Energy Security
Special Challenges for the Asian Region, with Focus on India


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Introduction

The world is still struggling to recover from its worst global financial crisis. There is also a shift in global economic power as parts of Asia, Africa and Latin America emerge as new engines of global growth. There is a widening and deepening impact of economic, fuel and food shocks on populations around the world. Climate change is threatening to make the earth less habitable and life more hazardous. Sea levels are rising, forests are being destroyed and more than 2 billion people face water shortages. There is a rising incidence of "mega-disasters" such as the devastating earthquakes in Haiti, massive flooding in Pakistan and Thailand, and, in Japan, the triple disaster of earthquake, tsunami and nuclear radiation, with huge costs in terms of lives, livelihoods and development.

The international community is faced with the twin challenges of meeting rapidly expanding energy demand to ensure economic growth and mitigating the associated environmental impacts. Major economies are facing tremendous environmental pressure to minimize fossil fuel consumption and energy-related emissions, and clean energy sources are increasingly preferred. The world is at the crossroads of a new energy order as the existing global energy supply systems are unable to cope with the growing energy demand in many countries. The "Arab Spring" and the Fukushima nuclear plant disaster represent two different types of challenges to two of the most important energy sources in the world, namely petroleum and nuclear power, which have hitherto enjoyed significant importance in the global primary energy mix.

Rapid growth in world population is closely linked to the issue of environmental security through the impact that people have on the earth's life-supporting resources. In developing countries, the environmental pressure is linked to poverty. More and more people are leaving rural areas and moving to cities but cities cannot provide jobs, homes, water, sanitation and other basic services for such an influx of people. This leads to urban squalor, with social tensions, crime and other problems to follow. The problems are even more acute in the larger cities, and the number of such cities is growing and most of them are in the developing world.

It is also worth noting that almost 1.3 billion people in the world, of which a large contingent lives in Asia, do not have access to electricity at all. As electricity is a basic and necessary public service, for any growth in terms of economic and social terms, sufficient and efficient electric power generation must be readily available for consumers. Bringing power to this energy-poor population, therefore, needs to be an important global priority alongside industrial development and environmental protection.

Energy security is a big dilemma both for industrialized and developing countries. In the short term, energy security is the ability of a country's energy system to react promptly to sudden changes in supply and demand, whereas long-term energy security is linked to timely investments to supply energy in line with economic developments and environmental needs. This involves the need to study different energy sources (coal, oil, gas and renewable), intermediate means (electricity, refineries) and transportation modes (grids, pipelines, ports, ships). All of these carry risks of supply interruptions or failures, challenging the security of undisturbed energy supply. In today's world, the need to ensure energy security is more urgent than ever. This is particularly true in the case of Asia where the energy demand is projected to rise rapidly in the next two decades.

Special Challenges Facing Asian Region

Almost half of the world's people live in Asia and a substantial proportion of the Asian population is poor, some at the lowest level of per capita energy use in the world. The poor are affected by the supply system shortfalls and are unable to pay for the limited services available. The emerging economies, especially China and India, with their huge populations, face the additional challenge of ensuring that the basic needs of the extremely poor for cooking and lighting are met, while at the same time reducing the adverse environmental impacts of energy production and use. It thus becomes necessary for countries in the Asian region to find ways to address these issues comprehensively if they are to join the ranks of more developed and prosperous countries.

Asia is set for expansion of economy, population and urbanization – all of which mean higher energy consumption in the region, especially in China and India. As the world's population grows and the emerging economies expand rapidly, global demand and competition for energy are intensifying and driving up prices of the world's finite oil resources, which are concentrated largely in a handful of politically unstable countries.

Although the Asian region as a whole is richly endowed with energy resources, many individual countries are increasingly facing shortages and have to rely mostly on imports. The region's economies have been faced with high and often volatile prices for energy, particularly for oil and gas, combined with supply disruptions caused by political instability in some main supplier countries. The energy, environment and national security concerns have set the stage for a paradigm shift in the way renewable energy is perceived around the world today. The non-fossil fuel sources such as solar,

wind power, ethanol, and bio-fuel are gaining renewed momentum. Even in the case of nuclear energy, despite the Fukushima nuclear plant disaster, several countries in the Asian region are going ahead with plans to install more nuclear plants in the future.

The growth in demand for energy will be felt most acutely in the power generation sector, which is increasingly reliant on coal. Incremental demand for coal has come mainly from power plants in Asia and especially in China, which now consumes nearly half of the world's total coal production. Coal is cheap and is one of the few fuels domestically available in large quantities in China and India. Understandably, these countries see coal as indispensable for fueling growth, staying as self-sufficient as possible in energy, and lifting their vast populations out of poverty. Coal-fired power plants generate almost 70% of India's electricity and 80% of China's. The Asian countries must come together to adopt new technologies for coal, this age-old energy source, and reshape the region's future energy mix. They should focus their attention first on reducing local pollution and toxic releases from coal plants. It would also help if rich countries could support R&D and pilot deployment of technologies that burn coal more cleanly.

Hydro development is a reliable and efficient way to produce electricity, with many benefits. Micro, small, medium, and large hydro development should be a priority in countries where the potential remains for hydro development. For such countries, policymakers should focus on developing it and balancing it with the electricity-generation matrix, depending on the other renewable and non-renewable energy resources they have.

The easiest way to bring a specific alternative energy on line to compete against fossil fuels such as oil and coal is to guarantee an attractive financial return for those who invest in it. Many European countries have put in place "feed-in tariffs" for solar and wind power. China has used this approach as well to promote wind power development. Some of the other barriers to investment in energy options can be infrastructure-related. The lack of suitable transmission infrastructure can make it difficult to bring renewable energy from areas with substantial wind and solar resources to population centers. Similarly, expensive natural gas transport infrastructure – pipelines or liquefied natural gas terminals – must be built before gas-fired power becomes a viable option for end users located far from the gas source.

The governments have a key role to play in making sure that the needed infrastructure is built to connect energy sources to customers. Where infrastructure crosses borders, regional cooperation is critical. Cross-border gas pipelines provide benefits for source, transit, and destination countries alike, but the development of such projects can be challenging and it is another area where the involvement of multilateral financial institutions can be very helpful.

In light of the convincing evidence of climate change and global warming, it is important that the emerging economies learn from the mistakes of the past and not follow the fossil-fuel based path. The Asian region will need to transition to low carbon economies and take the lead in energy efficiency and diversification programs by switching from fossil fuels to renewable energy. Climate change could affect every human being on the planet. With over half the world's population, Asia has more at stake than any other region and must, therefore, concentrate on:

- *Dramatically increasing energy efficiency and diversification programs and switching from fossil fuels to renewable energy sources;*
- *Adopting new approaches to urbanization by building more compact and eco-friendly cities;*
- *Relying more on mass transit for urban dwellers and railways for long-distance transport;*
- *Changing lifestyles to alleviate pressures on finite natural resources.*

Given its diversity, Asia will need to develop its own model that builds on the positive experience of East Asia. There is a wealth of traditional knowledge, rural skills and wisdom that can be found in remote inaccessible villages around the world. If only we listened to the voices of the poor living in rural areas, we could re-learn how to live simply and sustainably and how to respect the earth, water and air and not to abuse the limited resources we still have. The time has come now to apply real life low-cost solutions in order to save the planet. India's Mahatma Gandhi said: "Live simply so others may simply live."

Regional Cooperation Critical for Asia's Development

Over the next two decades, rapid economic development in the Asian region will drive energy demand, and the associated energy supply and environmental challenges will require a comprehensive policy response. Regional cooperation can provide a vehicle for ongoing collaboration and dialogue on the topics of energy security and climate change and to forge lasting partnerships that address these challenges jointly and effectively.

The participating countries can discuss current energy and electricity supply and demand trends and their implications for Asia's economic growth and environmental conditions; public policy options for promoting investment and infrastructure development to improve energy access and environmental stewardship; and the critical issues that stakeholders must address when determining their energy mix and investment goals, such as pricing mechanisms and market regulation.

Sharing experiences between policymakers, industry leaders, and other stakeholders can help identify sustainable solutions to the common challenges related to the growing need for energy in the world. Many challenges that countries face are similar to challenges that other countries or persons have faced before, so listening to how they have solved these issues and learning from successful case studies can reduce the time it takes to solve problems, as well as reduce costs.

Regional cooperation is critical for Asia's march towards prosperity. It will cement the region's hard-won economic gains in the face of vulnerabilities to global shocks, and it could be an important bridge between individual Asian countries and the rest of the world. It can help countries respond better to global challenges, and through managing the regional commons it can contribute to Asia's long-term stability and peace.

Strong political leadership is crucial for increased regional

cooperation. Building Asia's regionalism will require collective leadership that recognizes a balance of power among participants. When formulating its domestic or regional policy agenda, Asia will need to consider the regional as well as global implications. Peace and security throughout the world will be essential for Asia's long-term prosperity. The Asian Century should not be Asia's alone but the century of shared global prosperity.

India's Energy Secure Future

Since the early 1990s, India has experienced one of the fastest economic growth rates in the world, averaging over 6% and reaching 7-8% per year since 2003. This robust economic growth has brought immense benefits to the people of India, and it has allowed millions to emerge from poverty, creating a sizable middle class of 300 million people. The new consumers are enjoying their first tastes of modern prosperity.

However, as a globalizing India grows by leaps and bounds, its rapid economic development creates significant challenges for managing pressures on the country's natural resources and the environment, which are necessary for sustaining these accomplishments. Climate change could cause major changes to monsoon conditions and lead to other severe impacts. Water scarcity is leading to hardship and conflict all over the country.

India's fossil fuel dominated energy mix poses various challenges. First, over-reliance on imported fuel makes the country vulnerable to supply challenges due to geopolitical turbulence in the energy producing regions, and adds significant burdens to its economy; second, use of hydrocarbon sources has been adversely affecting the environment and human health, and the growing energy-related emissions are adding to the concerns over global climate change. For India's GHG emissions *vis-à-vis* those of other countries, see *Table*. In this context, to ensure energy security and to meet long-term economic goals, transition to a cleaner fuel mix with a higher share of domestically supplied alternative sources of energy becomes a strategic necessity for India.

Currently, India has the fifth-largest electrical system in the world. Even so, nearly 400 million Indians have no access to electricity. Some use kerosene, cow dung and firewood as fuel. Across India, in the absence of a central electricity grid, thousands of rural homes are receiving their first light through small companies and aid programs that deliver solar panels to the rural poor. For example, as shown in *Photo,* 300 villages in India have been provided with solar lighting under the program known as "LaBL" (Light a Billon Lives) of the Energy and Resources Institute (TERI). The per capita energy consumption of a country is closely linked to the Human Development Index (HDI) and, as can be seen in *Chart,* India's HDI is very low.

By 2035, India's power demand is expected to double, providing serious challenges for the country. India's electricity mix comprises 69% coal, 14% hydro, 10% natural gas, 4% oil, 2% nuclear, and 1% renewable energy (solar, wind, bio-fuels, waste, etc.). There is a need

TABLE

India's GHG emissions *vis-à-vis* other countries

Country	per capita carbon-dioxide emissions (metric tons)
US	20.01
EU	8.40
Japan	9.87
China	3.69
Russia	11.71
India	1.02
World average	**4.25**

Source: TERI, based in New Delhi, India

for more investment, particularly from the private sector, in generation transmission, and distribution. The most serious issue that India must address is the wide and growing gap between energy demand and energy supply. Two reasons are demographics and economics: not only is India's economy growing, thereby demanding more energy and electricity, but the population is growing as well. There is a massive urbanization, which is putting more pressure on energy and the environment.

Throughout India there is an urgent need for new and better infrastructure – roads and ports, power plants and telecommunications. To achieve this aim, India's 2012-13 budget contains a pledge to spend 50 trillion rupees (US$1 trillion) on infrastructure development during its 12th Five-Year Plan (2012-17), with nearly half of this investment expected to come from the private sector.

India launched in 2008 its National Action Plan on Climate Change (NAPCC) in order to promote the country's development objectives while also yielding benefits for addressing climate change effectively. The greatest gains would come from the implementation of the NAPCC, which include the development and expansion of solar energy and other renewable and non-fossil options in the total energy mix; clean coal and clean carbon initiatives; enhanced energy efficiency; sustainable habitat; water use efficiency; urban waste management; sustaining Himalayan ecosystems; expanding forest coverage, and sustainable agriculture.

But perhaps what is missing at the moment is integration of policies and actions involving ministries and departments that handle various elements of energy policy. There are far too many state and federal institutions involved in energy decision-making. Moreover, such integration should go beyond merely the supply sector but should include ministries dealing with transport (including railways), buildings, urban development, industry, and agriculture. India's power sector is also plagued by the dual responsibility of the states and the federal government. Power produced and sold in the same state is subject to oversight by the State Electricity Board and the State Electricity Regulatory Commission, whereas power sold between states is subject to federal oversight and regulation. As a

PHOTO

Lighting a Billion Lives (LaBL)

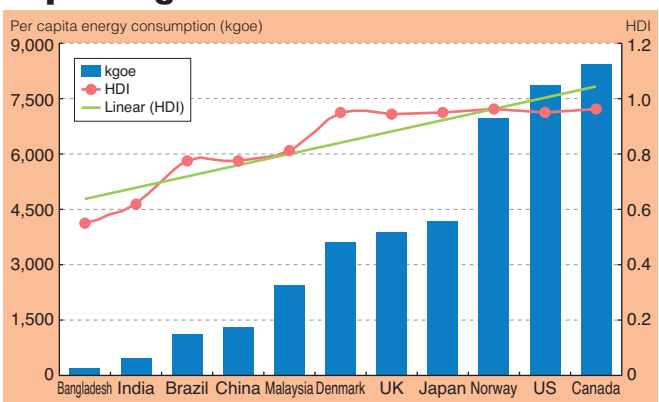
TERI's LaBL focuses on rural communities to replace kerosene lanterns with solar lighting

Program already in operation in around 300 villages in India

Source: TERI, based in New Delhi, India

CHART

Energy is critical for development & improving HDI



Source: TERI, based in New Delhi, India

first step towards the development of an integrated energy security strategy, TERI has proposed that the prime minister consider setting up a "Council on Energy Security" to work in tandem with the premier's Council on Climate Change.

In summary, in order to attain a higher energy security India will have to take a number of measures, including the stepping up of the exploration and production of energy resources at home, intensifying energy diplomacy, reducing the use of hydrocarbons in the transportation sector through the massive development of public transportation, and an ambitious program of expansion of supply from renewable energy sources. In addition, while there are geopolitical and policy issues involved, there are also great opportunities for India to promote energy collaboration with its neighbors, such as Nepal, Bangladesh, Myanmar, Pakistan and others.

Global Issues Call for Global Solutions

Energy security has risen to the top of policy agendas around the world. The president of the UN General Assembly has underlined the urgent need to provide sufficient and low-cost energy to people across the world, stressing that making energy readily available can boost efforts to eradicate extreme poverty. It is widely acknowledged that the more energy is available to communities, the greater the impact on food security, health, education, transport, communications and water and sanitation. Today, more than at any time in the past, it is crucial to ensure the sustainable use of energy and to address the challenge of energy poverty. Energy has become an important and essential component for achieving the Millennium Development Goals (MDGs).

It has been unfortunate that over the past decade the international community has not been able to agree on meaningful action to tackle the challenge of climate change, including energy poverty. There is an urgent need for international collaboration and cooperation between governments, academia, private sector and civil society to work together to develop new ways to shape the future of renewable energy sources while focusing on sustainability. The UN Conference on Sustainable Development (Rio+20), which was held in June this year in Rio de Janeiro, dwelt on some complex and extremely contentious issues such as green economy and sustainable development goals – areas where there is a sharp divide between the developed countries on one side and the emerging and poor countries on the other. The Rio+20 summit approved a strategy to haul more than a billion people out of poverty and cure the sickness of the planet, but the overall results have been described as rather modest. Unfortunately, no action was taken on proposals such as providing universal energy access and doubling renewable energy resources by 2030.

There is now a widespread recognition that a sustainable and secure global energy policy is the key to international security, economic development and environmental sustainability of modern civilization. Yet this importance is not reflected in the world's institutional infrastructure, and the existing mechanisms for global energy governance are inadequate to provide energy security, address energy-related environmental issues and ensure that energy services are sufficiently available to meet the MDGs and other development goals. Currently, these issues are addressed, in an uncoordinated fashion, by the International Energy Agency (IEA), Energy Charter Treaty (ECT), International Energy Forum (IEF), UN Environment Program (UNEP), International Atomic Energy Agency (IAEA) and certain other agencies and networks, business organizations, and research institutions. The international community needs to consider putting in place a more effective global organizational structure, preferably with teeth, that can ensure the provision of appropriate, reliable and affordable energy services on a sustainable basis for all countries on this planet. JS

Rabinder Malik has had a long career with the United Nations, including 20 years with the UN University in Tokyo, and with WHO and UNDP in India and Indonesia. He is a visiting lecturer at Keio University, representative of TERI in Japan, and member/adviser of several social, cultural and education organizations in Japan.