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Editorial

Wind Resources for Commercial Viability of Wind Projects in Nepal

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urrently there are more than 15 wind meteorological mast stations operating in Nepal, gathering wind resource data along with other meteorological parameters. Energy Sector Management Assistance Programme (ESMAP) under their RE Resource Mapping Programme – administered by the World Bank Group, have installed ten of these stations, whose objective is to generate a Wind Atlas of Nepal consisting of bankable data sets. Alternative Energy Promotion Centre (AEPC) and South Asian Sub-regional Economic Cooperation

(SASEC) maintains the rest of the stations. Whereas the complexion of data collection done by all three agencies are almost undifferentiated, the post ground data collection framework of the latter two stations remains unsure. It takes almost five million Nepalese rupees on average to setup a ground based wind resource measurement station and the data retrieved are as investment ready as a developer can expect. However, without statistical and modeling exercises to extrapolate those values, the measurement campaigns become futile.

Assessment and characterization of wind resource is fundamental in the techno-economic success of a wind project's operation, be it of any scale or size. Similar to any other sources of electricity, having accurate prediction of resource databases yield high capacity factor for a wind plant; perhaps even more important in wind projects than compared to others. This is also expressed by the fact that uncertainty in wind speed data assessment translates to three times uncertainty in Annual Energy Production (AEP) of a plant because of highly non-linear energy curve of a turbine when defined as a function of wind speed – a ±3% variability in calibration of an anemometer leads to

nearly 10% disruption in AEP. Furthermore, a major bottleneck in developing utility scale solar projects in Nepal has been the land availability, so eventually IPPs would have to resort to wind energy. At that point, wind resource assessments (WRA) will be of importance utmost in determining capital requirements of a project. One percent decrease in energy uncertainty fluctuates project's rate of return by up to three times. An assured energy production data attracts debt providers to a project that reduces equity investment, in turn increasing equity rate of return. Furthermore, to safely evacuate energy generated from wind farms to the grid, a detailed system impact study is performed which involves load flow, short-circuit, and dynamic stability analyses which requires at least 10 minute time series of AEP data that is retrieved from WRA.

AEPC and SASEC have traditionally been installing dedicated Wind Measurement Stations in various parts of the country on a demand-driven approach from local off-grid communities with an aim to later develop wind/solar hybrid mini-grid projects. Standard AEPC/SASEC procedure follows evaluation of recorded data from these pre-installed wind stations using traditional linear approach

software such as WAsP to devise a monthly wind speed and direction chart, based on which a suitable small capacity wind turbine is selected. However, in recent times wind component of these projects merely yield one quarter of their capacities- pivotal reason for this leans towards insufficient resource assessment. Merely using wind speed and direction data is insufficient; it is vital to perform micro-site analysis using Computation Fluid Dynamics (CFD) to accurately predict wind flow models. Modern site-assessment software such as Meteodyn WT and WindStation interprets recorded data from met mast stations by incorporating factors like roughness, topography, terrain of particular plant site that helps to generate a much more dependable assessment. If performance of small wind turbines are more sensitive to local wind characteristic variability then WRA proves to be an indispensable requirement and not just a project amenity. Perhaps AEPC, being the agency administering wind measurement campaigns in the country should incorporate data assessment and interpretation along with measurement campaigns by conducting micro-level site analysis of locations where wind measurement campaigns has been carried out.

Prior to installation, every wind turbine site

must be selected based on topography and the optimum location with the highest wind power density. However, rich wind potential area may not always give the best energy yield. Unexpectedly high wind speeds, called as gale, poses a high percentage threat to the structural integrity of a wind turbine, therefore, accurate resource estimate is also necessary for system designing; particularly in selection of wind turbine class. Back in 1987, a Danish Government supported project tested two 10kW wind turbines in Mustang but within weeks, the turbines were blustered due to severe and unaccounted gusts of wind. The mechanical design of those turbines were not build to withstand such tremendous wind speeds. Such scenes can lead to a permanent closure of wind projects.

In recent times, there have been some cornerstone programs in WRA of Nepal. Ongoing ESMAP project generates a Wind Atlas of Nepal with resolution of 3kmx3km. In addition, the first breed of accredited resource assessment project in Nepal, Solar and Wind Energy Resource Assessment (SWERA) in 2003 asserted that 10% of the wind rich parts of the country had potential to harness 3000MW. Nonetheless, these indices serve as mere indicators directing towards possibility of a wind

project in a proposed location and not enough to establish a commercial utility scale wind projects. To achieve that project developers must adapt a three-steps WRA – first phase involves identification of project area in general followed by second phase that entails ground-based measurement and concluded by third phase that estimates optimal energy yield also known as micro siting.

A high-quality resource assessment program is a low cost one-time investment process that reduces energy production uncertainty by generating accurate estimates of AEP. Likewise, accurate AEP estimates is required for impact studies of during grid integration of wind energy and in forecasting wind production curtailment during off-peak load hours, which directly affects project economics. It is necessary to perform comprehensive WRA campaigns before implementing a wind project; one

way of doing this can be by having licensing preconditions for wind IPPs to submit bankable WRA reports. Government of Nepal should also have a provision of facilitating soft loans or grants for project developers who are reluctant to invest in WRA due to its high capital cost. Similarly, in micro and mini-scale wind projects, AEPC should have a provision of carrying out detailed WRA and wind flow modeling using GIS models for topography and terrain as a prerequisite to applying for subsidy. Only then, the issues in operation and maintenance of such small-scale wind projects can be resolved. All told, without a complete understanding of real-time operation of a wind project, proper performance and operation issues may be fraught with unnecessary uncertainty, lost revenues and higher costs. WRA is an imperative step a project must follow to minimize such risks and uncertainty.



3rd March, 2019

Stakeholder Meeting on Electric Vehicle Promotion Conference



DC conducted a stakeholders meeting to discuss and finalize the content and details of the upcoming Electric Vehicle Promotion Conference to be organized by EDC scheduled for May, 2019.

Present in the meeting were Mr. Kushal Gurung, Wind Power Nepal, Mr. Sushil Pokharel, Sushmit Energy, Mr. Ravi Raj Shrestha, NEA

Engineering Co. Ltd, Mr. Binay Poudyal, NEA Engineering Co. Ltd, Mr. Purna Ranjitkar, Renewable Energy Confederation of Nepal, Mr. Bhusan Tuladhar, Sajha Yatayat, Mr. Umesh R. Shrestha, EVAN, Mr. Abhisek Karki, Kathmandu University, Mr. Daniel Tuladhar, Kathmandu University and Ms. Itnuma Subba, EDC.

12th March, 2019

Meeting with United Nations Development Programme (UNDP)

DC met with Mr. Vijay Singh, Assistant Country Director, UNDP and the team to explore possible collaboration for EV Promotion Conference. Mr. Singh expressed his interest in bringing international experts to contribute in making the event successful.



26th March, 2019

Meeting with United States Agency for International Development (USAID)



SAID delegation visited EDC office to discuss the content details to be covered in the interaction program - "Forest and Land issues in Hydropower Project Development" taking place on Friday 12th April, 2019 at Hotel Yak & Yeti. The discussion was specifically focused on pertinent land and forest issues. They have agreed to collaborate with EDC in this program.

7th March, 2019

EDC Delegation visits Nepal Electricity Authority (NEA)

DC delegation led by Mr. Kushal Gurung, Executive Committee Head, EDC and Ms. Itnuma Subba, CEO, EDC visited Mr. Hara Raj Neupane, Deputy Managing Director, Distribution and Consumer Service Directorate to extend an invitation to be the panelist for the upcoming EV Promotion Conference taking place on May, 2019. During the visit, Mr. Neupane shared that EV was one of their top priority projects in order to utilize the domestically produced electricity. He further expressed that NEA is open to cooperate with private sectors to promote the use of EV in Nepal.



Welcoming new member



Peak Power Pvt. Ltd. is first and foremost a solar energy company, that gets tremendous satisfaction from turning on clean, sustainable and reliable solar power plants for their customers. Established in 2012, Peak Power Pvt. Ltd. is proud to provide its services all over Nepal. Their customers include villages and remote communities, businesses of all shapes and sizes, private home owners, NGO's and large industry.



EDC ACTIVITIES

TenderNotice.com.np

Month: march 2019							
S.No.	Notice Publisher	Published Date	Description	Notice Category	Product Service		
1	Potential Investor for Hydro-Electric Projects in Nepal	3/30/2019	Quotation	Hydro Power/ Energy	Other Product/ Services		
2	Consulting Services for Updating of Feasibility Study, Conduct Detailed Engineering Survey and Design and Preparation of Tender Documents	3/29/2019	Proposal	Hydro Power/ Energy	Consulting		
3	Increasing of Wall Height and Maintenance of Quarter	3/27/2019	Tender	Hydro Power/ Energy	Construction/ Building		
4	Painting and Maintenance of Office and Camp Buildings	3/19/2019	Quotation	Hydro Power/ Energy	Construction/ Building		
5	बोलपत्र स्वीकृत गर्ने आशय	3/19/2019	Award Notice	Hydro Power/ Energy	Other Product/ Services		
6	Providing Canteen Services and Observing Discharge and Silt Data	3/19/2019	Tender	Hydro Power/ Energy	Other Product/ Services		
7	Supply and Delivery of Security Personnel Services	3/17/2019	Tender	Hydro Power/ Energy	Security		
8	Maintenance of False Ceiling, CGI Sheet Roofing and Construction of Footpath and Gym Hall	3/11/2019	Quotation	Hydro Power/ Energy	Construction/ Building		
9	Issuance of Letter of Intent to Award the Contract	3/9/2019	Award Notice	Hydro Power/ Energy	Other Product/ Services		
10	Consulting Services for Preparation of Biodiversity Action Plan	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Consulting		
11	Consulting Services from Hydropower Engineer/Hydraulics Engineer/Civil Engineer as Chair of the Panel of Technical Experts	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Consulting		
12	Consulting Services from Hydrological/Sediment Logical Expert	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Consulting		
13	Consulting Services from Geotechnical Specialist/Civil Engineer	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Consulting		
14	Consulting Services from Electro-Mechanical Expert	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Consulting		
15	Consulting Service for Preparation of Supplemental Environmental and Social Documentation	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Electronics/ Electric Utilities		
16	Consulting Services from International Indigenous Peoples Expert	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Consulting		
17	Consulting Services from Engineering Geologist	3/6/2019	Expression Of Interest	Hydro Power/ Energy	Consulting		
18	Increasing Wall Height of Peaking Pondage, Maintenance of Quarter and Protection Work of Syphon	3/3/2019	Tender	Hydro Power/ Energy	Construction/ Building		
19	River Training Works	3/3/2019	Tender	Hydro Power/ Energy	Construction/ Building		
20	Intention to Award	3/3/2019	Award Notice	Hydro Power/ Energy	Other Product/ Services		

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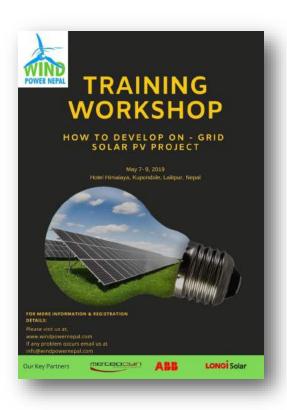




MEMBER UPDATES



ongratulation to **Saral Urja Nepal** on partnering with SB Power, a subsidiary of Golcha organization for the 2 MW utility scale solar power plant in Nepal. This project will be one of the first utility scale solar power plant in Nepal.



ind Power Nepal is organizing a 3 day
Technical Training Workshop on "How to develop on—Grid Solar PV Project". Please visit

www.windpowernepal.com for details or Download the brochure here: https://lnkd.in/fv6NC7y

EDC members will receive 20% off for this training workshop!



MEMBER UPDATES



Anjal Niraula, General Manager, Gham

Power has been featured as one of the 35

Global Changemakers in an exhibition called

"Changemakers: 35 visions of Global Leadership"



Ongratulation to Alternative Energy

Promotion Centre (AEPC). Green Climate Fund
accredits Alternative Energy Promotion Centre as a

Direct Access Entity to GCF.



NEPAL'S PERSPECTIVES

12th March, 2019

Law Amended to Ease Acquition of Forest Land

he government has amended the Forest Act and included a new provision which will allow the developer of certain infrastructure projects to acquire forest lands required for the construction of the project by paying a fee.

According to the new clause included in the act, national priority projects, national pride projects, transmission line projects of national priority and projects that have got investment approval from Investment Board Nepal are eligible to acquire wooded areas by paying money.

The new clause paves the way for the establishment of the Forest Development Fund which will charge the project developer a fee for forest lands for the construction of its permanent structures. The fund will use the fee paid by the developer to create new forests in an equivalent area of



similar ecology at similar geographic regions.

The amendment has been endorsed by Parliament, and the Forest Ministry is currently drafting a work plan which will determine the fee that project developers will need to pay for the type of land they acquire. "We are drafting the work plan which will determine the fee developers are required to pay for the type of land they acquire for their project," said Sindhu Prasad Dhungana.

"The fee will be determined by the value of the ecosystem of the forest land being acquired by the value of the ecosystem of the forest land being acquired by any project. Apart from that, the costs that will be incurred while planting trees on the new patch of land will also be considered before fixing the fee." The work plan, according to the ministry, will be rolled out within a couple of months.

The new provision in the law has come as a relief to many infrastructure projects that were struggling to get forest lands required for their project. Project developers have been asking that the new provision be inserted in the act for a long time, citing difficulties in acquiring

forest lands under the old law. The Investment Board has also been lobbying for making changes in the law to simplify the acquisition of forest lands.

As per the old law, project developers were required to purchase an equivalent area of land in a similar ecosystem and plant trees in order to acquire forest lands for their schemes. Similarly, they were supposed to nurture the saplings planted in the new forest for a period of five years before handing over the land patch to the Forest Ministry.

20th March, 2019

Solar Powered Charging Station in Lumbini to Come Online Next Month

he construction of solar powered charging station in Lumbini, which started on December 2018, is nearing its completion.

With 78 percent of the project work completed so far, the station is expected to open in April, according to the project officials.

The charging terminal will pave way for more Electric Vehicles (EV) to ply the roads without

having to worry about running out of battery.

The station, built by Ishaka Electric Company of Japan with the financial assistance Rs. 130 million from the Asian Development Bank (ADB), has 594 solar panels with a combined power output of 154 kilowatt. There are 23 charging stands, three of them are quick chargers that can charge a bus with 40kw battery and two cars with

40kw batteries at the same time in under an hour.

Normal chargers can take about an hour to completely charge one vehicle.

Two more charging centres are also being planned at the Gautam Buddha International Airport and the premises of the Lumbini Development Trust (LDT).

"In total, we will have 25 charging stands. The construction works have gained momentum and we hope to start operations at the power house before April," said Jiban Khanal, an electric engineer, adding that they have imported various equipment for the power house from countries including Japan, China, Italy and Korea.

"We are waiting for the lithium-ion battery. The charger station will be fully operational once we receive the battery. It's currently in Kolkata port in India," Khanal said.

In total, 154kw electricity will be generated from the power house.

"It will be the one of the largest charging stations which will produce the highest amount of electricity from solar power in Nepal," said Khanal, informing that the project also plans to supply electricity to the Nepal Electricity Authority (NEA) in case of surplus production. "If everything

goes to plan, for the first year, the project will supply electricity to the NEA free of cost.

Then the supply of surplus electricity could be sold under various plans in coordination with the Ministry of Energy, Water Resources and Irrigation." The project also plans to install transformers to supply electricity to the NEA grid.

"We have requested the LDT to identify a location for a grid point to supply and store electricity," said Nabutuso Nakab, an electrical of Ishaka Electric Company. "There's a possibility of exchange of electricity between the NEA and the power station," he said.



12th March, 2019

MICRO HYDRO NEEDS TO TAKE LICENSE

he person or body building of small and small power projects should now take the study & production license. The government has made such arrangement by amending the Electricity Act, 2049. According to the Act of amendment of some Nepal Act, 2075, arrangement has been made to take permission for small projects. Prior to this, the government had only been informed about the construction of the project. From this, the person or body building of small power plants in the rural areas appears to be in the market.

The Ministry of Law and Justice had submitted the legislation to the parliament by forming an Act. President Vidya Devi Bhandari, has been certified on March 3. After issuing a new constitution, there is a system that should be revised within Chaitra according to all the agreements of this Act .

There has been some amendment and amendment of the Electricity Act saying that it is disputed with that system. Section 3 of the Act has been removed. According to this, no one should be

required to produce electricity, produce, broadcast or distribute the license. However, the indigenous person or organization is not required to take the license for the production, broadcast or distribution of electricity till thousand KW.

It should be mentioned that according to the prescribed officer before the survey, production, transmission distribution or of hydropower from 100 to 1000 kW. After removing such arrangement, the officials of the Ministry of Law, will tell who should take the license.

No surveillance of the electricity survey, production and transmission will be paid for Rs 5 lakhs. Earlier, there was a provision for the construction of any project in the sub-section (2) of the Act 38, or to pay Rs 5,000. Such a penalty will now be paid for 1 MW for the project.

Thus, the person or entity who has taken the license should also be given exemption permission. While taking the study license of 1 MW to 5 MW, the payout should be paid Rs. 1 lakh per year and 5 million rupees per mW at the time of production

they should be permission. Initially, given Rs. 20 lakhs to study for a megawatt project. Because the Electricity Development Department initially issued a study allowance for two years. And, charges for two years. Dale Ghimire, who has been working in this area, has changed the production of small and small power plants. "An Act seems to be a problem in the government's campaign to bring the light in the rural areas," he said. "There is no person or group ready to prepare a license by paying a lot of money on small projects."



GLOBAL PERSPECTIVES

8th March, 2019

SOLAR BECOMES A MUST-HAVE FOR UTILITIES

otivated by steeply declining cost curves, leading utilities are building solar portfolios around the globe. The latest statistics show the cumulative capacity of the biggest utility-scale solar plant owners topped 18 GW at the end of last year, with power companies in China, the U.S. and India to the fore.

A rising number of energy utilities are turning to solar, increasing the scale of their aggregate PV portfolios more than sixfold in five years, according to figures released by Wiki-Solar, a U.K.-based compiler of utility-scale solar deployment data.

	2018	2017	2016	2015	2014	2013
Utilities	18,027	15,050	11,126	6,246	4,611	2,889
IPPs/other	22,238	19,151	15,242	11,817	9,399	6,992



Listing projects with capacities of 4 MW or more that were commissioned by the end of 2018, Wiki-Solar identified more than 18 GW of PV capacity under the ownership of big power companies.

However, the figures should be taken with a pinch of salt. First of all, Wiki-Solar is tracking only around 150 GW of the world's capacity of operating and under development utility-scale solar projects. Secondly, the compiler itself describes its data as an understatement, and notes some

participants in its survey do not publicize all their projects.

According to Wiki-Solar figures, as recently as five years ago only six utilities figured among the top 30 solar portfolio owners. That situation has changed markedly, with the latest figures showing Chinese, U.S. and Indian power companies leading the charge to solar.

Rank	Owner	Projects number	Capacity MW _{AC}
1	State Power Investment Corporation [CN]	50	2,659
2	NextEra Energy [US] (including Florida Power and Light)	43	2,627
3	Global Infrastructure Partners [US]	36	2,060
4	ENEL Green Power [IT]	33	2,015
5	Adani [IN]	28	1,957
6	Panda Green Energy [CN] (formerly GoldPoly) including United Photovoltaics [HK]	31	1,832
7	ACME [IN] (part owned by Eren Renewable Energy and EDF.)	32	1,630
8	Southern Power [US]	25	1,494
9	National Thermal Power Corporation [IN]	15	1,391
10	AES Corporation [US] including sPower	60	1,301
11	Consolidated Edison Development [US]	25	1,256
12	EDF Energies Nouvelles [FR] (part of: EDF)	59	1,182
13	Dominion Energy [US]	42	1,153
14	Lightsource BP [GB] (Part owned by BP)	149	1,102
15	Canadian Solar [CA]	28	1,100
16	Enerparc [DE]	141	1,076
17	Cypress Creek Renewables [US]	136	1,015
18	Sempra Energy [US] including SDG&E and lenova	13	941
19	GCL-Poly Energy Holdings [HK]	26	910
20	First Solar [US]	17	856
21	Berkshire Hathaway Energy [US]	6	833
22	Tata Power [IN]	26	803
23	Azure Power [IN]	22	788
24	Duke Energy [US]	50	784

"Leading Chinese and U.S. utilities like SPIC and NextEra have been prominent for some years, while dynamic growth in India has brought utilities like Adani and NTPC into the list," said Wiki-Solar founder Philip Wolfe. "The top European utilities have held position by investing overseas; notably for ENEL, in South and Central

America, and for EDF in Asia and America."

China's State Power Investment Corp (SPIC), one of the nation's top five state-owned electricity producers, owns huge solar projects including a 500 MW installation in Golmud, in Qinghai province. A quick look at the utility's website shows that by the end of 2016, however, SPIC owned solar capacity of 7,118.4 MW, far exceeding Wiki-Solar's latest figures.

"The figures on SPIC's website may well include smaller projects too, and cannot be traced back to individual solar power plants," added Wolfe. "Some companies also quote peak power [rather than AC] figures, some include capacity in development, and some may 'overclaim' for other reasons."

Blockbusting deals

Only last year, U.S. power giant NextEra revealed a massive solar panel deal with China's Jinko Solar, for the supply of 2.75 GW of modules over four years – almost 700 MW annually – while India's Adani came up with gigawatt-scale renewables plans. Italy's Enel has unveiled its 2019-2021strategy – a plan which envisages the deployment of an additional 11.4 GW of renewable

additional 11.4 GW of renewable energy capacity.

According to Wiki-Solar, independent power producers now hold a relatively lower share than they once did, as utilities become more active. But independent generators are still building significant portfolios at a steady pace, with infrastructure funds such as Global Infrastructure Partners and Warren Buffett's Berkshire Hathaway in the U.S. owning more than 2 GW and 833 MW of PV capacity, respectively. Leading specialist lar investors include the heavily indebted Panda Green Energy, Acme – which has made headlines for offering to generate solar power at record low prices in India - Enerparc and Cypress Creek Renewables, according to Wiki-Solar.

Some leading PV project owners develop their own plants but many buy projects from specialist developers. Wiki-Solar also aims to track the top PV project developers not listed as major plant owners, including specialist developers such as FRV, juwi, 8minutenergy and the late SunEdison, as well as leading solar equipment producers:

Rank	Project developers © wiki-solar.org	Projects number	Capacity MW _{AC}
1	First Solar [US]	70	4,414
3	SunEdison [US] (in insolvency)	121	3,053
9	Shunfeng [CN]	9	1,588
10	SunPower Corporation [US]	43	1,514
14	BrightSource Energy [US]	6	1,220
15	Abengoa Solar [ES]	17	1,179
17	JinkoSolar [CN]	15	1,139
18	Hareon Solar [CN]	10	1,074
22	juwi AG [DE]	83	951
25	Bharat Heavy Electricals [IN]	4	883
27	FRV [NL] (now part of ALJ)	28	806
28	8minutenergy [US]	13	797
33	Strata Solar [US]	110	701
35	Neoen [FR]	25	677

As pointed out, though, Wiki-Solar's datasets should be treated with reserve as the organization holds full participant data for only around 30% of projects.

"Several leading players keep us informed about their contributions but the involvement of others may be substantially understated," admitted Wolfe.



MEMBERS



































































































































ABHINAWA LAW CHAMBERS advocates & legal consultants

























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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.





