July 2019, Edition 8

Asian Council on Water, Energy and Environment

Confederation of Asia-Pacific Chambers of Commerce and Industry

Table of Contents

Message from the ACWEE Chairman 3
Turkmenistan learning from Japan's experience in water purification technologies 4
Wind power production in Azerbaijan increases eight-fold 4
Draft agreement on scientific research in Caspian Sea discussed in Turkmenistan 6
The challenges to ensure safe water for all in Bangladesh 7
Environmental impact on health in Bangladesh 9
Plans needed for water transport sector, Bangladesh Chief whips 11
Singapore investor pours US$500,000 into clean water in Cambodia 12
Cambodia's environment, Singapore's problem 13
Philippine water shortage hits more than 6 million people in and around nation's capital 14
China still facing an uphill struggle in fight against pollution, Environment minister 16
Private capital is key to Vietnam's future energy development 18
Government submits Maharashta plan to breathe easy 19
India's looming water scarcity 21
Managing India's household energy challenge 22
Construction on mega deepwater gas project launched in Indonesia 25
As Indonesia's oil sector is less profitable, it's time for clean energy: Experts 26
Indonesian institutions struggle to get funding for green energy projects 28

Japan, Iranian firm sign contract on water project 30
MP proposes swapping power, gas for water with Afghanistan 31
Japan to rule out coal-fired plants as international criticism rises 32
Japanese Ministry eyes subsidy plan for nuclear energy generation 33
Dams and dreams: a journey down the Karnali 35
Role of solar in Nepal's energy mix looks set to expand 39
600 farmers in big water project in New Zealand 41
Poor water management costs Pakistan dearly 43
Russia plans to invest $14b in Pakistan's energy sector 45
Environmental threats from chemicals CEOs' standpoint 48
Ceby City in the Philippines forms 10-year waste management plan 51
Tajikistan President starts Nurek hydropower plant's rehabilitation project 53
Turkey and Azerbaijan cement relations with new oil refinery 55
Energy could enable Turkey, US to reach $75 billion target with LNG trade 57
Nuclear, gas, renewables, petrochemicals: Turkish energy sector enjoys a prolific year 61
STAR refinery to export $500m in petrochemical raw materials per year in Turkey 66
Turkey: Waste water turned into antimicrobial packaging 68
Plastic bag use in steep decline after landmark Turkish regulation 69
PM hails Japanese experts' idea for water pollution treatment 70
Solar energy helps reduce electricity costs 20% monthly in Vietnam 71
Dung Quat oil refinery expansion project accelerated in Vietnam 72
Vietnam goes for nuclear power 73
Vietnam has great potential to develop renewable energy: experts 75
Asia: Renewable energy and alternative fuel subsidies have become a moral hazard 76
ADB supports 275 MW power plant to boost energy access in Sumatra 78
ADB supports private sector solar power development in Mongolia 79
ADB & ArmPower sign loan to expand private power generation in Armenia 81
Across India, solar power brings more than light 82

Message from the ACWEE Chairman

It is a pleasure to present to you the “Asian Council on Water, Energy and Environment (ACWEE)” newsletter, edition 8, 2019. This publication is a compendium of relevant news, reports, and analyses on recent developments in the water, clean energy and environment sector in Asia Pacific countries.

The reports show significant improvements in central Asia’s water quality. Neighboring countries are investing in Cambodia’s water supply while Manila has a water problem that the government is trying to address.

In India where energy and water supply are challenges, new investments in alternative energy for distant villages look promising. Indonesia is also exploring alternative energy sources as traditional energy becomes costly. Nepal, where I am developing projects, is harnessing the power of its rivers and Pakistan is exploring nuclear plants with Russia.

In particular, I would like to inform CACCI members that despite high rates of economic growth in South Asia, the populations continue lacking sufficient water and energy supplies, as well as clean environment. Fortunately, there is progress. On December 18th 2018, India opened up BBIN transmission connectivity in a free market framework. Recently the Nepalese government and its private sector visited Bangladesh to negotiate selling 9000 MW of power by the year 2040. They discussed the necessity of a number of high dams to control floods in Northern India.

Nepal and India, two markets that I am dealing in, are also discussing the 5040 MW Pancheshwor project where the construction will start in a few years. This project will supply enough water to make navigation possible in India as well as to clean the impurities in the Ganga’s waters. Moreover, it will help irrigate 1.7 million hectares of land and supply the Yamuna, Delhi, Rajasthan and Gujarat region. For these dry water regions, new water supplies will have positive impact on the national economies.

The private sector supplying peak power will be positioned in a very profitable business environment because South Asia’s peak power will be priced as one of the highest in the world in the coming decades. Great investment opportunities for the private sector are emerging in South Asia.

This newsletter indicates that Asia is investing money in energy sources to further extend economic growth. Enjoy reading!

Mr. Gyanendra Lal Pradhan
Executive Chairman, Hydro Solutions
Vice President, Nepal German Chamber of Commerce and Industry (NGCCI)
Chairman, Asian Council on Water, Energy and Environment (ACWEE)

Turkmenistan learning from Japan's experience in water purification technologies

Azernews, Trend, 4 April 2019

The representatives of the Turkmen State Committee of Water Management and Japanese Marubeni Corporation, Sojitz Corporation, Itochu Corporation, Komatsu Ltd. held negotiations on cooperation in the introduction of water purification technologies, Trend reported referring to the Turkmen State Committee of Water Management.

Moreover, the corresponding consultations were with the representatives of the Japanese Ministry of Economy, Trade and Industry, the Japan Bank for International Cooperation (JBIC), the Nippon Export and Investment Insurance (NEXI).

Earlier it was reported that Turkmenistan was preparing a project to create water reserves and increase the capacity of the Garashsyzlyk reservoir, located in the Lebap region, which will improve the water supply of the country's land.

Turkmenistan borders Kazakhstan, Uzbekistan, Iran and Afghanistan and uses water resources coming in accordance with agreed quotas from four trans-boundary rivers, namely the Amu Darya, Tejen, Atrek and Murgab rivers.

Turkmenistan is affected by the problem of the ecology of the Aral Sea, which is most noticeable in the country's northern Dashoguz Region, where problems have arisen with the provision of drinking water, the fight against salinization of cultivation lands, land degradation and desertification.

Wind power production in Azerbaijan increases eight-fold

Azernews, Leman Mammadova. 19 March 2019

The rapid development of technology in the modern world, offers wide opportunities for developing environmentally friendly and inexhaustible energy resources.

Azerbaijan produced goods and services in the amount of 368.8 million manats ($217.01 million) in production, distribution and supply of electricity, gas and steam in January-February 2019.

According to the State Statistics Committee, this makes 2.3% increase compared to the same period last year.

Production volumes in the sector of water supply, wastewater treatment and processing increased by 12.1% reaching 49.4 million manats ($29.07 million).

During this period, the total electricity production in the country amounted to 4,178.7 million kWh, which is 1.4% more than last year's figure.

Energy production at thermal power plants increased by 1.4% - up to 3,829.2 million kWh, at water power stations decreased by 1.8% - to 181.6 million kWh.

For two months, 18.7 million kWh of wind energy was generated, which is 7.8 times more than in January-February 2018.

During this period, the production of solar energy in the country increased by 15.9% and amounted to 5.1 million kWh.

The capacity of the energy system of Azerbaijan is more than 6,000 megawatts. At the same time, according to the experts, the potential of renewable energy sources in the country is more than 25,300 megawatts.

At present, 18% of electricity production in Azerbaijan fell on alternative energy sources, in which hydro power plants hold main share, although most of the country's potential in this area falls on solar energy (estimated at 5,000 megawatts). Some 4,500 megawatts accounts for wind power, 1,500 megawatts -- for biomass, 800 megawatts -- for geothermal energy, and the remaining 350 megawatts -- for the small hydro power plants (HPP).

The favorable geographic location and climatic conditions allow the widespread use of environmentally friendly alternative energy sources in Azerbaijan.

Aiming to lessen its dependency on oil, Azerbaijan carries out a number of measures for further development of alternative energy sector.

The Azerbaijani government is planning to increase the share of alternative energy by 30% by 2030 in total power generation.

There are plans to implement a number of projects totaling $2.3 billion in alternative energy.

The projects include a plant for production of biofuels (pellet fuels) in the Sabirabad district, construction of wind power plants in the Pirallahi district, an agro-energy residential complex in the Samukh district and others.

Construction of two wind power farms worth $800 million and $408.9 million in the Pirallahi district, as well as a wind power farm worth $377.7 million in the Khizi district are the biggest projects planned for implementation.

Draft agreement on scientific research in Caspian Sea discussed in Turkmenistan

Azernews, Trend, 15 March 2019

The Ministry of Foreign Affairs of Turkmenistan hosted the 1st meeting of authorized representatives of the Caspian states to agree on a draft intergovernmental agreement on cooperation in the field of scientific research in the Caspian Sea, Trend reported referring to the ministry.

The event was organized by the Ministry of Foreign Affairs and the State Enterprise for Caspian Sea Affairs under the President of Turkmenistan, and attended by experts from Azerbaijan, Iran, Kazakhstan, Russia and Turkmenistan.

Turkmen Dovlet Habarlary (TDH) state agency reports that "all economic activity in the Caspian Sea needs strict scientific accompaniment, should rely on a holistic perception of the natural and

anthropogenic processes that are taking place, a monitoring and forecasting system."

The Caspian Sea is the world's largest inland water body, not connected to the oceans and has a climate-forming significance. It is unique in having carried a diverse relict flora and fauna, including the world's largest herd of sturgeon.

Bangladesh

The challenges to ensure safe water for all

The Daily Star, Abdullah Shibli, 20 January 2019

(Photo: Star)

The Awami League Election Manifesto 2018 promised that many of the modern civic amenities I enjoy in Dhaka city or my ancestral home in Sylhet's Darga Mahallah will be available in every village. While I am not sure if all of the basic needs that I expect in these cities—such as running water, sanitary toilet, or electricity—will be available on demand in each of the villages by 2023-24, it is great to know that the new government will turn its attention to this matter and make it a priority.

Clean and safe drinking water is a basic human need and right. Clean water implies that water is free of E. coli and arsenic, 50 parts per billion. A recent World Bank report on water supply, sanitation, and hygiene (WASH) warns that clean water remains a “stubborn gap in Bangladesh's development.” Only a little over 50% of households can access clean water that is within 30 minutes of walking distance. It is difficult to obtain reliable and current data on the number of deaths and the cost of illnesses that can be attributed to the lack of clean drinking water.

In a study published in August 2018 in the prestigious “The Journal of Infectious Diseases”, the authors estimate that there are at least 100,000 cases and approximately 4,500 deaths each year from cholera. The majority of these deaths occur in children. According to WaterAid, a British NGO, “Over 2,000 children under 5 die a year from diarrhoea, caused by dirty water and poor toilets.” According to Water Project, another international NGO, “With a staggering 60% of the population that has to endure unsafe drinking water, the nation is in danger.”

In an op-ed published in the Daily Star and based on the above-mentioned WASH study, Syed Mansur Hashim reports that 75 million people, roughly half of our population, are at the risk of contracting the most serious diseases because they are drinking unsafe water.

The report cites two seemingly contradictory case studies of two children living in very different environments but having a common issue: both are affected by unsafe drinking water contaminated by E. coli bacteria. I thought I ought to share a paragraph from the WB study with my readers since it paints the contrasting scenario so vividly:

"Shilpi lives in a small house in a farming village near the Bay of Bengal. She has just begun primary school, though both her parents are illiterate. Her home recently received its first electric power but remains without running water. Therefore, her afterschool chores include walking half a kilometre to collect water from a well by a cow pen. The water is contaminated with E. coli bacteria. Nadia lives in a flat in Bharidhara, an affluent neighbourhood of Dhaka. Her parents are university graduates who hold well-paying jobs. She has just begun primary school. Her home has air conditioning. Hot and cold running water are available at the turn of a tap. The water is still contaminated with E. coli bacteria."

So what accounts for this state of affairs? The primary source of drinking water for almost 90% of the population is groundwater extracted by some form of tube well. "However, tube wells do not necessarily filter out all contaminants, cannot always withstand natural disasters, and are poorly regulated. As a result, many citizens are sometimes unknowingly consuming unsafe water with either faecal bacteria, arsenic, salinity, or other contaminants." When we switched from drinking surface water—from ponds, rivers, and streams—to groundwater many decades ago, it proved to be a double-edged sword. The transition from surface water to groundwater played an important role in the rapid decline in morbidity and mortality from waterborne diseases.

The downside of this switch has been that our groundwater remains "stubbornly contaminated" with dangerous microbes, heavy metals, or salt. The World Health Organization (WHO) alerts that 35 million people in Bangladesh are exposed on a daily basis to elevated levels of arsenic in the water they drink, which will eventually threaten their health while shortening their life expectancy. The Human Rights Watch (HRW) states that its figures show that approximately 43,000 people die each year from arsenic-related illnesses in Bangladesh. Its research finds that, depending on the progress of ending exposure, between 1 and 5 million of the 90 million children estimated to be born between 2000 and 2030 will eventually die due to the exposure to arsenic in drinking water.

When you come to think of it, many of the 21 election-time pledges made by Awami League are closely tied to the Sustainable Development Goals (SDG) of the UN. Take the case of SDG6, which calls for governments to "ensure availability and sustainable management of water and sanitation for all." SDG6 has eight targets—six of them are to be achieved by the year 2030, one by the year 2020, and one has no target year. Each of the targets also has one or two indicators which will be used to measure progress. In total, there are 11 indicators for SDG6.

The first three targets relate to drinking water supply and sanitation. The SDGs are also interlinked. WASH experts have stated that without progress on Goal 6, the other goals and targets cannot be achieved. In other words, accomplishing the other SDGs will require assuring clean water and sanitation for all as stated in SDG6.

In a World Bank blog, co-authored by the Principal Coordinator for SDG Affairs at the Prime Minister's Office, it is mentioned that “Bangladesh has still a long way to go to meet the Sustainable Development Goal (SDG) of providing universal access to clean water and sustainable sanitation by 2030.” But how do we fix these problems? It behoves the government to closely examine the WASH study for a list of issues that bedevil our water and sanitation sectors. For example, the study indicates that financial allocation for the overall sector development is insufficient. The WASH budget, as a proportion of national and LGD budget, has been declining since 2007. The estimated total budget gap is about 47% to meet just the government's envisioned water targets by 2025.

“An appropriate mix of policy changes, gradual and time-bound institutional changes, implementation of regulations and effective citizens' participation to ensure improved water quality and maintain service standards is needed to overcome many of these constraints to achieve the goal of safe universal access.”

Experts have also called for increased budgetary allocation for disposing of waste in urban centres. Another study recommends that “in order to make a significant impact, the government needs to reinvigorate the arsenic policies established in the 90s and change the maximum exposure amount from 50 micrograms to 10 micrograms (as recommended by the WHO).”

Dr Abdullah Shibli is an economist, and Senior Research Fellow, International Sustainable Development Institute (ISDI), a think-tank in Boston, USA. His new memoir, Fairy Tales: Stories from My Life, will be published by Jonantik soon.

Bangladesh

Environmental impact on health

The Daily Star, 1 January 2019

The World Health Organisation (WHO) defines the environment in relation to health as “all the physical, chemical, and biological factors external to a person, and all the related behaviours”.

(File photo)

There is no avoiding interaction with the environment as we go about our daily business of living. And as the world changes and gets more polluted, these environmental factors will inevitably affect our health.

Air Quality

Air pollution has become a major cause of death and disease worldwide. Pollutants in the air that have been identified as major culprits include particulate matter (PM), ozone (O3), nitrogen dioxide (NO2) and sulphur dioxide (SO2).

WHO has estimated that approximately 4.2 million deaths worldwide are linked to air pollution, mainly from heart disease, stroke, lung disease, lung cancer and acute lung infections in children.

The estimated figures:

• 29% of all deaths and disease from lung cancer,

• 24% of all deaths from stroke,

• 25% of all deaths and disease from ischaemic heart disease,

• 43% of all deaths and disease from chronic obstructive pulmonary disease.

Water Quality

This applies to both drinking and “other” water. Contamination of such waters can potentially cause mild to severe illness. The source of contaminants are myriad, and could include biological contaminants, discharge of waste, industrial and radioactive waste, excessive use of pesticides, fertilisers and leakage from water tanks.

Biological contaminants include bacterial, viral, fungal and parasitic sources, and could cause diseases like typhoid, cholera, encephalitis, hepatitis and gastrointestinal diseases. Chemical sources are myriad, and depends on the type of chemicals as well as location of the leaks.

The Built Environment

Even this has a major impact on health. Consider the implications of high-rise buildings with high density occupation and the effects on inhabitants. Add to this the issues of drainage, waste disposal, transport access, physical activity patterns and access to resources, and it becomes a potential cauldron of trouble.

Climate Change

Despite prominent naysayers, climate change has a huge impact on health. The phenomenon not only impacts sea level, it can influence the pattern and spread of infectious diseases and air quality. No surprise, the severity of natural disasters like floods, droughts and storms will worsen with climate change.

All this points to the issue of preparedness. Are we planning for healthy environments to nurture and protect health? Are we prepared to change to lessen the impact of climate change? Are we prepared for anything nature throws at us, including flood and disaster preparedness?

Plans needed for water transport sector, Bangladesh Chief whips

The Independent 5 April 2019 UNB, Dhaka

Short- and long-term planning is a must to prevent encroachment, save rivers and ensure passenger safety, Chief Whip Noor- E-Alam Chowdhury said. “The government is determined to save rivers,” he told a discussion on Naval Safety Week 2019, arranged jointly by Water Transport Ministry and Water Transport Department at CIRDAP Auditorium.

He urged the stakeholders to work in collaboration for solving the issues. The chief whip told the ship owners to work for passenger safety. State Minister for Water Transport Khalid Mahmud said that in the last 10 years, water transport sector has seen unprecedented changes.

“We've launched cruise ship on international route despite many limitations of government,” he added. He mentioned that currently there are 40 dredgers at the government's disposal with 35 more waiting to be added.

Noted writer and columnist Syed Abul Maksud said everyone needs to work coherently to keep our rivers pollution and occupation free. “The media can play vital role to aware the public,” he added.

The discussion was presided by Secretary of Water Transport Ministry Md Abdus Samad while former BIWTA chairman Dr Reaz Hasan Khandoker presented the keynote paper.

Singapore investor pours US$500,000 into clean water in Cambodia

Ecobusiness, Hannah Alcoseba Fernandez, 13 February 2019

Nexus for Development, a Southeast Asian impact investor, is funding a new project to alleviate Cambodia's water crisis.

In rural Cambodia, only 8.5% of households are connected to piped water. Image: Nexus for Development

A Singapore-based impact investment network is to pump half a million dollars into clean piped water for Cambodia's rural population.

Nexus for Development, through its debt-financing arm The Pioneer Facility, signed a deal to provide a collateral-free loan for Khmer Water Supply Holding (KWSH), a social enterprise that delivers piped water to remote areas in Cambodia, where only 8.5% of households are connected to a water system.

Nexus, which has worked for almost 10 years with entrepreneurs and investors in Asia and Africa, already met one-third of its US$6.5 million target, with US$1 million to be used for impact investment or funds that drive social and environmental change while generating financial returns.

The fund was raised through other investors like conservation organisations French Facility for Global Environment, the Lorinet Foundation, and Phitrust Asia.

Margarita Manzo, senior investment manager at Nexus, said while impact investing helps "fill the gaps impactful small medium enterprises face on the road to commercial sustainability", Nexus also benefits from it as it earn from loans that reach US$500,000 which have 10% interest over a period of three to five years.

The fund will be used to buy two additional piped water stations to provide water to about 12,500 households.

It will also construct water treatment plants, hire staff, purchase new water sources and install equipment such as pipelines to households.

KWSH has already connected over 13,000 households to piped water and has a long-term plan to provide clean water to over 60,000 households and 300,000 Cambodians.

Nexus has previously provided funding for other impact investment projects like solar-powered pumps in the Philippines, a water filters in Indonesia, and clean cook stoves in Laos.

Cambodia's environment, Singapore's problem

Malaymail, Surekha A. Yadav, 31 March 2019

So, apparently, my neighbourhood smells of urine.

That's right, Yishun — that proud northern region of our island — denigrated by the ignorant as a hotbed of crime (okay, there were a couple of cat killers) is now literally a pee town?

Honestly, this is rubbish! Firstly, Yishun is a lovely neighbourhood and secondly, I haven't noticed any urine smell and don't know anyone who has.

Still, on the online forums it is apparently a thing.

The National Environment Authority has said the urine and burning smells detected island-wide are in fact the result of fires at landfills and farm sites in Johor.

And this brings us to a serious point; from the regional plastic waste that washes up on our shores to the oil slicks that appear due to discharge from passing ships and of course the Indonesian haze that often chokes us in the hot months, Singapore seems to be the perpetual victim of other nations' inability to take care of their environment.

But is this really the case?

On the surface it seems open and shut. Singapore is as clean and green as they come. Almost 50% of the island is covered in foliage and we have created a beautiful green island, Pulau Semakau, out of our plastic waste recycling efforts.

Our air, when not polluted by particles from our neighbours, is clean. But when you begin to unpack Singapore's environmental credentials, things really aren't so clear.

Actually, while Singapore is literally green with a good percent of foliage, the rest of our track record isn't necessarily great.

Our carbon footprint (per capita) is arguably the largest in Asia and the Pacific, particularly if you consider the emissions released by the planes that bring so many goods and people to our country.

Our domestic recycling efforts are abysmal. Over 90% of Singaporeans make no real effort to sort their trash or recycle; rather, our recycling successes are based on government efforts and armies of imported labourers — themselves flown in from various parts of the world.

Our adoption of clean technologies like solar power, electric cars etc. has been sluggish but far worse than these is our role degrading the environment of our neighbours.

The reality is that Singapore's clean, green reputation is built on our wealth —

and our wealth has come at an environmental cost... to our neighbours.

A simple example is our land area. To support our expanding population and economic growth, Singapore has added over 100 square kilometres to its land area over the past 50 years.

This reclamation though depends on raw materials, particularly sand extracted at great environmental cost to our neighbours.

Forty million cubic tons have been poured into the sea around our coast and a significant portion of this has come from unscrupulous suppliers.

Entire islands have vanished from the sea in Indonesia and river beds and ecosystems in Cambodia have been destroyed on account of sand mining — with one destination for this sand being Singapore.

So for the 100 square kilometres we have reclaimed, we have potentially damaged hundreds of kilometres of mangroves, rivers and islands in other countries.

The reality is that the money and space we use to fuel our clean nation has come at a cost to other environments in the region.

But it is not about blame — the point is about accepting our responsibility and understanding that Indonesia's fires and Cambodia's habitat loss are our problem too.

As such, it is imperative that we improve systems ensuring what sand we use is sourced sustainably (even if that means greater cost) and share wealth and technology.

We should be proud that 50% our tiny island is green but maybe it is time we made the same investment to get the forest cover in Sumatra or East Malaysia back to 50% too.

That would be an achievement and definitely make a dent in the haze.

** This article reflects the personal opinion of the columnist.*

Philippine water shortage hits more than 6 million people in and around nation's capital

Associated Press, 14 March 2019

Water supplies will be cut for at least six hours a day for more than a million households until the rainy season fills dams and reservoirs in May or June

More than 6 million people have been affected by a water shortage in large areas of the Philippine capital and a nearby province, with long queues

forming for rationed water, and businesses and some hospitals struggling to cope after taps ran dry.

A couple carries empty containers looking for places to collect water in Mandaluyong, metropolitan Manila. Photo: AP

A spokesman for Manila Water Company, Jeric Sevilla, said that water supplies will be cut for at least six hours a day for an estimated 6.8 million people in more than a million households until the rainy season fills dams and reservoirs in May or June.

A man sits beside rows of buckets as he waits for water trucks in Manila. Photo: AP

The company, one of two government-authorised water suppliers in the densely populated Manila metropolis and nearby Rizal province, said a spike in demand and reduced water levels in a dam and smaller reservoirs in the sweltering summer are the culprit, exacerbated by El Nino weather conditions.

Manila Water, which supplies water to the eastern half of the capital, initially tried to cope with the limited supply by reducing pressure but it did not work since some communities in hilly areas complained of not getting water for long hours. The company then decided to schedule water supply interruptions thereafter, Sevilla said.

“The concept is for everybody to share the burden,” he said by phone. “Nobody wants this to happen. The welfare of our customers is foremost in our mind and we’re taking steps to mitigate the situation.”

Residents in more than a dozen cities and towns are expected to lose their water supply from six to 21 hours a day through the summer months, the company said in an advisory notice that appealed for public understanding.

In the hard-hit city of Mandaluyong, residents lined up for hours with pails and water jugs to get water from fire trucks. “We have no water. It has been one week, not a drop in our tap,” said resident Richie Baloyo. “There are children going to school, people need to work, how do you expect them to collect water like this?”

A woman cleans empty washing machines at a laundromat in Manila. Photo: AP

Many water-dependent businesses, such as car washes and laundry shops, have closed temporarily. Some restaurants have started using paper plates or porcelain plates covered with disposable plastic sheets to conserve water.

Health Secretary Francisco Duque III made an urgent appeal to relatives of hospital patients to "limit the watchers of your patients to one" to reduce water use.

Congress is to hold inquiries into the cause of the crisis.

The government has been blamed for decades of delay in constructing another dam and other related infrastructure. Manila Water has been criticised for not adequately preparing for contingencies.

"El Nino is not really the culprit," Sevilla said. "It's actually supply and demand."

China still facing an uphill struggle in fight against pollution, Environment minister

Guo Rui, 11 March 2019

Li Ganjie says that while the situation is improving, the hardest part of the challenge still has to be tackled

Cleaning the country's notoriously dirty air is a major priority for government, but minister warns task remains 'very challenging'

China's environment minister said that while the country's air quality has improved, the situation is still "grim" and the hardest challenges still need to be tackled.

Speaking at a press conference organised by the National People's Congress, Li Ganjie, the Minister of Ecology and Environment, said the number of good weather days in 338 major cities rose to 79.3% in 2018, up 1.3% from a year ago.

In the same period, the average concentration of PM2.5 – the deadly particles that are most harmful to human health – had fallen by 9.3%, Li said.

China has long been notorious for its heavy smogs. Photo: Reuters

But despite this improvement, Li said there should be no let-up in the battle against pollution and the country still needed to do more to tackle the problem.

He said the country had done the easy bit, but the “remaining parts are very challenging. The situation is grim and there is a long way to go”.

China has long been notorious for its heavy smogs, a consequence of years of breakneck economic development and its reliance on fossil fuels.

The Chinese leadership has made cleaning up the environment one of its three most important missions, along with poverty eradication and controlling financial risk, and delivering on these critical tasks is considered a sacred mission for the Communist Party.

Last July, the government outlined a three-year action plan targeting air pollution in three major regions, namely the Beijing-Tianjin-Hebei area, the Yangtze River Delta and the North China plain straddling Shaanxi and Shanxi provinces.

Ecology and Environment Minister Li Ganjie warns that major challenges still needed to be tackled. Photo: Xinhua

Li said China has commissioned a high-level study involving more than 2,000 of China’s top scientists and spent over 600 million yuan (US$89 million) to find out the causes of poor air quality in the country and put forward suggestions to clean up the air.

“We have achieved some basic success after about 18 months of hard work and we will make public the results of our research and actions as we go from one stage to another,” Li said.

The minister also said that officials falsifying data was another key obstacle to cleaning up the country’s skies.

He cited the April 2017 example of a collective fraud in Linyi, Shanxi province, where 16 officials in the city’s Environmental Protection Bureau were caught manipulating air quality figures in an attempt to hide excessive air pollution from the public.

Investigations later showed the gang had tampered with six air monitoring stations over the course of a year to cause them to give incorrect readings.

Li said all 16 had been sentenced for their crimes last May, adding: “I don’t think any one of us would have imagined that 16 officials could have been sentenced for environmental crimes in the past but we did exactly this for this serious case in Linyi.”

He claimed that China has now turned a corner and its current air quality figures can stand the test of time.

“What we hated most was such falsification of data,” Li said. “I would not dare to say this in the past but now I can vow that our data is truthful, accurate and complete.”

Private capital is key to Vietnam's future energy development

The Financial, 24 January 2019

The changing macroeconomic and sectoral context in Vietnam requires a new approach to financing electricity and gas investments, a new World Bank Group report titled "Maximizing Finance for Development in Vietnam's energy sector" said.

The study highlights the unviability of the traditional financing model which relies mostly on public investment by state-owned enterprises. Importantly, it presents an action plan on how to unlock new sources of finance, especially from the private sector, based on a comprehensive analysis of investment needs as well as constraints in the regulatory environment including the capital and forex markets.

"Given the limited fiscal space and the reduction of concessional financing available going forward, it will be important for Vietnam to step up mobilizing alternative capital resources for the electricity and gas sectors. The Government should address comprehensively the constraints currently impeding the flows of domestic and cross border private capital into two of the most strategic segments of the Vietnamese economy." - Ousmane Dione, the World Bank Country Director for Vietnam said.

Vietnam's electricity sector requires new investments of about US$10 billion annually frontloaded through 2030, higher than the average of US$8 billion for the period 2011–15. Meanwhile, the envisaged expansion of the gas sector calls for an accumulated investment of around US$20 billion between 2015 and 2035.

An enabling environment needed for private players to drive the next wave of electricity and gas investments

While Electricity of Viet Nam (EVN) and PetroVietnam (PVN) will continue to play an important role in developing new infrastructure, the vast majority of new gas and electricity investments will need to come from private players, the report argues. Moving into this direction is in line with the Government's strategy and objectives of financing the energy sector in the future.

"We observe a large interest from private investors to participate in the vast growing energy market in Vietnam, especially in renewables and LNG development. They are willing to invest as long as the projects are well-structured and bankable. What investors need is a transparent and stable

regulatory environment which incorporates a proper risk-sharing mechanism among all parties" - said Franz Gerner, the World Bank's Lead Energy Economist and the study's lead author.

To remove constraints and maximize financing available for electricity and gas investments in Vietnam, the report proposes a well-coordinated policy effort around three pillars:

1. Develop a major PPP/IPP program for new power generation as part of the development of Power System Development Plan 8 to build investor confidence.

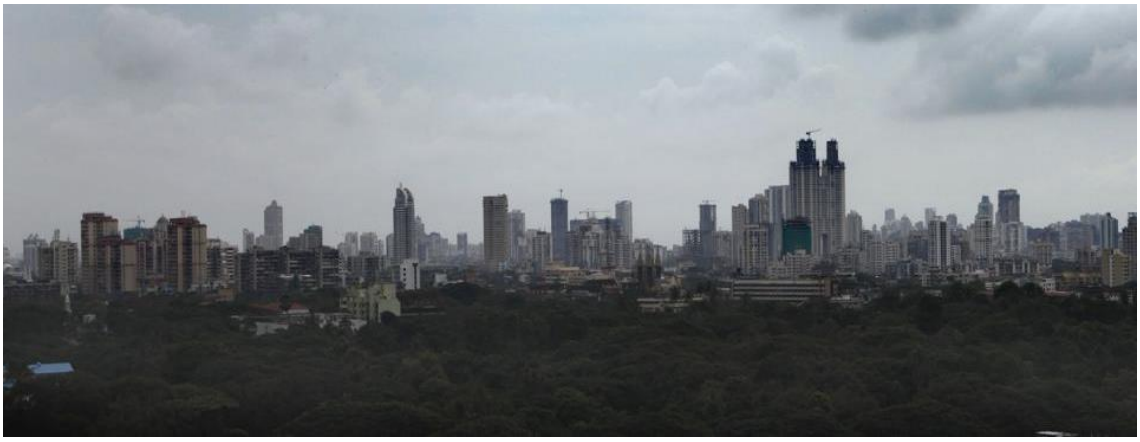
2. Enhance the financial standing and credit worthiness of EVN and PVN to enable them to access commercial finance without government support.

3. Increase the availability of local currency financing which is critical for both project finance and corporate project finance.

Government submits Maharashta plan to breathe easy

Hindustan Times, Mumbai, Badri Chatterjee, 6 April 2019

CPCB, which is part of a committee constituted by the National Green Tribunal (NGT) earlier this year, is expected to review the plan submitted by the MPCB this month.



The Maharashtra Pollution Control Board (MPCB) has submitted air pollution mitigation plans for 17 cities in the state four months after the deadline, the Central Pollution Control Board (CPCB) said. (HT File Photo)

The Maharashtra Pollution Control Board (MPCB) has submitted air pollution mitigation plans for 17 cities in the state four months after the deadline, the Central Pollution Control Board (CPCB) said.

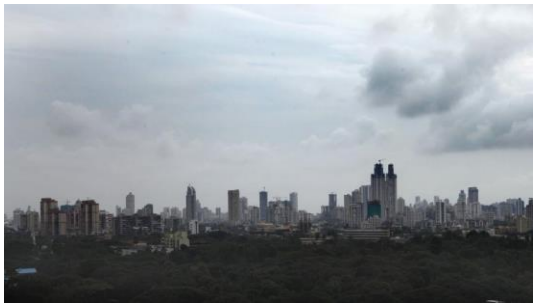
The suggested measures include adopting the most advanced emission standard for automobiles, daily pollution checks for vehicles and increasing the tree cover.

If approved by the CPCB, it will be implemented immediately in Mumbai and Aurangabad before being replicated in the other cities.

The 850-page document looks at sector-wise pollution sources for 17 cities, the highest number for any state in India.

“MPCB submitted a comprehensive action plan earlier this week, which identifies the major sources of air pollution across 17 cities, a timeline for 25% reduction for each source through mitigation measures by 2022. The agencies required to take action for each source have also been listed with individual responsibilities and time-bound targets,” said VK Shukla, in charge of air quality management, CPCB, and one of the scientists who developed the National Clean Air Action Plan, released by the Union environment ministry in January.

The action plan suggests swift adoption of Bharat Stage VI (most advanced emission standard for automobiles), implementation of carpooling, electric buses for office complexes with more than 100 employees, and daily pollution checks for vehicles.



The Maharashtra Pollution Control Board (MPCB) has submitted air pollution mitigation plans for 17 cities in the state four months after the deadline, the Central Pollution Control Board (CPCB) said. (HT File Photo)

“On ground execution of the action plan has begun with meetings already completed with the state transport secretary and Mumbai Metropolitan Regional Development Authority (MMRDA) commissioner addressing vehicular pollution and construction dust. We will make Mumbai and Aurangabad model cities to implement the plan and replicate it across the remaining 15,” said E Ravindran, member secretary, MPCB.

CPCB, which is part of a committee constituted by the National Green Tribunal (NGT) earlier this year, is expected to review the plan submitted by the MPCB this month. “If they [the action plans] are approved, CPCB will ask the state board to implement them immediately,” Shukla said.

According to the action plan, half of the pollution in the 17 cities is attributed to vehicular pollution (30%) to construction activity (20%). The remaining 50% comprises industrial emissions, cement batching plants, biomass burning (residential and open), the contribution of aviation, shipping, open waste burning and windblown dust from dry and arid regions.

“Keeping these sources in mind, the action plan suggests targets for reducing pollutants such as particulate matter (PM10 and PM2.5), sulphur dioxide (Sox) and nitrogen dioxide (Nox) below or at least at par with CPCB safe standards by 2022,” said Ravindran.

He said reducing vehicular pollution and biomass burning were priorities along with making stringent norms to mitigate point source emissions from industries, factories and cement plants.

Other measures include increasing tree and vegetation cover near industries and open spaces, treating domestic waste at source, allocating sparsely-populated areas for construction waste dumping and processing, auditing all newly-constructed and under-construction sites across 17 cities.

Experts said the development was encouraging but along with agencies, citizen participation is important.

“It is high time that state governments begin implementing city and region-based clean air action plans for an effective reduction in pollution,” said Anumita Roy Chowdhury, executive director (research and advocacy), Centre for Science and Environment, Delhi.

India’s looming water scarcity

The Hindu Business Line, Editorial, 7 April 07 2019

Drought conditions in peninsular India highlight familiar policy failures

Recent BusinessLine reports have highlighted the harrowing conditions of water scarcity in peninsular India, with the monsoon still about three months away. Scientists and specialists have observed that 40% of the country’s area is reeling under drought, of which 16-17% is severe. Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh and Telangana and Gujarat are in a particularly bad way, with northern Karnataka and Maharashtra not receiving adequate rainfall for three or four consecutive years. Major reservoir levels in Gujarat and Maharashtra, at 22% of their capacity, are well below 30% levels in April 2018 and the trend level of 33% at this time of the year.

While almost the entire country is vulnerable to ‘vegetation drought’, regions with low soil moisture such as the river basins of Mahi, Sabarmati, Krishna, Tapi and Cauvery are particularly susceptible due to low levels of soil moisture. It is extraordinary that Kerala should be in the grip of a water crisis in precisely the regions that were devastated by last year’s floods. A combination of high temperatures and water scarcity has put crops such as cardamom, rubber and tea under stress, with pest attack risks on the rise. An immediate as well as medium-term

policy response is called for. The first priority is to stave of a drinking water crisis by rationing the use of water for irrigation purposes, as Karnataka has done in recent years. Some curbs on construction with the onset of summer might be called for.

With regions like Latur in Maharashtra nearly back to the crisis they witnessed in 2016, it is clear that very little has changed on the ground. There is no evidence of a shift away from sugarcane. Meanwhile, micro-irrigation practices, such as the use of drips and sprinklers, are not picking up at the desired pace. Economic Survey 2015-16 observes: “The key bottlenecks in the adoption of this technology are the high initial cost of purchase and the skill required for maintenance.”

However, this is offset by reduced consumption of fertiliser and power, besides higher yields. With the political economy focus on rural distress, it is crucial that the right incentives are given. Rather than merely providing short-term relief to farmers, they should be persuaded to grow appropriate crops, to safeguard economic and environmental security. Therefore, power subsidies can be gradually withdrawn and instead drip and sprinkler irrigation subsidised. This should be accompanied by a shift away from paddy and sugarcane in rainfed regions, with subsidies and incentives being linked to such choices.

Telangana has shown the way in furthering micro-irrigation through Mission Kakatiya, which entails the revival of over 40,000 tanks in the State. This has led to an improvement in groundwater levels. However, catchment area rejuvenation needs equal attention, as the Kerala floods experience informs us. Policymakers should take a holistic view of water, agriculture and the environment.

Managing India’s household energy challenge

The Hindu Business Line, Aditya Chunekar, Shweta Kulkarni, Ashok Sreenivas, 7 April 2019

Promotion of energy-efficient appliances and gathering richer data on energy use are crucial

Various schemes in the power sector and the Pradhan Mantri Ujjwala Yojana (PMUY) have resulted in nearly every Indian household having an electricity and LPG connection. While this is welcome, India’s per-capita energy consumption remains low at only about a third of the global average and is seen as a limiting factor in India’s human development. This article proposes some ideas to ensure that households shift to clean-burning cooking fuel options, and to effectively plan and manage the resultant

increase in residential energy demand. The electricity issue was dealt with in the article ‘100% rural electrification is not enough’ (published in BusinessLine, April 27.)

Cooking energy challenge

Over seven crore new LPG connections have been given to poor households under PMUY. But ensuring that households continue to use LPG or other clean-burning cooking fuels on a sustained basis is a harder task and requires a four-pronged approach.

One, the supply push such as PMUY should be augmented with a demand pull from households. This requires building awareness about the severe health impact on women and children of cooking on traditional stoves, and overcoming any relevant gender, behavioural and cultural barriers.

Two, the supply initiative should also include other clean-burning fuels such as electricity, biogas and piped natural gas, as LPG may not always be the preferred or appropriate choice for all households.

Three, to go beyond connections and ensure consistent usage of modern fuels, policy measures are required to provide adequate and well-directed subsidy, establish countrywide supply chains, and develop viable business models for rural distribution.

And, four, there should be well-defined targets for sustained use of modern fuels and reduction in household air pollution.

Powering lives Kamal Narang

One, the supply push such as PMUY should be augmented with a demand pull from households. This requires building awareness about the severe health impact on women and children of cooking on traditional stoves, and overcoming any relevant gender, behavioural and cultural barriers.

Two, the supply initiative should also include other clean-burning fuels such as electricity, biogas and piped natural gas, as LPG may not always be the preferred or appropriate choice for all households.

Three, to go beyond connections and ensure consistent usage of modern fuels, policy measures are required to provide adequate and well-directed subsidy, establish countrywide supply chains, and develop viable business models for rural distribution.

And, four, there should be well-defined targets for sustained use of modern fuels and reduction in household air pollution.

Coordinating and managing these four approaches require a multi-ministerial programme anchored in the Ministry of Health, since this is primarily a health challenge, and driven from the Prime Minister's Office.

As rising incomes, increased electrification and a shift to modern cooking fuels lead to an increase in residential energy consumption, the drivers and patterns of this change need to be understood.

Richer information related to energy use in households can provide insights into income and price elasticities for energy demand, drivers for appliance purchase, fuel switching, etc., which can support better energy demand estimation and energy efficiency programmes.

Periodic surveys should be instituted to collect nationally and sub-nationally representative data regarding building characteristics, appliance ownership, appliance use and other factors that drive residential energy use. Several countries conduct such surveys, and current Indian surveys do not capture such information. Therefore, India should also institute such a survey, which can be conducted by the National Sample Survey Office.

Enhancing efficiency

Energy efficiency measures will have a pivotal role in managing future residential energy demand. Ownership of large appliances like refrigerators and air-conditioners (ACs) is still very low in India and will increase steeply, making energy efficiency measures very important.

The Bureau of Energy Efficiency (BEE) runs a "star rating programme" to promote energy efficient appliances. Three steps can help to strengthen the programme further. First, BEE should regularly revise the efficiency ratings upwards for all appliances. While the revision has happened for refrigerators and ACs, resulting in the energy consumption of such a 5-star appliance in 2019 being much lower than its 2009 equivalent, the ratings have not been revised for ceiling fans since 2010. This has resulted in 80-90% of the three to four crore ceiling fans sold annually in India being very inefficient. Second, BEE should conduct national level awareness campaigns

about star labels for various appliances, including the possible monetary savings over their lifetime that can offset their high upfront cost.

Third, BEE should scale-up performance testing of a random sample of star-rated models in the market, and make the test results public. This will increase consumer trust in star labels and consequently increase the adoption of efficient appliances.

India is potentially on the cusp of a rapid increase in residential energy consumption. This needs to be facilitated by suitable policy and institutional design, planned through a better understanding of the likely drivers and patterns of residential energy demand, and managed as efficiently as possible.

The writers are with Prayas (Energy Group). This is the second of the three articles on crucial challenges facing the Indian energy sector.

Indonesia

Construction on mega deepwater gas project launched

The Jakarta Post, Stefanno Reinard Sulaiman, 30 January 2019

Deputy Energy and Mineral Resources Minister Arcandra Tahar (JP/Dhoni Setiawan)

Construction on a long-awaited mega gas project, the Indonesia Deepwater Development (IDD), began in March, as a revision of the plan of development (PoD) was completed.

Energy and Mineral Resources Deputy Minister Arcandra Tahar said that the discussion on the PoD with contractor Chevron reached the final phase.

“The PoD revision was completed on the first quarter, so the onstream phase was expedited,” Arcandra said, adding that the project would still apply the cost-recovery scheme until the contracts expired.

Arcandra could not disclose the revised project cost, but he said the initial project cost was more than US$18 billion.

The IDD project is located mainly in the Kutei Basin, which covers an extensive area of onshore Kalimantan, extending into ultra-deepwater territory in the middle of the Makassar Strait, according to a report from energy think tank Wood Mackenzie.

In an effort to make the IDD viable, the government has decided to exclude the Makassar Strait Block from the project. The Makassar Strait block will be auctioned separately, and the IDD only contains two blocks -- Ganal and Rapak.

“We will also amend the production-sharing contracts (PSC) in line with the decision to cut out Makassar Strait from the IDD project,” he said.

The IDD, before the Makassar Strait block was excluded from the project, was expected to produce 1,230 million standard cubic feet per day (mmfcd) of gas and 50,750 barrels condensate per day (bcpd) by 2023. (bbn).

As Indonesia's oil sector is less profitable, it’s time for clean energy: Experts

The Jakarta Post, Stefanno Reinard Sulaiman, 20 February 2019

President Joko "Jokowi" Widodo (second left) visits a geothermal power plant in Tompaso, Minahasa regency in North Sulawesi. (Antara/Puspa Perwitasari)

The continuous decline in oil prices that has led to a lower contribution to national revenue should become a wake-up call for the government to immediately kick off fiscal reform that would speed up the use of renewable energy, experts in a recent discussion said.

According to a new report released by the Canada-based International Institute for Sustainable Development (IISD), most revenue from the oil and gas sector was indirectly allocated for fossil fuel consumption.

Based on the research that looked into the 2014-2016 fiscal years, the average contribution of the oil and gas sector

stood at Rp 190 trillion (US$16 billion) annually or 18% of government revenue, but 14% of which was later channeled for fossil fuel subsidies.

“As revenue from fossil fuels declines, it is more important than ever for this clean energy transition to be accelerated. Indonesia’s past shows it can grow its economy without expanding fossil fuel extraction,” IISD senior policy advisor and lead for Indonesia Philip Gass said.

Without increasing revenue, the fossil fuel subsidy would only encourage the wasteful consumption of energy, leading to faster depletion of Indonesia’s oil, gas and coal reserves, the report further stated.

The institution believes that further fiscal reform on fossil fuel subsidies is also possible as past experiences of cutting off the fuel subsidy in 2014, which saved around Rp 200 trillion, was a success story that could be repeated again.

“In 2014’s fuel subsidy cut, the government was able to make greater investments in infrastructure and provide greater support for communities and social assistance programs. […] More subsidy reform will push for cleaner energy,” IISD Indonesia coordinator Lucky Lontoh said.

The report recommends that the government phase out various energy subsidies and push for the greater role of renewable energy. The experts said in the report that developing renewable energy is suitable for Indonesia not only because it is more and more cost competitive but also because the country has plenty of clean energy resources like geothermal energy.

The contribution of clean energy power plants in 2018 stood at around 12%, while coal-based electricity stood at more than 50% and will likely do so until 2027.

The Energy and Mineral Resources Ministry’s director for new and renewable energy Harris said earlier that Indonesia had a lot of untapped clean energy potential.

“To date, we have only utilized 2% of our renewable energy potential, but luckily our geothermal energy has become one of the world’s biggest producers,” he said recently.

Based on the ministry’s recent data, Indonesia has 442 gigawatts (GW) of renewable energy capacity, but only 9.42 GW or 2% has been installed.

Furthermore, the fiscal transition toward cleaner energy faces a challenge from the relationship between the government and its people that dictate policy, said energy expert from Jakarta-based Paramadina University Emanuel Bria.

“We have learned that our targets on clean energy, such as in the National Medium Term Development Plan [RJPMN], were always missed. And it is because the market dictates our policies, such that this year coal production exceeded the initial plan,” he said.

The IIDS acknowledged that a radical fiscal transition in the energy sector would be hard to attain, so they believe

that the transition is a long-term goal with small steps that could be taken soon, such as increasing the use of abundant natural gas.

“Natural gas resources have a crucial role in the transition [toward cleaner energy]. Indonesia has more gas reserves than oil and the former is also much cleaner,” said the president director of energy firm PT Q Energy South East Asia David Braithwaite, who is also the report’s researcher.

Indonesian institutions struggle to get funding for green energy projects

The Jakarta Post, Stefanno Reinard Sulaiman, 7 February 2019

Securing funding for environmentally friendly projects has not been a straightforward process for Indonesian companies and organizations, many of which are unaware that certain standards need to be fulfilled before applying for funding for green energy projects at international and multilateral organizations.

Renewable energy: Solar panels sit in a residential area on Ponelo Island, North Gorontalo. (thejakartapost.com/Syamsul Huda M.Suhari)

The standards are considered basic: Write a clear proposal and comply with the principles of equal opportunity for all genders and minority groups.

The United Nations through its Green Climate Fund (GCF), for example, requires proposals to be aligned with national development priorities and gender equality standards and accommodate the needs of vulnerable groups.

In Indonesia, the GCF has been working with Finance Ministry’s Fiscal Policy Office and intergovernmental organization Global Green Growth Institute (GGGI) since 2017.

Thus far, only PT Sarana Multi Infrastruktur, a government-backed infrastructure financing firm, has met GCF requirements. Working with GCF are two other Indonesian institutions: private infrastructure company Indonesia Infrastructure Finance (IIF) and civil society group Partnership for Governance Reform (Kemitraan).

For instance, a solar power plant (PLTS) with a capacity of a 2 megawatt-peak (MWp) is operating in East Sumalata district, North Gorontalo. It is the biggest solar plant in Sulawesi.

One of the GCF’s gender equality requirements was to ensure a balanced amount and equal opportunities for both

men and women employees, said Meirini Sutjahjo, head of communications for Indonesia at the GGGI.

“It [meeting the gender requirement] is one of our challenges to find entities eligible for GCF funding,” she said.

Acting as a pool fund for public and private investment since 2014, the GCF’s total portfolio value is US$16.4 billion, comprising pledged, committed and implementing funds worth $10.3 billion, $4.6 billion and $1.8 billion, respectively, according to its website.

The GCF will give accreditation for eligible applicants, which can ask for funds ranging from less than $1 million to more than $250 million for each project.

The government acknowledged that having access to alternative sources of funding to finance green projects would help reduce the problem of inadequate investment in the renewable energy sector, which is growing at a snail’s pace.

“Aside from helping us in terms of grants or soft loans, they [foreign institutions] are also [helpful] in capacity building, such as project preparation,” said Harris, director for new and renewable energy at the Energy and Mineral Resources Ministry.

“We need good-quality proposals [to apply for international funding].”

The national goal is to cut greenhouse gas emissions to around 800 million tons of carbon dioxide by 2030, with 39.25% coming from the energy sector, which still heavily relies on coal and fossil fuel.

As of 2018, Indonesia has been reducing greenhouse gas emissions at a rate of 43.8 million tons of CO2 per year, only 13.9% of the targeted 314 million tons of CO2 per year until 2030.

The reliance on traditional energy resources is evident in the country’s use of coal-based electricity, which will continue to account for more than half of power generation until 2027. Renewable energy, meanwhile, makes up 12%, as of 2018.

Although there has been an increased use of renewable energy over the past few years, Harris noted that there was little progress in green projects, which were struggling to seek financing amid a high reliance on fossil fuels.

Data from the ministry show that 30 out of the total 75 power purchase agreements in renewable energy with a total capacity of 1,581 megawatts have yet to obtain financing. Most of the agreements were signed in 2017.

Harris said small-scale green energy projects were the most difficult to fund. “As a solution to this, we are connecting them with the National Development Planning Agency’s [Bappenas] Center of Private Investment [PINA].”

The PINA division is tasked with searching for alternative sources of funding for various infrastructure projects outside the state budget.

Japan, Iranian firm sign contract on water project

Iran Daily, 13 March 2019

The Japanese Embassy and the Iranian firm, Rural Water and Wastewater Co. in North Khorasan Province have signed an agreement on human security projects, according to a fax report sent to Iran Daily.

The contract on 'Grant Assistance for Grass-Roots Human Security Projects,' known as 'GGP,' was signed by Japan's Ambassador to Iran Mitsugu Saito and the company's Acting Managing Director Ramazanali Hassanzadeh in the Japanese Embassy in Tehran.

The project contract, totaling at €28,400, is an agreement between the two sides on "The Project for Improvement of Access to Drinking Water for Domestic Use for Rural People in North Khorasan Province."

Both sides decided to conclude the 'Grant Assistance' for humanitarian support, addressing the serious water shortage of the country in recent years, the report said.

Addressing the signing ceremony, the Japanese envoy said, "We wish that the wholehearted support of the people of Japan for the expansion and strengthening of friendship will reach people in North Khorasan Province, as well as the great success of the project."

MP proposes swapping power, gas for water with Afghanistan

Financial Tribune, 12 February 2019

MP proposes swapping power, gas for water with Afghanistan

Iran can buy several million cubic meters of water from Afghanistan in exchange for gas and electricity, a Zabol lawmaker said.

Over the past year, Afghanistan has blocked the flow of water from Hirmand (Helmand) River into the country as a result of which the incoming water volume has plunged to 2 million cubic meters from 150 mcm.

“Afghanistan is responsible for not letting Iran access its water right. However, besides getting our share of water from Hirmand, we can buy large volumes of water from the Afghans and sell them electricity and gas. We need water and they need gas and electricity,” ICANA quoted Habibollah Dahmardeh as saying.

Gas export infrastructure is almost ready with close to 1,400 km of gas pipelines in place, he added.

“Iran sells very low amounts of electricity to Afghanistan but by increasing power export we could swap it with water.”

The eastern neighbor has significantly reduced the volume of water entering Iranian territory in the bordering Sistan-Baluchestan Province by building dams on Hirmand.

According to the Energy Ministry, Iran received an agreed percentage of the river’s water based on a deal signed by the two governments in the past. In 1972, Iran and Afghanistan signed an agreement on sharing Hirmand water resources that was to the

detriment of the former as it reduced its water right to as low as 800 million cubic meters, less than 10% of the river's annual water flow.

Hamoun wetlands in Sistan-Baluchestan are considered a vital resource for the local population including residents in the provincial capital Zahedan. By depriving Iran of its water right from Hirmand, the government in Kabul is making things worse for the already water-stressed regions, turning the wetlands into barren desert.

Suffering from drought for more than a decade, the wetlands are now a source of dust storms that hit the underdeveloped and increasingly parched regions at regular intervals.

Japan to rule out coal-fired plants as international criticism rises

The Ashashi Shimbun, Masatoshi Toda and Tsuyoshi Kawamura, 28 March 2019

Protesters call for the abolition of coal-fired thermal power and an end to construction of new coal plants in Japan at the COP24 U.N. climate change conference in Katowice, Poland, in December 2018. (Asahi Shimbun file photo)

The Environment Ministry said that in principle it will not sanction construction of new large coal-fired power plants nor boilers to existing facilities in line with Japan's international pledges to tackle global warming.

Moves are spreading worldwide to shun facilities that burn fossil fuels because they spew so much carbon dioxide into the atmosphere.

The policy initiative, announced March 28 by Environment Minister Yoshiaki Harada, follows criticism that Japan is reluctant to break with such power generation, particularly after the 2011 Fukushima nuclear disaster.

The Ministry of Economy, Trade and Industry has the final say on whether to approve new coal plant projects, but such decisions are supposed to take into account the environment minister's opinion.

As a matter of course, the Environment Ministry conducts an environmental impact assessment for new plants with an output capacity of 150,000 kilowatts or more.

It will conduct more rigorous assessments in future and call for the rejection of projects with an emphasis on economic feasibility alone or those

lacking measures to cut carbon dioxide emissions when the ministry presents its opinion to the industry ministry.

Data shows that carbon dioxide emissions from the most advanced coal-fired plants amount to twice the volume of thermal plants using natural gas.

The technological means have not yet been invented that would allow operators of coal-fired plants to further reduce carbon dioxide emissions. Given this background, building new coal plants is not feasible.

After nuclear plants went offline nationwide after the triple meltdown at the Fukushima No. 1 nuclear power plant, power companies scrambled to draw up projects to construct coal-burning plants to secure stable electricity supplies.

Even today, about 30 projects remain, including facilities that will not be scrutinized for their impact on the environment due to their limited scope of power generation.

Coal plant projects have increasingly been criticized as running counter to a global shift to cleaner energy, especially as the international community intensifies its efforts to reduce greenhouse gas emissions under provisions of the Paris Agreement that will be applied from 2020.

A worldwide movement, “Divestment,” is pushing for an end to investment in and loans for coal-fired thermal power plants. Britain and Canada have announced their decision to scrap all their coal plants.

Japanese Ministry eyes subsidy plan for nuclear energy generation

The Ashahi Shimbun, Tsuneo Sasai, 23 March 2019

The economy ministry is weighing the introduction of a subsidy system paid to electricity producers who use nuclear plants to offset massive costs to meet tougher safety standards after the 2011 disaster.

Officials said that those expenses have cut into the cost competitiveness of nuclear energy to such an extent that a subsidy system may have to be utilized, despite its longtime contention that nuclear energy is the most economical form of electricity generation.

Given that the subsidies will end up being padded onto the electricity bills of households and businesses, it remains to be seen if the public will go along with shouldering the additional burden.

The ministry plans to establish the subsidy system by the end of fiscal 2020 in line with the scheduled review of the "feed-in tariff" system that set prices for purchasing electricity generated by solar and other renewable sources.

Hundreds of storage tanks on the grounds of the crippled Fukushima No. 1 nuclear power plant contain water contaminated with radioactive materials. (Asahi Shimbun file photo)

According to several sources and internal ministry documents, the plan would allow electricity producers that use nuclear plants to add a certain percentage to the price for which they sell the electricity to retailers. The reasoning among ministry officials is that nuclear energy provides added value as it does not pollute the environment or emit greenhouse gases.

The ministry's proposal is modeled after the zero-emissions credit introduced in New York state that provides support to nuclear plants so they can continue generating electricity.

Despite the higher expenses needed to meet tougher safety standards for nuclear plants in Japan, the government continues to describe nuclear energy as a "base-load energy source" and it has set a target of increasing the ratio of electricity generated through nuclear energy to between 20 and 22 % of total energy needs by fiscal 2030.

Also in that year, the government will begin requiring electricity retailers to procure 44% of sales output from non-fossil fuel energy sources, such as nuclear energy or renewable energy sources.

Because of that obligation, retailers may eventually be forced to procure a certain ratio of electricity from nuclear producers, even if the subsidies make that form of power comparatively more expensive.

Households and companies that purchase their electricity from such retailers would end up footing the bill.

However, public opinion surveys continue to show opposition to the resumption of operations at nuclear plants at levels close to double those who are in favor.

That opposition may make it more difficult for the economy ministry to push ahead with its subsidy program.

Liberalization of the electricity market has also effectively done away with the regional monopolies once enjoyed by electric power companies. Producers who use renewable energy sources, such as wind and solar, can now sell their electricity to a much wider range of consumers, further intensifying cost competitiveness among different energy sources.

A further spread of renewable energy will only make the situation facing nuclear energy even more difficult.

Nepal

Dams and dreams: a journey down the Karnali

The Nepal Times, Ramesh Bhushal, 8 January 2019

Nepal's largest dam project is caught up in wider geopolitics play, leaving locals in limbo for decades

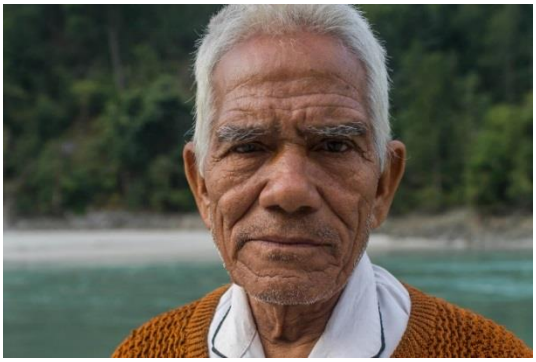
Dam site of Upper Karnali hydropower (900 MW) in Daab in Dailekh district. Indian company GMR is in final stage to start construction of the project. Photo: Nabin Baral

Dal Bahadur Shahi lives in Tuinkuna, in Dailekh district of western Nepal. This is the proposed site for Nepal's largest hydropower project, the 900 megawatt (MW) Upper Karnali. He was in his 50s when he first heard that electricity would be produced from the river he used to cross it several times a day.

"My arms could conquer the strongest waves of the river back then, but now I don't dare to go near it," he said. "Even if the project is built, I won't be able to see it. But I hope that our sacrifice of leaving this place for the sake of the nation will not be forgotten."

In the late 1990s, when the first project survey began, an engineer advised Dal Bahadur to buy more land so that he would receive compensation when the dam was built. But Shahi did not heed the advice, he did not have enough money anyway. There have been numerous surveys after that, but the locals were unaware of the wider water and electricity politics at play.

In 2008 an Indian company, GMR got the deal to carry out a detailed study, but a decade later the project is yet to take off. The company signed the project development agreement four years ago but has not yet managed to attract investors.

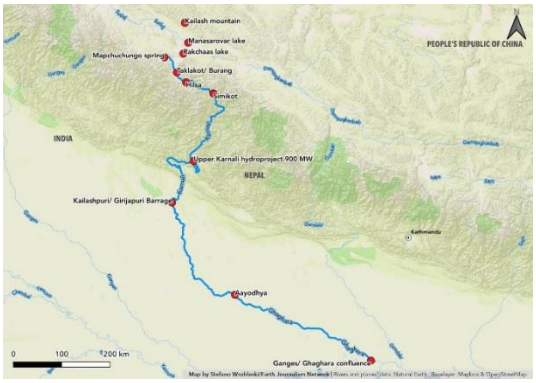


Dal Bahadur Shahi in Twinkuna in Dailekh district in the bank of Karnali river where the biggest hydropower is about to kick off. Shahi's family will be displaced once the dam construction starts. (Photo: Nabin Baral)

"I don't think this company has money. It looks like it will sell the license at higher price to another company and it will be delayed," says another resident, Lokendra Rawat, who left his village in

2008 when the company set up a project office.

“I came here to operate a hotel as the construction work would bring a lot of people. But it looks like I will be too old when it will be implemented,” he smiled.



Map: Stefano Wrobleski

Recently the company said it had provided compensation for the 250 families whose land will be submerged, but only a few people have received it. Dal Bahadur’s two sons were lucky to get compensation a few months ago. The company has now halted the compensation process and no one knows when it will resume. There is talk that the company is only paying compensation to influential and politically powerful people.

The Upper Karnali has always been a high profile political project. The Prime Minister of India, Narendra Modi, and Nepal’s then Prime Minister Sushil Koirala signed a deal for the project during Modi’s visit to Nepal in 2014.

But investors have not been convinced and it is unclear who will buy the electricity. The project is designed to generate power for export to India, but there is no power purchase agreement.

Frustrated by the lack of progress in India, last year the company signed a memorandum of understanding with Bangladesh, which could buy the electricity. Later in August this year Nepal signed a cooperation agreement with Bangladesh aimed at facilitating power trade.

In Rabalde, power house site of Upper Karnali hydro project is seen through fish net hung in Roshan Buda’a home in Accham. Zinc sheet roofed buildings in the field is the office of GMR company which is building the project. (Photo: Nabin Baral)

Nepal needs permission from India to take electricity across India to Bangladesh so all three countries need to agree on a deal. But experts say it’s not easy given the complex geopolitics of the region. Even so, India recently indicated that it’s open to trilateral trade by amending its earlier cross border trade regulation.

Some speculate that this move to ease the trade of electricity was only to help the Indian company GMR to secure financing for Upper Karnali. Nevertheless the amendment is also good news for Chinese and other companies who have been eyeing bigger projects in Nepal.

The project on the Karnali Bend was first envisaged as a 240 MW project in the 1990s, but has grown in scale over

the decades. GMR agreed to build a 900MW plant in 2008, but some technocrats and activists have blamed Nepal's government for selling the project short.

The feasibility study identified the possibility of developing a 4,180 MW project a little further upriver from where the current 900 MW project is planned. Whether this is really possible or not, given the fragile geology of the region, is another matter.

"Why was the best and cheapest project to build handed over to a foreign company who will export the energy, while we have a shortage of power? It should be developed for us," said Ratan Bhandari, a water rights activist from the region.

A kayaker paddles in the Karnali River in Accham district of Nepal. (Photo: Nabin Baral)

The current project will still be the biggest hydropower project in Nepal worth $1.5 billion. The Upper Karnali has rare hydropower potential, where water can be pushed through a 2.5 km tunnel over a drop of 130 metres, creating a huge generating capacity. This project is often called 'jewel in the crown' of Nepal's hydropower.

"Our jewel has been sold at the rate of coal," says Ratna Sansar Shrestha, a hydro-economist.

Nepal's move towards big dams has come at a time when scientists warn that more extreme weather events like floods and landslides will increase in the already fragile mountains in the region.

"The changing probabilities and magnitudes of extreme events can place additional risk on power generation infrastructure (dams and hydropower plants) as well as secondary infrastructure (roads and transmission lines). Further, hazards associated with shrinking glaciers, such as glacial lake outburst floods, can jeopardise large infrastructure investment," says a report by International Centre for Integrated Mountain Development. A study in 2014 also revealed that Nepal's glaciers have shrunk by 24% and its ice reserves by 29% over the past three decades.

Mount Kailash in Tibet. Four large rivers of Asia originate from four sides of Mount Kailash– the Brahmaputra (called Yarlung-Tsangpo) from the east, the Karnali from the south, the Sutlej from the west and the Indus from the north. (Photo: Nabin Baral)

However, developers say that current knowledge about impacts of climate change in hydropower is inadequate

and does not help better planning. While reports say that the hydropower projects will be impacted, they lack the details as to what degree, and what precisely to take into consideration, says Kumar Pandey of the Independent Power Producers Association Nepal (IPPAN).

“Investors need accurate information with evidence at micro scale so that they can use it while developing the project so there is need of specific knowledge about the impacts,” adds Pandey.

There are other dangers. Seismologists like Roger Bilham of the University of Coloradio say that a mega earthquake is long overdue in western Nepal. “There are two dangers lurking beneath the Himalaya: one is the unfinished business of 2015, and the other is a looming megaquake in western Nepal,” he told Nepali Times.

If built, the project will be the first hydropower plant on the Karnali, the country’s longest river which originates near Mount Kailash in Tibet and becomes Ghaghara in India before it meets the Ganga at the border of Uttar Pradesh and Bihar.

Megh Ale, team leader of the Karnali expedition, believes the main stream of the Karnali should be left free-flowing, “We can bring millions of tourists here while other tributaries could be used for electricity,” he says (see below).

Besides tourism, hydropower development would also endanger aquatic species. “Aquatic life has been threatened by hydropower across the country and if it continues many species will go extinct,” says Deep Narayan Shah, a researcher from Nepal’s Tribhuvan University’s Central Department of Environmental Science.

Nepal’s hydropower policy has a mandatory provision for developers to maintain 10% flow of water downstream around the year, but this has not been implemented and monitored.

Chief minister of Karnali Province Mahendra Bahadur Shahi says there has to be greater understanding about river ecosystems and suffering of people, who are critically dependent on the river and its resources, like fish.

“We may revisit the agreement done with GMR and I have told them that it won’t go ahead as agreed,” he says as he joined the expedition on the banks of Karnali recently.

However a few weeks later Shahi told journalists that he was willing to waive taxes for the developers, adding that without large hydroelectric projects, Karnali Province would remain poor.

It is common practice for companies to hold licences for years and then sell them to another company. Late last year, GMR (the same company that holds the licence for Upper Karnali) pulled out of the 600MW Upper Marsyangdi project after holding the licence for years. A consortium of Nepali and Chinese investors bought shares from GMR just as work was due to start. The parliamentary committee of Nepal has formed a probe committee to investigate further.

China is becoming a new but important player in Nepal’s energy politics, dominated by India for decades. There are two big projects in pipeline, the $2.5

billion Budi Gandaki and the $1.8 billion West Seti – both reservoir projects, and both controversial.

Earlier last year, the Nepal government announced that the 750 MW West Seti project, on one of the tributaries of the Karnali in western Nepal, would be built by Nepali firms while the license of the project had already been given to China's Three Gorges Company (CTGC). Negotiations then failed, resulting in the Chinese withdrawing from the project.

The 1,200MW Budhi Gandaki in central Nepal has also had a series of setbacks as the Nepal government awarded the project to China's Ghezhuoba firm, only to scrap it a year later, and then re-awarding the contract to the same company.

This has increased doubts among locals that Karnali will ever be built. "The most productive time of my life has gone waiting for this project to kick off," says Bal Bahadur Shahi at Ramaghat, 3km downstream from the project site.

Frustration is growing and locals are in a mood to fight back. Says Shahi: "We will wait at least for one more year. If the project is still not implemented, we will ask the government to take it over."

The story was jointly published by Nepali Times and The Third Pole. Subsequent installments of this five-part series that appeared from 8-11 January.

Role of solar in Nepal's energy mix looks set to expand

The Kahmandu Post, Bibek Subedi, 17 March 2019

More private developers are showing interest in installing solar plants across country.

Solar panels installed on rooftop and ground at Kaduwa village in Khotang district.Post (File photo)

Energy mix of Nepal, which until date is dominated by hydropower, is expected to be more diverse in coming years with more private developers showing interest in installing solar plants in different locations.

In this fiscal year alone, the Department of Electricity Development (DoED) has awarded survey licences to various developers willing to install solar plants at 21 different locations within the country. The combined installed capacity of these solar plants will be 317.14MW which will account for almost 70% of the total installed capacity of 56

solar plants that have received survey licence from the department till date.

The largest among them is 120MW Solar PV Project Dhalkebar in Mahottari district owned by Chaudhary Group, one of the biggest business houses of the country. Similarly, the second and third largest plants are 50MW Solar PV Project Barju in Sunsari and 30MW Parwanipur Solar Farm in Parsa—both owned by the same group, according to the department.

The increased attraction of the private sector towards the solar plant, according to Madhu Prasad Bhetuwal, director general at the DoED, is due to two factors—fall in price of photovoltaic solar panels in the international market and good power purchase rate offered by the Nepal Electricity Authority (NEA), the state-owned power utility and sole off-taker of electricity generated in the country.

The power utility purchases solar electricity from the developer at Rs7.30 per unit as fixed by the Guidelines for Development of Alternative Electricity Connected to Grid issued by the Energy Ministry in February 2018.

“At a time when prices of solar panel are falling in the international market, the rate offered by the NEA is lucrative,” said Bhetuwal. “This will lead to entry of more players in coming days.”

Similarly, the government policy to increase the share of solar electricity in the total energy mix of the country has been another reason behind developer’s preference to solar power.

As per the white paper on the ‘current status and future roadmap’ of the energy sector of the country, issued by the Energy Ministry, Nepal should have 5 to 10% of alternative renewable energy like solar electricity in its total energy mix. This prompted the electricity authority to gear up for increasing solar power in its total energy mix.

To date, the power utility has signed power purchase agreements with 12 solar projects with combined installed capacity of 53.14MW. The electricity authority has selected five private developers to build solar power plants at five locations and supply electricity generated to its nearest substations.

The power utility has also signed an agreement with Manila-based multilateral lender Asian Development Bank to provide viability gap funding worth $18.5 million to these five developers of the solar plants with a combined installed capacity of 24MW.

Moreover, the NEA is negotiating with six other developers of solar plants with a combined installed capacity of 59.61MW.

“As we have to maintain a certain portion of alternative renewable energy in our total energy portfolio, the portion of solar energy in our energy mix will increase proportionately with the hydroelectricity,” said Prabal Adhikari, chief of power trading department at the NEA.

New Zealand

600 farmers in big water project

NZ Herald, The Vision is Clear, 26 March 2019

(Photo supplied by The Vision is Clear)

Large-scale initiative in Southland expected to have big effect on water quality.

You could say it's "ace" that more than 600 farmers and multiple agencies are working together to improve water quality in the Aparima catchment area in the deep south.

ACE – otherwise known as the Aparima Community Environment (ACE) project – is a farmer-led initiative in Southland aimed at over 600 farms spread over 207,000 hectares – with 81% of that area developed. It has multi-agency participation with DairyNZ, Beef & Lamb and Environment Southland involved.

The ace thing about ACE, says DairyNZ's strategy and investment leader for responsible dairying, Dr David Burger, is its enormous scale and the intent to support all land managers in good farming practice. It will also track what happens on every single farm in the six Aparima catchment groups – Pourakino, Lower Aparima, Orepuki, Mid Aparima, Upper Aparima and Waimatuku – and relate this to water quality downstream.

Individual farms, Burger says, can have very different challenges when it comes to water quality, even if they are almost identical farms right next door to each other. The scale of the ACE project means farmers, land managers, extension experts and scientists will work together to identify, implement and track different environmental actions across a wide range of farming properties and land uses and link this directly to water quality outcomes.

"It means we can understand the science at catchment scale," says Burger. "Through modelling and monitoring, we can relate the actions of every single farm plan to collective and demonstrable outcomes downstream."

Over the next two years all landowners will have farm management and improvement plans, with the longer-term goal of enhancing the mana and resilience of the catchment for future generations.

"First individual farmers need to understand their own situation when it comes to water quality – and what options they have to reduce environmental risk," says Burger. "Then it will be a matter of implementing actions across the catchment and monitoring the change."

Robust science is a key ingredient of DairyNZ's drive towards improving water quality, Burger says: "For example, in terms of the science being employed to mitigate contaminant run-off from farms, we are trying to understand the relationship between the contaminant load upstream and downstream values.

"We need to have a high level of certainty we are focusing on the right area [of cause and effect]. It is not an easy task because the way in which contaminants flow and change between the source and the receiving environment varies within and across catchments.

There are all sorts of processes going on and some may not be observed for decades."

That said, DairyNZ's scientific exploration of the complex subject of water quality is designed to identify best practice interventions that can be applied as quickly as possible, he says.

One example is seepage wetlands – which DairyNZ work has shown can remove up to 75% of nitrate from runoff through bacteria and uptake by plants, vastly improving water quality. Wetlands also trap sediment and phosphorus and reduce faecal bacteria and help protect land from flood damage by slowing or holding surface water and releasing it slowly over time. They are also a valuable home for native plants and animals

Burger says Burger says scientific work is also being carried out to support the following improvements:

• Edge of field mitigation – tools like wood chip bio-reactors, constructed wetlands and detainment bunds are placed on the "edge of field" to improve the quality of the water before it enters waterways via farms. DairyNZ is working with NIWA and other agencies to understand how effective these tools are and how to optimise their design to ultimately support greater uptake by farmers nationwide.

• Farm environmental plans – more than 2000 farms (out of 12,000 total dairy farms in New Zealand) already have a Sustaibnable Milk Farm Environment Plan like those being proposed in the ACE project. Burger says the sector is aiming for all farms to have a farm plan by 2025.

• Good Farming Practices – DairyNZ co-launched the Good Farming Practice (GFP) Water Quality Action Plan alongside primary industry partners, regional councils and the Ministry for the Environment last year. This plan has already developed a national set of GFP principles and is now working towards implementing them over the next few years.

• Riparian planning tool – DairyNZ's Riparian Planner helps farmers set up a plan and advises on suitable species to plant and how this work should be carried out. It won an award by the New Zealand Association of Resource Management for Outstanding Contribution in 2016 and more than 2200 dairy farmers have used this tool.

• Effluent management – farmers have improved effluent infrastructure and practices across many regions. "Ten years ago, non-compliance rates were

17-18% in some regions; that is now down to about 5% or less," says Burger.

• Increased environmental spend by farmers – the 2015 DairyNZ and Federated Farmers survey showed an estimated environmental spend by farmers of over $1 billion from 2010 to 2015, equating to $18,000 a year per farm, or $90,000 over the five-year period – with 70% of that spending estimated to have been in the area of effluent management. Burger says the other 30% has largely been spent on wetlands protection or providing new wetlands on farms, plus riparian fencing and planting: "Those plants cost farmers quite a bit of money and maintenance is quite high too."

• The Sustainable Dairy Water Accord launched in 2013 has seen 97% of significant waterways on dairy farms (covering 26,000kms) fenced off to keep cows out; 99.7% of regular stock crossings now have bridges or culverts to achieve the same aim.

Those figures have been criticised by some commentators, saying they do not cover smaller streams flowing into larger streams but Burger says: "We started this programme many years ago as a nationwide, voluntary initiative because we wanted the sector to get on that journey – covering waterways wider than a metre and deeper than a gumboot.

"There is no quick fix. No one can do it all overnight. But what's been achieved so far, well before regulation, needs to be celebrated even as we acknowledge there is more that needs to be done."

Poor water management costs Pakistan dearly

The Express Tribune, Shahbaz Rana, 4 February 2019

WB says country suffers $12b loss annually; new dams won't address pressing water security issues. (Photo file)

Islamabad - Poor water management is costing Pakistan $12 billion annually, as its water security that is already at risk is also facing a new challenge because of reduction in inflows in eastern tributaries due to increased water use in India, says a new World Bank report.

'Pakistan: Getting More from Water' report that the lender formally launched in Islamabad highlights the challenges arising from mismanagement of water resources. The report also offers solutions that include water pricing and

phasing out subsidies to discourage use of water in four crops.

The report says large storage reservoirs can help improve some aspects of water security but do not address the most pressing water security issues. The findings come amid a national drive to build mega dams to preserve water.

Up to a quarter of the population may be at risk from arsenic contamination of drinking water. Floods and droughts also have significant social impacts, again affecting women and children the most.

The economic costs to Pakistan from poor water and sanitation, floods, and droughts are conservatively estimated to be 4% of its Gross Domestic Product (GDP) or around $12 billion per year.

The report also mentions that there has also been a small but important reduction in inflow from the eastern tributaries of the Indus because of development in India, which is permitted under the Indus Waters Treaty (IWT). The small but significant decrease in total Indus inflows appears to be largely a result of the increased water use in India on the eastern tributaries.

The report says only 16 countries have more water than Pakistan but because it is the world's sixth most populous country, water availability per person is comparatively low. There are 32 states with less water per person than Pakistan. Across these countries the average per capita GDP is 10 times that of Pakistan.

The report says Pakistan does not make the best use of its water endowment and water use is heavily dominated by agriculture. The four major crops, wheat, rice, sugarcane, and cotton that represent nearly 80% of all water use generate less than 5% of the GDP.

Scant attention is paid to environmental outcomes from water in Pakistan and water-dependent ecosystems—rivers, lakes, wetlands, and the Indus Delta—are in rapid decline.

Water security in Pakistan is undermined by poor water resource management and poor water service delivery – including irrigation and drainage services – and domestic water supply and sanitation services.

It says no formal mechanisms exist within provinces for reallocating water between sectors to match shifting demands or to cope with extreme drought.

Domestic water supply coverage is high—especially for urban households, but coverage is declining because of rapid urbanisation. And although the coverage is high, the quality of supply services is poor—especially in terms of water quality and reliability.

The report says climate change is the biggest longer-term and currently unmitigated external risk to Pakistan's water sector. The climate warming is expected to increase water demands by 5% to 15% by 2047, in addition to the demand increases from population and economic growth.

It underlines that there is no single simple solution to address water security in Pakistan. It will take concerted effort on many fronts by all

governments and water users over many years.

Large infrastructure gaps must be addressed, which require significant financial resources. Provincial-level water sector financing has increased in recent years, but federal financing has declined significantly in proportional terms.

In the upper Indus Basin, accelerated glacial melting will increase the risks of dangerous glacial lake outburst floods. In the lower Indus Basin, sea level rise and increases in the frequency and severity of coastal storms will exacerbate seawater intrusion into the delta and into coastal groundwater.

It said a second overlooked risk is change in basin-scale river sediment dynamics.

The report said new reservoirs would deliver relatively modest additional yield, and the water supply benefits would not justify the significant financial costs. But new reservoirs will help mitigate floods and seasonal flow variations, both of which are expected to increase with climate change.

Although population growth is slowing, projections suggest Pakistan's population will exceed 300 million by 2047 and water demands will increase significantly.

The World Bank has given a dozen recommendations to address water scarcity and mismanagement issues. Half a dozen recommendations relate to improved water resource management, three to improved service delivery, and three are related to improved risk mitigation.

Russia plans to invest $14b in Pakistan's energy sector

The Express Tribune, Zafar Bhutta, 7 February 2019

Islamabad - Russia has come up with an integrated investment package of $14 billion for the energy sector in Pakistan.

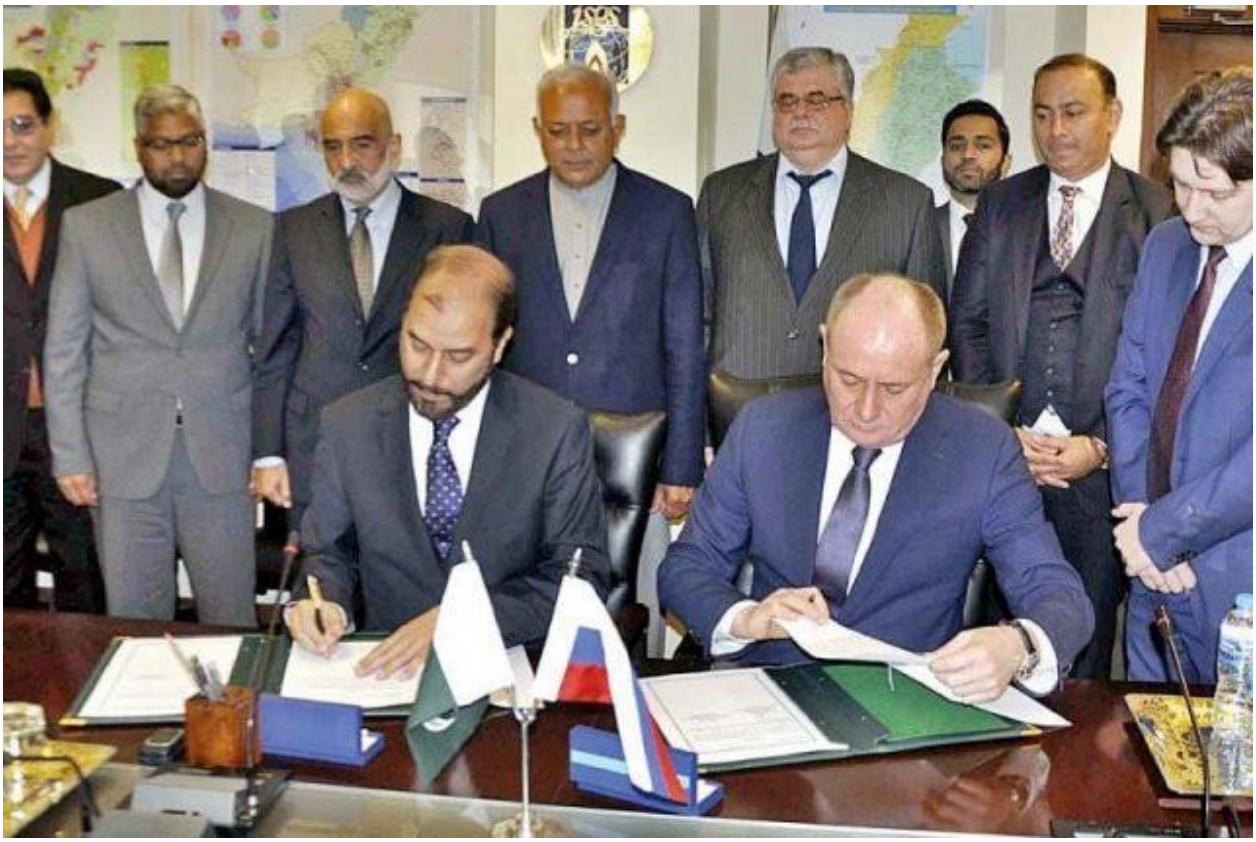
During a recent visit of the Russian delegation, headed by Gazprom Management Committee Deputy Chairman Vitaly A Markelov, the Russian side pledged an investment of $14 billion in offshore gas pipeline project, North South Pipeline Project and underground gas storages in Pakistan.

The officials said that they would invest around $10 billion in offshore gas pipeline project, $2.5 billion in the North South Pipeline Project and the remaining on building underground storages in Pakistan. The Russian companies would build gas pipeline from Karachi to Lahore to transport imported gas for meeting the needs of the gas-starved province. Recently, the government faced a severe gas crisis, which can be prevented by underground storages, said an official. The storages would help store

imported gas allowing meeting rising gas demand at any time, particularly in winters, he added.

Inefficiencies in power sector cost Pakistan $18b

Meanwhile, Pakistan and Russian state run entities signed inter corporate agreement to conduct a feasibility study of the $10-billion offshore pipeline project. Under this project, Russian company, Gazprom, will conduct feasibility steady to build offshore pipeline from Iran to Pakistan. The pipeline construction is expected to be completed in three to four years. In the first instance a feasibility study would be conducted by Gazprom at its own cost with no financial implications on Pakistan



Inter State Gas Systems (ISGS) Managing Director Mobin Saulat and Gazprom Management Committee Deputy Chairman Vitaly A Markelov signed the agreement in the Petroleum Division.(Photo: APP)

Earlier, the Ministry of Foreign Affairs irked Russia by refusing to sign the agreement in the presence of Prime Minister Imran Khan at the PM Office. This move came as a contrast to when the American energy giant – Exxon Mobil – was welcomed grandly to engage in offshore drilling, with the agreement being signed at the Prime Minister's Secretariat.

In a letter sent to Petroleum Division secretary on February 4, a copy of which is available with The Express Tribune, Ministry of Foreign Affairs Director General Europe-

2 Malik Muhammad Farooq referred Memorandum of Understanding (MoU) on implementing offshore gas pipeline project between Pakistan's designated entity ISGS and Russian energy giant Gazprom.

The Ministry of Foreign Affairs stated that it does not support signing of the agreement either in the presence of Prime Minister Imran or at the PM Office as the same is a commercial agreement between two commercial entities, said Farooq, adding that it would be appropriate if an alternative venue is selected.

The Petroleum Division had approached the PM Office requesting to hold the signing ceremony at the Prime Minister's Office. In a letter, the Petroleum Division said that the petroleum secretary had spoken to the additional secretary Europe-2 ministry of foreign affairs regarding signing of the agreement proposed to be held at Prime Minister's office on February 6. However, the additional secretary Europe did not give any cogent reason as to why the signing ceremony should not be held at the PM Office.

According to the deal, Russia will export 500 million cubic feet per day (mmcfd) to one billion cubic feet per day gas to meet growing demand of gas following industrialisation under the China-Pakistan Economic Corridor (CPEC).

In the first instance a feasibility study would be conducted by Gazprom at its own cost with no financial implications on Pakistan. Certain economic benefits such as transit fee would accrue to Pakistan if the project is implemented. Moreover, the project would bring Pakistan on the world map as the transit country for offshore gas pipelines. Besides, Pakistan will also have an option to off take gas from the transit gas pipeline.

Russia holds huge gas deposits in Iran and has offered Pakistan and India gas exports by laying an offshore pipeline that will pass through Gwadar Port. Russia has been a big gas exporter to EU countries and Turkey since long and despite US anger, the European bloc has continued to make imports to meet its domestic needs. Moscow receives gas from Turkmenistan and then exports it to EU states. It has got and managed gas deposits in Iran as well and is looking to gain foothold in the Pakistani market.

According to a statement, Minister for Petroleum Division Ghulam Sarwar Khan appreciated the expanding trajectory of bilateral relations between Russia and Pakistan. Khan welcomed Gazprom's interest in off-shore gas pipeline project and termed it a manifestation of multifaceted cooperation between the two countries. This project envisages transporting of gas molecules from Gazprom's sources in the Middle East onwards to Pakistan with a possibility of extending it further to South Asian countries.

The pipeline would follow an integrated approach including other ancillary projects such as underground gas storage, desalination and other power projects. Pakistan will import some 500 million to one billion cubic feet of gas from Russia daily, which would be transported via sea link, the agreement stipulates.

Environmental threats from chemicals CEOs' standpoint

Manila Times, Catherine H. Santos, 1 March 2019

In recent months, we have seen the growing awareness about adverse effects on the environment brought about by the use of plastics. Plastic pollution and climate change have been high on the agenda of governments and world organizations.

It is interesting to note that chemicals company CEOs' concerns about a number of wider 'sustainability trends' surpass nervousness about economic conditions. This is an unusual back story behind their longer-term caution, as we've found out in PwC's 22nd Annual Global CEO Survey. Out of 1,300 plus CEOs around the world, 48 survey respondents are from the chemicals sector.

CEOs' optimism shrinks on longer-term growth outlook

Just a short time ago, there was a notable dose of optimism evident in the chemicals sector. Having confronted extraordinary pressures for more than a decade — chiefly from product commoditization, raw materials volatility, fluctuating markets and rapidly expanding competition — 2018 initially delivered some strong results. Profits were up, capacity was tight and global demand was on a positive trajectory. It isn't surprising, then, that in the latest survey, more than 90% of chemicals companies' CEOs said they were bullish about their organization's 12-month revenue growth prospects, the highest level in five years.

But when CEOs were asked to consider their company's position over a longer period of time, their enthusiasm markedly waned. According to the survey, the CEO three-year growth outlook is actually at its lowest point in five years. Indeed, it would seem that it is hard to maintain an upbeat attitude when economies around the world are signaling a slowdown and trade tensions are worsening. According to the Financial Times, the Organisation for Economic Cooperation and Development has flagged the risk that the interaction of a sharp deceleration in China's economy, volatility in oil prices, Brexit uncertainties, and the fragility of some eurozone banks could lead to "a harder than expected landing." And already some chemicals companies are cutting earnings outlooks in the face of retreats in key markets, such as automotive.

Sustainability impacts outweigh macroeconomic concerns

Strikingly, these global headwinds are not the primary reason for the longer-term wariness of chemicals company CEOs –sustainability is.

Among these worries: the impact of resource and materials substitution, decarbonization, renewable energy and waste elimination. These are serious issues, particularly for the chemicals industry, which is at the tip of the spear of questions

surrounding the role that fossil fuels and new forms of energy will play in the future, including in the mitigation of climate change and pollution. How chemicals companies address these concerns will ultimately affect their license to operate, their marketplace status, their relationships with customers and, as the CEOs seem to be keenly aware, their ability to grow over the coming years.

Sustainability trends present growth opportunities

The greater focus on sustainability trends presents new growth opportunities for chemicals companies that were not possible before. The industry can be a significant player in developing materials that contribute to energy efficiency and greenhouse gas reduction in other sectors, improving the sustainability of downstream energy chains.

In the energy sector, for example, chemical products are commonly used in solar generation, and in new lighter and longer thermoplastic blades that offer the promise of greater wind power stability and efficiency. In transportation, lightweight materials could be critical for improvements in vehicle fuel efficiency and in the development of electric cars and trucks. Reducing the average weight of passenger cars from 1,380kg currently to 1,000kg by 2050 could lower emissions by 40%, according to a 2017 study by the International Transport Forum.

And although strides are being made in industrial materials, packaging remains a conundrum for chemicals companies — and another potential revenue channel if addressed correctly. Pressure is growing in many of the world's largest markets to replace plastic in packaging with alternative materials and move closer to so-called cradle-to-cradle manufacturing, in which every ingredient in the process is recyclable.

As products emerge to satisfy recycling requirements, chemicals companies engaged in traditional plastic packaging value chains could find that a big part of their cash flow is affected. In fact, nearly one in three chemicals company CEOs expects cradle-to-cradle developments to have a high or very high impact on their business within the next five years. To avoid hemorrhaging revenue in the plastic packaging side of their business, chemicals companies should begin to rethink the types of plastics that they are using and the production processes employed to manufacture packaging.

New additives, such as antioxidants, can produce higher yields of plastics from less material with less waste and fewer carbon emissions.

Although much research is still needed to develop and perfect these new additives, companies that can pioneer improvements in the financial and environmental costs of plastics manufacturing will find themselves in a strong position in the coming years.

Also leading the industry will be companies that take an active role in expanding the reach of recycling, in part by helping develop new methods for mechanical and chemical recycling programs that at their zenith reprocess plastic items back to raw material, or feedstock. More than 25 global companies, including four of the five largest chemicals

makers, have pooled US$1bn in the Alliance to End Plastic Waste to reduce the amount of plastic that ends up as garbage in the environment.

An innovation path

Chemicals companies have long accepted the need to shift from being ‘product sellers’ to being ‘solution providers’ in the customer-facing aspect of their business. But this is easier said than done. To drive sustainability initiatives, chemicals companies will have to collaborate with their customers. Purchasers will increasingly demand bespoke and innovative answers that transform their products to meet specific weight, waste, and functionality metrics.

Our survey indicates that chemicals executives have not yet fully embraced the idea of open innovation. We found that although chemicals

CEOs are slightly more focused on new products than CEOs globally, they are less likely to be collaborating with startups and entrepreneurs.

And they are much less likely to be pursuing new strategic alliances and joint ventures. Indeed, only 27% of chemicals CEOs are planning such initiatives within the next 12 months as a route to growth, compared with 40% of CEOs globally.

Making the move from ‘solution providers’ to ‘transformation deliverers’ requires CEOs to be sure their company has a clear and realistic lens through which to assess which markets offer the greatest potential for transformation. A disciplined portfolio approach is needed by which expansion into new areas can be weighed against returns from current activities. In turn, this will help companies articulate coherent portfolio strategies that can be readily explained to investors and that can drive merger, acquisitions and divestments, research and development, and other growth strategies. Many companies already use portfolio management to inform investment, but they don’t necessarily incorporate all the external forces, including sustainability trends, that will drive future transformation of target markets. Such transformation may be key to determining priorities for investment and divestment.

Delivering transformation also entails that chemicals companies become materials-agnostic. This is particularly the case in the specialty segment of the market, where companies don’t necessarily have to own the plastics they put together and assemble into composites. Instead, the focus should be on having the capabilities, insight, and relationships to provide a best fit for the customer’s needs. In the agrochemicals arena, materials-agnostic partnerships are developing around the use of a mixture of fertilizers, herbicides, and pesticides from different chemicals providers to more precisely address each farmer’s unique growing needs.

The strategic direction for the chemicals industry is clear but the roadmap to navigate it is uncertain. The coming decade is likely to see the sector come under increasing pressure on a range of sustainability measures. The good news for CEOs is that the

window of opportunity will remain open for some time for companies to show they are part of the solution, rather than the problem. As many companies are beginning to demonstrate, there is considerable opportunity for innovation — rather than regulation — dictating the pace, and the future.|

Catherine H. Santos is an Assurance Partner, Shared Services Partner, and General Office Services Lead Partner of Isla Lipana & Co., a member firm of the PwC network. For more information, please email markets@ph.pwc.com. This content is for general information purposes only, and should not be used as a substitute for consultation with professional advisors.

Philippines

Cebu City forms 10-year waste management plan

The Freeman, Jean Marvette A. Demecillo, 7 April 2019

Cebu - The Cebu City government has formulated its 10-year Ecological Waste Management Plan to establish a road map aimed at reducing and managing its solid waste generation from 2018 to 2028.

This would ensure that the city government will implement an effective solid waste management (SWM) system until 2028.

"The current practice of segregated collection, processing, and disposal of solid waste appears to be adequate, but the adoption of new technology for SWM is essential to catch up with the increasing volume and nature of daily solid waste generation from residential, commercial and industrial establishments," read a portion of the plan.

In his message, Cebu City Mayor Tomas Osmeña committed to ensure that all areas of importance were given due attention and to maximize its available resources to improve delivery of basic services.

"Our city population grows, and so does the volume of solid wastes generated from different sources -from households, restaurants, public markets, and numerous business establishments. Mismanagement of solid wastes creates adverse effects on social and economic well-being of the Cebuano populace," he said, adding that the garbage problem is not only local but a global concern, since it poses threat and danger to the environment.

The Safe Closure and Rehabilitation of the Inayawan Sanitary Landfill was also attached in the 10-year plan as well as the monitoring of the barangay's material recovery facilities as it improves the cost-effectiveness of the SWM

system and livelihood projects through recycling programs.

One of the cited alternative technologies is the adoption of a Waste-to-Energy that turns garbage into resources that can be used by the city government.

The city has now 54 trucks, with 37 operational units, 13 units under repair and four units are beyond economical repair.

Under its existing garbage collection and disposal activity, the city is currently contracting 28 compactor trucks that assist the mainline street garbage collection of the city.

This year, the city will be purchasing compactor trucks to avoid leasing and engaging with private entity in the collection of garbage.

The Cebu City Environment and Natural Resources Office is employing several measures and strategies to have a source-reduction-at-source as it continuously conducts information education campaign on waste segregation.

The 10-year plan was submitted to the City Council.

CENRO Head Ma. Nida Cabrera said the city will defend the plan before the Environmental Management Bureau in Manila.

Aside from the “reduce, reuse, recycle” strategy, the city is also promoting composting, which reduces waste disposal.

Cabrera said the city government is now preparing for the stricter regulation on the use of plastic and shopping bags, as there are two pending ordinances on the phasing out of the plastic materials in the city.

Last September 28, 2016, the City Government re-imposed the "No Segregation, No Collection" policy which is stipulated in the City Ordinance No. 2031.

The city government noted that an average of 500 tons of garbage per day is collected since private establishments like fast food chains and restaurants, hotels, and malls have contracted waste collection to private haulers that will go to their respective final disposal sites for residuals.

In the plan, the city sets its goals for the solid waste management until 2028 that includes to divert wastes from the landfill; to strictly enforce and monitor the implementation of solid waste management laws; to adopt and promote innovative and eco-friendly solid waste management technologies; to adopt and implement the integrated solid waste management system in its plans and programs; and to eliminate health risks to communities.

With this, the city intends to intensify the implementation of no segregation, no collection policy as it would help in the reduction of waste at the household level.

Aside from that, all 80 barangays will be asked to put up a material recovery facility in their respective areas to address the reduction of biowaste by providing a Takakura Method of Composting.

At least 20 of 80 barangays have already established their own composting facilities with the city's assistance on materials and equipment.

The city government aimed to implement polluters pay principle wherein the use of color-coded disposal bags will be paid at P1 to P2 per bag depending on the sizes.

It will also encourage different sectors to take part and support SWM initiatives and practices as part of their corporate social responsibilities.

As for the plan for final disposal, the Cebu City Solid Waste Management Board already endorsed to the executive department for the procurement of waste to energy project of the city with the private proponent to provide the technology and site of the facilities.

Cabrera said she is hoping that the Asian Development Bank will recommend to the original proponent that will undertake the waste to energy this month. — GAN (Freeman)

Tajikistan President starts Nurek hydropower plant's rehabilitation project

Asia Plus, 20 March 2019

President Emomali Rahmon visited Nurek for participation in Navrouz celebrations to start to implementation of Nurek hydropower plant rehabilitation project.

While in Nurek, Rahmon reportedly also met with representatives of the company that is engaged in rehabilitating the Nurek hydropower plant.

Recall, an international tender for rehabilitation of the Nurek HPP (Phase I) was announced in late August 2017.

International technology Group ANDRITZ (Austria) was selected by Barqi Tojik (national integrated power company of Tajikistan) from among three companies participating in the tender.

The World Bank on May 3, 2017 approved US$225.7 million in financing from the International Development Association (IDA) for the Nurek Rehabilitation Project.

The World Bank financing, one-quarter in grants and three-quarters in credits, will refurbish the Nurek Hydropower Plant (HPP) that will help secure electricity supply in winter and boost

economic productivity and the people of Tajikistan and local enterprises will gain access to a more reliable supply of electricity.

The first phase of the Nurek Hydropower Plant (HPP) rehabilitation costs an estimated US$350 million. In addition to the World Bank's IDA support, additional financing will be provided by the Asian Infrastructure Investment Bank (US$60 million), the Eurasian Development Bank (US$40 million), and other sources (US$24 million). With these funds, the Tajik authorities will rehabilitate three generating units and replace six autotransformers used to regulate voltage of the generated electricity (US$310 million); enhance dam safety, including a special focus on the protection against seismic hazards and floods (US$30 million); and strengthen the institutional capacity of open joint stock holding company Barqi Tojik and improve its operational and financial performance (US$10 million).

The ANDRITZ scope of supply comprises comprehensive modernization of the existing nine generating units by supplying and installing new 380 MW Francis turbines and generators, including new transformers, as well as the electrical and mechanical auxiliary equipment within the power house. After modernization, the installed capacity of the generating units will be increased by about 12%.

The rehabilitation of Nurek will safeguard the electrical energy supply in Tajikistan and make an important contribution towards the strategic use of renewable energy from hydropower in Central Asia. It also offers interesting opportunities for exporting energy to neighboring countries, with the related economic benefits for the countries concerned.

Until the gigantic Roghun dam is completed, the Nurek hydroelectric power plant (HPP) will remain the largest power-producing facility of its type in the Central Asian region.

Nurek only lost its status as the world tallest dam — at 300 meters — in 2013, when China inaugurated its Jinping-I Dam, which is but a handful of meters higher.

The 3,000-megawatt plant lies along the lower end of the Vakhsh River, which in turn feeds the more famous Amu-Darya.

Roghun Dam, which is under construction further upstream along the Vakhsh, will, if all goes to plan, soar to a height of 335 meters.

Construction of Nurek began in the early 1960s and took decades to complete. The first turbine went online in 1972. It was as late as 1988 that the plant reached peak output levels.

Any sudden and irreparable malfunctions at Nurek would be catastrophic. The plant meets around 70% of Tajikistan's electricity needs.

There was a small forewarning of what that eventuality could entail in late October 2016, when a temporary technical fault unplugged massive swathes of the country for around three hours. The sudden shortage of electricity in turn caused a halt of numerous alumina smelters at the

TALCO aluminum plant, the country's largest non-hydropower-related industrial concern. Damage caused to the aluminum plant caused a considerable falloff in productivity.

The Nurek HPP, with an installed capacity in excess of 3,000 megawatts, is the key asset of Tajikistan's energy system. Its rehabilitation is central to the Government's efforts to provide reliable electricity supply, especially during the winter months. The power plant, which generates about 70% of total annual energy demand, suffers from dilapidated equipment and infrastructure. The facility did not go through major rehabilitation since it was commissioned in 1972; it is currently only 77% operational.

ANDRITZ is a globally leading supplier of plants, equipment, and services for hydropower stations, the pulp and paper industry, the metal working and steel industries, and for solid/liquid separation in the municipal and industrial segments. ANDRITZ employs 26,000 employees at more than 250 production and service facilities in over 40 countries worldwide.

ANDRITZ Hydro is one of the leading global suppliers of electromechanical equipment for hydropower plants. With more than 31,000 turbines installed, totaling approximately 430,000 megawatts output, the business area provides the complete range of products, including turbines, generators, and additional equipment of all types and sizes – "from water to wire" for small hydro applications to large hydropower plants with outputs of more than 800 megawatts per turbine unit. ANDRITZ Hydro has a leading position in the growing modernization, refurbishment, and upgrade market for existing hydropower plants.

Turkey and Azerbaijan cement relations with new oil refinery

Eurasianet, David O'Byme, 23 October 2018

The refinery strengthens SOCAR (State Oil Company of the Azerbaijan Republic) position as the single-largest foreign investor in Turkey.

Azerbaijan and Turkey have further strengthened their already close relations with the formal commissioning of the first Azerbaijani-built oil refinery in Turkey.

For an estimated $6.3 billion, the new 10 million tons-per-year STAR refinery at Aliağa on Turkey's Aegean coast is one of the biggest foreign investment projects in Turkey and the country's first new refinery since 1986.

However, the refinery's formal opening on October 19 was marked by what was, by recent Turkish standards, an unusually low-key ceremony. (This

reporter attended the event on a trip organized by SOCAR Turkey.)

Addressing the few hundred dignitaries in attendance, Azerbaijan President Ilham Aliyev praised the policies of Turkish President Recep Tayyip Erdoğan and the strength of relations between the two countries.

“The stronger Turkey is, the stronger we are,” he said.

For his part, Erdoğan praised the strength of Turkish relations with its eastern neighbor, repeating the bilateral mantra of "one nation, two states.”

Turkish President Recep Tayyip Erdoğan and his Azerbaijani counterpart Ilham Aliyev mark the opening of a new Azerbaijani oil refinery in Turkey. (photo: president.az)

"With the STAR refinery, we have further strengthened the strategic dimension of our brotherly relations with Azerbaijan," he said announcing that the refinery was to be the first recipient of Turkey's new “Strategic Investment Incentive Certificate,” a license aimed at facilitating further investment.

Erdogan added that the new refinery will reduce Turkey's import bill for petroleum products by around $1.5 billion.

In that respect, the commissioning of the new refinery comes at a particularly important juncture.

In the wake of the economic crisis which saw the Turkish lira lose 40% of its value over the first eight months of the year, Ankara has been desperately trying to reduce dependence on imports in an effort to bring down the country's sizable current account deficit.

The new refinery will supply 4.8 million million tons per year of diesel, replacing a third of the volume Turkey imported last year, and overall will meet around 36% of Turkey's current petroleum product imports.

"The refinery, depending on oil prices, will generate trade value of $6-8 billion annually,” Azerbaijani MP Tahir Mirkishili told the Azerbaijani news site Trend, adding that once it is complete, SOCAR's investments in the Turkish economy will reach $19.5 billion.

“Azerbaijan, which is building a regional economy, will further increase its economic power with these projects,” he said.

The new refinery also locks Turkey and Azerbaijan into what will be a long term economic relationship.

“The opening of such a fundamental plant of strategic importance… showed that our states play a major role in ensuring security and stability in the region," Togrul Ismayil professor of International Relations at Istanbul's TOBB University of Economy and Technology, told the Azerbaijani news site Trend.

Azerbaijan will not, however, supply oil to the refinery: its own "Azeri light" crude, which is shipped through Turkey via the Baku-Tbilisi-Ceyhan oil pipeline, commands premium prices on global markets, so SOCAR plans to supply the STAR refinery from other regional suppliers.

But Turkey's crude oil imports have lately been complicated by ongoing regional tensions and Ankara's sometimes confrontational foreign policy. SOCAR has already inked a one-year deal with Russia's Rosneft for the supply of 1 million tons of crude over the coming year.

However, as that meets only around 10% of STAR's annual requirement, SOCAR will need to secure other major suppliers – a process which appears more complicated than it did when the construction of the refinery commenced three years ago.

The past year alone has seen Washington announce the re-imposition of sanctions against Iran – Turkey's main supplier of crude for most of the past decade – and demand that Turkey reduce its imports.

Similarly, last year's independence referendum in Iraq's Kurdistan region met with Ankara's strong disapproval and saw Turkey's existing refineries sharply cut imports of Iraqi crude, which are shipped via a pipeline through the breakaway province.

And it appears likely that the current spat between Turkey and Saudi Arabia over the murder of Saudi journalist Jamal Khashoggi will result in a drop in Turkish crude imports from that country, too.

Other potential regional crude suppliers exist, but as recent history has demonstrated, so do potential risks.

It's been only three years since Turkish jets downed a Russian warplane which had strayed from Syria into Turkish airspace, prompting a diplomatic crisis and bilateral economic boycott, the results of which included a sharp cut in Turkish imports of Russian crude.

While political and economic relations between Ankara and Moscow quickly improved, SOCAR is hoping that such tensions are not repeated.

David O'Byrne is an Istanbul-based journalist who covers energy.

Energy could enable Turkey, US to reach $75 billion target with LNG trade

The Daily Shabah, Elif Ersen@elifbiniciersen, 27 February 2019

Turkey's second FSRU operated by BOTAŞ was commissioned in January 2018 at the Dörtyol district of southeastern Turkey's Hatay on the Mediterranean coast. It has a storage capacity of 263,000 cubic meters – the largest in the world.

Transforming supply trends across the world, liberalization of the domestic market and improved infrastructure have created a dynamic Turkish gas market and sensitive pricing mechanisms, enabling Turkey to benefit from a ‘buyer's' market

The liberalization of the Turkish natural gas market, which kicked off in 2001 with the law allowing and regulating the entry of private sector players into the market by granting them import licenses, has profoundly contributed to the creation of a free and competitive market. Coupled with overarching global and regional transformations in gas production, and the reinforcing of its gas infrastructure with investments, the Turkish market has steadily expanded in the recent decade. With growing demand, Turkey has come to be defined as a "buyer's market" whereby multiple sellers engage in fierce competition. The free market conditions along with strong infrastructure have lowered prices and created a more consumer-friendly environment for one of the largest gas markets in Europe.

Eighteen years after the first liberalization move, state-run Petroleum Pipeline Corporation (BOTAŞ) still controls more than 80% of the local gas market. In 2017, the company purchased 82% of the gas imported from international suppliers, the rest was imported by eight private companies.

"The rapid changes and transformations on the supply side of the natural gas markets compel all local and global stakeholders in Turkey to comprehend the evolving market conditions and global dynamics," Deputy Energy and Natural Resources Minister Alparslan Bayraktar said in his address at a program titled, "New Regional Gas Market Dynamics under LNG Expansion and the Shale Gas Revolution," organized by the Atlantic Council in Turkey.

Some of Turkey's long-term gas contracts will expire in 2021 and the number of gas imports stipulated in those contracts total 16 billion cubic meters, corresponding to nearly 30% of the total 55 billion cubic meters of gas in 2017, according to the Energy Market Regulatory Authority (EMRA).

In reference to the renewal of contracts, Bayraktar said: "We are on the brink of a new period during which Turkey will make significant decisions. As policymakers in energy, we are expecting more flexible contract terms, given the copious amount of liquefied natural gas (LNG)." The conventional pipeline suppliers, the deputy minister added, must adapt to the changing world. "Now, the market is profoundly sensitive to pricing dynamics and the suppliers should realize this," he noted.

The changing trends in the global energy supply have led Turkey to improve and reinforce its infrastructure to expand storage and regasification capabilities. When the undergoing expansion projects are completed by 2023, the country will have a storage capacity of 11 billion cubic meters – around 20% of its total annual gas consumption.

In 2017, around 20% of Turkey's gas imports consisted of LNG purchases from Algeria and Nigeria. The EMRA annual sectoral report demonstrates that 38% of the total LNG imports supplied through BOTAŞ's contracts with Algeria and Nigeria, the spot market supplied the rest.

While Qatar came first in spot LNG market purchases with 32.5%, Norway came second, accounting for 17.8% of Turkey's total LNG exports in 2017. The U.S. – which became a net gas exporter in 2017 for the first time in 60 years – ranked third in Turkey's LNG imports with 16% of total spot purchases.

Currently, Turkey operates four LNG terminals – two of them are floating storage and regasification units (FSRU) and the remaining two are on-land facilities. The LNG terminal in Marmara Ereğlisi located 120 kilometers west of Istanbul in the northern Marmara Sea currently operates with a capacity of 5.9 million tons. The terminal is capable of compressing 8 billion cubic meters per year. Another on-land terminal is located in the industrial Aliağa district of Aegean province of İzmir with a capacity of 4.4 million tons of LNG. The İzmir terminal operated by Egegaz has a regasification and compression capacity for 6 billion cubic meters per year.

Turkey's first FSRU began operating in December 2016 in Aliağa and is capable of supplying 5.3 billion cubic meters gas per year, regasifying more than 12% of Turkey's annual gas demand. A consortium consisting of Kolin and Kalyon contracting companies, Etki Liman operates the terminal.

The second FSRU operated by BOTAŞ was commissioned in January 2018 at the Dörtyol district of southeastern Turkey's Hatay on the Mediterranean coast. It has a storage capacity of 263,000 cubic meters – the largest in the world. The unit has around 20 million cubic meters of daily output capacity.

These immense infrastructure investments, in addition to three major pipeline projects – TurkStream with Russia, Trans-Anatolian Natural Gas Pipeline Project (TANAP) as part of Southern Gas Corridor (SGC) with Azerbaijan and the Eastern Anatolian Gas Transmission Line with Iran – have contributed to Turkey's supply security to a great extent, Deputy Minister Bayraktar emphasized. He particularly pointed out that the diversification of resources and supply routes has been a direct consequence of growing gas demand – recorded at 5 to 6% per year on average.

Speaking of suppliers, Bayraktar also drew attention to the expanding share of U.S. LNG in the Turkish market. Since Turkey is planning to reconfigure its buyers' portfolio, the role of U.S. LNG might become more significant in the Turkish market, he added.

In reference to the recent phone calls between President Recep Tayyip Erdoğan and U.S. President Donald Trump, during which the two agreed to increase the bilateral trade volume to $75 billion from its current level of $20 billion, Bayraktar said the gas trade might play a key role in reaching that target.

Turkey indeed is one of the largest buyers of U.S. LNG. After becoming the second-largest LNG importer in Europe after Spain in 2017, Turkey became the top European market for U.S. LNG exports in 2018, according to the Department of Energy estimates.

During his remarks at the meeting, Richard L. Morningstar, the former U.S. ambassador to Azerbaijan and the director of the Atlantic Council Global Energy Center, stressed that energy has always been a common path for Turkey and U.S. no matter how sour their political relations.

"Energy is a space which remains consistent and bipartisan and is vital for American policy and its relations with Turkey," he said.

Turkey is looking to diversify its supply channels and simultaneously reinforce its LNG infrastructure with the third floating storage and regasification unit (FSRU) project that is currently ongoing, the remarks of the ambassador came as a harbinger of a new era in Turkish-American energy ties.

Although Europe is not currently the largest buyer of U.S. LNG and is still dominated by Russian gas, the availability of the U.S. commodity has changed a great deal in the market dynamics in terms of pricing and has so far enabled a diversified global market, boosting the supply security.

Partnership with energy firms in Mediterranean

Deputy Minister Bayraktar also elaborated on Turkey's accelerated efforts to explore hydrocarbon resources in the Mediterranean. Commissioning its first drilling vessel Fatih in the region in late October, Turkey is looking to get preliminary results in a couple of weeks.

The second drillship also came to the Yalova shipyard in the Marmara Sea for the maintenance and renovation and will start drilling wells in the Black Sea soon.

Bayraktar stressed that Turkey pursues an energy policy that will yield benefits for all partners and stakeholders in the region and implements a very expansive program to explore the resources in the Mediterranean. "We could cooperate with companies that understand Turkey's concerns and sensitivities in the Mediterranean," Bayraktar said and continued, "We want to be the party that resolves the existing problems. Independent of bilateral ties, we believe that energy can eliminate the political conflicts by bringing a positive agenda."

Turkey's Barbaros Hayreddin seismic vessel has been conducting surveys in the region since 2013 after the two sides signed an agreement that gives Turkey exploration rights for 30 years in 2011. Its first drillship Fatih also started operations with deep-sea drilling in October 2018 off Alanya, a district in the Mediterranean province of Antalya. In November 2018, Turkey also started shallow well drilling in Mersin, another Mediterranean province.

Nuclear, gas, renewables, petrochemicals: Turkish energy sector enjoys a prolific year

Daily Sabah, Istanbul, 1 January 2019

Turkey's first drilling vessel Fatih arrived near the city of Antalya in June 2018 to start the country's first drilling project in the Mediterranean

The launch of international projects, the acceleration of drilling and seismic surveys, the boosting of storage capacities and the nuclear journey have been the most exciting news for the Turkish energy market in 2018.

As much as the action in the international energy markets, 2018 has witnessed major developments in the Turkish energy industry. The initiation of drilling operations in the Mediterranean with Turkey's first drillship Fatih, the beginning of the construction of the country's first nuclear power plant, the launch of the Trans-Anatolian Natural Gas Pipeline (TANAP), the inauguration of a new petrochemical facility in the western Turkish province of İzmir, and the operation of the second liquefied natural gas (LNG) floating storage and regasification unit (FSRU) in the Mediterranean, have been the most significant events transforming the Turkish energy sector.

All of this has brought the country closer to its goal to increase self-sufficiency in energy as well as instituting a trading hub. The 1,850-kilometer-long TANAP is the largest section of the 3,500 kilometer-long Southern Gas Corridor (SGC) that was officially inaugurated during a ceremony held in Baku on May 29 with the participation of Azerbaijani President Ilham Aliyev.

TANAP, with around $8 billion of investment, will deliver 6 billion cubic meters (bcm)from the giant Shah Deniz II field in Azerbaijan to Turkey and 10 billion to Europe per year. The European part of the project is expected to become operational in 2020, upon the completion of the Trans Adriatic Pipeline (TAP), which will connect with TANAP at the Turkish-Greek border.

President Recep Tayyip Erdoğan inaugurated the TANAP project on June 12 in the northwestern city of Eskişehir, where the project's compressor station is located.

Currently, the Southern Gas Corridor Company holds a 51% share in the pipeline, Turkey's Petroleum Pipeline Corporation (BOTAŞ) has a 30% interest, BP holds a 12% share and State Oil Company of Azerbaijani Republic (SOCAR)

Turkey has the remaining 7% stake.

(From left to right) Turkish Republic of Northern Cyprus (TRNC) President Mustafa Akıncı, Azerbaijani President Ilham Aliyev, President Recep Tayyip Erdoğan, Ukranian President Petro Poroshenko, Serbian President Aleksandar Vucic and Treasury and Finance Minister Berat Albayrak attended the grand inauguration ceremony of the Trans-Anatolian Natural Gas Pipeline (TANAP), 12 June 2018

STAR refinery starts processıng oıl products

On October 19, Turkey's biggest oil refinery, STAR, officially opened in the western coastal province of İzmir with the attendance of President Erdoğan and his Azerbaijani counterpart, as well as other top officials from both countries.

STAR is SOCAR Turkey's biggest investment in the country at a cost of $6.3 billion.

The refinery, which has a crude oil processing capacity of 10 million tons, started its operations back on Aug. 3 with the arrival of the refinery's first crude oil cargo ship Absheron, loaded with 80,000 tons of feedstock.

In 2018, refining of around 2 million tons of crude oil was expected at the refinery, which will increase to 10 million tons at full capacity.

According to the official website of Turkey's leading petrochemical company, PETKIM, the STAR Refinery will meet more than 25% of Turkey's processed oil products needs upon start-up.

TurkStream offshore section completed

Alexander Medvedev, deputy chairman of Russia's gas giant Gazprom and the TurkStream project constructor, said in 2018 the company would almost double its

investments in the TurkStream gas pipeline project compared to 2017 when 92.8 billion rubles was spent.

On Jan. 15, Gazprom announced the company's plans to invest 182.4 billion rubles ($3.2 billion) in 2018 for the pipeline project to send Russian gas to Europe via Turkey.

On Jan. 29, more than half of the first line of the TurkStream natural gas pipeline project to deliver 35% of Turkey's gas needs had been completed, Gazprom officials said while on-site at Novy Urengoy, Russia's biggest gas field and the world's second-biggest field located in northern Russia.

On Aug. 8, Gazprom laid down 1,500 kilometers of the pipeline's length across two lines, corresponding to about 80% of the total length of the pipeline, Gazprom CEO Alexei Miller confirmed.

Also in August, the world's largest construction and heavy-lift vessel, Pioneering Spirit, which is currently laying the second line of the TurkStream project, set a new world record in offshore pipe laying on Aug. 26, Gazprom confirmed.

Gazprom said on its official Instagram account that the vessel, which belongs to the Allseas company, laid 6.27 kilometers of pipes per day on Aug. 26, surpassing the average of four kilometers per day.

The project has a total capacity of 31.5 billion cubic meters. The first part of the project with a capacity of 15.75 billion cubic meters will transfer gas to Turkey from Russia.

The first line of the TurkStream reached the Turkish shore off Kıyıköy in northwest Turkey on April 29 and the launch of the second line is expected in 2019.

On Nov. 19, Erdoğan announced during a ceremony in Istanbul marking the completion of TurkStream's offshore section that the project would be ready to operate in 2019 after tests are carried out.

Erdoğan confirmed that since 1987 Turkey has purchased 387 billion cubic meters of natural gas from Russia while hailing this achievement as a success for both countries in the energy field. He added that Turkey's goal is to reach an annual trade volume of $100 billion with Russia.

Launch of spot gas trade exchange market

EPİAŞ, Energy Stock Exchange Istanbul, launched its spot natural gas trade system on the energy stock exchange in September. As part of Turkey's efforts to become a natural gas trading hub, EPİAŞ developed a software system to allow natural gas trading via an electronic platform. After the successful completion of a five-month testing phase, the system officially went online.

The new system is expected to bring competition, supply diversification and high quality to the natural gas market.

The new spot natural gas market system will determine the natural gas prices for the day-ahead market. The system price will be set by matching offers from suppliers with corresponding bids from market players to develop a supply and demand equilibrium price. Participants will be able to trade at least 1,000 cubic meters of natural gas per day.

On July 27, EPİAŞ began to publish natural gas transmission data through its online transparency platform. It also started to share transport nomination, virtual trade, capacity, reserve, actualization and stock amounts, on a daily basis. Previously, on April 1, EPİAŞ launched online testing of its spot natural gas trade system on the energy stock exchange to improve the electronic system, before it goes officially online. Turkey aims to take concrete steps to utilize its geopolitical position near oil and gas-rich countries in the Middle East, Caspian and Central Asia to become an energy-trading hub.

Akkuyu Nuclear Power Plant begins construction

Turkey's first nuclear power plant Akkuyu, on Dec. 14, was granted a "limited works permit" for the construction of the plant's second unit.

On Dec. 14, the Turkish Atomic Energy Authority (TAEK) granted the country's first nuclear power plant, Akkuyu Nuclear Power Plant's (NPP) project company, Akkuyu Nuclear, a "limited works permit" for the construction of the plant's second unit, Rosatom, Russia's state nuclear corporation company and major consortium partner for the plant, announced.

Receiving the permit is an important stage in the licensing of Akkuyu NPP second unit's construction, Rosatom's statement read.

On Sept. 10, Rosatom announced that a new construction contracting company joined the partners for the construction of the plant. According to the company's statement, the new participant company, Titan-2 Concern, is to act as a contractor for the Atomstroyexport (ASE) company – an engineering division of Rosatom.

"Cooperation with Titan-2 Concern for the Akkuyu NPP is the next step in the company's strategy to have reliable partners for the construction and assembly at all construction facilities of ASE's engineering division," Valery Limarenko, head of ASE Company and the Engineering Division of Rosatom State Corporation, said.

The NPP was also granted an electricity generation license for a period of 49 years from the Turkish Energy Market Regulatory Authority (EMRA) on June 15.

Erdoğan stated in early December that the construction of Turkey's first nuclear plant was on schedule and that the second would be built in Sinop in the Black Sea province, while a third nuclear plant was planned for construction in the northwestern Thrace region.

Seismic vessels and drilling operations

Turkey purchased a second drilling vessel to explore domestic oil and gas reserves in order to become more energy independent.

Turkey's first drilling vessel, Fatih, arrived near the city of Antalya in order to start the country's first deep drilling project in the Mediterranean. Former Energy and Natural Resources Minister Berat Albayrak said on May 31 at an official sailing ceremony in the Kocaeli province that the vessel would conduct drilling at a depth of 2,600 meters in the Mediterranean, and hailed it as a historical step for Turkey.

On Dec. 8, the new Energy Minister Fatih Dönmez announced a second drilling vessel that was purchased by Turkey was expected to arrive in the Mediterranean waters by the end of January 2019.

The minister confirmed that Turkey's two seismic vessels, Barbaros Hayrettin Paşa and MTA Oruç Reis, were continuing seismic surveys in the Black Sea, and the Mediterranean, respectively. Barbaros Hayrettin Paşa, Turkey's first seismic vessel, was bought from Norway in 2013, and has been conducting surveys in the Mediterranean since April 2017.

MTA Oruç Reis was built by Turkish engineers in a local shipyard in Istanbul and has been in operation since late June 2017.

Dönmez announced that Turkey started its first deep-sea drilling offshore Antalya on the Mediterranean coast on Oct. 30, while drilling in offshore Mersin started on Nov. 26. The minister also said the second drillship will come to Turkey in late January and start operations in the Mediterranean in 2019.

Lake Tuz underground gas storage facility

On June 27, the World Bank and China-led Asian Infrastructure Investment Bank (AIIB) approved a total of $1.2 billion credit for Turkey's Tuz Gölü (Salt Lake) underground gas storage facility.

Former Energy Minister Albayrak said Turkey would gradually increase the storage capacity to reach 5.4 billion cubic meters before 2023. He added that 10 billion cubic meters of storage capacity would be reached with the expansion of the Silivri natural gas storage facility located west of Istanbul.

Turkey's Salt Lake gas storage facility located in the Sultanhanı district in the province of Aksaray, 40 kilometers from the Salt Lake, was officially opened on Feb. 10, 2017. Its storage capacity is set to increase from 1 billion cubic meters to as much as 5 billion cubic meters per year.

The facility at full capacity will have 60 caverns by 2023. The launch of the second phase of the project will open an additional 48 caverns.

Floating liquefied natural gas unit

On Feb. 8, Turkey began operations of its second floating liquefied natural gas unit with 20 million cubic meters of send-out capacity per day. The FSRU docked at a port in Dörtyol, Hatay – a province in the Mediterranean region. The country aims to reduce dependency on pipeline gas through FSRUs, and therefore, these units are docked at ports close to regions with higher gas consumption.

Turkey's first FSRU was launched in Aliağa district of Aegean province of İzmir in December 2016 at a time when the country needed extra gas capacity to meet the increased consumption due to the very cold weather conditions at that time.

Turkey

STAR refinery to export $500m in petrochemical raw materials per year

Daily Sabath, Istanbul, 26 March 2019

All tests on the State Oil Company of Azerbaijan Republic's (SOCAR) Turkey Aegean Refinery (STAR) have been completed and the refinery will start working on full capacity soon, according to the General Manager of STAR Refinery, Mesut İlter, who said the refinery will be exporting around $500 million of petrochemical raw materials per year.

The largest single-location real sector investment in Turkey, the $6.3-billion STAR facility, located in the Aliağa peninsula in the Aegean province of İzmir, is poised to be one of the biggest petroleum and gas operations in Europe, the Middle East and Africa.

"Once the refinery reaches full capacity, it will meet all [of] Petkim's [petrochemical company] need for raw materials. Until the second petrochemical plant planned to be built by SOCAR Turkey is launched, we will export about $500 million worth petrochemical raw materials annually," İlter told Anadolu Agency (AA).

He recalled that the STAR Refinery was inaugurated at a ceremony attended by President Recep Tayyip Erdoğan and

his Azerbaijani counterpart İlham Aliyev on Oct. 19 of last year.

İlter expressed that the refinery, with a capacity for processing 10 million tons of crude oil annually, was commissioned gradually, saying that, while increasing capacity, improvements should be made in terms of both logistics and supply sources.

Located in the Aliağa peninsula in the Aegean province of İzmir, the SOCAR Turkey Aegean Refinery (STAR) was opened in October 2018.

According to İlter, currently, the refinery is fully active and will have reached full capacity in a very short period of time.

"It will process 7.5-8 million tons of oil in the rest of this year and will process 10 million tons of oil in full capacity next year. Once the refinery reaches full capacity, it will meet Petkim's need for raw materials. Until the second petrochemical plant planned to be built by SOCAR Turkey is launched, it will export about $500 million worth petrochemical raw materials annually, corresponding to some 700,000 tons of petrochemical raw materials. After the construction of the second petrochemical plant is decided and put into operation, it will be meeting the needs of this facility," he said.

Given Turkey's growth and import data in Turkey's fuel oil sector, there is always a need for new refineries, according to the STAR Refinery general manager, who emphasized that it is crucial to make potential new refinery investments with petrochemical integration.

Indicating that Turkey imports $17 billion worth petrochemical goods on an annual basis, İlter said that Petkim meets 20% of Turkey's overall petrochemical production.

The total output of STAR is expected to decrease Turkey's current account deficit by $1.5 billion per year, by substituting refinery imports with domestic production. Turkey meets the majority of its oil and natural gas demand through expensive energy imports, which is a major expense on the country's budget.

Pointing out that a refinery investment to be made with petrochemical integration will close the gap in fuel oil and petrochemical sectors, İlter stated that Turkey consumes some 2.2 million tons of gasoline a year versus its production of 5 million tons, and imports the rest. "Therefore, instead of building a refinery to export gasoline, it is much more important to make an investment that will reduce imports in petrochemicals. Actually, this is what makes STAR Refinery valuable," he added.

Underlining that these investments are needed in order to offset Turkey's foreign trade deficit, İlter stated that even if Turkey does not see any economic growth, these investments are necessary in order to close this deficit. He continued, "However, we believe that economic growth will continue in the upcoming period."

Highlighting that they believe in the Turkish economy, state institutions and consumers, he said that they, therefore, are continuing investments continuously. "I think the economy will grow by 3-4% in the next decade. Economic growth might decline on a yearly or periodical basis. However, given the historical data, Turkey has grown by an average of 5% in the past decade. Therefore, as Turkey can take rapid action against economic changes, I think this is a temporary process. I think that growth figures will be positive at least as of the second half of 2019," he concluded. The largest foreign direct investor in Turkey, SOCAR has invested around $15 billion in the 11 years since it began investing in Turkey after it acquired the country's leading petrochemical company Petkim in 2008 for $2 billion.

Turkey

Waste water turned into antimicrobial packaging

Anadolu Agency, 6 march 2019

Abant İzzet Baysal University (AİBU) supports the Zero Waste Project, one of the key priorities in the Turkish the economy, to use resources effectively and decrease the amount of waste. Faculty members and students in the Faculty of Engineering Food and Environmental Engineering Department have produced antimicrobial packaging from potato factory wastewater.

The work was conducted by faculty members professor Gülsün Akdemir Evrendilek, assistant professor Sibel Uzuner, professor Nusret Karakaya, professor Fatih Evrendilek and postgraduate student Nurullah Bulut and supported by the AİBU Scientific Research Projects Coordination Department (BAIBU-BAP). As part of this research and development project, a package that can be used in food wrapping was developed from wastewater.

The antimicrobial package, which extends the shelf life of food, has high flexibility and is water-soluble. A patent application has been submitted for the package, which can be produced in different colors.

Noting that the gel is antimicrobial, AİBU faculty member professor Evrendilek said, "When you wrap foods with the package, it decreases microorganisms and extends shelf life."

Plastic bag use in steep decline after landmark Turkish regulation

Daily Sabah, Istanbul, 20 March 2019

A regulation that introduced a fee on plastic bags at stores has helped decrease their use by 80%, officials say, as Turkey's fight against polluting waste gains momentum.

Within three months since its introduction in January, a regulation on plastic bags made a tangible impact in Turkey. The government enacted the regulation that ordered customers to pay at least TL 0.25 for a plastic bag in shopping to curb the excessive use of those bags in the country's fight against plastic pollution.

Minister of Environment and Urbanization Murat Kurum hands out canvas bags to shoppers in Ardahan, March 18, 2019.

Murat Kurum, Minister of Environment and Urbanization, told Anadolu Agency (AA) in an exclusive interview that use of plastic bags in supermarket chains decreased to about 80%. "Chains gave away 294 million bags last January and this number was 82 million in January 2019. Similarly, number of plastic bags distributed this February, dropped to 150 million from 605 million in the same month of 2018," Kurum said.

Plastic bag use per person is 440 annually in Turkey and about 30-35 billion plastic bags are used in the country yearly. An estimated 5 trillion plastic bags are used worldwide every year, and they mainly contribute to maritime pollution as some 8 million tons of plastic including bags are dumped into the ocean every year, killing marine life and entering the human food chain, according to a United Nations report on the issue.

The minister said plastic bags took up to 800 years to completely dissolve to a point where they would not pose a threat to environment, they also seriously damage nature and marine life, pointing out to recent discovery of 40 kilograms of plastic inside the carcass of a young whale washed ashore in the Philippines. Experts conducting an autopsy on the whale concluded that the animal died from starvation as it was unable to eat because of the trash filling its stomach. The minister said that the new regulation found nationwide support and they would expand it to other materials. "We will launch deposit bottle recycling regulations in 2021 and consumers will be able to exchange discarded bottles for products like chocolate, bus tickets or phone credits," he said.

Though low, the price on plastic bags has led consumers to seek other means to carry the goods they purchased, with some municipalities distributing free

canvas bags for shoppers. A recent survey conducted by the Turkish e-commerce giant hepsiburada.com revealed that the demand in the market net bags increased by 154%.

Plastic bag restrictions are part of the larger "zero waste" project initiated two years ago by first lady Emine Erdoğan. Some 14,000 public institutions, from the presidential complex to ministries and their branches are integrated into the project which covers recycling of waste, sorting the waste at its source and recycling food waste to compost. The campaign helped Turkey to rediscover its potential to be a more eco-friendly country, despite heavy industrialization in recent years. The ensuing recycling drive saw zero waste collection areas set up in more places, from shopping malls to businesses, schools, hotels, airports, etc.

The drive saved more than 30 million trees between 2017 and 2018, with the recycling of more than 1.7 million tons of paper waste and cartons. Meanwhile, more cities are upgrading their waste management systems. The country also managed to recycle more than half of the plastic bottles in the market in one year.

According to the last available data from 2017, of 236,000 tons of plastic bottles sold in 2017, approximately 140,000 tons were recycled. Under a new draft bill, every business or public institution will be required to receive a zero waste certificate that will evaluate how it complies with the new policies. The bill also makes it mandatory for municipalities to set up facilities for the collection of waste separated at its source.

PM hails Japanese experts' idea for water pollution treatment

Vietnam Business Forum, NDO, VNA, 12 April 2019

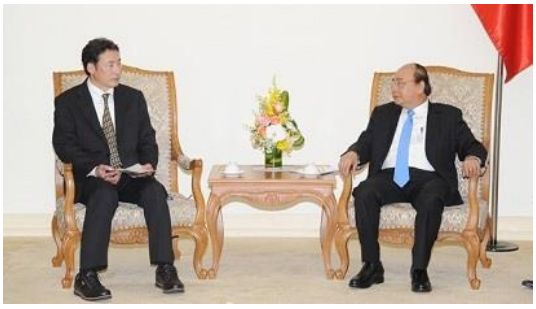
Prime Minister Nguyen Xuan Phuc hailed the water pollution treatment idea suggested by Japanese environmental experts while receiving them in Hanoi on April 11.

Welcoming the delegation, PM Phuc said that Vietnam pays special attention to the environment and considers this a big issue in national development.

The aspects mentioned by the delegation during this visit are practical for Vietnam, he said, expressing his hope that their trip will help strengthen the friendship and cooperation between the two countries.

Dr. Tadashi Yamamura, an environmental specialist of the United Nations who leads the delegation, highlighted the Japanese side's plans to install modern equipment using bio-nanotechnology on the bed of the To Lich River in Hanoi to help clean up this waterway.

He added that they have made considerations for two years before proposing this idea, voicing his belief that the technology will usefully assist Vietnam in wastewater treatment.



Prime Minister Nguyen Xuan Phuc (R) receives Tadashi Yamamura, who leads a delegation of Japanese environmental experts, in Hanoi, April 11. (Photo: NDO/Tran Hai)

Valuing the Japanese side's technology, PM Phuc said the two countries are strategic partners in many fields, with bilateral relations flourishing in multiple spheres, and wastewater treatment is a highly potential cooperation area.

He welcomed the Japanese side's proposal of sponsoring the pilot treatment of water pollution on part of the To Lich River and the West Lake using new technologies, and described this as a good idea that matches the Vietnamese Party and Government's policy on promoting environmental protection during national industrialization and modernization.

The Government leader also appreciated their mobilization of funding from private sources for this idea's realization.

He asked the Japanese experts and the Japan-Vietnam environmental improvement joint stock company (JVE) to work with the Ministry of Natural Resources and Environment and the Hanoi People's Committee to decide on the implementation.

PM Phuc expressed his belief that with their experience, the Japanese side will be successful in the treatment of wastewater in Hanoi, adding that it will be a good example in this field for other localities to follow.

Solar energy helps reduce electricity costs 20% monthly in Vietnam

Vietnam Business Forum, Kieuh Anh, 5 April 2019

In 2017, the roof of the Frozen Aquatic Factory No. 1 run by International Development and Investment Corporation (IDI), Sao Mai Group, installed 2,970 solar panels in the southeast direction, anchored by strong support frames tilting 12 degrees to catch the most sunshine. This design ensures high safety in stormy, windy weather, and even withstands 12-grade storms near the sea. The distance between battery ranges is large enough to move in case of repair or warranty.

According to statistics, on average, Dong Thap province has about five hours of sunshine a day and exposes to radiation intensity greater than 3,489 kcal per square meter per day.

Therefore, Sao Mai Group investing a handsome amount of money to install solar power panels on the roof of the Frozen Aquatic Factory No. 1 is a right decision and a long-term strategy.

Sao Mai Group successfully energized a 1.06-MW solar power plant in Vam Cong Industrial Park, Lap Vo District, Dong Thap Province, in the middle of 2017. Costing US$2 million of investment capital, this clean energy source is helping the company's manufacturing facilities reduce electricity costs by 20% per month.

To convert photovoltaic into two-way electric current, the factory uses eight large inverters and conduits. This solar rig has a total capacity of 980 kwp, capable of generating about 1,400 MW of electricity annually, helping IDI's factory reduce electricity costs about 20%, equivalent to VND417 million a month. So far it has helped save over VND15 billion in total. The investor will reach the breakeven point in the next five years, and the system will generate electricity at almost no cost in the next 20 years. However, this system only meets 30% of the electricity need of the factory and IDI therefore cannot sell solar electricity to EVN.

In fact, aquatic processing factories consume huge amounts of electricity. On average, a ton of raw materials requires 57 - 2,129 kWh of electricity and a ton of finished product, 324-4,412 kWh. The freezing system accounts for the most, at 70%.

If aquatic processors in the Mekong Delta invest in the solar power model that Sao Mai Group made for IDI, it will substantially reduce power bills and effectively save energy for the nation.

Vietnam

Dung Quat oil refinery expansion project accelerated

Vietnam net, 7 March 2019

The Ministry of Natural Resources and Environment has approved the environmental impact assessment report of a project to upgrade and expand the Dung Quat Oil Refinery, which is operated by the Binh Son Refining and Petrochemical Company (BSR).

BSR said this is an important milestone, affirming the efforts of the company and the support and direction of ministries, agencies, the People's Committee of Quang Ngai province and the Vietnam Oil and Gas Group (PetroVietnam).

According to the firm, the ratification of the report is a legal basis for BSR to

consult shareholders about the approval of front-end engineering design and the estimate for the project.

The Dung Quat Oil Refinery Plant

The Dung Quat Oil Refinery expansion and upgrade project received an investment certificate by the Dung Quat Economic Zone Authority (DEZA) in 2014.

The 1.8 billion USD project aims to increase the plant's annual capacity from 6.5 million tonnes of crude oil to 8.5 million tonnes.

Besides existing products meeting international standards and the EURO 5 criteria, the project will also produce plastics, tar, A97 and A98 gasoline and special materials used in military and defence.

The expansion project is scheduled to be completed by 2021.

PetroVietnam, the People's Committee of Quang Ngai and BSR have prepared all necessary conditions to implement the project.

By the end of February, the land clearance work had reached 99.8%. It is expected that on March 31, the local authorities will hand over all 108.2 ha of cleared land to the project management board under BSR.

BSR is coordinating with relevant units to finalise the capital arrangement plan for the project. It will propose policies and tools to increase revenue to the Government, as well as suggest PetroVietnam guarantee loans for the project.-VNA

Vietnam goes for nuclear power

Vietnam News, 13 April 2019

The Director General of the Viet Nam Agency for Radiation and Nuclear Safety, Mr. Nguyen Tua Khai, talks to Lao dong cuoi tuan (Weekend Labour) newspaper about his agency's capacity to operate a nuclear power plant.

What are the advantages and disadvantages of project VN3.01/13 on strengthening the capacity and effectiveness of the Viet Nam Agency for Radiation and Nuclear Safety?

Project VN3.01/13 is in its second phase.

The first phase of the project was carried out from 2012-2015 with financial support from the European Union. In the second phase, the project will receive the funding from the Ministry of Science and Technology in addition to the financial support from the European Union.

In this second phase, we'll continue to receive financial support from the EU and technical assistance from the European Agency –RISKAUDIT and technical agencies from France, Germany, Finland and Belgium.

This is a very good opportunity for staff from the Vietnam Agency for Radiation and Nuclear Safety to learn and share their knowledge and experience with foreign experts.

The Da Lạt Nulear Research Institute in Lam Dong Province. (Photo vnexpress.net)

The second phase will include seminars and workshops to strengthen the capacity of Vietnamese workers.

Has the agency faced any challenges in implementing the project?

The development and completion of a legal document on nuclear safety is a challenge for my agency. This task is new to us. Adding to that, nuclear safety is a rather new area for Vietnam while we have a big shortage of human resources in the fields of physics, nuclear technology, hydrothermal, materials and others.

That's why in the first phase of the project, our staff faced certain difficulties and challenges in the course of learning from foreign experts. Other challenges I should mention is our mission to develop an integration management system (IMS) – a very important task for the Vietnam Agency for Radiation and Nuclear Safety.

I hope with support from the EC experts, we'll accomplish the tasks we've been assigned to and the project's objectives to develop a core system, support system and management system.

What achievements did the agency make in the first phase of the project?

We managed to achieve all the targets set in the first three years of the project.

The project was launched in May 2016 when Vietnam was in the process of preparing for the construction of the Ninh Thuan Nuclear Power Plant.. However, in November, the National Assembly passed Resolution No. 31 to suspend the project. That's why now we are discussing amendments with the European Union to focus on areas of safety and responses to accidents that might occur.

With support from European experts, we have completed important draft legal documents governing the building and operation of nuclear reactors, the management of nuclear waste and

others. In June 2017, the Prime Minister signed Decision No.884 on how to deal with an accident at a nuclear power plant. In my opinion, this is a big contribution from the project towards the management of a future nuclear power plant in Vietnam.

Through this project, staff from the Vietnam Agency for Radiation and Nuclear Safety have gained good knowledge and improved their capacity in appraising the safety ratio of a nuclear power plant to international standards. I'm very glad to say that our European counterparts have reiterated that they would continue to co-operate with Vietnam in the field of nuclear power development. VNS

Vietnam has great potential to develop renewable energy: experts

Vietnam News, 13 April 2019

HCM City - The Saigon High-Tech Park Incubation Centre (SHTP-IC) and New Energy Nexus in Southeast Asia are kicking off the New Energy Nexus programme to support Vietnamese start-up companies in the renewable energy field.

Experts and startups in the renewable energy field share experiences at the Smart Energy Innovation Startups event held in HCM City. – VNS Photo Xuân Đăng

The programme will include experts in the industry to support startups in three phrases. In the first phrase, the programme will connect start ups in an effort to create a community that shares information and experiences in the renewable energy field.

In the second phase, the programme will hold a two-day exhibition, which is expected to take place in early June.

Lê Thanh Nguyen, director of SHTP-IC, said the exhibition would select quality projects to enter phase 3. The startups will receive support to complete their products, and call for investment to bring them to the market.

In addition, the SHTP-IC will provide modern equipment, the latest technologies and laboratories at the Saigon Hi-tech Park in District 9 for start-ups to conduct research and develop their products.

Stanley Nguyen, regional programme manager of New Energy Nexus, said the programme aims to build a regional ecosystem of support services, so that many startups and enterprises in Việt Nam will have a chance to work with other foreign agencies. The program has supported startups from Thailand and Indonesia, and soon the organisation will implement support programs in the Philippines, he said.

Nguyen Xuan Hien, CEO of Ingreentech Company, which provides smart and environmentally friendly technology solutions for businesses and households, said the city's Department of Science supported startups through tax incentives and financing.

The cost for households to install solar panels is VND150 million to VND250 million, much lower than the past few years. It will take five to seven years for households to recoup the capital by selling the surplus back to Vietnam Electricity, according to Hien.

Vietnam's annual power consumption has increased by 10% in recent years, and the country is at risk of facing power shortages in the future. - VNS

Renewable energy and alternative fuel subsidies have become a moral hazard

Asian Development Blog, Kelly Hewitt, 9 April 2019

Tax and economic incentives for renewable energy and alternative fuels are favored by many governments seeking greener energy options. But these subsidies can create a moral hazard. Private sector investors often take on more risk and implement projects that would not be viable without the subsidies. Some may argue: "precisely – the point of tax and economic incentives are to mitigate risk associated with investments in new technology." However, when such incentive schemes are not piloted; but instead, are rolled out full scale, moral hazards abound for private sector investors and government treasuries.

Investors need certainty. Yet, subsidies are based on public policy, not law, and can change at any moment. Change in government, change in strategy, change in budget all influence public policy. Acknowledging possible public policy change up front is a necessary part of an investor's risk assessment. Assuming no change in policy creates

the moral hazard of banking on the nonbankable.

Incentives for wind, solar and other renewable energy projects can create unforeseen business risks. Photo: ADB

Only two modes exist to mitigate policy change risk. The first is untenable – lobbying government to keep favorable policy alive. This mode is circular – mitigating the risk with reinstitution of the risk itself. The second and most tenable is to simply ensure, based on best estimates, that there is a return on investment that meets the minimum threshold requirement, without the subsidy. The latter represents liberal and free conventional market dealings – enabling market entry and retention where there is price, demand, and supply parity.

Public policy programs funded by government treasuries need to specify theory of change and desired impacts up front. Tax and economic incentives should be targeted and fit for their purpose to ensure actual effectiveness. Time horizons should be known and part of a thorough economic analysis. Also, timebound parameters applied under conventional financial analyses must be transparently known and tested. Government subsidies that are untargeted fail both economic and financial litmus tests. Desired impacts are not attained. While there may be some limited evidence of effectiveness, it is trumped by financial viability failure. Effectiveness is unsustainable.

In several countries around the world, and in Asia, the moral hazard of tax and economic incentives can be seen demonstrating increased harm to investors and the government's treasury. The subsidies start as a major driver of new renewable and alternative energy projects, but they are not targeted and time bound. As a result, countries are slow to remove the subsidies.

In some cases, such subsidies are removed without much notice in order to signal to investors that the renewable energy sector needs to become less dependent on subsidies. Such policy reversals aim to drive investors toward focusing more on scaling up technological and operational improvements than bringing down costs. But in some cases, green energy investors are discovering that without subsidies there's no return on investment for over a decade. With subsidies, it might take only a few years to recoup costs.

In addition, renewable energy subsidies can strain a country's treasury – more specifically, government institutionalized funding mechanisms designated to support renewable energy. Many countries have recently slashed subsidies for renewables and alternative fuels. Blanket subsidies are simply unsustainable. When not tailored to be fit for purpose or time bound, tax and economic incentives foster uncertainty and moral hazard. The result is harm to energy markets and government treasuries.

Tax incentives and subsidies can be effective but they need to be managed carefully.

ADB supports 275 MW power plant to boost energy access in Sumatra

ADB, 22 March 2019

Jakarta - The Asian Development Bank (ADB) signed a private sector financing package to support the construction of a 275-megawatt combined-cycle gas turbine power plant in Riau province in central Sumatra, Indonesia, to help secure the country's energy future and provide communities with more affordable and reliable electricity.

The financing consists of a $70 million A loan from ADB's ordinary capital resources and $82 million B loan from Sumitomo Mitsui Banking Corporation and MUFG Bank, with ADB providing a partial risk guarantee (PRG) to the participating commercial banks. The International Finance Corporation (IFC) will provide $50 million for the Riau Natural Gas Power Project in the first-ever cofinancing of an infrastructure project by ADB and IFC in Indonesia.

ADB will also administer a $20 million loan from the Leading Asia's Private Sector Infrastructure Fund (LEAP), supported by the Japan International Cooperation Agency. Established in March 2016, LEAP's mandate is to help fill financing gaps and increase access to finance for ADB-supported infrastructure projects in Asia and the Pacific.

"ADB's involvement in the project has helped secure long-term commercial bank financing necessary for any large-scale infrastructure investment, which has remained a challenge in Indonesia," said Infrastructure Finance Division Director for Southeast Asia, East Asia, and the Pacific at ADB's Private Sector Operations Department Mr. Jackie B. Surtani. "ADB's role as a lender and provider of PRG to the project's B loan lenders will enable the project to mobilize a significant amount of long-term debt."

The project is being implemented through PT. Medco Ratch Power Riau, a special purpose vehicle partially owned by PT. Medco Power Indonesia, a leading developer and operator of small and medium-sized independent power producers (IPP) in the country, and Ratchaburi Electricity Generating Holding Public Company Limited, Thailand's largest IPP.

"ADB's role was key in getting this transaction closed from the negotiation stage of the power purchase agreement to the structuring of the financing package," said PT. Medco Power Indonesia Chief Executive Officer Mr. Eka Satria.

The plant is expected to provide stable and reliable power to the domestic grid, amounting to about 1,445 gigawatt-hour annually. The use of combined-cycle gas-fired power generation will improve the environmental sustainability of the current energy mix in Sumatra by displacing diesel and coal as fuels for electricity generation.

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. In 2018, it made commitments of new loans and grants amounting to $21.6 billion. Established in 1966, it is owned by 68 members—49 from the region.

ADB supports private sector solar power development in Mongolia

ADB, 20 March 2019

The 15-megawatt Sermsang Khushig Khundii solar power plant in Tuv aimag (province) Sergelen soum (county), Mongolia.

Ulaanbaatar – The Asian Development Bank (ADB) and the Leading Asia's Private Infrastructure Fund (LEAP) signed an $18.7 million loan with Sermsang Power Corporation Public Company Limited (SSP) and Tenuun Gerel Construction LLC (TGC) to build, operate, and maintain a 15-megawatt solar power plant supplying electricity to Mongolia's central grid system.

The loan agreement for the Sermsang Khushig Khundii Solar Project marks ADB's first cofinancing with LEAP in Mongolia's renewable energy sector. The Canadian Climate Fund for the Private Sector in Asia provided a technical assistance grant to offset first mover costs and to catalyze the financing of ADB's first private sector solar power project in Mongolia.

"This project uniquely incorporates climate-resilient technical solutions from the private sector to accommodate Mongolia's cold and dry climate," said Director General of ADB's Private Sector Operations Department Mr. Michael Barrow. "The project also benefits from the transfer of operational knowledge and advanced technology from Japan and Thailand in developing and operating solar power plants."

The solar power plant is located in the Khushig valley at Tuv aimag (province) Sergelen soum (county). It will supply

electricity to the Central Energy System, which delivers power to an area accounting for over 80% of the country's energy demand.

The solar project will generate clean electricity totaling 22.3 gigawatt-hours annually in Mongolia, while lowering the country's carbon emissions by 26,400 tons per year. It will help the government increase the share of renewable energy in total installed capacity from 12% in 2017 to a targeted 20% by 2023 and 30% by 2030. Shifting to cleaner energy sources will also reduce electricity imports, improve Mongolia's energy security, and mitigate air pollution. The energy sector is dominated by coal-fired power plants and currently accounts for over 60% of the country's greenhouse gas emissions.

TGC is owned by Sermsang Power Corporation Public Company Limited (SSP) in Thailand, Sharp Energy Solutions Corporation (SESJ) in Japan, and AMOE Solar LLC and SH Energy Solution LLC in Mongolia.

"For SSP, this project is not only an important milestone for investment in renewable power projects in Asia, but also reflects our philosophy in developing ecologically sustainable projects," said SSP CEO Mr. Varut Tummavaranukub. "We are honored to be trusted by ADB for this milestone transaction."

LEAP was established in 2016 to fill financing gaps and increase access to finance for ADB-supported infrastructure projects in Asia and the Pacific. The fund is supported by the Japan International Cooperation Agency and is managed by ADB's Private Sector Operations Department.

The Canadian Climate Fund for the Private Sector in Asia (CFPS) was established by the Government of Canada in 2013 to provide blended concessional financing and technical assistance grants to private sector climate change mitigation and adaptation projects in Asia. The CFPS is administered by ADB under the Clean Energy Financing Partnership Facility.

Sermsang Power Corporation Public Company Limited, established in 2015 and based in Bangkok, Thailand, is a renewable energy producer and distributor in Asia that is committed to sustainable power production, as well as promoting a clean environment for a better future.

Sharp Corporation, parent company of SESJ, founded in 1912 and headquartered in Sakai City, Osaka, Japan, is a leading global electronics manufacturer. It is dedicated to contributing to the culture, benefits, and welfare of people worldwide through the use of its unique and innovative technology.

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. In 2018, it made commitments of new loans and grants amounting to $21.6 billion. Established in 1966, it is owned by 68 members—49 from the region.

ADB & ArmPower sign loan to expand private power generation in Armenia

ADB, 4 March 2019

Yerevan - The Asian Development Bank (ADB) signed a $44 million loan with ArmPower CJSC, a special purpose company owned by Renco Power (owned by Italian Renco Spa and Simest Spa) and Siemens Project Ventures (part of German Siemens Financial Services), to help expand and diversify power generation sources developed by the private sector in Armenia.

The assistance will finance a state-of-the-art 250-megawatt gas-fired combined-cycle cogeneration power plant with annual production of up to 2,000 gigawatt hours. The facility will be the country's first greenfield project-financed power plant. It will also create local employment during the construction and operation of the plant while boosting sector efficiency and reliability by helping to partially replace aging power generation assets with modern facilities.

"ADB's support for diversification of primary energy sources in Armenia will allow the country to replace aging power plants and generate power more efficiently," said ADB Principal Investment Specialist for Private Sector Operations Ms. Sonali Tang. "ADB's financing will establish a precedent for future financing of similar private sector projects in Armenia by boosting investor and lender confidence."

"This project represents the largest greenfield project finance in the history of Armenia," said Renco Chief Executive Officer Mr. Giovanni Rubini. "Renco, present for about 20 years in Armenia, expresses deep satisfaction for having been able to implement it successfully, assuming the new role of 'EPC-Finance' contractor, responsible not only for the construction of the plant, but for the development and procurement of the necessary funding for the execution of the entire project."

Along with ADB, German development finance institution Deutsche Investitions- und Entwicklungsgesellschaft mbH, the International Finance Corporation (IFC), IFC's Managed Co-Lending Portfolio Program, and the OPEC Fund for International Development will provide cofinancing for the project.

ADB's participation will further strengthen the project's environmental and social standards and support reductions in greenhouse gas emissions in the country. The loan supports the energy policy of the Government of Armenia, which highlights the role of the private sector to advance energy security through the diversification of energy sources. This project also complements ADB's earlier financing to Armenia's private sector power distribution company, Electric Networks of Armenia, to further improve the efficiency of the electricity sector.

ADB has been working with Armenia since 2005 and has approved over 30 loans totaling $1.49 billion and 36 technical assistance grants totaling $19.1 million. ADB has been increasingly balancing its portfolio by working with both public and private sectors. The share of nonsovereign operations in Armenia has grown rapidly in recent years, reaching 31% of the bank's overall operations in the country.

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 67 members—48 from the region.

Across India, solar power brings more than light

International Finance Corporation, photos by Dominic Chavez, 23 January 2019

Solar projects—big and small—are helping India achieve energy goals while creating opportunity for its people.

Dulu Sarna - Sarita Asur, a subsistence farmer and young mother of three, lives in one of India's most remote tribal areas—a place so isolated that it's not just off the power grid, it's also absent from most maps. She and her community, the Asur tribe, are based in the eastern state of Jharkhand. Nearly half of the people in this isolated territory lack access to electricity—the highest percentage of any state in India.

So when Azure Power, a private solar provider and longstanding IFC client, won a contract to bring power to 320 households in 11 mud-brick villages scattered across the state, the first item of business was to locate these communities. Engineers spent a week driving and trekking through waterlogged jungle to identify the coordinates of each village—including Sarita Asur's. Next, Azure Power arranged to transport the equipment (including 450-pound batteries) on the narrow, unpaved roads of one of India's poorest regions.

Solar powers India's future

"When we switched on the light for the first time, it was a very happy moment," Sarita Asur says. "It changed my family's life." Her home is now outfitted with three LED bulbs that receive power from an eight-kilowatt grid. Because the Asur community is small, the solar panels provide about 18 hours of clean energy every day—higher than the 12-hour average.

Families in her village are saving an average of $3 to $4 per month by

replacing kerosene with solar energy to meet most of their basic needs.

Families in her village are saving an average of $3 to $4 per month by replacing kerosene with solar energy to meet most of their basic needs. Paying the nominal solar tariff of $0.42 per month is far cheaper than using fuel lamps—and it's safer, too.

"I always feared the naked flame of the [kerosene] lamp at night," says Sarita Asur. "I no longer have to worry about that."

Solar power has brought other benefits to the tribe, including keeping wildlife away. Some years back, an errant elephant charged the home of 70-year-old Jerome Asur, destroying two of its walls. "What could I do," he shrugs, "it was much bigger than I am." With the village now lit at night, animals keep a safe distance. "I never thought I'd see electricity in this village in my lifetime," says Jerome Asur.

Sarita Asur now relies on LEB bulbs to light her house – a cheaper and safer energy source than kerosene lamps.

To meet India's ambitious targets, private companies, government officials, and multilateral development institutions like IFC are developing programs to increase solar capacity.

These initiatives are varied in their scale and reach: investors are building freestanding micro-grids in the tiny villages of eastern Jharkhand, constructing enormous ground-mounted solar parks in the central state of Madhya Pradesh, and covering urban rooftops with solar panels in the western state of Gujarat.

Meeting India's Energy Needs

Nearly one-third of the 1 billion people around the world who lack access to electricity live in India. Like Sarita Asur and her neighbors, many of them populate remote areas that prevent them from receiving electricity through standard transmission lines. For this reason, both grid-tied and off-grid solutions are necessary for achieving universal access to energy.

India is already working to address the energy needs of a burgeoning population of 1.3 billion: the country leads the off-grid solar market, and sold more than 3 million systems in 2016 alone. But there's much more work to be done: India aims to produce 40% of its electricity from renewable-energy sources by 2030, 175 gigawatts of which are slated to be developed by 2022. That's almost what the world's entire solar capacity was just four years ago.

Ground-Mounted Panels, Sky-High Potential

For India to achieve its ambitious targets, including cutting its emissions intensity by 35% by 2030, the government aims to produce more energy from solar power instead of coal. In April 2017, for instance, the government in the central state of Madhya Pradesh started building a 750-megawatt solar project, the Rewa Ultra Mega Solar Park. Once complete, this park will reduce greenhouse-gas emissions by 1 million tons every year and nearly double the state's capacity to generate solar power.

Remote villages in India are too far away from transmission lines. For these communities, off-grid systems are an alternative solutions.

Rewa's development has set several records in India. The initiative achieved the lowest tariff ever awarded for a country-wide solar project, bringing the cost of solar power on par with that of coal and thermal energy. "The biggest change that came with Rewa was that, without any subsidy from the government, solar power became cheaper than power from coal-based projects," says Manu Shrivastava, director of a government agency that promotes renewable energy in Madhya Pradesh.

In another first, the Rewa park will transfer solar power between two Indian states. With help from the World Bank, which financed the construction of the project's $30 million energy-transmission facilities, this solar park will supply Delhi's Metro Rail Corporation with 80% of its daytime energy. The metro system, which is one of the busiest in the world, is not only reducing its dependence on coal—it also expects to save $168 million on its energy bill over the next 25 years.

Nearly one third of the 1 billion people around the world who lack access to electricity live in India

IFC led Rewa's negotiations and helped structure a transaction that attracted $575 million in private investment. It also introduced a payment guarantee, which significantly reduced financial risk, attracted international bidders, and helped achieve the record-low tariff price. The government of India is currently working to replicate Rewa's bidding model in states across the country to continue to reduce the cost of solar.

Rooftop Rays

Massive projects like Rewa are well-suited for areas where land is plentiful and affordable. Yet India also needs to increase solar power in crowded, urban

areas where space is limited. With more than 300 days of sunlight, but a dearth of space, the city of Gandhinagar, the capital of the western state of Gujarat, pioneered an innovative solution to its land constraints.

Small solar grid installed by Azur Power in Dulu Sarna Village now light the homes of resident who used to rely on kerosene lamps.

“The market for rooftop solar started here,” says Omkar Jani, a former solar scientist for the Gujarati government. Nearly a decade ago, he and IFC designed the means to get this 5-MW project off the ground: what technology to use, how to install the panels, and where the energy would go.

The growth in India’s rooftop solar capacity, which today is 3.4 GWs, can be attributed to this first program conceived by IFC.

To start, IFC identified viable rooftops across the city and planned the transaction structure, which opened the government’s project to a competitive bidding process among private investors.

To reduce the financial risk, IFC advised that 80% of the solar panels be installed on government-owned buildings, and worked out the social, legal, and commercial details of leasing residential and public rooftops. IFC also participated in discussions between the government and the private power-distribution company, Torrent Power Ltd. (TPL), to arrange for the purchase of the solar energy to be fed into the city’s main electrical grid operated by TPL.

Solar panels installed on the roof top of the government building in Gandhinagar contrast with a neighboring coal-fired power plant.

Azure Power—the same company that electrified 11 villages in Jharkhand—started working on India’s first rooftop program with a $3 million loan IFC granted in 2013. The investment helped Azure install thousands of rooftop panels on private residences and public buildings across Gandhinagar at no cost to the roof owners. The terms of the deal were straightforward: in exchange for leasing their roofs, residents and rooftop owners receive a monthly payment based on how much energy their panels produce.

“The more solar power I generate, the less I have to pay for electricity, and the less I have to rely on coal,” says Aniruddhsinh Chanda, who leases his roof to Azure. The $19 that Chanda receives each month fully offsets his energy costs. “Before the solar panels, I used my rooftop maybe one or two

times a year," says Chanda. "Now, [the panels] use my roof 365 days a year."

Monthly payments that Aniruddhsinh Chanda receives for leasing his rooftop for solar panels fully offsets his energy costs.

Azure's panels provide a clean and reliable source of electricity for 10,000 people in Gandhinagar, reducing the city's annual emissions by 7,000 metric tons—the equivalent of not burning nearly 8 million pounds of coal. More broadly, Azure Power's overall solar portfolio, of 1 GW, provides electricity to 1.3 million households across India. Its Gujarati program has been replicated across and beyond India. The Maldives, Sri Lanka, Bangladesh, and Thailand are all currently exploring ways to duplicate the rooftop solar model. The World Bank has supported the growth of this sector through a $625 million credit line to the State Bank of India exclusively for rooftop solar projects.

Numbers back up these diverse and wide-reaching efforts to bring solar power to the region. According to a new IFC report, South Asia's climate-smart investment potential is estimated to reach $2.5 trillion by 2030.

Nimesh Prajapati, a senior engineer at Azure, backs up these efforts, too, because of the results he sees while inspecting rooftop panels across Gujarat. From the perch of a 10-story building on a recent inspection, he glanced toward a coal-fired power plant on the horizon. "This is what India was," says Prajapati, pointing toward the plumes of steam rising from the coal stacks. "This is what we're moving toward," he says, looking down at the blue sea of panels around him, iridescent in the morning light.

About CACCI:

Founded in 1966, the Confederation of Asia-Pacific Chambers of Commerce and Industry (CACCI) is a regional non-governmental association principally composed of the national chambers or associations of commerce and industry in Asia and the Western Pacific. Its current membership of 29 countries and independent economies cuts across national boundaries to link businessmen and promote economic growth throughout the Asia-Pacific region. CACCI holds Consultative Status in the Roster Category of United Nations' Economic and Social Council (ECOSOC)

Published by: The Secretariat, Confederation of Asia-Pacific Chambers of Commerce and Industry

Ernest Lin - Director General; Amador Honrado Jr. - Editor; Mig Moreno - Assistant Editor

7F-2, No. 760, section 4, Bade road, Songshan district, Taipei 10567, Taiwan; Tel. (886 2) 2760-1139, Fax (886 2) 2760-7569

Email: cacci@cacci.biz Website: www.cacci.biz