

Asian Council on Water, Energy and Environment



Confederation of Asia-Pacific Chambers of Commerce and Industry

Message from the Chairman

This is our fifth edition of the Asia Council on Water, Energy and Environment (ACWEE) newsletter.

In recent years, the notion of the Water, Energy, Food and Climate nexus has gained immense traction in the domain of natural resource governance. Understanding the interlinkages, critical thinking on the new security convergence in this nexus is a must. There is also a need to understand the implications of the nexus for policy making and natural resources management and address the challenges therein.

With the growing desire to diversify energy production to renewable realm, Asia Pacific countries show great promise. China has an impressive five-year outlook for additional wind and solar installation, and is expected to raise its 2020 solar target to 150GW (from 100GW) and wind target to between 250GW and 280GW (from 200GW) to fill the supply gap forecast by expectations that it will miss its nuclear and hydro targets. Renewable sources accounted for 16.4% of Chinese power in 2014, are expected to reach 22% in 2020.

Solar will continue its growth across South East Asia provided PV prices continue to stay competitive. Given their proximity to the equator, wind will not be a significant contributor to countries in South East Asia but will continue to play an important role in North Asia. Large dam hydro power plants provide a large capacity of hydro electricity in the region. Hydro will continue to drive the installed capacity of renewable energy particularly in Laos, Myanmar and China,

Energy demand is projected to almost double in the Asia and Pacific region by 2030. There is an urgent need for innovative ways to generate power in a socially, economically, and environmentally sustainable manner. As energy demand increases year after year, there is a need to promote scaling up of investments in renewable energy in the Asia Pacific region. There is also a need to raise awareness and develop a better understanding of how water is linked to economic growth across a nexus of issues and to make clear the water security challenge we face if a business as usual approach to water management is maintained.

This issue presents before you a rich assortment of articles. We believe that you would find them useful and informative. You are invited to contribute articles for the future editions. Please email the CACCI Secretariat at cacci@cacci.biz for more information.

Mr. Gyanendra Lal Pradhan

Executive Chairman, Hydro Solutions
Chairman, SAARC CCI Council on Climate Change, Energy and Water Resources
Chairman, Energy Committee, Federation of Nepalese Chambers of Commerce and Industry

INSIDE

Climate change, environmental-sustainability key topics at the ACWEE breakout session in Hong Kong

36 countries launch world alliance for geothermal energy

Food chain collapse predicted in world's oceans

Pacific nations plead for help for islanders when 'calamity' of climate change hits

Solar power capacity in India to reach 75GW by 2022, report says

Indian airport becomes world's first to run entirely on solar energy

Taiwan industry executives optimistic about solar energy market

To build greener economy, Bhutan wants to go organic by 2020

Global warming: What exactly is it?

Japan pushes clean-coal technology; hurdles abound

Nepal needs Bangladesh fuel link

Climate change, environmental sustainability- key topics at the ACWEE breakout session in HK



(Top-left) ACWEE Chairman Mr. Gyanendra Pradhan sits down with invited speakers during the open forum. (Top-right) Participants join the speakers for a souvenir photo after the ACWEE Breakout Session in Hong Kong on October 30, 2015.

(Bottom left to right) ACWEE Chairman Mr. Pradhan, Rotary Water Project head Mr. Albert Poon, and Nestle Philippines Assistant Vice President Mr. Jesus G. Reyes make their presentations on water, energy and environment.

Climate change and environmental sustainability are among the key topics discussed at the Asian Council on Water, Energy and Environment (ACWEE) breakout session in Hong Kong on October 30, 2015.

Mr. Gyanendra Lal Pradhan, Chairman of the ACWEE from Nepal, who chaired and moderated the session, reported that the session kicked off with his opening remarks and brief acknowledgment of the participants. This was followed by theme paper presentation by Mr. Pradhan.

Mr. Pradhan in his theme paper presentation provided a snapshot of the energy scenario in the Asia Pacific countries. Appraising Asia Pacific as a rich region in natural resources, he pointed out the region's vulnerability to the negative effects of climate change and environmental calamities.

He emphasized the need to recognize the fact that most of the environmental issues of the Asia

Pacific region are inextricably linked, and working to ameliorate one will often have added benefits for the others. He advocated for collaborative approaches to effective resource allocation and management in order to minimize environmental costs and reiterated the need to provide incentives to businesses and local communities to achieve sustainable use of resources.

Mr. Pradhan's presentation was followed by presentations on topics covering environmental sustainability in the region by selected key speakers from CACCI member countries.

The key speakers included **Mr. Albert Poon**, Rotary Water Project from Hong Kong and **Mr. Jesus G. Reyes**, Assistant Vice President, Nestle Philippines Inc. and Co-Chair, PCCI Environment Committee.

Mr. Poon shared his experiences on a number of water service projects in China and presented on how techniques such as rain water harvesting can help

provide an independent water supply to supplement the main supply during water restrictions or in areas of water deficiencies. He emphasized on the application of rainwater harvesting in urban water system to provide a substantial benefit for both water supply and waste water subsystems by reducing the need for clean water in water distribution system. He emphasized on the need to explore water resources for communities citing examples of rotary projects that have provided clean drinking water to schools.

Mr. Reyes presented the issues of environmental sustainability drawing experiences of Philippine businesses. He also presented his views on the experience and policies of the Philippines with respect to climate change and mitigating its impacts on the environment and on business.

The next meeting of the ACWEE will be held on the sidelines of the 30th CACCI Conference on November 2016 in Taipei, Taiwan. ■

36 countries launch world alliance for geothermal energy

Thirty-six countries on December 7 gave the official start to an initiative to promote geothermal energy in developing economies as a cleaner alternative to oil, gas and coal.

The Global Geothermal Alliance, launched on the sidelines of the UN climate talks in Le Bourget, aims at a sixfold increase in geothermal electricity production and a tripling of geothermal-derived heating by 2030.

At present, geothermal is growing modestly, at three to four percent per year, providing 12 gigawatts of electricity annually.

But this is just a fraction of its overall potential of 100 gigawatts, according to the industry. Only 24 out of 90 countries with geothermal potential actually use the resource.

The alliance said its members will seek to overcome “political uncertainty” about geothermal and strengthen the industry’s skills base.

The Global Geothermal Alliance initiative was sketched out in September 2014 at a summit organized by UN Secretary General Ban Ki-moon.

Members include countries on thermal “hotspots” in Africa, Southeast Asia and Latin America, ranging from Kenya and Tanzania to Malaysia, the Philippines and Guatemala.

Geothermal energy entails drilling into hot rock and using the heated water to generate electricity or provide heating for communities.

It is considered exceptionally clean, as the heat extraction process requires far lower emissions of carbon

dioxide (CO₂) compared with fossil fuels.

It is also deemed sustainable, given the almost limitless source of the energy, although individual wells can cool down or run out of water.

Obstacles to geothermal are the high cost of drilling and risks entailed in the exploration phase.

“Geothermal energy development particularly in developing countries faces important challenges,” the alliance said.

“Due to risks related to geological drilling during the exploration phase, along with the associated costs, financing the early stage of the process is limited to investors that understand and accept the possible associated risks.”

Agence France Presse ■

Food chain collapse predicted in world’s oceans

The world’s oceans are teeming with life, but rising carbon dioxide emissions could cause a collapse in the marine food chain from the top down, researchers in Australia said on October 12, 2015.

The first-of-its-kind global analysis of marine responses to climate change forecasts a grim future for fish.

Marine ecologists from the University of Adelaide reviewed more than 600 published studies on coral reefs, kelp forests, open oceans, and tropical and arctic waters.

Their meta-analysis, published in the Oct. 12 edition of the journal *Proceedings of the National Academy of Sciences*, showed that ocean acidification and warming will cut down on the diversity and numbers of various key species.

“This ‘simplification’ of our oceans will have profound consequences for our current way of life, particularly for coastal populations and those that rely on oceans for food and trade,” said associate professor and co-author Ivan Nagelkerken.



Very few organisms are expected to be able to adjust to warmer waters and acidification, with the exception of microorganisms, which are expected to increase in number and diversity.

But the increase in the smallest plankton is not expected to translate into more zooplankton and small fish, meaning bigger fish will struggle to find enough food to eat.

“With higher metabolic rates in the warmer water, and therefore

a greater demand for food, there is a mismatch with less food available for carnivores — the bigger fish that fisheries industries are based around,” said Nagelkerken.

“There will be a species collapse from the top of the food chain down.”

Oysters, mussels and corals are also expected to take a hit from global warming, which will further harm the environment for reef fish.

Agence France Presse ■



Pacific nations plead for help for islanders when ‘calamity’ of climate change hits

Pacific island nations have pleaded with wealthy countries to help their people migrate and find work if they are forced to flee their homelands because of the consequences of climate change. A coalition of low-lying island nations said moving people because of rising sea levels, storms and ruined agriculture was a last resort, but the “calamity” of climate change required industrialised countries to devise a plan.

In a joint statement after a summit in Kiribati the Pacific nations – Fiji, Kiribati, Tuvalu and Tokelau – said they were “gravely concerned over the lack of effective international response to climate change” that posed “major existential challenges” to their populations and cultures.

They repeated calls for an international body to be set up to coordinate population movement caused by climate change. The creation of such a body was included in an early draft of a UN agreement to be negotiated at climate talks in Paris in December but the idea was dropped last week. Australia opposed it, although countries including Britain, the US and France were open to the concept.

The countries called for funding for health and education programs, and aid to raise buildings above predicted sea level increases and safeguard water supplies from saltwater intrusion.

Wealthy nations should “prepare our people for ‘migration with dignity’, capable of contributing to other nations’ economies and development processes as skilled migrant workers”, the Pacific leaders said.

Developing nations have access to the UN-administered green climate fund to help adapt to or mitigate climate change. In 2009 nations agreed at Copenhagen to provide \$100bn in “climate finance” although this target has not been met and will be debated again at the Paris talks.

There is no body that oversees the orderly movement of people because of climate change impacts. The UN refugee convention applies only to those fleeing persecution, with little appetite among the richest nations to expand its definition to include “climate refugees” – amid predictions that up to 250 million people may be displaced worldwide by 2050.

People living on coral atolls in the Pacific are considered particularly vulnerable to a sea level that is rising by 1.2cm a year, four times faster than the global average. Coastal erosion, tainted water supplies and failing crops have prompted communities to move inland or to other islands.

Pacific leaders have taken an increasingly strident tone in calling for action, with Anote Tong, the president of Kiribati, recently calling Australia “very selfish” for its continued

commitment to coalmining.

Peter Christian, the president of Micronesia, told a UN gathering in New York earlier this month: “I speak as an islander who has walked the shores of many atoll islands, where there was once sandy beaches and coconut trees.

“Now there are none. I am told this will continue. We must become more cohesive in our actions to bring a useful conclusion to help mitigate the threat of sinking islands and prevent the potential genocide of Oceanic peoples and cultures.”

The chief executive of Greenpeace Australia, David Ritter, said Australia should do more given its clout in the region.

“Australia is the richest, largest country in the region, so to sit back and say we are doing enough is pathetic really,” said Ritter, who attended the Kiribati summit.

“People in the Pacific are very polite but privately the view of Australia is very clear: this is a country not doing enough. There’s a view that Australia is putting coal ahead of people.

“At the moment, if you are forced out of your home due to inundation you simply become stateless. There’s no mechanism to ensure that these people won’t fall through the cracks. When you go to Kiribati and see people trying to repair sandbagged seawalls, you can see why this is a live issue for them.” *The Guardian* ■

Solar power capacity in India to reach 75GW by 2022, report says

Solar will account for more than a fifth of India's increase in electricity demand by 2022 as installed capacity reaches 75 gigawatts, according to a research report.

Helped by a \$50 billion grid upgrade and new installations, India's solar capacity will be capable of delivering 110 terawatt-hours, or 22%, of required power increase within seven years, according to a report from the Institute for Energy Economics and Financial Analysis (IEEFA), a Cleveland-based researcher.

Net electricity demand in India, powered by an economic growth rate of 7%, is likely to increase by 500 terawatt-hours by fiscal 2022—60% of estimated requirements last year, IEEFA estimates.

A China-like expansion in solar installations is feasible for India in a period of several years, the report said. China's solar capacity surged from less than 1 gigawatt in 2010 to almost 33 gigawatts at the end of last year, according to



data from Bloomberg new energy finance.

"India is replicating Germany's and China's systematic electricity sector transformation, with the added advantage that the cost effectiveness of this is accentuated by the fact that the price of solar electricity has dropped by 80% in

five years," Tim Buckley, director of energy finance studies at IEEFA, said in a press release.

India has about 37 gigawatts of green-energy capacity. The country aims for an almost fivefold expansion to 175 gigawatts by 2022 at an estimated investment of \$200 billion. **Bloomberg** ■

Indian airport becomes world's first to run entirely on solar energy

An Indian airport has become the world's first to run entirely on solar energy. Cochin International Airport, in the south of India, inaugurated a massive 45-acre solar plant on October 6, 2015.

The plant, made up of 46,000 panels, will provide between 50,000 to 60,000 units of electricity every day (totaling 12 megawatts of power alongside pre-existing solar panels), according to a



release from airport authorities.

It has been a long-running **by Rose Troup Buchanan, Independent UK**

project: the airport first installed panels on the roof of its terminal in 2013 and has gradually expanded the initiative.

Authorities hope the initiative will reduce carbon emissions by 300,000 tonnes over the next 25 years.

It follows the Indian government's announcement that it intends to produce as much as 100GW of solar power by 2022, up from the 4GW (gigawatts) it currently produces. It is hoped that the innovation will not only contribute to India's spiralling need for power, but also fuel new investments. ■

Taiwan industry executives optimistic about solar energy market

The presidents of major corporations in the solar power industry in Taiwan expressed optimism for future growth, pointing to signs of recovery since the United States imposed anti-dumping duties on Chinese mainland and Taiwan.

Company executives gathered to share their perspectives about industry trends ahead of the 2015 International Photovoltaic Exhibition-- jointly organised by the Taiwan External Trade Development Council (TAITRA), the Taiwan Photovoltaic Industry Association (TPVIA) and Semiconductor Equipment and Materials International (SEMI) -- at Taipei Nangang Exhibition Hall 1 on October 14-16, 2015.

President and CEO of Motech Industries Co., Chang Peng-heng, said the solar energy industry "is still at a stage of infancy, but we have been seeing consistent growth." Chang pointed to an increasing demand in China and emphasized the country's current status as the world's largest market for solar energy.

"The 21st century is the century of solar power," said Chang.

Chang stated that Taiwan is a global leader in the production of solar batteries. While supply and demand levels have been stable, solar power costs continue to decline.

According to industry executives, the photovoltaics industry is still heavily-subsidised -- indicating a vulnerability to changes



Solar industry CEOs pose for group photo after a panel discussion about current energy trends.

in energy policies and governmental plans to slash subsidies. "It is also an important national security industry, so there is a high degree of governmental intervention," said Chang, referring to industry challenges at the present.

In its ninth year, the exhibition will showcase industry forecasts and the latest advances in technology. Visitors can expect to see more than 126 participating companies -- including Neo Solar Power, Giga Solar Materials, Win Win Precision, TSEC, AUO, Gintung Energy, Inventec, CSI Technology - demonstrating their products and services at 365 booths, according to exhibition coordinators.

Exhibition staff said a highlight of the event include panel discussions by 55 industry-leading

speakers, in forums that cover a range of topics, including sustainable architecture, low-carbon smart grids, innovative technology, measurement and reliability.

Also, to facilitate meaningful networking among visitors and help them grasp the latest information about industry trends, the exhibition features five themed pavilions: "Photovoltaics Systems," "Equipment and Materials," "Tests and Certifications," "High Concentration Photovoltaics (HCPV)", "Innovative Technology and Products."

Recent surveys conducted by the International Energy Agency (IEA) indicated that the Asia-Pacific region has been the largest contributor to global solar photovoltaic installed capacity for two consecutive years.

The China Post

To build a greener economy, Bhutan wants to go organic by 2020

Farmer Phub Zam, 55, is in a hurry. Monsoon rains have hit her farm in Bhutan's Paro valley and Zam is rushing to harvest her broccoli before crop is damaged.

"Of all my vegetables, broccoli is the most sought after," she said. "Each kilogram sells for 90 rupees (\$1.40)."

That's 15 to 30 cents more than broccoli imported from neighboring India. Zam gets the higher price because her produce is grown without the use of chemicals, making it healthier, more flavorful and more in demand.

"I apply organic manure that I compost right at home," she said. "The imported vegetables do not taste so good."

After decades of subsistence farming, Zam went organic four years ago. Now she grows 21 crops on her 1.3-acre farm — including grains, fruits and vegetables — and sells them, as well as homemade compost, to hotels, local vendors and nursery owners.

She earns 40,000 rupees (\$600) per month, three times more than she made before, she said.

Zam's success is part of Bhutan's plan to support sustainable farming as one key to build a thriving "green" economy.

In 2011, the government launched the National Organic Program, which aims to make the country's agriculture 100 percent organic by 2020.

By teaching farmers good organic farming practices and how to earn more money by growing organic produce, and by providing financial support, Bhutan hopes to reduce waste, decrease the country's dependence on imported food, and ensure it remains climate-neutral, producing no more climate-changing emissions each year than its forests absorb.

Already praised by environmentalists for its low carbon emissions and heavy use of hydropower,

Bhutan hopes to become even greener by showing that environmentally friendly farming can also make money.

Cash from trash

Zam's switchover came when a team of officials from the agriculture ministry told her they were offering women farmers in her village free training in organic farming, including composting and selling the compost for a profit.

After attending a three-day training course, Zam started her home compost heap. Today, she sells about 60 kilograms of compost — made of grass, leaves, cow dung and sawdust — every two months to tourist resorts and other buyers.

Zam also uses the compost at her farm, including in the two greenhouses she bought and installed with an 80 percent subsidy from the government.

Before learning how to compost, she would end every harvest season with two or three truckloads of dead leaves and other organic waste that she would either burn or pay someone to dispose of.

"Now, from leaves to cow dung to chicken poop, everything is used," she said. "I have no trash, only compost." Nedup Tsering, executive director of the government-funded Clean Bhutan project, which aims to make Bhutan a zero-waste country by 2030, notes that the country generates over 100 tons of garbage daily but has no centralized waste management program.

"We want citizens to practice the 5 Rs: Rethink, reduce, recycle, reuse and re-create," Tsering said.

The hurdles

According to Kesang Tshomo, coordinator of the National Organic Program, Bhutan faces some hurdles on its path toward fully organic farming, however.

"We have to be practical and consider the realities facing our farmers," she said.

One is that the country produces relatively little of its food. According to a 2014 study on food security by the Royal Bhutan College of Thimphu, less than 4 percent of Bhutan's total land is under food cultivation, which is why almost 50 percent of the country's rice is imported from India and Thailand.

To persuade Bhutan's farmers to use organic methods, showing that the switch can lead to higher production is key, Tshomo said.

In June, officials announced that the government had so far provided 176 greenhouses to farmers and planned to install 650 more. It said its combined policies of pursuing organic farming and modernization — such as building greenhouses and fencing — had helped increase agricultural production 3 percent since the start of the organic push.

The government is banking on the Clean Bhutan Project to also help Bhutan keep its pledge to remain carbon neutral. Currently, the country's carbon emissions rate is a negligible 0.8 metric tons per capita, according to the World Bank.

Promoting organic farming practices like composting is a "logical step towards the goal of remaining carbon neutral," said Peldon Tshering, chief strategist of Bhutan's environmental commission.

Zam, the Paro valley farmer, supports the government's plan to convert its farmers to organic agriculture. But for the project to succeed, she said, the government needs to help widen the market for organic produce.

Most of the hotels near her farm still mainly buy imported vegetables from India because they are cheaper, she said.

"If the government could convince people to buy from local farmers, it would help us a lot," Zam said. "I could sell all my produce within hours, without spending extra on driving a wagon from one market to another."

By Stella Paul, Reuters ■

Global warming: What exactly is it?



The world gathered in Paris on December 2015 to forge a global pact to reduce greenhouse gas emissions blamed for dangerous levels of global warming.

Here is why the Earth is getting hotter:

Greenhouse effect

The greenhouse effect is a natural phenomenon that has made Earth warm enough for humans to survive on it comfortably. An invisible blanket of nitrogen, oxygen and small amounts of carbon dioxide (CO₂) and other gases envelops our planet, allowing it to retain the sun's heat.

However, human activities such as burning coal and oil inject additional carbon dioxide into the atmosphere, which acts as an extra blanket to trap more — in fact too much — infrared radiation that would otherwise carry its energy into space.

If humans could see infrared light, we would be able to see directly how the color of the sky has changed.

Pollution sources

Humanity's annual output of greenhouse gases is higher than ever,

totalling the equivalent of just under 53 billion tons of carbon dioxide in 2014, according to the U.N.

And the rate of increase is accelerating. It jumped 2.2 percent per year during the 2000s, compared to 1.3 percent per year from 1970 to 2000.

Energy production is the single biggest source of greenhouse gases at 35 percent of the total. Agriculture and deforestation come in second at 24 percent.

Heavy industry is next at 21 percent, followed by transportation with 14 percent. Buildings contribute 6 percent of total emissions.

Already in the air

The average concentration of greenhouse gases in the atmosphere was 430 particles per million (ppm) of carbon dioxide equivalent (CO₂e) in 2011 — a level not seen on Earth for more than 800,000 years.

To stand a 2-in-3 chance at limiting global warming to two degrees Celsius (3.6 degrees Fahrenheit) over pre-Industrial Revolution levels — the United Nations target — the level must not exceed 450 ppm of CO₂e by century's end.

Warmer planet

Earth's average temperature has already climbed about 1.0 C from 1880 to 2015 — halfway to the 2 C target. But the increase has not been evenly distributed, with higher temperatures detected over land than the ocean, and increases have been particularly intense at the north and south poles.

The last three decades have been the hottest recorded on the planet since 1850. The surface temperature of oceans climbed 0.11 C per decade between 1971 and 2010.

Highest emissions

The U.N.'s climate science body has predicted that without reducing emissions, global temperatures would likely rise by 3.7 to 4.8 C by 2100. Humanity can emit no more than 1 trillion tons of carbon dioxide in total, on top of the 1.9 trillion tons already emitted.

To stay under the 2 C ceiling, greenhouse gas emissions must be cut by 40 to 70 percent over 2010 levels by 2050, and eliminated entirely by century's end.

Cutting emissions requires investments of hundreds of billions of dollars per year between now and 2030.

Agence France Presse ■

Japan pushes clean-coal technology; hurdles abound

For all the talk of a solar boom in Japan, coal still has a future, and potentially a big one at that. Japan's government and industry are backing emerging coal technologies they say are less damaging to the environment. While they are pushing the most polluting fossil fuel at home and abroad, the government will be trying to burnish its environmental credentials at climate talks that begin at the end of the month in Paris.

Japan is the biggest backer of public coal financing globally, according to a June report coauthored by the Natural Resources Defense Council, a U.S. environmental group, and partners. The country also ranks last among the Group of Seven nations in efforts to move away from coal, according to E3G, a nonprofit group promoting a low-carbon economy, in a statement last month.

By promoting new and advanced coal technologies as cleaner and more efficient, Japan is contradicting environmentalists such as NRDC and WWF, which are seeking to discourage investors from backing fossil fuel. For major Japanese suppliers of power generation systems such as Mitsubishi Hitachi Power Systems Ltd., the national push also offers the opportunity to market their products in countries where coal is still widely used.

"Support from developed countries for high-efficiency coal-fired generation is needed" to keep plants with low efficiency from expanding in countries where the fuel is readily available, said Nobuyuki Zaima, a project manager in charge of clean coal at the trade ministry-affiliated New Energy and Industrial Technology Development Organization.

"We can certainly contribute to the reduction of CO2 through applying Japan's superior coal technology," he said.

Japan has about 23 gigawatts of coal capacity in various stages of planning or development at home, according to Kiko Network, a Kyoto-based environmental group. That compares with Japan's coal capacity of 41 gigawatts in 2014, according to



Workers repair a coal loading facility at Onahama port in Iwaki, Fukushima Prefecture. Japan's government and industry are backing emerging coal technologies that they say are less damaging to the environment. Bloomberg

Bloomberg New Energy Finance.

"Consumption in the OECD, where coal use faces strong policy headwinds, is projected to drop by 40 percent" through 2040, according to the International Energy Agency's World Energy Outlook. "By 2040, Asia is projected to account for four out of every five tons of coal consumed globally, and coal remains the backbone of the power system in many countries in our central scenario," according to the outlook.

At the forefront of Japan's push to show that coal can be burned more efficiently and with less pollution is the Osaki CoolGen project in Hiroshima by a venture between Chugoku Electric Power Co. and Electric Power Development Co. Osaki is a government-backed demonstration project that will use a technology called integrated gasification fuel cell combined cycle, or IGFC. That means it will use some of the captured emissions to power a fuel cell, generating additional electricity.

The approach builds on another advanced technique known as IGCC, which heats or cooks coal to produce a gas that is burned in a turbine. Waste heat is used to drive a steam turbine to produce more electricity.

Compared with the most

widely used coal plants in Japan, IGFC is expected to increase efficiency by 15 percentage points and cut carbon dioxide emissions by 30 percent, according to government estimates.

The advanced coal technology has drawbacks that go beyond emissions, notably price. The cost for the first stage of the Hiroshima project is estimated at ¥89.5 billion, with the government paying one-third, according to a trade ministry document. The project's full cost has yet to be made public, according to Electric Power Development, known as J-Power.

"IGCC and IGFC don't change the picture," said Sebastien Godinot, an economist for the WWF's European policy office. "They are not ready commercially. It is now that an urgent shift to low-carbon power is required."

In July, Japan's trade and industry ministry released a road map outlining the next-generation thermal power technologies that nation expects to adopt. The plan projects that IGFC technology could be ready for broad use around 2025 — making the nation one of the biggest backers of the technology. "This is a colossal program to make IGFC possible," said Hiroshi Sasatsu,

Continued on next page

Nepal needs Bangladesh fuel link

Nepal's ongoing crisis of petroleum oil and cooking gas started when our sole supplier, Indian Oil Corporation, refused to fill our oil tankers and gas bullets, and the Indian border security forces and customs officials blocked oil shipments at the border. The southern neighbor has thereby reneged on its oil trade commitments to pressure Nepal into amending its newly promulgated constitution.

Out of desperation, Nepal has started cutting trees and selling fuel-wood to urban residents for cooking. But this is a destructive and short-term solution to the problem.

Hence, Nepal signed a Memorandum of Understanding with China on Oct. 29 for oil trade, and a Nepal-China commercial treaty is due to be signed this week for import of one-third of Nepal's petroleum needs.

This article proposes that Nepal should sign a similar agreement with Bangladesh to fulfill the other one-third of its petroleum needs. India could supply the remaining one-third of Nepal's oil and gas needs.

Bangladesh has been observing Energy Security Day on Aug. 9 annually to draw inspiration from its assassinated first president, Bangabandhu Sheikh Mujibur Rahman, who had aspired to develop gas fields and strengthen its energy sector.

Thus, Bangladesh is in a position to

meet Nepal's energy needs provided that we workout certain arrangements. That is why a high level Nepal Oil Corporation (NOC) delegation is in Bangladesh since Nov. 14 to assess all the possible options for importing cooking gas, gasoline, diesel, kerosene and air turbine fuel.

Import Demand

Bangladesh has created a balanced mixed energy system by developing its natural gas, coal and petroleum resources, diversifying crude oil imports, expanding refineries, and importing electricity from India.

Even though the country is self-sufficient in natural gas, it has lodged a strategic claim with the Asian Development Bank to be an investor in the TAPI (Turkmenistan, Afghanistan, Pakistan and India) pipeline project to transport natural gas from Central Asia to South Asia. Hopefully, Nepal will demand her share in the TAPI scheme as the proposed pipeline would be close to its border.

We need petroleum to keep the factory wheels turning, motor vehicles running, airplanes flying and hospitals running. Nepal imported about 1.63 million tonnes of oil and gas in 2014-15.

Imports have been swelling at the rate of 0.2 million tonnes annually for the past three years. Bangladesh imports four times more oil than Nepal,

and to accommodate Nepal's one-third of petroleum demand, it will have to boost the capacity of its refineries by about 0.5 million tonnes initially.

Thus, the NOC delegation needs to assure Bangladesh about Nepal's schedule for gas and oil imports for a durable solution in terms of quantity, time, prices, cost, and recovery rates.

Enabling Support

The transportation of an agreed quantity of imports between Bangladesh and Nepal has to pass through a corridor that is simple in geography but complicated in institutional functions. There is the Kakadvitta-Siliguri-Phulbari transit and transport corridor in place and it could be enriched by adding natural gas and oil in its basket of merchandise.

That said, an obstacle remains because there is no tripartite motor vehicle agreement (MVA) in place to enable the carriage of goods by trucks, oil tankers and gas bullets between Nepal and Bangladesh through India.

The 19th South Asian Association for Regional Cooperation Summit declaration recently initiated an MVA among the member states. Pending the signing of an MVA, India allows back-to-back cargo movement at the Phulbari border customs.

*By Y. B. Thapa, The Kathmandu Post/
Asia News Network* ■

Continued from page 9

director of J-Power's research and development department.

Not everyone supports the idea of promoting more efficient coal power. "Even though the efficiency of coal-power generation is improved, coal plants emit about twice as much carbon dioxide as plants powered by natural gas," said Yuki Tanabe, a program coordinator at the Japan Center for a Sustainable Environment and Society.

Proponents must convince investors and environmentalists that the technologies make sense at a time when pressure is mounting on lenders to shy away from fossil fuels. Citigroup Inc., the third-biggest U.S. bank, said in October it

will cut back on financing for coal-mining projects. In September, Norway's \$830 billion wealth fund estimated a proposed ban on coal investments would prompt it to sell holdings in 120 companies valued at about 55 billion kroner (\$6.4 billion).

Nonetheless, coal is cheap and attractive to some developing countries with ample reserves, said Toshi Arimura, professor of environmental economics at Waseda University in Tokyo. That makes clean coal technology the second-best choice, he said.

"It will be great if wind and solar power can work as substitutes, but they can't immediately serve as baseload power sources like coal does," he said.

by Chisaki Watanabe, Bloomberg ■

