VOLUME 1

India Forward

Emerging Perspectives

S&P Global

India is a leading global power with a unique voice that is increasingly representative of emerging markets. Strategically located, with promising growth and a young workforce, India is increasingly influencing the world.

S&P Global and CRISIL's journey with *Look Forward: India's Moment* in 2023 demonstrated the value we can deliver to our customers by taking an in-depth look at the country from interconnecting vantage points. This inaugural edition of *India Forward*, prepared by S&P Global's cross-divisional India Research Chapter initiative, provides distinct thought leadership on India by combining local expertise, global perspectives and our full suite of capabilities.

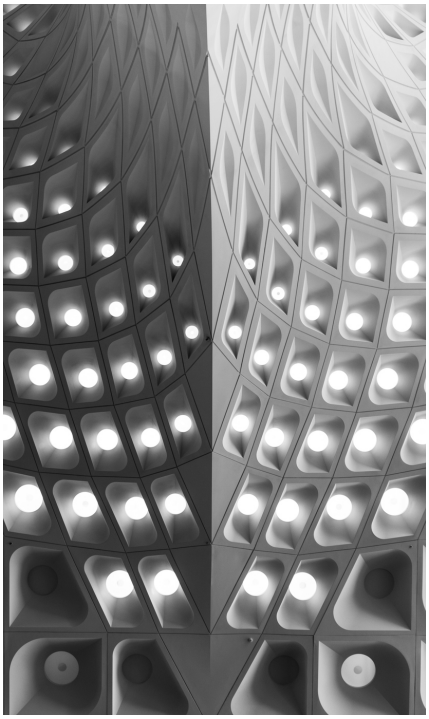
Inside *India Forward: Emerging Perspectives*, our researchers and analysts have provided essential intelligence on the many factors shaping India's future. India's medium-term prospects are healthy and poised to deliver sustained growth, buoyed by likely structural reforms, opportunities within the AI sector and more efficient agriculture. India's inclusion in global bond indexes opens new opportunities, portending sizable foreign inflows into government debt. At a time of increasing geopolitical competition, how India takes advantage of its long coastline for trade opportunities will be crucial. The same goes for the country's multidimensional energy future, with growing energy demand and the need for sustainable technology investments.

Our annual research in *India Forward* will highlight the risks and opportunities that India encounters on its path to becoming the world's third-largest economy by 2030.

India is building on its moment, and S&P Global and CRISIL are committed to powering the Indian market with integrated ratings, analytics, data and insights. The country is special to us as it is the location of our largest global workforce and *India Forward* is a testament to our commitment.

Douglas L. Peterson
President and CEO, S&P Global

India Forward
Emerging Perspectives



India is becoming a global leader during a period of geopolitical reordering and is in a unique position of being a bridge for advanced and emerging economies.

It aspires to collaborate to tackle shared global challenges, achieving inclusive economic growth, addressing growing climate risk, reconfiguring trade relationships, navigating global security conflicts and adapting to new technologies. The country's path forward will serve as a guide for other economies.

For advanced economies, engagement with India can offer signals on working in a world that seeks a new paradigm in climate finance, trade agreements and resource utilization. For emerging economies, India's approach could be an indicator for adopting diplomatic, regulatory and operational positions through their next stage of economic growth.

In this inaugural edition of *India Forward*, experts led by S&P Global's India Research Chapter highlighted eight themes to watch as India strengthens its claim as the world's bridge power.

India is on track to become the world's third-largest economy by 2030 and accelerating structural reforms will be key to unlocking private investment. Promisingly, the HSBC India Purchasing Managers' Index, compiled by S&P Global Market Intelligence, shows that India has consistently seen the highest private sector output expansion worldwide over the past year.

The internalization of India's capital markets, supported by the inclusion of Indian government bonds in major emerging market indexes, is an encouraging first step. Indian equity markets will remain active by regional standards, assisted by a supportive domestic regulatory environment.

It will be critical for India to lead global governance on technologies such as generative AI, which can be harnessed for economic growth. India can aim to replicate the success of the digital infrastructure public-private partnership model and S&P Global Ratings data shows significant public investment commitments into its AI sector.

India is experiencing a multidimensional, interlinked economic and energy transition. Its growth story will rely on executing an energy strategy that balances security, affordability and adoption of material net-zero technologies. S&P Global Commodity Insights data shows that India's total petroleum product demand will continue rising in the next decade. At the same time, its cross-sectoral realities require energy transition-specific policies and technologies to be net-zero by 2070.

The multidimensional transition is also ushering in transition in agriculture, as noted by CRISIL. In the next decade, India is prepared to adopt techniques and reforms to address climate change, ensure food supplies and improve farm incomes.

Beyond the domestic landscape, India must capitalize on its over 7,500-km coastline — using investment, trade and geopolitical strategies — to augment its commerce. More than 90% of India's import trade is conducted via sea, comparable to the trade dynamics of South Korea, China and Vietnam.

As India navigates domestic risks and opportunities amid geopolitical competition, it can meet its aspirations by integrating local solutions and global best practices. With continued openness to regional and global collaboration, India can create the right competitive conditions for inclusive growth and sustainable national and global outcomes.

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Scan the QR code to access our interactive data visualizations and listen to our podcast on India's demographic dividend. Join Farhan Husain, global head of communications at S&P Global Market Intelligence, as he chats with economists Sophie Malin and Ashima Tyagi about India's labor sector dynamics.

India's growing role in the global economy

Structural reforms and investment can support sustainable growth for India's economy, which will be the third largest globally by fiscal 2030–31.

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Chief Economist

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Head of Asia-Pacific Economics

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Director, Economic Indices

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Senior Economist,
Asia-Pacific

In the post-pandemic world, India has emerged as the fastest-growing large economy, with healthy medium-term prospects. In the fiscal year to March 2024, growth surprised on the upside at 8.2%, exceeding the government's earlier estimate of 7.3%.

Strong growth momentum

Fiscal 2024–25 started on a strong note, with goods and services tax (GST) collections at an all-time monthly high of 2.1 trillion Indian rupees in April and remaining healthy in May and June.

Given strong HSBC India Purchasing Managers' Index (PMI) readings so far in fiscal 2024–25 and with manufacturing and services sector activity trending well above the neutral mark of 50 to signal expansion, robust growth appears to be the key driver of GST collections and improved compliance. The HSBC India PMI is compiled by S&P Global Market Intelligence. The India Composite PMI Output Index reached one of the highest levels in nearly 14 years, supported by favorable economic conditions, strong demand, capacity expansion, increased new work intake and productivity gains.

India has consistently experienced the highest private sector PMI output expansion worldwide over the past year.

Highlights

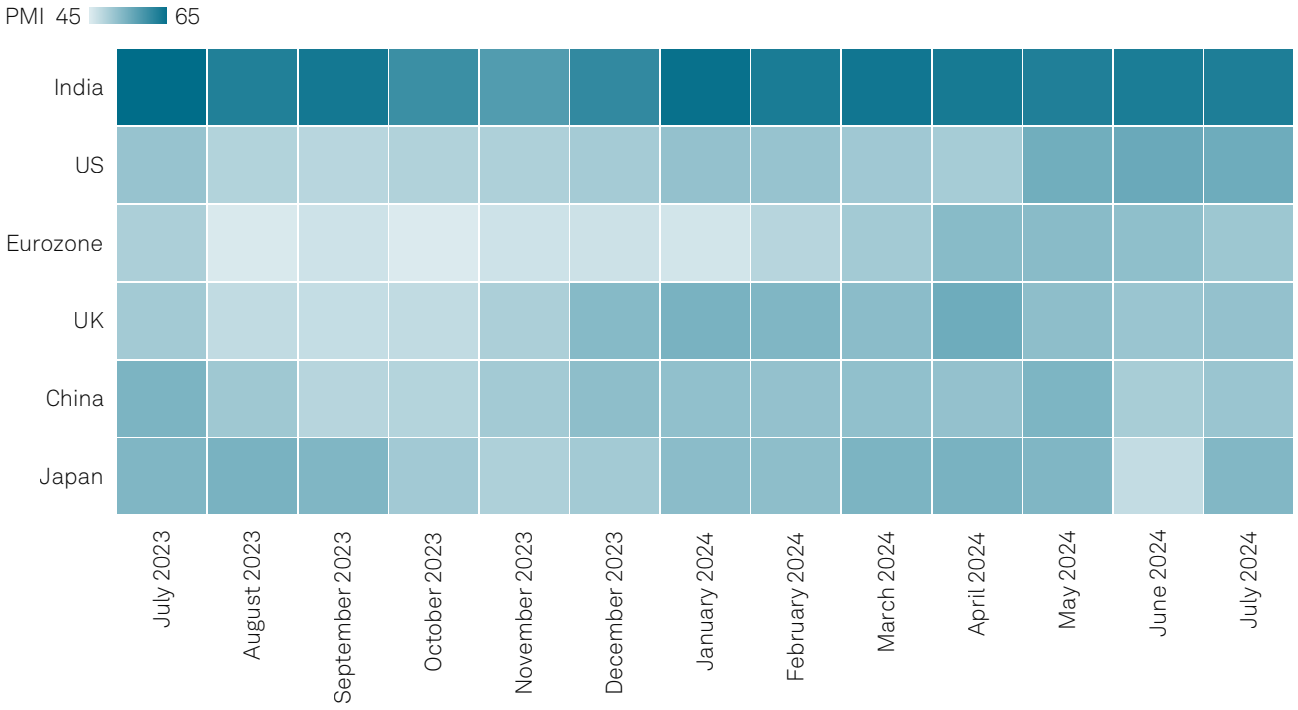
India is set to become the third-largest economy and transition to the upper-middle-income category by fiscal 2030–31 if forecast annual growth of 6.7% is realized.

The continuation of structural reforms to facilitate business transactions and improve the logistics sector will support private sector investment, making growth less dependent on public capital expenditure.

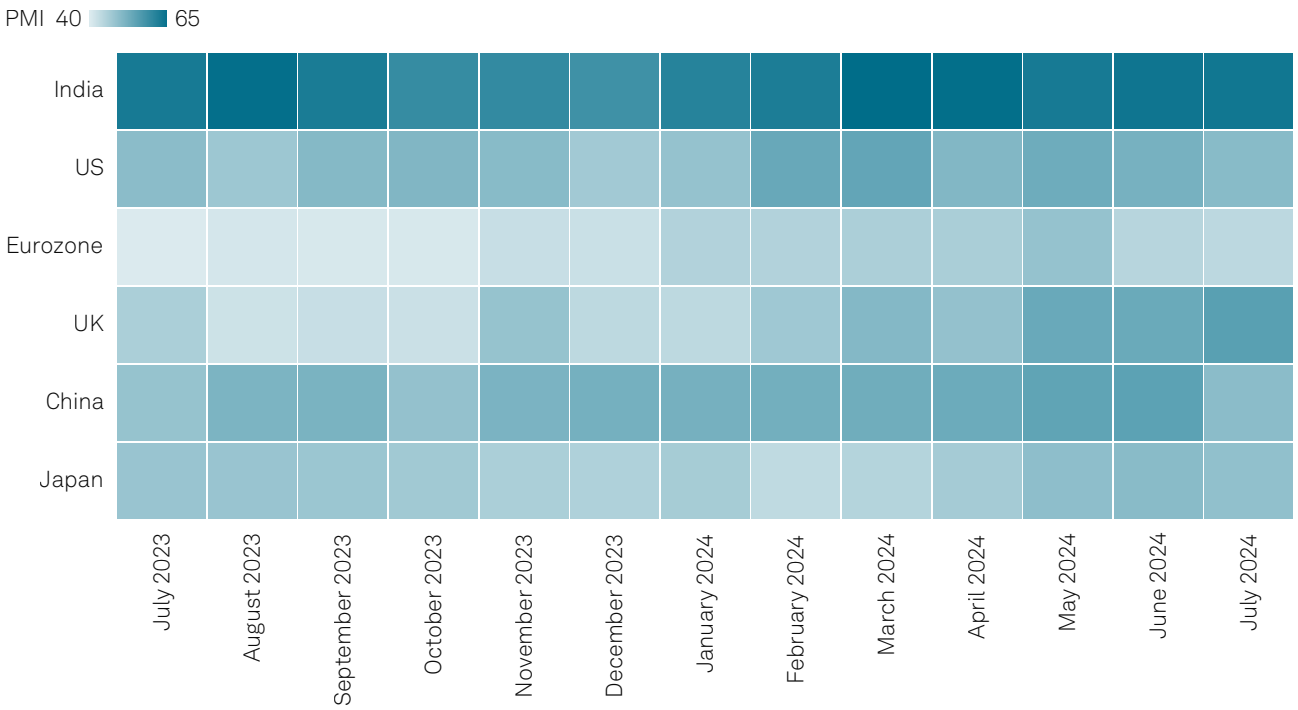
High food price inflation in the face of climate change could constrain monetary policy, making investment more expensive. Enhancing climate risk adaptation and mitigation policies and infrastructure to de-risk agriculture are therefore imperative for the smooth conduct of monetary policy.

India outpacing other economies in private sector PMI output expansions

Global Services PMI



Global Manufacturing PMI



As of July 18, 2024.
PMI = Purchasing Managers' Index.
Sources: HSBC; Caixin; Hamburg Commercial Bank; au Jibun Bank; S&P Global.

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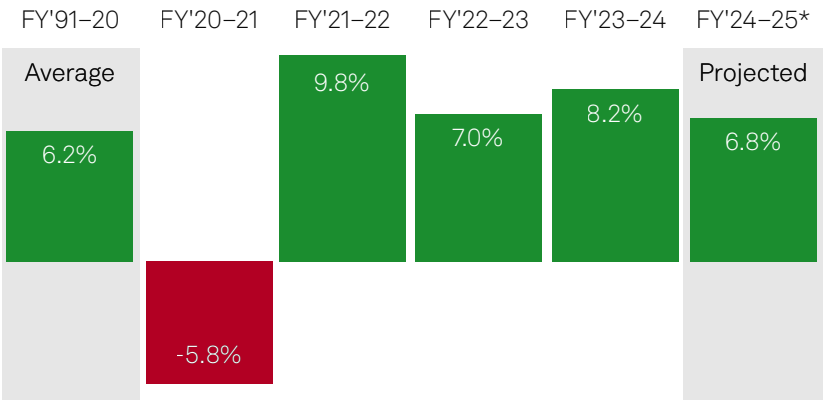
There has been an increase in new export orders for goods and services, complementing buoyant domestic demand in India and driving expansion in total sales and business activity. Qualitative data from the PMI surveys also reveals new business gains for manufacturers and service providers globally.

More broadly, we expect India's real GDP to grow 6.8% in the current fiscal year, moderating from a high base in fiscal 2023–24. The transmission of the Reserve Bank of India's (RBI's) rate hikes between May 2022 and February 2023 is underway and likely to modestly weigh on demand in fiscal 2024–25. Regulatory actions to tame unsecured lending are also slowing credit growth. Additionally, the government's intended fiscal consolidation will mean a lower fiscal push to growth. Even at 6.8%, India would be the fastest-growing large economy.

India has track record of high growth: Momentum to continue

Real GDP growth (YOY, %)



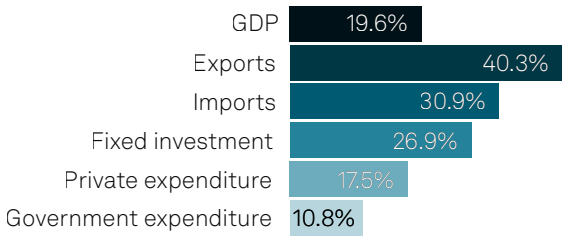
As of July 18, 2024.
* Years are fiscal, FY'24–25 = April 2024–March 2025.
Sources: S&P Global Market Intelligence; CRISIL.

Striking a private-public investment balance for sustainable growth

Government infrastructure buildouts and household investments have supported India's post-pandemic recovery. A broad-based recovery in private sector corporate investments, which account for about 37% of total investment in India, is yet to materialize. This is despite the private sector's enhanced ability to invest, thanks to a competitive corporate tax regime, healthy corporate balance sheets and the government-supported Production Linked Incentive (PLI) scheme.

Leaders and laggards in India's post-pandemic recovery

Demand side real GDP (FY 2023–24 growth over FY 2019–20, %)

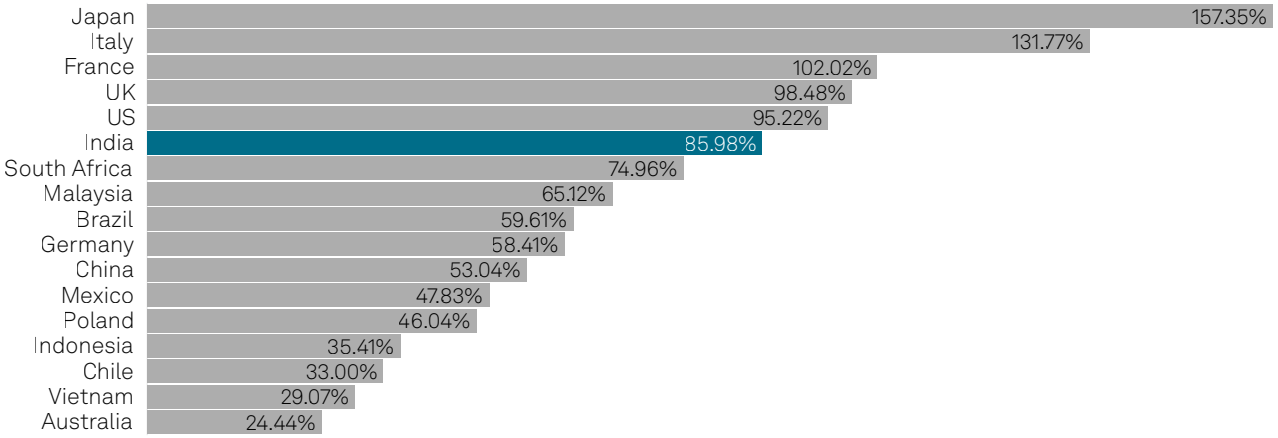


As of July 18, 2024.
Source: S&P Global.

The private sector will have to shoulder more investment responsibility as India's fiscal settings are constrained. India's net general government debt is elevated at about 86% of GDP, and the government may choose to shore up its balance sheet to build up fiscal buffers.

India's fiscal settings are constrained

Net general government debt in 2023 (% of GDP)



As of July 18, 2024.
General government refers to the aggregate of the national, regional and local government sectors, including social security, and excluding intergovernmental transactions.
Source: S&P Global Ratings.

The corporate sector, on the other hand, has deleveraged in recent years, improving its financial flexibility and ability to pursue capacity expansion.

There are initial signs that the private sector investment cycle is gaining momentum. Government investment in infrastructure and the concomitant revival of the housing sector are crowding in private investments in linked sectors such as steel and cement.

We expect industrial **investments to continue gathering** momentum in traditional sectors such as steel and cement, as well as in emerging sectors.

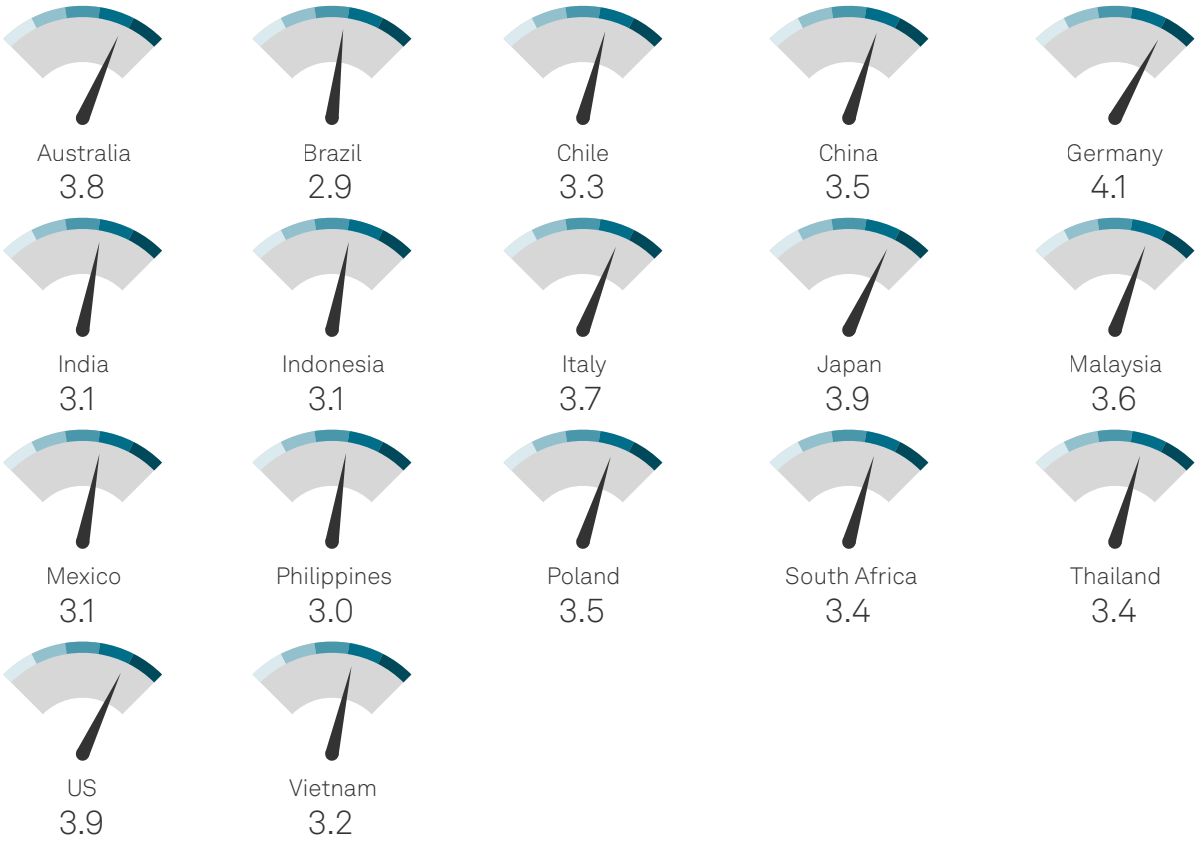
Policy efforts are leading to an improvement in India's logistics environment and supporting investment. However, India's logistics performance still trails that of regional peers, and policymakers have deployed industrial plans to support private investment in strategic areas.

Private corporate investment is also picking up in some emerging segments where the PLI scheme has been introduced. Electronics and pharmaceuticals are the two success stories here. Solar photovoltaic manufacturing and advanced carbon composite batteries are set to be the next big-ticket investments under the PLI over the next couple years. That said, PLI-led investments are likely to peak in fiscal 2025–26 unless new sectors are added, according to CRISIL estimates.

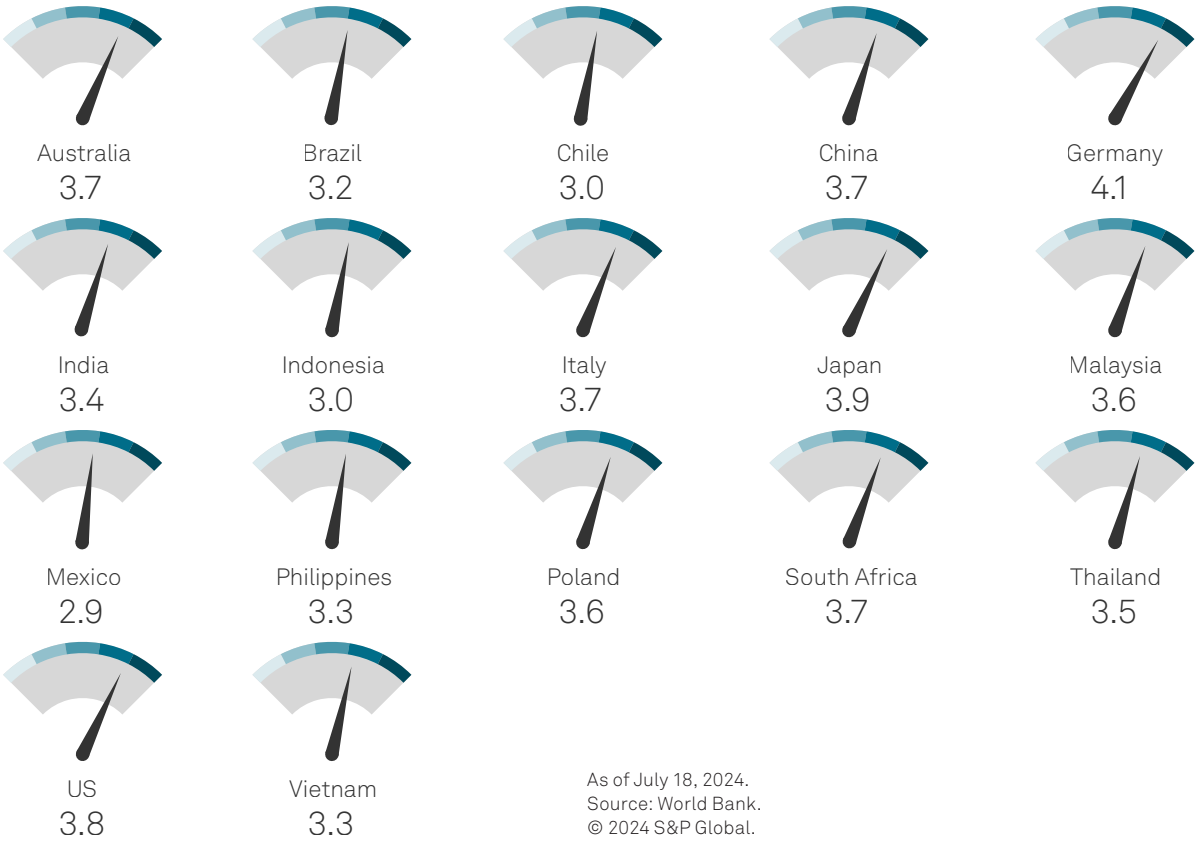
CRISIL Research's assessment of over 700 listed large and midsize corporates — excluding oil and gas, and banking, financial and insurance services — indicates that capital expenditure improved 8% between fiscal years 2020–21 and 2022–23. However, that momentum was not broad based. The capex is calculated as a change in gross block, or the total value of all the assets a company owns.

Logistics performance has improved, but room for progress remains

2014 Logistics Performance Index



2023 Logistics Performance Index



As of July 18, 2024.
Source: World Bank.

We expect industrial investments to continue gathering momentum in traditional sectors such as steel and cement, as well as in emerging sectors. CRISIL expects 18%-20% of industrial investment to come from new sectors such as semiconductors, electronics and photovoltaic module manufacturing over the next five years.

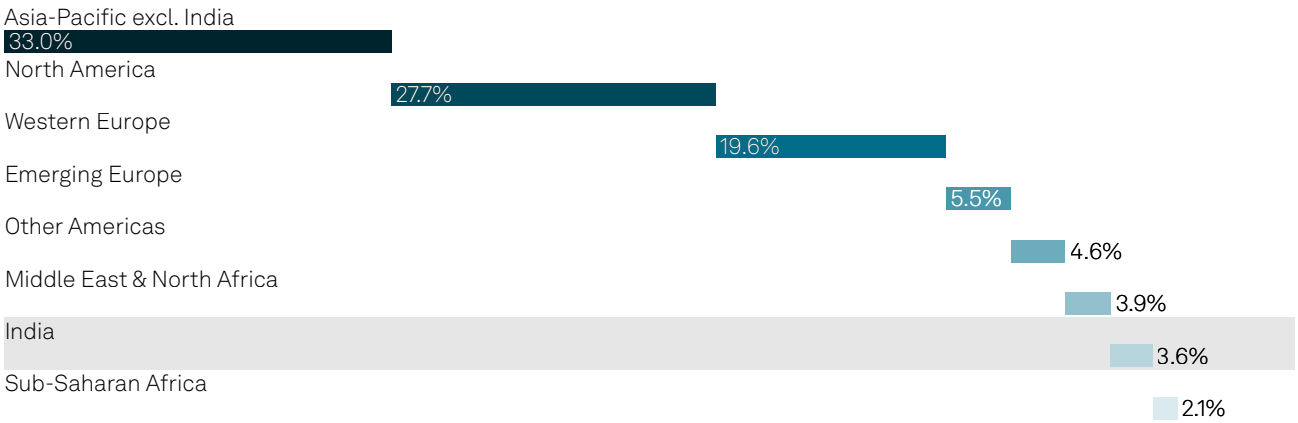
The Union Budget 2024–25, presented July 23, maintained India's infrastructure buildout momentum, with capex budgeted to grow 17.1% in the current fiscal year. Additionally, reduction of import duties on critical minerals and raw materials should improve domestic value addition and may help private investments.

As the role of private corporate investment increases and the government continues its infrastructure buildup, albeit more selectively, capital will remain a key driver of India's medium-term growth. The contribution of efficiency, or total factor productivity, to growth will also rise, supported by improvements to physical and digital infrastructure alongside declining logistics costs. The competitiveness of India's industries should also continue to improve, facilitating greater integration into global value chains and attracting foreign investment.

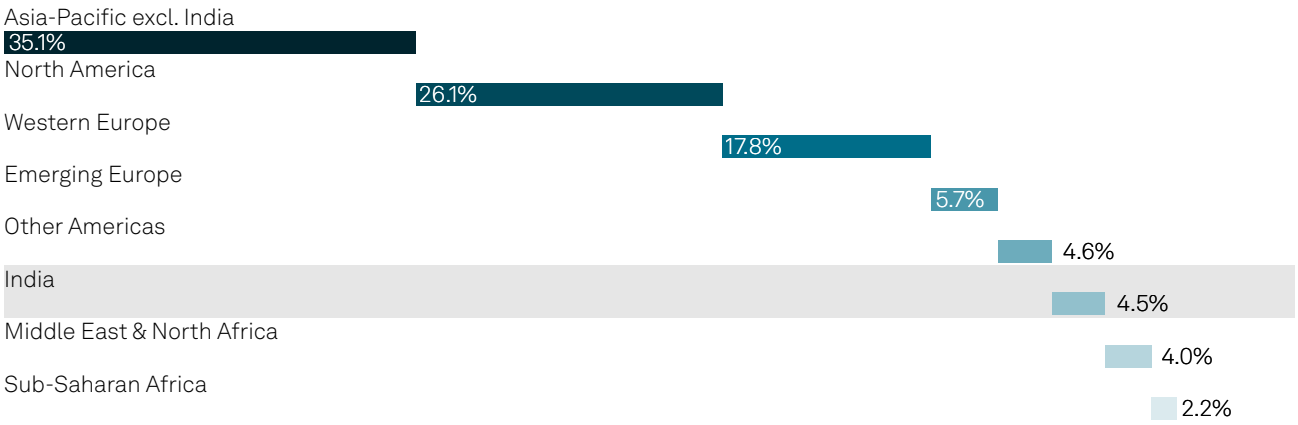
India's rising contribution to global growth

Increasing productivity should boost India's growth, allowing the economy to expand 6.7% on average to the end of the decade. According to S&P Global Market Intelligence projections, the size of the country's nominal GDP would nearly double to over US$7 trillion by fiscal 2030–31 from US$3.6 trillion in fiscal 2023–24. This would make India the third-largest economy in the world, raising its share in global GDP from 3.6% to 4.5% and lifting its per-capita income to the upper-middle-income group.

India's share in world real GDP will rise from 3.6% in 2023 ...



... to 4.5% in 2030



As of July 18, 2024.
Source: S&P Global Market Intelligence.

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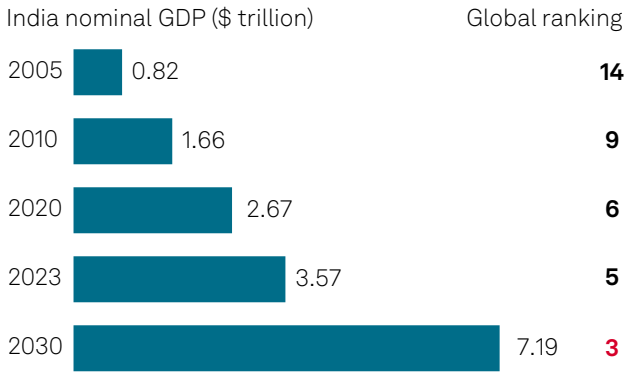
With growth projected to nearly double by FY 2030, India is set to become the 3rd largest economy



As of July 18, 2024.
Source: S&P Global Market Intelligence.

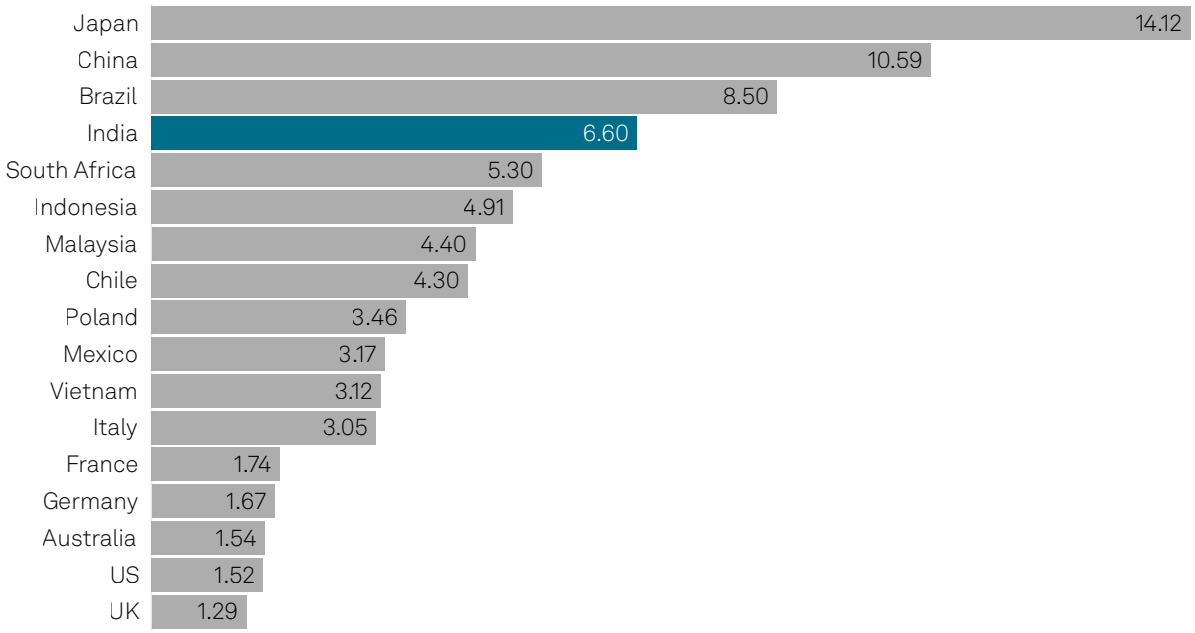
VISIT SPGLOBAL.COM/INDIA-FORWARD/EMERGING-PERSPECTIVES TO SEE THIS DATA IN MOTION.

Robust buffers against external headwinds

Strong external buffers are crucial in the face of growing global risks stemming from geopolitical uncertainties and trade disputes. India's external buffers are resilient compared with those of other nations, thanks to the country's sharply narrowed current account deficit (0.7% of GDP in fiscal 2023–24 against 2.0% of GDP in fiscal 2022–23), strong foreign exchange reserves of over US$650 billion and ongoing fiscal consolidation.

India maintains strong foreign exchange buffers

Usable reserves in months of current account payments, 2023

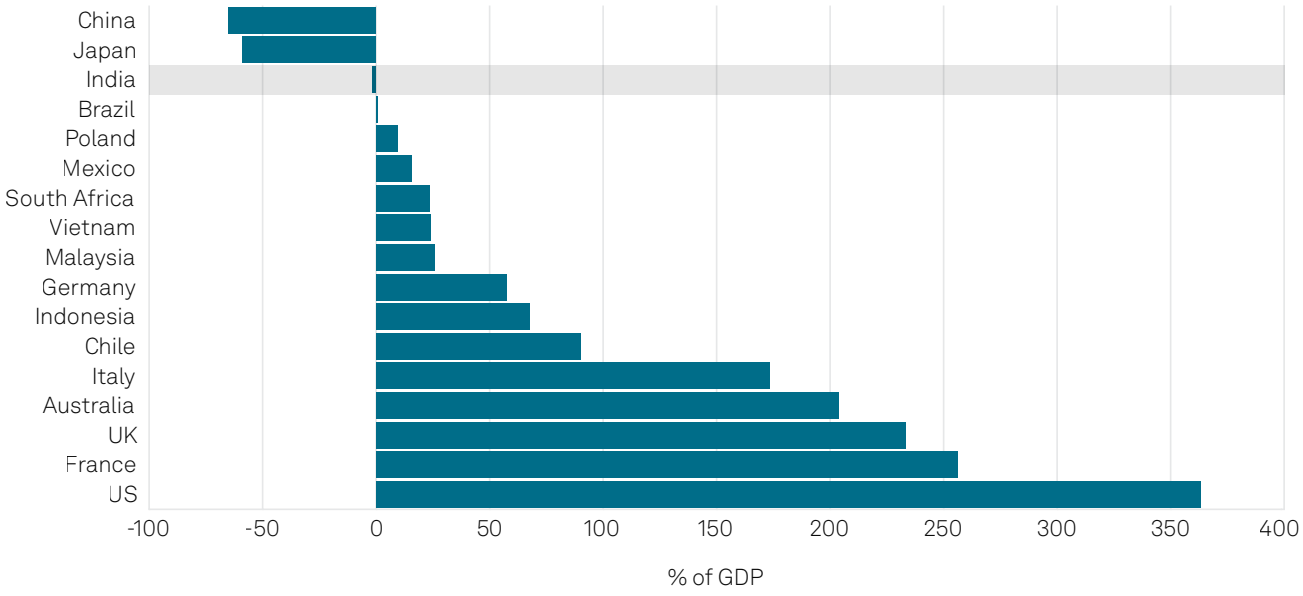


As of July 18, 2024.
Usable reserves refer to official foreign exchange reserves (including gold at market price) minus items not readily available for foreign exchange operations and repayment of external debt (such as: reserves pledged as security; mark-to market losses on reserves sold forward; or reserves deposited with offshore branches of domestic financial institutions.
Source: S&P Global Ratings.

On a narrow net external debt basis, which measures an economy's international borrowing and lending and excludes direct equity and debt, India is a small net lender. This strong position reduces the economy's vulnerability to capital outflow pressures and ensures resilience in servicing balance of payments liabilities.

India is a modest net external creditor

Narrow net external debt (% of GDP)



As of July 29, 2024.
Narrow net external debt refers to the stock of foreign and local currency public and private sector borrowings from nonresidents (including nonresident deposits in resident banks) minus liquid non-equity external assets, which include official foreign exchange reserves, other liquid public sector foreign assets, and financial institutions' deposits with and lending to nonresidents, as a percent of current account receipts. A negative number indicates net external lending.
Data for 2023.
Source: S&P Global Ratings.

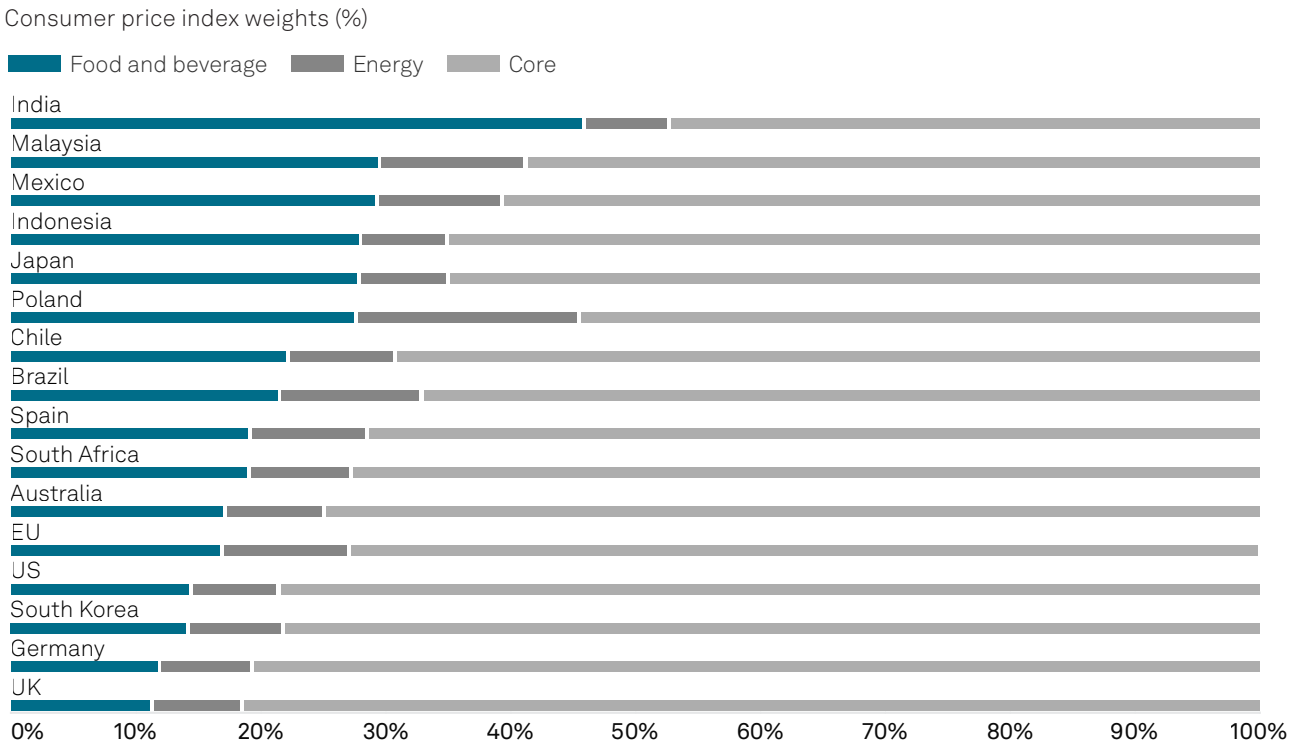
The recent inclusion of India's bonds on global bond indexes should support capital inflows into the economy's financial markets. With the inclusion, gross portfolio inflows are estimated to be between US$20 billion and US$30 billion over the next two years, which is marginal compared with the size of the overall bond market. Nevertheless, it paves the way for greater foreign participation in local financial markets and may result in more capital inflows in the long term.

Monetary policy: Tricky last mile of inflation

Persistent food price inflation in the face of rising climate risks has the capacity to constrain monetary policy. Central banks can typically overlook spikes in idiosyncratic parts of inflation such as food. But when food price inflation is persistently high and has a significant weight in the consumption basket, central banks can no longer afford to ignore it, especially if growth momentum is strong. This is precisely the situation the Reserve Bank of India is facing on the domestic front.

In India, the food and beverage weight in the consumer basket is high, at about 45%, when compared with a broad selection of economies. This makes inflation and inflation expectations highly sensitive to agricultural supply shocks.

India's consumption basket is heavily weighted toward food



As of July 18, 2024.
Sources: National statistical agencies.

In fiscal 2023–24, headline consumer price inflation averaged 5.4%, while food and beverage prices rose 7.0% and core inflation was up 4.3%. July data indicated a moderation in food and beverage inflation due to a high base from last year. This, together with declining energy prices, brought down headline inflation to 3.5%, lower than the 4% midpoint of the central bank's target range. Core inflation has been on a path of moderation since early 2023, but the latest reading in July saw a pickup in year-over-year growth to 3.4%. The RBI has reiterated its resolve to bring down headline inflation to 4% on a sustainable basis. Historical data shows this cannot be achieved without a significant and durable drop in food prices.

Another consideration for Indian monetary policy is the uncertainty over US Federal Reserve Board actions. While the RBI's monetary policy decisions are primarily influenced by its assessment of India's economic strength and domestic inflationary challenges, they are still, albeit to a lesser extent, tied to actions by systemically important central banks such as the Fed.

Normal monsoons are expected to deflate food prices, but a durable price reduction will require something more. In addition to monsoons, weather events such as heat waves and unseasonal rains have added a new dimension to food production and its price outlook.

Persistent food price inflation in the face of rising climate risks has the capacity to constrain monetary policy.

The frequency and scale of these weather events due to climate change have been increasingly evident in the post-pandemic period. In fiscal 2022–23, heat waves and unseasonal rains contributed to a surge in inflation, even though the monsoon season delivered no surprises. In fiscal 2023–24, the effects of climate change that contributed to extreme weather events led to the driest August that India had ever recorded. June 2024 was the hottest month for northwest India since 1901.

Fiscal policy is important in controlling climate change's impact on food production and supply, and the government can choose to take action via specific interventions. These include upgrading agricultural infrastructure, from production to transportation and storage, and encouraging and incentivizing cold storage and food processing to reduce wastage amid increasing risks to food supply. Complementary policies would include agricultural reforms that enable efficient price discovery.

The Indian government's fiscal policy stance engenders better coordination with monetary policy to manage inflation. The deficit target for the current fiscal year has been lowered to 4.9% of GDP compared with 5.6% in the previous year. Aware of climate risks, the Union Budget also announced measures to enhance agricultural resilience and improve transport and storage infrastructure, which, if successful, could help lower food price inflation sustainably.

Conclusion

Despite cyclical moderation this fiscal year, India is set to remain the fastest-growing large economy and expand its contribution to global growth. India is well positioned to improve its prospects by continuing its infrastructure buildout and accelerating growth-enhancing reforms.

In the current environment, the private sector needs to take the lead on achieving a balanced and sustainable lift in the investment cycle. Equally important is the limiting of food inflation by addressing structural bottlenecks and climate risks, as well as fostering conditions for supportive monetary policy. The Union Budget announcements reflect these imperatives. All eyes are now on execution. ■

India's growing capital market: Promising first steps to internationalization

The inclusion of Indian government bonds in major emerging market indexes is a step toward internationalization, but the share of government debt in foreign ownership is likely to only change gradually.

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Head of Credit Research, Emerging Markets

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India's inclusion in global bond indexes will encourage sizable foreign inflows to government debt and the country's primary equity market is outperforming regional peers, with a substantial forward calendar. However, the transformation of India's capital markets is likely to be gradual and require additional policy adjustments.

Highlights

Indian government bonds have attracted sizable foreign portfolio inflows, in absolute terms, since the 2023 announcement of India's inclusion in major emerging market indexes. Net inflows are set to continue as India's index weight increases in the JP Morgan Government Bond Index-Emerging Markets and the country is added to Bloomberg's Emerging Market Local Currency Government Index. However, the share of government debt in foreign ownership is modest and likely to only change gradually.

Indian equity capital markets are also expected to remain active by regional standards, with a substantial planned forward calendar. International demand for Indian equities will be assisted by attractive growth prospects and an improving regulatory environment.

The projected expansion of foreign ownership of Indian government bonds is likely to free up bank lending capacity and institutional investment flows for other purposes, although banks and domestic institutions will continue to provide the bulk of state funding.

Indian debt dynamics change as its IPO market outperforms

India was added to JP Morgan's reference index for global government bonds on June 28, 2024, marking the beginning of a transformation for India's domestic debt market. India's weight in the index started at 1% and will rise 1 percentage point monthly until it reaches 10% by March 2025. The index currently tracks US$234 billion of assets. India will also join the equivalent Bloomberg index in 2025 and is under discussion for inclusion in the FTSE Emerging Markets Government Bond Index.

As forecast in *Look Forward: India's Moment*, fund flows to India have increased substantially because of this inclusion, with total net bond purchases by foreign portfolio investors estimated at about US$2 billion between June 28 and July 16 and at US$11.5 billion since the announcement of India's admission to JP Morgan's reference index.

The greater foreign focus on Indian debt markets has also modestly benefited the country's corporate bond market. Securities and Exchange Board of India and National Securities Depository Ltd. data showed net foreign inflows of 80 billion rupees, or US$963 million, to Indian corporate debt from the start of 2024 to the end of May, after six consecutive years of net foreign outflows.

Since its green bond debut in January 2023 with an 80 billion rupee, or US$1 billion, two-tranche issuance of five- and 10-year debt, India has conducted several green debt sales, with proceeds dedicated to environmental projects and issuance extending to 30-year maturities in a 200 billion rupee green bond calendar for fiscal 2024–25. However, issue sizes have been moderate, with the bulk of these sales being purchased by domestic institutions. While India's green bond program was welcomed conceptually by international environmental, social and governance-dedicated funds, the relatively modest scale of individual issues and their domestically targeted nature have so far restricted foreign participation. On April 5, 2024, the Reserve Bank of India granted foreign investors access to Indian green bonds. However, unless India expands its ESG focus — for example, through state development of, or funding for, renewable energy projects, permitting far larger and more liquid issuance in foreign-eligible securities — green bond sales are unlikely to substantially accelerate foreign inflows.

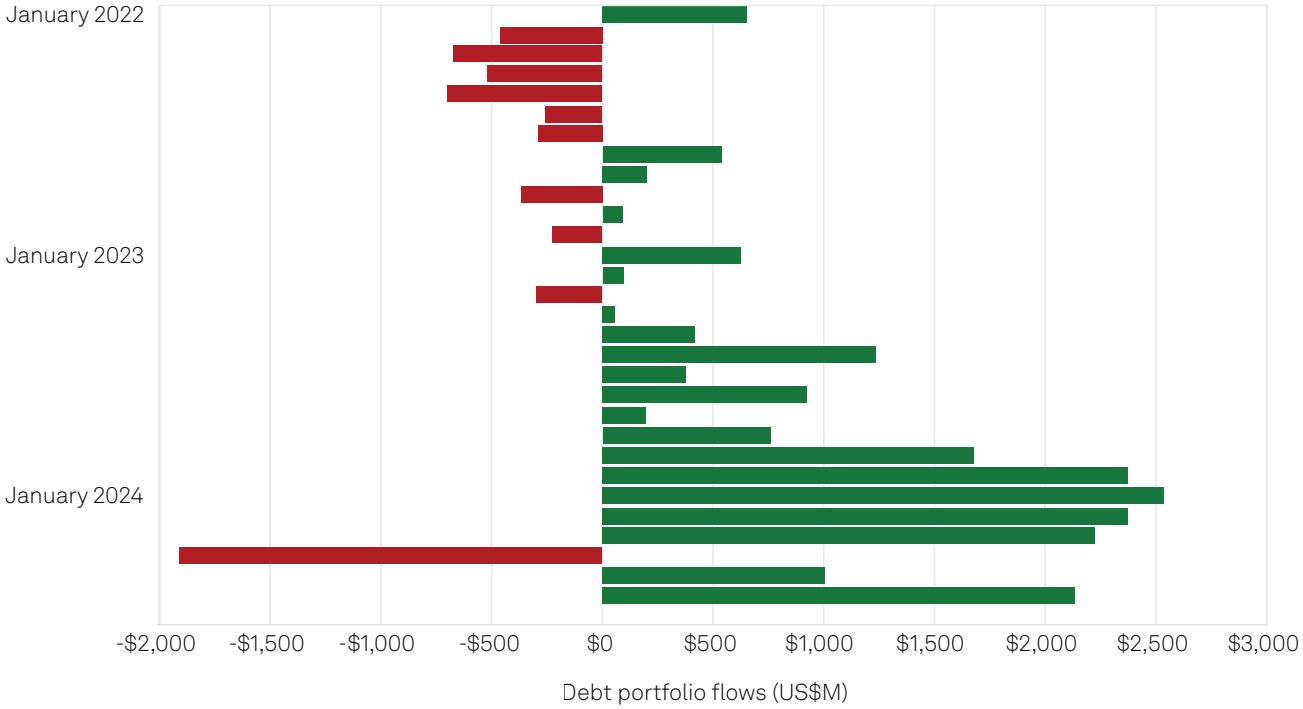
India's primary equity market is also outperforming regional peers. According to London Stock Exchange Group data, Indian IPOs raised about US$4 billion in the first half of 2024, over double the volume in the same period of 2023, with a sizable pending calendar. Multiple transactions have been heavily oversubscribed, largely by domestic institutional and strategic investors.

Foreign ownership share growth in Indian government debt likely gradual

Increased foreign investment in India's public sector debt will ease the reliance on domestic funding sources, with this likely to reduce the crowding out of the private sector and sizably increase the capital available for the country's corporate bond market. In *Look Forward: India's Moment*, S&P Global concluded that wider index inclusion could increase foreign participation in India's government bond market to 10% from 0.9% in 2023, and that this would enable funds available for corporate debt issuers in India to almost triple relative to nominal GDP by 2030.

As mentioned, portfolio inflows to India have increased significantly since the announcement of its addition to JP Morgan's reference index. However, due to local entities such as banks increasing their holdings — bank-held shares rose 1 percentage point for total central government bonds and 5 percentage points for Treasury bills between March 2023 and March 2024 — the foreign participation share in Indian debt has remained stable.

Inclusion in JP Morgan index boosted portfolio flows

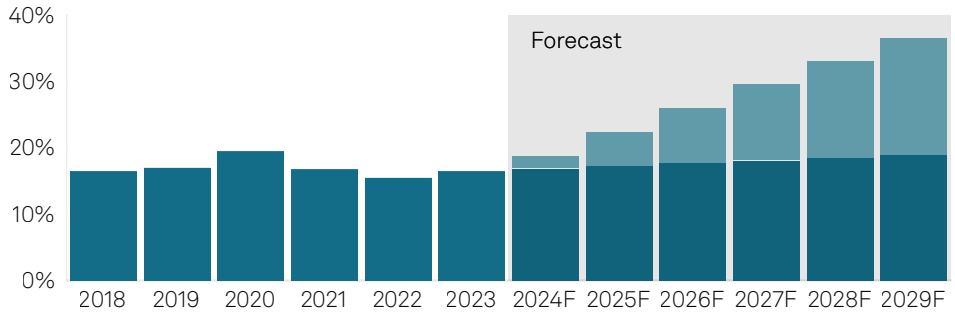


As of July 29, 2024.
Net nonresident purchases of emerging markets stocks ("portfolio equity flows") and bonds ("portfolio debt flows") in millions of US dollars. Proxy for portfolio flows as measure in the balance of payments.
Source: Institute of International Finance

The further development of India's debt capital market will require government action to improve market access and settlement procedures, also likely ushering in greater foreign participation in domestic markets alongside the increased scrutiny and potential volatility that would come with it. S&P Global's base case, after adjusting initial estimates, is that foreign participation in government debt will gradually increase and help lower the existing crowding out effect in domestic debt markets.

Index inclusion should gradually boost available funds for corporate issuer

Outstanding corporate bonds as a percent of GDP and additional funds estimate (%)



As of July 28, 2024.
F = forecast.
Corporate bonds were forecast by keeping the growth average from 2011 to 2023. The potential for additional available funds was forecast by assuming that 10% of the funds destined to outstanding government debt will be liberated and could be invested in corporate bonds.
Source: S&P Global.

Regulatory relaxation important in determining primary equity market growth

India's primary equity market has been strong in 2024, with a sizable and expanding forward IPO calendar. Driven by regulatory improvements and strong economic growth that has outpaced other large Asian markets such as mainland China, Indonesia and Malaysia, India's primary equity market has gained significant traction this year. It boasts the highest number of IPOs in Asia, ahead of mainland China, Hong Kong, Japan and Indonesia. Regulatory reforms, including easing ownership restrictions and streamlining foreign investment procedures, have facilitated increased foreign investment.

Likewise, the streamlined know-your-customer requirements of the Securities and Exchange Board of India and the introduction of the single-window clearance system for foreign portfolio investors have reduced entry barriers.

Since relaxing limits on foreign direct investment in the retail, civil aviation, construction, space and insurance sectors, the government is looking to ease foreign ownership limits for banking and defense, which would further enhance India's appeal as a foreign direct investment and IPO destination.

Domestic banks to reduce government debt holdings gradually, rely on wholesale funding to expand credit

Between March 2023 and March 2024, domestic bank holdings of central government bonds increased 14%, outstripping growth of 11% in the stock of central government bonds. Holdings of central and local government securities since 2023 continues to account for 26% of total banking sector assets.

The expansion in bank holdings could be a tactical investment decision reflecting expectations of monetary easing, providing scope for future trading gains. Public sector banks hold a much larger proportion of government securities than their private sector peers, reflecting historical asset quality weakness and weak capitalization.

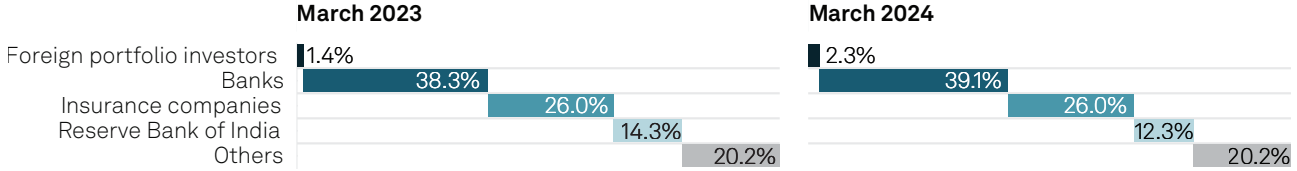
Going forward, banks' role in financing government debt may gradually decline as foreign investor participation in government debt rises and corporate credit demand picks up. All banks are required to maintain an at least 18% statutory liquidity ratio in government securities,

Going forward, banks' role in financing government debt may gradually decline as foreign investor participation in government debt rises and corporate credit demand picks up.

which effectively funds government debt. In the long run, a higher proportion of foreign funding in government securities may pave the way for statutory liquidity ratio reductions, reducing the role of banks in government financing.

Recent growth has not been at the expense of expanded lending to the real economy, which grew 16% in the year to March 2024 — a faster growth rate than for bank holdings of government debt. Overall balance sheet expansion by banks reflects recent improvements in the sector's capital position — including the impacts of past capital injections in state-run banks — and in asset quality metrics, boosting sector capacity for new lending.

Proportion of foreign investors' holding of government debt had doubled



As of July 18, 2024.
Source: S&P Global Market Intelligence.

Indian banks' low LDR belies a high reserve requirement

Loan-to-deposit ratios among key regional banking systems


Vietnam
LDR: 101.28


Thailand
LDR: 90.98


Malaysia
LDR: 88.7


Indonesia
LDR: 84.78


India
LDR: 80.78

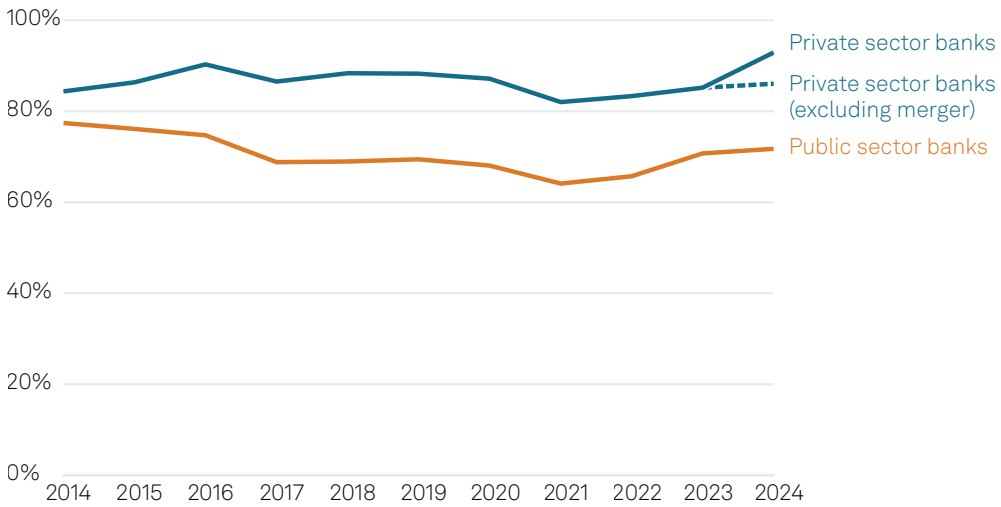

China
LDR: 78.19


Philippines
LDR: 64.9

As of July 28, 2024.
LDR = loan-to-deposit ratio.
Sources: S&P Global Ratings; Reserve Bank of India; Bangko Sentral ng Pilipinas; Bank Negara Malaysia; State Bank of Vietnam; Bank of Thailand; National Financial Regulatory Administration.

In the future, banks' ability to finance private sector investment could be constrained by their ability to tap domestic savings. As economic conditions improve, investors are likely to enjoy more options, such as mutual funds, equity investments and real estate, for their savings. The development of alternative investment options already contributed to a two-decade high loan-to-deposit ratio of 80% for Indian banks in December 2023. S&P Global expects this trend to constrain loan growth for many banks, with year-over-year credit growth forecast to decline to 14% in fiscal 2024–25, from about 16% in fiscal 2023–24.

LDR deterioration is a bigger problem for private sector banks than for public sector banks



As of July 28, 2024.
LDR = loan-to-deposit ratio.
Sources: Reserve Bank of India; S&P Global Ratings calculations.

Indian banks have typically relied on deposits as their main source of funding, but the structural reallocation of savings to other instruments is likely to encourage them to place greater reliance on wholesale domestic and international debt. This would occupy some of the room created by increased foreign holdings of government debt, thus increasing the available domestic funds for the corporate and banking sectors. Wholesale borrowings are likely to increase the banking sector's cost of funding. As a result, we forecast net interest margin to fall 20 basis points to 3% in fiscal 2025–26, implying a reduction of between 10 bps and 15 bps in the return on average assets.

Favorable growth prospects attract foreign direct and portfolio investment

Although India's growth prospects are reliant on further government liberalization, the country is well placed to perform strongly within Asia. By fiscal 2030–31, India is poised to become the world's third-largest contributor to global growth, according to S&P Global Market Intelligence. This will boost India's attraction to foreign investors and encourage them to reallocate prior equity investments from slower-growing markets.

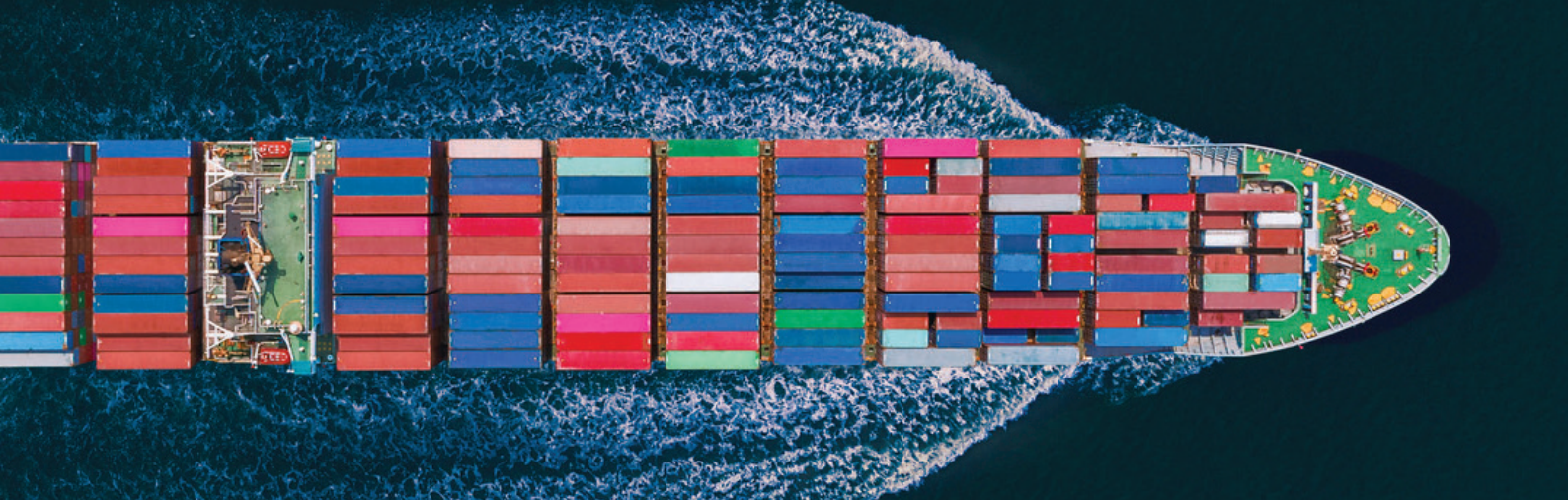
However, the borrowing needs of India's government are unlikely to decline, with the country primed to continue expanding expenditure on infrastructure investment. Public sector capital expenditure is on track to reach about 3.4% of GDP in fiscal 2024–25, almost 4.5 times the level in 2012–22, in absolute terms. Large-scale investment in areas such as renewable energy and technology, including semiconductors, is likely to encourage further foreign capital participation, both directly and through equity investments. If successfully implemented, this public investment should support India's longer-term economic growth outlook and contribute to fiscal consolidation.

Expanded foreign demand for government debt should lower yields. Additionally, strong economic growth would be a positive indicator for credit risk within the corporate sector. As foreign investment flows into government debt, freeing up capital resources for deployment elsewhere, corporate issuers are likely to enjoy lower borrowing costs and tighter debt margins. This will benefit larger, higher-rated companies and banks. Alongside this, declining wholesale funding costs should help banks continue growing their credit provision to households and smaller businesses.

Conclusion

India's debt and equity capital markets have benefited from the country's strong economic growth prospects. Specifically for debt capital markets, India's inclusion in the JP Morgan Government Bond Index-Emerging Markets in June 2024 and the country's planned addition to Bloomberg's Emerging Market Local Currency Government Index in January 2025 will progressively increase foreign investment in Indian government debt.

The higher demand for government debt is likely to lead to lower costs of funding for India's government and banks, reducing subsequent lending from banks to the broader economy. ■



From Kandla to Kolkata

Leveraging India's long coastline will drive geopolitical and economic opportunities.

Deepa Kumar
Head of Asia-Pacific Country Risk

Rahul Kapoor
Vice President, Global Head of Shipping Analytics and Research

Eric Johnson
Senior Editor, Technology, Journal of Commerce

A combination of external developments and domestic objectives to be a global leader has encouraged New Delhi to home in on a key question — how to transform India's 7,500-km-plus coastline from a geographical characteristic into a strategic apparatus. While 270 degrees of access to neighboring and global markets suggests huge maritime potential, gradual efficiency gains along the coastline have limited geopolitical and economic opportunities thus far.

Global events since the onset of the COVID-19 pandemic have accelerated a recalibration of India's ambition to shift to being a maritime power from a continental power. Becoming a maritime power requires more interventions across three dynamics: infrastructure development, trade opportunities and geopolitical strategy.

Highlights

For India to maximize benefits from its long coastline, it requires suitable investment, trade and geopolitical strategies.

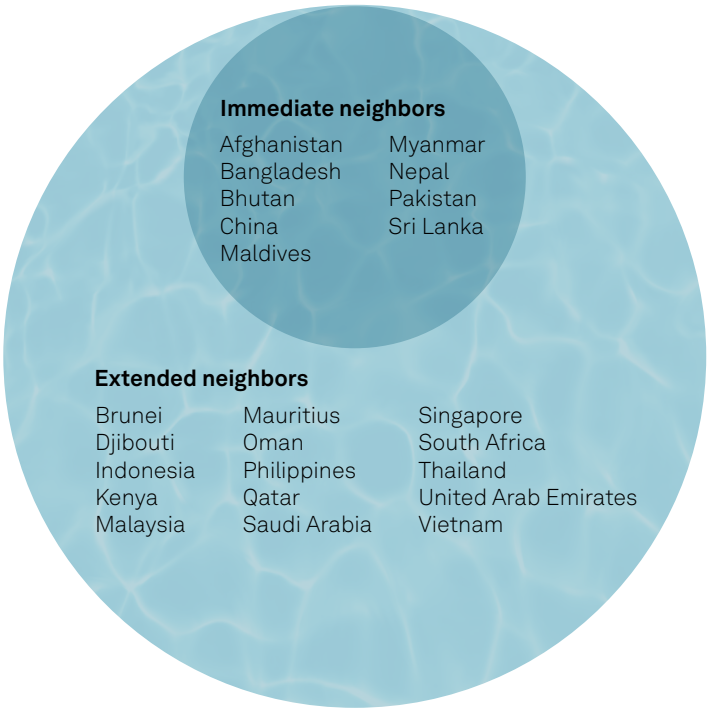
More than 90% of India's import trade is seaborne; a litmus test will be how it prepares its ports for increasing exports and to manage substantial bulk commodity imports.

As geopolitical competition increases in the Indian Ocean region, India should look beyond domestic ports and develop a regional network of strategically vital ports.

Indian Ocean-led: India's evolving opportunity landscape

India's opportunity landscape is expanding alongside its strategic focus on its coastline. It now has a wider Indian Ocean-led understanding of this landscape, extending beyond the traditional idea of the neighborhood as defined by India's immediate land and sea borders. Indian initiatives in this extended neighborhood include, for instance, regular Indian Navy calls at ports in Djibouti and Singapore, maritime economic corridor development with Sri Lanka and Oman, and upgraded trade agreements with the United Arab Emirates and Bangladesh.

India's new sphere of influence represents a vast expanse across the Indian Ocean region



As of Aug. 7, 2024.
Sources: Country Risk analysis; S&P Global Market Intelligence.

VISIT SPGLOBAL.COM/INDIA-FORWARD/EMERGING-PERSPECTIVES TO SEE THIS DATA IN MOTION.

Nearly half of India's exports and imports are with its extended neighborhood

India's major trading partners and merchandise trade in 2023

India exports (US$B)		India imports (US$B)	
US	75.7	China	99.6
United Arab Emirates	33.0	Russia	60.6
Netherlands	23.1	United Arab Emirates	45.5
China	16.2	US	43.2
UK	12.4	Saudi Arabia	33.6
Singapore	12.0	Iraq	29.2
Bangladesh	11.2	Indonesia	22.6
Saudi Arabia	10.8	Singapore	21.5
Germany	9.7	South Korea	21.4
Hong Kong	8.7	Switzerland	19.7

As of July 29, 2024.
Sources: S&P Global Market Intelligence; Ministry of Commerce and Industry, government of India.

VISIT SPGLOBAL.COM/INDIA-FORWARD/EMERGING-PERSPECTIVES TO SEE THIS DATA IN MOTION.

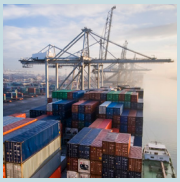
An intersection of three dynamics

For India to maximize benefits from its long coastline, suitable investment, trade and geopolitical strategies need to be implemented, in line with India's vision for its domestic growth and place in the global world order.

Infrastructure development

Port infrastructure development in India remains a work in progress. According to the World Bank and S&P Global's Container Port Performance Index 2023, only three Indian ports are ranked in the global top 50. The performance gap between public and private sector ports is notable: While India's largest government-owned port — the Jawaharlal Nehru Port Trust (JNPT) complex — ranked 96th globally, the privately operated Mundra Port Terminal in Gujarat ranked 27th.

The difference in performance underpins a shift in cargo handling as well. Until a decade ago, India's government-owned ports commanded about 75% of the country's container volumes, with JNPT and Chennai Port leading the pack. But cargo volumes have increasingly shifted to private ports, given their market-oriented dynamics in a competitive environment, and bureaucratic hurdles associated with pricing and infrastructure investment have limited the attractiveness of government-owned ports.



The rise of Adani Ports
Privately run ports in India captured 47% of total cargo in fiscal year 2023–24, according to S&P Global's Journal of Commerce. This demonstrates the rise of Adani Ports. Adani-run Mundra Port handles 15.6% more volume than JNPT and grew twice as fast in fiscal year 2023–24.

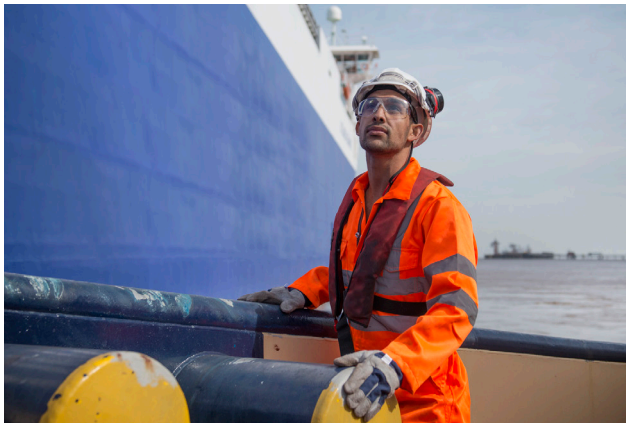
Notably, the evolving dynamics in public and private sector port development still benefit India's maritime ambition. The Ministry of Ports, Shipping and Waterways' Maritime India Vision 2030, released in 2021, is emblematic of the complexity of managing the improvement of 12 government-run and more than 200 privately run ports across India's vast coastline.

India has sufficient container capacity for the near term — about 33 million twenty-foot equivalent units (TEUs) compared with 22 million TEUs handled nationwide annually. More capacity is on the way: A US$10 billion greenfield port at Vadhavan, near Mumbai, would command roughly 23 million TEUs of annual capacity at full buildout, and a US$600 million investment in a new container terminal at Tuna-Tekra, near Kandla in Gujarat, would add another 2 million TEUs of annual capacity. This should preclude the worries about overcapacity seen in other Asia-Pacific countries such as China or Vietnam, which have built container capacity for volumes that are slow in coming or unlikely to materialize.

India has sufficient container capacity for the near term — about 33 million twenty-foot equivalent units (TEUs) against 22 million TEUs handled nationwide annually.

A holistic evaluation of the government's Sagarmala initiative would also be useful. Through Sagarmala, which was introduced in 2014, the government has underscored the importance of seaborne trade in guiding India's path to growth by focusing on modernizing ports through efficiency and tactical infrastructure improvements. The government's deadline of 2025 for India's importers and exporters to save between US$4.2 billion and US$4.8 billion in logistics costs will be a key indicator of progress.

India's intent to lure greater imports and exports — traditionally transhipped through the Port of Colombo in Sri Lanka — can be addressed by developing as-yet-absent deepwater ports that serve the largest ships trading between Asia and Europe, and by reducing terminal handling costs at JNPT (which can be 60% higher than at other hubs in Asia and the Middle East, according to a study by the Associated Chambers of Commerce and Industry of India). Vizhinjam Port in Kerala will be a key deepwater gateway, catering to services that until now have relied on Colombo.



While India has long been viewed as moving too slowly in building logistics infrastructure to match its trade ambitions, this methodical approach has likely worked to its advantage. In addition to port development, unlocking India's trade capacity also depends on in-country infrastructure progress. More investment should be directed toward facilitating connectivity with landlocked states that have import or export demand through freight rail corridors and interstate highways. India's vast interior markets hold the key to trade development.

Trade opportunities

India's maritime landscape-led trade growth is poised to continue, while overland and airborne trade share is extremely low. India's trade is overwhelmingly seaborne, similar to mainland China, South Korea and Vietnam, which also conduct nearly 90% of their trade via sea, as noted by S&P Global Market Intelligence's Global Trade Analytics Suite. This dependence on maritime routes to manage imports and exports likely informed port development strategies in mainland China, South Korea and Vietnam; India will have to consider port development accordingly.

A litmus test will be how India prepares ports for increasing exports and to manage substantial bulk commodity imports. India's bulk commodity imports are primarily energy imports in crude oil, liquefied natural gas (LNG), liquefied petroleum gas (LPG) and coal; metallurgical coal for steel making; and agriculture-sector imports such as fertilizers. The demand for these in India is expected to remain strong beyond 2030, backed by economic growth prospects.

Over 90% of India's import trade is seaborne

Seaborne market share (import)

	2019	2020	2021	2022	2023
South Korea	100%	100%	100%	100%	100%
India	97%	98%	98%	98%	98%
Mainland China	95%	95%	96%	95%	94%
Vietnam	91%	92%	91%	91%	94%
US	64%	65%	58%	51%	54%

Seaborne market share (export)

	2019	2020	2021	2022	2023
South Korea	99%	98%	99%	99%	99%
Vietnam	83%	82%	84%	87%	89%
India	85%	84%	82%	83%	86%
Mainland China	76%	75%	78%	78%	77%
US	73%	75%	63%	61%	70%

As of July 29, 2024.
Sources: Global Trade Analytics Suite; S&P Global Commodity Insights.

The domestic challenge will stem from the fact that handling bulk commodity cargo poses higher operational challenges than handling containerized cargo — and that inadequate handling equipment and a lack of deepwater berths to accommodate larger ships add to costs for Indian energy importers. But this is also an opportunity for India to increase its share of international container shipments on the back of global supply chain diversification. With an estimated compound annual growth rate of 3%–5% in 2023–30, rising bulk commodity imports are a chance for the port ecosystem to evolve and reduce the logistics burden.

Case study: Coal imports

India's dependence on imported thermal and metallurgical coal is likely to stay high for the next decade. The country's economic development strategy is focused on raising capital expenditure for infrastructure, thereby driving demand for steel and, in turn, for raw materials such as coal. India is now the largest seaborne coking coal buyer, a trend driven by the country's growing steel capacity and consumption.

The role of Indian ports in meeting energy security needs and driving efficiency gains to reduce import costs is critical. India's total metallurgical coal demand is expected to rise from 150 million metric tons (MMt) to over 250 MMt by 2030, while coking coal imports are set to reach 100 MMt in 2030, according to S&P Global Commodity Insights estimates.

India's ports system also needs to support domestic coal flows. S&P Global Commodity Insights' Commodities at Sea data shows that coal flows within India have surged since 2021, following an increase in domestic coal production. This represents a fundamental shift in how a key energy material is transported to the country's power plants, domestic coal having previously been transported via road and rail.

The role of Indian ports in meeting energy security needs and driving efficiency gains to reduce import costs is critical.

Total coastal coal flows within ports in India increased to 32.1 MMt in 2023 from 6.5 MMt in 2020; in particular, the ports of Krishnapatnam, Kamarajar and Karaikal saw volumes grow to 13.0 MMt in 2023, up from 1.4 MMt in 2020; 5.5 MMt in 2023, versus 1.0 MMt in 2020; and 3.0 MMt in 2023, versus just 69,000 metric tons in 2020, respectively.

India's coastal trade, however, is significantly underdeveloped and is a key area for improvement. In comparison with China, Indian domestic coal flows via sea are miniscule (5%), with huge growth opportunities in the coming decade.

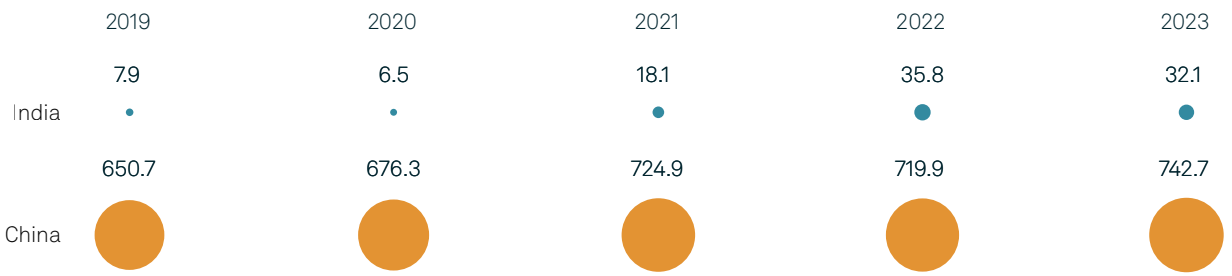
Intermodal waterways should also remain a focus. Efforts by India's Inland Waterways Authority to set up jetties and modern handling equipment, coupled with increasing inland barge availability, should drive coastal and inland shipping.

Port diplomacy: India's external strategy

In addition to leveraging the coastline for domestic objectives, India has adapted its approach to maritime geopolitics to meet its external objectives. This is part of India's ambition to act as a bridge power, aligning the interests of emerging economies in Asia and Africa with those of advanced economies in East Asia, North America and Europe. It conveys India's intent to maximize its interests by developing as many partnerships as possible, irrespective of political systems — in fact, by actively using global contradictions to its benefit.

India's coastal coal flows remain a key area for improvement

Domestic coal flows (million metric tons)



As of July 29, 2024.
Source: S&P Global Commodities at Sea.

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As geopolitical competition increases in the Indian Ocean region, India's ports strategy should extend to developing a regional network of strategically vital ports. The US, Japan, China and France, among others, have already made public and private sector investments in the Indian Ocean region, building, managing and/or operating ports in countries including Djibouti, Somalia, Saudi Arabia, Qatar, Sri Lanka, Pakistan, Singapore, Malaysia and Cambodia. India's outreach has already seen some success, resulting in codevelopment and comanagement at ports in Oman, Iran, Bangladesh, Sri Lanka and Myanmar.

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For India to compete effectively in the Indian Ocean region, it must align the pace of domestic reform, infrastructure buildup and diplomatic outreach, especially among the ministries of External Affairs, Trade and Commerce, and Ports, Shipping and Waterways.

Equally important are India's workarounds to secure the domestic and overseas capital investment needed to pursue investments abroad and ensure they serve Indian interests, irrespective of shocks in the geopolitical environment. An ideal balance could be achieved by engaging domestic and international stakeholders as follows:

- By encouraging domestic "national champions" to frontload external investments in countries of strategic and economic importance.
- By leveraging multilateral and global alliances that India is part of to pursue joint investment strategies; for example, by seeking financial capital from Japan and providing operational support from India.
- By perusing deep Indian diplomatic expertise to guard against political changes in other countries that risk negatively affecting Indian interests.

India's role as a guarantor of regional stability

Global conflicts that present risks to Indian trade and investments along its coastline have increased India's intent to act as a guarantor of regional stability. For instance, according to Commodity Insights' Commodities at Sea data, approximately 42% of India's 2024 crude oil imports as of July 2024 passed through the Strait of Hormuz. Future supplies would be at risk should conflict escalation restrict the flow of shipments. Indian security posturing will therefore continue around the Indian Ocean region. The Indian Navy already participates in maritime operations with about 35 countries bilaterally and in over 20 multilateral arrangements.

As shipping routes and global trade become more intertwined with countries' ideas of national security, Indian efforts to build this network are critical to meeting its economic growth and stability goals.

Conclusion

While a retrospective view of how India's geography has informed its economic, industrial and foreign policy is the story of how it mitigated risks in continental India, the future lies in maximizing opportunities along its coastline.

Nine of India's 28 states dot the coastline, six of which rank among the top 10 for GDP contributions by 2030, according to S&P Global Market Intelligence. Looking to 2030 and beyond, a multidimensional and multistakeholder approach would increasingly extract the benefits of India's maritime domain. ■

Striking the balance: India's energy security, affordability and sustainability

Navigating this trio will be difficult, but it is India's "need of the hour," given changing geopolitics and growing domestic energy demand.

Rajeev Lala
Director, Upstream Strategies and Transformation

Ravi Narayanaswamy
Vice President, Fuels, Chemicals and Resource Solutions

Mansi Anand
Senior Research Analyst, Upstream Companies and Transactions

Pulkit Agarwal
Head of India Content

Abhishek Ranjan
South Asia Lead, Fuels and Refining

Gaurav Srivastava
Executive Director, Oil Markets and Downstream Consulting, Middle East and South Asia, CI Consulting

Highlights

India is in a unique situation. The country faces growing domestic energy demand, has a heavy reliance on energy imports and requires more aggressive investment in new, sustainable technologies.

The country needs a strategy that can address all these factors and is challenged with speedily scaling up both the known (domestic oil and gas production, refined capacity expansions, renewable generation, biofuels) and the novel (hydrogen, alternative powertrains).

India is the world's fastest-growing major economy. As such, its energy demand will continue to increase in the coming years. However, the country relies heavily on oil imports, making it vulnerable to supply disruptions and price volatility. Thus, energy security is paramount.

India has set a net-zero emissions goal for 2070 and its major oil and gas companies have similar individual targets between 2035 and 2050. The country's national oil companies have aggressive Scope 1 and 2 goals compared with other nations. In addition, energy affordability is key for the Indian government, which needs policies that balance growing domestic aspirations, fiscal prudence and political capital when prices spike. India's energy security is tied to the energy transition and focuses on adopting clean energy while continuing to use oil and gas for growth.

India's energy security is tied to the energy transition and focuses on adopting clean energy while continuing to use oil and gas for growth.

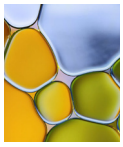
India is undertaking various measures to address its increasing dependence on crude oil imports. These include investing in overseas upstream oil, diversifying crude oil imports, upscaling strategic petroleum reserves, increasing biofuel blending and promoting alternative automotive powertrains. While these initiatives address the issues of energy security and high oil import dependency to a degree, India needs to do more to successfully deal with its energy challenges.

India's burgeoning oil demand

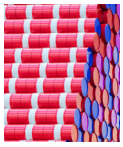
India's total petroleum product demand is projected to rise by almost 2 million b/d to reach 7.1 million b/d by 2035 from 2023 levels, according to S&P Global Commodity Insights. This will likely be led by transportation as demand for diesel and gasoline grows. Additionally, jet fuel and naphtha will be key growth products as the prospering economy ramps up consumption of aviation and petrochemicals. Similarly, liquefied petroleum gas demand is expected to grow 41% until 2035, from 0.9 million b/d in 2023, supported by a continuous push for cleaner cooking fuel. India is expected to remain a net exporter of gasoline, diesel, jet fuel, naphtha and fuel oil, while dependency on LPG imports is expected to increase.

Key factors influencing India's energy security

Strategic petroleum reserves



Burgeoning demand



Diversification of crude basket

Battery technology and supply chain

Biofuels

Alternative automotive powertrain

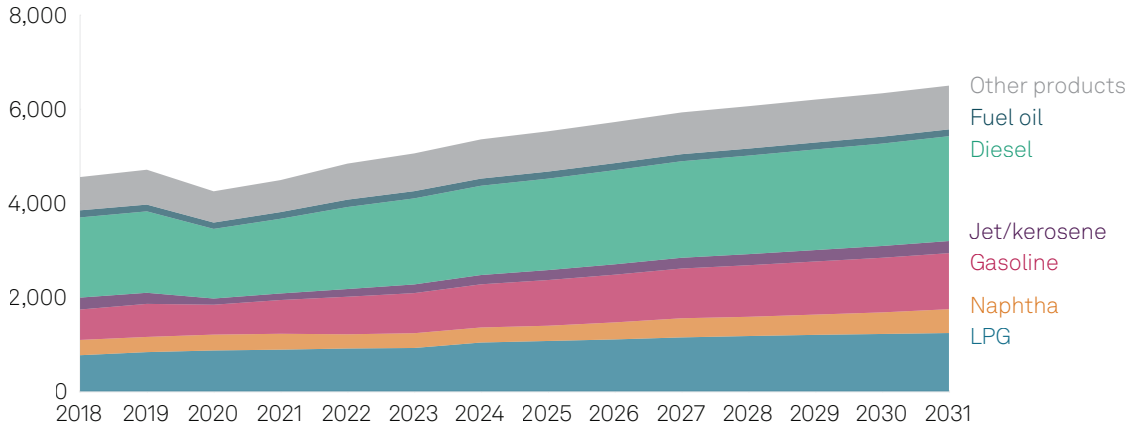
Electric mobility

Reimagining supply security

Source: S&P Global Commodity Insights.

India projected to have steady growth in petroleum consumption

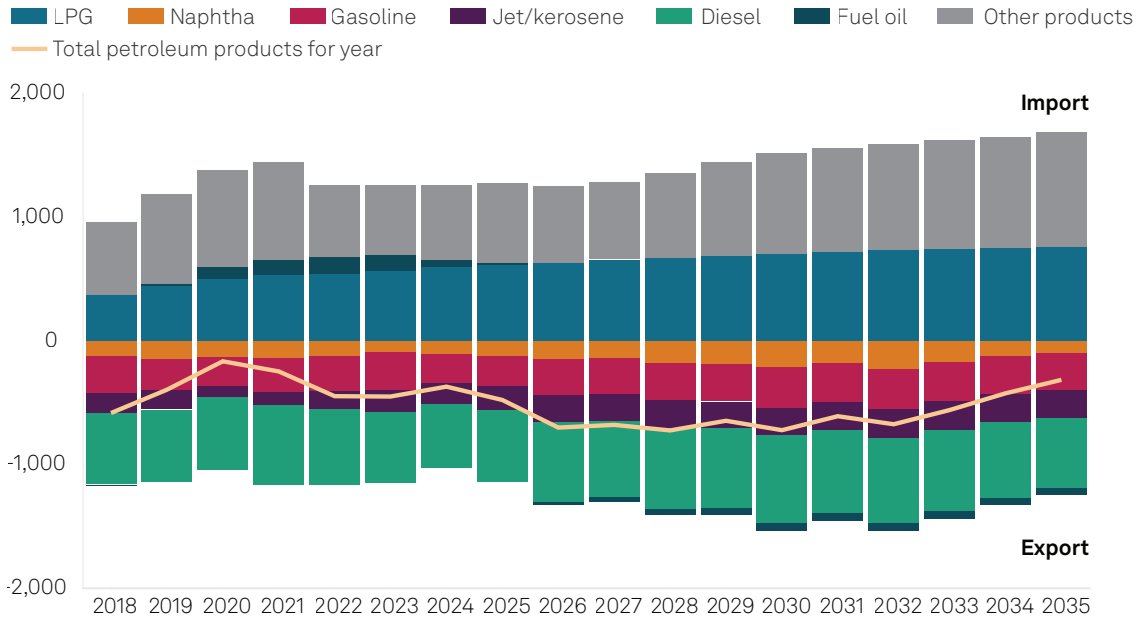
Total petroleum consumption by products (000 b/d)



Data compiled May 2024.
Source: S&P Global Commodity Insights.

India expects to remain net exporter of gasoline, diesel, jet fuel

Net trade by products (000 b/d)



Data compiled May 2024.
Source: S&P Global Commodity Insights.

Reimagining supply security

Rising demand raises concerns about crude oil supply. India has historically seen energy security through the lens of physical supply security, which has always been the focal point of energy conversations. This extended to "supply, but at what cost?" when prices spiked or stayed elevated, but the core notion of the physical supply of crude oil was always in the background. Thus, every effort in the first 15 years of the 21st century was made to secure physical supply. Indian companies, led by national oil companies, invested in upstream assets internationally, buying US$13.6 billion of assets before 2014, according to S&P Global Commodity Insights data. While this acquisition activity grew by US$6.5 billion

after 2014, it was centered on government-to-government relationships, primarily in Russia, with a significant corporate-led pullback from upstream expansion.

This "securing supply" strategy has slowly turned into an "offer the market, not the bid" strategy. Historically, Indian national oil companies would talk up the potential of the market back home when bidding for upstream assets, offering themselves as constructive upstream partners because of the scale of India's oil market. However, this has given way to securing supply contracts and reducing the bidding for underlying assets. In the upstream industry, securing supply is increasingly being replaced by securing supply contracts.

The mantra of India's 2024 general election was continuity for the oil and gas industry. While arguments can be made that continuity is yielding diminishing returns, with limited foreign and private equity in India's upstream sector, new strategies are being thought up to restructure the sector by 2030. These include aggressively expanding open acreage, investigating frontier areas and creating partnership models for developing discoveries. One underappreciated idea is to create a Production Linked Incentive (PLI) scheme to accelerate production and challenge the upstream sector to support the economy's fast-growing needs and slow down India's 90% (and rising) dependence on imported oil.

Diversification of crude oil imports

India's import dependence affects its energy security and, given the associated price volatility, impacts oil affordability, leading to higher fiscal deficits. Consequently, India adopted a diversification strategy for oil imports to mitigate geopolitical issues and risks related to supply choke points. This strategy was being developed before the Russia-Ukraine conflict began and focused on increasing US crude oil import volumes.

Then the Russia-Ukraine conflict triggered perhaps the biggest rebalancing of global oil flows in the past few decades, with Russia becoming the top crude oil exporter to India when discounted Russian barrels found a home with opportunistic Indian refiners. This strategic move provided near-term affordable oil security and made Indian refiners accustomed to processing crude oil such as Urals. Russia is still the top exporter to India, with imports in June 2024 surpassing the high levels of July 2023. Furthermore, trade between the two countries is being facilitated by innovations in shipping and payment mechanisms.

This change in oil flows has helped India diversify from Middle Eastern crude oil. India now buys 30% less oil from the region compared with before the Russian invasion. The flip side is that India's relationships with emerging stable suppliers beyond the Middle East, such as the Americas and West Africa, have weakened, leading to volume shrinkage. This could be troubling if the economics of importing Russian oil begin to no longer make sense. For now, chasing affordability has solved India's diversification and supply security problems. It remains to be seen whether this solution is sustainable.

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Strategic petroleum reserves

India's strategic petroleum reserves (SPRs) represent another attempt to resolve the energy security question. If scaled up, SPRs could be a buffer against supply disruptions and volatile global oil markets. However, at 9.5 days of national demand cover, according to the Ministry of Petroleum and Natural Gas, the current SPR program will need to expand significantly. While phase two of the program should allow 48 million barrels to be stored — about 18 days of national demand cover — the pace of budgetary allocations, investments, utilization of past allocations and construction needs to be accelerated.

Biofuels

India's energy security strategy is increasingly focused on alternative fuels, with natural gas as a substitute for petrol, and ethanol playing a pivotal role in blending. The rising use of ethanol has supported a reduction in fossil-based gasoline reliance, leading to lower crude oil imports. This shift should enhance domestic supply and reduce dependency on volatile global oil markets, ensuring significant savings on foreign exchange expenditure.

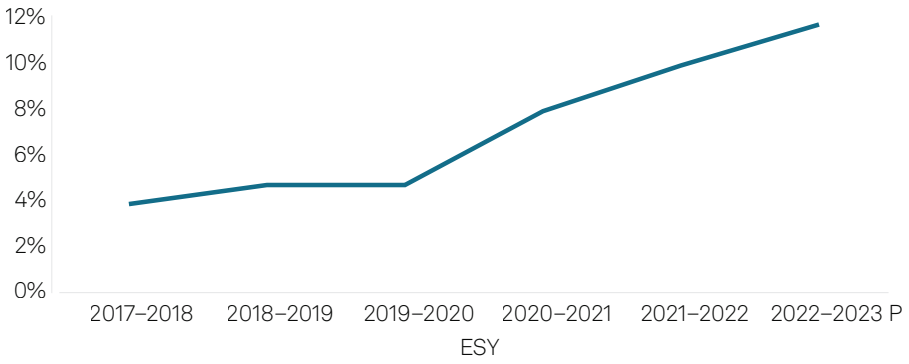
India has made significant strides in ethanol blending with gasoline, achieving a 15% average blend rate, and is looking to meet a 2025 target of 20% on an accelerated timeline. Many retail stations have already begun selling 20% blended gasoline. All of this was made possible by the government's push to expand feedstocks for ethanol production, new ethanol production plants, lucrative ethanol prices and fiscal support.

However, India's biodiesel program remains miniscule, and the absence of meaningful quantities of domestic feedstock is the biggest impediment. India's dependence on seed oil imports would potentially skyrocket if lucrative and nonnegotiable blending targets were set. The country's curious lack of used cooking oil (UCO), the most popular biodiesel production pathway in Asia, can be attributed to policy sensitivities around higher cooking oil imports, which again highlights the interplay between affordability and security.

Regarding sustainable aviation fuel, India has opted for the ethanol-to-jet fuel route to meet import substitution criteria, despite this being very expensive compared with the UCO route. The country's policy focus on compressed biogas is also an ethanol blending corollary targeting imported LNG.

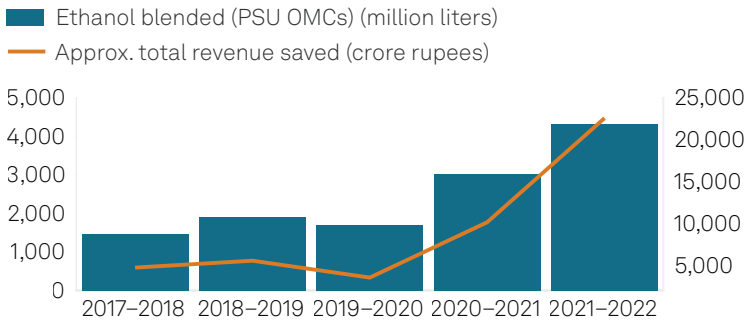
Government policies and initiatives promoting biofuel use aim to reduce fossil fuel use by the equivalent volume, thereby lowering crude oil imports and enhancing energy security through increased domestic production.

Ethanol blending in gasoline increasing each supply year



As of June 2023.
ESY = ethanol supply year (Dec. 1 to Nov. 30); P = provisional.
From ESY 2022–23, ESY changed to Nov. 1 to Oct. 31, and ESY 2022–23 is for the period of December 2022 to October 2023.
Data for ESY 2022–23 is up to June 2023.
Sources: Oil companies.

India oil companies saving millions by blending ethanol

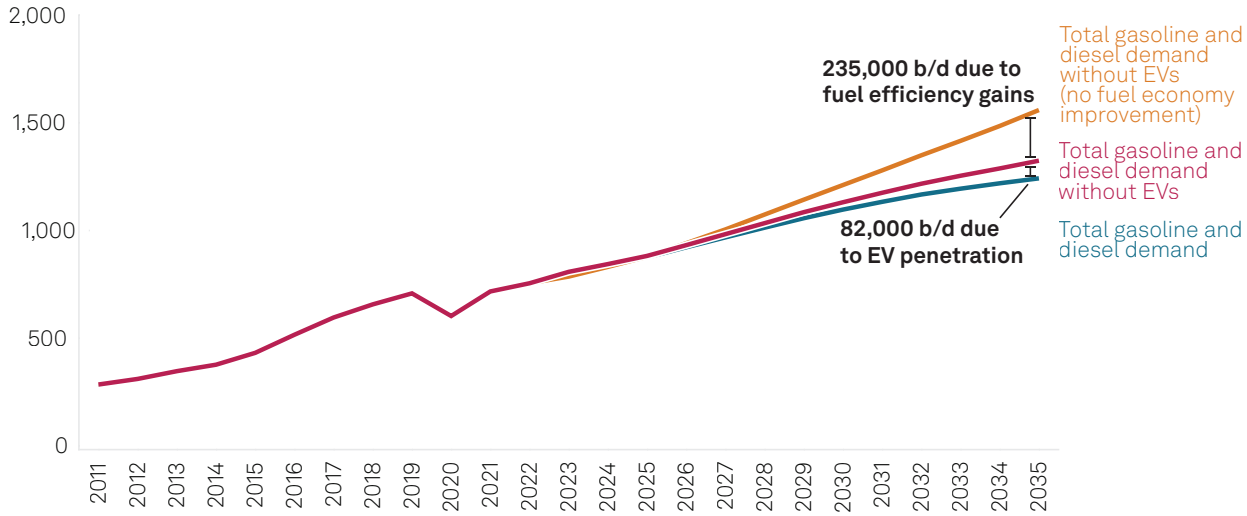


As of November 2022.
PSU = public sector undertaking; OMC = oil marketing company.
Crore is equivalent to 10 million rupees.
Source: Petroleum Planning & Analysis Cell.

Alternative automotive powertrains and electric mobility

The penetration of alternative powertrains in India's vehicular fleet is gaining momentum, affecting the demand for traditional transportation fuels such as gasoline and diesel. Battery-electric vehicles (BEVs) are at the forefront of this shift, supported by hybrid and flexible fuel vehicles. These offer lower emissions and enhanced efficiency, aligning with India's environmental objectives. The influx of BEVs, particularly in the two- and three-wheeler categories, has impacted gasoline demand more than diesel demand.

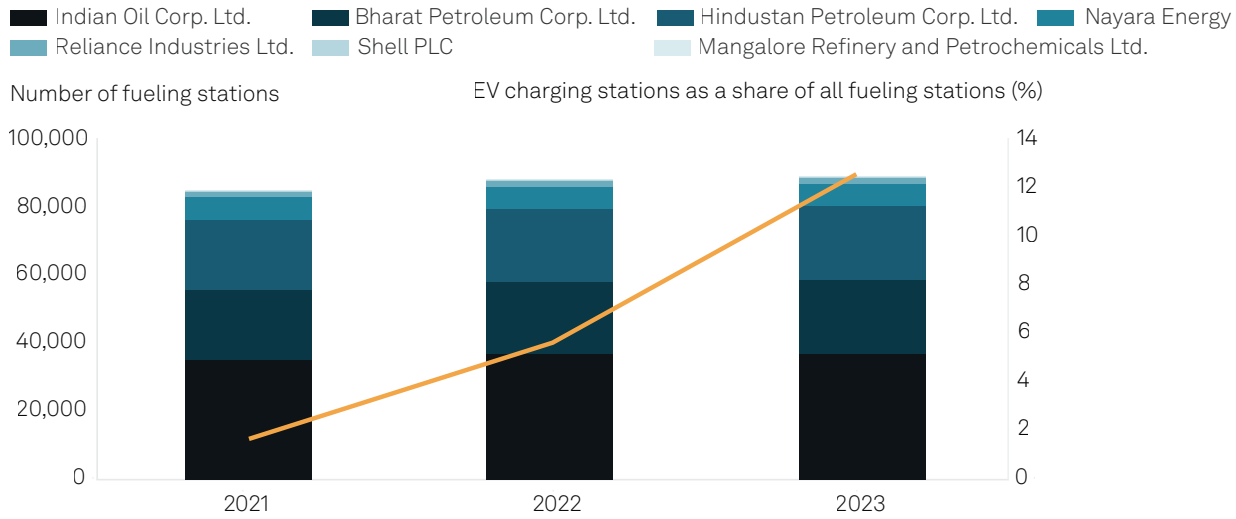
Efficiency gains and EVs displacing gasoline, diesel demand (000 b/d)



As of August 2023.
Source: S&P Global Commodity Insights.

The electric vehicle market in India is closely tied to the development of charging infrastructure. Major oil retailers in India have played a significant role in expanding this charging infrastructure. By promoting electrification in the transportation sector, India is looking to reduce its dependence on crude oil imports.

Major oil retailers expanding EV charging stations across India



As of July 23, 2024.
Sources: S&P Global Commodity Insights; Petroleum Planning & Analysis Cell.

Compressed natural gas (CNG) and hybrid vehicles have also proven to be effective transitional alternatives, particularly in the car segment, bolstered by government initiatives promoting natural gas. CNG car penetration reached 16% in 2023 and is anticipated to rise as compact car buyers increasingly favor them over traditional internal combustion engine vehicles. The recent introduction of CNG bikes in India could further accelerate CNG adoption in the two-wheeler category, potentially reducing oil demand in the transportation sector.

As India seeks road transport gasification, e-mobility and emerging technology adoption, biofuel growth, and crude oil supply diversification, it is in a race against time to scale up the known and the novel.

Battery technology and supply chain

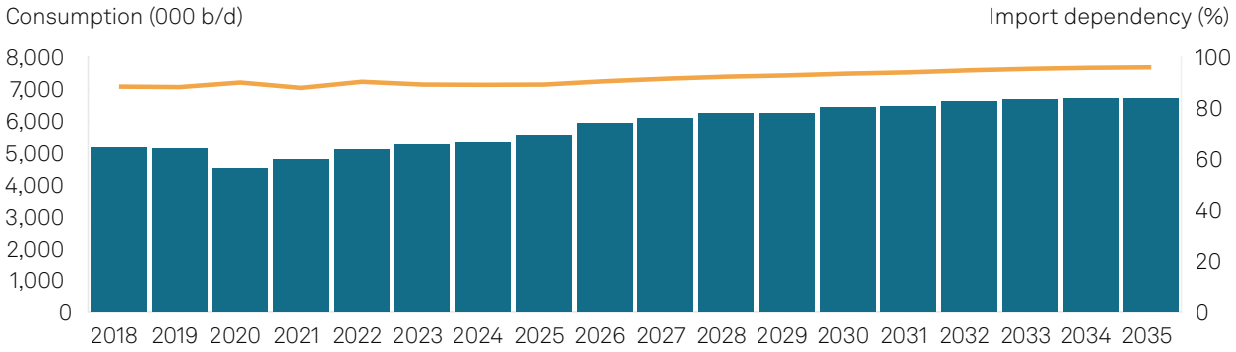
According to data from S&P Global Mobility's AutoTechInsight platform, Indian demand for EV lithium batteries is anticipated to grow by a multiple of 35 from 2023 to 2035, driven predominantly by the light-vehicle segment. This necessitates a stable and efficient battery supply chain, balancing domestic production with international partnerships to foster robust EV market expansion.

Historically reliant on imports from mainland China, South Korea and Japan, India is now focusing on local manufacturing through the PLI scheme and related government policies. Original equipment manufacturers are investing in local production facilities such as Ola's electric two-wheeler gigafactory. Major players such as Reliance and Adani are planning to establish lithium-ion battery cell factories in India and evaluate alternative chemistries such as sodium-ion. Meanwhile, joint ventures such as Suzuki's collaboration with Toshiba are poised to enhance India's production capabilities and technological expertise. These are just small steps in the pursuit of Atmanirbhar Bharat, or a self-reliant India, catering to energy security with a nod to sustainability.

Conclusion: Scaling up the known and the novel

Despite being amid an energy transition, India's status as one of the world's fastest-growing economies means that its reliance on imported crude oil is projected to increase to 96% by 2035 from 89% in 2023, with demand expected to continue growing at a high single-digit rate while domestic production lags. Combined with the fiscal pressures of a high oil price environment, this means India will pursue oil security, with the country set to remain a regional refining hub. As India seeks road transport gasification, e-mobility and emerging technology adoption, biofuel growth, and crude oil supply diversification, it is in a race against time to scale up the known and the novel.

Crude oil demand and import dependency



As of May 2024.
Source: S&P Global Commodity Insights.

To solve India's challenges of ensuring an energy supply that is secure, affordable and sustainable, it is vital to accelerate biofuel blending, especially sustainable aviation fuel, compressed biogas and biodiesel, while ensuring ethanol blending continues to grow. India also needs to bring flexible fuel vehicles into the fleet mix, ramp up its sustainable e-mobility ecosystem and provide financial incentives to increase EV penetration. Finally, the country must make domestic exploration and production above-ground risk terms aggressively competitive, pursue high-quality overseas upstream investments, scale up the construction and filling-up of its SPRs, and continue to push for cleaner and alternative energy sources. ■

Q&A

Mansi Madan Tripathy

Country Chair for Shell India and Vice President of Shell Lubricants APAC

You have taken over as the country chair for India. What is your vision for Shell India for the next five years?

Shell wants to be an absolute partner for India in terms of the entire energy transition which we are going through, and India is a strategic market for the Shell group.

India is already the world's third-biggest consumer from an energy perspective, and what is fascinating to me about that entire journey is that, while oil and gas are going to continue to play their part, a big part of the growth in India's energy mix will be linked to the entire renewables space, and that's where we feel that Shell will play an important role in line with our global strategy of delivering more value and less emissions.

Can you highlight some recent milestones?

We want to be absolutely true to our mission. We have invested US$5 billion to date to build India's energy infrastructure. We have about 13,000 people in Shell India, and a majority of them work in our capability centers, which includes asset monitoring, technology, financial operations and digital innovation, creating significant value for the Shell group globally.

We also have our business presence in the country in downstream, integrated gas and power solutions. We acquired Sprng Energy at US$1.5 billion, which is helping us with the entire renewables push in the solar and wind segments. Our LNG regasification plant at Hazira has a capacity of 5 million metric tons per annum, which is very important to us as India moves toward a gas-based economy. We also have our mobility business, with over 350 retail stations. Our lubricants business is also growing and well established, with 250 distributors.

How will Shell position itself in India, where policymakers are saying that fossil fuels will remain a key priority for the country in the foreseeable future?

We have been trying to analyze where the markets are going to grow, where are Shell's strengths, and where can we play a role in this whole transition. At the same time, balancing energy security and energy sustainability will be a key priority.

I think the sweet spot for the energy transition will be the integrated power play, as we feel that gas is going to be a very important transition fuel while we get into the full renewables space. The government's agenda is to raise the share of gas in the energy mix from 6% to 15%. Within that, there are two spaces where we want to grow further. One is in the LNG space for heavy-duty vehicle transport. The heavy vehicles segment accounts for significant emissions in India. If that can be changed to gas, which is a proven technology right now, that could be a very big pathway for our growth. The other is gas for power. In the future, gas-based power could be one of the vital pillars that support India's LNG growth because of its ability to provide grid stability and flexibility and cater to peak demand in the summer.

How do you see the threat of electric vehicles taking away market share from transport fuels in India in the foreseeable future?

If you look at the last two years' worth of data from India, the growth of EVs hasn't been completely in line with the market projections. We were trying to follow what has happened in Europe and China, and, potentially, the infrastructure development and consumer sentiment. We will have to see and weigh how all that goes in the future. I think, in any scenario, internal combustion engines will still make up the bulk of the production as well as usage. In transport, again, the highest consumption as well as emissions are in the heavy vehicles segment, where the EV solution is still elusive.

What will be your strategy to grow the retail fuel business in the country?

That's a very important part of the business for us. Our footprint right now is about 350 retail stations, more skewed toward the southern and western parts of the country. We aim to be methodical in our growth in India in the retail business while continuing to offer an integrated mobility experience including fuels, cafes and convenience stores, with a prominent network of EV recharging and lubricant changing facilities. And as we go on that journey, we are trying to see how we can integrate LNG at the right junctures.

Q&A continued

Do you have ambitions to expand your footprint in India's upstream sector?

We have been present in the upstream business through our BG acquisition with Panna-Mukta and Tapti oil and gas fields. However, these were end-of-life assets, and we are now carrying out the safe decommissioning of the Tapti unmanned platforms.

We are aware that over the last few years, the government has taken steps in terms of policy reforms and fiscal measures toward making upstream a more attractive sector. We are currently assessing the potential of these opportunities in India.

How will AI change the energy landscape. How is Shell India embracing some of the technological changes and the revolution we are witnessing?

What is fascinating to me is the kind of revolution which is happening in AI-based technology, which is helping improve the experience of our customers and making Shell a more efficient business. India serves as a key technology and innovation powerhouse for the group, driving cost efficiencies through digital innovation and cutting-edge technologies across core technical, digital, and finance processes.

For instance, we have technology teams in India that are looking after our global assets, including our global upstream assets. They are able to predictively call out if there's a risk. We have done some benchmarking based on that feedback. From a technology perspective, AI is also helping the company to enhance the efficiency of the molecules landing up with its consumers.

For example, Shell India engineers, as part of a global team, have developed a race fuel containing 10% second-generation bioethanol for Scuderia Ferrari to use in its Formula 1 racing cars. The team uses digital simulation to predict the combustion behavior and performance of each fuel blend to significantly reduce the development time and maximize performance and efficiency. The team is now working on a 100% sustainable race fuel, which includes several different sustainable fuel components, to meet requirements for the 2026 Formula 1 season. ■

Interview by Sambit Mohanty, Asia energy editor at S&P Global Commodity Insights.

A multidimensional reality: India's energy, power, industrial and mobility transitions

India's cross-sectoral plan for a just energy transition will create policies, technologies and a competitive landscape for a net-zero future.

Atul Arya
Senior Vice President, Chief Energy Strategist

Gauri Jauhar
Executive Director, Global Energy Transitions & Clean Tech Consulting

Rashika Gupta
Senior Director, Gas, Power and Climate Solutions

Puneet Gupta
Director, India & ASEAN Automotive Market

Ankita Chauhan
Associate Director, South Asia Power & Renewables

Rajiv Narang
Executive Director and Global Head of Process Economics Program

Vedant Patil
Principal Consultant, Energy Transitions & Cleantech Consulting

Highlights

India's plan for a just energy transition must be balanced with energy security needs.

Tailored policies and development of carbon markets will support emissions reduction strategies in the power, transport and industrial sectors.

Investment in India's energy transition will focus on energy efficiency, renewables, low-emission fuels and mobility.

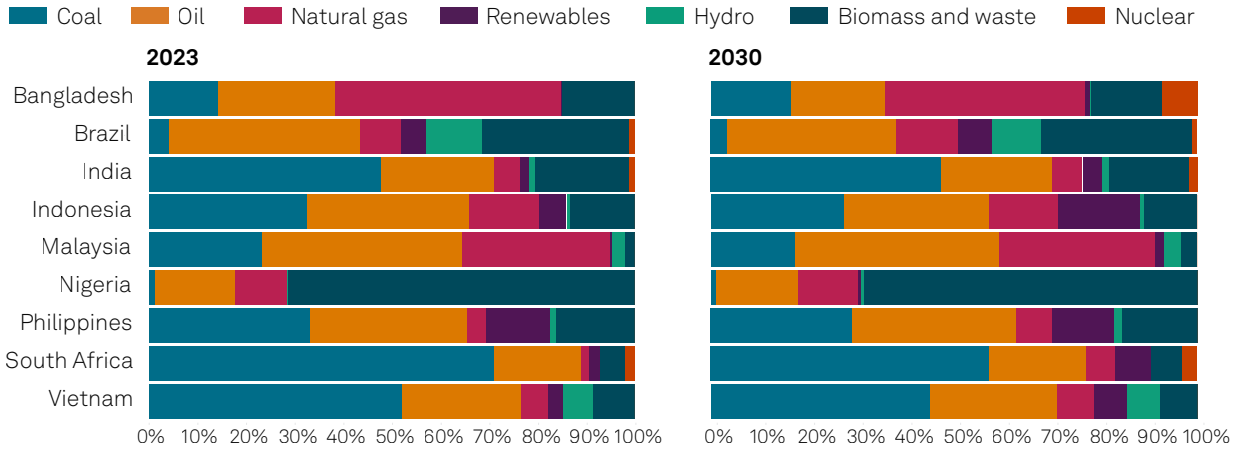
Radical choices will be key to ensure that each technology option, mature or burgeoning, is applied to its full potential to reduce emissions.

In its quest to reach net-zero by 2070, India is laying the foundations for a new energy system. This system will need climate-sensitive policies to incentivize advancements in mature and burgeoning clean-energy technologies in an evolving, competitive landscape.

As India rides the global energy transition wave, it navigates the demands of economic ascent. This should take the country to the upper-middle-income level by the mid-2030s, alongside an urban surge of more than 40%, according to recent S&P Global Commodity Insights' Energy and Climate Scenarios. The quality of this growth hinges on addressing endemic pollution levels. IQAir data shows that 17 of the world's 20 most-polluted cities are in India, with coal dominant in the energy mix at 48%, according to Energy and Climate Scenarios. To overcome air pollution and climate change threats, India needs to accelerate its energy transition and move beyond business-as-usual approaches.

In Commodity Insights' base-case scenario, fossil fuels remain foundational to the energy mix in 2030, even as renewables rise. Running alongside the energy transition pathway will be the need to keep the lights on in an aspirational, growing economy in which India's energy security and affordability will reign supreme. According to the International Energy Agency, India, the world's largest democracy, caters to a population for whom household spending on energy as a share of income is twice that of the US, the world's richest democracy. India's situation is not unique; many emerging markets face a similar fossil fuel lock-in. Until 2030, India's high dependence on fossil fuels mirrors trends in countries such as Indonesia, South Africa and the Philippines.

Comparison of India's primary energy mix with key emerging markets



As of Aug. 5, 2024.
Source: S&P Global Commodity Insights.

SEE HOW INDIA'S FOSSIL FUEL SHARE STACKS UP—VISIT SPGLOBAL.COM/INDIA-FORWARD/EMERGING-PERSPECTIVES.

Running alongside the energy transition pathway will be the need to keep the lights on for an aspirational, growing economy in which India's energy security and affordability will reign supreme.

Technology slate for interlinked sectoral transitions in power, mobility, industry

India's journey toward a low-carbon future involves an integrated, cross-sector approach. Each of the following sectors faces unique challenges and opportunities in this transition, necessitating sector-specific strategies and technologies. India's low-carbon technology landscape comprises both mature and burgeoning technologies. Mature technologies such as solar, wind, energy storage, energy efficiency and electric vehicles require significant scaling to meet 2030 targets.

Transport sector: The transport sector comprises about 13% of India's total CO_2 emissions. EVs, in tandem with policies promoting their adoption, the development of charging infrastructure and incentives for manufacturers and consumers, are key to mobility transformation. Advancing biofuels and improvements in fuel efficiency are also critical to electrifying transport.

Power sector: The power sector comprises 48% of India's total CO_2 emissions. Solar and wind power are central to its decarbonization, with ambitious targets for 2030. Energy storage systems, such as batteries, are vital to address problems with intermittent, variable renewables and ensure a stable power supply. Integration of smart grids and digital technologies will further enhance the efficiency and reliability of the grid.

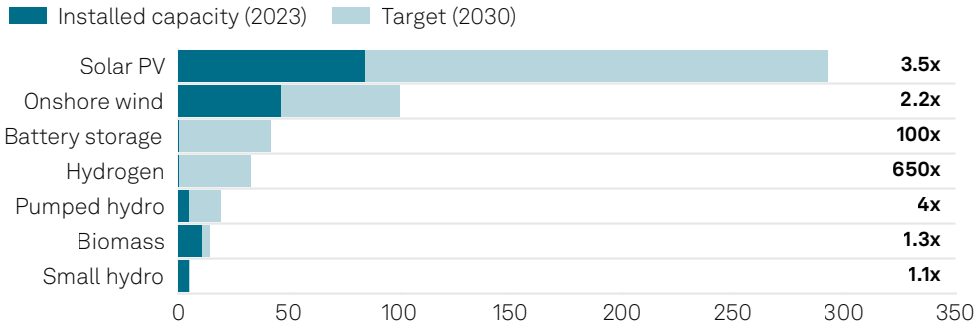
Industrial sector: The industrial sector comprises 21% of the country's CO_2 emissions, particularly in areas such as refineries, chemicals, iron and steel, and cement. Decarbonizing these industries requires a multifaceted approach, including energy-efficiency improvements, adoption of cleaner technologies and transition to alternative fuels such as green hydrogen and bioenergy. Carbon capture, utilization, and storage (CCUS) technologies also hold promise for mitigating emissions from hard-to-abate industrial processes.

Power sector transition

India's power sector faces the hurdle of heavy reliance on coal, which makes up about 73% of total generation. Continued power demand growth, the intermittent and variable nature of power supply from renewables, high storage costs and infrastructure constraints suggest the coal bias will continue in India's power mix in the near term.

To address these challenges and scale up renewables, India is pursuing a multipronged strategy of diversifying energy sources, reducing costs with competitive tenders and economies of scale, strengthening grid infrastructure and bringing self-reliance to supply chains. India is targeting to more than triple its current renewable capacity to reach about 500 GW by 2030, according to the Ministry of Power. This ambitious goal provides long-term visibility for renewables demand, which will be tender-driven by federal- and state-level agencies. Further, India is prioritizing low-emission technologies such as green hydrogen, green ammonia, small nuclear reactors and CCUS to achieve its climate objectives.

India looking to triple its renewable capacity by 2030



As of Aug. 5, 2024.
Sources: S&P Global Commodity Insights; Central Electricity Authority.

Strategies such as the Production Linked Incentive (PLI) scheme for solar and battery manufacturing and the Ministry of New and Renewable Energy's Strategic Interventions for Green Hydrogen Transition (SIGHT) scheme are being launched to significantly increase India's manufacturing capacity to build self-reliant supply chains. This should help the country meet domestic demand as well as position India as an alternative regional hub for export markets. Further, commissioning deadlines under the PLI scheme may be extended to allow original equipment manufacturers to scale up their facilities and start production to access the PLI's five-year financial incentives However, in the short term, transition to local manufacturing for key components may create upward cost pressures for the sector.

Green mobility transition

India's road map for green mobility unfolds in phases, balancing technological advancements with market readiness and infrastructure development. By 2030, the nation targets significant penetration of battery-electric vehicles (BEVs) across all segments, from two-wheelers to buses and commercial vehicles. This phased approach to the transition addresses the needs of urban and rural areas while promoting innovation and competition among manufacturers.

Initiatives such as the PLI, Faster Adoption and Manufacturing of Electric Vehicles, and Advanced Chemistry Cell schemes will make BEVs increasingly attractive, with enhanced range and faster charging, addressing concerns about practicality and convenience.

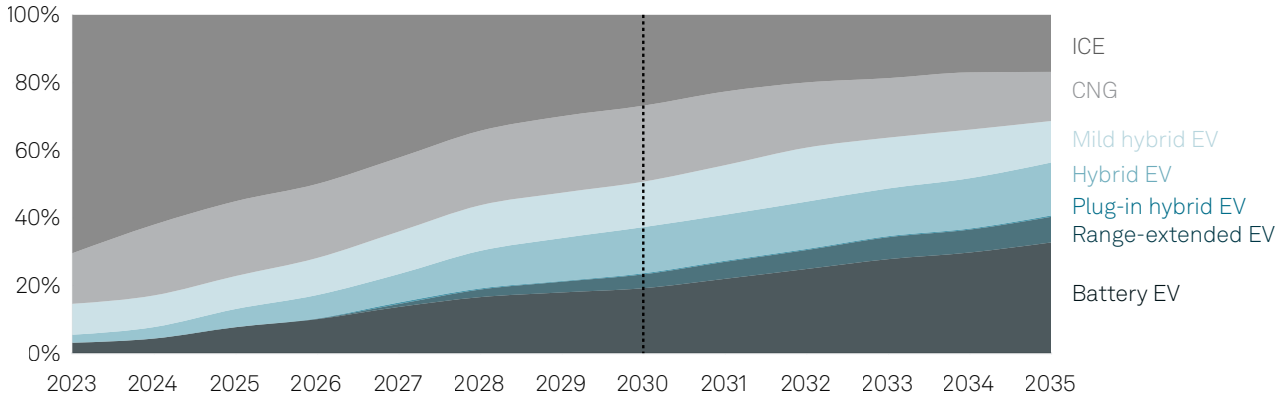
Alongside the rise of BEVs, hybrid solutions and compressed natural gas powertrains, India is focusing on the mass adoption of economically sustainable solutions such as biofuels. This promotes its agricultural-based economy (India is the world's largest producer of sugar), reduces imports of crude oil and LNG — a step toward self-reliance, or Atmanirbhar Bharat — and improves air quality, as biofuels are produced from waste, thus reducing pollution from crop burning and waste decomposition. India's commitment to green mobility is underscored by its adoption of stringent emission standards and robust regulatory frameworks. The implementation of Bharat Stage 7 emissions norms aims to reduce pollution from conventional internal combustion engines, while the phased introduction of Corporate Average Fuel Efficiency/Economy norms (phase three by 2027 and phase four by 2032) should ensure a gradual but impactful transition toward greener powertrains.

Hard-to-abate industrial transition

As India accelerates manufacturing, the country's share of global industrial production is expected to double from about 3% in 2023 to about 6% in 2050. S&P Global estimates that for a net-zero scenario, India will need about a 1.7-gigaton reduction in industrial emissions in that time. This longer-than-2030 time frame is when key breakthrough technologies that impact hard-to-abate process emissions are expected to achieve global commerciality. Key industrial sectors for applying these technologies will include refining and chemicals, nonferrous metals such as aluminum, iron and steel, and cement.

EVs to dominate sales in India by 2030

Sales-based powertrain forecast projections in India



As of Aug. 22, 2024.
ICE = internal combustion engine; CNG = compressed natural gas.
Source: S&P Global Mobility.

India's road map for green mobility unfolds in phases, balancing technological advancements with market readiness and infrastructure development.

Burgeoning technologies such as hydrogen and CCUS are crucial for deep emissions reduction but face challenges on readiness and scale. Unless the green hydrogen economy is developed faster to meet India's 2030 net-zero target, achieving this goal could be delayed by a decade. CCUS is in its early stages, with a few pilot projects and unexplored sequestration options. Policy intervention is crucial to identify and match carbon sources with suitable sinks. The development of carbon markets will be vital in putting a price on carbon and developing a market basis that will have a material impact on emissions reduction in the hard-to-abate industrial sector.

A just transition: Investment themes and conundrums

India's energy transition can be characterized by four key investment themes: energy efficiency, renewables, low-emission fuels, and mobility. The government's policy framework uses a mix of subsidies, mandates, taxes and incentives to cover these. While subsidies and incentives have been the primary tools thus far, India has allocated an average of 37% to fossil fuels and 5% to green energy over the past five years, according to the International Institute for Sustainable Development. The adoption of mandates and incentives to stimulate demand for environmentally friendly technologies such as green hydrogen is likely to grow. To facilitate financing for these technologies, the country is also developing a carbon market framework and a climate finance taxonomy.

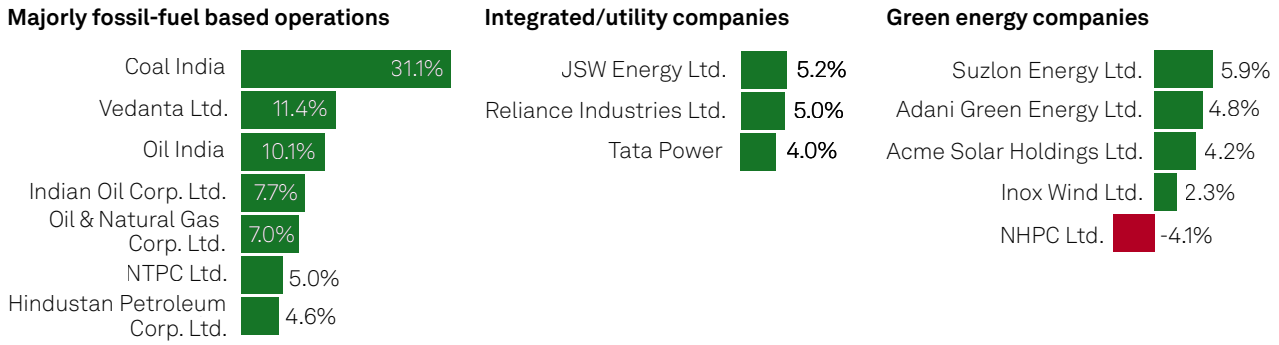
Ensuring a just transition, securing adequate financing and making radical choices are essential to achieve India's net-zero goals. A significant hurdle is the returns gap between traditional oil and gas companies and green energy enterprises. Despite investor enthusiasm and higher stock market valuations for green energy companies, S&P Global Commodity Insights data shows that oil and gas companies have consistently outperformed them by an average of 8.3% in returns on capital employed over the past five years. Addressing this disparity is crucial for a fair and just transition and impacts the broader political economy of fossil fuel-dependent industries.

Looking forward: 7 critical decisions for India's energy transition

1) **Make the radical choice of gas in power mix:** Gas, a key growth fuel and bridge for the full energy transition, remains underrepresented in the Indian energy mix, being stuck at approximately 6%, according to Energy and Climate Scenarios. To achieve the government's ambition of 15%, announced by the Ministry of Petroleum and Natural Gas in 2023, India must deploy sufficient gas in power to support flexibility, alongside the growth of renewables and sustainability, to transition away from coal.

Fossil fuel-based companies have higher returns than green, integrated competitors

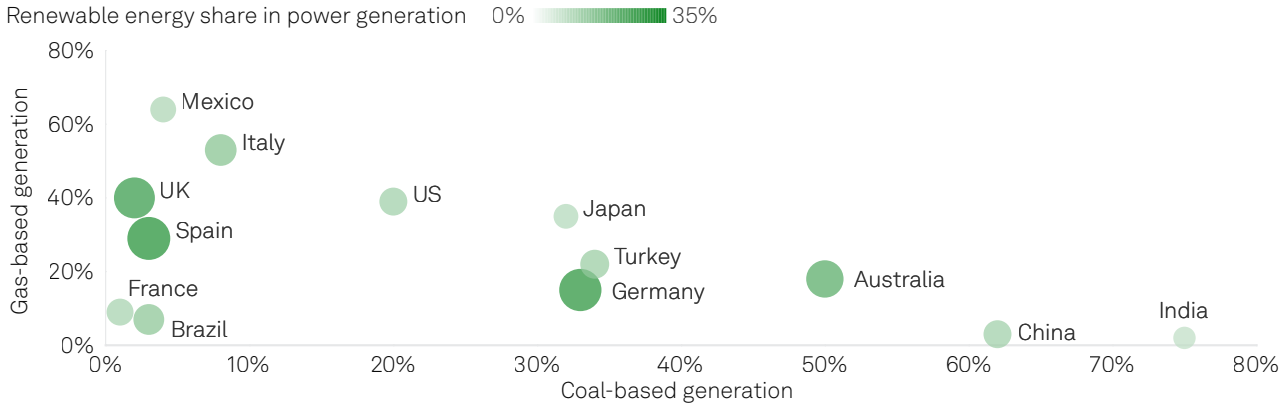
Return on capital, average fiscal year 2020–24



As of Aug. 5, 2024.
Source: S&P Global Commodity Insights.

Globally, natural gas makes power plants flexible and reliable to balance a greener grid

Power generation mix of major renewable producers



As of Aug. 5, 2024.
Source: S&P Global Commodity Insights.

2) **Advance critical mineral security:** India, the only developing nation in the Minerals Security Partnership, has identified 30 critical minerals necessary for its energy transition. The country has also established Khanij Bidesh India Ltd., a joint-venture company under the aegis of the Ministry of Mines, to secure access to critical minerals overseas. While the number of projects on critical minerals more than double to 127 in 2023 from 59 in 2020, according to the Ministry of Mines, more focus on domestic exploration is required.

3) **Accelerate power sector reforms:** India must prioritize market reforms to address legacy issues such as high losses, inefficient operations and financial distress in the distribution sector. It should foster a competitive market environment by promoting private participation and ensuring fair market practices. It should also develop and implement innovative market-based solutions to improve grid reliability, including demand response programs, advanced AI-linked grid technologies and real-time pricing. Additionally, India needs to focus on grid modernization and expansion to accommodate increasing renewable energy integration and enhance grid resilience.

4) **Boost energy efficiency and productivity:** India should focus on energy-intensive industries for significant efficiency improvements. It must promote energy-efficient cooling solutions, expand public transportation and leverage energy service companies for environmentally friendly building projects. A concerted effort to reduce energy consumption in these areas is vital for improving energy productivity.

5) **Build strong clean energy supply chains:** Securing domestic raw material supplies, developing a skilled workforce and promoting local component manufacturing are essential for building robust battery, electrolyzer and photovoltaic manufacturing ecosystems. Leveraging government procurement to create a domestic market is crucial for supporting local industries.

6) **Mobilize green finance:** India should create a conducive environment for green bond issuances, explore innovative financing models and strengthen financial institutions' capacity to manage green projects. Attracting private capital through a climate taxonomy and impact investment funds is necessary to scale up clean energy investments.

7) **Drive innovation and technology development:** India must focus on decentralized renewable energy solutions, promote domestic innovation and foster public-private partnerships for technology development. Supporting research and development in off-grid and mini-grid technologies will be crucial for addressing energy access challenges in rural areas.

Conclusion

As India pursues a balanced energy transition prioritizing long-term sustainability and energy security, several critical challenges have emerged. Despite the policy push in a greener direction, advancing a just transition raises a few conundrums. Radical choices will be needed to ensure that each technology option, mature or burgeoning, has been applied to its full potential to bend the emissions curve. Addressing the twin challenges of air pollution and climate change will help deliver a high-quality, high-growth economy to the world's largest democracy. ■

Advancing India's climate strategy

India's firm climate commitments, but increasing climate vulnerability, position it as a crucial partner in advancing global climate discussions and furthering climate efforts domestically.

Radhika Tomar
Director, Corporate Sustainability Assessment, Asia-Pacific, Middle East and Africa

India, the third-largest energy consumer globally, is committed to climate action. Its per capita emissions of 2 metric tons are less than half the global average of 4.6 metric tons, according to the International Energy Agency. In 2015, the country submitted its first nationally determined contribution (NDC) goal of reducing the emissions intensity of its GDP 33%-35% by 2030 from 2005 levels. It surpassed this goal in 2019, reaching 33% 11 years ahead of schedule. As per India's updated NDC, the country is aiming for a 45% reduction by 2030.

The country's climate strategy must balance such reduction targets with economic growth and burgeoning energy demand to cope with more intense and frequent climate-related events. In addition to playing an important role in international dialogues, fostering partnerships and developing action plans that combine adaptation and mitigation, addressing key areas such as climate finance and participation from all levels could help shape India's approach to climate change.

Highlights

India is committed to climate action and could strengthen its climate strategy by balancing emission reduction targets with economic growth.

The country continues to be vulnerable to the physical risks of climate change. In 2024, India has experienced weather extremes including heat waves, with temperatures soaring beyond 45 degrees C, and devastating monsoons.

Effective climate action will require enhanced adaptation efforts, for which climate finance is critical.

India's influential role in climate negotiations

India is a key energy driver and a crucial partner in powering global climate efforts, and has emphasized the importance of being actively engaged in international dialogues. Climate policy took center stage at the G20 Leaders' Summit 2023 in New Delhi, with declarations to "pursue low-[greenhouse gas]/low-carbon emissions, climate-resilient and environmentally sustainable development pathways by championing an integrated and inclusive approach."

In international dialogues, India has continually highlighted climate justice. At COP27, the country called on developed and developing nations to respond while stressing the principle of "common but differentiated responsibilities and respective capabilities," according to a government statement. India has spearheaded a campaign for the greater infusion of climate capital and technology transfer into developing nations. While the country has set its net-zero pledge for 2070, the UN NDC registry shows Southeast Asian nations such as Malaysia and Singapore aiming for 2050 — two decades earlier. India's long-term low-carbon development strategy indicates the reason for India's later net-zero target is rooted in its expanding economy and increasing energy requirements.

The country continues to find partners in South Asia through groupings such as the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) and the South Asian Association for Regional Cooperation (SAARC) to address climate change challenges, exchange strategic knowledge and promote capacity development. Its climate diplomacy also extends beyond South Asia through bilateral agreements with countries such as the UK, Japan, France and the US. As a founding member of the International Solar Alliance, India's international climate clout has grown by promoting solar energy across the globe.

India's climate vulnerability is growing

India continues to be highly vulnerable to the physical risks of climate change, experiencing an increase in the intensity and frequency of extreme weather events. According to World Meteorological Organization data, the country sustained over US$4.2 billion in damages due to flood-related disasters in 2022.

In *Look Forward: India's Moment*, S&P Global Sustainable1 forecast that in New Delhi, temperatures will exceed 40 degrees C for 48 days annually by the 2050s.

In 2024, India has experienced huge climate-related losses: heat waves with temperatures climbing beyond 45 degrees C, intense monsoons leading to the Wayanad landslides, and cloudbursts and flash floods in the fragile Himalayan ecosystems affecting human lives, livestock, livelihoods and infrastructure.

Combining climate adaptation and mitigation for climate resilience

Integrating adaptation strategies with mitigation efforts could accelerate India's climate response. In 2023, the country presented its initial adaptation strategy to the UN Framework Convention on Climate Change, outlining the challenges and its planned actions for climate adaptation. The communiqué indicated that total adaptation-relevant expenditure was 5.6% of GDP in 2021–22, growing from a share of 3.7% in 2015–16. It also estimated that US$680 billion, or 56.68 trillion Indian rupees, would be required until 2030 for adaptation without any additionality in a business-as-usual scenario, with 2023–24 as the reference year.

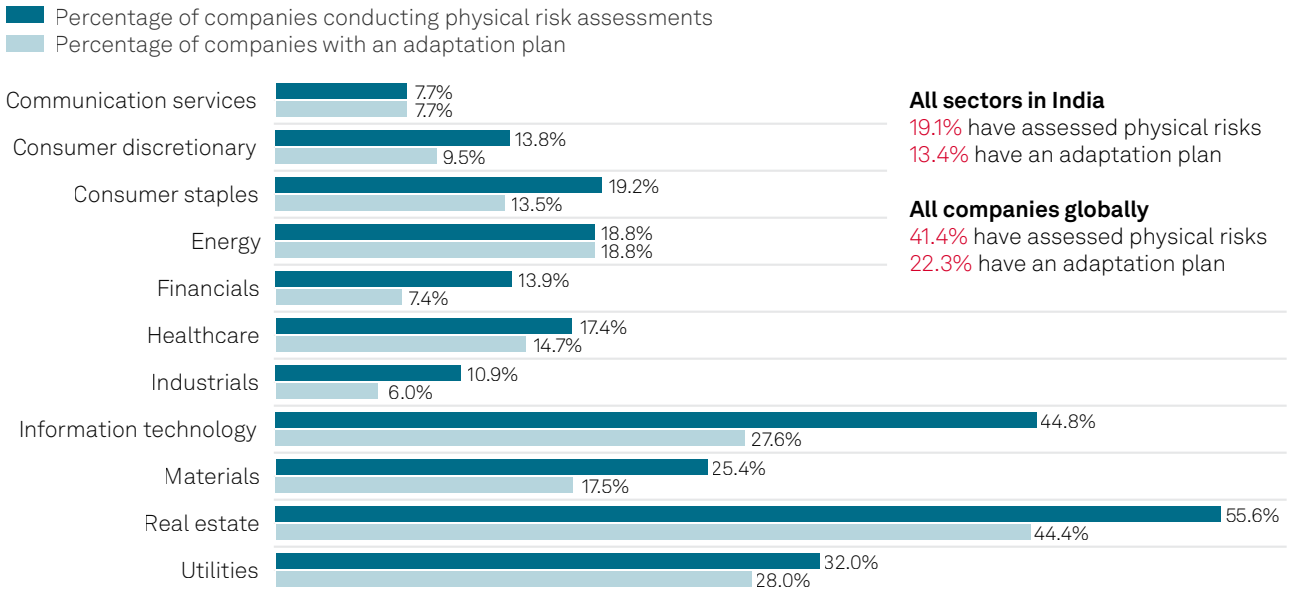
The lack of climate finance is the fundamental challenge deterring adaptation efforts, but this is not unique to India. The UN Environment Programme's "Adaptation Gap Report 2023" estimated the adaptation finance gap for developing countries is US$194 billion to US$366 billion per year. Mitigation finance, including private investment, has dominated climate finance in Asia-Pacific, accounting for 91% of total flows, or US$472.5 billion. Adaptation finance accounted for only 8%, US$40.8 billion, mostly from public funding, according to a 2023 Asian Development Bank report.

Adaptation and mitigation have been central to climate finance, but recognition of loss and damage is growing as a third crucial element. At COP28, held in 2023 in the United Arab Emirates, India supported implementing the fund for responding to loss and damage. In India's 2024–25 Union Budget, Finance Minister Nirmala Sitharaman unveiled plans for a climate finance taxonomy aimed at boosting funding for climate change adaptation and mitigation by attracting more international investment and fostering public-private collaboration.

Aside from finance, adaptation requires mapping vulnerability at a grassroots level. While mitigation strategies benefit from top-tier policies such as setting emissions reduction goals or increasing renewable energy, adaptation needs a bottom-up strategy with active participation from local stakeholders. It demands the efforts of multiple verticals, from village-level governance to state and central ministries. Climate adaptation strategies must be customized to specific local geographies and climatic contexts as there is no holistic solution. This need for customization, combined with diverse socioeconomic conditions, poses a barrier to the widespread application of adaptation measures.

Trends in adaptation planning in India

Percentage of Indian companies that conduct physical risk assessments and that have a climate adaptation plan



As of July 19, 2024.
Chart based on S&P Global ESG Scores raw data. Results based on 674 companies based in India and 13,814 companies globally assessed in the 2023 S&P Global Corporate Sustainability Assessment.
Source: S&P Global Sustainable1.

The development of climate-resilient infrastructure is crucial to counter the physical risks of climate change. In 2019, Prime Minister Narendra Modi launched the Coalition for Disaster Reduction Infrastructure, a climate adaptation initiative, to promote infrastructure resilience to climate and disaster-related risks. Recurring destruction from floods and storms necessitates upgrades to rural and urban infrastructure, the development of robust emergency response plans and disaster response preparedness.

Conclusion

To create a more robust transition strategy, India could consider undertaking measures to increase climate finance flows, incentivize private sector investment toward adaptation, build scalable resilient solutions, empower municipal and local authorities in climate emergency response, build climate-resilient infrastructure and encourage the implementation of local adaptation measures.

Capacity development at the individual and government levels could help improve disaster preparedness and emergency response. India's approach to climate adaptation and mitigation can help the country strengthen its resilience to climate impacts, protect against financial losses, achieve its climate commitments goals, and prevent deaths and injuries from climate-related events. ■

Making agriculture more efficient for food security and sustainable growth

Adoption of efficient agricultural techniques to address climate change, coupled with infrastructural reforms, can enable India to ensure food supplies, energy security and improved farm incomes to foster sustainable economic growth.

Swati Mathur
Associate Director, Agribusiness Consulting

Pushan Sharma
Director, Research

India's agricultural sector is crucial to food security, employment and economic growth. Enhancing land productivity through climate change mitigation initiatives such as cultivating weather-resistant and high-yield crop varieties, along with the adoption of digital techniques and infrastructure reforms, would help sustain food supplies, improve farm incomes and boost agriculture's contribution to India's economy.

Highlights

Agriculture remains vital to the Indian economy given its pivotal role in food security, economic growth and energy security. The sector is a major focus for the government, with its share in nominal GDP at 18%, according to S&P Global Market Intelligence. The sector is also responsible for the livelihoods of 47% of the population and is often a critical factor in electoral decisions.

Adoption of advanced agricultural technologies such as weather-resilient crop varieties, soil regeneration and internet of things-based crop monitoring could help boost farm productivity.

New policies are required to address infrastructure issues such as irrigation, storage and supply distribution to ensure undisturbed food supplies and agricultural input to the feed and transport sectors.

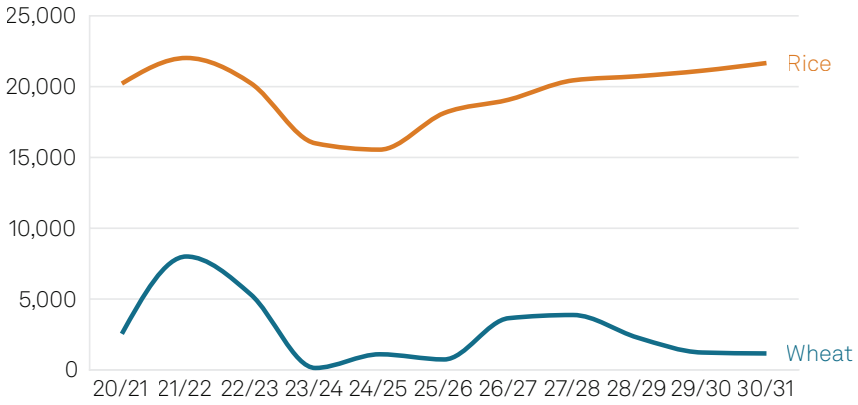
The evolving role of agriculture: Meeting rising demands

India needs to secure sustainable and affordable food supplies for its growing population and to enhance farm incomes. According to UN estimates, India surpassed China as the world's most populous country in 2023. Further, population growth is likely to continue over the coming decade, underscoring the need for food self-sufficiency. Indian consumer demand has increased over the past two decades thanks to a rising population coupled with income growth and changing lifestyles. India is self-sufficient in staples, but with swelling demand, the 10-year outlook indicates a reduction or stagnation of exportable surplus for key crops from 2020–21 levels.

Agricultural input has also been increasingly used for biofuel production to curtail India's reliance on energy imports and to provide farmers with a new avenue for income. Mounting pressure on agriculture to address food demand, energy and feed sector needs could be eased by boosting land productivity and through infrastructure reforms. A demand increase for agricultural input without a corresponding supply increase would distort supply-demand balances and reduce exportable surplus, potentially forcing consumer sectors to import the required crops.

Exportable surplus of key crops shows no growth through 2030

(000 metric tons)



As of Aug. 14, 2024.
2020/21, etc., refers to crop year July 2020–June 2021. Exportable surplus refers to net exports.
Source: S&P Global.

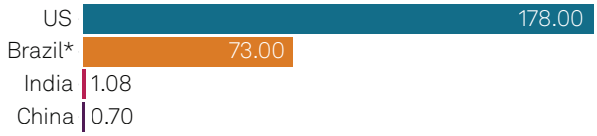
Confronting the challenges

Climate change and infrastructure challenges affect agriculture sector performance

India's agriculture sector plays a vital role at home and helps the country with its foreign policy objectives. Its arable land availability is among the largest globally, comparable to the US and surpassing China and Brazil, making India one of the largest producers of wheat, rice, cotton, sugarcane and many other crops. At the same time, the country has seen inconsistent growth in agricultural output due to its vulnerability to extreme climate events.

India's landholding sizes small compared to US, Brazil

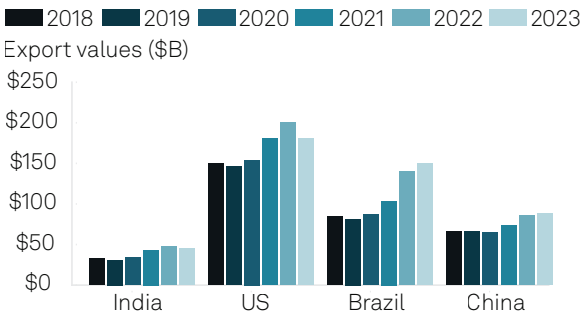
Average landholding size in hectares, as of 2015 unless noted



As of 2015–16 (latest available data).
* As of 2000.
Sources: Center for Development Research (ZEF) research papers; India Agriculture Census.

Increasing emissions are leading to rising temperatures, with knock-on effects for climate-sensitive industries such as agriculture. Extreme heat, dry spells and uneven rain are detrimental to crop yields. Unfavorable weather disturbs crop cycles and makes it challenging to sustain the agricultural productivity necessary to meet rising demand. India is dominated by small and fragmented farms, which makes adoption of new technologies difficult. Small land holdings depend on conventional practices due to a lack of affordability and hence struggle to access water, input and formal credit, further encumbering productivity.

Agriculture exports increase over past 5 years



As of Aug. 14, 2024.
Sources: S&P Global Market Intelligence; Ministry of Agriculture; government of India; International Trade Centre Trade Map.

Uncertainty in the agriculture sector weighs on India's economic performance as the consumer food price index contributes 39% to the total consumer price index, according to Indian government data. In response to the monsoons in 2023, the government implemented export restrictions to manage domestic demand and curb food inflation. With increasing climate risks, export controls are likely to become a familiar policy response during periods of climate stress, affecting India's position in global agricultural trade.

Faster inclusion of advanced agricultural technologies

With demand shifting from calories to nutrition, there is a need to repurpose some of the existing sown area under field crops for fruits and vegetables, given that India has a surplus of staples such as paddy and wheat. In future, this would require higher productivity for staples so overall production levels are unaffected. While India's productivity for most staples is around the global average, it is far below that of China. Given that China's average landholding is more than 30% lower than India's, there is scope for yield enhancement as well as a critical need. India's yields for maize and soybean fall below the global average and could be improved.

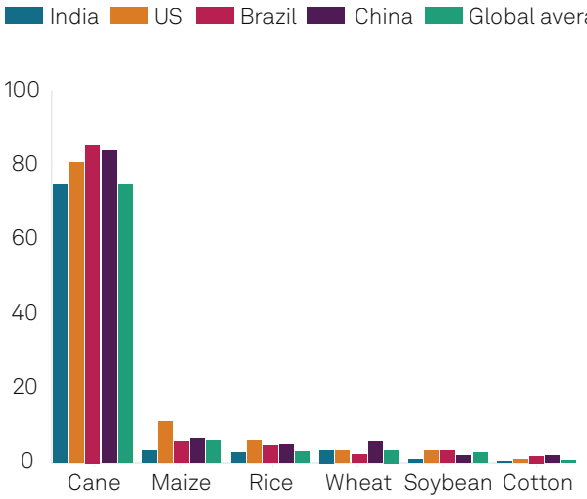
Indian yield improvements could be brought about by including weather-resilient and high-yield crop varieties. In 2022, the Ministry of Environment, Forest and Climate Change decided to exempt genetically edited (GE) products derived through site-directed nuclease 1 and 2 (SDN 1 and SDN 2) techniques from the purview of regulations governing genetically modified organisms or plants (GMOs). This move has paved the way for plants derived using these techniques to be on par with their conventionally bred counterparts and could transform the development and commercialization of products leveraging biotechnology.

There is a scientific distinction between GMOs and GE crops. The latter are created using a plant's existing set of genes and do not involve genes from other organisms. This has helped GE crops gain more public acceptance than GMOs. Innovating GE crop techniques and using hybridized crop varieties could boost yields, improve drought resilience and reduce reliance on chemical input, benefiting farmers and consumers.

Governments worldwide are becoming more receptive to GE agricultural products. The global GE seed market is expected to expand with a compound annual growth rate of about 40% by 2030. Realizing the gains to be reaped with advanced agricultural technology, the Indian government unveiled 109 high-yield crop varieties in August 2024 and is encouraging farmers to use new seed varieties. However, factors such as global harmonization on the technology, regulatory requirements, trade barriers and environmental and ethical concerns must be considered, which may slow GE crop adoption in other countries.

India's productivity for most staple crops is near average

Yields of select staples for 2023/24 (000 metric tons per hectare)



As of Aug. 14,2024.
Source: S&P Global.

Digitalization is seen as the next revolution that will boost Indian farms' productivity. Advanced practices such as precision farming, soil regeneration and digital crop monitoring will be instrumental in enhancing agronomics. Initiatives such as the Digital Agriculture Mission and Agri Stack will be pivotal in improving farmers' socioeconomic status. Agri Stack in particular is expected to offer improved on-the-ground assessment of farms and crops, enabling better credit assessment at the farmer level and greater access to formal credit. As it stands, only about 60% of farmers in India have access to credit from banks.

Infrastructural reforms

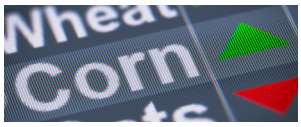
New policies are required to address infrastructural issues from farm to fork. The following are three key areas for reform.

- Strong distribution and supply chain network: Essential infrastructure needs to extend right up to the farm gate. The Central Institute of Post-Harvest Engineering and Technology reported post-harvest losses of US$11 billion per year as of fiscal 2023. Improvement in farm gate infrastructure — everything from sorting and storage to distribution networks — is essential to reduce food waste.

- Value play to increase farm income: The government has been looking for ways to increase farm income. This could be achieved sustainably by increasing value realization for produce, which would be more beneficial than reducing costs or providing direct cash transfers to farmers. There is immense scope for enhancing the value of produce, given that India's agricultural exports, currently at US$45 billion-US$48 billion, are targeted to reach US$100 billion by 2030. Branding and market linkages enabled India to become one of the largest exporters of rice, especially basmati rice, before export curbs; there is potential for other crops as well.

- Collective farming practices: Implementing collective farming reforms would be an effective way to share knowledge and resources as well as achieve economies of scale. Despite the launch of multiple government initiatives, irrigation remains a major challenge, with just 57% of agricultural land irrigated. Amid heat waves depleting water availability, new technologies such as drip irrigation could be adopted by groups and associations as marginal farmers would struggle to finance this kind of upgrade alone.

Looking forward: Addressing the 4 Vs



Volatility

Vulnerability

Vital infrastructure

Value

Source: CRISIL Market Intelligence & Analytics.

The agriculture sector's vulnerability to the evolving climate scenario coupled with increasing demand for agricultural commodities may pose a challenge for India in the coming years. The Union Budget 2024–25 earmarked US$15.5 billion for boosting productivity and resilience in this fast-growing industry. Quicker adoption and spread of innovative measures such as GE crops and digitizing farming practices will be crucial in improving agricultural output and the economy. To boost agriculture performance, it is imperative to pursue strategic goals tied to the four Vs: Volatility, vulnerability, vital infrastructure and value.

- Address **volatility** in agricultural commodity prices: India must tackle seasonal variations and production fluctuations that cause price instability.

- Mitigate crop **vulnerability** due to climate change: With the advent of digital farming and advances in biotechnology, crop yields can be increased.

- Implement **vital infrastructure** transformations: India must fortify its agricultural supply chain and address challenges related to basic needs such as near-farm infrastructure pertaining to sorting, grading and storage. Farm irrigation and food processing facilities are also critical areas for intervention.

- Maximize **value** realization for produce by diversifying the sown area under high-value crops and reducing input costs. ■

India's AI ambitions: Can public-private partnerships lead the way?

An opportunity exists to replicate the success of India Stack to accelerate India's AI mission.

Shankar Krishnamurthy
Head of EssentialTECH Center of Excellence & Innovation

Sugandha Srikanteswaran
Managing Director, Digital Solutions India

Developing AI capabilities and the realization of resulting productivity gains will require India to have policies that provide an ethical and regulatory framework, research and development and digital infrastructure investments, and a skilled AI labor pool.

Highlights

AI can play a key role in accelerating India's economic growth as the country aspires to be the third-largest economy in the world by fiscal 2030–31.

India can aim to replicate the success of the digital public infrastructure public-private partnership model that helped accelerate the country's digitalization.

There is a significant opportunity for India-based IT providers and startups to be public-private partners for AI.

AI's potential rests on several factors

Investment capacity, including the willingness of corporations and governments to fund AI research projects.

Digital infrastructure, encompassing an economy's IT infrastructure, the population's access to the internet, the availability of reliable data and the existence of institutions to support AI research and development.

Policy support from prevailing laws and regulations, and the development and implementation of rules that facilitate AI's progress — including the regulatory environment for technology startups, a conducive administrative environment and data privacy regulations.

Labor suitability and availability, including education levels, AI literacy, the capacity to reskill workers, and the ability to attract and retain a qualified workforce.

As of Aug. 13, 2024.
Source: S&P Global Ratings.

Can the AI mission replicate the success of the Digital India model to accelerate economic growth?

The Digital India initiative, a public-private partnership seeded with key investments by the government of India, continues to play a key role in transforming Indian society using digital technologies. The vision of the program was centered on three key areas: digital public infrastructure (DPI), digital access to government services and the digital empowerment of citizens. While the origins of DPI can be traced back to the launch of the Aadhaar unique biometric citizen ID system in 2009, successive governments, through the continuation of policies and investments, have continued to evolve DPI, also known as India Stack.

DPI is widely acknowledged to be a successful platform that has helped accelerate India's digitalization through increased connectivity, improved efficiency, innovation and inclusive growth.

The recently announced IndiaAI Mission has the potential to build on the successful public partnership model created by the Digital India initiative and accelerate India's economic growth as the country aims to become the third-largest economy in the world by 2030, as per S&P Global projections.

IndiaAI Mission

On March 7, 2024, the Indian government announced the launch and implementation of the IndiaAI Mission through a public-private partnership model aimed at nurturing India's AI innovation ecosystem. This demonstrates the Indian government's commitment to creating an AI environment and propelling economic growth.

According to the mission's official website, the broader vision of IndiaAI is to "bolster India's global leadership in AI, foster technological self-reliance, ensure ethical and responsible AI deployment, and democratize the benefits of AI across all strata of society." Pivotal initiatives within the mission include the following: Compute Capacity, Innovation Centre, Datasets Platform, Application Development Initiative, FutureSkills, Startup Financing, and Safe and Trusted AI.

According to a 2024 report published by not-for-profit industry association Nasscom, the Indian AI market is expected to grow to between US$17 billion and US$22 billion by 2027, attracting investments of US$4 billion and becoming the third-largest talent base with an expected 1.25 million to 1.35 million people with AI skills.

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IT and IT-enabled services sector's critical importance to India's GDP

IT services (IT) — including software development, maintenance and support — and IT-enabled services (ITES) — including business process outsourcing and knowledge process outsourcing — have been crucial contributors to India's GDP, adding US$254 billion in revenue to, and comprising about 7.5% of, India's GDP in fiscal 2023–24. Almost 80% of the IT/ITES revenue came from exports, with the US, UK and EU being the top three markets. The IT/ITES industry has also created large employment opportunities and is estimated to employ 5.43 million professionals, according to the Ministry of Electronics and Information Technology.

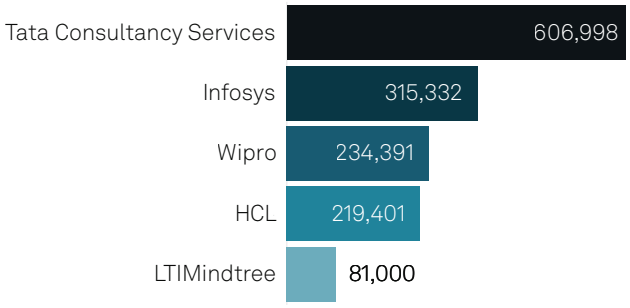
The IT/ITES industry has adapted well to disruptions, including economic downturns and various automation-driven reductions, by focusing on growth areas such as digital transformation and cloud services. The industry has continued to grow in head count and revenue. However, generative AI presents a new set of challenges with its ability to create natural language chat applications such as ITES/voice business process outsourcing, which can disrupt customer service functions. GenAI can also generate code, automate testing and improve the efficiency of application development by 20%-40%, making it so fewer programmers are required. With its high reliance on head count for revenue growth, IT service providers must find ways to continue growing revenue by recalibrating their business models to provide higher-value services.

The starting point in the recalibration and transformation of the IT/ITES model is upskilling and reskilling the workforce to understand and deliver outcomes to clients using GenAI. These firms have deep roots in global enterprises and have established themselves as trusted partners by helping clients optimize processes and reduce costs through outsourcing. As part of customer IT and business operations, IT/ITES providers can harness their knowledge of architecture, data and processes to help integrate GenAI into workflows and deliver outcomes like improved customer experience and faster time to market.

The top five IT service providers collectively had a workforce of 1.45 million employees as of the first quarter of fiscal 2024–25. According to the companies' reports, these providers have trained more than 775,000 employees on GenAI.

Top 5 service providers employ nearly 1.5 million people

Workforce count as of the first quarter of FY'24–25



As of Aug. 13, 2024.
Sources: Company websites.

Workforce transformation is the first step in countering the impact of GenAI on revenue growth. IT/ITES providers need to be open to changing business models by reducing dependence on time and material engagements and must move toward more outcome-based engagements using AI/GenAI. This business transformation requires providers to understand their customers' business strategies and IT processes, using AI/GenAI to deliver outcomes in the form of improved customer experience and the faster launch of new products and services. One major opportunity can be found in the customer experience management function — which includes help desks, service desks and call centers — where IT/ITES providers can use AI/GenAI to create human-like chat interactions to deliver a faster and superior personalized customer experience.

IT/ITES providers have the scale, expertise and transformation experience required to establish a public-private partnership for AI skilling and to impact the Indian labor market. Initiatives such as IndiaAI FutureSkills provide the framework for a public-private partnership that can prepare the Indian workforce for opportunities.

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AI skilling in India

AI is rapidly transforming the global job market, and the Indian workforce is no exception.

The Ministry of Electronics and Information Technology acknowledges that while AI may threaten some jobs, it offers a variety of new, high-paying roles. India's AI job market has expanded in recent years, with a 2023 report by Nasscom highlighting 30% year-over-year growth. According to Nasscom and the Boston Consulting Group, the availability of AI jobs in India is underpinned by the country's available talent, which is ranked second globally. This growth is driven by the increasing adoption of AI technologies by Indian businesses to enhance productivity, improve customer experience and drive innovation for the domestic and global markets.

AI is opening avenues for new job opportunities across multiple industries. Sectors such as manufacturing, healthcare, and banking, financial services and insurance are looking to grow their adoption of AI and GenAI. For instance, HDFC Bank is investing in building large language models, and startups such as Krutrim are focusing on creating domestic-related LLMs. The renewable sector is also expecting a boom in job opportunities, including white-collar jobs such as project management and market analysis, with a focus on solar energy. The skilling needs in the solar energy sector are also high, and AI can be used to provide this education.

The upskilling of the workforce is a key aspect of embracing AI and GenAI. Companies have launched educational programs, such as Microsoft's AI Odyssey and the NVIDIA Deep Learning Institute. The National Council for Vocational Education and Training, along with the Indian Institute of Technology Madras, launched AI learning programs. These initiatives aim to equip the Indian workforce with the necessary skills to leverage AI technologies effectively. According to a 2024 study on global capability centers by Nasscom and KPMG, upskilling on AI and GenAI needs to grow, and fresh graduates need to gain hands-on experience with the technology to quickly bridge some job gaps.

From a regulatory perspective, AI guardrails and enforcement are continuously being reviewed and published. Key requirements for the rollout of AI include the labeling of AI models, obtaining consent and informing users of models' fallibility. These measures aim to ensure that AI technologies are deployed responsibly and ethically. This will also create new job opportunities in legal and counsel for the AI sector.

In essence, the adoption of AI and GenAI in India presents a bilateral scenario. While there are concerns about job displacement, the potential for creating higher-paying, skilled roles is significant. The government's financial commitment, coupled with industry-specific opportunities and robust skilling initiatives, positions India to harness the transformative power of AI effectively.

India commits about US$1.3B to AI initiatives

Significant AI incentive allocations

Region	Amount (US$B)	Share of 2024 GDP (%)
US	3.3-3.6	0.01
Canada	1.8	0.08
India	1.3	0.03
European Commission	1.2*	0.01
Germany	1	0.02

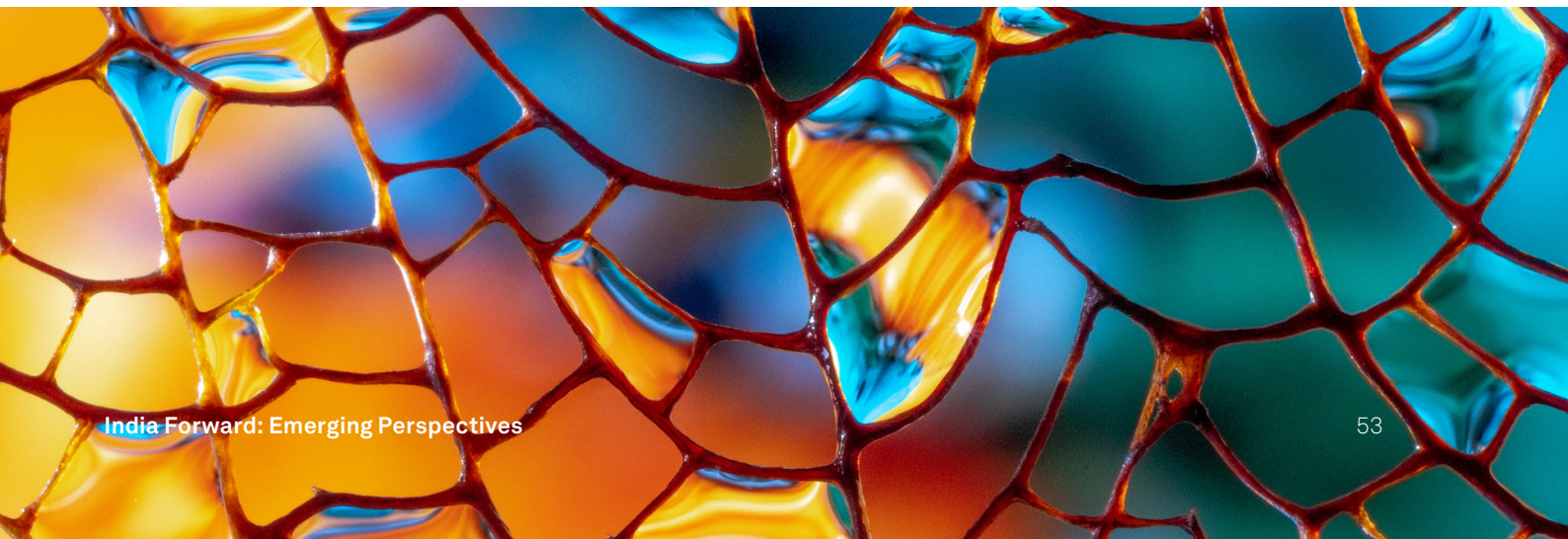
As of Aug. 13, 2024.
* Per year until 2027.
Source: S&P Global Ratings.

Investments in AI

While the US is the global leader in public and private AI investment, the Indian government has demonstrated its commitment to the industry's development by announcing a budgetary allocation of 103.72 billion rupees, or about US$1.3 billion, through the IndiaAI Mission.

The US, China and the UK accounted for 81% of global private investments in AI startups over 2013–23. In fiscal 2023–24 alone, US private investments amounted to US$67.22 billion, while private investments from Indian companies totaled US$1.39 billion.

While an initial public investment in 10,000 graphics processing units as part of the IndiaAI Mission is a good start, it is small-scale compared with the capacity created by US-based companies such as NVIDIA, Microsoft, OpenAI, Google, Amazon and Facebook — capacity that has allowed them to dominate the AI/GenAI market, especially in AI infrastructure and LLMs.



Private investment in AI in India at about US$1.39B

Cumulative private investments in AI between 2013 and 2023 (US$B)

As of Aug. 13, 2024.
Source: S&P Global Ratings.

Indian IT service providers have also announced investments in AI. Wipro has committed US$1 billion over the next three years to build its ai360 platform and FullStride Cloud, expanding AI, data and analytics solutions. Tata Consultancy Services, India's largest IT services provider, has also made significant commitments to invest in AI, including the launch of its TCS AI WisdomNext platform. The platform is an aggregation of multiple GenAI services on a single interface that enables enterprises to adopt AI at scale. Meanwhile, Infosys launched the Topaz platform for GenAI. These companies also have venture arms that invest in early-stage AI startups and AI-related companies.

The public-private partnership AI opportunity

In addition to playing a key role in creating a skilled and expert AI workforce, IT/ITES providers have the opportunity to partner with the IndiaAI Mission and replicate the success of the Digital India initiative, fostering an ecosystem that enables innovation and the creation of new products and services using AI.

The Digital India initiative, which was created with public funding, was largely leveraged by financial technology startups that revolutionized the digital payments, education and e-commerce sectors. While startups will continue to play a key role in AI, there is a significant opportunity for established IT/ITES players to partner with the IndiaAI Mission and cover areas including AI skilling, investing in AI infrastructure and creating an India data repository.

There is an opportunity for IndiaAI and Indian IT/ITES providers to create India-specific models, trained with datasets that can help Indian researchers in various sectors such as climate and environmental studies, agriculture, food supply chain, healthcare, and mobility.

Conclusion

In summary, the IndiaAI Mission provides a substantial opportunity for established IT/ITES providers to be a force multiplier and create an impact beyond their organizations and customers. They can transform themselves and Indian society through this public-private partnership. The continuation of supportive policies, the demonstrated success of the Digital India public-private partnership model and the transformation expertise of IT/ITES providers over the last 30 years all point to the high probability of this partnership succeeding and helping India realize its potential to become the third-largest economy in the world by 2030. This collaboration can also transform India into a society that has democratized access to computing and AI, creating opportunities for a large section of the population and establishing India as a leading economic engine of sustainable development over the next 20 years. ■

About the S&P Global India Research Chapter

The India Research Chapter brings together experts from across divisions and functions of S&P Global and CRISIL (an S&P Global company) to focus on the opportunities, risks and potential that will shape India's future.

It is a strategic initiative aimed at providing in-depth, timely insights and thought leadership into the complexities and dynamism of the Indian economy and its diverse sectors and industries. The 2024 key research themes are:

1) India's Economic Landscape

2) Balancing Energy Security & Energy Transition

3) Future of Capital Markets

4) Digital Disruption and Artificial Intelligence

5) Geopolitical Scenarios

6) Trade, Resources & Supply Chains

7) Agriculture

8) Sustainability

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