

Asian Council on Water, Energy and Environment



Confederation of Asia-Pacific Chambers of Commerce and Industry

Message from the Chairman

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

The water, energy and food security nexus are inextricably linked meaning actions in one area more often than not have impacts in one or both of the others. The interdependencies across the water, energy and food sectors, in turn influence policies in other areas of concern such as climate and biodiversity. These linkages have always been present, but as the population in the Asia Pacific region is rising fast with increasing demands for basic services and growing desires for higher living standards, the need for more conscious stewardship of the vital resources required to achieve those services and desires has become both more obvious and urgent especially from a regional perspective.

Understanding the nexus perspective increases opportunities for mutually beneficial responses and enhances the potential for cooperation between and among all sectors. A true nexus approach can only be achieved through close collaboration of all actors from all sectors in the region.

Parallel to these, concerns have begun to focus on environmental issues including nature's challenges, particularly disaster induced insecurities on the nexus components. For example, in the recent seismic episode of the devastating earthquake in Nepal on April 25, 2015, the catastrophe has changed our notions of how we should think about water, energy and food security. UN-Water [the confederation of the water divisions of 31 UN agencies] defines water security as safeguarding quality and quantity of water for various human and environmental needs and ensuring protection from pollution and natural disasters. While much of the discussion on water security to date has focused on water quality and quantity, as this earthquake has clearly demonstrated, the water insecurity resulting from natural disasters can be very substantial and of long duration. With climatic change and variability, we are likely to see more natural disasters and hence more disaster-induced water insecurity. Are we prepared? There is a need for research and concerted discussion on this.

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



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ACWEE to convene at the 29th CACCI Conference in Hong Kong



(Left) The 29th CACCI Conference will be held in Hong Kong on October 29-30, 2015. (Right) The cover of the CACCI Conference brochure features the famous Hong Kong harbor view with an iconic Chinese junk ship.

The Asian Council on Water, Energy and Environment (ACWEE) is set to convene at the 29th Annual CACCI Conference to be held in Hong Kong on October 29-30, 2015.

ACWEE Chairman Mr. Gyanendra Lal Pradhan will chair the council's breakout session.

A set of speakers will be invited to talk about different issues involving water, energy, environment and climate change. The council will also discuss proposed projects and activities for membership expansion and networking, including the 1st Hydropower and Clean Energy Excellence Award.

The ACWEE wishes to make use of the CACCI Conference as a bridge that will link members and encourage each one to work together in facing various environmental issues in the Asia Pacific region.

About the 29th CACCI Conference

Hosted by the Kowloon Chamber of Commerce (KCC) the 29th CACCI Conference will take on the theme "Asia Beyond Limits."

Amidst an uneven economic

rebound in the advanced Western countries and the continuing threat of deflation their economies are facing, the Asia-Pacific countries – which account for roughly 40% of the world's population and more than 50% of global GDP - are seen to show resilience due to greater foreign investment, continuing domestic demand, and government-driven investment in infrastructure projects.

The 29th CACCI Conference aims to provide another forum for CACCI members and invited experts to examine and share their views on measures that the business sector and governments in the region can undertake to take full advantage of the current opportunities offered not just by markets in the Asia-Pacific region but by countries in other parts of the world as well, thereby enabling them to grow beyond the domestic borders and into the global market.

Online Registration

Kowloon Chamber of Commerce recently unveiled the CACCI Conference website intended for registration and easy access to



Above photo shows the screenshot of www.hkkcc.org.hk/cacci

information on the forthcoming 29th CACCI Conference in Hong Kong on October 29-30, 2015.

The website, www.hkkcc.org.hk/cacci, allows all CACCI members and guests to register and pay securely online through Paypal. Registration fee for overseas delegates is US\$300. Members and guests who register before August 1 will enjoy 10% discount off the registration fee. More information about the event schedule can be found on the website. ■

Renewables the best way to solve Asia's energy dilemma: ADB

Asia is expected to become the largest energy consuming region in the world well before 2050. At the same time, developing Asia's share of worldwide energy-related CO2 emissions has more than doubled from 17% in 1990 to 37% in 2011, and without a change in current energy use patterns, is expected to rise to 46% by 2035. The region must also deal with the vital 'unfinished business' of providing electricity to around 600 million people who still lack it.

The public and private sectors, along with donor agencies including the Asian Development Bank, are responding to these challenges in a number of ways including scaling up the use of energy from clean, renewable sources and using power more efficiently.

After a period of decline, due in part to uncertainty over incentive policies in Europe and the US and reductions in support in some countries, clean energy investments rebounded in 2014, with \$270 billion invested globally and a record 95 gigawatts of renewable energy capacity installed. The People's Republic of China (PRC) remained the top overall destination, attracting over \$83 billion in investments. In developing Asia, Indonesia attracted more than a billion dollars of investment in renewables and the renewable energy sectors of the Philippines and Myanmar saw investments in the \$500 million range.

"These investments occurred during a time of lowering oil prices, so while most countries in Asia are benefiting from the price drop they are also aware that it cannot last forever and are investing in more sustainable and clean sources of energy for the future," said Yongping Zhai, Technical Advisor (Energy) of ADB, "This process is also being driven by the steady decrease in technology costs for renewables which is particularly important for developing countries where clean energy investment was once viewed as



The People's Republic of China has some of the largest wind farms in the world. Its investments in renewable energy have grown more than eightfold since 2006.

financially unviable."

The PRC, the world's second largest economy as measured by nominal GDP, has pledged to cut its CO2 emission intensity by 40%-50% from 2005 levels by 2020, and to peak its GHG emissions around 2030. Its investments in renewable energy have grown more than eightfold from \$10 billion in 2006 to \$83 billion in 2014, and in 2012 it invested more in clean energy than the US.

In India, the seventh largest economy in the world, policymakers have been moving to tap the country's vast solar resources. In May 2015 a 100-megawatt concentrated solar plant in Rajasthan state became fully operational – the biggest of its kind in Asia. The plant is supported by ADB financing. India's solar power capacity has risen from 161 megawatts in 2010 to 3.7 gigawatts in March 2015, with its total renewable energy investments rising from 4.7 billion in 2006 to \$7.4 billion in 2014.

From 2011 to 2014 ADB's clean energy investments exceeded \$2 billion annually, reaching \$2.4 billion in 2014 —the highest level ever—with nearly a third of the amount supporting private sector projects. Approved climate financing over the same period averaged \$3 billion a year, with about 75% earmarked for climate change mitigation and 25% for adaptation measures. Support to help countries

'climate proof' or adapt to the impacts of climate change is now an integral part of ADB operations. This is as true for energy projects as others since hydropower plants, for example, need to be ready to cope with changes in water flows, pylons need to be able to withstand higher winds, and buried electrical wires to be ready to cope with floodwaters.

Energy efficiency is another crucial area in which countries can make power savings. ADB studies show that efficiency investments in the demand side equivalent to 1%-4% of energy sector spending could meet as much as 25% of the projected increase in primary energy consumption in developing Asia.

ADB's energy efficiency investments reached \$900 million alone in 2014 and between 2010 and 2013, projects supported under its Energy Efficiency Initiative have resulted in 3 gigawatt-hours equivalent in energy savings per year.

All these measures are helping economies in the region respond to the threat of climate change while ensuring they remain energy secure and on a sustainable growth path. The Paris climate change summit in December will be the global acid test for seeing how far Asia and the Pacific and the rest of the world are prepared to go to avert potential climate disaster.

Asian Development Bank

ADB, Azerbaijan sign A\$1 billion MOU to upgrade power distribution network

The Asian Development Bank (ADB) and Government of Azerbaijan have signed a Memorandum of Understanding for a \$1 billion investment program to rehabilitate and expand the country's power distribution network.

The agreement was signed on the sidelines of ADB's Annual Meeting taking place in Baku from 2-5 May. The signatories were Baba Rzayev, chairman of state-owned Azerishig Open Joint Stock Company, which will carry out the program, Finance Minister Samir Sharifov for the Government of Azerbaijan, and ADB Vice President Wencai Zhang.

"Azerbaijan's power sector plays a leading role in the country's economy and the proposed program will further improve electricity delivery to customers," said Mr. Zhang. "The program will deliver more reliable power supplies, reduced distribution losses, and higher quality customer service."

ADB is supporting the program

through a \$750 million multitranche financing facility with a \$250 million loan earmarked for the first phase. The funds will be used to upgrade and expand the power distribution lines, substations, and customer service lines, and to replace the existing electric meter devices with digital electric meters. Capacity building support will also be given to Azerishig Open Joint Stock Company to enhance its operational and financial performance.

The Government of Azerbaijan will provide counterpart funds of \$250 million.

ADB has been supporting Azerbaijan since 1999, with total approved assistance of nearly \$2.1 billion (public and private sector), much of which has been earmarked for infrastructure to help the country diversify and expand economic opportunities.

In the energy sector, cumulative approved assistance, including cofinance, equal to about 9% of ADB's total country operations. ADB's support for power improvements includes a



Baba Rzayev (right), chairman of state-owned Azerishig Open Joint Stock Company, Finance Minister Samir Sharifov for the Government of Azerbaijan (center), and ADB Vice President Wencai Zhang (left) sign an MOA for a \$1 billion investment program to rehabilitate and expand the country's power distribution network.

\$160 million loan completed in 2014 to strengthen the country's main power transmission network, a private sector energy efficiency project, and a biomass renewable energy project. Domestic electricity sales in Azerbaijan are projected to rise 3% annually between 2015 and 2020.

Asian Development Bank

E-trikes share limelight at APEC meet in Boracay

As the issue of climate change gain momentum on the world stage, zero-emission electric trikes (e-trikes) shared the limelight at this year's summit of the Asia Pacific Economic Cooperation (APEC) hosted by the Philippines.

At the Ministerial Meeting held on May 23-24 in Boracay Island, electric trikes were used to ferry ministers and delegates from the 21-economy strong APEC where climate change mitigation forms part of the growing challenge countries need to provide a solution for.

This comes amid the call of US President Obama who, according to the New York Times, is pushing for urgent action to combat climate change as a "national security imperative" and that climate change "constitutes a serious threat to global security" as it acts as "an accelerant of instability around the

world."

As a platform to showcase the country's own efforts to help mitigate the effects of climate change by lowering our carbon footprint, EMotors Inc.'s ZUM e-trikes were used to serve the transport needs of the ministers and delegates. EMotors is the appointed electric mobility partner for APEC 2015.

Guillermo Luz, co-chair of the National Competitiveness Council and private sector coordinator for the National Organizing Committee said: "The ZUM e-trikes deliver two key messages about the country—that we are concerned about the environment



and climate change and support electric vehicles and that we also support the emergence of more local manufacturing in the country."

"We are honored to be part of the solution not only to lower carbon emissions but to provide a profitable means of livelihood for many Filipino entrepreneurs," said Elizabeth H. Lee, EMotors president. *Manila Bulletin*

APEC moves to cut environmental goods tariffs as deadline looms

With time in short supply, senior trade officials from the 21 APEC member economies are ramping up efforts to meet their landmark commitment to cut tariffs on environmental goods by year's end. The implications for the future of global trade and development are substantial.

APEC members who met in Boracay in May were briefing one another on their progress in reducing tariffs on an APEC list of 54 environmental goods such as waste water purifying equipment, solar panels and wind turbines, and working out technical issues to bring levels down to five per cent or less. The region's Leaders launched the undertaking and set a three-year deadline in 2012.

In play is the first multilateral tariff-cutting arrangement in 18 years. Its completion would help to lower the cost of goods on the APEC list, improving access to them as markets grapple with the effects of development, demand for stronger environmental

protection rises and new targets in areas like carbon emissions and renewable energy are considered.

More than 70 percent of these goods produce renewable energy, are used for environmental monitoring, analysis and assessment, or strengthen air pollution controls, according to the APEC Policy Support Unit.

Bringing the initiative to a successful conclusion would boost a USD500 billion global industry and with it, jobs and economic growth in the region. Twelve of the top 30 global exporters of environmental goods are APEC members, including half of the top ten, the International Trade Center reports.

It could also facilitate tariff-lowering negotiations on environmental goods that began under the World Trade Organization last year, building on APEC's work.

"Officials are putting forward their plans for implementing tariff reductions on the APEC list of environmental goods," said John Larkin, Chair of the APEC

Committee on Trade and Investment, the coordinating body for the initiative. "Having a clear and consistent interpretation of the commitments in the APEC list and how tariff cuts will be put into effect is key to the success of the initiative."

Officials are collaborating with one another to ensure clarity among APEC members as well as their own domestic institutions and businesses on how tariff cuts will proceed—helping to facilitate buy-in. The progress of APEC members in implementing the tariff cuts were scheduled to be discussed in the May 23-24 meeting by APEC Trade Ministers.

"Transparency, open lines of communication and recognition of the potentially significant benefits of greater access to environmental goods for economies and people's lives will play an important role in implementing the APEC commitments on environmental goods," concluded Larkin.

Issued by the APEC Committee on Trade and Investment ■

American firms eyeing more investments in Asia

American companies are setting their sights across Asia on various energy investments, primarily in the areas of renewable energy, deployment of technologies on energy efficiency as well as on its export of liquefied natural gas.

In a recent briefing with global journalists here, United States Energy Secretary Ernest Moniz has noted that they have been taking inroads in major markets like China and Japan, but the inflow of capital will also cover even smaller emerging Asian markets.

Notably, the Philippines is one of the emerging markets which has been counting on the investment interest of many American firms – in fact, they have already advanced capital flows on the sphere of renewable energy and energy efficiency tech deployments.

"On the whole would be renewables and energy efficiency

technologies and also water technology which is a now a major, major climate issue," Moniz said as to the targeted investments of US companies.

He averred "more specifically in Asia, we hope to see a very, very robust energy technology markets in that they will surely provide opportunities for American companies."

With the world's biggest economy's plan of bringing in its liquefied natural gas (LNG) to Asia, the Philippines could also be part of the demand pie.

"One area in which obviously there's a lot of interest in terms of energy and trade is in natural gas and LNG exports, Moniz has noted.

He enthused that "in the longer term, there is still keen interest in the US becoming a very, very large natural gas exporter."



This undated file photo shows United States Energy Secretary Ernest Moniz.

The US energy chief stressed that "the lower oil price that we had a year ago had impacted in the sense that the LNG landing cost had gone down substantially because of its linkage to oil prices." *Manila Bulletin* ■

All streetlamps in Taiwan to use LED lighting by 2016: MOEA

Taiwan is on track to replace all existing mercury vapor street lamps with LED fixtures by the end of 2016, Vice Economics Minister Cho Shih-chao said on March 25.

The project, which launched last year, entails NT\$5.49 billion in subsidies to local governments for mandatory replacements across Taiwan proper and the offshore islands, according to the Ministry of Economic Affairs (MOEA).

"We expect that the project will be completed by the end of next year," Cho said at the opening ceremony of two lighting trade shows in Taipei.

Once installed, the new streetlight system will create energy savings of 640 million kWh of electricity and 330,000 tons of carbon dioxide emissions each year.

"LED efficiency has improved rapidly due to recent technological advances. LED's luminous efficacy is three times that of mercury vapor. The lifespan of LED lighting triples mercury, too," Cho said.

If the project unfolds as planned, Taiwan will be first in the world to abandon mercury-containing streetlamps, according to Vice President Wu Den-yih, who also presided at the opening ceremony.

"Since 2008, (the central government) has been working on switching to LED along all of Taiwan's transportation lines, and this project has been completed," Wu said.

"In the future, Taiwan will be the first in the world where all



Vice President Wu Den-yih, center, and Vice Economics Minister Cho Shih-chao, third left, attend the opening ceremony for the Taiwan International Lighting Show and LED Taiwan at the Taiwan World Trade Center Nangang Exhibition Hall. Central News Agency

streetlamps feature LED lighting."

Lighting Shows Open

Wu and Cho attended the opening of the Taiwan International Lighting Show and LED Taiwan, two trade shows at the Taiwan World Trade Center Nangang Exhibition Hall.

The Taiwan International Lighting Show is Taiwan's largest solid state lighting exhibition, and LED Taiwan is the only trade show in the country dedicated to LED manufacturing.

The annual joint exhibition broke records this year, with more than 337 participating manufacturers and 898 booths, Wu said.

Organizers expect the four-day expo to draw more than 1,400 foreign

buyers and 16,000 domestic buyers and to generate business opportunities worth US\$13 million.

Opportunities Ahead

The Opto/LED Fab Watch report has cited Taiwan as a leading LED manufacturer, with more than 21 percent of the world's capacity.

Taiwan's strengths in the industry lie in its comprehensive LED supply chain and strategic position, according to SEMI Taiwan, one of the organizer of LED Taiwan.

The global lighting market is expected to expand by a compound annual growth rate of 18.7 percent, with the Asia-Pacific region accounting for nearly half of the total, said SEMI Taiwan.

By Enru Lin, The China Post



Pipe dreams: Turkey aims to be gas transit hub between Asia and Europe

Turkey has staked a claim to become a major transit hub with two new pipelines to pump gas from Azerbaijan and Russia to Europe, but boasting may prove easier than fulfilling the ambitious projects.

Turkey and Azerbaijan recently started work on the new 1,850 kilometer (1,150 mile) overland Trans-Anatolian Natural Gas Pipeline (TANAP) which by 2018 aims to provide 10 billion cubic meters of gas per year (bcma) to European consumers and 6 bcma to Turkish customers.

At the same time Turkish and Russian officials are in intense negotiations to agree terms for a brand new Turkish Stream pipeline under the Black Sea.

With the EU backing TANAP and Russia behind Turkish Stream, Turkey is now placed in a hugely strategic position in the intensifying rivalry between Brussels and Moscow over gas supply.

Turkey's dream is to turn the region on the western side of the country bordering Greece and Bulgaria into a gas hub, where multiple pipelines will meet to pump gas to EU consumers.

The EU-backed TANAP appears sure to be built, as finding returns on the US\$40-US\$45 billion investment in Azerbaijan's Shah Deniz 2 gas field depends on the pipeline.

Turkish Stream however is a far less stable proposition.

'Takes time'

Questions remain over whether Turkey has sufficient capacity to become a genuine gas hub, which requires far more than the building of pipeline infrastructure.

"To be an energy hub there are a number of ingredients that are necessary, none of which exist as yet

in Turkey," said Edward Chow, senior fellow at the Center for Strategic and International Studies (CSIS).

He pointed to the lack of a strong international banking system, a solid legal system to resolve normal commercial disputes and sufficient storage facilities.

"Turkey has the advantage of location, it's near a lot of oil and gas producing countries. Being a hub takes time," he said.

The US\$10 billion TANAP project — whose construction was launched by President Recep Tayyip Erdogan and his Azerbaijani counterpart Ilham Aliyev — is firmly backed by the European Union which hopes it will help Europe reduce its dependence on Russian gas.

But analysts say Turkey will need to ramp up its total capacity from the initial plan of 16 bcma for it to make any major impact on the EU's goal of diversifying supplies away from the Russia of President Vladimir Putin.

"In the longer term if TANAP carries much more that will start to give it greater significance. That is something that will probably happen but will not be imminent," said Laurent Ruseckas, senior advisor in global gas at IHS Energy.

'Hard to fathom'

The plan to build Turkish Stream was dramatically announced by Putin in December in Ankara, as a replacement for the South Stream pipeline and to bypass Ukraine.

Putin blamed the EU for the collapse of the South Stream project, which was to have come ashore in Bulgaria.

But Russia and Turkey, who already operate the undersea Blue Stream pipeline, have yet to agree a final accord on Turkish Stream.

In exchange for agreeing to host the pipeline, Turkey secured from Russia a reduction on its own gas imports of 10.25 percent, a welcome concession for a country with slowing growth and pressured currency.

Yet Russian daily Kommersant reported last week that the final negotiations had reached a "dead end" over the pricing terms. Turkish Energy Minister Taner Yildiz insisted however that the two sides were in agreement.

"I suspect this will happen but it is not ready to go yet, final agreements must be negotiated and signed between Gazprom and (Turkey's state energy firm) BOTAS," said Ruseckas.

Even once the agreements are signed, political will and financial backing will be needed to build the four pipelines required to create the envisaged capacity, which like South Stream is 63 bcma.

"A one or two strand Turkish Stream is conceivable in my mind," said Chow.

"A 63 bcma system is hard for me to fathom any time soon," especially given the financial strains of Russian gas giant Gazprom and the pressure from Western sanctions over Ukraine, he said.

One pipeline has a capacity of around 16 bcma. Still the plan to build Turkish Stream is a sign of the strengthening relations between Russia and Turkey. The two have managed to prevent disputes over the Syria and Ukraine conflicts from damaging their emerging alliance.

While TANAP could be seen as a competing project to Turkish Stream, Erdogan with conspicuous timing telephoned Putin on the evening of the TANAP ceremony to discuss the Russian-Turkish pipeline plan, the Kremlin said.

By Stuart Williams, AFP

WB report proposes 3 steps to decarbonizing development for a zero-carbon future

STORY HIGHLIGHTS

- To keep temperatures from rising more than 2 degrees Celsius, as governments have agreed, will require transforming how the world uses energy.
- Electricity from clean energy sources plays an important role.
- A new World Bank report lays out three steps for a smooth transition to a zero-carbon future and provides data, examples and policy advice to help countries make the shift.

Getting to zero net emissions and stabilizing climate change starts with planning for the long-term future and not stopping at short-term goals. It means getting prices right as part of a broad policy package that can trigger changes in both investments and behaviors, and it requires smoothing the transition for those most affected.

A new World Bank report walks policymakers through those three steps with data, examples and policy advice to help put countries on a path to decarbonizing their development in a smooth and orderly way.

The solutions exist, and they are affordable – if governments take action today, the report says.

It warns, however, that costs will rise for the next generation the longer action is delayed. Data from the latest Intergovernmental Panel on Climate Change report suggests that waiting just 15 more years and taking no action until 2030 would increase costs by an average of 50 percent through 2050 to keep temperatures from rising less than 2°C.

“Choices made today can lock in emissions trajectories for years to come and leave communities vulnerable to climate impacts,” said World Bank Group Vice President and Special Envoy for Climate Change Rachel Kyte. “To reach zero net emissions before the end of this century, the global economy needs to be overhauled. We at the World Bank Group are increasing our focus on the



policy options.”

Step 1: Plan for the future

By planning for the end goal rather than short-term milestones, governments can make proactive choices that lay the groundwork for future development and avoid locking in both damaging development patterns and investments that could become unusable in a carbon-constrained world.

In quickly urbanizing areas, that means designing cities for public transportation. It also means investing in the research and technology that will be needed 20 or 50 years down the road.

In the new report, *Decarbonizing Development: Three Steps to a Zero Carbon Future*, the authors also discuss the risk of stranded assets, such as coal-fired power plants that might not be able to operate as governments set limits on greenhouse gas emissions. It notes that just the fossil fuel power plants built in 2012 will emit some 19 billion tons of carbon dioxide over their expected 40-year lifetime, more than the annual emissions of all fossil-fuel power plants that were operating in 2012. Retiring them early is possible, but that changes the cost comparison for decision-makers as they weigh fossil fuels against clean energy sources.

“The goal is to reach zero net emissions by 2100, not to reduce emissions at the margin in the next

decades. It implies a very different set of measures, including structural and spatial transformations of our economies,” said World Bank Group Chief Economist for Climate Change Marianne Fay, a lead author of the report.

At a technical level, the report says zero net emissions is achievable as part of well-planned, robust economic growth that emphasizes four areas: The work starts with a shift from relying on fossil fuels for electricity to using clean energy that decarbonizes electricity.

With increasing amounts of clean energy following, a massive shift to electrification can then increase access to clean energy and displace polluting fuels.

Improving energy efficiency helps lower the demand.

Keeping natural carbon sinks healthy through better forest and land management helps offset emissions by absorbing and storing carbon.

Many of the steps governments can take now – such as developing public transportation and improving energy efficiency – also offer immediate and local benefits in improved access for residents and reduced pollution.

Step 2: Get prices right as part of a broad policy package

On the policy front, governments

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UBM India flags off India- Sri Lanka Renewable Energy Growth Forum

UBM India on March 11 hosted The India- Sri Lanka Renewable Energy Growth Forum 2015 at the Galadari Hotel, Colombo. The one-day conference aimed to accelerate the growth of renewables in the region through collaboration and technology and product share.

The conference, bringing together key decision makers and leading professionals addressed policy, technology, finance and other important drivers for increased deployment of renewables, leading to energy security and economic growth.

The inaugural ceremony was represented by eminent renewable energy expert, Nobel laureate and energy advisor to Sri Lanka government, Prof Mohan Munasinghe delivering the keynote address. Mr Krishnan Pallassana, Director, The Climate Group (India) delivered the inaugural address. Mr Harsha Wickramasinghe, Deputy Director General (Strategy), Sri Lanka Sustainable Energy Authority delivered

the keynote address and Mr Mangala P B Yapa, Secretary General/CEO, The Ceylon Chamber of Commerce delivered the Special Industry Address. The speakers at the conference included some of the leading Indian names like Dr Pawan Singh, Director, PTC India Financial Services Ltd., Mr Vinay Kumar.P, COO, Greenko Group, Mr Anurag Jain, Senior General Manager, Business Development, Welspun Energy Ltd and Mr D Radha Krishna, Chairman, Urja Gyan Foundations, amongst others eminent industry speakers.

The India-Sri Lanka Renewable Energy growth forum comes at a critical time when there is a global trend towards massive deployment of solar power and other renewables and investments worth billions of dollars in clean technology and green energy are eyeing suitable projects.

The event gains further significance in the light of the recent visit of the President of Sri Lanka to India and upcoming visit of Indian



Prof Mohan Munasinghe, Nobel Laureate and Founder Chairman, Munasinghe Institute for Development (MIND) at the inauguration of The India- Sri Lanka Renewable Energy Growth Forum 2015, Colombo.

Prime Minister Shri Narendra Modi to Sri Lanka on 13th March.

UBM India annually hosts India and Asia's most popular Renewable Energy India show at Greater Noida, India. The expo attracts more than 500 exhibitors, several international pavilions, 15,000 trade visitors besides workshops and multi track conference sessions. ■

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can begin shifting investments and mindsets toward low-carbon growth by getting prices right as part of a broad policy package that provides incentives to ensure low-carbon growth plans are implemented and projects financed.

Putting a price on carbon through a carbon tax or cap-and-trade system addresses a market failure to incorporate the cost of environmental damage from greenhouse gas emissions. It is an efficient way to raise revenue while encouraging lower emissions, and it can be easier to administer and harder to evade than other taxes.

But while carbon pricing is necessary, it is not enough on its own without complementary policies, the authors write.

A complementary policy package that provides incentives to ensure green technologies are developed and deployed at scale can include measures such as performance standards for energy efficiency, rebates

on fuel-efficient vehicles, and renewable portfolio standards that require electricity providers to get a percentage of their power from renewable sources all provide incentives for low-carbon choices.

Policymakers can also reduce tariffs on low-carbon goods, such as solar panels and energy-efficient lightbulbs, as the Asia Pacific Economic Cooperation countries recently agreed to do.

Step 3: Smooth the transition

The economic transformation required to shift economies to zero net emissions before the end of the century will require public buy-in and changes in support for those most affected.

Removing fossil fuel subsidies, which primarily benefit the wealthy, and implementing carbon taxes or cap-and-trade systems are two ways to free up or generate revenue that can lower costs of education, health

care, and infrastructure and provide direct support for the poor while also reducing carbon emissions.

"Data in 22 developing countries show that if fossil fuels subsidies were replaced by universal cash transfers, the bottom 60 percent would benefit from the reform," said Stephane Hallegatte, a senior economist for climate change at the World Bank and a lead author of the report.

Smoothing the transition also includes helping businesses reinvent themselves for a cleaner world. Automakers started down that path as they improved gas mileage to meet performance standards and developed electric and low-emissions vehicles to meet demand.

The international community has an important role. The report notes that making progress on global agreements will go a "long way towards convincing economic actors that the future will be carbon neutral." *World Bank* ■

Construction of Hydropower Plants in Nepal in the Light of Recent Earthquake

By Engr. Gyanendra Lal Pradhan

Chairman

SAARC CCI Council on Climate Change, Energy and Water Resources

CACCI Asian Council on Water, Energy and Environment

FNCCI Energy Committee



The recent earthquake on April 25, 2015 of 7.8 magnitude and major aftershock of 7.3 magnitude on May 12, 2015 has affected almost all sectors of Nepal. The event has been a historical calamity for the country in all aspects, including human casualties and structural damage. Thousands of people are mentally and physically traumatized by this event – with a significant loss to family life, social networks, and the human workforce of the country. People are already stressed, and the large-scale recurrent shocks (more than 380 aftershocks of magnitude 4.0 or greater since the first major event of April 25) only compound the high level of trauma.

The earthquake has resulted in massive damage to the infrastructure in Nepal. The earthquake has caused significant impairment to all types of infrastructure and basic services.

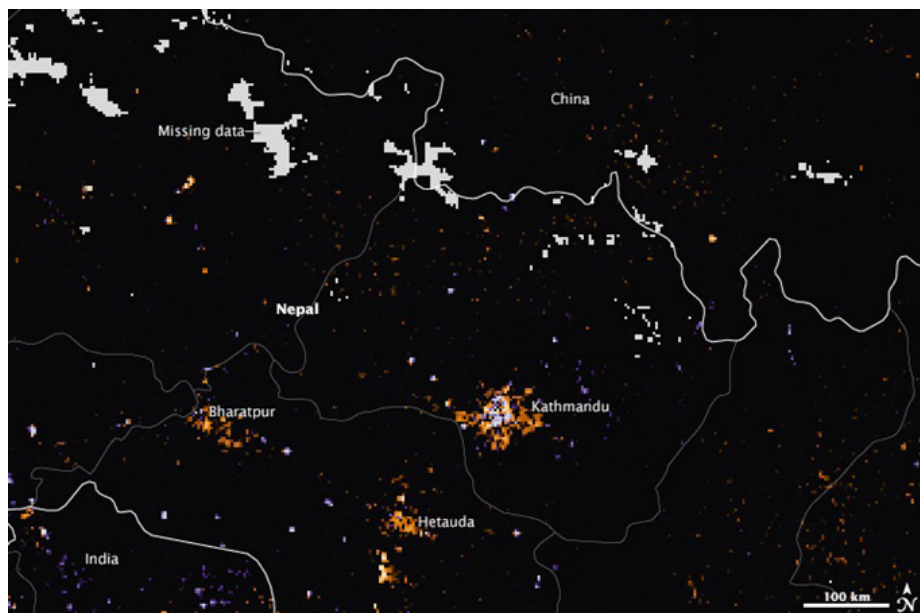
Power sector also suffered damages in electricity generation facilities and distribution networks. Both existing and under-constructions power projects have suffered damages.

According to the Post Disaster Need Assessment (PDNA) Report, 10 MW of Nepal Electricity Authority

(NEA) owned power plant and 101.4 MW of Independent Power Producers (IPPs) owned power plants are severely damaged and are not operational. Likewise, 38.1 MW of NEA owned power plants and 22 MW of IPPs owned power plants are partially affected but are operational. Under-construction hydropower projects with a combined capacity of about 1,001 MW owned by IPPs and NEA are partially damaged. The cost of damage to the generation facilities are assessed to be 77.29 million US\$ for the NEA and IPPs power plants according to PDNA Report.

Similarly, distribution lines—including distribution poles, insulators and conductors—are damaged in large quantities. The exact quantity is yet to be confirmed.

Infrared satellite imagery released by the NASA's Earth Observatory—which compared light output detected in Nepal over a 10 day period a month before the quake to the period just before and after the event—hinted at the impacts. In the image below, areas experiencing lower light output after the earthquake appear in shades of orange:



Orange areas indicate where light output plummeted in the aftermath of last month's earthquake in Nepal. (Image: NASA)

With the exception of the authority's own Sunkoshi Hydropower Project, which suffered serious damages in the quake, most of NEA's power plants were back in operation, but at least eight private generating facilities remained completely offline.

The number of all damaged distribution transformers may be in the many hundreds or even thousands.

The rickety electricity system in Nepal had been expanding and, by some accounts gradually improving since the end of a brutal civil war in 2006 and the establishment of a comparatively stable, if sometimes fractious political system. The rapid deployment of small-scale, increasingly independent hydropower projects in dozens of remote communities

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had helped to reduce the portion of Nepal's 28 million inhabitants without any access to electricity in recent years to between one-quarter and one-third.

With more than 2 percent of all global water resources at its disposal, Nepal has long been poised to be a self-sustaining electricity powerhouse. A prodigious monsoon season and vast water stores of the Himalayan glaciers feed thick arterial river flows up and down this mountainous nation, representing as much as 83,000 megawatts (as per the recent studies, the potential is estimated to reach above 150,000 megawatts) of hydropower potential— enough to overhaul a woefully underdeveloped economy and turn Nepal into a powerful regional electricity supplier.

Beset by political bickering, however, the nation has only managed to harness less than one percent of that potential thus far, and the recent earthquake is only likely to set things back further— though China and India will be keen to get things on track as quickly as possible. With burgeoning middle-class and electricity-hungry populations of their own, both countries have been eyeing Nepal's hydropower sector in recent years, and they have been pouring billions of dollars into infrastructure projects here.

Despite these damages to the generation facilities, fortunately, there is no record of catastrophic disaster due to the failure of dam, tunnel and other major components. The most of the damages are on surface water conveyance structures (headworks,

penstocks and canals) and access roads caused by earthquake induced landslides or rock falls, not due to the failure of structure itself by earthquake. Only 15% of total installed capacity of the country is affected by the earthquake. The large hydropower plants like Kali Gandaki A, Kulekhani Storage, Middle Marsyangdi, Marsyangdi, Khimti are still intact and perfectly operational, although minor damages have been reported. This shows that the hydropower sector of Nepal is still safe after earthquake. **Therefore, the latest quake is unlikely to affect the investors' confidence in this sector.**

One real-life full-scale experience is worth a hundred opinions. Such is the experience gained from the performance of concrete dams that have been severely shaken by the earthquake. There are no reports of RCC dam failure during the latest earthquake in Nepal. While concrete dams are designed to withstand a higher degree of seismic shaking than buildings and have performed well, we should not become overconfident of their performance in the future. Great care should be taken in the design details and quality of construction. Particular attention should be given to possible faults located under the dam.

On the irrigation systems front, although the damage to agriculture and the region's irrigation systems has not yet been assessed, we can expect major destruction of rural market places, irrigation canals, and food-collection centres— all of which threatens the food security status in the affected region. Large-scale landslides, erosion, and these

immense landslides, will worsen as Nepal receives its annual monsoon rains. There is enormous destruction of infrastructure for basic services including roads, water supply, irrigation and hospitals. Many underground water supply pipes are broken, causing water leakages and contamination. The destruction is most severe in rural areas where very little infrastructure has withstood the shocks.

There is a need for recognizing the pathways of recovery in irrigation systems by assessing the social, cultural and behavioral factors that make villagers resilient to after-shocks events.

Regarding adaptation and agricultural water security, the earthquake and its aftermath are affecting the availability of sufficient quantities of good-quality water for residents.

This catastrophe has changed our notions of how we should think about water security. UN-Water [the confederation of the water divisions of 31 UN agencies] defines water security as safeguarding quality and quantity of water for various human and environmental needs and ensuring protection from pollution and natural disasters. While much of the discussion on water security to date has focused on water quality and quantity, as this earthquake has clearly demonstrated, the water insecurity resulting from natural disasters can be very substantial and of long duration. With climatic change and variability, we are likely to see more natural disasters and hence more disaster-induced water insecurity. Are we prepared? ■