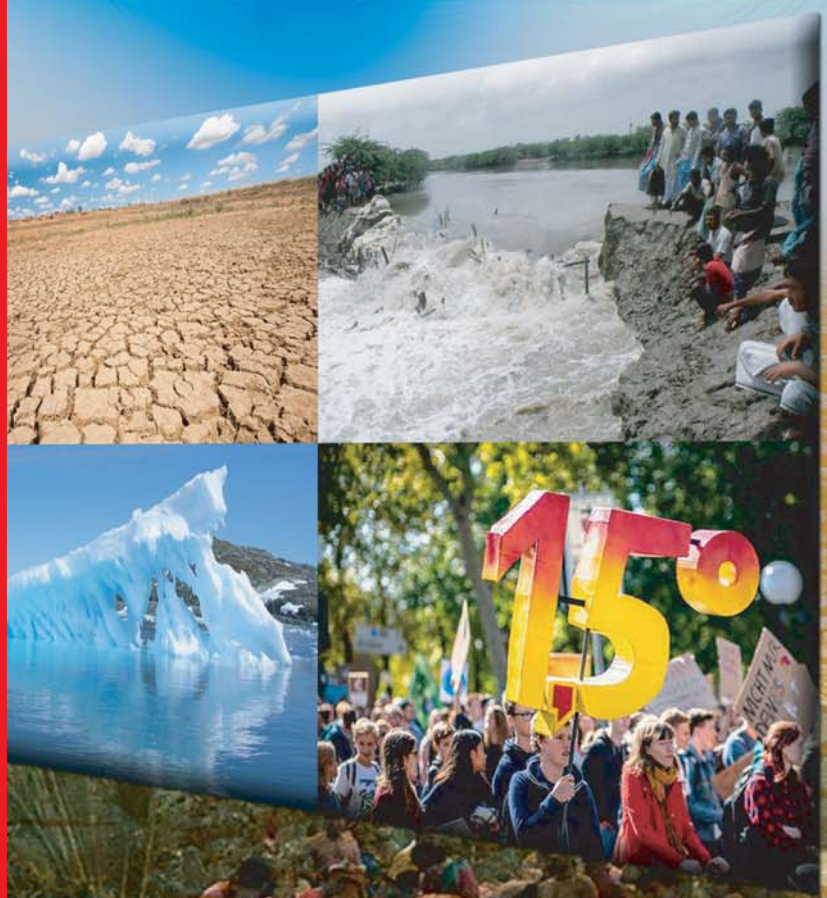
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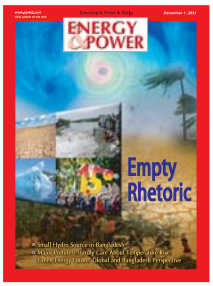
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Restricting global warming below 1.5 degrees C was the main focus of the climate conference in Glasgow, yet the 20 main polluters did not announce any definite plan for reducing emissions. These countries contribute around 80% of the global emission. There is no alternative to adoption of an ambitious emission reduction plan by G20 countries…
Dr. Mizan R Khan tells EP

Fortnightly Magazine, Vol 19, Issue 12, December 1-15



ENERGY & POWER

EDITORIAL

The Glasgow climate conference has been successful in terms of finalizing the Paris Rule Book and reaching a broad-based consensus on limiting global warming to 1.5 degrees Celsius. To restrict the temperature rise, the emission of greenhouse gas will have to be cut drastically. The latest IPCC report suggested ensuring a 45 percent emission cut by 2050 to limit global warming. And to do that, it also suggested immediately phasing out coal, the main source of carbon emission. But the major producers of coal and other fossil fuels as well as their heavy users are reluctant to cut usage of the environment-polluting fuels as quickly as required for saving the planet from looming devastating consequences. The major polluters like G20 countries want to use coal up to even 2060 0r 2070.

Different science reports, including the latest one of the IPCC, have estimated that the global emission would increase by 13.7 percent within 2030 even if the current NDCs are fully implemented. Despite this concern, major polluters are not coming up with any practical plan even to cut emissions. Environment experts and activists warned that, as a result, the global temperature would increase by 1.9 degrees C and might even rise up to 2.7 or 3+ degrees C.

It's the major polluters who should play the right kind of role and save the planet.

highlights



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Bangladesh to setting up close grid canals with small hydro power generation facilities all over the country taking the feed water from suitable points of the river protection embankments. These projects also to control river flow and erase river erosion problems as well as to provide electricity.
… more in Article.

COVER



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The Glasgow climate conference cannot be undermined in terms of holding it in an adverse condition due to COVID-19 pandemic. It could finalize the Paris Rule Book and reach a consensus on limiting global warming to 1.5 degrees Celsius, among other issues, to become successful to some extent. However, major polluters like G20 countries were hardly coming up with any practical plan to achieve the target.

Individual's opinion does not necessarily reflect editorial policy of Energy & Power

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Green page

Encouraged by the readers and patrons, the EP would continue bringing out Green Pages to contribute to the country's efforts in its journey towards environment-friendly energy.



Green page

Country's First Hydrogen Fuel Plant Nears Completion

Ctg to Get Country's First Waste-to-Energy Plant

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Deputy Director, International Centre for Climate Change and Development,
Independent University

Sri Lanka Shuts Oil Refinery as Dollar Shortage Bites



Sri Lanka shut its only oil refinery recently after running out of dollars to import crude, in an escalating economic crisis that has triggered shortages of food and other staples.

The country's foreign reserves had fallen to $2.3 billion at the end of October, down from $7.5 billion when the current government came to power almost two years ago.

International rating agencies have downgraded Sri Lanka's credit worthiness as the economy shrank an unprecedented 3.6 per cent last year with the Covid-19 pandemic.

The island's tourism earnings and foreign worker remittances have dropped, sparking an import ban on a host of goods including vehicles, spare parts and spices since March last year.

Energy minister Udaya Gammanpila said it was the first time the Sapugaskanda refinery has been shut down since it was built by Iran in 1969.

Gammanpila said the country instead planned to import refined petrol and diesel and that the government would save an unspecified amount of money by doing so When we refine crude at Sapugaskanda, we get 37 per cent furnace oil and 19 per cent aviation fuel and only 43 per cent petrol and diesel,' he told reporters in Colombo.

Top Sri Lankan officials have warned of fuel rationing by the end of the year unless consumption is cut drastically.

Gazprom Nearing Completion of Far East Natural Gas Pipeline



OAO Gazprom is nearing completion of a project to expand the Sakhalin–Khabarovsk–Vladivostok gas trunkline between Komsomolsk-on-Amur and Khabarovsk in Russia's Far East.

About 376 of 390.8 km of the linear section (including backup strings and submerged crossings) have been welded, laid, and backfilled. Construction and installation operations are expected to be complete this year.

The new section will supply gas to consumers in Khabarovsk Territory, and establish new connections for consumers receiving gas via the Okha – Komsomolsk-on-Amur gas pipeline, which is slated for potential decommissioning.

Petronas, Technip Energies Establish Framework for Carbon Capture Collaboration

Petronas and Technip Energies signed a heads of agreement (HoA) establishing a collaboration framework for the further development and commercialization of carbon capture technologies.

These include Petronas' Rotating Pack Bed assisted cryogenic CO2 recovery technology (CryoMin), and membrane-based CO2 recovery technology (PN2).

Earlier this month, Petronas signed a Memorandum of Understanding (MoU) with ExxonMobil Exploration and Production Malaysia Inc. to explore opportunities in carbon capture and storage (CCS) technologies to help decarbonize Malaysia's upstream industry and provide CO2 storage solutions for the region.

Under the terms of the ExxonMobil MoU, the parties will assess the viability of potential CCS projects offshore Peninsular Malaysia and identify suitable technology for potential application.

The companies will also share subsurface technical data to enable CO2 storage assessment and characterization. Relevant data related to pipelines, facilities and wells will also be shared to evaluate potential reutilization of existing infrastructure for transport and storage in selected locations.

GIP to Sell Freeport LNG Interest to JERA Americas for $2.5b



Global Infrastructure Partners (GIP) agreed to sell its 25.7% interest in Freeport LNG Development LP to JERA Americas Inc., the US-based subsidiary of JERA Co. Inc., for $2.5 billion. Global Infrastructure Partners II acquired the stake in 2015.

JERA, through its subsidiaries, owns 25% of Freeport LNG Train 1 and purchases and transports 2.32 million tonnes per year (tpy) of LNG for use in Japan and other LNG importing countries.

Freeport owns and operates an LNG export facility on Quintana Island, near Freeport, Tex.

In May 2020, Freeport completed construction on the third of its three liquefaction trains, which together produce over 15 million tpy and are underpinned by long-term contracts.

Freeport is in the process of pursuing multiple growth opportunities, including a fully permitted, shovel-ready Train 4 expansion.

Closing of the transaction is subject to customary regulatory approvals and closing conditions.

Four of a Family Burnt in 'Gas Leak' Fire in Dhaka



Four of a family were burnt in a fire believed to have been originated from gas leakage in Dhaka's Mugda area recently.

The injured -- Sudhanshu Boidya (35), his wife Priyanka Baroi (32), their son Arup Boidya (5) and Priyanka's mother Shefali Rani Baroi (55) -- were taken to Sheikh Hasina National Institute of Burn and Plastic Surgery.

All of them are in critical state, said SM Aiyub Hossain, resident surgeon of the burn institute.

Priyanka's brother Palash Baroi said his sister's family came to his house in Dakshin Mugda area from Shariatpur a couple of days back for Sudhanshu's treatment.

The house was engulfed by flames as Priyanka went to the kitchen and attempted to light the gas stove to boil water, he said quoting the injured.

The fire originated after the leaked gas accumulated in the kitchen came in contact with the spark of matchstick, police said.

Four Bakhrabad Gas Distribution Company Staffers Arrested



Police have arrested four officials of the Bakhrabad Gas Distribution Company Ltd for allegedly harassing and extorting money from customers in Cumilla.

Technician Shah Alam, 55, Office Assistant Rabiul Hossain, 28, Plant Operator Shafiqur Rahman, 50, and driver Ayub Ali, 25, were nabbed from the district's Monipur village under Burichang upazila recently.

According to locals, the four employees, along with two other unidentified individuals, entered the house of Tajul Islam, a resident of Monipur village. They told Tajul's mother that their gas connection was illegal and it will be disconnected if Tk 5,000 is not paid. Later, following a negotiation, they took Tk 3,000 and left for his neighbor's house.

Tajul, who was outside at that moment, called the police immediately after being informed about the incident.

Police arrived at the scene shortly and detained the four. Tk5,500 cash, four mobile phones, and an identity card were seized from their possession.

Sylhet Gas Fields Holds 39th AGM

Sylhet Gas Fields Limited, a company of Petrobangla, held its 39th annual general meeting (AGM) at a hotel in Dhaka recently, with its Chairman and Additional Secretary (operation) of Energy and Mineral Resources Division Md A Hamid Zamaddar in the chair.

Petrobangla Chairman ABM Abdul Fattah and Managing Director of Sylhet Gas Fields Md Mijanur Rahman were also present.

JS Body Asks for Info on Fuel Use



A parliamentary body recently asked for accurate information on the type and amount of fuel used in public transports.

The parliamentary standing committee on the ministry of power asked the ministry concerned to conduct a survey in this regard.

The committee thinks this is necessary as there should be accurate statistics on CNG-run, diesel-run, and petrol or octane-run public transport and vehicles.

The meeting was held at the Sangsad Bhaban, with AL MP Wasika Ayesha Khan in the chair.

BAPEX Holds 32nd AGM



The 32nd annual general meeting (AGM) of Bangladesh Petroleum Exploration & Production Company Ltd. (BAPEX) was held at a city hotel recently, says a press release.

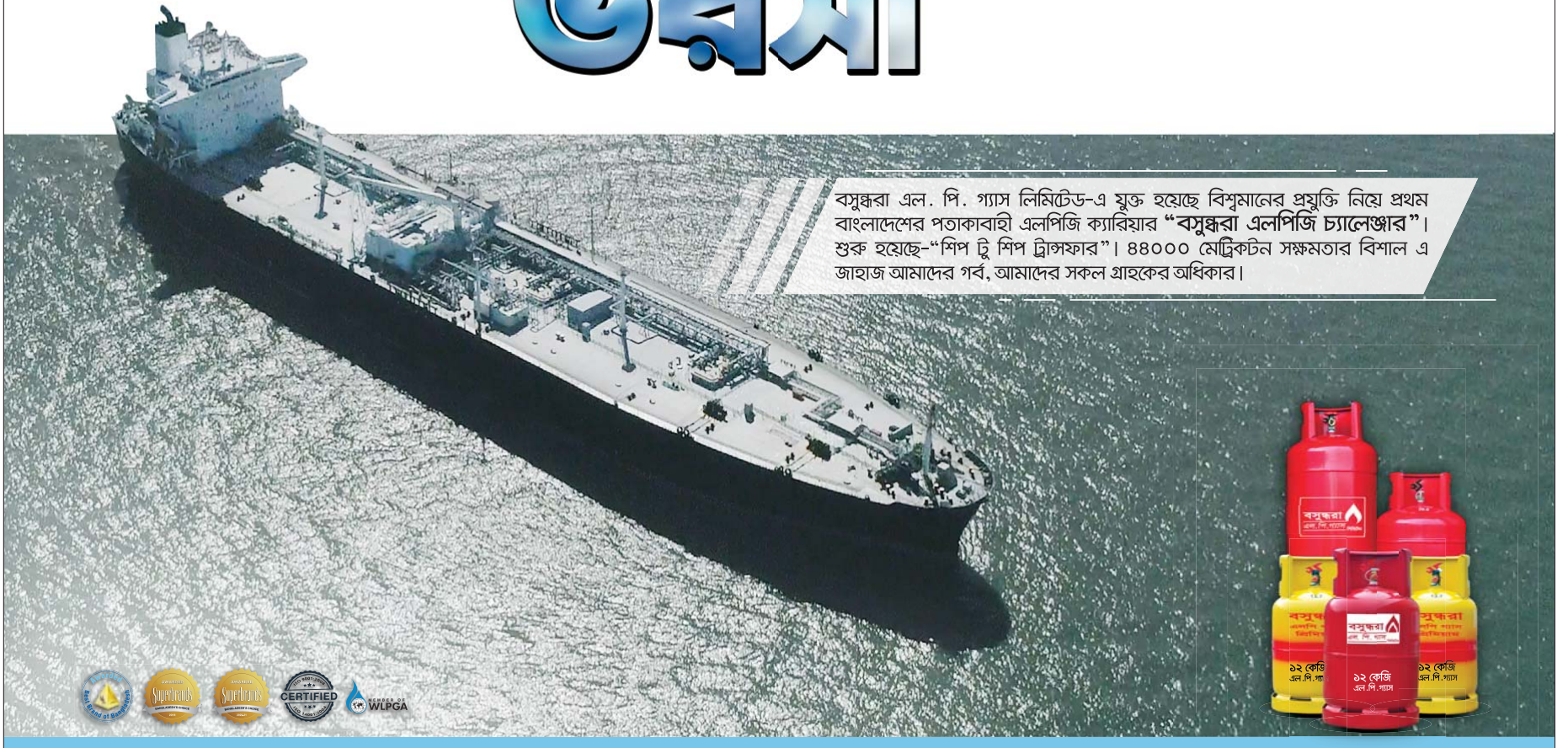
Shareholders and members of the Board of Directors of the company attended the meeting, presided over by Md Anisur Rahman, Chairman of BAPEX Board and Senior Secretary of Energy & Mineral Resources Division.

The audited accounts for the fiscal year 2020-2021 of the company was approved by the shareholders at the AGM.

During the financial year, total income and expenditure of the company was over Tk 5.07 billion and over Tk 4.82 billion respectively. The net profit after tax was Tk 164 million.

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সমুদ্রের বুকে জেগে আছে ভরসা



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Titas's Drive Underway to Cut Illegal Connections in Dhaka

Titas Gas Transmission and Distribution Company Limited has conducted drives to disconnect the illegal use of gas in households of zone 6 under the Metro Dhaka Marketing Department.

The operation was carried out to declare the area as a default bill-free zone The drive carried out by a taskforce started on 21 November and continued till 30 November.

The areas under zone-6 (Code 119 and 120) include Shahjahanpur, Malibagh, Shantibagh, Gulbagh, Rajarbagh, Mominbagh, Shantinagar, Chamelibagh, Siddheswari, Kakrail and Bailey Road.

Energypac Organizes National Vehicle Fair



Energypac has recently organized a month-long national vehicle fair from November 1 for motor enthusiasts who can easily pick up their desired vehicle (pickup/heavy-duty truck) by visiting the fair. The fair continued till the end of this month.

At the fair, Energypac Power Generation Limited (EPGL) put JAC commercial pickups and Shacman heavy-duty trucks on display. This fair was held in 39 districts of the country simultaneously.

On the occasion Faiaz Chowdhury, chief business officer, Energypac Power Generation Limited (EPGL), said, "Energypac is happy to bring this national vehicle fair for our customers. This fair is an excellent opportunity for our customers to compare the prices and specifications and make an informed decision. Both JAC and Shacman vehicles will be available for purchase at the fair."

DPDC Observes Diabetes Day

A medical webinar was organized by Dhaka Power Distribution Company at the its conference room recently on the occasion of World Diabetes Day.

DPDC managing director Bikash Dewan was chief guest at the event, said a press release.

DPDC executive directors, company secretaries, chief engineers, general managers and the DGM/superintending engineers at the DPDC head office were present on the occasion.

Tamatun Islam Tanha, DPDC's medical officer, discussed the types, causes and remedies for diabetes and gave an informative presentation.

IDCOL Gets Highest Income Tax Payer Award

Infrastructure Development Company Ltd. (IDCOL) has been awarded the 1st position of the Highest Income Tax Payer Award by the National Board of Revenue (NBR) under Non-Bank Financial Institution category for Assessment Year 2020-2021.



NBR also presented Tax Card 2021 in favor of Ms. Fatima Yasmin, Chairman, IDCOL & Mr. Abdul Baki, Director & CEO (in-charge), IDCOL. Finance Minister A H M Mustafa Kamal was present as the chief guest of the award-giving ceremony, organized by the NBR.

Abu Hena Md. Rahmatul Muneem, NBR Chairman, handed over the award and the tax cards to S. M. Monirul Islam, Deputy CEO & CFO, IDCOL.

BGFCL Profit Stands Tk174cr in FY21

Bangladesh Gas Fields Company Limited (BGFCL) earned a profit of Tk174 crore in the Fiscal Year 2020-21, after paying Tk558.71 crore in taxes.

This natural gas production company, which is the largest in the country, had earned a total revenue of Tk1,125.60 crore during this fiscal, while it incurred operating expenses of Tk951.58 crore, said a press release.

Earlier, the 66th annual general meeting of the company was held at BGFCL's head office in Birasar area of Brahmanbaria town recently.

The general meeting chaired by the Senior Secretary of the Department of Energy and Mineral Resources, Md Anisur Rahman, was attended by BGFCL shareholders, directors and senior officials.

Five Missing as Coal-Carrying Bulkhead Sinks in Mongla

Five crew members are missing after a coal-carrying bulkhead named MV Fardin-1 capsized at Mongla recently.

MV Fardin-1 capsized after colliding with a foreign merchant ship at Mongla port's Harbaria-9 point.

The bulkhead was carrying 350 tonnes of coal as per the statement of shipping agents.

While unloading, MV Fardin-1 was pushed by the Panama-flagged Handipark ship. Two of the seven crew members were rescued, but the other five remain missing.

Empty Rhetoric

Mollah Amzad Hossain













The Glasgow climate conference cannot be undermined by any means in terms of holding it in an adverse condition due to COVID-19 pandemic. There is also a broad-based consensus that finalization of the Paris Rule Book with a Carbon Market Mechanism is a big achievement of the COP26.



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A consensus on a target to limiting global warming to 1.5 degrees Celsius above pre-industrial level by 2100, instead of the previous goal of restricting it well below 2.0 degrees C level as agreed in the Paris climate conference, is another achievement of the just concluded conference of parties (COP). The major polluters like G20 countries were taking part in the discussion on limiting the temperature rise, but hardly coming up with any practical plan to achieve the target. The civil society organizations and environmental experts thought that their (G20 leaders) remarks during the discussions were not sincere enough or had no real meaning. The experts also considered that the G20 would not even come up soon with a proper plan in this regard. Different science reports, including the latest one of the IPCC, have apprehended that unless it is possible to cut global emission by 45 percent within 2030, the global temperature would increase by 1.9 degrees C and it might rise up to 2.7 or 3+ degrees C. The UNFCCC in a synopsis report on the NDCs submitted so far said that the global emission would increase by 13.7 percent within 2030 even if the NDCs are fully implemented. The CSOs and climate activists criticized that the major polluting countries raised their voice in favor of the 1.5 C target, but on the other hand they were working on ensuring sustainability of the fossil fuel business in the longer term. There is no doubt now that the dirtiest fuel coal will remain alive until 2050. It has also become clear by now that other fossil fuels like oil and gas would dominate the entire century unless there is any major technological discovery to meet the growing energy needs.

Unlike previous COPs, the countries, however, recognized in Glasgow the looming dangers of climate change as predicted in the first part of the 6th IPCC report. But the major polluters are yet to submit their updated NDCs with emission cut ambition to the UNFCCC. Post-COP26 experts' analyses suggested that almost all the countries of the world are now suffering from climate impacts like floods, droughts, cyclone, wildfire, heavy snowfall and ice melting. It also put increased pressure on the politicians of the respective countries. Leaders of major polluting countries have started realizing the importance of the Loss and Damage issue. But many have raised concern that it may not be possible to restrict global warming not even below 3 degrees C by 2100 if major polluting countries cannot immediately plan and execute emission reduction. In the Glasgow summit, the major polluting nations did not submit ambitious NDCs, not even reacted positively towards its requirements. Major polluter China mentioned about reaching Net Zero by 2060 and another top polluter India informed about achieving Net Zero by 2070. But they also did not submit detailed plans for these.



Experts, returning home from Glasgow, are meeting in post-COP26 discussions. Achievements and failures are being discussed threadbare. Based on the outcome of these discussions, a report would be prepared.

Dr. Fazle Rabbi Sadeque Ahmed, Deputy Managing Director of PKSF and climate expert, observed that COP26 was the talk of the world following a year of global shutdown for COVID and shuttle diplomacy of the UK Presidency. Hence the expectations were sky high. But every major action needs money and resources. But not many encouraging decisions could be reached. Arrangement of a US$100 billion fund every year till 2023 has become uncertain now. Discussions have been launched for raising US$200 billion from 2025 each year, increasing it by US$100 billion over the next 5 years. However, the Paris Rule Book could be finalized through reaching agreements on market and non-market mechanisms under article 6. Major polluting nations for the first time agreed to discuss financing for Loss and Damage. Dr Rabbi thought that discussion in the COP is a continuous process. In every event some progress is achieved and the COP26 is not a difference.

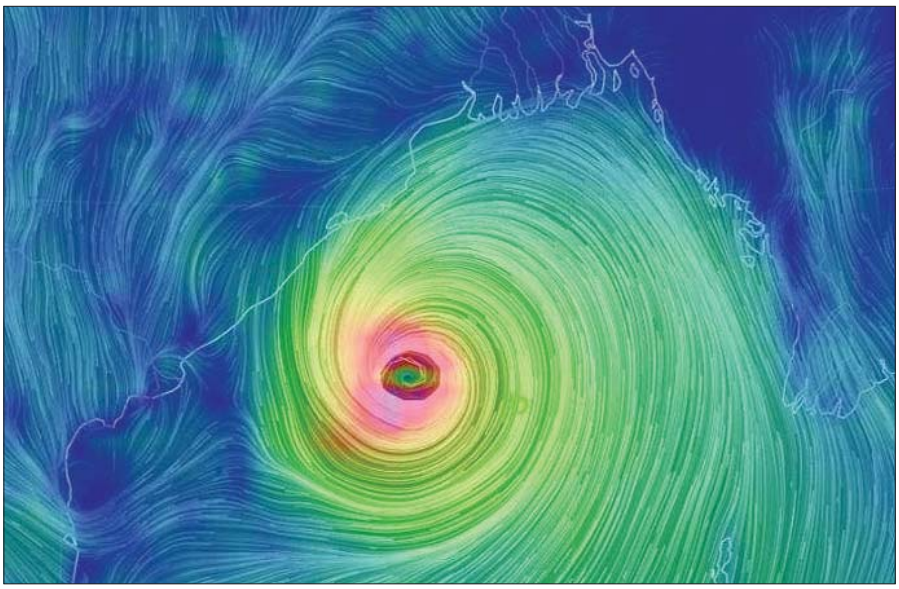
Dr. Mushfiqur Rahman, environment

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expert, observed that financing is a major challenge for emissions reduction and not many achievements were made here even in COP26 for overcoming the loss and damage of climate disasters. It is being said that some pledges would be met in 2023. But how much would that be? How would Bangladesh get finance even if the total required fund is pledged? These need extensive discussion.

Secretary of Power Division Md Habibur Rahman mentioned in the post-COP26 discussion of SREDA that achieving net zero by 2050 is a major challenge. We are moving in the positive direction though we have no obligation. Power and energy sectors have major obligations for reducing emissions. Our achievement as per previous NDC was over 5%. According to the updated NDC, our unconditional emission reduction target is 6.73%. For the 15% conditional reduction target achievements, there is no alternative to accessing international finance. But developed nations have not yet committed enough money to the fund where from this finance can be accessed. The time limit has been extended in COP26. Debate has ensued about RE targets by the Mujib Perspective Plan 2041. We are working on a RE contribution up to 40% by then.

ATM Mostafa Kamal, Additional Secretary of Power Division, opined that highly populated China, India and Bangladesh cannot achieve the same level of success in non-carbon energy development like the less-populated Western European countries. Those developed countries have attained the pinnacle of development where the developing nations are endeavoring to reach. We have rights for creating emissions for continuing the development process. According to SDG, we do not only need to ensure



supply of power and energy to all, we also have to ensure supply at affordable cost. Consequently, in consideration of the present technical innovations, we cannot but remain dependent on fossil fuels for quite sometimes into the future. But by adopting state-of-the-art modern technology, we are trying to reduce emissions as much as practical. Works are continuing on Energy Efficiency and Conservation. Achieving global finance would add impetus to our endeavors.

DG of Power Cell Engr. Mohammad Hossain mentioned that Bangladesh entered the highway towards clean energy, shelving 10 coal power projects ahead of COP26 and mandating "Phase Down" of coal power. But this has created risk for generating low cost power. Truly, no country in the world has become 100% RE dependent till now. Consequently, if not on coal, Bangladesh would continue to remain dependent on natural gas and oil for a considerable time into the future. 95% mitigation work needs to be done in the power sector for reducing emissions. Bangladesh by preparing action plans is going ahead with implementation. But not much encouraging response for global finance could be derived from the COP26.

Dipal Chandra Barua, President of Bangladesh Solar and Renewable Energy Association, opined that Bangladesh must change its mindset for getting out of the fossil fuel paradigm. For this, we have to move forward in a planned manner by developing skilled human capital.

Engr. Al Mudabbir Bin Anam of GIZ said political leaders charted a roadmap for reducing emissions. We all have to work to reach the end of the road. Bangladesh has to work with a mission for achieving Energy Efficiency.

Mohammad Alauddin, Chairman of SREDA, thought that Bangladesh would be able to generate 5000 MW power from RE by 2030. But all have to work ensuring efficiency towards responsible use of energy and power.

Dr. Nurul Quadir, Former Additional Secretary, in another post-COP26 discussion said some successes like Paris Rule Book finalization, increasing finance in adaptation, finalization of stocktaking and reporting were achieved in COP26. But pledges for

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putting together US$100 billion every year in the climate fund have been deferred. Discussions about below 1.5 degrees C global warming limits have gathered momentum. There are frustrations regarding pledges for submission of ambitious NDCs by the major polluters. Consequently, there is genuine concern about achieving Net Zero by 2050.

Ziaul Haq, Director of the Department of Environment (DOE), considered COP26 a success. Global stocktaking for reducing emissions from 2023 is a major milestone. Some 161 of the 197 countries submitted updated NDCs. But even if these are achieved 100% by 2030, emissions cannot be reduced by 45%. Rather it would increase by 13.7%. This remains a serious concern.

Emeritus Professor Dr Ainun Nishat observed that the door for implementation of the Paris Agreement could be opened through finalization of article 6 in COP26. The IPCC report got due attention in discussion in the COP. The host country can be given 6 out of 10 for their arrangements. The 1.5 degrees C warming limitation target has been recognized. These achievements would pave the way for stronger parleys in COP27. Ultimate success would not be achieved if appropriate planning for reducing emissions and access to financing cannot be ensured.

Prof Saleemul Huq, Director of International Centre for Climate Change and Development, thought the achievement about Loss and Damage though marginal, yet it was an encouraging beginning. The CVF played an important role for this.

Mirza Shawkat Ali, Director of the Department of Environment (DOE), pointed out that it is essential to monitor



individual country contributions to the climate fund. Beginning of contribution to Loss and Damage fund is an achievement though not a major contribution has been made. 100 countries and 40 large automobile manufacturers have pledged to get rid of Internal Combustion Engines by 2040. It is a milestone achievement. Talks have ensued for doubling the contribution to the climate fund from 2025.

The above observations of experts indicate successes achieved in the COP26 in different areas. But the major concern is hesitations of major polluting countries coming up with specific ambitious NDCs for restricting global warming below 1.5 degrees C by 2100. The primary target is reducing global emission from 50 giga tonnes to 32 giga tonnes by 2030. An analysis on the 161 NDCs submitted evidence that even if these are 100% implemented, this would rather increase emissions by 13.7% than reduce it by 45%. Different analysis evidence that 'phasing down' instead of 'phasing out' of coal would lead to continued use of coal till 2060 or 2070. No decision was taken even for reducing use of natural gas and oil. No roadmap could be worked out for reducing subsidies on fossil fuel use. Unless the civil society, experts and other pressure groups can stress the 20 major polluters in coming up with specific ambitious NDCs for limiting emissions soon, global warming instead of getting restricted to 1.5 degrees C would rather increase beyond 3 degrees C.

However, some optimism has been created at COP26. But at the same time concerns have intensified about uncertain future successes. World community has to keep fingers crossed for COP27. A trusted global community would be able to create required pressures on developed nations in taking right plans for reducing emissions and committing enough financial, technical, technological assistance towards developing, least developed and climate vulnerable nations for combating climate. The bottom line is actions, not words are necessary for the crossroads of human civilization.

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Green Energy Future
Global and Bangladesh Perspective

Saleque Sufi

The just concluded COP26 that culminated with the Glasgow Climate Pact 2021 has shown some lights at the end of tunnel. The global community could reach closer than ever before for a cleaner, greener future world. Expectations have grown brighter for a non-carbonised, environment-friendly future world. True that there exist many issues and challenges, but there has been a greater realization that use of fossil fuel must be reduced at a faster rate for achieving the 1.5 degree C global warming limit by 2100 and Net Zero Vision. The world community is divided into three broad categories – developed world also the major polluters, developing world also significant polluters and least developed countries mostly with insignificant carbon footprints of their own. There is another category – climate vulnerable countries. The onus is on developed countries for drastically reducing emissions, contributing generously to Green Climate Fund (GCF) for assisting the LDCs, Climate Vulnerable Countries in managing the environment and at the same time ensuring that the economic development keeps going by adopting advanced technologies. Developed countries must also assist others with financial and technological support. Global research suggests that achieving a green future is technically and technologically possible. But how soon or whether at all will be achievable depends on many issues and challenges which COP26 has addressed to some extent.

Bangladesh is a developing country as well as a climate vulnerable country. Every year as impacts of global and regional emissions, natural disasters (cyclones, tidal bores, floods) destroy crops and properties, make many climate refugees. Its own carbon footprint is negligible and as such has no obligation for reducing emission. But still for its own sake it has no option but growing green by adopting non-carbonised energy generation. The challenges of Bangladesh would be unlike many other developing nations. Till now it almost exclusively depends on fossil fuel (own gas and imported LNG, LPG and other Petroleum products). It is importing electricity from a regional country. Bangladesh delayed exploiting its own discovered coal reserve. With the world community agreeing to phasing down use of coal, we are not sure whether Bangladesh can exploit its coal resource at all. Apart from under implementation coal power projects, no new coal power plant may also be built in Bangladesh. Natural gas (own gas and imported LNG) may continue as a major transition for another 25-30 years at least. Renewable energy like solar and wind have some prospects. Bangladesh being predominantly a flat country. There is no significant prospect of hydroelectricity of its own. Talks for importing hydroelectricity from Nepal, Bhutan and India have been going on since mid 1990s without much headway. Bangladesh is going to have its first nuclear power project (2X1200 MW) up and running by 2025. For Bangladesh to achieve its goal of a developed economy by 2041 keeping an eye on its pledge of Net Zero 2050, Bangladesh needs to be very smart in going green.

Can the World Grow Green at All?

There was a thought whether the world can ever grow clean and green. Fossil fuel lobbies with strong public relation access made the most believe that transitioning to renewable energy from dirty polluting fossil fuels may never be possible at all. But for damage and destruction from global warming due to carbon and GHG emissions playing havoc made scientists and researchers carrying out extensive works on climate issues and renewable energy.

Stanford University, recently collated research papers by 91 authors. These analysed different scenarios whether individual nations or the entire regions could get exclusively reliant on renewable energy. The findings were that it is technically possible and technologically feasible for switching to a fully sustainable global energy landscape within 2050. It was also found that greater geographical connectivity of solar, wind and hydropower can reduce energy use and cut costs. These would help achieve limiting global warming below 1.5 degree C by 2100. But for this, strong support and commitment of policymakers, businesses and all other stakeholders would be essential.

The research papers reviewed different situations and geographies. Scenarios of small island states, developed countries and countries in sub-Saharan Africa came under the purview. In every case, the researchers considered energy for electricity generation, transport, heating and cooling of buildings and industry. The outcome of the research was yes. 100% or near 100% supply of energy can be made from renewable sources at different locations of the world.

One such study reviewed global warming, air pollution and energy insecurity, creating Green New Deal roadmaps for 143 countries to confront the chal-

lenges. The roadmaps worked out requirements for countries contributing 99.7% of global CO2 emissions switching to 100% clean, renewable wind, water and solar power no later than 2050, with at least 80% by 2030. The study divided the world into 24 regions for working together on grid stability and energy storage solutions in order to meet energy demand matching supply between 2050 to 2052. If this can happen, it would be possible to power the entire world by sustainable energy. Just through switching to wind, water and solar worldwide, it would be possible to eliminate 4-7 million deaths from air pollution annually.

Researchers in Finland reviewed the feasibility for developing a renewable super grid connecting the regions of North America, including the USA, Canada and Mexico. It appeared that dividing the regions to 20 interconnected sub-regions, based on population, energy demand, area and electricity grid structure, it would be possible to reduce storage requirements and overall costs of the energy system. Theoretically it sounds very encouraging. But achieving all the above would be only possible by 2030 with the full support of policymakers, investors and other relevant stakeholders.

The above studies dealt with wind, solar and water energy only. According to some other studies, nuclear power is also considered another reasonably good environment-benign source of energy. For stringent and innovative safety regulations and closer international watchdogs, nuclear has become a safer and popular form of energy. But this would need countries having state-of-the-art modern technologies transferring this to other countries and assisting them with finance and human resources development.

Moving Away from Coal and Oil

Countries, which extensively rely on coal and oil, may appear reluctant to transit quickly. In fact some major developing countries desperately tried to rephrase the expression of phasing out coal as was the popular demand for inclusion in the Glasgow Climate Pact. Fortunately, global pressure could help achieve phasing down. Realistically, the end of the coal era is now in sight. There are great possibilities that most of the old technology using polluting coal power plants would be retired soon. Those built with modern ultra super critical technology and using superior qualities cleaner coal and keeping emissions below permissible limits would also be retired on due course and no new plants would be built after a while. It is not that countries are pledging for it, but also major financial institutions and donor countries have made fresh vows for not providing technical and financial assistance for new coal plants.

As for transiting from oil, the example of Saudi Arabia, to a 100% renewable energy by 2040 can be mentioned. World is aware of the huge oil deposit. World is also aware of sunshine for powering solar energy. Finish study said that by 2050; solar power can contribute 79% of the country's energy demand supported by enhanced battery and water storage. Energy storage would play a central role in the transition to a sustainable energy landscape. This is essential for overcoming the intermittent nature of solar and wind resources.

Bangladesh Priorities

Bangladesh is on the threshold of industrial revolutions. A small country with very thick population density has to change its agro-based economy to industries. It needs energy for fueling the economic growth. For different reasons it could not explore and exploit all its potential own primary fuel resources (fossil fuels – coal and petroleum). It has huge challenges in relying on imported fuel as well. The energy generation is still predominantly fossil fuel based. It cannot and should not have immediate plans for scraping too many coal or gas based power generation schemes. It must endeavor for exploring and exploiting own primary fuel resources to the best of the ability. There is significant potential for solar and wind (specially, offshore wind). Not much potential for major hydro electricity. But Bangladesh has a great potential for being part of sub regional renewable energy grid (BBIN). It is not only hydroelectricity generation and sharing. India, Nepal, Bhutan and Bangladesh must work more closely in setting up renewable energy regional grid benefitting all. Although not really a green energy, Bangladesh can have at least one more nuclear power plant in the Southern region. About 5000-6000MW nuclear by 2041 would be great for Bangladesh. From the lessons being learnt in Rooppur, it may not be difficult bringing another nuclear power plant on stream in less than 10 years say by 2030. Renewable energy either of own or from regional grid can contribute 20% in the fuel mix by 2030. Bangladesh must go all out for achieving energy efficiency. That in itself would act as third fuel.

What Green World Would Mean?

We are aware of the issues and challenges. We admit that the targets for limiting global warming to 1.5 degree C and Net Zero by 2050 are ambitious. But we are convinced that technologies exist for the world transiting to fully sustainable system by 2050. Mitigating the impacts of climate change would mean fewer natural calamities – cyclones, floods, tsunamis, bush fires, droughts caused due to global warming. The air would get cleaner. WHO report mentioned that nine out of ten people in the world now breathe polluted air. This causes respiratory diseases, heart conditions, strokes and other life threatening diseases.

Pollution, mostly from burning fossil fuels, kills up to seven million people annually, this includes exposures to toxic fumes from using wood, coal and dung as primary cooking fuel. Transition to renewable and sustainable energy sources would also reduce energy bills well within affordable limits. Renewables are already on course of outpricing fossil fuels.

But for attaining the objectives in the greater interest of human civilization, urgent actions need to be taken by all stakeholders, policymakers, business leaders, financial institutions, medias. World must act as a global village.

EP

Saleque Sufi;
Contributing Editor, EP

Cost Comparison of Power Generation

Nuclear and Other Fuels in National, International Contexts

Dr. Engr. Md. Shafiqul Islam

Since the very inception of the now underway Rooppur nuclear power plant project (RNPP), the corresponding unit cost of generating one kilowatt-hour (kWh) of electricity has been a subject of much speculation. I have yet to see someone come up with deterministic quotes backed up by a convincing economic and financial analysis. Admittedly, from a financial and technical standpoint, the RNPP is the largest 'mega' project in the history of the country. It is, therefore, very important to evaluate the economic feasibility of this project.

A total of 2,400 MWe of electricity from the two VVER-1200 reactor units is expected to be added to the national grid by 2024. Russia is investing 90 percent of the total cost of US$12.85 billion, which is about US$11.34 billion. The credit is to be repaid over a period of 28 years along with an interest rate of Libor plus 1.75 percent and capped at 4%. The details of technical, economic, and financial parameters are given in Table 1. And, if necessary, there is a provision to extend the period for another 10 years. Bangladesh will bear the remaining 10 percent of the project cost, i.e. 1.26 billion US dollars from its own resources.

To analyze the economic aspects of this project, the active life of the two units has been fixed at 60 years. The construction period is 6 years. The inflation rate was taken to be changed at a steady rate of 6 percent per year against the local currency. For the USD currency, the inflation rate changes at a steady rate of 2% and a tariff rate of 25%. The discount rate has been fixed at 10 percent considering the growing economy of Bangladesh. The discount rate usually considered in the developed countries is 3-5%. The fuel cost and the operation and maintenance cost are capped at $11.2 and $14.5 per megawatt-hour (MWh) with the lower limits set at $4.5 and $7.82 per megawatt-hour, respectively (See Table 2). In comparison, the global average rate for the fuel cost and the operation and maintenance cost are $6.28 and $12.79 per megawatt-hour, respectively.

The fuel cost and the operation and maintenance cost are capped at $11.2 and $14.5 per megawatt-hour (MWh) with the lower limits set at $4.5 and $7.82 per megawatt-hour

Given international practices, the cost for waste management and decommissioning of the reactor units is taken as 9 percent of the total investment which amounts to about $1.0 billion. The plant capacity factor of the two plants has been varied from a minimum of 50 to a maximum of 90 percent. The average plant capacity factor of thermal power plants in our country is 50 percent. On the other hand, the average plant capacity factor of nuclear power plants is 85 percent and the plant capacity factor of VVER-1200 reactors is 93 percent.

A total of nine case studies have been conducted with the plant capacity factors of 50, 75, 80, 85, and 90 percent. These are subject to change from high fuel cost of $11.2 to low fuel cost of $4.5 and from high operation and maintenance cost of $14.5 to low cost of $7.82. The case studies have been modelled using the FINPLAN tool developed by the International Atomic Energy Agency (IAEA). Analysis of the results shows that the minimum selling price per unit stands at 8.25 cents (7 taka) under the maximum fuel cost and maximum operation and maintenance cost and minimum plant capacity factor of 50 percent. The minimum selling price per unit is 4.38 cents (3.72 taka) under the minimum fuel cost and operation and maintenance costs, and the maximum plant capacity factor of 90 percent. On the other hand, if the maximum fuel cost and the highest operation and maintenance cost are considered with the plant capacity factor taken as 75 percent, the selling price per unit stands at 6.38 cents (5 taka).

From the case studies with a fixed discount rate of 10 percent, the internal rate of return (IRR) is found to be 13 to 20 percent. As the IRR is higher than the discount rate, this makes the RNPP economically attractive. The main

Table 2. Some Key Plant Technical, Economic, and Financial Data at Nine Different Postulated Cases Considering Low and High Values of O&M Costs and Fuel Costs

Item	Variable	Case-1	Case-2	Case-3	Case-4
Plant technical data	Unit-wise plant capacity	1200MW_e × 2 unit = 2400 MW_e			
	Construction period	6-year			
	First commercial operation year	Unit 1-2023 and Unit 2-2024			
	Plant lifetime	60-year (2022/2023 to 2081/2082)			
	Plant capacity factor (PCF)	75%	80%	85%	90%
Investment costs and its terms and conditions	United States Dollar (USD)	11.4 billion			
	Bangladeshi taka (BDT)	219.2 billion			
	Interest rate	4%			
	Repayment period	28 years			
Inflation rate	USD	Steady rate 2% /year			
	BDT	Steady rate 6% / year			
Tax rate	Steady rate	25%			
Currency exchange rate	Exchange rate reflects the inflation rate	80 BDT per USD			
Depreciation	Linear	60 Years			
O & M costs (Low case)	From 2022	123 Million USD per year (7.82 $/MWh)	131.5 Million USD per year (7.82 $/MWh)	139.7 Million USD per year (7.82 $/MWh)	148 Million USD per year (7.82 $/MWh)
Fuel costs (Low case)	From 2022	70.95 Million USD per year (4.5 $/MWh)	75.7 Million USD per year (4.5 $/MWh)	80.4 Million USD per year (4.5 $/MWh)	85.1 Million USD per year (4.5 $/MWh)
		Case-5	**Case-6**	**Case-7**	**Case-8**
O & M costs (High case)	From 2022	228.6 Million USD per year (14.5 $/MWh)	243.8 Million USD per year (14.5 $/MWh)	259 Million USD per year (14.5 $/MWh)	274.4 Million USD per year (14.5 $/MWh)
Fuel costs (High case)	From 2022	176.6 Million USD per year (11.2 $/MWh)	188.4 Million USD per year (11.2 $/MWh)	200.1 Million USD per year (11.2 $/MWh)	211.9 Million USD per year (11.2 $/MWh)
Case-9: Worst-case					
O&M costs (High case)	14.5 $/MWh	Fuel costs (High case)	11.2 $/MWh	Plant capacity factor (Worst)	50%
Decommissioning costs	Fund starting from 2030	1.0 billion USD			
Discount rate	10%				

reason is due to the low interest rate of 4 percent and the low operation and maintenance cost per megawatt-hour of $8.0 to $14. It is to note that the operation and maintenance cost is chosen close to the global average (See Table 2).

Now, let's see how the cost of generating electricity from nuclear energy fares against other energy sources. According to the Bangladesh Power Development Board (BPDB) sources, the selling price of electricity per unit (1kWh) is 2.80, 8.76, 18.44, 24, 5.80, and 13 taka from gas, coal, furnace oil, diesel, electricity imported from India and solar power, respectively. The unit generation cost of electricity from domestic gas is the lowest and then nuclear. However, if the electricity generation from imported liquefied natural gas (LNG) is considered instead of domestic gas, then nuclear power will be the cheapest. It is further observed that the cost of electricity generation from coal is almost double than that of nuclear power and the cost of electricity generation from diesel is the highest. It is becoming possible to generate

electricity from solar energy at an affordable cost as compared to furnace oil and diesel. In the case of independent power producers (IPPs), rental and quick rental, the cost of power generation per unit is even higher.

Next, let us turn our attention to the international context in relation to the cost of generating electricity from our nuclear power project. Russia is building two reactors in Belarus and Hungary with similar models of Rooppur reactors and almost similar investment and loan terms. The minimum unit selling price of electricity in Belarus and Hungary is 8.3 and 7.28 cents respectively, which is lower than the respective country's coal. In this case, it is seen that the cost of generating electricity from nuclear energy in our country is less than in Belarus and Hungary. The average unit selling price of electricity from nuclear power in Bangladesh is 5.37 taka which is about 37 percent less than the global average selling price (8.5 taka/10 cents). The economic analysis shows that power generation from the RNPP is economically competitive at the national and international level and there is less risk in investment. However, if the construction period is more than 6 years, the favourable condition may deviate. If the lifespan of the two units is taken to 20 years more, it is possible to get electricity at a lower price. For more details on the economic and financial analysis, see the published article in the internationally recognized journal; Islam Md. Shafiqul and Tanvir Hassan Bhuiyan, 'Assessment of Cost of Nuclear Power in Bangladesh', Nuclear Energy and Technology 6 (3) 181-194.

Table 2. O & M Costs and Fuel Costs Data

Name of the study	O&M cost ($/MWh)	Fuel Cost ($/MWh)
MIT (2003)	12.34	4.82
The Royal Academy of Engg. (2004)	14.58	11.22
The University of Chicago (2004)	8.98	4.49
Canadian Nuclear Association (2004)	7.86	4.49
OECD/NEA (2005)	11.22-29.23 (Average=20.2)	4.49-19 (Average=11.74)
UK Energy Review (2006)	12.9	6.51
Global high case	18.4	7.85
Global low case	7.52	5.27
Global average	12.79	6.28
This study (Rooppur NPP project)		
High case	14.5	11.2
Low case	7.82	4.5

When I communicated this published piece with Jacopo Buongiorno, a distinguished professor at the Massachusetts Institute of Technology (MIT) in the United States, he reviewed the analyses and commented that the nuclear power generation in Bangladesh is nothing short of interesting and internationally competitive. He added that although the initial cost is a bit higher, the 4% interest rate and the operation and maintenance cost of 8 to 14 US dollars per megawatt-hour has helped make the project cost-competitive internationally.

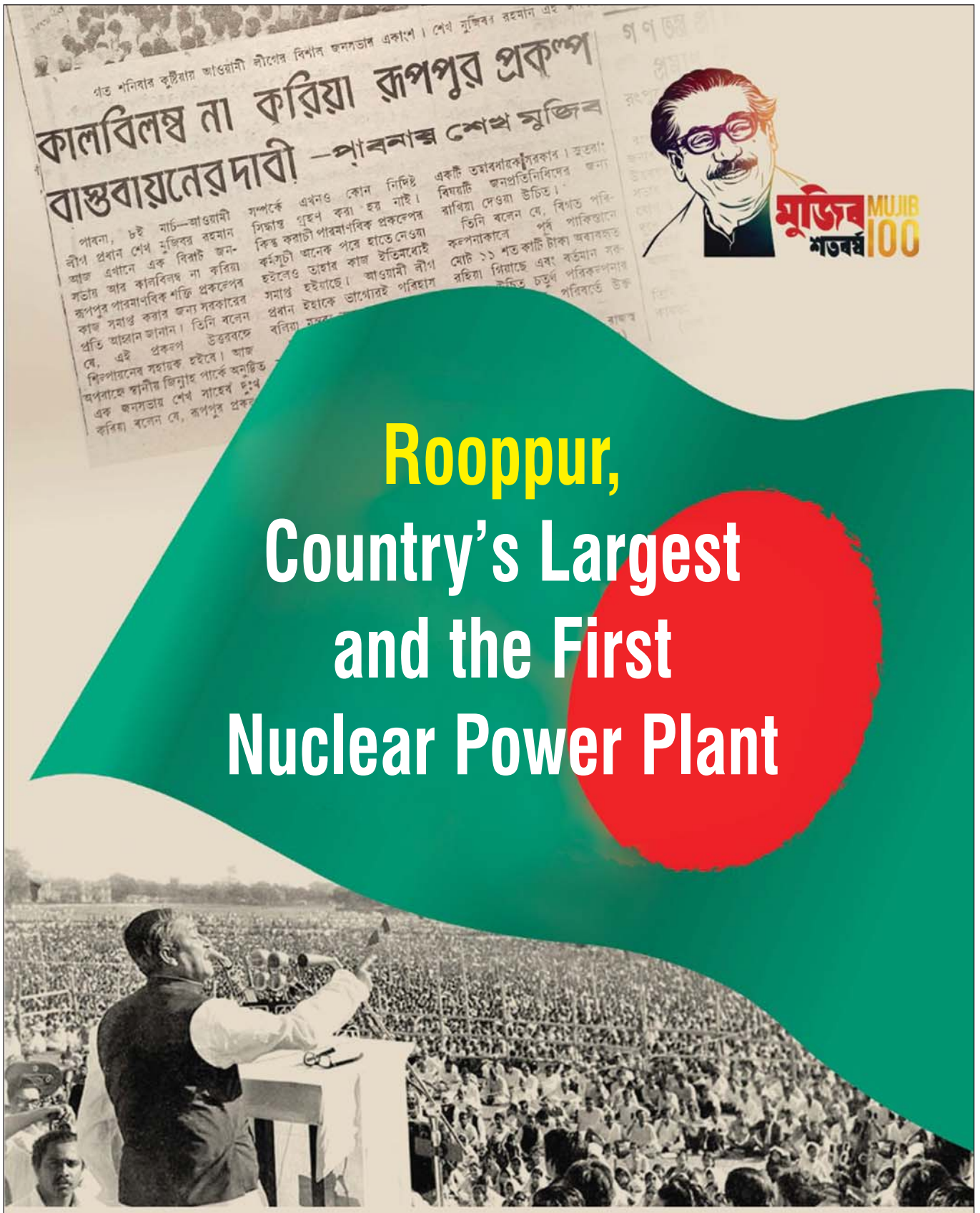


Work going on in Rooppur NP

Here, I would like to mention a relevant issue. After a comparative analysis of the technical and financial aspects between Russia's Generation-3 (VVER-1000) and Generation 3+ (VVER-1200 and VVER-1300 TOI), I had given my opinion to select the VVER-1200 model – which has the highest proven safety features – at a technology selection policy-making seminar on July 5, 2015. In this regard, I published an article 'How should the reactor of Rooppur be?' (Source: 2 August 2015, Daily Prothom Alo). The reason for mentioning this is that the financial matter is closely related to reactor technology. Generating electricity from nuclear energy is very environmentally friendly and economic. The Gen-3 + VVER-1200 reactor with modern safety features is extremely unlikely to fail like Chernobyl or Fukushima. Now it is necessary to complete the construction work on time with the ancillary infrastructure and adapt the technology by creating skilled manpower. Then it will be possible to generate reliable, affordable, and clean electricity for all.

EP

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Rooppur, Country's Largest and the First Nuclear Power Plant

Rooppur Nuclear Power Plant

MITSUBISHI POWER

Bangladesh's Journey to A Sustainable Future

Every country in the world will be impacted by climate change, and Bangladesh is also subject to its effects. While contributing less than 0.47% of global emissions, it is one of the most climate-vulnerable countries globally.

Bangladesh has laid out clear plans to decarbonize and do its part to fight climate change in the Mujib Climate Prosperity Plan (MCPP), launched at this year's COP26.

This sets Bangladesh on a transitionary path towards renewables by moving away from fossil fuels, exploring more energy storage solutions, and focusing on fuels like hydrogen and ammonia for zero-carbon power generation.

Natural gas as a transitionary fuel

Even as coal plants remain on the energy grid to ensure energy security, Bangladesh is haltingdevelopment of new coal plants and shifting to natural gas in the near term. Earlier in 2021, it scrapped plans to build 10 new coal-fired power plants of over 8,700 MW in capacity.

This shift to natural gas-fired power plants helps reduce carbon emissions and water consumption. Mitsubishi Power's gas turbines reduce emissions by up to 65% when compared with coal-fired power plants, with power generation efficiency approaching 65% and reliability of over 99%. For every megawatt of electricity produced using natural gas instead of coal, water consumption is also reduced by 260 gallons.

In 2001, Bangladesh began operation of its first large-class gas turbine, Mitsubishi Power's M701F gas turbine, at the Haripur Power Plant in the city of Narayanganj. The M701F gas turbine also supports four other power plants across the country - the New Haripur, Bheramara, Bibiyanaand Sirajganj Power Plants - and continues to be one of the most efficient and reliable today, supporting the energy transition.



Mitsubishi Power's gas turbines reduce emissions when compared with coal-fired power plants, and enhance power generation efficiency and reliability

Adopting carbon-free fuels

In the long term, carbon-free fuels such as hydrogen and ammonia will play key roles in getting the country to net-zero, as both fuels don't emit carbon dioxide.

In addition to being able to utilize natural gas for power generation, Mitsubishi Power's large-class gas turbines can also co-fire with 30% hydrogen and are slated to support 100% hydrogen firing by 2025. When utilized as part of a combined cycle power plant, the 30% hydrogen system will reduce carbon emissions by more than 75% compared to traditional coal-fired power plants.

Additionally, Mitsubishi Power's H-25 Series gas turbines will have the ability to exclusively fire with ammonia by 2025 – and can be adopted in tandem with other technologies such as renewable energy to enable a gradual energy transition for Bangladesh.

Supporting the adoption of renewables

Renewable energy sources such as

wind and solar will bring about substantial carbon reductions for the country but could be susceptible to seasonal shifts and changes in demand. Battery Energy Storage System (BESS) solutions,such as those from Mitsubishi Power, will help maintain energy security by storing energy for use when supply decreases and demand peaks.

Another complementary technology for renewables are gas turbine combined cycle (GTCC) plants, which are able to operate flexibly, to support energy needs of the grid.



Since 2011, Mitsubishi Power has worked on BESS solutions, amassing orders globally totaling over 1GWh worth of energy storage

A partner in Bangladesh's energy transition

Mitsubishi Power is a committed partner to Bangladesh in its journey to decarbonization. We have been a part of the country's journey since 1960, when we delivered our first steam turbine to Bangladesh, and are now responsible for approximately 20% of the country's peak daily energy production, across 13 power plants and industry sites.

With decades of invaluable experience, operations and maintenance (O&M) services have also been integral in our work to ensure power plants run efficiently with minimal downtime. We work with customers to propose and implement the right financial solutions to fund new projects – and have formed strong partnerships with government bodies andlocal utilities.

We remain committed to our efforts to help produce 'Power to build a brighter sonar Bangla'. EP

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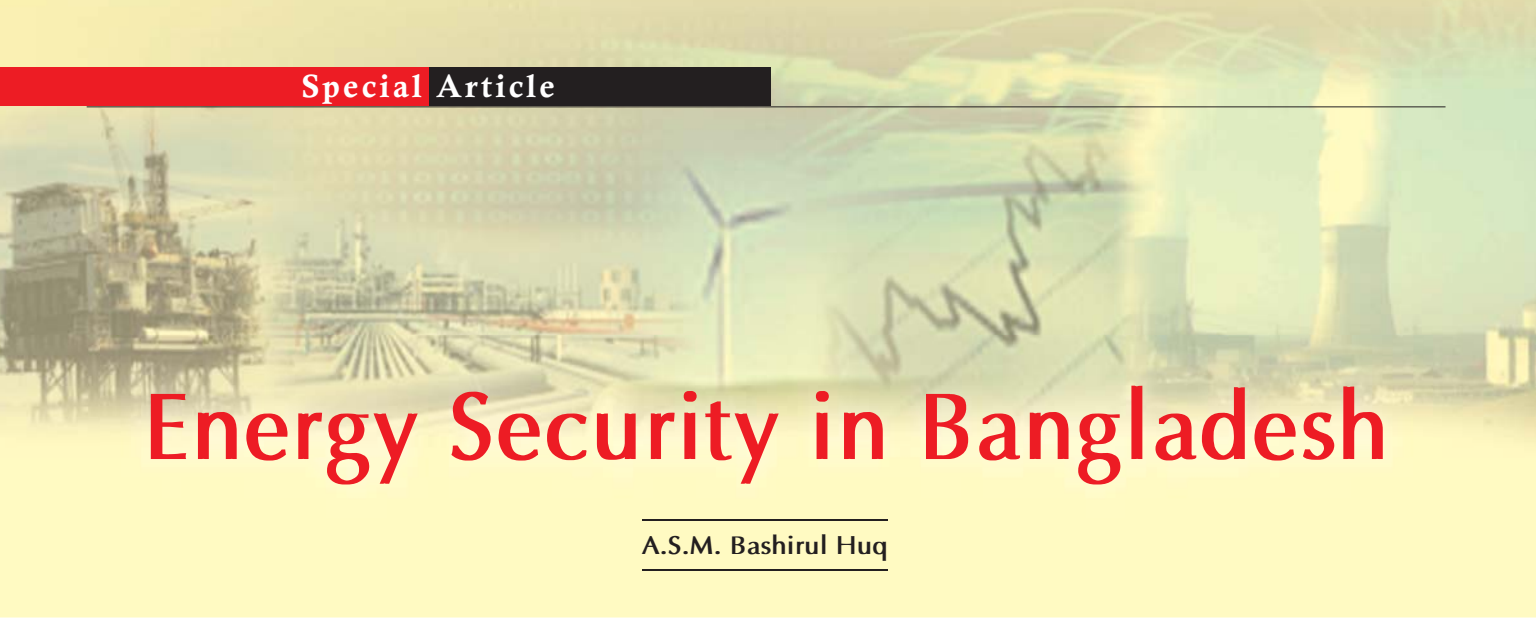
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বিজ্ঞাপন হার	টাকা
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ভেতরে অর্ধেক পাতা (রঙিন)	২০,০০০.০০
ভেতরে ১ কলাম (রঙিন)	১০,০০০.০০
ওয়েব সাইট প্যানেল প্রতিমাসে	২০,০০০.০০
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মোফাজ্জল হোসেন জয় ০১৭১২ ৬৭৭৬০১
E-mail: rangberang2020@gmail.com

রুম ৫০৯, ৫১০, ৫১১ ও ৫১২, ইস্টার্ন ট্রেড সেন্টার, ৫৬ ইনার সার্কুলার রোড, পুরানা পল্টন লাইন, ভিআইপি রোড, ঢাকা-১০০০
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Energy Security in Bangladesh

A.S.M. Bashirul Huq

The 2030 Agenda for Sustainable Development, adopted by all the member states of United Nations in 2015, provides a shared blueprint for peace and prosperity of the people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve quality of life, health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The seventh of the 17 goals calls for ensuring access to affordable, reliable, sustainable and modern energy for all.

In a June 14, 2021 report released by the United Nations Sustainable Development Solutions Network (SDSN), it was announced that three countries, including Bangladesh, have made the best progress in implementing the Sustainable Development Goals (SDGs). After receiving the 2030 Global Agenda in 2015, Bangladesh has achieved this progress in SDGS Index Score. The other two countries on the list are Afghanistan and Ivory Coast.

Energy security is defined as the ability of a country to ensure adequate, affordable as well as a consistent supply of energy for use in domestic, military, industrial and transportation. Energy security further relates to present and future requirements of energy and ensure that energy deficiency never takes place for the consumers despite critical situations such as political instability and economic crisis.

The International Energy Agency (IEA) defines energy security as the uninterrupted availability of energy sources at an affordable price. Energy security has many aspects: long-term energy security mainly deals with timely investments to supply energy in line with economic developments and environmental needs. On the other hand, short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance.

Water is essential for all phases of energy generation, from production of fossil fuels and biofuels to power plant operation. Managing energy-water linkages is, and will continue to be, pivotal to the prospects for successful realization of a range of development and climate goals.

Energy security should be reciprocal. It is a two-way street. Security of demand is as important to producers, as security of supply is to consumers.

The energy sector faces multiple threats from climate change, in particular from extreme weather events and increasing stress on water resources. Greater resilience to climate change impacts will be essential to the technical viability of the energy sector and its ability to cost-effectively meet the rising energy demands driven by global economic and population growth.

The inter-dependencies between energy and water are set to intensify in the coming years. Water is essential for all phases of energy generation, from production of fossil fuels and biofuels to power plant operation. Managing energy-water linkages is, and will continue to be, pivotal to the prospects for successful realization of a range of development and climate goals.

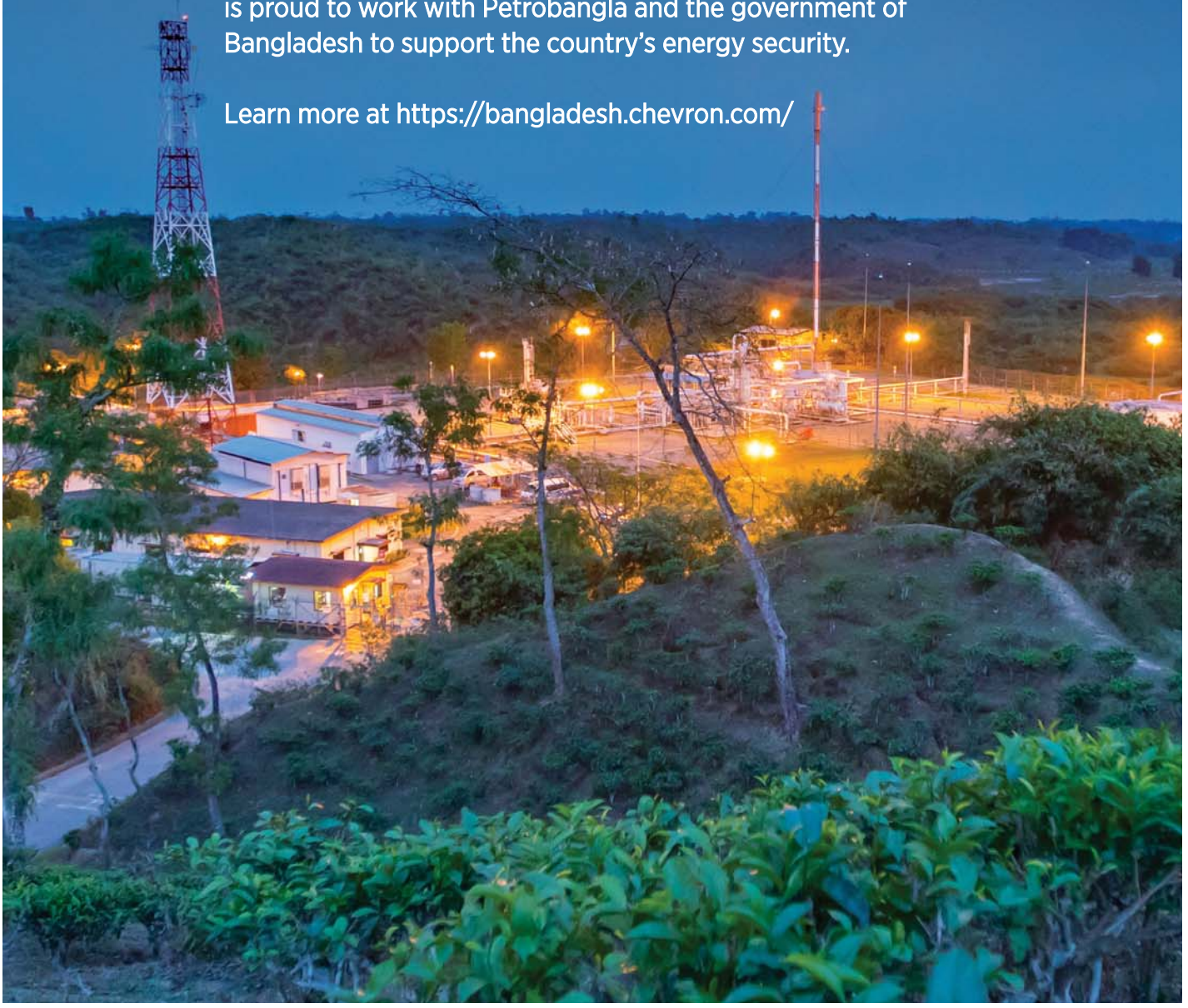
Half a century ago, in the 1970s, energy security referred to the provision of imports of oil at stable prices and the availability of domestic fossil fuels free from disturbance and from labor unrest. The goal of energy security was to prevent long lines of cars waiting for limited gasoline, or avoid electricity load shedding, or for the rural people of countries like ours, make kerosene oil available at affordable price for cooking and lighting. However, population growth and increasing levels of per capita resource consumption at better standard of living drives growing energy demand in the present time. The modern energy landscape is complex, and energy security is a much broader and more dynamic concept than it was in the old time.

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The Following Table Would Show The Growth of The Power Sector in The Last 12 Years Under The Present Government's Regime:

Item	In 2008	In 2021	Gain/Loss
No. of Power Stations	27	146	119
Generation Capacity (MW)	4,942	25,235	20,293
Transmission Line (Ckm)	8,000	12,848	4,848
Grid Substation Capacity (MVA)	15,870	52,364	36,494
Power Import (MW)	0	1,160	1,160
Distribution Line (km)	260,000	613,000	35,3000
Population Having Access to Electricity (%)	47	99.5	52.5
Per Capita Electricity (kWh)	220	560	340
Number of Customers (Mn)	10.80	40.70	29.90
System Loss (%)	14.35	8.49	-5.84

Source: Power Cell

Public expectations have also evolved as a consequence. However, essentially a society should be able to carry on despite short term shocks to the supply of energy.

Renewable energy is an important component of energy security but it works differently from fossil fuels. For example, inertia functions differently. Inertia is the capacity of a power system to respond to unexpected shocks, and its ability to react and stabilize the system's balance.

Future energy systems, responsive to this enlarged concept of energy security, will look very different. Large fossil fuel and synchronous generators will be replaced by a clean electricity system composed of small-scale, clean asynchronous generators. It will mix large renewable projects (which will mean extending the physical transmission network) with distributed energy generation (for example, from rooftop solar), and the network will require new systems to ensure coordination and stability.

There is a relationship between energy and development. For any country, affordable energy, especially access to electricity, enables better health care, improved education, and greater food production. Infant mortality decreases, life expectancy increases, living standards improve. In the present time, citizens live longer, and earn a better living. In developing countries like Bangladesh, massive population growth, huge influx of people to cities, excessive water use, and increased numbers of automobiles are combining to make energy security the critical challenge of our time. In short, more development would require more energy.

While considering energy security, it has to be kept in view that fossil fuel era is nearing its end. The IEA on May 18, 2021 published a report outlining the essential conditions for the global energy sector to reach net-zero CO2 emissions by 2050. It presented the "most technically feasible, cost-effective and socially acceptable pathway" to show what is needed across the main sectors by various actors, and by when, for the world to achieve net-zero energy-related and industrial process CO2 emissions by 2050.

There is a target — 75% reduction in methane emissions from fossil fuel use by 2030. Coal demand to decline by 90% to less than 600 million tonnes of coal equivalent in 2050, oil would decline by 75% to 24 million barrels per day and natural gas may decline by 55% to 1750 billion cubic meters. The roadmap sets out milestone to guide the global journey to net zero by 2050. These include, from today, no investment in new fossil fuel supply projects, and no further final investment decisions for new unabated coal plants. By 2035, there will be no sales of new internal combustion engine passenger cars, and by 2040, the global electricity sector would have already reached net-zero emissions.

World leaders, green groups and influencers reacted to a "terrifying" UN climate science report on August 9, 2021 with a mix of horror and hopefulness as the scale of the emergency dawned on many.

"Fossil fall guys", UN Secretary-General Antonio Guterres said the report "must sound a death knell" for coal, oil and gas, and warned that fossil fuels were destroying the planet.

Energy Security Situation in Banglades

In 1971 at the time of liberation, 3 percent of the total population in Bangladesh had access to electricity, while today; about the entire population has been brought under the electricity network. In the many areas that are too remote to be connected to the national electric grid system, solar power and photovoltaic cells are the people's alternative choice for getting electricity. In islands like Kutubdia, where national grid is not likely to be available in near future, wind power is being tried for harnessing, and has at present the largest wind power plant in the country. People there also use solar power while there is an electricity generating station too.

At the time of liberation of Bangladesh, all the gas fields of the country were operated by foreign companies as they had discovered them. Wise and prudent statesman Bangabandhu Sheikh Mujibur Rahman as President of the

country took a bold and far-reaching decision to ensure energy security of the independent country and took over the five gas fields, viz., Titas, Habiganj, Rashidpur, Kailashtila and Bakhrabad, on August 9, 1975 for only 4.5 million pounds sterling from the foreign companies. His government rightly felt that in order to continue the trend of development, uninterrupted supply of energy to industries would have to be ensured.

The most important measure in the energy balance of Bangladesh is the total consumption of 53.6 bn kWh of electric energy per year. Per capita this is an average of 560 kWh, which is, however, one of the lowest in the world, and higher than only Nepal and Afghanistan in South Asia.

Like all the countries in South Asia, Bangladesh faces many of the same challenges as the rest of the world: the country's economy to grow fast, raising energy demand growth; but the country has not developed sufficient domestic resources, remaining dependent on imports. The major state-owned utilities in the energy sector lack commercial incentives and tend to be inefficient; prices for fuels such as kerosene, LPG and diesel, and electricity are somewhat distorted that encourage their inefficient use. However, Bangladesh Energy Regulatory Commission is now at the helm to bring about transparency and accountability in the sector by addressing these inconsistencies for creation of a level playing field for all, thereby attracting investment

Oil & Gas Sector

It is a fact that fossil fuels do, and will continue to dominate energy sectors around the world even as all seek ways to reduce greenhouse gas emissions associated with use of these fuels. All said and done about fossil fuel, and its unpredictable pricing, proved reserve of petroleum crude oil and natural gas in the world is still abundant. Present reserve of oil will be good for at least seven decades, and natural gas is likely to see the world through about a hundred years. The quantum of petroleum product requirement will rise substantially if the country's natural gas runs out and its dependence on liquid fuel increases. At the same time, pressure on the country's hard earned foreign currency will rise too.

Nuclear Power Reactors of RNPP

Unit	Type	Capacity (gross)	Construction started	Operation
Rooppur 1	VVER-1200/523	1200 MWe	30 November 2017	2023
Rooppur 2	VVER-1200/523	1200 MWe	14 July 2018	2024

Bangladesh does not have any oilfield and, therefore, all the oil required in the country has to be imported, about 1.5 million tonnes of crude oil for processing in the small refinery in Chattogram, about a million tonnes for Bashundhara Bitumen Refinery in Dhaka, and the rest as finished products. Present consumption of oil is 7 million tonnes of which about 5 million tonnes is High Speed Diesel Oil (HSDO) that is needed for transport and irrigation sectors. It is estimated that the quantity would go up to 10 million tonnes in 2030. Additionally, another large quantity of petroleum products is Liquefied Petroleum Gas (LPG). Present consumption of LPG is about 1.2 million tonnes used for domestic cooking, industry and for transport vehicles as auto gas. About 20,000 tonnes of LPG is produced in the country, 15,000 tonnes in the refinery and 5,000 tonnes at Kailashtila Gas Field from natural gas. Rest of it comes through imports from various countries and sources by 28 companies in the private sector. This quantity would rise to 3 million tonnes in 2030.

Lubricating oil is another important product needed for all machinery operation. Lubricant base oil is all imported for production of 25,000 tons in three blending plants in the country and the balance about 100,000 tons comes as finished products through imports from Gulf States and India.

Bitumen is also an important petroleum product used mainly for road construction and repair. The present consumption in the country is about half a million tonnes of which about 60,000 – 70,000 tonnes was so long produced by the refinery, and the balance quantity was imported. But in 2020, Bashundhara Group set up one million tonnes capacity bitumen plant in Keraniganj, Dhaka. This plant can meet the entire requirement of the country and export a sizable quantity too.

Bangladesh is the nineteenth-largest producer of natural gas in Asia. Gas supplies presently meet 56% of domestic energy demand.

Chevron, ConocoPhillips, Equinor, Gazprom and ONGC have been major international oil companies (IOCs) engaged in Bangladesh's hydrocarbon industry, with Chevron's gas fields accounting for the largest of natural gas production.

Bangladesh is known to be one of the least exploited countries in the world. Around 100 wells have been drilled for oil and gas in the last hundred years. This is a prime example, by any standard, of an underexplored country which has seen major gas discoveries in the past, and has been rated highly for further gas prospects.

To encourage natural gas exploration, with Bangabandhu's farsightedness and keen interest for exploring hydrocarbon and developing the energy sector, the government opened the hydrocarbon sector to foreign investors in 1972, when a few major international oil companies carried out exploration in the offshore areas in the Bay of Bengal, but without any positive results. The next bidding round was opened in 1993 and 1997. After initiating the First Bidding Round of Production Sharing Contracts, IOCs today produce about 850 MMCFD of natural gas, making over 50 percent of total gas production. The leading foreign producer is Chevron, which alone produces 800 MMCFD from the Bibiyana, Jalalabad and Moulavibazar fields.

Over the last 20 years, Bangladesh consumed about 13 trillion cubic feet (TCF) of gas. During the same period, only less than 2 TCF of new gas reserve has been discovered. The number of exploration wells drilled during this time was merely 22.

The production level from existing discoveries of about 12 TCF of gas in the country is expected to start declining quickly in the next few years. However, the majority of geological areas in the country is still unexplored. In the Gas Sector Master Plan 2017, it is mentioned that there are still large upsides in the indigenous production in Bangladesh if further exploration successes can be achieved.

At present gas demand in the country is over 3350 MMCFD, and the country produces about 2,400 MMCFD. To meet the deficit, the government has taken a very timely step to import 800 MMCFD of Liquefied Natural Gas (LNG) for which two Floating Storage and Regasification Units (FSRUs) have been anchored at Maheshkhali from where the gas is transferred to the national gas grid for supplying to the customers. Of the two FSRUs, one belongs to Petrobangla's Rupantarito Prakritik Gas Company Limited (RPGCL). This was installed in April 2018 and started operation in August that year. This is being operated by a US company Excelerate Energy on build, own and operate (BOO) basis for 15 years. A total of 310,553 MMCF LNG has been supplied through this facility till July 31, 2021. The other similar FSRU belongs to local private energy company Summit and runs under same condition as that of the RPGCL. The second FSRU was completed and its operation started in April 2019. This facility supplied 246,773 MMCF LNG till July 31, 2021. A 1,000 MMCFD capacity land-based LNG receiving terminal is in the process of construction at Matarbari in Cox's Bazar district. It is expected that the LNG import is going to be a regular feature to meet the country's gas demand unless new discoveries are achieved.

Geologists believe the country's maritime exclusive economic zone holds one of the largest oil and gas reserves in the Asia-Pacific. Protectionism and a lack of technical capacity have impeded Bangladesh's potential to emerge as a major global hydrocarbon producer.



Country's largest Bibiyana gas field Photo: Chevron

Coal

At present there is no unified coal policy and, as a result, extraction of the resources, though abundant, still remains in a nascent stage, while plan was to increase power generation from coal to 50 percent from 2 percent by 2021. However, the present coal power accounts for about 8 percent, and a few large coal power plants are coming up to generate electricity with imported coal. Only one coal mine in the country provides fuel for generation of 250 MW power at a mine-mouth plant. However, the government has reportedly decided to scrap the approval for 10 coal-based power plants with a total generation capacity of 8,451 MW. The decision was taken considering the impact of new coal-fired power projects on the environment. Bangladesh targets to produce 40% of its electricity from renewable energy sources by 2041, as part of its commitment to the Climate Vulnerable Forum (CVF).

Electricity

Electricity is the major source of energy for most of the economic activities. Bangladesh's total installed electricity generation capacity (including captive power) was 4,948 megawatt (MW) in 2008, 15,351 MW as of January 2017 and 20,000 MW in 2018. In 2021, the generation capacity has gone up to 25,235 MW.

Bangladesh's capital Dhaka is an ancient city. There is a popular saying that the Nawab of Dhaka had installed a small generator in his palace "Ahsan Monzil", and started generating power at 5 pm on 7th of December 1901, which is considered as the introduction of electricity in Dhaka city. Later, around 1930, DEVCO, a subsidiary of Octavius Steel Company, developed electricity distribution system at 400 Volt level under private ownership and brought that for public access. Probably in 1933, a power generation station named "Dhanmondi Power House" (DPH) was established with two 1500 kw generators each, from which the electricity distribution system of the city started for sale to the public on commercial basis.

At the time of partition of India in August 1947 when the British colonial rulers quit, power generation and distribution in the present territory of Bangladesh were in the hands of some private sector business houses. The power supply to the then 17 provincial districts was only within the district headquarters in a limited scale. The generation voltage was 400. Power was supplied to most of the towns during the

নর্থ-ওয়েস্ট পাওয়ার জেনারেশন কোম্পানি লিমিটেড

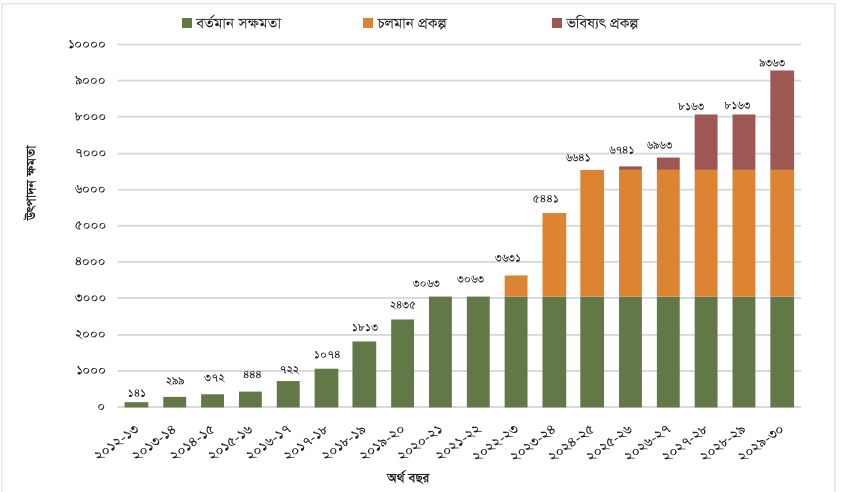
দেশের উন্নয়ন অগ্রযাত্রায় গর্বিত অংশীদার



দ্রুত বিদ্যুৎ উৎপাদন বৃদ্ধির স্বীকৃতি স্বরূপ মাননীয় প্রধানমন্ত্রী শেখ হাসিনা'র হাত থেকে **পুরস্কার** গ্রহণ করছেন নর্থ - ওয়েস্ট পাওয়ার জেনারেশন কোম্পানি লিমিটেড এর প্রধান নির্বাহী কর্মকর্তা প্রকৌঃ এ.এম. খোরশেদুল আলম

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nighttime only. Exception was in Dhaka where power was supplied round the clock from DPH and the generation voltage was 6600 volts, and this was the highest supply voltage at that time. There were no long-distance transmission lines, nor was there any interconnection between the towns. Besides, captive power was generated by some industries (tea, sugar and textile) and railway workshops. Dhakeswari Cotton Mills, Pahartali Railway workshop, Saidpur Railway workshop and Sugar Mills were among them. In aggregate, the generation capacity of the country was 21 MW. The generation capacity of the power utility companies together was only 7 MW and there was no transmission system. Later in 1960s, the largest generation was at 36 MW power house of Natural Gas Fertilizer Factory Fenchuganj (NGFF) in the district of Sylhet.

In 1948, Electricity Directorate was set up in order to plan and improve power supply situation. In 1959, East Pakistan Water and Power Development Authority (EPWAPDA) was established and a modern power system really started taking off. In 1960, Electricity Directorate was merged with EPWAPDA. The philosophy was to give more autonomy to an organization for development of this basic infrastructure. At that time, relatively higher capacity plants were built at Siddhirganj, Chittagong and Khulna (highest plant size was only 3 units of 10 MW Steam Turbine generators at Siddhirganj). At the same time, the Kaptai dam was under construction under Irrigation department. Two units of 40 MW were installed at Kaptai, and this for that time was considered to be the largest power plant. Side by side construction of Siddhirganj-Kaptai 132 kV transmission line was in progress. Construction of Kaptai dam and commissioning of Siddhirganj-Kaptai 132 KV transmission line in the year 1962 may be taken as a milestone of power development of this country.

In 1972, after the emergence of Bangladesh as an independent country, Bangladesh Power Development Board (BPDB) was set up by dividing East Pakistan Water and Power Development Board (EPWAPDA) as a public sector organization to take control of the power sector.



Excelerate LNG ship Photo: Chevron

The power sector of the country was a vertically integrated state-owned monopoly as Bangladesh Power Development Board (BPDB), which with time was becoming too large with too many sub-sectors to keep control under one head. In order for promoting security of power supply, with suggestions and financial assistance from the multilateral development partners like the World Bank and the Asian Development Bank, BPDB was slowly and steadily broken up and initially its transmission sector was separated as a new organization named Power Grid Company of Bangladesh Ltd. (PGCB) to own, operate, maintain and develop the transmission system to meet the growing need of the country.

During the mid-1970s the government had initiated reform of the power sector by establishing rural electrification for achieving a desirable social upliftment in the country. A different approach and a new model were considered for undertaking a comprehensive scheme. In October 1977, the BREB and later in 1991, the Dhaka Electric Supply Authority (DESA) was created basically to operate and develop distribution system in and around the metropolitan area of Dhaka and to bring about improvement of customer service, collection of revenue and lessen the administrative burden of BPDB. Gradually, it was given the entire rural power distribution system to be done through Palli Bidyut Samities (PBSs), which are cooperatives of the users. In order to improve the electricity distribution system of the capital city, another utility, Dhaka Electric Supply Co. Ltd. (DESCO) was set up as a state-owned company by dividing DESA, and DESA has been renamed as Dhaka Power Distribution Company Ltd. (DPDC). Two more electricity distribution companies have been established – one for the Khulna zone and another for Bogra-Rangpur zone, viz., Western Zone Electricity Distribution Co. Ltd. (WZEDC) and Northern Electricity Supply Company Ltd. (NESC) respectively.

It may be mentioned here that because of the large investment required for installing new power plants in the public sector, Independent Power Producers (IPP) policy was adopted by the government in 1996 at the initiation of the World Bank. As of June 2009, Bangladesh had total installed capacity of 4942 MW at both BPDB and IPP units in the country.

The transmission network of BPDB (now PGCB) is 12,848 route km long comprising 230 KV, 132 KV and 66 KV lines and the total capacity is 52,364 MVA.

From the above, it may be observed that the prevailing situation of Bangladesh power situation was rather poor. But with the government's strong and

effective position on energy sector development, the scenario has changed a lot and, in the last one decade, the generation capacity rose to more than 25,000 MW and the government's vision of providing electricity to all by the year 2020 met with success.

One most outstanding achievement in ensuring energy security was constructing transmission grid between Bangladesh and India in 2015 for exchange of power between the two friendly neighboring countries. A total of 1,160 MW power is being imported from India and the process is ongoing. It is, however, a two-way power transmission link, and, if needed, India may also import from Bangladesh.



Payra coal fired power plant of BCPCL Photo: BCPCL

Other Options

Although non-renewable, nuclear energy is a clean reliable source for stable energy supply around the world. A total of 443 nuclear power plants currently operate in 32 countries. Most are in Europe, North America, East Asia and South Asia. The United States is the largest producer of nuclear power, while France has the largest share, 70 percent of electricity generated by nuclear power. In addition to the commercial nuclear power plants, there are about 220 research reactors operating in over 50 countries, with more under construction, also for producing medical and industrial isotopes. Nuclear reactors are used for marine propulsion too, mostly in naval ships.

In the face of reducing fossil fuel use in all aspects of life, Bangladesh's decision to install two nuclear power plants at Rooppur known as Rooppur Nuclear Power Plant (RNPP) is a bold and correct decision. The power plant will have two reactors and two generators of 1,200 MW capacity each. The first unit will be ready for operation in 2023 and the second unit in 2024.

According to estimates made in 2019, the global nuclear fuel uranium reserves were over 8 million tonnes, sufficient for over a hundred years at current level of consumption. It is, however, believed that the world will not run out of uranium for centuries to come.

In the last 75 years, serious nuclear power plant accidents were three – the Fukushima Daiichi nuclear disaster (2011), the Chernobyl disaster (1986), and the Three Mile Island accident (1979). There was also the SL-1 accident (1961). Nuclear power accidents can involve loss of lives and large monetary involvement for remediation work.

Renewable Energy

Renewable energy (RE) has become a viable option and is the ultimate answer to mitigate the impact on climate. Use of renewable energy sources still remains at an insufficient level, despite significant potential being available. We see the accelerating growth of rural electrification, and the growing recognition of its importance in many parts of the world. Many of the technologies will provide part of the answer to our long-term sustainable energy needs.

Renewable energies have the virtue not only of being clean and potentially abundant, but they also can add to security and lower dependence on imported fossil fuels. There are many potential sources of renewable energy, but the technology for capturing and storing intermittently generated power is not adequate.

Solar Power

Solar energy has several great benefits, including eliminating electric bills and avoiding utility inflation. It represents an infinite source of power. Solar energy also protects the environment, creates jobs and saves the user from paying electricity bills.

Worldwide usage of solar energy varies greatly by countries. As of 2019, China had the largest solar energy capacity in the world of 204,700 MW, about 3.9% of China's total energy consumption.

Bangladesh has one of the world's largest domestic solar energy programs. The World Bank and other development organizations, along with the private sector, are working with the government to bring affordable, solar-powered electricity to places where the traditional grid doesn't reach.

Small-scale solar home systems now provide electricity to more than 4.0 million households and about 20 million people in rural areas, roughly one-eighth of the country's population.

The program has also introduced 1,000 solar irrigation pumps and 13 solar mini-grids.

Wind Power

Wind power is the conversion of wind energy by wind turbines into a useful form, such as electrical or mechanical energy. The power is directly proportional to the velocity of the wind. Wind energy was the first source of energy in the history of mankind. It has been put to use for around 5000 years. During the last decades, the technology

for wind energy has improved very fast. Early wind wheels could produce just a couple of kWh; while new turbines can produce millions of kWh a year with rated power up to 6 MW.

The present day phase of wind electric generators (WEG) started with the oil crisis of middle east during 1975, when renewed need was felt for the government to get new and renewable sources of energy. Work under development of wind electric generators started in many countries notably Denmark, Germany, USA, UK, the Netherlands etc. This development took two directions: one large size and other small size.

In Kutubdia, a wind battery hybrid power plant (WBHPP) is the first grade quality, 11 kV, largest and successful renewable energy project in Bangladesh and was supplying 3 hours during day times and 3-4 hours during night times. The WBHPP has been running well for more than two years. They were supplying 0.60 to 0.80 MWh electrical energy every day at 11KV. The WBHPP supplied more than 240 MWh electrical energy to the consumers at Kutubdia Upazilla sadar.

In the islands and southern coast line of Bangladesh, the average wind speed remains between 3 and 4.5 m/s in the months of March to September and 1.7 to 2.3 m/s for the residual period of the year. So, in islands and coastal areas, the appeal of wind mills for pumping and electrification is very high. BPDB has completed a 1000 kW capacity wind battery hybrid power project in Kutubdia island. Under this project, a total of 50 units of 20 kW capacity stand-alone type wind turbines were installed. The total power generated by all the wind turbines is stored in a battery bank. Wind Battery Hybrid Power Plant (WBHPP) was officially started on March 30, 2008. The other project of BPDB has completed a 0.90 MW capacity grid connected to wind energy at Muhuri Dam area in Feni district in 2004. One major benefit of wind turbines is that they do not need any fuel for electricity generation. The wind condition for generation of electricity at different places in Bangladesh is different. The maximum annual average wind speed is 2.42 m/s in Cox's Bazar and minimum 2.08 m/s in Hatia Island.

The cabinet committee on public purchase recently approved the construction of a 55 megawatt capacity wind power plant at Mongla in Bagerhat.

Biomass Power

Biomass is a potential source of energy in Bangladesh. The rural economy is plagued by slow growth rate, unemployment problem, deficient infrastructure and abject poverty. Currently, Bangladesh is the seventh most crowded countries in the world and biomass provides 75% of the total energy. Since it is an agrarian country, biomass is almost like renewable energy source in Bangladesh. Agricultural crop residues, animal manure and municipal solid waste are the major sources of biomass energy in the country.

Future energy systems, responsive to this enlarged concept of energy security, will look very different. Large fossil fuel and synchronous generators will be replaced by a clean electricity system composed of small-scale, clean asynchronous generators.

In the National Energy Policy 1966, it is stated in Article III.1.3 that "Direct and total replacement of biomass fuels by commercial energy will be prohibitive for financial and infrastructural constraints. Biomass fuels will, therefore, continue to play an important role in energy scene of the country for many years to come". It has been observed that the trend of use of biomass fuels will continue at least beyond 2030.

In fact, biomass fuels are still the major cooking fuels in Bangladesh and they account for 75 percent of cooking fuels, while 13 percent get piped natural gas and 11 percent use Liquefied Petroleum Gas (LPG). Electricity is also used by some for cooking purpose. Majority of the rural households are the majority users of biomass fuel for cooking. Statistics of their supply and consumption are not considered in the national accounting system for estimating GDP. As the biomass fuels are noncommercial, they are generally identified in the literature as non-commercial fuels. Thus the important contribution of biomass fuels remains unaccounted for in the national economy.

Conclusion

Given that it is very important to ensure energy security, considering the fact that large investments would be required for the purpose, and considering the fact that all of such large investments would not be forthcoming from the domestic market, and considering further that the government's public-private partnership (PPP) initiative has not met with much success yet in the energy sector, it would be necessary to attract foreign direct investment (FDI) in all of the energy sectors. But, according to ADB, "If Bangladesh is to attract greater investment, particularly from abroad, it will need to address some increasingly binding constraints. These are felt especially in infrastructure and the business environment, and include acute power shortages, transportation bottlenecks, inadequate and inefficient port facilities, high business startup costs, and slow institutional reforms".

It has also to be kept in view that improving energy efficiency may be the fastest, cheapest and most effective way to manage energy supply problems over the longer term. Effective conservation can reduce the quantum of energy imports, and help on the environmental front as well. In addition, lower demand for energy would reduce the security concerns and promote activities for more sustainable development. International cooperation could provide development of new technologies and standards in the energy sector to improve energy security, boosting the country's economic growth.

Finally, energy security is one of the prime issues of today's development agenda of the country. EP

A.S.M. Bashirul Huq;
Former Director, Bangladesh Petroleum Corporation

বিশ্বাস আর আস্থায়
ফ্রান্সের টোটাল
এলপি গ্যাস



TOTAL

Small Hydro Source in Bangladesh

Mohammad Mosharraf Hossain

The COP26 concluded with ringing an alarm bell for the global demise of fossil fuel. Coal is in the ventilation unit while oil and gas are in the CCU and ICU respectively. It is only a matter of time, precisely by 2030, 2040 and 2050, when these fuels would be laid to rest making way for the renewable energy in the world. The recent developments in the world energy scenario have triggered serious tremor in the energy sector of most developing countries as well as in the middle-income ones. The global anxiety on the climate change and the need to contain the emission of greenhouse gases have shaken the energy world and coupled with the distortion in the energy demand and supply emanating from the two years of pandemic pushed the fossil fuel prices to an exorbitantly high level which is seen by many as the tip of iceberg that may be ahead to bring the energy sector to a fathomless ocean of troubles. Bangladesh cannot be a case in isolation under such scenario. This is more so when the country has been relying on mono-fuel like natural gas for a long time for its electricity generation. Now with the fast-depleting natural gas and having no sign of discovering a new gas field of world standard and world leaders' summit on climate change declaring holy war on fossil fuels; paradigm shift from the coal, natural gas and oil to renewable energy sources is inevitable. Green energy project should be taken up without any loss of time for the incremental demand of electricity through harnessing offshore wind energy, pumped energy from river water, solar and other conceivable and implementable green sources of energy which need to be dovetailed with writing off the fossil fuel-based power stations.

While different form of renewable sources of energy are being talked about as replacement of fuels, most of the sources are new for Bangladesh. As such detailed techno-economic feasibility study must be religiously undertaken for all the available options before jumping into the band wagon of renewable energy. The popular choice of renewable sources of energy are solar, wind, wave, small hydro, hydrogen, storage battery and nuclear. Many countries of the world are moving ahead with solar and wind while other sources are also getting attention and practiced by some circles. The choice is constrained by the availability of solar power, lands, speed of wind and other physical characteristics including but not limited to geographical location as well as terrain conditions. In Bangladesh till now Solar Home System has gained much popularity but sustainability of such mode of electricity may still be doubtful when examined from the point of view of long-term seamless supply of electricity. In fact, detailed techno-economic feasibility study is a must for all the renewable energy options available for consideration in Bangladesh before deciding on the type of sources that need to be taken up for meeting the electricity need after 2050. Needless to mention that the nature of renewable energy sources may not allow to replicate the process imported from other places without considering the local conditions.

Making a high permanent embankment all the way from uppermost tip of Padma and Jamuna within the territory of Bangladesh up to the confluence of the rivers in the south before these stream meet the Bay of Bengal

Small hydro may be an attractive choice for Bangladesh. Small hydro by definition is not the common dam-based hydroelectricity requiring high head of water, reservoir, dam and other water controlling mechanisms which may not always be environment friendly. Small hydro is related to harnessing energy from the water flow that moves from the glaciers to the sea. Globally water in the perineal rivers is used for many purposes though electricity generation from such flow is still to gain popularity. As the flowing water has some energy, it must be possible to use the same for electricity generation. Therefore, the basic principle in hydropower generation involves conversion of potential energy of river or stream water into electrical energy. The amount of hydropower that can be generated at a river site is directly proportional to the

flow of water and the vertical elevation drop at the site. This indicates that an extensive hydrologic analysis is required, especially in the absence of significant flow monitoring data, to accurately estimate river flow. Two types of hydropower plants, namely the run-of-river type and the impoundment type plants have been extensively studied in many countries. The run-of-river type plant diverts a portion of the flow from the main channel through one or more turbines, and the impoundment type plant stores water in a reservoir system making more water available to run the turbine(s) for a longer period. The run-of-river type plant is suitable for small scale energy production and have less adverse impact to the environment and the population compared to the impoundment type systems.

With the general success of large hydropower as the world's leading source of renewable energy, it is only reasonable that countries consider small hydro, that is run-of-river and development of energy from river flow as well. Large hydro dams are costly to build, and new facilities require extensive timelines for consultation, planning, environmental assessments and construction. In addition, most of the more favorable hydropower sites in Bangladesh like Kaptai, Shangu and other sites in Chittagong areas have been developed or in the process of development. Globally, an old technology with many recent innovations, small hydro is appealing for its reduced environmental impacts, potentially cheaper development, and plentiful prospective sites. Although not yet cost comparable to large hydro, small hydro is still capable of yielding lower costs per kWh than some other sources. Small hydro is likely to gain a stronger presence in coming years if research and development (R&D) becomes more of a priority.

Small hydro as compared to rooftop solar has enormous potential as there is no requirement of land which is hindering the solar and wind power addition. Unbelievable as it may appear, but the smallest of canals and distributaries those criss-crossed the country can contribute enormous amount of decentralized energy at a negligible cost. This yet-to-untapped asset can make up for the renewable energy shortfall being faced at present. Lift irrigation and piped irrigation water can irrigate vast stretches of parched fields. Trains of these micro power houses in the slow-moving man-made canals which are still untapped in our country can contribute enormous amount of renewable energy at a negligible cost. These small power houses are being rigorously investigated all over the world as they can be put up in the shortest possible time frame.



View of Padma river

The Ganges, the Brahmaputra and the Meghna river systems in Bangladesh comprise one of the biggest combined catchment areas of the world and create the biggest Bengal basin. With the ever-increasing incidents of severe losses of landmass along with other assets into the mighty rivers, it is time to give serious thought on the way out for stopping the river bank erosion permanently and make use of the river water flow that meets the Bay of Bengal without any contribution to the energy needs of the country. Some of the approaches, among others, could be (i) making a high permanent embankment all the way from uppermost tip of Padma and Jamuna within the territory of Bangladesh up to the confluence of the rivers in the south before these stream meet the Bay of Bengal (ii) controlling the river flow through constructing barrage (iii) installation of a hydro electricity generation system in an around the barrage for supply of electricity to the people of Bangladesh and (iv) setting up close grid canals with small hydro power generation facilities all over the country taking the feed water from suitable points of the river protection embankments. These projects, related to control of river flow, should be able to erase river erosion problems for good and provide adequate electricity from small hydro power stations in the country. It is time that these projects' feasibilities are taken up for expeditious implementation. Uncontrolled flow of water in Padma and Jamuna leads to crisis for Bangladesh that needs to be controlled and converted into opportunities at the earliest.

EP

Mohammad Mosharraf Hossain;
is a former Chairman of Petrobangla and Bangladesh Energy Regulatory Commission (BERC)



Bangladesh's Future Focus May be on Nuclear Energy Use: Dr Tawfiq

Bangladesh may go for nuclear power use to meet its growing consumption, said Prime Minister's Energy Advisor Dr Tawfiq-e-Elahi Chowdhury.

Taking advantage of advanced technologies, Bangladesh may concentrate on nuclear power in near future to meet its energy demand as it has zero emission," he said recently.

Mr. Chowdhury was addressing the first-ever stakeholders' meeting at a city hotel on formulation of an integrated energy and power sector master plan.

The Power, Energy and Mineral Resources Ministry organized the meeting with State Minister for Power, Energy and Mineral Resources Nasrul Hamid in the chair.

Japan International Cooperation Agency (JICA) is providing financial and technical support for framing the integrated plan for the energy and power sector.

The function was addressed, among others, by Principal Secretary to the Prime Minister Dr Ahmad Kaikaus, Japanese Ambassador ITO Naoki and Power Secretary Habibur Rahman. EP

Reduce Fuel Prices to Facilitate Economic Recovery: BGMEA

Bangladesh Garment Manufacturers and Exporters Association (BGMEA) president Faruk Hasan has urged the government to re-consider the decision of fuel price hike for creating a stable business atmosphere.

He said that the production and transportation costs of the RMG sector have increased by 5 per cent after the recent hike in diesel price, the BGMEA president said at a press conference in a city hotel recently.

"We haven't had much employment in the last two years because of Coronavirus. In order to increase investment and employment, it is necessary to facilitate business and continue existing policy," Faruk Hasan said.

The BGMEA president said that despite the increase of orders in readymade garments (RMG) sector, the prices of the products have not been increased much yet. EP

Chevron Seeks 60sqk Flank to Bibiyana Field

Chevron has proposed to acquire around 60-square-kilometre 'flank' to Bangladesh's largest producing gas-field Bibiyana for additional exploration as the American energy major deems the area abounds with hydrocarbons.

The US-based multinational believes there are additional gas reserves north of the Bibiyana gas field, which is located outside its contract area in the gas-reach north-eastern region, a senior Petrobangla official said.

Chevron has sought the flank area from state-run Petrobangla based on unsolicited offer under the Speedy Supply of Power and Energy (Special Provision) Act 2010.

The law has a provision of immunity to those involved with a quick-fix remedy for energy and power crunch.

"The company intends to carry out drilling of several wells to increase natural gas production (once it gets approval), says the official. EP

Bashundhara LP Gas Holds Distributors' Conference



Bashundhara LP Gas held a conference of its distributors at a hotel in Cox's Bazar recently.

Some 350 distributors from across the country and nearly 150 officials of Bashundhara Group joined the conference titled 'Atut Ek Bondhone', says a press release.

Best distributors were given awards at the event on the basis of their sales volumes during the period from November 2020 to October 2021.

Chief Financial Officer (CFO) of the company Mahabub Alam said: "Bashundhara LP Gas has continued to achieve recognitions one after another at home and abroad. World's acclaimed publications -- Global Business and Business Tabloid -- have also recognised Bashundhara LP Gas as the country's best product."

MM Jasim, COO Brand and Marketing, Sector-A, observed that Bashundhara LP Gas has been playing an important role in strengthening LPG market in the country by harnessing its two decades of experience.

Head of Sales of Bashundhara LP Gas Ltd engineer Zakaria Jalal chaired and moderated the conference. EP



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Govt Setting Up Underground Wire Lines in Ctg: Nasrul



State Minister for Power, Energy and Mineral Resources Nasrul Hamid said that the government has taken a project to set up underground line for removing the hanging wire from the port city.

Nasrul Hamid said this as chief guest while inaugurating a four-day long Chattogram Real Estate and Housing Association of Bangladesh (REHAB) Fair-2021, held at Mohona Hall of Radisson Blu in Chattogram recently.

He said that the government is planning to take all the connecting wire lines into underground pipe line in the city.

"The wire will not see hanging around the city in future. Not only Chattogram, but also all the big cities of the country including Dhaka are being planned in this regard," he added. EP

Energypac Launches Energetic Future Leadership Program

Leading power engineering company Energypac Power Generation Ltd (EPGL) has launched a leadership development program titled 'Energetic Future Leadership Program (EFLP)' to provide students a gateway to the professional world through training and networking.

EPGL has curated the program specifically to provide engineering students with the unique opportunity of setting their chosen professional discipline in the context of the bigger picture, according to a press release.

The Energetic Future Leadership Program will take place over the course of three months with a total of twelve lessons.

Taking place virtually, twice a year, the program will allow students with the special prospect of interacting with experienced professionals.

Highlighting the program's innovative, immersive, and collaborative approach, Naweed Rashid, chief strategy officer, EPGL said: "A great leader possesses a clear vision, is courageous and capable of bringing out the best abilities in others. Energypac realizes the importance of this life-altering skill; hence, we have introduced the comprehensive Energetic Future Leadership Program to provide cross-functional experience, experimental learning, and leadership development training."

Engineering students currently in their third or fourth year will be eligible to partake in this exclusive program.

Participants who complete the courses will receive an official certification from Energypac via a grand award ceremony.

The top three participants will get preferences to secure the Management Trainee Officer (MTO) position at Energypac in their subsequent openings. EP

Filling Station, Tank-Lorry Owners Want Commission, Transportation Fare Hike



As if taking a clue from the public transports, the petrol pump and tank-lorry owners are now demanding that the government raises commissions on fuel sales and transportation fares following the recent hike in fuel prices.

According to sources in the refueling business, the leaders of the Bangladesh Petrol Pump and Tank-Lorry Owners Workers Unity Council, a representative body of the both operators and workers, held a meeting on November 14 to negotiate the demand with the Bangladesh Petroleum Corporation.

But the meeting ended inconclusively, the sources said.

'But no concrete decision has come from the meeting as the BPC took time to hold an inter-ministerial meeting to take opinions from the other ministries concerned,' said Nazmul Haque, president of the unity council, also the president of Bangladesh Petrol Pump Owners Association which also held separate meeting with the BPC on the same issue.

He, however, informed that a 12- point demand of the unity council was placed to the BPC. The organization has been urging the government for long to meet their demands. EP

Linden Energy Interested to Supply LNG to Bangladesh



A US-based internationally focused energy development company seeks to supply liquefied natural gas (LNG) to Bangladesh for a 20-year period, officials say.

In exchange, Linden Energy assures Dhaka of lobbying Washington to secure zero-tariff/lower-tariff entry of Bangladeshi items, including garment, to the US market.

The Houston-based firm has recently placed its proposal in Bangladesh embassy there to this end.

The mission has conveyed the proposal in a letter to power, energy and mineral resources ministry.

Linden has also proposed that a sovereign guarantee be arranged for the deal through appropriate credit institutions, reads the letter.

"This will involve construction of an offshore LNG terminal by a leading US company and the supply of 4.0-million tonnes LNG per annum by another leading company," it says. EP

DPDC, NKSoft Sign Deal to Improve Electricity Supply in Dhaka



Dhaka Power Distribution Company Limited (DPDC) has signed a deal with USA-based NKSoft Corporation to improve the electricity supply in Dhaka by modernizing the distribution system.

NKSoft Corporation Managing Director John Chowdhury and DPDC Company Secretary Md Asaduzzaman signed the $2.07 million contract on behalf of their respective organizations at Biddut Bhaban in the capital on 23 November.

NKSoft KEMA consulting will assist DPDC to modernize five 33/11kv sub-stations in its distribution systems on a pilot basis.

The sub-stations are - Satmosjid 33/11kv, Jigatola 33/11kv, Greenroad 33/11kv, Asadgate 33/11kv and Lalmatia 33/11kv stations. EP

Petrobangla Faces Challenge in Paying LNG Bills to FSRUs



Petrobangla, the state owned oil and gas corporation, is spending huge amount of money for using the floating storage re-gasification units (FSRUs) at Moheshkhali of Cox's Bazar.

"We are importing maximum 2.5 million tonnes of LNG per year and minimum 1.5 million tonnes from Qatar, which translates into an import of around 1,000 million cubic feet per day (mmcfd) maximum. But the government has been importing around 600 to 700 mmcfd to bear the cost of the two FSRUs at Moheshkhali of Cox's Bazar," a senior official of the Energy Division said.

Petrobangla has to pay the terminal owners around $500,000 per day for re-gasification of up to around 1,000 mmcfd of LNG.

However, the FSRUs owned by a US firm Excelerate Energy is named as Moheshkhali Liquefied Natural Gas (MLNG) and the other is owned by a local company Summit LNG. EP

Private ICDs Raise Handling Charges by 23% Citing Fuel Price Hike

Bangladesh Inland Container Depots Association (BICDA) has increased the charges for container handling by 23% citing the recent fuel price hike and increase in other export-import costs.

The owners of 19 private inland container depots (ICDs) in Chattogram – following a recent virtual meeting – made an announcement on the new rates of five service charges with retrospective effect from 4 November.

Bangladesh Freight Forwarder Association (BAFA) and Bangladesh Garment Manufacturers and Exporters Association (BGMEA) have termed the move "illogical" as it will exponentially increase import-export costs.

As per the new tariffs, the transport charge for a 20-foot container (between the port and depot) has been increased to Tk1,415 from Tk1,150.

Haulage charge for a 40-foot container has been hiked from Tk2,300 to Tk2,830.

Also, export stuffing package charges for a 20-foot container have been increased from Tk4,140 to Tk5,092.

The rate has been adjusted to Tk6,790 from Tk5,520 for a 40-foot container.

Meanwhile, for the lift on/off services, the charge for 20 and 40-foot containers has been raised to Tk425 from Tk345.

Tariff for the Verified Gross Mass (VGM) service has been hiked from Tk1,150 to Tk1,415. EP

Wärtsilä, MSC Join Forces on 2-Stroke Marine Engine Conversion Solution

Wärtsilä will commercially launch its Two-Stroke Future Fuels Conversion platform during the first quarter of 2022.

This innovative and patented engine combustion technology platform will enable the fast and cost-effective conversion of two-stroke main engines to operate on clean-burning future fuels.

This is seen as a major step in the maritime industry's efforts to achieve decarbonized shipping operations, while the easy retrofitting will avoid owners having to face long off-hire charter time.

The retrofit conversion will initially enable operation with currently available LNG fuel, most importantly with negligible methane slip from the engine.

The modular design of this concept provides a platform that will be further developed in order to allow for the adoption of alternative green fuels or fuel blends when they become commercially available. EP

Steam Generators Installed at Unit-1 of RNPP



All four steam generators have been installed at the design position at Unit-1 of the Rooppur Nuclear Power Project.

Specialists of Energospecmontazh, a subcontracting organization of ROSATOM State Corporation Engineering Division have carried out assembly operations to install the steam generators at their regular position in the reactor compartment in accordance with the approved schedule.

"Another important stage of the installation works has been completed at Power Unit- 1. The steam generators being installed in the permanent position allows starting welding works on the main circulation pipeline to connect the primary circuit equipment, such as: a reactor, steam generators, main circulation pumps," said Aleksey Deriy, Vice-President of ASE and Director of the Rooppur NPP Construction Project.

The steam generators were manufactured for the Rooppur NPP at the Atommash plant (branch of AEM-Technologies) in Volgodonsk of Russia. Each complete steam generator is about 14-meter-long, more than 4 meters in width and weighs 350 tons. EP

Asia LNG Prices Improve on Higher Demand

Asia liquefied natural gas (LNG) prices rose recently following three weeks of decline as demand increased in China after a sharp drop in temperature, while market players eyed Russian supply into Europe.

The average LNG price for December delivery into Northeast Asia rose to $31.5 per metric million British thermal units (mmBtu), up $2, or about 6.8% from the recent past, industry sources said.

Sustained below normal temperatures could deplete inventories rapidly and send buyers back to the spot market, where prices need to remain elevated to hold the arbitrage against the TTF, Emily McClain, senior gas markets analyst at Rystad Energy, said in a report.

"While the market appears to be heaving a sigh of relief, the healthier supply-side picture is balanced by the onset of colder weather in North Asia and Europe and mounting vessel congestion at the Panama Canal, and we are certainly not out of hot water yet," she said. EP

Matarbari Power Plant Project Cost Goes Up 44pc

The outlay for Matarbari coal-fired power plant, one of the mega-projects of the government, is set to increase by 44.1 percent to Tk 51,854.9 crore following the decision to expand the channel to bring in coal.

As per the original plan, the channel was supposed to be 3km-long, 250 meters wide and 15 meters deep.

Now, the project consulting agency -- a consortium of Japan's Nippon Koei and Tepsco, Germany's Fichtner and Australia's SMEC -- has advised the channel be usable for deep-sea vessels deep sea port.

As a result, the channel will now be 14.3 km long, 350 m wide and 18.5 m deep.

This will cost about Tk 14,327 crore and an additional three years, according to the revised proposal, which will be placed at tomorrow's Executive Committee of National Economic Council meeting.

Japan International Cooperation Agency would largely be footing the additional cost of Tk 15,870.4 crore to take the donor agency's total commitment to the project to Tk 43,921 crore, up 51.8 percent from the original plan. EP

Adnoc to Invest Record $6bn in Drilling



Adnoc is investing $6 billion in drilling growth as it boosts its crude oil production capacity to 5 million barrels per day by 2030.

The investment is in the form of procurement awards to top-tier contractors for wellheads and related components, downhole completion equipment and related services, and liner hangers and cementing accessories, which are crucial in drilling for oil and gas and completing wells, Adnoc said recently.

The contracts were awarded to different local and international companies. Gulf Automation Services & Oilfield Supplies, UAE agents for TechnipFMC, and Al Ghaith Oilfield Supplies & Services Company, UAE agents for Baker Hughes, secured $3.27bn worth of contracts related to the procurement of wellheads and related components for drilling operations. EP

CONFIDENCE INFRASTRUCTURE

CONTRACT SIGNING BETWEEN FOOD MINISTRY AND CONFIDENCE INFRASTRUCTURE AND GSI, USA JV
CONSTRACTION OF STEEL SILO AT NARAYANGANJ





PRIDE IN
BANGLADESHI
INFRASTRUCTURE



Green page

Country's First Hydrogen Fuel Plant Nears Completion



Bangladesh's first hydrogen fuel production plant, a project initiated by the Bangladesh Council of Scientific and Industrial Research (BCSIR), is all set to begin operations by June next year.

The plant will produce hydrogen by converting household waste and water into highly combustible fuel through a process known as biomass gasification and electrolysis of water, respectively, according to BCSIR officials.

The BCSIR has already set up a unit of the plant, and the works to set up another are going on in full swing.

Once both units begin operations, they will collectively produce about 5.8kg of hydrogen fuel daily. The volume could go up to 29kg if the plants run round the clock.

In a bid to locally produce highly sustainable and environment-friendly hydrogen fuel, the BCSIR took up a pilot project involving Tk 54 crore for the "Establishment of Hydrogen Energy Laboratory" at its Chattogram center in October 2018.

The main aims of the project are to conduct research, ensure quality control related to hydrogen production, provide storage and supply solutions, develop infrastructure, and provide services in the form of a national level reference center.

In Bangladesh, the demand for hydrogen is growing in the transportation, energy and power generation, oil refining, steel, methanol, electronics and food industries.

Tawfiq-e-Elahi Chowdhury, adviser to the prime minister for energy, power and mineral resources, recently visited the hydrogen plant.

After his visit, Chowdhury told reporters that the government had taken several initiatives to increase the domestic use of hydrogen fuel.

"Since this is the first plant in Bangladesh, the government is emphasizing on research in this sector," he said. EP

Ctg to Get Country's First Waste-to-Energy Plant

The government is set to install the country's first waste-to-energy power plant in Chattogram within the next one and a half years, State Minister for Power, Energy and Mineral Resources Nasrul Hamid has said.

The plant will use waste to produce electricity. A proposal by the Chattogram City Corporation to set up the power plant is currently being reviewed by the Ministry of Power, Energy and Mineral Resources.

Nasrul said, "The plan will soon be



approved and will be implemented within one and a half years."

The state minister disclosed the information at a program held recently at the Hotel Radisson Blu Bay View.

The government is also undertaking several other initiatives to ensure an uninterrupted electricity supply in the port city.

"Chattogram is a commercial city. The government has undertaken a Tk700 crore project to ensure a non-stop electricity supply here. The project will be implemented within one to two-and a-half years," he said.

The whole country is being brought under electricity service, he added. EP

Two More RE-Based Power Plants Likely



The government is considering setting up two renewable power plants having combined capacity to generate 102.50 megawatt of electricity.

The power plants are 42.5MW Gazipur Power Plant and 60MW Pabna Sujanagar plant.

Power Division is likely to place the proposals before the Cabinet Committee on Public Purchase soon.

According to Bangladesh Power Development Board (BPDB) sources, the 42.5MW Gazipur Power Plant will be implemented for a 25-year period with per kilowatt tariff of Tk 17.20 under the Special Power Act.

An inter-ministerial working group selected the Gazipur Power Plant among five proposals of power plants that will use the wastes of Gazipur City Corporation.

BPDB will pay maximum Tk144.08 billion for a period of 25 years to purchase the electricity from the plant, officials said.

The Chinese-owned Canves Environmental Investment Company Ltd (CEICL) will implement the power plant on 30 acres of land owned by the Gazipur City Corporation (GCC).

The CEICL will require signing four separate agreements including implementation agreement (IA) with Local Government Division, GCC, BPDB and PGCB.

The GCC will supply required quantity of wastes and both the GCC and Canves Environmental Investment Company Ltd will sign waste supply agreement in this regard.

On the other hand, the joint-venture Bangladesh-China Renewable Energy Company Ltd will implement 60MW solar-based power plant at Sagarkandi under Sujanagar Upazila in Pabna under no electricity no power basis.

BPDB will purchase per unit of electricity at Tk 8.48 under no electricity no tariff basis.

According to the Power Division, the government has a plan to produce 40,000MW of electricity by 2030 considering the 10-14 percent economic growth. EP

Texas Lands $1b Investment in Solar, Battery Projects

Two facilities with a combined capacity of 400 MW/800 MWh of battery storage and 600 MW of solar power generation will be built in Caldwell County beginning in Spring 2022.

Petroleum products firm Chem-Energy will invest more than $1 billion in solar and battery plant facilities in Central Texas.

Two facilities with a combined capacity of 400 MW/800 MWh of battery storage and 600 MW of solar power generation will be built in Caldwell County beginning in Spring 2022. The first facility -- constructed on 3,511 acres near Uhland -- is expected to be operational in 2023.

The facilities will provide clean energy and grid stability to ERCOT and the Texas grid.

"Caldwell County is the perfect strategic choice for our flagship operations in Texas," said Robert Hayward, COO of Chem-Energy Corporation. EP

Green page

IDCOL Organizes Workshop on EV Ecosystem

The speakers at an event discussed the barriers that vehicle and battery manufacturers are facing for making investments in the electric mobility sector.

The event was organized as part of the UK Government-funded "Road to a Green Bangladesh" project that is scoping scalable business models and a financing ecosystem for businesses with an aim for electric vehicle uptake in Bangladesh.



The event was chaired by Nazmul Haque, chief investment officer of IDCOL, according to a press release.

Nazmul Haque in his speech pointed out IDCOL is opening dialogues and bringing in the mainstream EV market players to develop an ecosystem where with the right set of business models the sector will grow to be bankable guided by the policy framework.

With the recent fuel price hike and increase of fares in public transport, the economy of running an EV presents a more lucrative option for vehicle owners.

The companies that participated in the workshop included Bangladesh Auto Industries Ltd., Haq's Bay Automobiles, Nitol Motors, Navana Batteries Ltd., Rahimafrooz Batteries, Rimso Battery and Co. Pvt. Limited; HAMKO, Confidence Batteries Ltd. and others. EP

JICA Faces Complaint Due to Obscuring Support for Coal to Investors



Complainants have filed a formal complaint against Japan's International Cooperation Agency (JICA) — the first of its kind — to the US Securities and Exchange Commission (SEC).

The complaint addresses the agency's false assertion that its bond issued on US markets was free from coal, when in fact JICA's funding will contribute to coal-fired power plants in Bangladesh.

JICA — the development assistance agency owned by the Japanese government — sought to alleviate concerns of coal-wary investors through the inclusion of a clause in its bond prospectus that claims their activities would be coal-free, stating: "[JICA] will not knowingly allocate any proceeds from the sale of the bonds to activities related to coal-fired power generation".

The statement in the US dollar bond, issued in April 2021, came as JICA's own financial statements suggest bonds will contribute to funding new coal fired power plants.

JICA has been involved in the Matabari Phase 1 coal power plant in Bangladesh and has, to date, failed to confirm it will not continue funding for Phase 2.

The 1200 Megawatt coal plant located in Cox's Bazar, home to 100,000 people, poses significant health concerns to the population with estimates that the project could result in up to 14,000 premature deaths across its operational lifetime.

Five NGOs; Friends of the Earth Japan (FoE Japan), Friends of the Earth US (FoE US), JACSES, Market Forces and Mighty Earth have worked together to file this complaint under the representation of US securities lawyer Kevin Galbraith. EP

Toyota to Develop Alternative Fuels

Toyota Motor Corp said recently it will partner with four other Japanese vehicle makers to explore the viability of alternative green fuels for internal combustion engine cars, including hydrogen and synthetic fuels derived from biomass.

The companies, which in addition to Toyota include Mazda Motor Corp, Subaru Corp, Yamaha Motor and Kawasaki Heavy Industries, made the announcement at a race track in Okayama, western Japan, where Toyota is racing a hydrogen car.

The hydrogen race car is being driven by Toyota chief executive Akio Toyoda along with other Toyota drivers.

Converting internal combustion engines to green fuels such as hydrogen is technologically difficult, but doing so would allow the companies to support decades-old existing supply chains employing hundreds of thousands of workers that they may otherwise have to drop as they switch to building electric vehicles (EV).

As nations tighten environmental regulations to cut carbon emissions, automakers including Toyota, are ramping up production of EVs. Japan has said it aims to be carbon neutral by 2050 and is promoting the use of hydrogen fuel.

Toyota plans for 15 EV models by 2025 and is investing $13.5 billion over the next decade to expand battery production capacity. At the same, time however, it is continuing to develop vehicles powered by hydrogen. EP

Green page

Denmark Signs Deals to Facilitate Wind Power Links to Germany, Belgium

Danish grid operator Energinet signed deals recently with Belgium's Elia (ELI.BR) and Germany's 50Hertz that move Denmark closer to building two sea links connecting its offshore wind turbines to Germany and Belgium to boost the flow of green energy in the region.

A massive expansion of offshore grid infrastructure is needed to meet the rising amount of renewable energy needed to enable European countries to slash dependency on fossil fuels while ensuring that volatile renewables



become a more reliable source of energy.

Energinet said a cooperation agreement signed with transmission system operator Elia edged them closer to a final investment decision on an interconnector between their two countries via a yet-to-be-built artificial island in the North Sea.

With a relatively small coastline and limited access to offshore wind power in the Belgian part of the North Sea, Belgium needs to import green energy on a large scale.

Energinet also inked a separate deal with German high-voltage grid firm 50Hertz, of which Elia owns 80%, on a power link to another planned hub which will be located on the Danish Baltic island of Bornholm. EP

Clarke Energy Represents Kohler at UN COP26 Event

Global conference aims to secure global agreements to achieve environmental goals

Kohler Company is working toward achieving a Net Zero environmental impact by 2035. Clarke Energy's recent appearance at the United Nations Conference of the Parties (UN COP) event in Glasgow, Scotland helps support that initiative and more. Clarke participated in the delegations of the Association for Decentralized Energy (ADE) and the World Biogas Association (WBA), with the goal of supporting methane emission reduction, hydrogen economy and flexible power.

Globally, Clarke Energy has supplied over 7GW of gas-engine fueled power generation capacity. This is typically deployed in a combined heat and power (CHP) configuration – generating power at efficiency levels up to 90%. 1.4GW of this power is renewable and largely deployed on biogas and landfill gas applications.

Hydrogen Economy

The hydrogen economy had a high-profile position at the conference particularly with respect to the decarbonization of global gas supplies that currently rely heavily on fossil natural gas. Hydrogen as a fuel source is being supported by legislation or initiatives in the UK, France, Germany, the Netherlands and the United States.

Clarke Energy has already developed successful experience of using hydrogen mixed with carbon monoxide as a waste gas fuel at furnace sites in South Africa. Now the focus is on conversion of CHP plants and flexible gas engine peaking stations to operate on hydrogen as a gas.

Flexible Power

Flexible generation was a focus at COP26 as it will be a key enabler to the widespread deployment of renewable energy.

With the growth in intermittent wind and solar power, alongside the closure of large base load power stations such as coal and nuclear, global power networks are becoming more and more unstable. There is a technical need to supply flexible power installations that either generate dispatchable energy or alternatively can time-shift power with technologies such as battery energy storage systems or renewable fuels such as biomethane or hydrogen. This is an area where Kohler is developing a range of new solutions including gas peaking stations – large grid connected power plants that can engage at short notice, to large battery energy storage plants or alternatively smaller localized microgrid technologies to support commercial buildings, industry and campuses.



Methane Emission Avoidance

On November 11, a high-profile pledge was made from 100 nations to slash global methane emissions. The US and China committed to boost climate cooperation over the next decade including planning to slash methane emissions.

Methane is a "super-warmer of the atmosphere" and can be emitted from a range of sources linked to human activity including from decomposing waste at landfill sites, from wastewater and from agricultural wastes. When methane is emitted in this way it is typically called 'biogas' or 'landfill gas'. Using biogas for power generation is something Clarke Energy has excelled at over the last 30 years delivering more than 1.4GW of renewable electricity from biogas globally, and more recently biomethane.

Alex Marshall, Group Business Development and Marketing Manager joined the World Biogas Association's delegation and secured coveted access to the "Blue Zone" of the conference and was invited to speak at the Kenya Climate Change Working Group Association on avoiding emissions from short-lived atmospheric pollutants such as methane, black carbon, ozone and hydrofluorocarbons. Alex provided practical examples of how Clarke Energy is delivering methane reducing projects globally in countries such as Kenya, India, the United States, France, Romania and Greece.

By continuing to boldly innovate in products and applications and acquire synergistic businesses, Kohler and Clarke are well positioned to support the transition to net zero. We are supporting global power generation networks, helping deliver resilient supplies of power, generating renewable energy and to support the push to reduce global methane emissions. EP

"Dhaka-Glasgow Declaration" Proves Bangladesh's Leading Role in Climate Diplomacy: PM



Prime Minister Sheikh Hasina recently described the adoption of the "Dhaka-Glasgow Declaration" in the COP26 conference as an outcome of playing a leading role by Bangladesh in the climate diplomacy.

"I believe that the declaration adopted by the heads of the government and state of the most 48 climate vulnerable countries led by Bangladesh in the just-concluded COP26 Summit was an outcome of the leading role played by our country in climate diplomacy," she said.

The prime minister said this in a press conference arranged to brief media about her 14-day official visit to the United Kingdom and France.

Sheikh Hasina said major feat of the COP26 is that heads of the state and government of the world agreed to further accelerate the climate funding process including allocation of $100 billion every year keeping consistency with Paris Agreement and Sustainable Development Goals (SDGs).

A total of 141 countries including Bangladesh pledged to check all kinds of deforestation move by 2030, she added. EP

US, China Unveil Surprise Climate Agreement

The United States and China, the world's two largest emitters of carbon dioxide, unveiled a deal to ramp up cooperation tackling climate change, including by cutting methane emissions, phasing out coal consumption and protecting forests.

US climate envoy John Kerry and his Chinese counterpart Xie Zhenhua announced the framework agreement at the UN climate conference in Scotland. Both billed it as way to tip the summit toward success.

Earlier, the head of the United Nations conference noted that climate commitments so far in the talks would do too little to tame global warming and urged countries to "get to work" over the remaining two days. EP

Young People More Likely Than Older Ones Aware About Climate Change: Survey

Younger people in Bangladesh are substantially more likely than older people to be aware of climate change, says a new international survey by UNICEF and Gallup released recently ahead of World Children's Day.

Over 90 per cent of the Bangladeshi children and youth who were aware of the issue also agree on the need for their government to act boldly now.

The findings come from the poll The Changing Childhood Project, the first of its kind to ask multiple generations for their views on the world and what it is like to be a child today.

The poll surveyed more than 21,000 people across two age cohorts (15-24 years old and 40 years old and up) in 21 countries, across all regions and income levels, including Bangladesh.

The survey shows that children and young people are nearly 50 per cent more likely than older people to believe that the world is becoming a better place with each generation, and that childhood has improved, with overwhelming majorities believing that healthcare, education, and physical safety are better for today's children than for their parents' generation. EP

Air Pollution in Europe Still Killing 300,000 Per Year



Premature deaths caused by fine particle air pollution have fallen 10 percent annually across Europe, but the invisible killer still accounts for 307,000 premature deaths a year, the European Environment Agency said recently.

If the latest air quality guidelines from the World Health Organization were followed by EU members, the latest number of fatalities recorded in 2019 could be cut in half, according to an EEA report.

Deaths linked to fine particular matter-with a diameter below 2.5 micrometers or PM2.5 -- were estimated at 346,000 for 2018. The clear reduction in deaths for the following year were put down partly to favorable weather but above all to a progressive improvement in air quality across the continent, the European Union's air pollution data center said.

In the early 1990s, fine particles, which penetrate deeply into the lungs, led to nearly a million premature deaths in the 27 EU member nations, according to the report.

That figure had been more than halved to 450,000 by 2005. EP

UK Keen to Work with Bangladesh on Alternative Energy



The United Kingdom has expressed its keenness to work on alternative energy with Bangladesh.

UK Minister of State for South Asia, the United Nation and the Commonwealth of FCDO Lord Tariq Ahmad of Wimbledon expressed the desire when he called on Prime Minister Sheikh Hasina at her official Ganabhaban residence in Dhaka recently.

Prime Minister's Press Secretary Ihsanul Karim told the newsmen after the call on.

During the meeting they also discussed various issues like climate, British-Bangladesh trade and Rohingya issues, he said.

Emphasizing on green energy the UK state minister said that the region has a great potential of green energy as Nepal and Bhutan have hydroelectricity.

He also said hydroelectricity can be distributed through establishing a regional grid.

In reply, Bangladesh Prime Minister said, "We are working on it."

As Tariq Ahmad stressed the need for solar energy, Sheikh Hasina said that Bangladesh has so far given 6.5 billion solar connections. EP

UAE to Host COP28 in 2023

The ruler of Dubai said in a tweet recently the United Arab Emirates (UAE) has been selected to host the COP28 international climate conference in 2023.

"We will put all our capabilities to make the conference a success. The UAE will remain committed to global climate action to protect the planet," said Sheikh Mohammed bin Rashid al-Maktoum, who also serves as prime minister of the UAE.

It will be the second time in as many years that the annual talks will be held in the Middle East, with Egypt set to host them in 2022, and the third time the talks are hosted by a member of the Organization of the Petroleum Exporting Countries. Former OPEC member Qatar hosted in 2012 and Indonesia did in 2007.

Mariam bint Mohammed Almheiri, UAE's minister of climate change and environment, said on Twitter the UAE is ready to deliver a meeting that mobilizes countries to boost their efforts to fight climate change.

"Hosting this global gathering will provide us with a prime opportunity to involve our most dynamic segment of society - our youth - in the meetings and negotiations that will ultimately ensure a sustainable future for generations to come," she said. EP

New Plants Develop Waste-Based Biomethane, Biohydrogen for Fleets

Advanced Biofuel Solutions Ltd (ABSL), a developer and producer of advanced biofuels, and Greenergy, a manufacturer and supplier of waste-based biofuels, signed of a Joint Development Agreement to develop, construct and operate up to five municipal waste-based biofuel plants in the UK.

Design work for the first plant to be situated at Ellesmere Port near Liverpool is underway and commercial production is due to commence in 2025.

Using ABSL's proven and patented RadGas technology,



the first plant will convert annually 133,000 tons of municipal waste into biomethane for natural gas vehicles or biohydrogen for hydrogen vehicles.

Together, the five plants would replace millions of liters of fossil petrol and diesel used in transport fuels, saving 800,000 tons of CO2 per year, with the output of the plants equivalent to powering 5,000 HGVs. EP

Toyota Puts 100 Hydrogen-Fueled Taxis on Copenhagen Streets



The green conversion of taxi services is in full swing. The Danish government's aim is that no new taxis emit CO2 or air pollution from 2025 and by 2030 all moving taxis must be zero-emission cars.

On November 5, Toyota and the taxi service DRIVR have put over 100 hydrogen taxis on the roads in Copenhagen, supporting the political goals for a greener taxi industry.

The app-based taxi service DRIVR is one of the taxi companies that is at the forefront of the green transition.

As a customer it has long been possible to choose between hybrid, electric and hydrogen cars. Now it significantly has increased the number of hydrogen taxis in its fleet through the collaboration with Toyota.

All 100 taxis are Toyota Mirai fuel cell vehicles, the world's first mass-produced hydrogen car, only emitting water while driving. EP

OUR CHILDREN ARE TEACHING US HOW TO TAME THE BRUTAL ROAD TRANSPORTS

Reverse Swing



Farid Hossain

Our children are teaching us on the streets. Once again the students - mostly from schools and colleges - have taken to the streets to show us how to discipline our rogue transport sector. They are on the streets to press home their nine-point demands, three a half years after the country's unprecedented student movement that jolted the nation's conscience and exposed the utter failure of the powers to be in taming the unruly transport owners and workers. The demand in 2018 was to ensure safety on the road. The same demand and the same slogans have gripped the city's streets for the past two weeks. The students are taking over the responsibilities where the politicians, the administration and the partisan adult student organizations have failed, utterly and hopelessly. The children are once again opening our eyes to our shameful broken promises, deception and unpardonable negligence. The 2018 "Nirapad Sarak Chai" (We demand safe road) agitation by students from July 29 to August 8 forced the government to hurriedly draft a road transport bill which made a smooth sail through the parliament. The act turned into law after being signed by the president, but since then it has remained unimplemented.

This half-way approach to the half fare issue has done little to break the stand-off. Rather it has raised a volley of legitimate questions

This time thousands of students left their class rooms in the capital city to pour into the streets on December 25, a day after a garbage-carrying truck of Dhaka South City Corporation ran over Nayeem, a student of Notre Dame College, in Gulishtan. In less than a week another high school student Mainuddin was crushed to death by a recklessly driven bus (in race with another bus) in the city's Rampura road. In between another garbage truck, this time from Dhaka North City Corporation, hit and ran over a former media man Kabir Ahmed on the Panthapath road. While the deaths on the road have silenced the dead for ever, the protests have become louder. The students - fearless and uncorrupted by selfish partisan politics due to their young age and clean hearts - have staged 2018-like demonstrations to press home their 9-point demands, mainly safety on the road and half fare ride on all public transports. As the green-and-red national flag-waving students blocked roads in parts of the city chanting slogans, muted support and solidarity came in from their guardians and a cross section of the people.

With regard to the half fare the students demand that it must be introduced for all students across the country and on all modes of public transports: bus, trains and launches. As the protests dragged on with the students issuing one ultimatum after another the government and the transport owners have reluctantly agreed to introduce half-fare bus ride for students only in the capital city. The other conditions are: students must show their ID cards, they will get the concessions only between 7 am to 8 pm; only on the weekdays and not on weekends like Friday and Saturday and not on government holidays and when the educational institutions remain go on annual vacations. The protesting students have promptly rejected the conditional concessions sticking to their original demand. Aren't those studying and living outside the capital city students? They ask while rejecting the offer to be effective from December 1 (Wednesday).

This half-way approach to the half fare issue has done little to break the stand-off. Rather it has raised a volley of legitimate questions. Whatever concession has been offered can at most be called a complicated and unrealistic approach to a really serious issue that has for long gripped not only the students but also the general public. With an average fatality of 14 a day our roads and highways have turned into death traps. The pathetic condition has been compounded by the atrocious behavior of transport owners and workers toward the passengers. The country's buses have been made into a sort of a "battle field."

In this bleak scenario the young and the bold have come forward to let loose the pent-up anger of the people. They are trying to do what successive governments have failed to ensure: a little bit of discipline and civility on the streets. Let's stand by our children. EP

শেখ হাসিনার উদ্যোগ ঘরে ঘরে বিদ্যুৎ

পাওয়ার গ্রিড কোম্পানি অব বাংলাদেশ লিঃ

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- গ্রিড উপকেন্দ্র, গ্রিড লাইন ও টাওয়ার জাতীয় সম্পদ, তা রক্ষা করা সকলের দায়িত্ব।
- গ্রিড উপকেন্দ্র, সঞ্চালন লাইন ও বৈদ্যুতিক টাওয়ারের গুরুত্বপূর্ণ যন্ত্রাংশ চুরি প্রতিরোধে সহায়তা করুন, বিদ্যুৎ বিপর্যয় থেকে দেশকে বাঁচান।
- উচ্চ ভোল্টেজের বৈদ্যুতিক টাওয়ার ও লাইন হতে নিরাপদ দূরত্ব বজায় রাখুন।
- বিদ্যুতের গ্রিড লাইন ও টাওয়ার হতে নিরাপদ দূরত্বে স্থাপনা নির্মাণ করুন।
- বৃক্ষ রোপনে গ্রিড লাইন ও টাওয়ার হতে নিরাপদ দূরত্বে স্থান নির্বাচন করুন।
- বিদ্যুৎ ব্যবহারে সাশ্রয়ী হোন। আপনি বিদ্যুৎ সাশ্রয় করলে তা অন্য একজন ব্যবহার করতে পারে। এমনকি সাশ্রয়কৃত বিদ্যুৎ গুরুতর অসুস্থ কারও জীবন বাঁচানোর কাজে লাগতে পারে।
- বিদ্যুৎ অপচয় রোধে সচেতনভাবে ফ্যান, বাতি ও অন্যান্য বৈদ্যুতিক যন্ত্রপাতি ব্যবহার করুন।
- বিদ্যুৎ সাশ্রয়ী (LED/CFL/T5) বাল্ব ব্যবহার করুন।
- যথাসম্ভব দিনের আলো ব্যবহার করুন।
- বিকাল ৫:০০ টা হতে রাত ১১:০০ টা পর্যন্ত সময়ে বিদ্যুতের চাহিদা বেশী থাকে। এ সময় দোকান, শপিংমল, বাসা-বাড়ীতে আলোকসজ্জা হতে বিরত থাকুন।



Major Polluters Hardly Care About Temperature Rise



Dr. Mizan R Khan

I expected an ambitious program for mitigation, but it was not reflected in the NDCs submitted by the countries. Based on the decisions, it would not be possible to restrict global warming below 1.5 degrees C. The warming would reach 2.7 degrees C even if it is possible to implement all the NDCs submitted to the UNFCCC.

The expectations from the just concluded COP26 were sky high. In my opinion, however, it was neither a success nor a failure and concluded somewhere in between. All countries have agreed that restricting global warming below 1.5 degrees C was the main focus of the conference in Glasgow, yet the 20 main polluters did not announce any definite plan for reducing emissions. These countries contribute around 80% of the global emission. There is no alternative to adoption of an ambitious emission reduction plan by G20 countries for achieving the global emission cut target – from 50 giga tonnes to 32 giga tonnes by 2030. This commitment was absent in COP26.

Dr. Mizan R Khan, Deputy Director of International Centre for Climate Change and Development, Independent University, made the observation in an exclusive interview with Energy & Power ***Editor Mollah Amzad Hossain.***

The Glasgow climate conference has just concluded. How would you evaluate its achievements or failures?

Mixed reactions and observations have been sounded since the conclusion of the COP26. Few found some achievements, but others termed it non-conclusive and a failure. From my past 20 years of experience as a negotiator, I can term it at best something between success and failure. Success is very limited in agreed actions for reducing global GHG emissions. I expected an ambitious program for mitigation, but it was not reflected in the NDCs submitted by the countries. Based on the decisions, it would not be possible to restrict global warming below 1.5 degrees C. The increase has already reached 1.1 degrees C. The warming would reach 2.7 degrees C even if it is possible to implement all the NDCs submitted to the UNFCCC. This is a global average. Catastrophic disasters would be triggered if temperature increases further in the tropical countries. There is nothing to mention about climate finance at all. However, some better commitments have been tabled.

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The G20 countries who are major contributors to global emission did not come up with ambitious plans. Two fast growing economies - China and India - mentioned that they would endeavor to reach Net Zero by 2060 and 2070 respectively.

The Paris Rule Book could be finalized with Carbon Market Mechanism. There is no barrier now to implement the Paris Agreement. What are your views?

Finally, the Paris Rule Book could be completed after 5 years of protracted discussion through finalization of the article 6. It is undoubtedly a major milestone achievement.

Developed countries earlier did not show any positive interest about discussing the loss and damage issue. But this time under the Santiago Network, some positive discussions could be held. How do you look at it?

Though the achievement is not up to the expectation, yet it can be termed encouraging. Here the Climate Vulnerable Countries Forum, led by Bangladesh Prime Minister Sheikh Hasina, has played a major role. The COP Presidency was also very sensitive about this. Consequently, dialogues about finance would continue. The discussion started in 2015 and we expect further progress in COP27.

Commitments for US$ 4.0 million have been achieved to start works on loss and damage under the Santiago Network. I believe more funds would come. Loss and Damage would get stronger support in COP27. This time all agreed that this is not a problem which is unique to the developing world only, it is also a threat for the developed world as well.

In the earlier COP, the IPCC reports were not taken into cognizance, but this time the reports were taken into active consideration. That is why limiting global warming below 1.5 Degrees C received prime importance. It is a positive development, according to most. What is your opinion?

Yes, positive discussions have been initiated. The IPCC report has elaborately discussed and put forward the consequent impacts of global warming if it goes unrestricted. That is why Loss and Damage came as an important agenda. Phase Down has been agreed about coal use. Though Phase Out was originally proposed. It is a very difficult position in environmental diplomacy. On one side you have low-income countries and on the other the largest economies.

India said they would Phase Down as they need to continue using coal. On the other hand, Saudi Arabia is mainly an oil-using economy. Nothing much has been talked about natural gas. That is why all arguments were made as to why coal should be the only target among all fossil fuels. Why would oil and natural gas not also come under discussions? Saudi Arabia is happier than others sensing that coal could be targeted. Gas and oil remained untouched. These two fossil fuels must also come under discussion. Inefficient subsidy on fossil fuel must also be stopped. Discussions were extensive but no action plans could be worked out. Hence, I am not very optimistic about the success as I mentioned earlier as well.

It would not be a wise decision for Bangladesh moving out of coal too soon. Coal producing and coal using countries are caring less about global concerns. Our coal use only marginal not even at Nano level. We must not compromise our growth

Ambitious NDCs required for reducing emissions by 45% in 2030 were not received. Are you optimistic about it?

Funding inefficiency of fossil fuel means funding problems, not solutions. In future COPs, more stresses would be there for reducing fossil fuel use. Developed and underdeveloped countries provide subsidies. Total amount of subsidy is over US$ 0.5 trillion. Both developed and underdeveloped countries have fossil fuel based power generation. Fossil fuel lobbies are also very influential. Still some strong lobbies are active against ambitious mitigation plans. But stronger pressures can be created if environment activists, civil societies and youth movements can actively channelize their programs.

The IPCC is stressing upon reducing emissions by 45% by 2030. The present total global emission is 50 giga tonnes. By any means it needs to be brought below 32 giga tonnes. 197 countries have agreed but 20 major polluters have to take the main initiatives. These countries together contribute around 80% of the global emissions. The main challenge is making them agree. I am not much hopeful at this stage.

Bangladesh has no obligation for reducing carbon emission. Even then it has submitted NDC for reducing carbon emission by 90 million tonnes from 2012 level by 2030. This has created an obligation for implementing it. How would you evaluate it?

Bangladesh desires to lead climate negotiation. Hence such plan is courageous despite of not having obligation. We can request other countries to replicate this. If proceeded in a planned manner, it is achievable without much difficulty.

Energy and power are the main focus areas for implementation of the NDC targets. But cost of energy would increase for non-carbonized energy use. What kind

of impediments the higher energy price may create in transition to developed economy?

I do not believe that higher energy cost would impede development. If we can ensure Energy Efficiency and Conservation by adopting advanced technologies, we can achieve up to 6.73% or more of the unconditional reduction commitment. The target set in the Bangladesh's NDC is very much pragmatic. We can achieve even higher if all stakeholders remain committed for it. But much would depend on all out implementation success of the government. We can become a reduction model as we actually do not have obligation for it.

We have to focus on non-carbon energy. We could not achieve much in Renewable Energy. RE contributes about 3% of our total generation capacity now. In a country like Bangladesh where competing priorities, huge unmet demand exist, higher targets for RE must be set and focus must be diverted. The Mujib perspective plan has a target of 40% by 2041. I am not sure whether achieving 40% by 2041 would be possible. But we must keep plugging away. Nuclear energy is definitely costlier than RE, the cost of which has become lower than fossil fuel these days. Of course, nuclear is an option for Bangladesh. If we think about 8-9% sustainable GDP growth, demand growth of energy would also commensurate with it. In Bangladesh, truly speaking, very few major options are available than nuclear power. But the cost of power would increase. The impacts need to be kept under control through ensuring efficiency at all segments of the value chain.

What is your opinion about Bangladesh's moving out of coal? The world did not agree to phasing out, rather it said phasing down. This means coal use would continue. What is your opinion?

It would not be a wise decision for Bangladesh moving out of coal too soon. Coal producing and coal using countries are caring less about global concerns. Our coal use only marginal not even at Nano level. We must not compromise our growth. Huge number of population is still not satisfied with energy supply scenario. We must adopt options which would ensure supplying power and energy at affordable cost. We cannot yet rule out coal use completely. Even if Bangladesh cannot use any coal annually, it would make no visible impact on global emission.

How would you evaluate Glasgow Climate Pact? What preparations should be taken for encountering challenges in COP27?

We need to do much better homework for COP27. We negotiate among LDCs. African groups undertake better homework. But they do less intellectual exercise. We cannot dictate negotiation. Our only power is intellectual power. We only carry out 1-2 meetings before negotiation. We prepare traditional country paper. We need analytical exercise. We can propose idea. Innovation of ideas comes in the first session. We can propose new and innovative ideas there.

Financing is a major issue for achieving climate targets. But US$100 billion target could not be achieved in COP26. Will it be achieved by 2023? What would be the situation by 2025?

I am not much optimistic. Per Copenhagen Commitment, we should have had US$100 billion by 2020. There is a promise that by 2023 it would happen. The Glasgow Pact provides for setting target of additional fund by 2025. Discussion for charting out new road map beyond 2025 would be discussed at COP27. I have reasonable doubt whether US$100 billion would be accumulated by 2023. Again this fund has to be outside the commitments of developed countries. The main issues are how much fund is coming? How and to whom these are being disbursed? OECD claims US$79 billion has been provided in 2018. OXFAM report mentioned about US$19-22 billion.

Will the climate fund turn into an instrument to control developing countries?

We cannot completely rule out such possibility. But I am optimistic about Bangladesh handling it properly. Only 15% for us come from external sources. Internal resources contribute about 85%. More than 85% is allocated in ADP. Voice of Bangladesh must grow louder. It is possible. We do not need depending much on international support. For this our voice needs growing louder. Foreign assistance now contributes a mere 1% now in national development. We do not need it even if we can control wastages. We have to plug leakages and corruptions. Our per capita income is growing.

CVF was the driver of the pressure group this time. Many thought the dynamic diplomatic acumen of Bangladesh Prime Minister was instrumental for this. What are your views?

Of course, Bangladesh Prime Minister Sheikh Hasina played a major role. Her leadership was exemplary and encouraging. Whatever achievement has been made in Loss and Damage is mainly due to initiatives of CVF. PM's leadership has given CVF a huge boost. It has to be further strengthened.

What kind of preparations Bangladesh should take for getting finance from Green Climate Fund and other sources for mitigation?

Unfortunately, we could not make much headway yet. Building capacity is our dedicated mission. Business as usual strategy would not work. We must focus on target. There is no dearth of international fund. We have to prepare bankable projects and approach with positive initiatives. EP

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