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ENERGY[™] DEVELOPMENT COUNCIL

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The Current Need of Nepal-Quality & Secure Electricity Access

MR. JIWAN KUMAR MALLIK SOLAR POWER EXPERT AEPC/RERL AN EDC MEMBER ORGANIZATION

In the recent past, Nepal has made significant progresses in ensuring electricity access to all its people. The Multi-Tier Framework (MTF) study recently published by the World Bank shows that only 5.2% of Nepalese households do not have access to electricity. In other words, 94.8% of households have access of electricity by one means or the other such as grid or mini grids, solar home systems, solar lanterns, rechargeable batteries, etc. However, the question still remains – how prudent is it to include solar home systems, solar lanterns, etc. under households with electricity access knowing that these smaller sources fall under Tier 0 (less than 3W) and Tier 1 (up to 49W, minimum for 4hrs for task lighting, phone charging, radio) of the MTF. Considering only households with at least Tier 3 (200-800W, minimum for 8 hrs) access and above, as envisioned in "Universalizing Clean Energy Access in Nepal" report published by National Planning Commission (NPC) in 2018, then the electricity access is reduced to 67% households including both grid and off-grid. Interestingly, 14.5% of grid connected households and 53.1% of off-grid households are below Tier 3. Furthermore, only 47.4% grid connected households have electricity for more than twenty three hours a day, another 47.7% households between 16-23 hours and the remaining 5% less than 16 hours. Similarly, only 31% of grid connected households have less than 3 interruptions for less than 2 hours in a week while 50.6% have 3-14 interruptions per week and 18.4% have more than 14 interruptions per week. In a nutshell, just the extension of the distribution line or installation of generating unit does not and should not count towards electricity access without due consideration to availability, reliability, quality and affordability. Otherwise, it will just remain an impressive achievement in paper with very little socio-economic impact on the benefitted population. For this instance, it would be practical to consider 67% electricity access in the country rather than 95% as claimed by experts and the media quoting MTF report.

Though we are delighted to have achieved 95% electrification rate in Nepal, are we aware on how secure it is. The Annual Report 2018/19 of NEA shows that Nepal has imported 37.2% of its total electrical energy from India. Similarly, our generation is heavily dependent on hydro resources

which is very vulnerable to natural calamities such as floods and earthquakes. These pertinent issues raise serious doubts on energy security. The 3D analysis — (i) Energy Security, (ii) Energy Equity (iii) (Accessibility and Affordability) and Environmental Sustainability of Trilemma Index of World Energy Council, published recently, ranked Nepal in 117th position of 128 countries. Individually, Nepal is ranked 126th on Energy Security, 107th on Energy Equity and 101st on Environmental Sustainability. One of the major reasons given in this report for poor energy security ranking is the lack of generation diversity. Thus, while relying on imported electricity on the short term, it is imperative that we think about energy generation mix by promoting other indigenous renewable energy sources like solar, wind etc on longer term.

In the same context, the capital cost of recently completed and near to completion hydropower projects in Nepal are tabulated below.

Hydropow- er <mark>Proj</mark> ect	In- stalled Capaci- ty (MW)	Total Cost (NPR in billions)	Cost per kW (NPR)	Years of Com- pletio n 12 9*
Kulekhani III	14 456	5	357,00 0 164,00 0	
Upper Tama- koshi*		75		
Chameliya	30	16	533,00 0	11
*under const and time	ruction and	l likely to in	crease in b	oth cost
Source: Naga	irik News, 1	14 th Nov. 201	9	

On the other hand, the International Renewable Energy Agency (IRENA) has estimated the average solar PV generation cost to be USD 340 to 834 per kW by 2030 and USD 165 to 481 per kW by 2050 compared to USD 1,210 per kW in 2018 which is about NPR 139,000 per kW. Even in case of Nepal, the grid connected solar of the same scale, the CAPEX cost including land cost would almost be half of that of hydro.

"In Nepal, the general perception is that hydropower is only indigenous resource, we have to change this perception and start considering other locally available renewable energy as indigenous sources as well. The focus instead should be on meeting the demand with the most economical mix of power generation options."

the operation On the contrary, and maintenance cost of solar which has all non-rotating components is much less compared to hydro which has several rotating machines and civil structures. In terms of energy yield, a 1 MW solar can generate 16 -22 lakh units per year. It solely depends on the technology, location and design of the system. In case of Q40 design of 1MW hydropower plant (HP), the annual energy yield comes to be 55 to 60 lakh units per year. As all the energy produced by a HP in 24 hours is not utilized, in fact only around 75% (41lakh units per year)is actually utilized. 45

Consequently, the Levelized Cost of Electricity (LCOE) of HP is actually 25% more than indicated in financial calculations done by IPPs and does not differ much from solar. In addition, the LCOE of solar without battery is lesser than NEA commercial tariff. An Energy Service Company (ESCo) in Kathmandu is providing solar generated electricity to commercial consumers for their day time load (without battery storage) at a lower tariff than NEA normal (5AM-5PM) tariff of NPR 11.10 per unit. The beauty of solar is that the project cycle is shorter, less vulnerable to natural calamities as it has less civil structure and it can even support grid by supplying reactive power even in the night. In Nepal, the general perception is that hydropower is only indigenous resource, we have to change this perception and start considering other locally available renewable energy as indigenous sources as well. The focus instead should be on meeting the demand with the most economical mix of power generation options. It is time to ponder on Energy Security and Quality while striving towards achieving goal of "Electricity for All" by the year 2023.

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11th November, 2019

A Regional Energy Cooperation Workshop



Mr. Wilhelm Soderstrom Nord Pool Consulting



A group photo with the participants, resource person and organizers

A one day training workshop on Regional Energy Cooperation was successfully conducted on 11th November at Hotel Summit, Kathmandu organized by Energy Development Council and International Centre for Hydropower. Mr. Wilhelm Soderstrom, Nord Pool Consulting delivered presentation on energy market foundation, market coupling & optimization of cross border flows and regional market in the Asian context.

Download the presentation on energy market foundation, market coupling & optimization of cross border flows and regional market in the Asian context <u>here</u>.

EDC ACTIVITIES

28th November, 2019

Visit to Honorable Minister Mr. Basanta Nembang

EDC delegate felicitated the newly appointed Minister for Physical Infrastructure and Transport (MoPIT) Honorable Mr. Basanta Nembang and Development Advisor to the Rt. Hon. Prime Minister Er. Gajendra Thapaliya. The minister said his top priority for the energy sector development will be to fulfill the earlier commitment for the construction of basic infrastructure. To do so, he said he would coordinate closely with MoEWR for various pipeline hydro and solar projects.



EDC ACTIVITIES

TenderNotice.com.np

Month: november 2019							
S.No.	Notice Publisher	Description	Published Date	Notice Category	Product Service		
1	Madhya Bhotekoshi Jalavidyut Company Limited, Maharajgunj, Kathmandu	Medical and Group Accident Insurance Services	11/29/2019	Quotation	Banking/ Finance /Insurance		
2	SJVN Arun-3 Power Development Company (P) Ltd., Khandbari, Nepal	Construction of Office Building, and Supply, Transportation, Loading and Unloading, Installation etc. of Quality Control Laboratory Equipment along with Complete Accessories	11/23/2019	Tender	Other Product/ Services		
3	SJVN Arun-3 Power Development Company (P) Ltd., Khandbari, Nepal	Construction of Office Building, Supply, Transportation, Loading and Unloading, Installation etc.	11/23/2019	Amendment Notice	Other Product/ Services		
4	SJVN Arun-3 Power Development Company (P) Ltd., Khandbari, Nepal	Intent to Award the Contract	11/23/2019	Tender	Other Product/ Services		
5	Vidhyut Utpadan Company Limited, Buddhanagar, Kathmandu	Construction of Hydroelectric Project	11/20/2019	Award Notice	Other Product/ Services		
6	Upper Tamakoshi Hydropower Limited, Gyaneshwor, Kathmandu	Notice of Intent to Award the Contract	11/19/2019	Pre- Qualification	Construction/ Building		
7	Vidhyut Utpadan Company Limited, Buddhanagar, Kathmandu	Notice of Time Extension	11/10/2019	Award Notice	Other Product/ Services		
8	Dhaulagiri Kalika Hydro Limited, Gyaneshwor	Supply and Delivery of Motorcycles	11/8/2019	Time Extension	Other Product/ Services		
9	Vidhyut Utpadan Company Limited, Buddhanagar, Kathmandu	Supply and Delivery of Hydraulic Excavators with Breakers, Pickup Vehicle	11/7/2019	Quotation	Automotive / Vehicles		
10	Remit Hydro Limited, Maharajgunj, Kathmandu	Construction of Pre-Fab VIP Guest House	11/7/2019	Tender	Automotive / Vehicles		
11	Blue Energy Pvt. Ltd., Durbarmarg, Kathmandu	Amendment Notice	11/5/2019	Amendment Notice	Other Product/ Services		
12	Blue Energy Pvt. Ltd., Durbarmarg, Kathmandu	Sale of Old Items	11/5/2019	Amendment Notice	Other Product/ Services		
13	Nepal Hydro and Electric Limited, Butwal	Consulting Services for Review of Feasibility Study Report, Preparation of Detailed Engineering Design and Bidding Documents for Project Construction	11/4/2019	Tender	Other Product/ Services		
14	Uttar Ganga Power Company Limited, Head Office, Durbarmarg, Kathmandu	Supply and Delivery of Vehicle	11/3/2019	Expression Of Interest	Other Product/ Services		
15	Vidhyut Utpadan Company Limited, Buddhanagar,	Supply and Delivery of	11/1/2019	Tender	Electronics/ Electric Utilities		

MEMBER UPDATES



Sunbridge Solar Nepal Pvt. Ltd.'s Soru Solar Pumping Project:

Name of Project: Soru Solar Pumping Project Address: Soru, Mugu System Size: 1.5KW Total Dynamic Head: 120 Meter Daily Discharge: 20,000 Litre Water Source: Karnali River No of Beneficiaries: 20 Household Application Type: Basic Irrigation for vegetables Customer: Krishi Gyan Kendra, Jumla

NEPAL'S PERSPECTIVE

24th November, 2019

DEPARTMENT OF TRANSPORT OPENS UP AVENUE FOR E-TAXIS

A new set of guidelines from the Department of Transport Management will facilitate the entrance and operation of electric taxis in Nepal, a move that is expected to allow transport entrepreneurs to bring in new taxis that are environmentally friendly.

The department approved the new rules on November 18 and they were made public on November 19.

"The new guidelines have been framed to promote e-taxis in Nepal," said Prem Kumar Singh, a technical director at the department. "Everyone can operate taxis without any hurdles if they follow the guidelines."

Based on the new guidelines, e-taxis should be sedans with lithium-ion batteries and a 40kilowatt motor. The guidelines apply to only sedan cars with a lithium-ion battery. Other requirements include a three-box configuration with separate compartments for engine, passengers and cargo, an LED screen, air conditioner and heater, and an electric



billing system.

Once such taxis come into operation, it will help reduce the number of cases of <u>overcharging by</u> <u>taxi drivers</u>, said department officials.

Taxi operators whose vehicles are more than 15 years old could purchase new electric taxis, said Gogan Bahadur Hamal, director-general of the department. The government has already announced a <u>ban on vehicles</u> that are more than 20 years old.

Environmentalists have welcomed the

Environmentalists have welcomed the government's move, calling it a step toward 'clean energy', especially at a time when Kathmandu's <u>air is</u> <u>getting more toxic</u>.

"It's a good initiative, but I wonder how the government is going to implement it. The question is, can common people afford such taxis?" said Rajan Thapa, country coordinator of Clean Air Asia, an international non-governmental organisation that leads the global mission for better air quality and healthier, more livable cities in Asia. However, technical director Singh said that the government is working to make sustainable plans for the promotion of e-taxis so that they can be within everyone's reach.

The department officials said that the Nepal Electricity Authority has already agreed to install electric charging stations at various places.

"There are already 10 charging stations in the Valley and many other private companies are working to install more," said Singh.

According to the department, the government has stopped giving out new number plates for taxis since 2000 to avoid congestion on the roads. However, after the 2015 earthquake, it issued <u>1,500</u> <u>permits</u> for new taxi licences to expand livelihood for some families severely afflicted by the disaster.

GLOBAL PERSPECTIVES

22nd November, 2019

Social costs & Wind costs so Low They're cheaper than "existing" coal & <u>Nuclear - Lazard LCOE Report</u>

A brief decade held considerable cost-efficiency gains in wind and solar. These sustainable technologies are now more cost-effective than any other power generation technologies in general, according to <u>Lazard</u>. Solar and wind technologies simply make more sense.

Further, this analysis excludes subsidies. Solar and wind aren't just cost-effective when subsidized—they're cost-effective when *not* subsidized despite more than a century of fossil fuel subsidies.

These findings back up recent findings from Berkeley Lab's <u>Tracking the Sun</u> report. Lazard's full <u>Levelized Cost of Energy 13.0</u> report and <u>Levelized Cost of Storage Analysis 5.0</u> show dramatically different solar, wind, and battery storage costs in 2019 compared to 2009. Here's one chart highlighting the trend:



Solar and wind became cheaper than competing new-build power plants years ago. What the latest report shows is that they have actually gotten so cheap that they are now competing with existing coal and nuclear power plants. In other words, *new* wind and solar farms can be cheaper than continuing to get power from *existing* coal and nuclear power plants. Here are some LCOE ranges for different technologies:

- Utility-scale thin-film solar: \$32–42/MWh
- Wind: \$28–54/MWh
- Existing nuclear (midpoint of marginal cost): \$29/MWh

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- Existing coal (midpoint of marginal cost): \$33/MWh
- New coal: \$66–152/MWh
- New nuclear: \$118–192/MWh
- New gas combined cycle: \$44–68/MWh

"While the reductions in costs continue, their rate of decline has slowed, especially for onshore wind. Costs for utility-scale solar have been falling more rapidly (about 13 percent per year) compared to the onshore wind (about 7 percent per year) over the past five years."

Rolling in subsidies for renewable energy that are granted to make up with pollution externalities from other sources, solar and wind get even more competitive. "When US government subsidies are included, the cost of building new onshore wind and utility-scale solar (with values averaging \$28/MWh and \$36/MWh, respectively) is competitive with the marginal cost of coal and nuclear generation (with values averaging \$34/MWh and \$29/MWh, respectively)." The report also includes comparisons for specific countries — USA, Australia, Brazil, India, South Africa, Japan, and Europe.

The storage report also shows a rapid drop in the costs of batteries, which leads to wind + storage or solar + storage getting increasingly competitive (and putting natural gas peaker plants out of business).<u>Lazard writes</u>: "Lithium-ion, particularly for shorter duration applications, remains the least expensive of energy storage technologies analyzed and continues to decrease in cost, thanks to improving efficiencies and a maturing supply chain.

"Solar PV + storage systems are economically attractive for short-duration wholesale and commercial use cases, though they remain challenged for residential and longer-duration wholesale use cases."

To learn more, we highlight recommend you check out <u>Levelized Cost of Energy</u> <u>13.0</u> and <u>Levelized Cost of Storage Analysis 5.0</u>.



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23rd November, 2019

AS LITHIUM PRICE DROP, PRIVATE EQUITY INVESTORS HUNT FOR DEALS

Private equity groups and other investors have grown emboldened by the <u>lithium industry</u>'s malaise, forging plans to invest billions of dollars in mining projects to develop the electric vehicle battery metal.

A more than 50 percent drop in lithium prices since 2018 has unnerved industry executives, fueling cuts to capital spending and halting expansions. Shares in major lithium producers have dropped as a result, exacerbating retail investor anxiety.

But Carlyle Group-backed Traxys and other nontraditional investors and lenders say they sense a buying opportunity, as <u>electric vehicles</u> grow in popularity and fossil fuels are phased out in a rising number of countries.

"Now is the time to invest," said Erez Ichilov, managing director of Traxys Projects, which earlier this month launched a \$2 billion fund with metals financier the Pallinghurst Group to invest across the electric vehicle supply chain. "When you look at how under-invested this value chain is, \$2 billion is not a lot."

The Pallinghurst-Traxys Battery Materials

fund plans to focus on lithium projects, as well as copper and graphite, in developed economies to reduce risk, Ichilov told an industry conference earlier this month.

That and a recent spate of other deals should help bridge what analysts forecast will be an underinvestment by the lithium industry in coming years.

"Mining needs a lot more capital than it has been getting," said Sam Jaffe of Cairn Energy Research Advisors, who estimates more than \$100 billion needs to be invested in the battery minerals supply space, including for materials like lithium, nickel and graphite.

Texas-based private equity firm Centaurus Capital took up half of ioneer Ltd's A\$40 million (\$27 million) stock offering in late November, a tacit bet that the company's Nevada lithium project will see strong demand in coming years. The offering was backed by Goldman Sachs Group Inc and Australian private wealth business Ord Minnett.

Centaurus did not respond to a request for comment.

Czech utility CEZ is finalizing a deal to

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convert a 2 million euro (\$2.2 million) loan into majority control over European Metals Holdings Ltd's Cinovec lithium and tin project, which it says is the largest lithium deposit in Europe, an unusual arrangement for a utility.

Commodities trader Transamine Trading SA earlier this year said it would lend Canadian miner CAT Strategic Metals Group nearly C\$10 million (\$7.5 million) for the Kamativi Tailings Lithium Project in Zimbabwe.

Transamine did not respond to a request for comment.

"With strong projected demand ahead, the industry is still underserved from investments in the space," said Ernie Ortiz, president of Lithium Royalty Corp, an affiliate of Waratah Capital Advisors, which earlier this year invested A\$8.1 million (\$5.5 million) for a 2.5 percent royalty in Core Lithium Ltd's Canadian lithium project.

Ichilov, the Traxys investor, said his fund plans to move fast.

"We want to make significant moves in 2020," he said. "We're big believers in the <u>energy</u> <u>transition</u>. It's a tectonic shift."



Members





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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.







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