

EDC COMMUNIQUE



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Is development process on track ?

DR. ATMA RAM GHIMIRE
MANAGING DIRECTOR
LIBERTY ENERGY COMPANY LTD
AN EDC MEMBER ORGANIZATION

It is understood that the development is process, it cannot have overnight expectation and result. But important question that often we lack is ‘has the process been in track for development’? This question becomes relevant for all sectors/segments of an economy. In Nepal, energy sector has compelled us to rethink our processes, policies and actions so as to review challenges that we have been unable to remove, actions that we have been failed to take and initiate/improve new course of actions so that the sector is development friendly, state machinery and private sector go hand in hand especially

hydropower generation, which is one of the most effective sector to enhance lives of people of Nepal.

Even with existing situation, gradual progress has been made with private sector generation of hydro-electricity, surpassing by few more megawatts than Nepal electricity Authority, monopoly government body with some regulatory rights along with generation and distribution of electricity. In short span of 27 years, when late Shailaja Acharya allowed private sector to develop power generation up to five megawatt new era had started. There are numerous challenges but ‘hope’ for better condition is the only nerve in the brain of hydro-generating entrepreneurs that drives them in

this sector.

Current positivity remains power purchase agreement in take or pay condition, return of VAT, income tax concession, implementation of announced “Urjaa Bikas Niti” and expectation of energy regulatory commission with facilitative and regulatory rights. But the list is very short in comparison to existing challenges. The first challenges is from financial aspect. Equity management, bank financing, credit rating, approval of ‘Dhitopatra’ Board, for initial public offering and issues in capital market management are major financial challenges faced by developers. Each one of them has many branches and sub-branches of challenges mixed with delays and indecisions.

The most important challenge remains with the government. Government delivers the license to entrepreneurs when applied, with their fees, should not it have some responsibility to make sure that happens? Why then other government body, NEA, says take and pay, means no further action as bank will not finance such project. If one government department has approved work why environment, land reform and forest ministries need different from local to ministry and sometime cabinet level approval, instead of one window approval system? It



would also lessen prevailing corruption practices, when citizen need to contact officials personally to get approvals. NEA despite being government owned has its own challenges to be profit earning institution by managing all sources of energy it deals with but major being hydropower. It's inability to provide transmission line in time has wasted generated electricity and huge financial losses to developers. Secondly, it's 'designed to be flexible/fixed policy' on 'take or pay' and 'take and pay' has been vulnerable and expensive for developers.

Local social problem and challenges are other important hurdle. The much higher expectations from public from one single project, when state machinery has not been able to do it for years is major concern. They want schools, teachers, hospital, doctors, drinking water, roads to every

ward and employment of all unemployed locals (just for supervisory jobs only) from one hydropower project irrelevant of its size one megawatt or hundred. Then there are local and area dons who need their "hapta". Despite these development of hydropower is appreciative.

It would be injustice to this write up, if developer's attitude is not stated. Some developers want ownership without investment, some try to double investment before generation, some try to influence policy / decisions with connection (political or financial). But lately there have been genuine investors and they really need to focus on effectively working with like-minded association to solve existing challenges and cooperate with government and related organizations.



EDC ACTIVITIES



10th January, 2019

EDC delegation visited Energy Secretary

E_{DC} delegation led by Mr. Kushal Gurung, Head of Executive Committee visited Energy Secretary Mr. Dinesh Kumar Ghimire to extend felicitation and to update about EDC's activities and plans.



11th January, 2019

EDC conducted its 4th AGM

E_{DC} successfully conducted its 4th Annual General Meeting at Hotel Ambassador, Lazimpat. Special thanks to our board members, executive committee members and all our members for their presence and active participation in the meeting.



EDC ACTIVITIES

22nd January, 2019

USAID NHDP invited EDC for a workshop

Members of EDC were invited to attend a workshop on "Disaster Risk Reduction and Dam Safety" organized by NHDP and HATCH. Representative from IDS Energy Pvt. Ltd., Reliable Hydropower Pvt. Ltd., Gorkha Hydro and Engineering Pvt. Ltd. and Arun Valley Hydropower attended workshop. The workshop aimed to expand participants' knowledge and understanding of Disaster Risk Reduction and Dam Safety.

30th January, 2019

EDC invited by High Commission of Canada for Nepal-Canada Sustainable Hydro Workshop

Ms. Itnuma Subba, CEO of EDC attended the program which was interactive and highly informative of Canadians interest and engagement in Nepal. EDC looks forward for collaborative meetings in the future.



EDC ACTIVITIES

EDC welcome its new member



Pashupati Energy Development Company (P) Ltd, was established on 6th December, 2001. The company is the promoter of the Khani Khola (2 MW) and Tungun-Thosne Khola (4.3 MW) Hydropower Projects in cascade system in Lalitpur District, promoter of Clean Energy Development Bank in the public sector with foreign joint venture investment, venture supported by USAID, promoter of Maya Khola Hydropower Company Ltd. implementing the 14.9 MW Maya Hydropower Project in Sankhuwasabha District.



21st January, 2019

Multiconsult invites EDC at their Bangkok office opening

It was a pleasant evening to meet the Multiconsult team and other guests in their Bangkok Office opening. Ideas about the possible cooperation in hydropower sector was exchanged.

EDC ACTIVITIES

TenderNotice.com.np

Tender, Bids and Notices related to Hydro and Energy segments in Nepal

Month: January 2019

S.N o.	Notice Publisher	Description	Published Date	Notice Category	Product Service
1	Chilime Hydropower Company Limited	घर भाडामा चाहियो	1/28/2019	Proposal	Real Estate
2	Nalgad Hydropower Company Limited	Construction of Compound Wall and Entrance Gate	1/28/2019	Tender	Construction/ Building
3	Raghuganga Hydropower Limited, Beni, Myagdi	Supply and Delivery of Laptops	1/28/2019	Tender	Electronics/ Electric Utilities
4	Tamakoshi Jalavidyut Company Limited, Kathmandu	Amendment Notice	1/24/2019	Amendment Notice	Other Product/ Services
5	Power Transmission Company Nepal Ltd., Sanepa, Lalitpur	Construction of School Building	1/24/2019	Quotation	Construction/ Building
6	Suri Khola Hydropower Pvt. Ltd., Tripureshor, Kathmandu	Hydro-Mechanical Works	1/21/2019	Tender	Other Product/ Services
7	Tamakoshi Jalavidyut Company Limited, Kathmandu	Consulting Services for Project Preparation and Related Expenses of Tamakoshi V Hydroelectric Project	1/17/2019	Notice	Consulting
8	Betan Karnali Sanchayakarta Hydro Power Company Limited,	Procurement of Vehicles	1/14/2019	Tender	Automotive / Vehicles
9	Jagdulla Hydropower Company Limited, Buddhanagar, Kathmandu	Procurement of Double Cab Pickup	1/10/2019	Tender	Automotive / Vehicles
10	Raghuganga Hydropower Limited, Beni, Myagdi	Supply and Delivery of Laptops	1/9/2019	Tender	Electronics/ Electric Utilities
11	Raghuganga Hydropower Limited	Construction Completion of Existing Buildings	1/6/2019	Tender	Construction/ Building
12	Trishuli Hydropower Company Limited, Vansthali, Kathmandu	बोलपत्र स्वीकृत गर्ने आशय	1/3/2019	Award Notice	Other Product/ Services
13	Nepal Electricity Authority, Medium Generation Operation and Maintenance Department, Trishuli Hydroelectric Center, Nuwakot	Supply, Delivery and Installation of Air Conditioners (AC)	1/3/2019	Tender	Electronics/ Electric Utilities
14	Trishuli Hydropower Company Limited, Vansthali, Kathmandu	Supply, Delivery and Installation of Air Conditioners	1/2/2019	Tender	Electronics/ Electric Utilities
15	Trishuli Hydropower Company Limited, Vansthali, Kathmandu	Supply, Delivery and Installation of Air Conditioners	1/1/2019	Tender	Electronics/ Electric Utilities

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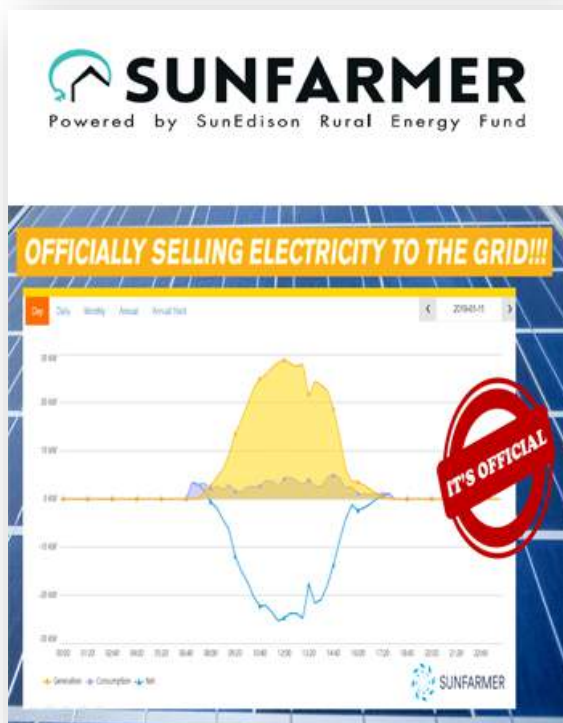
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MEMBER UPDATES



Saral Urja Nepal team has signed the power purchase agreement (PPA) for 50 kW solar roof-top with NMB Bank Limited. Under this 15 year PPA, Saral Urja Nepal will install and own the solar roof-top at NMB Bank, and sell the solar electricity to NMB at a unit price lower than what NMB currently pays the utility (NEA). This is an entirely opex model where NMB has no upfront investment.



SunFarmer is the only Nepalese organization selected as a finalist for the 2019 Ashden Award for sustainability in the category of Sustainable Energy and Health.

SunFarmer announces successful net-metering. Now, the company is officially selling electricity to the grid.



MEMBER UPDATES

NEUPANE LAW ASSOCIATES
2019 RANKING AND COMMENTARIES

TOP RANKED
Chambers
ASIA PACIFIC
2019
Neupane Law Associates

"The firm is respected for its business-focused and timely advice...The team is responsive, keeps to deadlines and takes a commercial approach to issues. They are one of the best firms to deal with...They have been excellent and professional at all times, their advice has been very clear and concise, and they have addressed any questions promptly."

Chambers Asia-Pacific 2019
Band 1 for Corporate/Commercial

The Legal 500
ASIA-PACIFIC
TOP TIER
2019

"A thriving transactional practice and is also skilled in dispute resolution. The team has extensive expertise in cross-border banking and finance work and handles complex and high-value commercial, M&A as well as project finance mandates."

The Legal 500 Asia-Pacific 2019
Tier 1: Leading Firm

IFLR
1000
RECOMMENDED
FIRM
2019

"Thorough work, good written work, very fast and detailed responses. Ability to work in international environment with lawyers from multiple jurisdictions. Highly professional."

IFLR1000 Client Feedback 2019
Active in Financial and Corporate

Neupane Law Associates has received the highest possible rankings for 2019 from Chambers & Partners, The Legal 500 and IFLR 1000 .



NEPAL'S PERSPECTIVES

15th January, 2019

BUSINESS MODELS KEY TO SUCCESSFUL MICROGRIDS IN NEPAL

Currently, only 11% of Nepal's rural population of about 23 million people has access to electricity. It's prohibitively expensive to string power lines across the country's rugged, precipitously steep mountainsides. As a result, many people who live in remote villages still subsist on kerosene and batteries.

But, pioneering Nepalese renewable energy developer Gham Power has spent almost a decade tackling the electricity challenge in Nepal, and they have an impressive track record. Since its founding in 2009, the Kathmandu-based company has installed over 2,000 solar PV and hybrid renewable energy systems with a total capacity of over 2.5 MW, using HOMER software to model many of their systems. Gham Power has some important lessons to share that could benefit any



organization working on energy access issues.

Gham Power has learned that in order to make community microgrids profitable and scale up their development, energy developers must find a way to finance and support successful local businesses that need electricity. When business users provide ongoing financial support for microgrids, householders with smaller power requirements can benefit from the infrastructure of a sustained electricity supply.

That finding has led Gham Power to develop new ways of planning and financing microgrids in Nepal. The company's General Manager Anjal Niraula says "The main difficulty of implementing mini-grid projects is not technical, but defining a business model around its implementation: how to fund a project and make a viable business out of it." Niraula elaborated on this idea for his presentation at the 2018 HOMER Energy International Microgrid conference on the vital role of "productive end use" in microgrids.



Gham Power's Evolution in the Microgrid Market

Explaining the history of the company's impressive growth over the past decade, Niraula says it has been driven by a shift from hydropower

to solar photovoltaics that was prompted by a combination of maintenance issues, climate change, and a natural disaster. Small head hydro turbines were widely deployed in Nepal, but maintaining the turbines adequately was challenging for small, rural communities. The devastating earthquakes of 2015 destroyed many of the nation's critical hydro systems. In addition, drought has been increasing in Nepal, and hydro doesn't generate much electricity during drought periods. As a result, the country is moving towards solar PV as a more dependable renewable resource.

Gham Power began installing small solar systems in 2010, shortly after a massive energy crisis in Nepal. According to Niraula, there were daily power cuts in 2007 and 2008. "We were not farsighted enough to anticipate growth in energy demand," he says. When Gham Power began servicing larger commercial customers in 2012, Niraula says he realized "The large institutions got it – hospitals, banks. They used diesel generators regularly. They made the connection and saw how much money they would save immediately with solar. They became our best customers." That was when Gham Power began to scale and

expand its business to include microgrids.

Now the company provides a variety of distributed energy developments, including water pumps for agriculture, installations for commercial and industrial customers, and micorgrids for remote communities without main grid access.

Most importantly, Gham Power has learned important lessons about how to reduce financial risk and improve the prospects for economic sustainability of its distributed energy projects.

Pathways to successful microgrids

As it grew, Gham Power found itself getting deeply involved – not only in energy – but in analyzing community income streams that could sustain hybrid renewable energy projects, and microgrids in particular. Niraula described Gham Power in his 2018 HOMER conference presentation as a “social enterprise with solar-based solutions.” He maintains that it is crucial to determine “productive end uses” for village electricity, then bundle those projects to create attractive investment opportunities. “Everybody was talking about the ABC model for microgrids (anchor, business,

consumer). We got these ideas from other parts of the world, like the Philippines, and we knew ‘this is the right approach.’” But, Gham Power took the ABC model one step further, realizing that the “anchor” alone wasn’t enough. “The proportion of energy consumed by businesses overall is more important for the future of the microgrid than one anchor tenant,” says Niraula, “and we realized we need financial diversity.”

Business uses of microgrids in Nepal can include cell phone towers such as those owned by Gham Power partner NCELL (Nepal’s first private cell phone company), irrigation pumps for profitable farms, grinding mills for grain, refrigeration, and tourism. Diverse revenue streams can support a microgrid that in turn provides electricity to village households for lighting, cell phone charging, refrigeration and potentially, new businesses, and social services.”

Gham Power has also learned to include expert maintenance and streamlined payment processes. “Very early we determined that people were unable to maintain their systems adequately,” says Niraula. “We have been using lead acid batteries all along, and continue to do so because we

can get them very cheaply in India. But they are not easy to maintain. Now Gham Power contracts with communities to provide operations and maintenance services for a full 10 years. Only then do we turn the microgrid over to community ownership. In the beginning though, we designed our systems to account for worst case usage. We also used to give our customers FREE maintenance for the first two years just so the systems wouldn't fail."

Finally, efficient payment methods are key to the financial success of community microgrids.

moving beyond "one-off" projects. "We want to be able to scale up and replicate."

Gham Power explores creative funding mechanisms

Aside from its energy expertise, Gham Power has invested considerable efforts in fundraising, identifying new sources of revenue to finance its distributed energy projects. The company wanted to figure out how to reduce risk by mixing



Gham Power – the first “pay-as-you-go” renewable energy company in Nepal – uses smart meters with mobile prepayment in all of its projects, ensuring steady income and discouraging energy theft.

Looking towards the future, says Niraula, is

capital from outside investors into its projects. Gham Power's internet-savvy fundraising staff wasted no time harnessing digital strategies to attract private contributions from the international community. Their target audience is the mountain-loving

tourists who have visited Nepal to trek on its trails and climb its magnificent peaks.

Fans of Nepal can give back to the country via a website called the “[Off Grid Bazaar](#).” The Off Grid Bazaar is an “interactive online project development platform that helps small farmers in Nepal get access to reliable and cost-effective irrigation solutions by blending debt and grants.” Making the pitch for solar pumps, Gham Power says “Studies suggest that irrigation increases the net

income of small farmers by 30% to 100%. Yet, over 70% of agricultural land in Nepal is unirrigated.”

With over 80 projects planned, Off-grid Bazaar has already raised \$172,000 of a \$209,000 goal, and makes it easy for website visitors to give donations.

While fundraising from tourists may be an unfamiliar dimension of renewable energy development, Gham Power’s solid work in microgrid finance & analysis will be relevant to energy professionals in many parts of the world.

Learn more about Gham Power at <http://ghampower.com/>

Visit the Off Grid Bazaar to make a donation to an agricultural project in Nepal: <https://offgridbazaar.com/>

18th January, 2019

NEPAL WANTS MORE HYBRID WIND-SOLAR AND NEEDS INFORMATION ON PRICES

Through three tenders, Nepal's Alternative Energy Promotion Center is increasing efforts to bring power to rural communities, to increase the share of renewables in a nation still dominated by hydropower.

Nepal's Alternative Energy Promotion Center (AEPC) has launched three tenders to resume its demanding path towards renewable energy development, and to address chronic energy shortages, especially in rural areas.

In a first tender, the AEPC announced it is seeking consultants for a feasibility study for four hybrid wind/solar projects planned for the municipalities of Tila, in Jumla district; Tripurasundari in Dolpa; Rajpur in Dang Deokhuri district; and Soru, in Mugu. Consultants have until Thursday to submit proposals.

The projects will be developed on the model of the hybrid wind/solar plant the AEPC has implemented in rural Nepal with the support of the Asian Development Bank. The plant, commissioned



in December 2017, is powering 83 rural households in Hariharpur Gadhi village, in the Sindhuli district. That cost \$16.2 million and was part financed by the government of Nepal, the Climate Investment Fund's Scaling up Of Renewable Energy Program and the local community.

In a second tender in late December, the AEPC announced it is seeking consultants for the implementation of hydro mini-grid systems totaling 3.4 MW capacity and solar / wind mini-grids with a combined 500 kW capacity, under the National Rural and Renewable Energy Program.

Subsidy program

A third tender issued by the AEPC, for which the deadline is also on Thursday, is aimed at selecting consultants for a study of standardizing maximum retail prices for renewable energy technologies. “[The] government of Nepal has approved [a] subsidy policy and subsidy delivery mechanism for implementation of [a] subsidy program,” said the AEPC in the tender document. “[To] assure the quality and best services to end users, it is necessary to standardize the prices of the household technologies.”

Through the subsidy policy, the government wants to support residential and institutional PV;

solar driers, cookers and irrigation systems; biogas units, metallic improved cooking stoves; rocket stoves and metallic gasifiers; and improved water mills.

Nepal has around 1 GW of installed power generation capacity – almost all of which is hydropower – and only 65% of the country’s population has access to electricity. The International Renewable Energy Agency estimates Nepal has the potential for 2.1 GW of PV capacity. To date, however, there is only one large-scale PV project under construction, the 25 MW project at Devighat Hydropower Station, in Nuwakot.

21st January, 2019

NMB SIGNS PPA TO LAUNCH UNIQUE SOLAR ROOF-TOP MODEL

NMB Bank Ltd. (NMB) announced today that it signed a private power purchase agreement with Saral Urja Nepal Private Limited (SUN) for a 50 kW grid-tie solar roof-top with net metering. The grid-tie solar roof-top will be placed in NMB Bank's Head office in Babarmahal, Kathmandu.

Under the power purchase agreement, SUN will install, own and operate the solar roof-top for 15 years. NMB will purchase all the electricity generated from the solar roof-top at a price lower than their retail grid electricity tariff with no up-front investment.

“This initiative reaffirms NMB's commitment to expanding and financing renewable energy in Nepal. Not only will part of our own electricity requirements be met through solar, we will also use this to expand financing of solar roof-top solutions across Nepal,” said Mr. Sunil KC, CEO, NMB Bank.

Over the 20 years life of NMB's solar



roof-top system, NMB will pay a lower price per unit from solar than from the grid. The 50 kW will also help to avoid 2 Million kWh imports and reduce imports by NPR 2 Crore over the project's life.

“We welcome the decision of Nepal Electricity Authority to allow net metering, a system that allows users to connect their solar system to the grid and export the excess electricity to the grid. Net metering has opened up tremendous opportunities for Nepal to diversify its generation base, reduce electricity costs to consumer, avoid imports and help build a more reliable electricity

grid,” said Mr. Bishal Thapa, Managing Director of Saral Urja Nepal. The agreement between NMB and SUN is also intended to expand financing of such solar roof-top systems across Nepal.

“The system at NMB is a unique model where customers can get a solar roof-top system with no upfront investment and pay a rate for solar electricity that is lower than NEA’s tariff. We believe that through this system we can achieve 500 MW of solar roof-top within the next 5 years,” said Mr. Aashish Chalise, CEO of SUN.

NMB and SUN are working towards a financing facility that will enable SUN to offer the solar energy services across Nepal.

“Following this project, we expect to partner with SUN in launching a financing facility to expand the application of solar roof-top across Nepal that will allow customers to save money, diversify Nepal’s generation, reduces electricity imports and create many new jobs,” said Mr. Dinesh Dulal, Head – Energy & Development Organization.

29th January, 2019

Kathmandu's battle with pollution and how EVs are a part of the solution

Maheswar Rupakheti, PhD (Atmospheric Science) from Dalhousie University in Canada, is Scientific Leader at IASS Institute for Advanced Sustainability Studies Potsdam, Germany.



Could you tell us about your major findings?

The level of air pollution in Kathmandu is bad. Through our studies on the level of pollution traffic police are exposed to, we found that the level of pollution in the city is on average five times more than the WHO-prescribed guidelines. Similarly, on busy intersections of the city, the level of PM_{2.5} easily goes past 100 times the WHO norm. It is believed that for every increase in 40 micrograms of PM_{2.5}, the population's chance of hospitalisation increases by 1.5 per cent. You can easily do the maths for levels that are 100 times the WHO norm.

To put things into perspective, we have seen that the amount of PM_{2.5} in the air on Berlin's worst days in terms of air pollution is comparable to the clearest days in Kathmandu.

One of the surprising results of the study came from our monitoring of Polyaromatic Hydrocarbons (PAH), which is a known carcinogen. We found out that the level of PAH in a small city like Kathmandu is comparable to that in New Delhi and Beijing, two cities that have received global attention for being highly polluted.

Gaseous pollution was also found to be high. The level of ozone, a pollutant harmful to both humans and plants was found to be high around the Nagarkot area in Kathmandu.

What are the major sources of air pollution in Kathmandu?

To list the sources of air pollution in

in Kathmandu, I would mention brick kilns, open incineration of garbage and agro residue. But, around 60 per cent of the air pollution in Kathmandu is related to traffic. This includes both the emissions and the dust associated with traffic. In addition to that during the brick kiln season, around 40 per cent of the PM2.5 in the valley can be attributed to the kilns.

What is the academia's understanding of the effects of air pollution in Nepal as a whole?

A recent study published in the Lancet says that over 32,000 Nepalis die every year due to air pollution. Most of the deaths that can be attributed to air pollution is preventable. According to a 2016 study by the World Bank, around 4.6 per cent of Nepal's GDP goes towards health-related costs incurred due to air pollution.

The World Health Organisation, in 2014, declared that any form of air pollution ultimately causes cancer. So there is no 'safe' level for pollution.

What is your assessment of government efforts to

control air pollution?

Just a few days ago, the Prime Minister's Office organised a meeting of stakeholders to discuss how the money collected through the pollution tax could be used. Similarly, several plans have been made to control air pollution. I believe that given the level of pollution we are faced with, we do not need to wait for a detailed scientific study. We can reduce pollution significantly by taking any form of action, although we do not yet have a clean air law.

I believe that although the current laws are not sufficient to tackle air pollution in Nepal, but we can still use them to drive pollution down considerably. After doing so, we will reach a point where further lowering becomes difficult, that is when we will need the clean air regulation.

There are some positive steps that have been taken, but steps are not adequate given the large scale of the problem. The government plans to install more than three dozen emission testing facilities and that is a step in the right direction.

The government's plans also include the use of electric vehicles. Can EVs help reduce the pollution problem in Kathmandu?

Well, I can't exactly say how much effect EVs will have on air pollution. But after the recent road expansion drive in Kathmandu, we have seen that wider roads do not necessarily equate to lower pollution. We need mass transit buses and electric buses that can replace the small passenger vehicles on the road. I also think that local authorities should promote cycling.

Switching to EVs is one of the ultimate

solutions to controlling air pollution. In Germany, only electric cars will be sold after a few years; similar is the case with Norway. That is the direction we need to head towards.

We don't manufacture cars in Nepal, and it has to be imported. I think that the government should provide encouragement to EV owners—some incentives are already in place. But people are still not interested in buying EVs. We must look at the next 15-20 years to make the switch given the golden opportunity our hydropower projects present to us.



GLOBAL PERSPECTIVES

10th January, 2019

SINGAPORE UNVEILS 30 MINUTES FULL EV CHARGING POINTS

Electric vehicle (EV) users can now fully charge their vehicles in 30 minutes at SP Group's (SP) island-wide charging network.

SP is building Singapore's largest public EV charging network with 1,000 points, including 250 direct current charging points, by 2020.

SP's first wave of 38 charging points are located at commercial buildings, industrial sites and educational institutions. The locations are close to amenities such as food centres, offering drivers greater convenience while waiting for their vehicles to be charged.

There are 19 high-powered 50kW DC charging points and the other 19 are 43kW alternating current (AC) charging points. These are



among the fastest EV charging points in Singapore.

The 50kW DC chargers can fully charge a car in 30 minutes. Over the next few years, SP will introduce more high-powered DC charging points of up to 350kW. Other than SP's, there are six other DC chargers in Singapore.

SP's new additions will be a game-changer in improving the charging turnaround time for EV drivers in Singapore.

EV drivers can also enjoy at least 50% cost savings compared to typical Internal Combustion Engine (ICE) vehicles for every kilometre travelled. The cost of using SP charging points will be regularly adjusted, mainly influenced by the prevailing electricity costs in Singapore.

“Our nation-wide public charging network offers EV drivers fast charging, with greater convenience and a seamless experience through our digital solution, at cost-competitive rates. This will encourage wider adoption of green mobility in Singapore, and enable drivers to save cost,” said Mr Wong Kim Yin, group chief executive officer of SP Group.

EV drivers can use SP Group’s charging service through the SP Utilities mobile application where they can search for the nearest available charging points, receive updates on their charging sessions and make payment.

This first wave of locations includes Singapore Polytechnic. The SP charging points there will also serve as an education and research platform, as part of Singapore Polytechnic’s engineering curriculum to train students and adult learners. Through this collaboration, SP Group and Singapore Polytechnic aim to develop new skills related to EVs and related charging technologies for Singapore.

30th December, 2018

6 Renewable Energy Trends To Watch In 2019

2019 promises to be an exciting year for clean tech. An increasing number of countries, companies and regions are embracing sustainable energy generation and the landscape is rapidly evolving.

Here are 6 renewable energy trends to watch in the coming year.

1. Energy Storage

Energy storage plays an important role in balancing power supply and demand, and is key to tackling the intermittency issues of renewable energy. Pairing a storage system with a renewable energy source ensures a smooth and steady power supply, even when weather conditions are not optimal for energy generation.

Batteries are the most common storage devices used in renewable energy systems and their use is increasing on both the residential and grid-wide scale. Energy storage technologies are expected to continue to improve, making their use more viable and affordable. It is projected that



storage will represent a core component of all new energy technologies moving into the future, as both utility-scale and domestic energy storage solutions become more price competitive, eroding the advantages of traditional energy sources.

On the Caribbean island of Barbados, old electric car batteries are being reused to provide grid energy storage and extend their useful lifespan.

2. Microgrids and AI

Microgrids are local energy grids that can operate either autonomously or while connected to a larger traditional grid. They provide energy

independence, efficiency and protection during emergencies. Using the machine learning capabilities of Artificial Intelligence (AI) with microgrid controllers allows for continuous adaptation and improvement of operation.

Deployment of microgrids is becoming significantly quicker, with new software allowing for designs to be completed in a single day. San Diego tech company XENDEE is rolling out an advanced toolkit for microgrid design in partnership with the WorleyParsons Group to make available turnkey solutions in up to a 90% less time and cost than conventional methods.

From California to the Pacific Islands, microgrids are taking center-stage. Palau is a Pacific island nation and the 13th smallest country in the world, but has committed to building what would be the world's largest microgrid - 35MW of solar panels paired with 45 megawatt-hours of energy storage. This effort is part of the nation's goal to transition to 70 percent renewable energy by 2050, recognizing that islands are on the front lines of experiencing the effects of climate change and stand as ground zero for the global energy transition.

3. Energy Blockchain And IoT

Originally developed to record cryptocurrency transactions, blockchain technology is being adapted for use in the energy market. Blockchain is an incorruptible digital ledger that conducts and records transactions through a peer-to-peer network. The lack of centralization in blockchain leaves it as ideal for eliminating the middlemen of electricity suppliers. It reduces energy inequality and inefficiency and empowers consumers to buy and sell energy from other consumers directly.

Pairing the distributed ledger technology of blockchain with the everyday devices that we use to receive and convey information, now commonly referred to as the Internet of Things (IoT), stands to have a profound impact on energy systems. With the correct applications, devices can autonomously buy and sell energy at the optimal times, optimize energy system settings in a real-time context and monitor and analyze performance of energy-consuming devices.

These technologies are beginning to be used for groundbreaking projects, such as the Brooklyn Microgrid. The project involves a community

powered microgrid whose owners buy and sell power to each other via blockchain technology. The success of projects like this ensure that they will be implemented on a wider scale.

4. Grid Parity And Falling Costs

Grid parity occurs when an alternative energy can generate power at a cost and performance level equal to or less than electricity generated from conventional methods. Solar and wind have reached parity in both price and performance in many regions, and new technologies continue to hone their competitive edge.

The traditional model of large, top-down and centrally distributed energy production is being replaced by modular, consumer-driven and evenly distributed power generation. Once thought to be difficult to integrate into the grid, renewables are now serving to strengthen grid reliability and resilience. The utilization of blockchain, AI and other automation technologies make renewables self-optimizing, increasing their efficiency.

Solar and wind are already more efficient and cost-effective than conventional sources, and evolving technologies will continue to improve

their price and performance. Combining the economic benefits with a low environmental impact, we can expect to see renewables move from being an acceptable energy source to a preferred one.

5. Big Commitments

An increasing number of corporations, cities and countries are embracing emissions reduction targets and climate action plans to meet the goal of limiting the rise in global temperature.

To date, over 100 cities worldwide report that at least 70 percent of their energy production is from renewables, and more than 40 are currently operating on 100 percent renewable electricity. Hundreds more have pledged to work towards the goal of energy generation that is 100 percent based on renewables. Recognizing their impact on climate change, 158 companies have also committed to transitioning to 100 percent renewables.

Many of these corporations and municipalities were inspired to make these commitments after the 2015 Paris Agreement. With the new information provided by the IPCC's 2018 report, we can expect to see an increase in bold

commitments to switch from fossil fuels to renewable energy sources.

6. Energy Access Advances In Developing Countries

When talking about exciting new innovations in energy technology, it can be easy to forget that a significant percentage of the world's population remains without access to energy at all. A billion people live without electricity and hundreds of millions have unreliable or prohibitively expensive energy sources.

Achieving universal access to energy is a critical component of addressing global development challenges. The changes that are occurring in the energy market offer a solution to the problem of energy access. Community-based microgrids could represent the most cost-effective

way of delivering affordable and reliable power to those currently living without it. Clean, modular and renewable energy systems are ideal for many of the communities that have been unable to benefit from conventional centralized forms of energy generation and delivery.

While politics often stand in the way of progress, new energy technologies and commitments from international groups like the [World Bank](#) and SEforALL are laying a foundation for providing energy access to developing countries. With their ever-improving cost and performance metrics, we can expect to see renewables increasingly deployed to provide power to communities and regions that have long been left in the dark.

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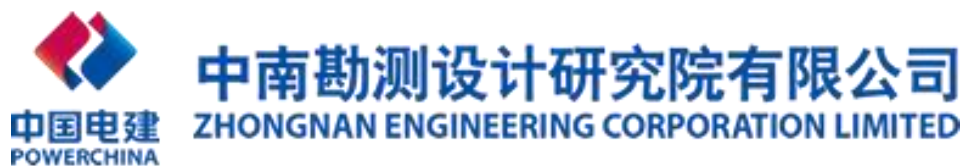




PARTNERS



Investment Board of Nepal
Government of Nepal





ENERGY™
DEVELOPMENT COUNCIL

Main Office

Heritage Plaza II (Block C & D),
Kamaladi,
Kathmandu, Nepal
P.O Box no. 516
Phone: +977-1-4169116/ 4169117/
4169118
Fax: +977-1-4169118
Email: info@edcnepal.org

Contact Office

RM 316/3 F Chinese Overseas
Scholars Venture Building, South
District
Shenzhen Hi-tech Industry Park,
Shenzhen, China

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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