in the region, with other countries remaining only marginal consumers.

**Figure 62. Middle East electricity generation is dominated by oil and gas (2011)**

![Bar chart showing Middle East electricity generation by source in 2011](source: World Bank, Citi Research)

**Iran continues to rely heavily on natural gas power, which it is continuing to expand.** The country is also seeking to develop its nuclear generation and sanctions will play a dominant role in determining whether future power demands are met by natural gas or nuclear. Iranian natural gas supply in the shorter term depends in large part on supply though, as winter shortages have limited consumption.
Iraq is planning to dramatically boost electricity generation from natural gas at the expense of crude oil, fuel oil and diesel. Natural gas accounted for around 30% of generation in 2010, but the IEA projects this to rise to around 60% in 2020 and 85% by 2025. This could add 20 bcm to natural gas demand over the coming decade.

Israel is developing its natural gas power sector in response to the development of the Tamar and Leviathan gas fields. The share of natural gas in the power sector has already risen from 37% in 2011 to 60% in 2013, with the government forecasting natural gas consumption to rise from 5.2 bcm in 2010 to 18 bcm in 2030. In contrast, coal is likely to be increasingly displaced by natural gas and renewables.

**Infrastructure to boost metals demand**

Despite lower oil prices, infrastructure requirements in the Middle East remain high and we calculate the total regional spend on projects – including both those currently in implementation phase and those in planning phase – at around $2.5 trillion, with a heavy concentration in the GCC countries. Indeed, in all six countries, project spending accounts for over 100% of GDP (Figure 63). The focus of the spending is on real estate and basic infrastructure, with a significant amount also being spent in the energy sector and in industry. This activity should provide a substantial boost to commodities demand, particularly metals – demand for which we expect to grow faster in the Middle East than for energy or grains.

Some of the planned infrastructure in the GCC may be at risk due to lower oil prices, particularly those related to real estate. But there are some good reasons to expect continued strong growth. Addressing the chronic shortage in affordable housing in Saudi Arabia is a political priority. Qatar has a World Cup to prepare for in 2022 and Dubai has Expo 2020. Across the GCC, efforts to diversify away from oil will require further infrastructure investment. Revenues may be under threat from lower oil prices, but the ability of most GCC governments to pursue these priorities remains intact thanks to the extraordinary wealth they have amassed in the past decade. GCC governments also have very low indebtedness ratios, by and large, and would be able to finance these expenditures through capital markets relatively comfortably, in our view. We see steel as the greatest beneficiary of such projects, with benefits also for copper, aluminum, zinc and nickel.
Further afield, continued high population growth requires heavy investment in energy and transportation, particularly in the Levant,\(^{14}\) where chronic underinvestment in water and electricity is contributing to political instability. The ravaging by war and neglect of infrastructure in Iraq and more recently Syria implies a major push on reconstruction and development in those countries post-conflict. And the possibility of a reversal of sanctions against Iran and an opening of that country’s economy also augurs well for regional growth and consumption.

\(^{14}\) Countries and regions located in the Levant region include Cyprus, Israel, Jordan, Lebanon, Palestine and Syria. Iraq, Sinai, Egypt and Turkey are also occasional included in the region.
Latin America – Beyond the Commodity Boom

Slower growth, but significant differentiation

According to the World Bank, between 2002 and 2008 energy prices rose 179% and other commodity prices rose 76%. During the same period, Latin America posted an average annual growth rate of 4.1%, virtually twice the growth rate of the previous 20 years of 2.4%. This is no coincidence as Latin America is still a significant net commodities exporter. By the same token, softer demand for commodities as China transitions should translate into more modest growth rates for the region.

However, Latin America is not a homogenous region, and we note two important distinctions amongst the countries in the region from a commodities perspective.

While Latin America is a net commodities exporter, the importance of commodities to the external sector of each country varies. Commodities account for 88% of total exports for Peru but only 25% for Mexico. More important still, manufacturing exports in the latter are equivalent to those of Brazil, Argentina and Chile combined. Accordingly, global demand conditions for manufacturing are far more important for Mexico than for the countries in South America. In Figure 65, we illustrate this via the ratio of commodity to manufacturing exports: while most major countries in the region export more commodities than manufactured products, the ratio varies significantly, and is inverted for Mexico (manufacturing exports exceed commodities exports).

In addition to differing “comparative-advantages”, policy differences also matter. Not all countries in the region responded in the same manner to the commodities boom. In some cases, the reaction was unfortunately quite similar to past experiences in the sense of being reflected in a short-lived boost to consumption. But there were also cases in which countries took advantage of these conditions to induce economic transformations to provide alternative growth drivers, helping to cushion the impact of softer commodity prices ahead. A succinct indicator

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15 Mexico’s specialization on manufacturing goods is consistent with its higher population density: 59 inhabitants per km² compared to 23 and 15 for Brazil and Argentina.
of these differences is the rate of investment (Figure 66). In 2004, the investment ratios for the six countries considered were all below 20%; a decade later, a discernible gap has opened between Chile, Colombia and Peru (investment rates between 24% and 27% of GDP) and Brazil and Argentina were investment ratios are still below the 20% mark.\textsuperscript{16}

Therefore, for the purposes of projecting economic growth, and in particular for assessing regional commodity demand, it is useful to divide Latin America into three groups:

- **Brazil, Argentina and Venezuela (BAV):** Clearly, there are quite important distinctions amongst these countries, but they share a high reliance on commodity exports and relatively low investment ratios thereby making them more vulnerable to the downturn in the commodity cycle.

- **Colombia, Chile and Peru (CCP):** Also highly dependent on commodity exports, but where a stronger investment cycle during the boom period suggests more capacity to rely on alternative growth sources.

- **Mexico (MX):** A very open economy featuring mostly manufacturing exports geared to the US market.

### Commodity demand: localized opportunities

Latin America is expected to see commodities demand growth slow compared to the boom period, in line with a slowdown in overall economic activity to 2.6% over 2014-2019 compared to 4.1% during the 2002-2008 boom.

We forecast regional demand growth over 2014-2025 to be slower than that observed over 2001-2013 for four out of the seven commodities considered, and if the comparison is made with the 1990s, only one commodity is expected to outperform: natural gas. As the Supercycle comes to an end, Latin American economies will rebalance to less resource-intensive growth and structural changes, particularly in Mexico, as well as innovation are likely to yield deeper changes in patterns of commodities consumption.

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\textsuperscript{16} 2013 data for Venezuela is not yet available.

\textsuperscript{17} We calculated the elasticity of demand to economic growth (in nominal US dollars) for each commodity-country pair. We considered countries within each of the three groups as part of the same sample and in some cases where the coefficients proved volatile, we used polynomial adjustments. We then assessed the resulting coefficients for each commodity sub-regional group in order to determine whether adjustments over the statistical results were necessary.
We expect meaningful differentiation between the groups, with 2014-2019 GDP growth rates forecasts of 1.3% for the BAV group, 3.9% for CCP and 4.0% for Mexico. In the case of Mexico, this sanguine projection reflects the expectations unleashed by the ambitious structural reform program currently being implemented by the Peña Nieto administration. However, the BAV group accounts for 60% of the 7 countries’ combined GDP (Mexico is second at 24%) and is expected to experience the slowest growth.

This differentiation in growth rates helps to create winners and losers for commodities demand as the share of consumption is not evenly distributed with GDP for all commodities. In particular, natural gas, steel and copper consumption are all more concentrated in Mexico and less concentrated in the BAV countries, boosting growth prospects for these commodities. On the other hand, aluminum consumption is quite concentrated in Brazil. Consumption patterns for oil and grains are broadly in line with GDP.

---

### Figure 68. Share of commodities consumption in Latin American-7

<table>
<thead>
<tr>
<th></th>
<th>BAV</th>
<th>CCP</th>
<th>MX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share in combined GDP</td>
<td>60%</td>
<td>16%</td>
<td>24%</td>
</tr>
<tr>
<td>Shares in combined consumption of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil</td>
<td>60%</td>
<td>12%</td>
<td>28%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>53%</td>
<td>10%</td>
<td>38%</td>
</tr>
<tr>
<td>Steel</td>
<td>52%</td>
<td>15%</td>
<td>33%</td>
</tr>
<tr>
<td>Refined Copper</td>
<td>51%</td>
<td>15%</td>
<td>33%</td>
</tr>
<tr>
<td>Aluminum</td>
<td>71%</td>
<td>2%</td>
<td>27%</td>
</tr>
<tr>
<td>Corn</td>
<td>62%</td>
<td>11%</td>
<td>26%</td>
</tr>
<tr>
<td>Wheat</td>
<td>60%</td>
<td>18%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: BP Statistical Review, World Steel Association, Wood Mackenzie, USDA, Citi Research

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Natural gas is expected to see the strongest growth of any major commodity in the region at 4.4% over 2014-2025. The biggest driver is Mexico’s energy reform. Demand for natural gas is already strong in the country as its industrial base has been shifting away from oil and towards natural gas, but this has led to bottlenecks in the supply of the latter. By allowing private participation across the whole range of upstream and downstream activities, the country is expected to attract $12 billion of investment in the next couple of years to expand its natural gas pipeline network by 6.5 thousand kilometers and provide full connectivity to cheap US natural gas. This should in turn accelerate a shift in power generation to natural gas and away from fuel-oil plants. Industrial users of electricity in Mexico currently pay 70% more than those in the US and a growing reliance on natural gas for power generation is a way of extending the benefits of the US energy revolution south of the border.

By the same token, Mexican oil demand should grow at a relatively modest 1.2% annually over 2014-2025. More important for Latin America as a whole is the 1.7% annual growth forecast for the BAV countries. As a result, we expect Latin

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America’s regional oil surplus to widen despite lower oil prices and under-investment in Venezuela in recent years. Supply growth is expected to be driven by Brazil, Argentina and Mexico, with energy reforms in the latter potentially boosting output by 1-m b/d by 2025.

Thermal coal is another commodity where demand is expected to be negatively impacted by the shift to natural gas. Moreover, the continued build out of renewable power generation in Chile and Brazil is likely to see regional demand growth turn negative by the 2020s. Columbia is the major exception given ample domestic endowments, but its consumption is small relative to the region.

Demand for industrial metals is expected to hold up relatively better, with steel and copper demand over 2014-2025 expected to outpace demand over 2004-2014. The majority of the growth for both commodities is expected to be driven by Mexico, as both energy reform and manufacturing sector growth drive strong demand. Copper is an unusual case given the CCP region is by far the world’s largest supplier. Demand in those countries will thus depend to a large degree on government policies regarding downstream processing.

Aluminum demand is expected to face greater headwinds given its reliance on Brazil. However, we expect rapid consumption growth in Mexico due to the increased usage of aluminum in auto manufacturing, an expanding auto sector – the country is already the world’s 6th largest producer and 4th largest exporter – and the country’s foray into aerospace. As a result, we forecast a major realignment in regional aluminum demand, with Mexico’s share of regional aluminum demand rising from 25% in 2013 to 34% in 2025, while Brazil’s share falls from 52% to 36%.

Grains demand is expected to remain relatively stable. We expect wheat demand, which is used primarily for human consumption, to continue to grow at similar rates as population growth – around 1% over 2014-2025. Corn demand in the region is driven largely by Brazil, which is the third largest user of corn for animal feed in the world. However, due to lower expected demand for biofuels production, we forecast Brazilian demand growth to slow to 3.0% over 2014-2025 compared to 3.6% over 2001-2013. In contrast, Mexican demand is forecast to

19 Although we do not explicitly model this, lower electricity tariffs could also boost Mexican demand.
accelerate to 3.0% over 2014-2025 from 1.0% over 2001-2013. This is partly due to Mexico primarily consuming white corn — the country’s staple for human consumption and also for animal feed — as opposed to the most used internationally yellow variety. This could change though as the government implements programs to substitute white corn production with yellow corn in several States.

Regional demand growth is unlikely to stem the rapid growth in the region’s grains exports. Latin America is increasingly challenging the United States’ status as the ‘global bread-basket’ and leading grains producer and exporter. The US has seen relatively steady output growth of 2-3% per year and still represents about one-third of the worldwide corn and soybean harvest and 20-30% of global wheat exports. But in recent years, Latin American bellwethers including Brazil and Argentina have become increasingly important global suppliers.

In 2013 and 2014, Brazil posted two consecutive years of record corn and soybean exports while Argentina has consistently remained a top-five global wheat exporter for the past several years. This is in large part due to the growth in harvested area for staple grains in Latin America. South America also benefits from opposite summer/winter cycles versus the US and other exporters. The dominant consuming regions – US, Europe and Asia – are all located in the Northern Hemisphere, while Brazil and Argentina – which are located south of the equator – harvest grains while the major consumer blocs are planting new crops. Thus, these countries can help satiate global import demand in countries such as China just as the US and others are fading-back on seasonal sales. With ample arable land another advantage, regional grain exports are likely to remain key sources of global supply in the coming decade.
Africa – Electrical and Agricultural Revolutions Needed

In recent years, Africa has emerged as the second fastest growing region in the world behind developing Asia. This trend looks set to be maintained in the coming years. But what Africa needs in the coming decade to really benefit from its commodity endowment is a double revolution: electrical and agricultural.

**Electrifying a continent will generate demand for commodities:** in the building of generation and distribution infrastructure as well as fuel supply, which is likely to be a combination of hydrocarbons and renewables.

**In conjunction, Africa needs a new agricultural revolution** to feed its own rapidly growing population, and to grow exports for rising Asian food demand. This requires development of new hybrid crops more suitable to and productive in Africa’s climatic conditions, as well as a major change in land ownership attitudes and policies.

But none of this will happen quickly. The next few years are likely to see a continuation of currently rising food and fuel imports, with a gradual shift likely to occur only in the mid- to late-2020s.

**Figure 71. African commodity demand forecasts**

<table>
<thead>
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</tr>
</thead>
<tbody>
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<td>Oil (k b/d)</td>
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<td>3,519</td>
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<td>3,723</td>
<td>3,823</td>
<td>3,927</td>
<td>4,034</td>
<td>4,143</td>
<td>4,255</td>
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<td>4,945</td>
<td>3.0%</td>
<td>2.7%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Natural Gas (Bcm)</td>
<td>108</td>
<td>115</td>
<td>123</td>
<td>123</td>
<td>127</td>
<td>131</td>
<td>136</td>
<td>140</td>
<td>145</td>
<td>149</td>
<td>154</td>
<td>182</td>
<td>4.6%</td>
<td>3.2%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Thermal Coal (Mt)</td>
<td>202</td>
<td>199</td>
<td>200</td>
<td>201</td>
<td>203</td>
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<td>215</td>
<td>222</td>
<td>229</td>
<td>234</td>
<td>240</td>
<td>247</td>
<td>0.5%</td>
<td>2.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Steel (Mt)</td>
<td>30</td>
<td>31</td>
<td>33</td>
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<td>36</td>
<td>38</td>
<td>39</td>
<td>40</td>
<td>42</td>
<td>43</td>
<td>52</td>
<td>5.6%</td>
<td>3.4%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Refined Copper (kt)</td>
<td>296</td>
<td>294</td>
<td>277</td>
<td>288</td>
<td>299</td>
<td>309</td>
<td>321</td>
<td>332</td>
<td>344</td>
<td>357</td>
<td>369</td>
<td>448</td>
<td>3.7%</td>
<td>3.5%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Aluminium (kt)</td>
<td>511</td>
<td>546</td>
<td>559</td>
<td>568</td>
<td>600</td>
<td>638</td>
<td>677</td>
<td>717</td>
<td>759</td>
<td>803</td>
<td>848</td>
<td>1,134</td>
<td>4.1%</td>
<td>5.9%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Corn (Mt)</td>
<td>70</td>
<td>75</td>
<td>79</td>
<td>79</td>
<td>83</td>
<td>84</td>
<td>87</td>
<td>89</td>
<td>92</td>
<td>94</td>
<td>96</td>
<td>108</td>
<td>4.9%</td>
<td>2.5%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Wheat (Mt)</td>
<td>61</td>
<td>59</td>
<td>63</td>
<td>64</td>
<td>63</td>
<td>64</td>
<td>66</td>
<td>68</td>
<td>69</td>
<td>70</td>
<td>71</td>
<td>77</td>
<td>3.5%</td>
<td>1.9%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Source: BP, IEA, EIA, IMF, World Steel, Wood Mackenzie, USDA, OECD, UN, Citi Research

**Africa is not as structurally long commodities nor as dependent on them for growth as commonly believed**

African growth has been much more loosely connected to Chinese demand for commodities and the Commodity Supercycle than is popularly perceived. We estimate that these factors have only accounted for around one third of the pick-up in African growth over the past decade, and even this may be overstated.

The pick-up in growth in Africa, notably in Sub-Saharan Africa (SSA), has been driven far more by domestic factors, such as demographics and an improved political and policy environment. Moreover, the service sector has been the main engine of growth and for many countries the commodity sector is now a relatively small component of GDP.

Many African governments also do not earn very high levels of tax revenue from their commodity exports, with the clear exception of oil exporters. Moreover, for hard commodities, linkages to the economy are often very limited given that production is often in an enclave sector. Finally, commodities production in Africa has often been stagnant, serving as a drag on growth for some countries.

The most important economic link between high commodity prices and economic performance is via exports. These are concentrated in a limited number of countries – Angola, the DRC, Zambia, South Africa and South Sudan clearly dominate.
Moreover, increased commodity exports to China have been offset by rising Chinese exports of manufactured goods.

Instead, China’s more important involvement in Africa in the last decade has been in the construction sector: building a new infrastructure throughout the continent. Some of this has been funded by Chinese lending to Africa, and some through the payment for commodities by construction. The secondary impact of this construction driven involvement is that around a million Chinese migrants, many of whom originally worked on these construction projects, are now continuing to transform a continent through their engagement in a wide range of businesses.

In many ways, a bigger question to ask about the impact of China’s slowdown on Africa is not its impact on commodity prices, but on this large migrant community.

Energy: Rising demand not production the story of the next decade for Africa

While Africa is thought of as a net energy exporter, only four countries are globally significant exporters: Algeria, Libya in North Africa and Nigeria and Angola in Sub-Saharan Africa. Other African countries’ exports are considerably below 500-k b/d, such as Chad, Congo (Brazzaville), Equatorial Guinea, Gabon and South Sudan. Those with even lower production levels are usually net oil importers, including Egypt, Cameroon, Cote d’Ivoire and Ghana. Moreover, African oil production actually peaked in 2008 and has been in decline in recent years.

Significant potential exists for increased African oil and gas production and Africa has been a hotbed of exploration activity in recent years, but lower oil prices are likely to limit potential growth over the coming decade. The major exception to this is East Africa, where major discoveries have the potential to turn a region which has been an energy importer into an exporter. In particular, Mozambique looks set to emerge as a large gas exporter, in addition to coal.
The real energy story in Africa is rising petroleum product imports. According to BP, these have been rising at around 3% a year for the last decade, reflecting two key trends:

- For many businesses and households in Africa, the most secure electricity supply is from generators, mostly diesel-fuelled. Even in countries with a reasonable supply from a national grid, many companies still keep back-up generators.

- Vehicle use is rising substantially, particularly in major cities.

In a world with slower hydrocarbon demand and lower energy prices, the new wave of hydrocarbon projects in Africa may increasingly see rising African demand as the key to their financial viability, not the traditional export model.

Continued petroleum product imports will depend on the build-out of domestic refineries. Africa currently produces around 10% of global crude oil supply, but its refining capacity is less than 4% of the global total. There would certainly seem to be demand for at least two to three major refineries, with demand for one major refinery in Nigeria and another somewhere in East Africa.

However, plans to build a major refinery in Nigeria depend on whether the government is willing to abolish gasoline subsidies (diesel fuel prices are already liberalized), but there does seem to be slow progress in this direction. In Uganda, crude oil development is being based around a relatively small and simple domestic refinery, which will produce basic distillates for the local market and heavy fuel oil to feed an electricity station. But at some point a more substantial refinery will be needed which can use existing and new oil production in the region, not only from Uganda, but also South Sudan and possible future oil production from Kenya.
Electricity for all: Hydrocarbon demand to be supplied locally, but not metals demand

According to the IEA, the largest demand globally for new electricity generating facilities in the coming decades will come from Sub-Saharan Africa. Driving this is simple economics: the cost of producing electricity from diesel generators is roughly $0.35 a kilowatt-hour – more than ten times the cost of producing electricity from a national grid. The IEA projects that across all developing regions, Sub-Saharan Africa will account for 64% of the additional investment in the electricity sector. In fact, according to IEA data this would imply there needs to be just short of $2 billion per year invested in electricity generation in Africa to meet the goal of universal access to electricity by 2030. Much of this investment may not happen, but electricity generation is crucial to driving the region’s future growth. Some of this will come from renewable sources, such as hydroelectricity, solar, wind and geothermal. But much is likely to come from hydrocarbons – primarily from within Africa.

However, most of this demand is likely to be sourced from within the continent. Tanzania and Nigeria are expected to channel new development of natural gas resources to domestic power and industrial uses. Ghana is using the gas from its recently developed Jubilee oil field entirely for domestic use, largely for power generation. Nigeria already exports gas to neighbouring countries through the West African Gas Pipeline, and the reality is that the success of its much vaunted, but slow moving electricity reform program, will depend on gas fired electricity generation.

Examining East Africa, from the north it is clear that Ethiopia’s huge hydroelectric Renaissance Dam project can be connected with various geothermal and solar projects along the Rift Valley in north Kenya, as well as to electricity from Tanzania and Mozambique generated by gas fired plans from the new fields coming into production. From the south, in addition to Mozambique’s gas are both its, and Botswana’s, substantial coal resources. And then to this can be added huge potential hydroelectric capacity from both Mozambique and the Democratic Republic of Congo. The challenge is to get commercially viable projects up and running and to connect all the respective national grids.

More likely to benefit from the build-out of Africa’s energy infrastructure are metals, including copper, steel, aluminum and zinc. It is unlikely that any of these inputs will be manufactured locally in the near future, leading to increasing demand for imports. While Africa is often considered a significant exporter of metals, these are generally limited to upstream raw materials (e.g. bauxite, iron ore) rather than finished metals (e.g. aluminum, steel). In fact, the range of major industrial commodities important to African countries is quite limited.
Agriculture: Food for thought and, hopefully, export

Africa has become a net food importer in recent years and we expect that Africa will continue to import more basic foodstuffs in the short term, while exporting higher value beverages, horticultural and floricultural products.

Africa is seeing a major increase in urbanization, driving demand for wheat and rice at the expense of more traditional Africa cereal crops such as maize, sorghum, millet and cassava. Wheat in particular is hard to grow in many African countries given their climates.

On the other hand, exports of higher value products are growing in response to rising beverage and chocolate consumption in a range of emerging markets, and rising European demand for year round fruit, vegetables and flowers. But, one of the keys to Africa’s future growth will be its ability to more fundamentally increase agricultural exports in more basic food commodities.

Around half the world’s usable uncultivated land is in Sub-Saharan Africa – approximately 202 million hectares. Effectively, the region has the land resources to feed growing global demand. Many countries also have the water resources. The challenge is to attract investment into the sector.

For the sector to develop to anywhere near its potential, the key will be developing land ownership structures and arrangements that are conducive to the development of a more commercially driven agricultural sector.

Agricultural production in Africa is still predominantly driven by small scale household farming and governments will have to decide what sort of agricultural sector they want: one with large scale commercially driven farms, or one with a greater mix of farm scales.

Two models of commercial agricultural development seem to work well in Africa. First, there are good examples of vertically integrated agricultural producers supplying domestic markets in an increasing number of countries. Second, are examples of profitable export driven production – both traditional crops such as cocoa, tea and coffee (often grown on plantations) as well as in new crops, such as palm oil, horticulture and floriculture.
Production of coffee from these seven main African producers accounts for just under 10% of global output, estimated at 145,194 thousand bags in 2013 by the ICO. Global output is still dominated by Brazil, Columbia, Indonesia and Vietnam, although Ethiopia is on the fringes of the globally significant producer group.

Source: International Coffee Organisation

Source: IMF, World Economic Outlook
Russia – Move from Rising Demand to Net New Supplier

Though Russia is one of the world’s largest emerging markets – and one of the largest economies at number eight in nominal terms and number six in purchasing power parity (PPP) – Russia’s impact on global supply-demand balances is likely to be felt more through growing supply than increased demand. With a declining population (particularly working age population), lower oil prices and already relatively high per capita commodity consumption, prospects for Russian commodity demand growth look meager.

In the near-term, commodities such as copper, iron and steel which are consumed in large volumes domestically and with spare production capacity will experience production growth and export volume expansion due to the domestic recession and currency weakness.

In the long-term, commodities such as natural gas with state commitment to provide the necessary infrastructure build-out will see the greatest production growth and export volume expansion.

Figure 79. Russia is not expected to be a major contributor to global commodities demand growth

Oil – Exports to Show Modest Declines

Demand – unlikely to return to previous growth rates

Russian oil consumption crashed with the dissolution of the Soviet Union, falling almost 50% in 1989 to 2.6-m b/d in 1998. Since then, demand has been growing steadily, and has even accelerated in recent years. Since 1998 demand has grown at a compounded rate of 2.1% per year, although this rate accelerated in the post-crisis period (2010-2012) to 5.0% as auto sales rebounded. However, with Russian GDP slowing sharply in 2013 and 2014, Russian oil consumption came to a complete halt. With the Russian economy now expected to contract, we forecast domestic oil consumption will contract by around 3% in 2015 before resuming growth of about 1% per year. We think the growth seen in the early years of this decade is unlikely to return.

Figure 80. Russian oil balance

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<tr>
<td>Oil (k b/d)</td>
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<td>3,089</td>
<td>3,212</td>
<td>3,313</td>
<td>3,362</td>
<td>3,294</td>
<td>3,327</td>
<td>3,361</td>
<td>3,394</td>
<td>3,428</td>
<td>3,463</td>
<td>3,639</td>
<td>2.4%</td>
</tr>
<tr>
<td>Natural Gas (Bcm)</td>
<td>493</td>
<td>490</td>
<td>500</td>
<td>494</td>
<td>495</td>
<td>498</td>
<td>502</td>
<td>506</td>
<td>511</td>
<td>515</td>
<td>519</td>
<td>544</td>
<td>0.8%</td>
</tr>
<tr>
<td>Thermal Coal (Mt)</td>
<td>222</td>
<td>223</td>
<td>249</td>
<td>242</td>
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<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>1.1%</td>
</tr>
<tr>
<td>Steel (Mt)</td>
<td>41</td>
<td>47</td>
<td>49</td>
<td>50</td>
<td>50</td>
<td>51</td>
<td>51</td>
<td>52</td>
<td>52</td>
<td>53</td>
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<td>55</td>
<td>4.7%</td>
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<tr>
<td>Refined Copper (kt)</td>
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<td>676</td>
<td>677</td>
<td>670</td>
<td>664</td>
<td>657</td>
<td>663</td>
<td>670</td>
<td>677</td>
<td>684</td>
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<td>Aluminium (kt)</td>
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<td>949</td>
<td>950</td>
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<td>931</td>
<td>922</td>
<td>931</td>
<td>940</td>
<td>950</td>
<td>959</td>
<td>1,008</td>
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<tr>
<td>Corn (Mt)</td>
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<td>5</td>
<td>6</td>
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<td>14</td>
<td>11.4%</td>
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<td>Wheat (Mt)</td>
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<td>35</td>
<td>38</td>
<td>39</td>
<td>40</td>
<td>41</td>
<td>47</td>
<td>-0.4%</td>
<td>3.3%</td>
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</tbody>
</table>

Source: InfoTEK, BP, IEA, EIA, IMF, World Steel, Wood Mackenzie, USDA, OECD, UN, Citi Research
Supply – revival to near stagnation

Today Russia is generally out of large, undeveloped onshore oilfields that could materially move the needle on production. If Russia is to grow output further from the current 10.8-m b/d level, it will have to do so via a combination of (1) more intensive production of highly depleted horizons in West Siberia, (2) tapping deeper and/or tighter horizons in those same fields (the tax regime has been tweaked to encourage this), (3) developing a larger number of relatively small fields (which, lacking scale, have inferior economics to larger fields), (4) tapping the significant shale resources that are – at least on paper – available and (5) from Russia’s large shelf opportunities, particularly in the Kara Sea via Rosneft.

However, we note that many of these opportunities – in particular deep water, the Arctic shelf and the shale plays – are specifically targeted by European and US technology sanctions. If the Ukrainian crisis doesn’t recede and the sanctions remain in place indefinitely – as our numbers implicitly imply – then Russia will begin running into increasingly strong headwinds on the production front as conventional production declines accelerate and the productivity of the marginal conventional field declines. That being said, Russian oil producers in recent years have become adept at applying the latest technology not at shale targets, but at less-attractive conventional targets to make them economically attractive.

Exports – slow declines expected

In Figure 81 we present our scenarios for Russian oil exports through 2020. We chose this year to examine as, between now and then, sanctions are unlikely to have a material effect on Russian oil production. After 2020, production could begin to rise on the development of the Kara Sea and the Bazhenov, Domanik and other shale plays, assuming sanctions are lifted in the course of the next year or two.

- **Our base case scenario** of flat production growth and modestly-growing demand (a bit slower than the average 1.8% seen in 2000-2013) sees Russian oil and product exports falling by 0.5% (about 35-k b/d) per year for the period.

- **Our optimistic case** of 0.5% annual production growth – similar to what we saw in 2014 – and slower consumption growth of 1% per year would see exports expand at a slow 0.3% annual rate, or about 20-k b/d per year.

- **Our pessimistic case**, where production begins slowly slipping backwards and consumption slightly outstrips the 15-year average, sees exports falling by 2% each year, or about 125-k b/d.

- **By 2025, if these trends hold, we could see Russian overall oil and refined product exports falling to 6.8-m b/d.** However, these forecasts will depend significantly on the state of development of Russia’s (presumably) immense offshore resources and very large onshore shale resources, both of which are the target of current European and US sanctions. If those sanctions are lifted in the medium term, by 2025 Russia could be bringing on material amounts of production from both plays.
Natural Gas – Excess Supply to Gradually be Directed to China

Demand – weak at home

After a long period of steady growth, Russian gas demand took a large step backwards in 2009. With the rebound of oil prices, demand quickly rebounded, but beginning in 2012 demand began to turn down again, and is now on pace to take its third consecutive step back, likely falling by around 4% relative to the 2011 peak.

In reality, the demand picture isn’t quite as bad as it appears at first blush, as there is a weather factor that must be considered. Russia, as a northern country, consumes a substantial amount of its energy for heating purposes and, while 2011 was very near the recent norm in terms of heating-degree days (HDD), 2013 and 2014 were warmer than normal (note that 2010 was cooler than normal). Adjusted for the weather effect, it appears that Russian domestic gas demand is about 2.5% lower in 2014 than it was in 2011. Going forward, we would assume that Russian gas demand will rebound around 1.5% on weather normalization, but that a shrinking economy in 2015 will overwhelm that rebound, pushing gross demand down by 3% in 2015. After that, we expect the resumption of growth, but at a slow 0.5% annual growth, about half the rate seen in 2000-2014.
Russian gas demand is dominated by heating use, accounting for about 40% of the total. Natural gas has also long been used as a transport fuel in Russia, and with domestic gasoline and diesel pump prices on par with those seen in the US and significant untapped gas reserves, Russia would seem to be a natural expansion market for natural gas vehicles (NGVs). However, in spite of a push by both Gazprom and Rosneft to increase gas usage in the domestic fleet, as of 2012 (Figure 85) only 2% of total Russian gas consumption was used for transport fuel, and we think the business environment in Russia will likely not prove conducive to a rapid displacement of gasoline and diesel by natural gas as a transport fuel.

Supply – as far as the eye can see

Per BP, Russia as a whole had 31 tcm of proved gas reserves as of the end of 2013, or some 52 years at last year’s production rate and some 17% of the global total (Figure 86). We think this number likely significantly understates the level of Russian gas resources.

Gazprom alone has some 35 tcm of gas reserves under Russian ABC1+C2 standards and Russia’s relatively smaller gas producers have proven and probable reserve to production ratios that are anywhere from almost 50% (Lukoil) to 100% (Rosneft and Novatek) larger than their already-significant proved reserve to production numbers. Finally, Russia reportedly has potential shale gas resources comparable to or even exceeding those of the United States, which we think are likely not included in the official numbers.

In 2012 Gazprom began bringing on-line its Bovanenko field on the Yamal Peninsula. Designed to enable the company to replace production at declining Soviet-era core fields in West Siberia, Bovanenko will eventually ramp up to a plateau capacity of 120bcm/yr. However, with the lower call on Gazprom production, the ramp-up speed of Bovanenko has been reduced significantly. Currently, Gazprom’s peak production capacity, per management, is close to 650 bcm/yr. Although it might not be able to sustain that level for a full year, we think it could produce well in excess of 600 bcm,
implying that Gazprom – and by extension, Russia – has at least 100 bcm of excess production capacity on hand today.

While there are a number of new major export projects, most of them will not touch the current excess production capacity, as they will generally develop new gas fields to supply the volumes for new export infrastructure to be built.

- **Yamal LNG** will be anchored by the Novatek-led consortium’s 490 bcm South Tambeyskoye field, which will have the capacity to produce at least 27 bcm/y at plateau levels. Novatek has other fields in the area, notably the Malo-Yamalinskoye field further south on the Yamal peninsula and the Geofizicheskoye (125 bcm) and Salmanovskoye (Utreinnye, 235 bcm) fields on the nearby Gydan peninsula to provide volumes for either expansion of liquefaction capacity and/or to extend the plateau period of production.

- **Gazprom’s new 38 bcm Eastern Route contract with China**, signed last May, will be supplied by two new fields – Chayandinskoye and Kovykta – with 2.8 tcm of reserves between them and will have a dedicated pipeline for delivery.

- **The exception to the rule is Gazprom’s Western Route with China** that will look to tap into excess West Siberian production capacity to ship 30 bcm/yr – and eventually as much as 100 bcm/yr – to China via the Russian-Chinese border near Kazakhstan. That 100 bcm/yr number is likely far in the future – no earlier than 2030 and likely well beyond that. The initial 30 bcm/yr contract being negotiated would, when that level is hit in the middle of the next decade, remove some of the production cushion available in Russia.

**Exports – driven by Chinese demand and export infrastructure build-out**

The 2008 Global Financial Crisis saw gas demand fall not only among Russia’s domestic consumers, but also among Gazprom’s customers abroad. European exports appear to have more or less fully recovered to around the 150 bcm range seen in 2005-2008. However, with European demand weak for years, and possibly in structural decline, there is no guarantee that Russian exports to the region will resume growing any time soon. Growth in US shale gas production is contributing to this, first by displacing US demand for coal and thus helping depress Atlantic Basin prices, and later this decade with the start of US LNG exports.

Exports to the former Soviet Union (FSU) region are also unlikely to recover much from current depressed levels unless prices move substantially lower. Russian exports to the region declined from almost 100 bcm/yr in 2006-2008 to c60 bcm in 2013, with about 80% of this decline coming from Ukraine due primarily to the large price increases.

In 2005, Ukraine and other FSU countries were paying around $60/mcm for Russian gas. Gazprom pushed this up via contract negotiations in 2006 and 2007 to a bit over $100/mcm, and after the so-called “gas war” of January 2009, the two sides signed a new agreement pushing Ukrainian prices to full European levels. While the price Ukraine pays under that contract may be lowered by the Stockholm Arbitration court sometime in 2016, in the interim the final price will fall substantially due to the sharp fall in the price of oil to which the contract price is linked.

**The one bright spot for Gazprom is the Chinese market**, with one large contract already signed, another under serious discussion, and a third recently proposed.
In May of 2014 Gazprom and China National Petroleum Company (CNPC) signed a 38 bcm contract on the so-called Eastern Route with deliveries to start around 2019. The infrastructure being laid down for this contract will have the capacity to be relatively easily expanded to over 60 bcm, and we expect the contract volumes to be eventually increased to that level.

Also in May, China and Russia resurrected negotiations on the so-called Western Route, which would see a new pipeline built from existing West Siberian fields down to the Russian-Chinese border between Mongolia and Kazakhstan. Initial volumes being negotiated are 30 bcm, but Russian sources have indicated that could expand over time to as much as 100 bcm with three dedicated lines. We estimate approximately 100 bcm excess production capacity exists today, and substantially more low-cost conventional resources exist in the region that could provide additional volumes to support such long-term contracts while allowing the full satisfaction of domestic demand and the call on Russian gas in FSU countries and Europe.

Metals – Near-Term and Long-Term Export Growth

During the 2015-2016 period, Russia will contribute negatively to global metals demand due to a domestic recession. Slow economic growth and lack of radical structural economic reforms over 2015-2025 should see Russian demand contribute little to global balances.

Due to collapsing costs and expanding margins on Ruble weakness, industries with spare capacity will experience near-term output expansion and coupled with falling demand, exports of certain metals will rise considerably. Once Russia exits recession, the outlook for continued export volume growth is uncertain because of infrastructure and financing challenges.

Demand – 2015-2016 decline will depend on consumption intensity

For certain metals such as nickel, Russia has low consumption intensity. As a result, the current recession has a non-meaningful impact on demand for this metal since the base is very low.

For other metals, however, Russia’s consumption intensity is relatively high. This is particularly the case for steel and steelmaking raw materials, copper and to a lesser degree aluminum.

We forecast a 4% decline in domestic steel demand in 2015 followed by zero growth in 2016. This will subtract ~2 mt or about 0.1% from global steel demand. We estimate a similar impact for aluminum and copper.

Longer term, demand growth for metals will be muted due to modest economic growth.
Near-term production growth depends on spare capacity

The Ruble collapse has cut production and transport costs to levels well below export price levels even for low quality assets. This will stimulate output expansion wherever assets are not already operating at full capacity.

- Production growth will occur at numerous sub-efficient and smaller steel plants, as well as iron ore, coking coal and copper mines not currently operating at full capacity. This should lift output by ~5% through 2016, with the greatest increase in steel and iron.

- Aluminum output would normally be expected to expand but Rusal has committed to not restart mothballed production. Rusal cut production in 2014 by 0.25 Mt or 7% in 2014 and we expect no increase in 2015 and about a 0.2 Mt increase in 2016 from the first stage of Boguchansky, itself subject to further possible delays.

- Nickel production will be flat based on Norilsk’s long-term plans and recent 2015 production guidance. Copper output is expected to rise by 2%.

Exports jump where spare capacity and high intensity of demand exist

Exports will jump for those metals where both 1) the starting level of domestic demand is considerable such that the recession will destroy meaningful demand and 2) spare capacity exists allowing producers to respond to lower costs and higher margins by lifting output.

- Steel and metallics net exports will rise by at least 3 Mt or 12% in 2015. We currently forecast no further increase in 2016 based on the economy stabilizing, but this could prove conservative. Because Russia is a meaningful importer as well as exporter of steel, we measure steel volumes via net exports rather than exports.

- Iron ore and coking coal exports also likely to expand, but to a lesser degree. This is because most of the iron ore and coking coal production output growth will be exported in the form of steel and other metallics products, we believe.

- Copper net exports are likely to rise by ~50 kt or 10% in 2015 from our estimate of 450 kt in 2014.
Export growth for other commodities will be less meaningful. The figure below shows those commodities with the greatest near-term export growth based on available spare capacity (vertical axis) and domestic consumption (horizontal axis).

Figure 90. Metal group commodities with greatest near-term export growth

Source: Citi Research
Implications of the Multipolar Natural Resources Economy
New Patterns of Commodity Trade

The Commodities Supercycle of the last decade was characterized by China anchoring rapid global demand growth that outpaced supply, with trade flows more often than not pointing to China. In the coming decade, Citi expects that pattern to break down. We expect several key trends to emerge over the coming decade for commodity trade flows:

- **Slowing global trade flows** as global demand growth slows in response to slower population growth, China’s transition and increased energy efficiency, and as demand growth for oil reorients from net importers (China, US, Europe) to net exporters (Middle East, Latin America).

- **Downstream shift by natural resource exporters** as they seek to capture more of the value chain in the face of slower global demand growth and lower prices. Examples include the build-out of Middle Eastern oil refining capacity and Indonesia’s ban on unprocessed mineral exports.

- **The US energy revolution** which is turning the US from the largest importer of crude oil and petroleum products to the world’s largest exporter of products and a net exporter of crude. It is also expected to revolutionize international natural gas markets, and is depressing coal markets.

- **Reorientation to the “Emerging 5”** which will become increasingly important at the expense of the US, Europe and China – particularly India for oil, natural gas and coal; ASEAN for oil, coal, metals and grains; the Middle East for metals; and Latin America for natural gas and grains.

**US Energy Revolution**

When it comes to crude oil and other hydrocarbons, the US is bursting at the seams. As of today, every barrel of locally produced petroleum product and crude oil – as well as the as-yet-to-be-defined category of condensate — that can get out of the country is in fact getting out. The US has very rapidly become a powerhouse as an exporter of finished petroleum products, natural gas liquids, “other oils” including ethanol, and – yes – even crude oil – with total gross exports expected to have reached a combined 5-million barrels per day (m b/d) or more by the end of 2014, up a stunning 4-m b/d since 2005.

Citi fully expects that allowable exports of crude oil and condensates – a special category of light crude oil – will exceed 1-m b/d gross by early 2015 if not before. The US has reduced its net oil imports by a stunning 8.7-m b/d over a very short period of time – that’s more than the total production of all countries in the world other than the US, Russia and Saudi Arabia and also greater than the combined exports of Saudi Arabia and Nigeria. Citi expects that the oil import gap will be totally closed well before the end of the decade, possibly by 2019 if not by 2018, at which time the US should become a net exporter of crude oil and petroleum products combined.

In the end, there remains an inevitable day of reckoning when US crude production cannot escape its North American confines, pushing down US crude oil prices and endangering production, without widely liberalized exports. That day may be coming sooner than people expect, perhaps before the end of 2016. Meanwhile outcomes for production and export levels make a big difference. The US government will inevitably need to respond to growing pressures to export crude oil. But the debates in Washington on whether to lift...
the various bans on exports of crude oil and condensate are misplaced. What is most likely to occur is the unfolding of a piecemeal, ad hoc set of decisions facilitating exports incrementally, with the sum of the increments reaching very high levels.

Then there’s natural gas. At the start of this decade, the US was a net importer of natural gas. By the end of the decade, exports by ship of liquefied natural gas (LNG) should rival those of Qatar, the largest such exporter today, and pipeline exports to Mexico and Canada could be of the same magnitude. When it comes to liquefied petroleum gases (LPGs) like propane, butane and ethane, the US already overtook Saudi Arabia as the largest exporter more than a year ago and could overtake the entire Middle East by the end of 2016.

All of these details matter because they are shaping the emergence of North America as an energy superpower that is poised to usher in disruptive changes to global oil markets, trade and investment.

Crude Oil: Retreat of Global Trade

Despite still rising global oil demand, Citi expects the amount of oil traded in waterborne markets and tracked as international trade flows to be nearly flat to the end of this decade due to rising US domestic production, a shift in demand growth to traditional exporters and an increase in Chinese pre-financing deals.

US supply displacing imports

The prolific rise of US shale has pushed out traditional imports in the world’s largest oil import market. US net crude imports could fall from 7.5-m b/d in 2013 to 3.7-m b/d by 2020, or a drop of 3.8-m b/d.

The process started in PADDs I and III (East Coast and Gulf Coast), and is now moving to PADD V (West Coast). Figure 91 shows how this trend started in particular with lighter oils, and is more slowly starting to impact medium and heavy grades of crude oil. As this process has unfolded, the Atlantic Basin has moved from deficit to surplus (Figure 92).

Figure 91. US Gulf Coast crude imports by quality

Source: EIA, Citi Research

Figure 92. The Atlantic Basin crude balance is shifting towards a surplus m b/d

Source: Citi Research

20 PADD stands for Petroleum Administration for Defense Districts, a nomenclature which the US uses to break up oil markets into distinct regions for accounting purposes.
The result has been widely observed by the oil markets over the past months – supply overtook weak demand, leading to a precipitous drop in prices as OPEC policy catalyzed further bearish direction in the market. This represents a fundamental shift in trade flows that is likely to persist in the coming decade – shale pushes the Atlantic Basin into surplus, while Asia will remain in deficit and the key driver of imports.

From a supplier perspective, Canadian imports reached 3.0-m b/d of the US’s 7.3-m b/d of crude imports by late 2014. Imports from Africa have been almost completely backed out and imports from Saudi Arabia fell by over one-third from the fourth quarter of 2013 to the fourth quarter of 2014. As US and Canadian heavy sour crude availability rises and prices worsen, baseload suppliers in Mexico and Venezuela are also likely to come under pressure.

Figure 93. West African crude oil exports are moving from the US to Asia, where they are searching for new markets, a trend we expect to become even more pronounced

Light sweet crude imports have already plummeted, replaced by domestic light sweet crude from shale plays. Medium and heavy crude imports have been stickier, but supplier countries have had to weather lower prices, while more North American supply of similar quality crudes is on the way too.

Regionally, Iraq has seen steady flows to the US so far, but these could begin to wane. Mexico has begun shifting lighter sweet crude grades Olmeca and Isthmus to Europe and the US West Coast. Venezuela is already looking to shift greater volumes of crude oil to China to repay previous oil-for-loans deals.

Rising demand from oil net exporters

An increasing share of global oil demand growth is forecast to come from regions that are net oil exporters, including the Middle East, Latin America and Russia. Collectively, the three regions accounted for 557-k b/d of annual demand growth over 2003-2013, representing 50% of global demand growth. Over 2014-2025, we forecast demand growth from the three regions to remain stable in volume terms at 555-k b/d annually even as demand growth slows in China and
declines in OECD countries. In fact, we expect the Middle East to be the largest source of demand growth globally over the coming decade, overtaking China.

Rather than boosting global trade flows, as is the case with Chinese demand growth (which is almost entirely sourced via imports due to limited domestic supply), demand growth from such regions will actually reduce oil trade flows as domestic production is retained rather than exported (see Middle East and Russia sections).

Figure 94. Russian oil exports are forecast to decline

The build-out of refining capacity in the Middle East will also serve to further reduce exports of crude oil as producers seek to move downstream in order to capture a greater share of the value in the supply chain – an important theme across commodities. However, GCC oil producers are quite likely to both anticipate these pressures on exports and plan accordingly, including seeking to boost energy efficiency and expanding power generation from renewables.

Chinese pre-financing deals

Chinese pre-financing oil deals have effectively taken significant amounts of oil away from traded markets. China has signed large hydrocarbon finance and import deals with Russia, Venezuela, Ecuador, Brazil and others whereby China offers loans repayable via oil shipments (Figure 96). In total, these pre-financings will likely take around 3.3-m b/d off the international market, reducing the growth of freely traded oil. This is in addition to any “equity oil” obtained through production of joint ventures with Chinese firms.

Additionally, bilateral cooperation between Russian and China looks set to increase, particularly in the form of pipeline exports of Russian hydrocarbons to China. A November 2014 announcement of a Memorandum of Understanding (MOU) to dramatically increase gas exports to China is indicative of the types of deals that might happen outside the realm of the traded international oil and gas marketplace.
Thus China’s second major influence on traded volumes in the coming decade may actually be to take oil off the traded market, magnifying the importance of the rise of other ASEAN sources of demand that will be freely traded.

**Import growth to come increasingly from ASEAN and India**

With US imports declining and Chinese import growth slowing, import growth is expected to come increasingly from ASEAN and India. Demand in these two regions is expected to increase annually by around 340-k b/d over 2014-2025, with only modest growth in domestic supply anticipated.

As the Atlantic Basin becomes swamped, both OPEC producers and West African (WAF) producers are increasingly likely to look east to place their barrels, with India and ASEAN countries prime destinations in addition to China.

**Petroleum Products: Taking Up Crude’s Slack**

**Rise of Middle East refining shifting trade flows from crude to products**

The rapid rise of petroleum product consumption in Middle East countries will be accompanied by a substantial rise in refining capacity. Domestic consumption will certainly consume a large portion of domestic refining capacity, but the expansions should also clear the way for greater product exports.

This development is an example of one of the themes of this report – traditional commodity exporters moving downstream to capture more of the value chain. Gulf exporters are expected to export around 1-m b/d of refined product from 2015.
Marginal refining capacity in traditional importing centers – particularly in Europe – should be most impacted. Instead of importing oil and producing refined products, the displacement of European refining by Middle East refining may shift import flows into Europe from oil to refined products.

Beyond the Middle East, shifts in refinery capacities and economics are also reshaping crude and product trade flows. Refinery additions in the Middle East, FSU and North America have the added benefit of cheap feedstock while Indian and Chinese refinery additions benefit from strong regional oil demand growth. That points to trouble for further European and OECD Asian refiners, with a large portion of new refinery additions having some insulation to weak product markets. Margins are expected to remain depressed as a result.

Conversely, due to a lack of refineries, refined product imports in Africa are rising and are likely to continue unless refinery capacity growth can be accelerated.

**US transitioning from world’s largest importer to the largest exporter**

The US was once the world’s largest gross and net importer of petroleum products, with net imports of 2.0-m b/d as recently as 2007. The US is now the largest gross exporter and second largest net exporter (after Russia). By 2020, we expect US net product exports to reach 4.7 to 5.6-m b/d, by far the highest in the world.

The obstacles to exporting the growing surplus of US light sweet crude and heavier Canadian sour crudes (except to the US) have resulted in a growing conversion of crude oil to petroleum products, which can be freely exported from the US. Product supply has grown, swelling surpluses and driving record exports. Refinery margins have also been boosted by widening discounts of domestic crude relative to global crude prices.
There are also significant obstacles to growing the refinery base to match increasing US crude oil production. With a completely open export regime, light sweet crude prices would reconnect with global light sweet crude prices. Citi thinks it is inevitable that crude oil export policy will loosen from 2015 under a variety of political pressures, thus allowing increasing volumes of light sweet crude to be exported and reconnecting US and global crude prices. This might also halt the shift in product yields of US refineries, whose crude slates have become lighter, meaning greater refinery output of light ends. With a loosening of crude export policy, the US could export its light sweet crude surplus and continue to import heavier crudes.

Going forward, the exportable surplus of petroleum products should continue to grow. US petroleum product demand can ease from ~19-m b/d in 2013 to 18.5-m b/d in 2020, while refinery output (and NGL field production) can rise from 19-m b/d in 2013 to 20.2-m b/d in 2020. The additional increment of gross product exports from 2013 to 2020 should be about +2.6-m b/d in the base case to +3.6-m b/d in the high case.

The impact of US natural gas liquids (NGLs) and condensate exports warrants particular attention, with the potential to upend existing rigid pricing arrangements overseas and benefiting major consumers of light hydrocarbons. We expect exports of NGLs produced from shale plays to rise from 0.3-m b/d in 2013 to 2.4-m b/d in 2020 in the high case, and up to 1.6-m b/d in 2020 in the base case.

The “supply push” is coming – but will it create a “demand pull”? The export arbitrage is opened up by higher international prices vs. those in the US, even after factoring in the cost of export processing and shipment. The increase in international supply should lower prices globally, but the easing of the US production glut should give US prices support. For global petrochemicals, US NGL exports flooding the world market should hold down feedstock costs.
Natural Gas: Coming Out Party

Natural gas has historically been a highly local and regional commodity, with large price differentials and limited trade flows. That has begun to change with increasing global trade of liquefied natural gas (LNG), accelerated by Japan’s Fukushima accident dramatically increasing the country’s import demand. However, the market remains nascent with oil-indexed pricing remaining prevalent in much of the world, disconnected regional pricing and many supply agreements carrying destination restrictions preventing buyers from moving supplies to alternative destinations.

The coming decade is expected to see a dramatic change, including the development of a true spot market for LNG, convergence in global natural gas prices and rapid growth in internationally traded volumes. The regional composition of natural gas and LNG supply and demand is also likely to undergo a massive transformation.

Exports are expected to increase rapidly from Australia (LNG), the US (LNG and pipeline to Mexico), Mozambique (LNG) and Russia (LNG and pipeline to China). Import demand is expected to be driven by China (LNG and pipelines from Myanmar, Central Asia and Russia), India (LNG) and Latin America (LNG and pipelines from US and intra-region). In contrast, demand from Japan is likely to decline as LNG is displaced by a partial restart of nuclear capacity and build out of renewables and coal fired power plants.

US and Australian exports to reshape global natural gas order

Over the next half decade, the long-held order of global gas supply and demand looks likely to be upended with sharply higher US gas exports on top of higher Australian exports, reversing the fortunes of gas producers and consumers and altering the existing geopolitical natural gas/LNG balance.

It now seems fairly clear that North American exports could be larger than once thought, perhaps even above the initial estimate of 12-Bcf/d (92-mtpa) at the high-end and surpassing Qatar (10.3-Bcf/d or 79-mtpa) and Australia (10.8-Bcf/d or 83-mtpa) by 2020. The US should see net revenue gains from net gas exports. The
gas trade balance looks likely to change from -$8 billion in 2011 to +$18 billion in 2020 as a result of LNG exports and exports to Mexico.

Figure 103. Map of future global gas flows

Source: Citi Research
Note: Schematic only; size of arrows not reflective of actual flow; arrow directions indicative only

US LNG exports could have far-reaching impacts, including:

- **Bringing gas-indexed pricing to the global market**, replacing current oil-indexed pricing, where oranges are being priced against apples. This will both be due to the use of Henry Hub pricing as the basis for US exports and lack of impediments to re-sale of US exports, which should encourage the development of a spot market (the same could be true of Canadian and Australian exports).

- **Redrawing global geopolitics**. Low political risk and gas indexation of prices offer an appealing alternative to traditional suppliers, with US exports likely to diminish such exporters’ political influence.

Gas exports to Mexico are also set to surge as pipelines are being constructed across the US-Mexico border. US exports to its southern neighbor are likely to surge as a result, growing from 2.1-Bcf/d in 2014 to 5-Bcf/d by 2017 and 6.4-Bcf/d by 2020.

With the US becoming a more important supplier in the global gas market, many importers will benefit from increased diversity of supply, while many exporters will see their bargaining power eroded. High-cost liquefaction projects globally that have not reached final investment decisions are likely to face more headwinds in obtaining capital, signing contracts and receiving favorable contract terms.

**Coal: Two Roads Diverging**

**Import demand for thermal coal is diverging dramatically.** In the developed world, thermal coal demand – and along with it import demand – is declining as power demand falls and coal is displaced by natural gas and renewables in the generation mix. In China, which is by far the world’s largest consumer as well as the largest importer, demand growth is slowing and expected to peak by 2025 as a result of slowing economic growth, a transition away from manufacturing and “everything but coal” power strategy. Imports are also expected to stagnate, remaining roughly flat over the next few years before beginning a gradual decline.
On the other hand, demand growth is expected to be quite strong in India and ASEAN, with strong power and infrastructure demand growth, as well as growing market share of coal in a number of countries. Collectively, these two regions are forecast to see thermal coal demand grow by 7.8% annually through 2020, with import demand growing by 9.2% annually over the same period.

Strong growth in India and ASEAN has two effects. The first is a rise in import demand from traditional importers such as India, Malaysia, Thailand and the Philippines. The second is the reduction in export supply available from Asia’s two largest exporters: Indonesia and Vietnam.

In fact, Vietnam is expected to soon shift to a net importer of coal, with net imports reaching around 30 Mt by 2020 and 50 Mt by 2025. For Indonesia, domestic demand is forecast to grow by 77 Mt between 2014 and 2020, with another 47 Mt over 2020-2025. This will put tremendous pressure on the world’s largest thermal coal exporter, in combination with lower coal prices, and will likely see Indonesian export volumes peak during this period.

Japan represents the biggest wildcard as coal imports will depend on government policy towards nuclear energy, and the amount of subsidies offered for renewables. We expect a partial resumption of nuclear capacity and continued strong support for renewables build-out. However, the first fuels impacted by this will be fuel oil, followed by LNG. As a result, we forecast coal imports to initially rise in the coming years, before beginning to decline in the 2020s.

Metals: Upstream Battle

ASEAN and the Middle East rising as importers

China’s voracious metals demand during the Commodity Supercycle was a central driver of global metals prices, and China’s influence on metals markets, while changing, continues to be large. China represents nearly half of global consumption for each of copper, aluminum, nickel, lead and zinc.

Yet as China pushes its economy away from the historically heavy dependency on industrial-led growth and seeks to curtail pollution, the world may need to look for other, more dispersed sources of growth in the coming decade.
Two regions in particular stand out as new centers of demand and import growth: ASEAN and the Middle East. In the Middle East, regional demand is expected to be driven by infrastructure and real estate development, particularly in the GCC. ASEAN demand is also expected to rise significantly on the back of urbanization, infrastructure build-out and the rise of export-oriented manufacturing.

Figure 106. ASEAN and Middle East copper imports are poised for significant growth

Source: WBMS, Wood Mackenzie, Citi Research

Downstream push by exporters

Metals exporters are increasingly pushing to build out downstream industries, including the following:

- **Indonesia**: banning exports of unprocessed minerals, including bauxite and nickel ore, as well as imposing export tariffs and quality restrictions on other exports including copper concentrate and iron ore. The policy has explicitly been aimed at prompting downstream investment, something that we expect in nickel, alumina and copper.

- **India**: imposing a 30% export tariff on iron ore and seeking to ensure sufficient supply for the domestic steel industry in the long-term. India was once the world’s third-largest iron ore exporter at over 100 Mt/y and now is essentially balanced, with future exports largely dependent on the pace of domestic steel build-out. India has also imposed a 20% export tariff on bauxite as it seeks to preserve supply for domestic alumina and aluminum projects to meet rising Indian demand.

- **Zambia**: imposed a 10% export tariff on copper concentrate exports which has prompted investment in smelting capacity, with anode exports to China to increase instead.

- **Vietnam**: banned exports of bauxite, which is prompting investment in alumina refining capacity to supply Chinese import demand.

- **Philippines**: discussing implementing a ban on unprocessed natural resources exports. We think such a measure will likely be passed but not take effect until at least 2019 and more likely sometime in 2020-2025.
We expect these trends to continue as natural resource exporters seek to transition their economies to more value added downstream processing.

Figure 107. Indonesia's ban on unprocessed mineral exports was a large blow to Chinese importers and sent them scrambling to source volumes from elsewhere

Upstream trade to exceed downstream

Despite this push by exporters to move downstream, growth in trade of upstream metals including copper concentrate, bauxite and alumina is likely to exceed growth of finished metals trade. Largely this is due to expanding downstream processing capacity in China, meaning that China is growing imports of raw materials at the expense of finished metals.

In fact, China is now a net exporter of aluminum and steel. We expect export growth of both to moderate, with China unlikely to be a structural aluminum exporter in the long term. For steel, China is likely to remain a large structural exporter given slowing domestic steel demand, rising scrap supply and domestic overcapacity.

A number of other major sources of demand growth are likely to rely on domestic metals supply as well, including the Middle East for aluminum, India for copper, and to a degree ASEAN and India for steel. In contrast, a number of countries likely to grow production of finished metal will be forced to import raw materials in addition to China, including the Middle East for bauxite/alumina, India for copper concentrate, and Russia for alumina/bauxite.

However, the prospects for iron ore trade are not as bright as for copper concentrate, bauxite and alumina given the rise of steel scrap in China, which we expect to rise from 10% of Chinese steel feedstock in 2013 to 20-25% by 2020 and continue rising thereafter.
Figure 108. Chinese copper concentrate imports now exceed refined copper imports

Figure 109. China imports far more bauxite & alumina than it trades aluminum or aluminum products

Export growth to be concentrated

With slowing global demand growth and lower real prices than during the Supercycle, we expect export growth to be concentrated in a few major suppliers by commodity rather than the more widely dispersed growth seen over the past decade.

- **Copper**: Latin America and Africa
- **Bauxite**: Guinea and Australia.
- **Alumina**: Indonesia and Guinea
- **Iron ore**: Australia and Brazil
- **Steel**: China

Grains: From Richer to Poorer

Grain trade is expected to slow over the next decade when compared to the last, growing at around 1.5% annually. At a high level, global trade dynamics for grains should largely extend the trends of the last decade. In particular, we expect rising exports from the developed world to the developing world.

For wheat, Africa, Asia and Latin America are expected to be importers, while Europe, North America and Australia/New Zealand should all be exporters. For corn, Africa and Asia will be the major import regions, while Europe, Latin America and North America will be the primary export regions.
Rising ASEAN imports

While China is expected to remain the largest grains importer in Asia, **import growth is expected to be particularly strong in other developing Asian nations.** ASEAN wheat import growth is forecast to increase by around 35% to 2025, with imports in Indonesia rising 31%, Malaysian 24%, the Philippines 28% and Vietnam 44%.

Similarly, other Asian nations are also expected to witness strong import demand for coarse grains. Those include Indonesia (31.5% import growth to 2025), the Philippines (30%) and Vietnam (43%). Thus Asia, inclusive of China, should remain an epicenter of grains import demand, with ASEAN growing market share.

Corn over wheat imports in China

China has emphasized self-sufficiency in food grains in particular (wheat and rice), while feed grains are likely to receive less emphasis in this regard. Priorities for farming are therefore likely to promote growth of foods like wheat over animal feed grains like corn. The result is policy more amenable to imports of feed grains increasing. Thus over the forecast period, according to the UN, China’s coarse grain imports are expected to rise by around 60%. Yet this demand is subject to policy moves as seen with China’s banning of certain genetically modified corn for several months in 2014. In contrast to corn, the UN forecasts Chinese wheat imports to drop by around 50% from current levels by the early 2020s.

African wildcard

The recent increase in African grain imports is pronounced and due to several factors: population growth, poor productivity improvements in farming, policy distortions, poor infrastructure and weak institutions. But this highlights a conundrum: Africa has vast amounts of arable land and farming potential, but its food imports are rising. A key question for grains trade in the coming decade is whether Africa can realize its production potential, improving self-sufficiency and reducing imports. The alternative is strong food import growth going forward.

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21 “Why Has Africa become a net food importer?” UN FAO.
This highlights the potential for Africa to be a swing player. If current trends continue, the continent looks set to increase imports, with some forecasting sub-Saharan wheat imports to rise as much as 50% over the forecast period. Yet, if reforms lead way to productivity gains (which may imply greater economies of scale in farming), this trend of rapidly increasing imports would moderate or even reverse.
New Paradigm for Natural Resource Economies

Over the course of the Commodities Supercycle, countries heavily geared towards natural resources exports were among the fastest growing economies in the world. Moreover, they were able to weather the financial crisis far better than most thanks to the sharp rebound in commodity prices. At the extreme, Qatar averaged annual growth of 14.7% over 2002-2011, but even the largest and most developed commodities exporters experienced outperformance. Russia for example averaged 4.9% growth over the period and Australia 3.0% compared to 1.7% for the US.

![Figure 112](image1.png) The fastest growing economies during the Commodities Supercycle were large natural resource exporters – even amongst large economies, aside from China and India 2002-2011

<table>
<thead>
<tr>
<th>Overall</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Qatar</td>
<td>14.7%</td>
</tr>
<tr>
<td>2 Azerbaijan</td>
<td>14.2%</td>
</tr>
<tr>
<td>3 Turkmenistan</td>
<td>12.4%</td>
</tr>
<tr>
<td>4 Angola</td>
<td>11.0%</td>
</tr>
<tr>
<td>5 China</td>
<td>10.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top 30 Economies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 China</td>
<td>10.7%</td>
</tr>
<tr>
<td>2 India</td>
<td>8.1%</td>
</tr>
<tr>
<td>3 Argentina</td>
<td>7.1%</td>
</tr>
<tr>
<td>4 Saudi Arabia</td>
<td>6.4%</td>
</tr>
<tr>
<td>5 Indonesia</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

![Figure 113](image2.png) The list of fastest growing economies over the coming five years is expected to see far fewer commodities exporters as well as generally slower growth 2014-2019

<table>
<thead>
<tr>
<th>Top 30 Economies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 India</td>
<td>7.0%</td>
</tr>
<tr>
<td>2 China</td>
<td>6.8%</td>
</tr>
<tr>
<td>3 Indonesia</td>
<td>5.5%</td>
</tr>
<tr>
<td>4 Mexico</td>
<td>4.5%</td>
</tr>
<tr>
<td>5 Taiwan</td>
<td>3.9%</td>
</tr>
<tr>
<td>6 South Korea</td>
<td>3.5%</td>
</tr>
<tr>
<td>7 Turkey</td>
<td>3.4%</td>
</tr>
<tr>
<td>8 Poland</td>
<td>3.3%</td>
</tr>
<tr>
<td>9 South Africa</td>
<td>3.3%</td>
</tr>
<tr>
<td>10 Australia</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

However, with the end of the Supercycle, weaker global demand for natural resources and lower prices, these countries face a host of economic challenges:

- **Deteriorating terms of trade and current accounts**: According to Citi’s calculations based on official data, the full impact of lower commodity prices has yet to be fully felt in the terms of trade of commodity exporters. This may largely be due to 2014 having been a watershed year for many of the most important commodities, including oil (and oil-linked natural gas), iron ore and coal. Aside from further deterioration on this front, we expect volume growth to be slower over the coming decade due to weaker global commodities demand growth. This is likely to lead to structurally weaker current accounts (and balance of payments) for commodities exporters.

- **Currency depreciation**: 2014 witnessed widespread depreciation of commodity exporters’ currencies, with Russia providing the most extreme example. Such depreciation is forecast to continue, putting upwards pressure on imported inflation, and pressure on foreign currency reserves for countries that seek to slow the tide.
Hit to fiscal balance and government spending cutbacks: Lower commodities prices and slower growth of natural resource industries will cause a significant blow to government revenues in several forms. Moreover, as many major producing countries increased royalties and other forms of “government take” during the commodities boom, their revenues have become increasingly leveraged to commodities. With lower revenue comes an undeniable deterioration in fiscal balances and for most major exporters, this will necessitate a cutback in government spending. Nowhere is this more apparent than in the Middle East where governments have already begun to announce reduced spending plans in response to lower oil prices.

Investment pullback: Investment rates across the economies of major natural resource exporters are likely to decline. Not only will this come from the public sector, but the capital expenditure (capex) boom in commodities industries has also rolled over. These are in somewhat different stages, from copper which peaked in 2011-2012, to oil which is peaking in 2014-2015. All are expected to see lower investment in the coming years though, hitting local economies directly and via multiplier effects.
More broadly, the petro-states – those countries for which more than 60% of government revenues (and in many cases more than 80%) derive from oil and natural gas exports – have been undergoing an economic and political crisis as governance problems have required high revenues to meet domestic needs, and lower prices have made this impossible. These countries are challenged by skewed income distribution, aging leadership confronting challenges to their legitimacy, high population growth rates and elevated unemployment levels (except for the oil-rich Gulf states). The “resource curse” has long lingered as a critical problem for these countries and the unwinding of the commodities cycle has exacerbated their plight while reducing their freedom to reform just as reform has become more urgent.

**Structural economic shifts**

In the face of slower global demand and lower prices for natural resources, economies dependent on natural resource exports are likely to seek to shift their economies in several ways:

- **Downstream shift to commodities processing** in an effort to capture more of the value chain. This includes Middle Eastern countries building out refining capacity, Indonesia preventing exports of unprocessed minerals to force investment in smelting and refining facilities, as well as similar moves by countries such as Zambia, India and Vietnam.

- **Develop commodity intensive industries** to utilize countries’ comparative natural endowments and boost markets for domestic natural resources. Examples include the build-out of the aluminum industry in the Middle East and Russia to take advantage of cheap local energy, expansion of coal fired power plants in Indonesia and Colombia and expansion of biofuels in Brazil, Malaysia and Indonesia.
Manufacturing sector expansion to take advantage of China’s shift away from the manufacturing sector and develop alternative drivers of export revenue and economic growth in the face of weaker demand for commodities. There is no single replacement for China’s role as the world’s factory, and countries from Vietnam, to Mexico, Indonesia and Bangladesh are already benefitting.

Investment in “new economy” sectors in an effort to develop new growth drivers. Most notable of these are significant investments in renewable energy in countries including South Africa, Brazil, Chile, Australia and Indonesia.

Reduced government subsidies in response to lower fiscal revenues, particularly in the energy space. Countries including Indonesia, Malaysia, and Angola have already reduced fuel subsidies and other countries are likely to follow. Electricity subsidies are another likely area of reform.

The results of these shifts are expected to make countries that have been traditionally reliant on natural resource exports more diversified. They are likely to be less exposed to commodities prices and less externally driven, instead becoming more exposed to manufacturing and more driven by domestic consumption.

Social and political pressures

More difficult economic conditions are also expected to have profound social and political implications for economies heavily depend on natural resources. Social stability will be severely challenged given increased difficulty finding employment in natural resource industries and likely weaker wage growth across the economy. Governments will be less able to appeal to the populace via government spending due to lower government revenue. Imported inflation from currency depreciation is also likely to be a problem, with food inflation an area of particular concern.

Political risks are also likely to rise. Economic slowdowns, particularly following periods of good growth inevitably increase political dissatisfaction, reducing the popularity of ruling governments and increasing the appeal of alternative political actors. Moreover, decreased government handouts are likely to reduce dependence on ruling governments. Weaker economic performance from the natural resource sectors also increases the risk of nationalization.

Cautionary tales

History is filled with examples of countries heavily geared to natural resource exports struggling to contend with the unwinding of a commodities cycle. We list a few extreme examples here:

Venezuela (1997-1998, oil): A 53% decline in oil prices over 1997-1998 decimated revenue from Venezuela's largest industry and exports. GDP growth fell to 0.3% in 1998 and -6.0% in 1999 as a result. Moreover, Venezuela's economic crisis contributed to widespread dissatisfaction with Venezuela's two major parties. The result was the election of alternative candidate Hugo Chavez who reshaped the country’s constitution.

Bolivia (1980-1986, tin): The crash of tin prices in the 1980s led to a sharp drop in exports and government revenue. The government attempted to maintain domestic spending by printing money, resulting in hyperinflation.

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22 Due to rising labor costs, factor price reforms, credit reforms, greater emphasis on environmental costs, changing local government incentives, etc.
24,000%), default on government debt and a deep recession with five consecutive years of negative GDP growth over 1982-1986. The crash also resulted in a restructuring of Bolivia’s mining industry, with the breakup of the national mining company Comibol and massive layoffs.

- **Zambia (1970s-80s, copper):** A sharp fall in copper prices during the 1970s and 1980s devastated an economy dependent on copper for virtually all of its exports and over half of government revenues. The result was a sharp increase in government debt, forcing Zambia to borrow heavily from the IMF, and a period of economic stagnation, including negative GDP growth in six out of nine years over the course of 1973-1981.

- **Ghana (1960s, cocoa):** A large decline in international cocoa prices saw export revenue plummet and economic growth slow from over 5% annually to less than 2%. Under pressure to maintain payments to foreign creditors, the government cut the price of cocoa paid to producers in 1965. The next year, the government was overthrown in a military coup.
Globalization 3.0

The outlook for the coming decade that we have presented in this report is quite different from the experience of the past decade. The shifting structure of global growth from a China centric model to more diffuse manufacturing and consumption growth will have profound consequences.

As China transitions from an investment and export manufacturing-led economy to one increasingly driven by domestic consumption and services, the composition of many economies that have become linked to China will shift as well.

Countries dependent on natural resource exports are likely to invest in downstream manufacturing to diversify their economies. Moreover, as final consumption demand growth in emerging markets outpaces that of advanced economies, many such countries are likely to take the opportunity to develop domestic industries to meet this rising demand rather than relying on imports from China.

There is no single replacement for China as the world’s factory. Instead, export manufacturing is expected to grow in a range of countries including Bangladesh, Vietnam, Indonesia and Mexico. This will drive a diversification of industrial commodities demand away from China towards the “Emerging 5”.

While commodities have historically been highly cyclical – whether in terms of supply, demand, or prices – the shift in global growth patterns is likely to diminish the cyclicity of commodities demand. In particular, China’s leading role in driving incremental demand is expected to diminish. The share of consumption from the US and Europe is also likely to continue to erode.

The result should be a more diverse distribution of commodities consumption, and particularly of drivers of marginal demand changes. This increase multipolarity is likely to result in less synchronized global demand. Moreover, with different countries at different stages of the business cycle, global demand as a whole should become less cyclical as a downturn in one key economy has a lesser impact on overall demand. In other words, commodities demand should be more stable under Globalization 3.0 than under the China and US/EU driven framework of the past dozen years.

Lower commodity prices also have a differentiating impact on demand prospects. Regions that are significant commodity exporters, such as the Middle East, Russia and South America are likely to experience slower growth in the years to come. In contrast, regions that are net commodity importers, such as India, ASEAN, China, the US and EU, are likely to benefit.

However, despite the rise of the “Emerging 5” and the end of the long boom in commodity prices, commodities demand growth is likely to be structurally slower in the decade to come. Slower population growth, China’s transition, and technological innovation are among the factors driving this moderation.
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Key Insights regarding the future of Commodity Demand

**COMMODITIES**
The Commodity Supercycle was characterized by near unprecedented rapid, sustained, synchronized global demand growth centered on the rise of China. Going forward, we expect the coming decade to feature slower, more geographically diverse, less synchronized demand growth.

**INFRASTRUCTURE**
The strong growth in China’s commodities demand was based on large investments in infrastructure projects at the national and local level. China’s economy is undergoing a structural shift away from investment and towards consumption, which will lead to a marked decreased in commodity demand.

**SOCIAL CONSTRUCTS**
Over the course of the Commodities Supercycle, countries heavily geared towards natural resources exports were among the fastest growing economies in the world and were able to weather the financial crisis. The economies that were highly dependent on natural resources exports now face structural economic, social and political challenges.