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## **RIISING TO THE CHALLENGE OF ENERGY SECURITY**

### *How the United States, India, and China Can Lead the Way*

By Tom Cutler with Clara Gillispie

China, India, and the United States are the world’s largest energy consumers and greenhouse gas (GHG) emitters, accounting for almost half of global energy consumption—about 44% combined—and slightly over 50% of global GHG emissions.<sup>1</sup> Looking ahead, their dominance of the global energy order will become even more pronounced. Thus, as shifts in the center of global energy demand place Asia’s rising powers in the limelight, the extent to which India, China, and the United States are able to work together will have increasingly important implications for global prospects of a more sustainable and prosperous energy future.

The ability of these energy giants to join forces is framed by changes in their comparative energy outlooks, which are all in different stages of transition. The International Energy Agency (IEA) anticipates that by 2040 China will consume a 22% share of global energy demand (same as now), India an 11% share (a near doubling), and the United States a 12% share (shrinking from 16% today).<sup>2</sup> China will therefore remain a major force in global markets even as its economic slowdown spawns market volatility. An important aspect of this picture is the emerging trend of a rising India, whose growing appetite for oil, coal, and other sources of primary energy is expected to increase at the fastest rate in the world. Meanwhile, for both market and diplomatic reasons, the United States will continue to play a significant role in global energy

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<sup>1</sup> International Energy Agency (IEA), *World Energy Outlook 2015* (Paris: IEA, 2015), 69; Jos G.J. Olivier, Greet Janssens-Maenhout, Marilena Muntean, and Jeroen A.H.W. Peters, “Trends in Global CO2 Emissions: 2015 Report,” PBL Netherlands Environmental Assessment Agency and European Commission, Joint Research Centre, Background Studies, 2015, [http://edgar.jrc.ec.europa.eu/news\\_docs/jrc-2015-trends-in-global-co2-emissions-2015-report-98184.pdf](http://edgar.jrc.ec.europa.eu/news_docs/jrc-2015-trends-in-global-co2-emissions-2015-report-98184.pdf).

<sup>2</sup> IEA, *World Energy Outlook 2015*, 69. Estimates derived from data under the new policies scenario.

leadership, even as it experiences a possible decline in demand in both relative and absolute terms.

While each of these three countries has undertaken specific efforts to strengthen its energy security at a national level, multilateral energy cooperation among the three has remained less ambitious. Some of this stems from disparate domestic goals, political mistrust, and lack of opportunities even though there are compelling reasons to collaborate. For example, these three countries also share important common concerns, particularly the need to strengthen global environmental outlooks. Energy is the leading source of CO<sub>2</sub> emissions (contributing around two-thirds of the world total as of 2015), and numerous cities in China and India already suffer from some of the most poisonous air pollution in the world. As such, clean energy deployment and climate change could be a fertile area for formal triangular cooperation, perhaps based on significant collaborations already underway in bilateral exchanges between the United States and India and between the United States and China.

Collaboration among these three nations on developing new and innovative strategies could help accelerate the move to less carbon-intensive energy systems and enhance energy security and overall quality of life. The actions they take to increase environmental security have impacts beyond their borders and are by nature more win-win than a zero-sum competition. This NBR Commentary considers how the United States, China, and India are responding to energy security challenges individually in order to suggest ways they might elevate their leadership in enhancing the world's energy and environmental outlook. In doing so, it suggests specific opportunities where collective action could better advance all three countries' shared interests.

## Energy Security: Meeting Demand While Revisiting Supply Strategies

Given that competition for seemingly limited resources can fuel conflict and undermine cooperation, analyses of energy security have traditionally focused on the challenges of meeting demand.<sup>3</sup> One of the most important consequences of the shifting energy epicenter to Asia is that countries in the region are facing growing dependence on imports of oil, gas, and coal, and increasingly demand for these resources cannot be met by traditional suppliers within the region. By 2040 the IEA projects that Asia will be the final destination for 80% of regionally traded coal, 75% of oil, and 60% of natural gas.<sup>4</sup>

India and China also face acute and growing import vulnerabilities. The Asian Development Bank (ADB) projects that from 2010 to 2035 India's oil import dependence could jump from 76% to 92%, and its gas import dependence could grow from 20% to 36%. Despite significant indigenous renewable resources and ambitious plans to expand the use of alternatives, India's coal import dependence is expected to double from 16% to 33%. During this same timeframe, China's oil import dependence is anticipated to climb from 59% to 72%, coal imports will double from 5% to 11%, and gas import dependence could reach as high as 50% of total Chinese demand.<sup>5</sup> In this context, energy supply security has become an increasingly important driver of Indian and Chinese foreign policy. Specifically, India's and China's increasing dependence on oil imports is making the geopolitics of pipelines and shipping routes ever more critical to national energy supply strategies.

<sup>3</sup> For an outstanding compilation of analyses from different perspectives, see *China, India and the United States: Competition for Energy Resources* (Abu Dhabi: Emirates Center for Strategic Studies and Research, 2008). In particular, see Mikal Herberg, "The U.S.-China-India Triangle of Strategic Energy Interests," in *China, India and the United States*, 417–50.

<sup>4</sup> IEA, *World Energy Outlook 2015*, 53.

<sup>5</sup> See Asian Development Bank (ADB), *Asian Development Outlook 2013: Asia's Energy Challenge* (Mandaluyong City: ADB, 2013), 186, 261–67.

*China.* Because it is dependent on energy trade flows through the Strait of Malacca (including for 80% of oil imports), China has taken a number of foreign policy actions to mitigate this vulnerability that have implications for the energy fortunes and strategic interests of other nations. These actions range from concerted diplomatic efforts, including foreign aid to strengthen ties with select producer countries, especially in Africa, to controversial endeavors such as island building in the South China Sea based on its outlandish nine-dash-line claim. Beijing also has pursued land-based energy supply strategies, including fostering stronger energy links with Russia and promoting the One Belt, One Road initiative for Eurasia along the historical Silk Road. Meanwhile, even though China possesses significant reserves of natural gas, including unconventional gas, numerous obstacles to indigenous development and production have made it necessary for Beijing to prioritize securing new import sources as a pragmatic supply security strategy.

*India.* Despite facing similar challenges to those confronting China, India—due to its strategically advantageous location and shorter supply routes—has set qualitatively different priorities for its import strategies. For example, because India's only significant oil supply chokepoint is the Strait of Hormuz, it can focus on diversifying its sources of supply. Since India must still satisfy growing requirements for oil, particularly for use in the transportation sector where substitutes are limited, deepening relationships with new and existing suppliers is an important diplomatic objective.

A key national priority for India is connecting the hundreds of millions of its citizens with no access to modern energy services. Even with ambitious plans to promote renewables and nuclear power, India faces a steep demand curve that will continue to put pressure on its pursuit of

an all-of-the-above approach for securing supplies to fuel the power sector, including continued demand for coal. It will also face huge investment requirements for improved energy infrastructure to achieve greater reliability and to enable greater access to energy.

*The United States.* The revolution in shale gas and tight oil production in North America has been a game changer. The unexpected transformation of the United States from a vulnerable net importer of oil and gas to an emerging exporter offers an opportunity for the country to play a more influential role in world energy markets. Already the world's fourth-largest coal exporter, with a customer base that includes India and China, the United States has become the world's largest producer of oil and gas. Exports of liquefied natural gas (LNG) from shale have commenced, and recently started exports of crude oil could reach Asian markets in the near term, as North America is expected to be self-sufficient in oil by the mid-2020s.

This change has altered the calculations of U.S. energy security and created a new role for the United States in global energy markets as a potential supplier. It has also accelerated the shift in global energy trade patterns from an Atlantic orientation to one centered on the Asia-Pacific region. Yet these trends have not insulated the United States from its own energy challenges. Dramatic shifts in supply mixes, coupled with aging energy infrastructure, are pressing the United States to re-evaluate its domestic energy strategies. As highlighted by the efforts to implement the Quadrennial Energy Review and the controversies surrounding the Clean Power Plan, the ultimate direction (and political buy-in for such efforts) remains unclear, leaving some policymakers and analysts in Asia uncertain about U.S. energy priorities.

## Can Regional Energy Cooperation in Asia Be Strengthened?

Despite its increasing dependence on imported energy supplies, Asia has no single overarching collective energy security arrangement. Regional cooperation in Asia's energy security has not taken hold to the level of the IEA's oil-sharing and oil stockpile program, despite the existence of the Association of Southeast Asian Nations (ASEAN), the Asia-Pacific Economic Cooperation (APEC) forum, the East Asia Summit (EAS), and other ad hoc forums. (Although ASEAN has an oil-sharing plan, it only serves Southeast Asia.) Further, even though both India and China depend on the Middle East for over half of their oil imports, neither state belongs to any multilateral energy security program that includes an international oil-sharing scheme or coordinated management of strategic oil stocks. This is a gap in the international energy system that needs to be filled.

World energy demand was centered on the industrialized nations of Europe and North America in 1974 when members of the Organisation for Economic Co-operation and Development (OECD) founded the IEA, which remains Eurocentric in its membership despite efforts to expand its geographic scope. Now we are in a different world where massive economic expansion fueled by growing consumption of energy has launched the emergence of an Asian century. The relatively rapid and virtually simultaneous emergence of India and China as major players on the global energy scene has raised questions about the need for adjustments in the existing international energy system and whether new institutions for energy and environmental security will evolve.

It is in the collective interest of all nations that India and China become full members of the international energy community and that they be responsible stakeholders commensurate with their growing importance to world energy markets. And

in light of its strategic foreign policy rebalance to Asia, the United States in particular has an interest in the energy security of India, China, and Asia as a whole.

To its credit, the IEA has continued its efforts to bring India and China into closer coordination short of full membership. In November 2015, the organization's energy ministers agreed to enhance their outreach by admitting China, Indonesia, and Thailand as being "in association" with the IEA. This new status of association is aimed at enhancing the IEA's engagement with key emerging economies and allows them to participate in expert meetings, send staff to the secretariat, receive technical training, and have priority in a number of programs related to energy technology, energy efficiency, and emergency response.<sup>6</sup>

Significant in the announcement was the absence of India, which reportedly still has the issue under active review. India already engages with the IEA on a limited scale, but greater participation is an opportunity that New Delhi should take the appropriate steps not to miss. A formal association with the IEA would give the country a seat at the table and a voice in critical discussions of global energy security, including how best to adjust the IEA and maintain its effectiveness amid changing world energy markets. IEA energy ministers have instructed the secretariat to report back in 2017 with proposals to broaden the organization's collective oil security mechanism in an effort to strengthen links for emergency cooperation with India and China and other major nonmember countries in the event of an energy supply crisis.

Of course, modifying the IEA is not the only option. Given that the EAS is the only regional grouping that includes India, China, and the United States, the EAS should consider beefing

<sup>6</sup> "Summary of the Chair, The Hon. Ernest J. Moniz, U.S. Secretary of Energy," IEA, November 17–18, 2015, <https://www.iea.org/media/news/2015/press/IEAMinisterialChairsSummary.pdf>; and "Joint Ministerial Declaration on the Occasion of the 2015 IEA Ministerial Meeting Expressing the Activation of Association," IEA, November 18, 2015, [https://www.iea.org/media/news/2015/press/IEA\\_Association.pdf](https://www.iea.org/media/news/2015/press/IEA_Association.pdf).

up its energy security responsibilities.<sup>7</sup> Another option is for India and China to jointly create a new organization—an “Asia energy agency,” for example. This would be comparable to China’s recent initiative to form the Asian Infrastructure Investment Bank (AIIB) as a counterpart to the ADB. Although the AIIB might serve as a model, to be most effective this new agency would certainly need to have a broad membership, including the United States and key members of the IEA and the Organization of Petroleum Exporting Countries (OPEC). Realistically, given China’s overcapacity and energy dilemmas, it remains to be seen whether establishing a China-based energy grouping is practical. In fact, prognostications of a Sinocentric Asian regional system have come under question due to the uncertainty caused by China’s economic slowdown and changing demographics, causing some to consider the prospect of an Indian-led Asian century.<sup>8</sup>

However, inadequate supply of energy represents a major bottleneck that must be resolved if India is to achieve true great-power status.<sup>9</sup> This is in addition to the Indian government being able to successfully manage its growing import dependence without the benefit of having any international energy alliances, unlike most other major nations. New Delhi faces many challenges, not the least of which is climate change, yet also

has many opportunities as the energy epicenter of Asia tilts toward India.

## Opportunities and Challenges for Deeper Collaboration

Although whatever new energy and environmental paradigm eventually evolves will be shaped in some measure by the future geopolitical structure of Asia itself, there can be no doubt that the United States, China, and India, as the three largest emitters of greenhouse gas, share a responsibility to address global concerns about the impacts that such emissions have on public health and prosperity. And with the IEA, ADB, the Institute of Energy Economics, Japan, and others projecting coal use to remain significant in each country (though to varying extents), it is vital that they find ways to better mitigate harmful emissions stemming from what is otherwise a desirable fuel in terms of cost and security of supply.<sup>10</sup>

The United States, China, and India together make up 72% of all coal consumed worldwide—with China and India accounting for 60% of coal consumption. The IEA forecasts that by 2040 Asia as a region will account for 80% of global coal consumption as U.S. demand declines.<sup>11</sup> Despite best efforts, both countries continue to struggle with efforts to mitigate CO<sub>2</sub>, particulate matter of 2.5 micrometers (PM2.5) or less, and other noxious pollutants stemming from such power generation. These statistics underscore that an unintended consequence of the shifting energy epicenter to Asia is the concentration of coal-induced greenhouse gas emissions and the risk of not having clean air.

Significant challenges lie ahead in terms of bolstering clean energy mixes to use less coal and improving air quality as the glut in fossil

<sup>7</sup> For further discussion of this proposal, see Tom Cutler, “The Architecture of Asian Energy Security,” in “Adapting to a New Energy Era: Maximizing Potential Benefits for the Asia-Pacific,” National Bureau of Asian Research, Special Report, no. 46, September 2014, 51, 56.

<sup>8</sup> The IEA predicts that India will register the fastest rate of economic growth to 2040 (6.5 % per annum) and will become more energy-intensive while China becomes less energy-intensive. These and other trends, such as India’s rising energy demand and imports mentioned earlier, no doubt prompted the IEA to conclude that “an unmistakable inference from our analysis is that India is heading for a central position in global energy affairs. Energy developments in India transform the international energy system, and, in turn, India will be increasingly exposed to changes in international markets.” See IEA, *World Energy Outlook 2015*, 38, 548. For an additional commentary, see Dan Blumenthal, Derek Scissors, Nicholas Eberstadt, Sadanand Dhume, and Alex Coblin, “Rethinking the Asian Century,” American Enterprise Institute, June 8, 2015, <https://www.aei.org/publication/rethinking-the-asian-century>.

<sup>9</sup> For an in-depth perspective see Raymond E. Vickery Jr., “India Energy: The Struggle for Power,” Wilson Center, 2014, <https://www.wilsoncenter.org/sites/default/files/India.Energy.Vickery.pdf.pdf>.

<sup>10</sup> BP plc, “BP Statistical Review of World Energy,” June 2014; and Institute of Energy Economics, Japan, “Asia/World Energy Outlooks 2013,” October 21, 2013; IEA, *World Energy Outlook 2015*; and ADB, *Asian Development Outlook 2013: Asia’s Energy Challenge* (Mandaluyong City: ADB, 2013).

<sup>11</sup> IEA, *World Energy Outlook 2015*, 278.

fuel markets and low oil prices impinge on new investment in renewables and more efficient infrastructure. Energy security in India is still heavily premised on meeting a growing demand for coal, while recent drops in requirements have prompted speculation that China has reached peak coal demand. Today, China has the world's most advanced coal power fleet and seeks to more than double its capacity for nuclear power. China is also expected by the IEA to deploy more renewables than any other country between now and 2040. The climate agreement China reached with the United States in 2014 sets 2030 as the year by which GHG emissions should peak.

Although India is reluctant to make international commitments on a similar scale, the country has ambitious plans for nuclear and solar in particular, which should help it achieve its goal of reducing the energy intensity of its GDP by 33%–35% below 2005 levels by 2030. However, the IEA expects that India will contribute the world's largest net increase in coal-fired generating capacity through 2040, greater than the increase in China or the rest of the world combined (excluding China). Given that more than 80% of India's total coal-fired capacity will come from plants that have not been built yet, every effort must be made to deploy the most advanced, supercritical clean-coal technology possible, as well as commercial-scale carbon capture and storage when available.<sup>12</sup> In the United States, greenhouse gas emissions have already leveled off, which is a turning point in helping Washington achieve climate goals that have often emphasized market-based policy tools rather than top-down government intervention. However, the United States must resist the pull of complacency and avoid the illusion that its domestic efforts will be sufficient. On this basis, it is useful to look at these issues from a tripartite perspective to see where the pooling of time, talent, and resources among India, China, and the United

States might lead to new breakthroughs in the path to clean energy.

Tripartite cooperation is not guaranteed, however, as the energy relationships between and among these energy superpowers is uneven. Although they are neighbors, India and China do not trade in energy fuels. The most significant energy-related bilateral trade stream is Chinese equipment for power-generation projects in India, such as coal and solar. Given that their respective state-owned oil companies compete against one another for overseas projects, the two governments signed memorandums of understanding in 2006 and 2012 enabling these enterprises to partner together in acquiring equity ownership in oil and gas production blocks. However, successful ventures have been rare. Both countries also invest in the U.S. energy sector, ranging from fossil fuels to renewables, but not so much between themselves, although Chinese companies are reportedly poised to invest billions of dollars in India's solar sector.<sup>13</sup> Each imports modest amounts of coal and oil from the United States, both have previously obtained LNG re-exported from the United States, and some Indian gasoline reaches the U.S. East Coast market. While China has been reluctant to pursue shale-based LNG imports across the North Pacific due to concerns about the politicization of U.S.-China trade, India has actively solicited LNG supply contracts with the United States. Conversely, U.S. companies (with Japanese parents or partners) are building nuclear power plants and seeking manufacturing deals in China but have yet to break ground in India despite efforts backed by the U.S. government in the wake of the 2008 U.S.-India civil nuclear deal. In comparison, India's nuclear ties with China are modest and limited politically by China's nuclear cooperation with Pakistan. In sum,

<sup>12</sup> IEA, *World Energy Outlook 2015*, 332–33.

<sup>13</sup> For examples of these investments, see Vrishti Beniwal and Bibhudatta Pradhan, "China Tycoons to Invest \$5 Billion in Indian Renewable Power," *Bloomberg News*, October 15, 2015, <http://www.bloomberg.com/news/articles/2015-10-15/china-tycoon-liang-to-invest-3-billion-in-green-energy-in-india>; and Smriti Mittal, "China's Sany Group to Invest \$3 Billion in Renewable Energy in India," *CleanTechnica*, October 19, 2015, <http://cleantechnica.com/2015/10/19/chinas-sany-group-invest-3-billion-renewable-energy-india>.

the Indo-Sino energy relationship is somewhat constrained by strategic competition, so both nations find it relatively easier to engage in energy trade and investment with the United States.

The United States conducts robust government-to-government bilateral cooperation in energy with both China and India, including jointly operated clean energy R&D centers, as a priority program for U.S. international energy policy. The joint clean energy R&D centers and other extensive technical collaboration conducted by the United States demonstrate that even when the nations cannot agree on the politics of climate change, they can agree on the science of clean energy research. This includes overcoming the hurdles of how to share the intellectual property rights of joint research, among other difficult issues. Such collaborations have also included robust and positive opportunities for academic and research exchange programs, further supporting new generations of rising scientists and leaders with deeper multinational ties. One potential option for building on these ideas is to set up a trilateral clean energy R&D center that engages leading minds from the United States, China, and India. This center could draw on each country's respective strengths in the sciences, manufacturing, financing, and technology deployment.<sup>14</sup> Although this initiative might not result in the discovery of the next disruptive technology, at the very least it could serve as a successful example of their shared commitment to the interdependence of nations and humankind's common environmental destiny.

Beyond the specifics of any individual program, there is a powerful symbolic meaning to these collaborations that should not be discounted. As the December 2015 UN Climate Change Conference discussions in Paris highlighted, capping global

temperature rises to below two degrees Celsius will require ambitious, dedicated, and innovative efforts from every corner of the globe. If the United States, China, and India do not succeed in their own efforts and reforms, including fulfilling their Intended Nationally Determined Contributions (INDC) emanating out of the conference, the world will fail to achieve the two-degree Celsius goal.

### **Conclusion: Leadership in Energy and Environmental Security**

Cooperation between India, China, and the United States is essential if they are to provide global leadership in energy and environmental security. The notion that the big three could work together to lead the rest of the world in scaling up less carbon-intensive energy systems might seem unrealistic according to conventional wisdom. However, because positive foundations exist for collaboration that could be built on and reinforced, there is a clear opportunity for deepening trilateral cooperation in environmental security in particular. Key goals on which interests converge include transparent energy markets, stable prices, attractive investment climates, secure energy transport, commercial pathways for the deployment of new technologies, and an environmentally sustainable future. Bold efforts and political courage will be needed, along with genuine government/industry partnerships, if nations are to rise to the challenge and accomplish new miracles in clean energy. The only failure is not to try. What is needed is a new paradigm for technology cooperation, and an attainable first step would be for the United States, China, and India to establish a joint center for energy and the environment. If the world needs to transform its energy systems to combat climate change, then a uniting vision for the world's three largest energy consumers could be instrumental in achieving the goal of a sustainable and prosperous energy future. ∞

<sup>14</sup> An excellent monograph with interesting proposals for renewable energy cooperation is Jacqueline Brittain, Taylor Montgomery, John Ryan, Aakriti Vasudeva, and Zhu Zhonghe, "United States, China and India: Renewable Energy Cooperation," Elliott School of International Affairs, George Washington University, 2015, <https://elliott.gwu.edu/sites/elliott.gwu.edu/files/downloads/US%20China%20India%20Renewable%20Energy%20Cooperation-1.pdf>.

## Sustainable Futures Energy and Environmental Security in Times of Transition



The seventh annual invitation-only Pacific Energy Summit will be held in Singapore on June 23–24, 2016, and will convene 200 leaders from government, industry, and research from across the Asia-Pacific. Delegates will address how countries in the Asia-Pacific can foster more robust, collaborative approaches to sustaining economic growth and advancing much-needed access to energy while achieving the ambitious environmental goals outlined in the Paris Agreement.

Topics to be discussed include:

- Near-Term Plenty, Long-Term Risk: Market Outlooks in an Era of Abundance
- Matching Climate Ambition and Practical Energy Policies Post-Paris
- The Rise of South and Southeast Asia in Global Energy Markets
- Understanding the Water-Energy Nexus
- Asia's Urbanization and Implications for Energy
- Revolutionizing Transportation Sectors to Combat Harmful Air Pollution
- Flexible and Sustainable National Policy Frameworks: Balancing Coal, Gas, and Nuclear Energy Options
- Closing the Investment Gap: Financing Energy and Environmental Targets
- Evaluating Futures: Changing Economic and Energy Outlooks in the Asia-Pacific

Chaired by Admiral Dennis C. Blair (former Director of National Intelligence; Chairman of the Board and CEO, Sasakawa Peace Foundation USA; and Member, NBR Board of Directors), the 2016 Pacific Energy Summit will explore these topics in a high-trust setting among select senior policymakers, scientists, industry leaders, and researchers. The Summit is an invitation-only gathering of high-level stakeholders from policy, industry, and the expert community. Official invitations will be sent starting this month. To request an invitation, please email [pacificenergy@nbr.org](mailto:pacificenergy@nbr.org).

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