

EDC COMMUNIQUE



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Editorial

Municipal Solid Waste

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AN EDC MEMBER ORGANIZATION

Waste management has become a major problem in Nepal of late, be it in the megacity like Kathmandu valley or at the highest peak Mt Everest. Though there are simple and proven method of waste management, such as 3R (Reduce, Reuse, Recycle) principle, we are somehow still lagging behind. Segregation of waste at source, a basic foundation for waste management, is hardly being implemented anywhere with rare exceptions. Furthermore, most of the municipalities are not even collecting all the wastes that are being generated. A survey conducted by WindPower Nepal in 2017 & 2018

shows that municipalities such as Dhulikhel collects about 9 tons of waste daily, Gorkha-7.5 tons, Hetauda- 25 tons, Damak- 14 tons and Bhadrapur-12 tons of waste daily. The collection efficiency of these municipalities was just 55-60% of the total waste generated and even these wastes were not managed properly. Some municipalities practiced open dumping on the city outskirts or nearby riverbanks. At the dumpsite, informal waste pickers scavenge for recyclable and reusable materials and help to reduce about 20% - 25% of the waste and then burn the residual to reduce the volume. This practice of unregulated combustion emits harmful toxic gases posing numerous public and environmental health issues. Besides, the leachate generated from the open dumping site contaminates soil and water resources.

Fortunately, most of the municipal waste in Nepal consist of organic waste, more than 50% of the total waste, which can be converted into biogas and compost fertilizer- both valuable commodities for our country. However, processing huge amount of municipal waste require sophisticated technology with big capital. Economic analysis of ongoing large-scale biogas projects in Nepal shows that these projects are only viable with upfront capital subsidy. A proper understanding of the cost against benefits is

a must prior to the project implementation. In general, a biogas plant with a capacity to process one ton of organic waste daily would cost around Rs 50 lakhs to build, and the cost goes down with increase in the scales of production. The project with at least 40 tonnes per day (TPD) capacity can become commercially viable, due to increased revenue from high gas yield and fertilizer.

However, not all the municipalities generate such huge amount of organic waste daily. In such a situation, a collaborative approach among different adjacent municipalities is essential, to synergize the efforts and resources, thus making the biogas plant feasible. The Kankai-Birta-Arjun municipal biogas plant is one of the examples of collaborative approach in managing the organic waste wherein Kankai municipality in coordination with Birtamod and Arjundhara Municipalities is building a 40 TPD biogas plant using 16 TPD of organic waste collectively from these municipalities, along with other substrates.

Municipal solid waste management service is often viewed as the concern of local authorities only; however, it is a daunting task to efficiently perform all the activities by themselves. Thus, achieving sustainable waste management requires effort from both private and public sector under Public-Private

Partnerships (PPPs) model. The local authority should focus on overall planning and management, changing its role from “day to day service provider” to “service enabler”. Many municipalities have involved private sector in various aspects of solid waste management ranging from waste collection, transportation and disposal to complete package of waste management. While PPPs represents a smart action for waste management, it is not likely to succeed if the government fails to provide a conducive environment.

Large-scale biogas is a fledgling technology in the context of Nepal. Installation of biogas plant will make use of methane generated from the biodegradable organic waste, thus, reducing the GHG emissions in the atmosphere and is expected to replace firewood and fossil fuels (LPG). It is estimated that a ton of organic fraction of municipal solid waste generates about 56 m³ of biogas (25 kg of bio-CNG), which is equivalent to 25 Kg of LPG, 33.6 kg of kerosene and 196 kg of firewood. Moreover, converting one ton of organic municipal waste to bio-CNG will annually substitute NPR 1, 24,614 of Nepal Oil Corporation (NOC) loss in addition to replacement of imported fossil fuel costs

as per present loss incurred per cylinder of LPG by NOC being NPR 200. On the other hand, 208 kg/day of compost fertilizer is generated from a ton of MSW along with biogas. Nepal experiences fertilizer supply deficit almost every year. In the year 2016/17, the actual supply of fertilizer was 3,24,977MT wherein the potential demand was about 7,00,000MT. The supply of organic fertilizer will largely benefit farmer in a country like Nepal where more than 66% of its people are directly involved in farming and 26% of its land is being used for agriculture. Thus, implementation of a biogas project to treat municipal waste would encourage sustainable industrial practices to combat climate change and increased agricultural productivity.

Unmanaged waste have adverse impact on public health and economy. Hence, government has to prioritize it, moreover with the promulgation of new constitution, the onus is now on the local government. Each municipality should look at waste management as a business opportunity and use sustainable mechanisms such as waste-to-energy to manage municipal solid waste.



EDC ACTIVITIES

July, 2019

Feedback on Electricity Regulatory Commission (ERC) Directive (draft)

Upon the request letter received from ERC, EDC submitted a letter of feedback on ERC's draft directive. The letter covered the conflicting directives between ERC and DOED. Further, the application requirement for captive projects and IPP were found to be same for Clause 6 which is possible in grid connection case only hence, relevant recommendations were provided based on the nature of the project. Also, the license provision should take into a reasonable consideration on the size and nature of the project so that there is no need of license for every project but the developer.

15th July, 2019

EDC Welcomes its New Member



Nyadi Hydropower Limited was established to develop Nyadi Hydropower Project in the consortium of Butwal Power Company and Lamjung Electricity Development Company Limited. It is a run-of-river type project, located in Lamjung District of Western Development Region of Nepal. The project has an installed capacity of 30 MW and will generate 168.5 GWh of energy annually.

EDC ACTIVITIES

TenderNotice.com.np					
Tender, Bids and Notices related to Hydro and Energy segments in Nepal					
Month: January 2019					
S.N.	Notice Publisher	Description	Published Date	Notice Category	Product Service
1	Tamakoshi Jalvidyut Company Limited, Tamakoshi V Hydroelectric Project, Kathmandu	Opening of Financial Proposal	7/26/2019	Hydro Power/ Energy	Other Product/ Services
2	Sanjen Jalavidyut Company Limited, Kathmandu	Standing List for Supply and Delivery of Office Accessories and Other Services	7/23/2019	Hydro Power/ Energy	Enlistment- Multiple Category
3	Remit Hydro Limited, Babarmahal, Kathmandu	Standing List for Supply and Delivery of Office Accessories and Other Services	7/23/2019	Hydro Power/ Energy	Enlistment- Multiple Category
4	Chilime Hydropower Company Limited, Kathmandu	Standing List for Supply and Delivery of Office Accessories and Other Services	7/23/2019	Hydro Power/ Energy	Enlistment- Multiple Category
5	Sanima Middle Tamor Hydropower Ltd., Kathmandu	Supply of Hot Rolled Carbon Steel Plate	7/22/2019	Hydro Power/ Energy	Other Product/ Services
6	Upper Solu Hydroelectric Company Limited, Hattisar, Kathmandu	Supply and Installation of Electro-Mechanical Works	7/22/2019	Hydro Power/ Energy	Electronics/ Electric Utilities
7	Remit Hydro Limited, Babarmahal, Kathmandu	Opening of Financial Proposal	7/21/2019	Hydro Power/ Energy	Other Product/ Services
8	Api Power Company Limited, Thapathali, Kathmandu	Construction of Hydro Power Project	7/18/2019	Hydro Power/ Energy	Construction/ Building
9	Upper Tamakoshi Hydropower Limited, Gyaneshwor, Kathmandu	Construction of Tunnels and Connecting Roads	7/16/2019	Hydro Power/ Energy	Construction/ Building
10	Jagdulla Hydropower Company Limited, Buddhanagar, Kathmandu	घर भाडामा लिने सम्बन्धी	7/15/2019	Hydro Power/ Energy	Real Estate
11	Suri Khola Hydropower Pvt. Ltd., Tripureshor, Kathmandu	Construction of Transmission Line	7/14/2019	Hydro Power/ Energy	Electronics/ Electric Utilities
12	Hydroelectricity Investment and Development Company Limited, Kathmandu	Standing List for Supply and Delivery of Office Accessories and Other Services	7/12/2019	Hydro Power/ Energy	Enlistment- Multiple Category
13	Api Power Company Limited, Thapathali, Kathmandu	Survey, Design, Fabrication, Supply, Installation, Commissioning and Testing of Transmission Line	7/12/2019	Hydro Power/ Energy	Electronics/ Electric Utilities
14	Raghuganga Hydropower Limited, Myagdi	बोलपत्र स्वीकृत गर्ने आशय	7/11/2019	Hydro Power/ Energy	Other Product/ Services
15	Api Power Company Limited, Thapathali, Kathmandu	Fabrication, Supply, Installation, Commissioning and Testing of Hydro-Mechanical Works of Hydro Power Project	7/4/2019	Hydro Power/ Energy	Other Product/ Services
16	Chilime Hydropower Company Limited, Kathmandu	Insurance Services	7/3/2019	Hydro Power/ Energy	Banking/ Finance /Insurance
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MEMBER UPDATES



A contract has been awarded to **Cosmic Electrical Engineering Associates Pvt. Ltd.** for survey design, construction, testing & commissioning of 132 kV Transmission Line project for Dordi-1 Hydroelectric Project. The project is intended to complete in one year.



Gham Power has recently introduced small sized solar water pumps for land sizes of 0.1-0.2 hectare. These small sized solar water pumps are foldable and convenient to carry, minimizing chances of theft. To reach more farmers, we are planning to leverage partnerships with locally based institutions. These small pumps are powered by 2

solar panels of 80 watt each. The water output from these small pumps average at 10,000 litre per day. We have also innovated a carriage bag for these smaller pumps. Farmers can now fold the solar panels and fit them into a small bag and transport them to their homes, minimizing chances of theft.



NEPAL'S PERSPECTIVE

3rd July, 2019

AEPC MULLS 2MW WIND ENERGY PROJECT IN KAILALI

In a bid to ensure sustainable and clean energy, the Alternative Energy Promotion Centre (AEPC) is gearing up to set up wind turbines that will generate two megawatts of energy in Kailali district.

As per AEPC, which is a unit under Ministry of Energy, Water Resources and Irrigation (MoEWRI), studies are being conducted to determine the possibility of carrying out the project and a detailed feasibility study will be carried out soon. “We plan to complete the detailed feasibility and detailed project report along with starting the project construction in fiscal year 2019-20,” said Madhusudhan Adhikari, executive director of AEPC.

The centre has allocated a budget of Rs 100 million for the project for the upcoming fiscal.

As per Adhikari, Asian Development Bank (ADB) has already conducted a feasibility study and said the project is possible.

“ADB, in its report, has said the capacity of the project (2MW) can be expanded, and we will soon fix the exact capacity of the project,” Adhikari said, adding they plan to instal wind turbines with 500 kilowatt capacity in each pole. However, if the MoEWRI approves AEPC’s proposal, wind turbines of one megawatt capacity will be installed in each pole. As per the initial study, the cost of generating one megawatt from wind turbine will hover around Rs 130 million, which is cheaper compared to hydropower energy. At present, hydropower generation cost stands at Rs 200 million to Rs 250 million per megawatt on average.

Puskar Manandhar, energy officer at ADB, said the bank will assist AEPC to take the project forward. “We have already completed the basic wind measurement in the project site on behalf of the government,” he said, adding that access to clean, reliable and affordable energy will help create

opportunities to boost local income, which will also open the door for commercial activities. AEPC and the local government of Kailali district have already reached an agreement to install the wind turbines at the project site.

Mahadev Bajgain, mayor of Lamki Chuha

municipality, Kailali, said they will assist in the land acquisition and other necessary processes for the project. “Around the project site, we plan to build a park and introduce tourist-friendly activities like fishing to attract visitors.”

31st July, 2019

NEPALIS ARE CONSUMING 38 PERCENT MORE ELECTRICITY THAN TWO YEARS AGO

Two years ago, a Nepali household used to consume 117 kilowatt-hours of electricity every year. Now, each household utilises 245 kilowatt-hours per year, 38 percent more than in the fiscal year 2017-18, a recent study shows.

The surge in electricity demand is largely driven by a reliable supply of power and increased use of gadgets and electrical appliances indicating a growth in the purchasing power of Nepali households.

“Earlier, demand for electricity was concentrated during peak hours, but with a regular and reliable supply, the power utility now witnesses consumption or ‘flat demand’ throughout the day,”

said Prabal Adhikari, spokesperson for the Nepal Electricity Authority.

According to Adhikari, consumer behavior has changed as households and individuals possess many gadgets which they now utilise more and charge as per their convenience.

Also, energy officials were able to undertake electricity network expansion and upgrading projects connecting 420,000 new households to the grid in the fiscal year 2018-19. This, coupled with growing supply of electricity, also led to an increase in energy consumption.

However, in the last fiscal year, the country fell short by a wide margin in terms of electricity

generation. At the beginning of the fiscal year 2018-19, Nepal's total electricity output stood at 1,073 megawatts, and the government had targeted adding 760 megawatts to the grid over the year. However, only 10 percent of the expected increase was added to the national grid by the end of the fiscal year.

According to the Energy Ministry, the construction of hydel plants with a combined capacity of 195 megawatts concluded in 2018-19. However, only 78 megawatts was fed into the national grid as the schemes which can churn out 117 megawatts are in the testing and commissioning phase.

Nonetheless, the supply of energy has grown over the years, and in line with the increasing supply, the ministry has aimed to increase the per capita electricity consumption to 700 kilowatt-hours per year by the fiscal year 2021-22.

Also, in the current fiscal year alone, the Nepal Electricity Authority expects to connect around 43 hydropower projects with a combined capacity of 1,150 megawatts to the national grid, doubling the country's current total electricity output.

A mere four years ago, the power utility used to issue notices requesting consumers to save as much energy as they can and consume less during

the peak hours at a time when the country witnessed power outages that lasted on average 16 hours a day. Now, the state-owned power utility is planning to run advertisements encouraging more usage of electricity.



“We have been carrying out internal discussions on ways to increase electricity consumption,” said Adhikari. “We will promote the use of electric vehicles by building supporting infrastructure and also encourage Nepali households to buy more electrical appliances for cooking and other kitchen requirements.”

Also, the government appropriated Rs. 3 billion to Sajha Yatayat recently to procure electric buses for public transportation, hinting at its intention to promote electricity consumption.

The country has witnessed a significant expansion of the power network in the last fiscal year as officials were able to add more than 600 kilometres of power lines and 30 new distribution

substations to the country's domestic and cross border electricity transmission network.

Apart from increasing domestic consumption, stakeholders have been urging the government to secure new markets for electricity to avert future spillage of power, in view of the surplus energy the country is poised to produce soon.

In May, office bearers of the Independent Power Producers' Association of Nepal had urged the government to take measures to ease power trade between Nepal, India and Bangladesh to resolve the market access issues private hydroelectricity producers are currently facing.

As per the latest Energy Progress Report, electricity has reached 95.5 percent of Nepal's population with 99 percent of Nepal's urban population enjoying access to electricity, and 95 percent of rural people receiving power through a mix of grid and off-grid systems.

"Only 1.3 million out of the 29 million

Nepalis remain to be connected to an electricity supply. In 2010, only 65 percent of the population had an electricity connection," states the report.

Also, Nepal's access to electricity increased at a rate of 4.3 percent, which is higher than the global average of 0.8 percent.. Officials who are buoyed by the prospect say that Nepal can achieve 100 percent access to electricity within a few years, well ahead of the target year 2030 set by Sustainable Development Goal 7. Currently, only eight districts—Bajura, Humla, Jumla, Kalikot, Mugu, Dolpa, Rukum (East) and Solukhumbu—remain to be connected to the national grid.

As per the Nepal Electricity Authority's statistics, electricity demand as on Tuesday stood at 1,061 megawatts, state-owned power plants churned out 420 megawatts, private hydel schemes generated 434 megawatts, imports from India stood at 207 megawatts, and the power utility exported 50 megawatts.



GLOBAL PERSPECTIVES

23rd July, 2019

JAPAN'S MARUBENI BACKS BLOCKCHAIN CROWDSOURCING PLATFORM FOR SOLAR, WIND FARMS

Japan's Marubeni Corp has agreed to back a blockchain power purchasing platform, WePower, that is looking to establish itself in Australia to tap rapid growth in solar and wind power, the two firms said on Tuesday. The Japanese trading house has issued an unspecified loan to Lithuania-based WePower, convertible into shares. A Marubeni spokeswoman in Tokyo told Reuters that the size of the stake Marubeni will end up with after converting the loan has not been determined. WePower has designed a blockchain platform that it says makes it easy for small- and medium-sized businesses to buy power from wind and solar project developers, offering standardised, digital power purchase agreements to help underwrite new projects.

Typically, power purchase agreements (PPAs) are negotiated one-to-one between a developer and an industrial buyer. But negotiations

are usually complex and lengthy, requiring contract commitments of at least five to 10 years. Australia is already running out of major power consumers to commit to large supplies of power from new projects. But tens of billions of dollars worth of power generation projects are on the drawing board, projects which will need to turn to smaller commercial and industrial businesses to line up enough PPAs to back a project.

WePower offers a standard contract, shorter timeframes and flexibility for buyers to on-sell their offtake agreements if they no longer need the power. The firm raised \$40 million in one day in February 2018 in an initial coin offering. "The only discussion point then, through the platform, is the price," said WePower Chief Executive and co-founder Nikolaj Martynuik said in a statement. "That takes a lot of the complexity out."

3rd July, 2019

TESLA ANNOUNCES A NEW, UTILITY-SCALE ENERGY STORAGE PRODUCT CALLED MEGAPACK

Tesla announced a *utility*-scale energy storage solution, to be called Megapack. Modeled after the giant battery system it built as part of the Hornsdale wind farm in South Australia, it can directly connect to renewable energy sources providing a constant source of power when the sun sets or the wind stops.

This system, called Powerpack, stored power generated by the wind farm and then delivered the electricity to the grid during peak hours. The facility saved nearly \$40 million in its first year.

Tesla claims it can deploy a one gigawatt-hour plant over three acres in under three months, which is about four times faster than a comparable fossil fuel plant. This will be the third and largest energy storage system offered by Tesla.

It also offer a residential-scale system called Powerwall and the commercial-scale version Powerpack. Tesla claims that Megapack will offer 60 percent greater energy density compared to its existing Powerpack system.

This is the latest effort by the company to retool and grow its energy storage business, which is



a smaller revenue driver than sales of its electric vehicles. Of the \$6.4 billion in total revenue posted in the second quarter, just \$368 million was from Tesla's solar and energy storage product business.

Powerwalls are now installed at more than 50,000 sites and according to the company's second-quarter earnings report, it deployed a record 415 megawatt-hours of energy storage products in Q2, an 81% increase from the previous quarter.

It's a significant step forward company most known for the production of electric cars and that certainly benefits from its knowledge of battery technology. Back in 2006, Musk described Tesla's "overarching purpose" is "to help expedite the move from a mine-and-burn hydrocarbon economy

towards a solar electric economy, which I believe to be the primary, but not exclusive, sustainable solution.”

The Megapack could provide a much-needed boost to the company if it can convince utilities companies to opt for this solution rather than the more common natural gas peaker plants. These are used when a local utility grid can't provide enough power to meet peak demand, an occurrence that has become more common as temperatures and populations rise.

So far, it seems to be successful as Tesla's Megapack will provide 182.5 MW of the upcoming 567 MW Moss Landing energy storage project in California with PG&E.

Tesla hopes to be the sustainable alternative. And in states like California, which have ambitious emissions targets, Tesla could gain some ground. Instead of using a natural gas peaker plant, utilities

could use the Megapack to store excess solar or wind energy to support the grid's peak loads.

In fact, only yesterday, the Southern Californian city of Glendale announced it was dropping a gas peaker in favor of clean alternatives.

As *GreenTechMedia* reported, the city council voted in April 2018 to pause development on the 262 megawatt repowering of the Grayson Power Plant and examine clean energy alternatives. Now, the municipal utility has completed an examination of 34 clean energy proposals and selected a diverse portfolio it says will meet reliability needs and save ratepayers \$125 million.

The final portfolio, proposed in Glendale Water & Power's new integrated resource plan, would repower the Grayson Power Plant with a 75 megawatt/ 300 megawatt-hour Tesla battery installation and up to 93 megawatts of fast-ramping Wartsila engines.

MEMBERS





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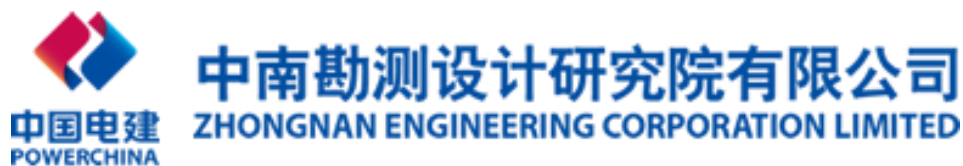




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Energy Development Council (EDC) is a non-profit umbrella organisation of the entire energy sector of Nepal established to ensure every Nepali has access to energy and energy security by promoting favourable policies and investments. EDC consists of Energy Developers, Energy Associations, Energy Consumers, Energy Financiers and other funds, Consumer Institutions, Energy Contractors from both private and government sectors involved in hydropower, solar, wind and other renewables, generating more than 80 percent of the nation's total electricity.



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