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# EDC COMMUNIQUE

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ENERGY™ DEVELOPMENT COUNCIL

*In this issue*



*Editorial*

## Financing microgrid projects for the underserved communities in Nepal


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An EDC Member organization


More than a billion people globally lack access to electricity, the majority of whom are based in rural areas. Estimates suggest that there are a further two billion people who have access to electricity; however, it's highly unreliable. Reliable access to electricity is one of the pre-requisites for improving people's lives across the developing world (ARE, 2015).

In Nepal, around 30% of the population still lack access to

the national grid electricity. Due to the rough and mountainous terrain, it is a daunting task laying conventional on-grid electricity system around every corner of the country. There has been a consistent reduction in the cost of renewable energy-based micro-grids over the last decade. The reduction in cost has meant that microgrids are increasingly seen as a viable alternative to the traditional grid expansion model.

A micro grid can be defined as a small energy system capable of balancing captive supply and demand resources to maintain stable service within a defined boundary. The definition of a micro-grid changes depending on the project constraints in which it is used. It could be a grid-tied system with large battery storage and smart electronics that can provide power during service outages or could be an off-grid system with pay-as-you-go meters and less than 100 kilowatts of solar PV similar to what we have implemented in Nepal which can also be defined as community microgrids.

Although connection to the national grid is a dream to realise for every rural underserved community in Nepal yet the practical aspects of this happening early is a dream for now. Microgrid projects have been implemented in many parts of Nepal with the ultimate objective of serving the rural populace. The IEA (2011) estimates that micro-grids are the best solution for providing electricity to 45% of the rural population without access to electricity. Micro-grids can utilise locally available energy sources such as wind, solar, biomass, and hydro. Using locally available renewable energy sources has the advantage of low running costs, greater energy security, and lower environmental pollution. Evidence suggests that a "meagre" provision of electricity that only supports lights and domestic appliances is not enough and hence there is an increasing emphasis on developing business models for mini-grids that are more sustainable (Safdar and Heap, 2016).

However, the most challenging part of micro-grid projects is that it must be cheaper or in par with the status quo. Most of the microgrid projects are implemented in regions that are underserved and hence have a low level of income and thus less ability to pay. The CAPEX of these projects hence needs to be reduced in order to lessen the burden on these communities. There is however no official benchmark outlining the required functionality for

financing such microgrid projects. Equity and debt financing are the most common. However, these add to the development costs as the equity guys would have to get deals approved by the committee and the debt guys face issues with accessing commercial loans and processes such as due-diligence etc add further complication to the otherwise simpler financial model. Grant financing allows for effective reduction of tariff for consumers but needs to be monitored efficiently to ensure that this form of finance is being used for the intended purpose.

Ghampower Nepal Pvt Ltd, one of the early solar PV developers based in Nepal implemented the first of its kind solar microgrid in Nepal. Its operation was based on the ABC model. The financing of this project was made possible by grants from ADB, DoEN Foundation, Netherlands and GSMA hence reducing the CAPEX and allowing for the tariff rates to be made reasonable. The Alternative Energy Promotion Centre has been implementing similar microgrids on a regular basis. These microgrids are however majorly funded by the Nepal Government and hence the real cost of this form of energy is not realised amongst the community. AEPC contributes about 70-80% of the investment on such projects and the community would have to contribute the remaining 20-30% which is more so in the form of kind rather than cash.

Sunbridge Solar Nepal along with Friends in Renewable Energy, the developers and service providers implemented the first of its kind private-community financed microgrid project in Ghurmi, Okhaldhunga. The community contributed around 22% of the capital costs in the form of cash which was then used towards the construction of the project. The remaining 78% was borne by SBSN and FRE. The pay-back period of this microgrid project is expected in 3 years' time with an IRR of 18-20% after which the project would be handed over to the community.

The financial models being implemented by the AEPC, the donor agencies, the so-called "grant" organisations, although would allow for the lowering of CAPEX and hence lower the burden on the community significantly yet would in the long run distort the decentralised micro-grid market altogether as the true cost of energy would be hazed for the community and without such "inputs" the community would still continue to wait for their "saviour".

# EDC ACTIVITIES

*7th February, 2019*

## Meeting with PwC India

Delegates from PwC India, Infrastructure, Power & Utilities visited EDC. They expressed their interest to collaborate with EDC in energy works in Nepal.

*8th February, 2019*

## EDC held a member meeting

A focused discussion in bringing FDI in hydropower & renewable energy sector in Nepal held at EDC office, Heritage Plaza, Kamaladi.

Present in the meeting were EDC members: Mr. Kushal Gurung, Wind Power Nepal, Mr. Hitendra Dev Shakya, NEA Engineering Co, Mr. Krishna Acharya, Crystal Dev P. Ltd, Mr. Kabin Maharjan, Anak Hydro, Mr. Sarad Bashyal, Anak Hydropower, Mr. Kedar Karki, Chirkhuwa Hydro Power, Mr. Anjan Neupane, Neupane Law Associates, Mr. Avishek Malla, Sunfarmer, Mr. Sagar Koirala, Krishna Grill and Engineering Works, Ms. Itnuma Subba, EDC and Mr. Dheeraj Raya, EDC.

# EDC ACTIVITIES

*11th February, 2019*

## Meeting with USAID-NHDP

Mr. Robert Taylor, Chief of Party, USAID (NHDP), Mr. Hari Prasad Subedi, Electricity Sector Financial Specialist, NHDP and Ms. Karnika Bhalla, Director of Finance, Accounting & Compliance visited EDC office. The meeting was about possible collaboration in organizing workshop on Forest and Land issues in hydropower sector development, that EDC has been actively advocating.

*15th February, 2019*

## Member Meeting to plan for ELECTRIC VEHICLE PROMOTION CONFERENCE, 2019


EDC held its member meeting at its office for program planning of the upcoming Electric Vehicles Promotion Conference scheduled for April, 2019 in Kathmandu.

Present in the meeting were EDC executive committee members Mr. Kushal Gurung & Mr. Sushil Pokharel, representatives from NEA Engineering Co. Ltd and EDC secretariat.

# EDC ACTIVITIES

*20th January, 2019*

## EDC joined Think Tank Alliance of Global Energy Interconnection

EDC has joined Think Tank Alliance of Global Energy Interconnection (TAGEI) formed by Global Energy Interconnection Development & Cooperation Organization (GEIDCO) as the only exclusive association in Nepal and active participant in relevant activities.

## Welcoming new member

Laxmi Bank was incorporated in April 2002 as the 16th commercial bank in Nepal. In 2004 Laxmi Bank merged with HISEF Finance Limited, a first generation financial company which was the first merger in Nepali corporate history. Laxmi Bank is a technologically driven progressive bank with strong risk and corporate governance foundations.

# EDC ACTIVITIES

## TenderNotice.com.np

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

**Month: february 2019**

| S.No. | Notice Publisher | Description | Published Date | Notice Category | Product Service |
|---|---|---|---|---|---|
| 1 | Raghuganga Hydropower Limited, Myagdi | Intention to Award the Contract | 2/26/2019 | Award Notice | Other Product/ Services |
| 2 | Sanima Middle Tamor Hydropower Ltd., Kathmandu | Check Survey, Design, Supply, Manufacturing, Delivery, Installation, Testing and Commissioning of 220 kV Double Circuit Transmission Line | 2/26/2019 | Pre-Qualification | Other Product/ Services |
| 3 | Sindhu Jwala Hydropower Ltd., Kathmandu | Sale of Petrol Pump | 2/25/2019 | Tender | Other Product/ Services |
| 4 | Suryakunda Hydroelectric Private Limited | Plant and Design Build of Electro-Mechanical Works | 2/21/2019 | Tender | Other Product/ Services |
| 5 | Nepal Hydro and Electric Limited, Butwal | Internal Auditing Works | 2/18/2019 | Expression Of Interest | Accounting/ Auditing |
| 6 | Power Grid Corporation of India Limited | Tower Packages | 2/18/2019 | Tender | Other Product/ Services |
| 7 | Tamakoshi Jalavidyut Company Limited, Kathmandu | Consulting Services for Selection of Construction Management and Supervision Firm | 2/17/2019 | Expression Of Interest | Consulting |
| 8 | Trishuli Hydroelectricity Company Limited, Vansthali, Kathmandu | Supply and Delivery of Vehicle | 2/17/2019 | Tender | Automotive / Vehicles |
| 9 | Trishuli Hydroelectricity Company Limited, Vansthali, Kathmandu | Supply and Delivery of Double Cab Pick-up Vehicle | 2/16/2019 | Tender | Automotive / Vehicles |
| 10 | Trishuli Hydroelectricity Company Limited, Vansthali, Kathmandu | Supply and Delivery of Vehicle | 2/15/2019 | Tender | Automotive / Vehicles |
| 11 | SJVN Arun-3 Power Development Company (P) Ltd., Khandbari, Nepal | Providing and Installation of Boundary Pillars, Air and Water Quality Monitoring and Supply, Transportation and Installation of Weather Stations | 2/12/2019 | Tender | Other Product/ Services |
| 12 | Upper Tamakoshi Hydropower Limited, Upper Tamakoshi Hydroelectric Project, Gyaneshwor, Kathmandu | Supply of Security Guard Services | 2/4/2019 | Tender | Security |

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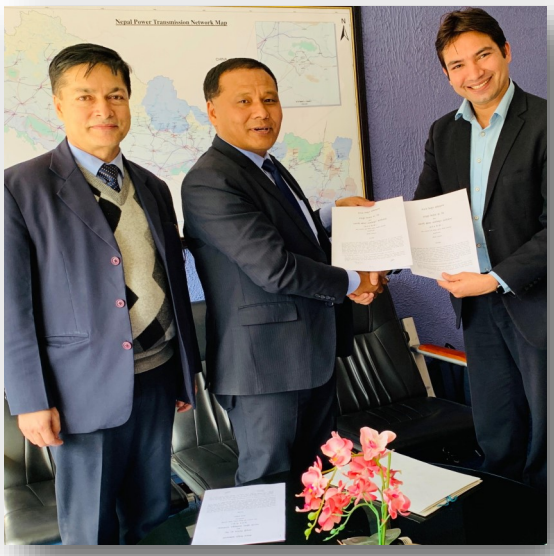
# Member Updates


WindPower Nepal is working with CG Energy Infrastructure (CGEI), a company of Chaudhary Group, to develop a 200 MW on-grid solar in Nepal, spread across three different sites. The project has received survey license for all three sites from the DOED (Department of Electricity Development) and is now in the process of grid impact study and power purchase agreement with the Nepal Electricity Authority.



Government of Nepal is welcoming investment in clean energy sector offering "Take or Pay" basis Power Purchase Agreement (PPA) for run-off-the river types of projects upto installed capacity reaches 5250 MW. Sushmit Energy Private Limited's 57.3 MW HPP's PPA is amended to "Take or Pay".

# Member Updates

Saral Urja Nepal (SUN) has signed the power purchase agreement for the 25 kW solar roof-top with SHALIGRAM HOTELS PRIVATE LIMITED. Shaligram Hotels will now be able to save on their electricity expenses and contribute to reducing Nepal's energy imports, with no up front investments.

CDC, the UK's development finance institution, announced its first direct investment in Nepal, a US$15 million, three-year loan to NMB Bank ("NMB"), one of the country's leading commercial banks. CDC's investment in NMB will allow the bank to grow its lending to key sectors of the Nepalese economy, including infrastructure, agriculture and foreign currency-earning sectors such as tourism and hydropower projects.

# NEPAL'S PERSPECTIVES

*1st February, 2019*

## WORLD BANK FUNDS NEPAL MINI-GRID ENERGY ACCESS PROJECT WITH USD 7.6 MILLION

The World Bank (WB) approved the Strategic Climate Fund (SCF) grant and SCF Loan of USD 5.6 million and USD 2 million, respectively to help Nepal channel its energy sources for renewables on February 01, 2019.

The SCF grant and credit will support Nepal's private sector-led *Mini-Grid Energy Access Project*, aiming to mobilize energy-service companies in select Nepal regions for increasing the capacity of renewable energy mini-grids.

***"One component of the project will provide credit facility to the private sector to support renewable mini-grid sub-projects, and help this sector prosper and expand," said Subodh Adhikari, World Bank Senior Energy Specialist and task team leader of the project.***

The second component provide technical assistance to energy-service companies, Nepal's mini-grid sector and partner banks to facilitate smooth project implementation, adds Adhikari.

The Nepal government is using the project to ease private-sector participation in the renewable energy mini-grid sector and remove any barriers obstructing participation by introducing new approaches that will promote

Likewise, private entities and cooperatives will be utilized to provide electricity services to Nepal's rural areas as 'energy service companies' (ESCOs).

These ESCOs will bring together the necessary technical expertise and financing capacity to develop, build, own and operate renewable mini-grid projects.

They will have access to better credit terms and stronger project development support through project.

*"**This project will tap into the vast business opportunities and technical potential for the private sector to provide more efficient and sustainable energy services in Nepal," said Faris Hadad-Zervos, World Bank Country Manager- Nepal.***

Zervos adds that the project is directly linked to the Nepal government's effort for greater private sector management and commercial financing through public-private partnerships and the World's Bank mission of all increasing all financing opportunities for the country's development.

The project ultimately aims to support rural residential and non-residential customers, who will gain access to new or improved energy services in rural areas through renewable energy mini-grids.

*14th February, 2019*

## GOVERNMENT LAUNCHES PROGRAMME TO MOBILIZE PUBLIC FUND FOR HYDROPOWER DEVELOPMENT

The government has launched a program to mobilize funds of general public for hydropower development.

Prime Minister KP Sharma Oli inaugurated the program amid a function at City Hall in Kathmandu on Thursday, coinciding with the first anniversary of the formation of the government.

The program has been launched at a time

when the government has failed to expedite hydropower projects like Upper Tamakoshi, Kulekhani III and Budhigandaki, among others, being implemented by its entities.

Earlier, organizing a press conference on Wednesday, Minister for Energy, Water Resources and Irrigation, Barshaman Pun, had informed that the government had made all necessary arrangements, including formulation of laws and preparation of program document, to start the program. "This is an attempt to mobilize scattered resources of the general people in hydropower projects for people's socio-economic transformation," he added.

Different government entities, including Nepal Electricity Authority and Hydroelectricity Investment Development Company Ltd, will implement the project. They will encourage people to invest in such projects, according to the ministry.

The government has unveiled plan to build 19 projects, including Tamakoshi-5 (96 MW), Upper Arun (725 MW), Trishuli 3B (37 MW)) and Bheri Babai (48 MW), by mobilizing resources from general people. The energy ministry had floated the program in its white paper for the electricity sector issue


earlier.

"This program makes a big shift in hydropower investment sector of Nepal. Now, we are becoming capable enough to invest even in big hydropower projects. Earlier, we had to look at foreign investors for the same," Pun said in the press meet.

Financial need to implement all 19 projects will be in tune of Rs 600 billion, according to the ministry. However, the ministry has not categorically specified how people will be able to invest in those projects.

Pun's predecessor at the ministry, Janardan Sharma, had announced a similar program of seeking investment commitment from general public. However, the program was aborted midway after collecting investment commitments from general public.

*26th February, 2019*

## Proposed Law gives new powers to Investment Board Nepal

The Cabinet recently approved a bill governing public-private partnership and foreign direct investment projects that gives Investment Board Nepal new powers to approve schemes worth more than Rs6 billion. Currently, only investments of more than Rs10 billion come under the board's purview as per the Investment Board Act which regulates its operation and functioning.

Apart from dealing with public-private partnership and foreign direct investment projects, the proposed legislation, which will supersede the Investment Board Act, will also determine how Investment Board Nepal is operated.

"We are in the process of tabling the new bill in Parliament," said Ramesh Dhakal, secretary at the Prime Minister's Office. "After the bill becomes law, Investment Board Nepal will handle investment proposals of more than Rs6 billion while the related ministries of the federal and provincial governments and local bodies will deal with investment proposals of less than that amount."

The Finance Ministry had sent a draft bill that proposed allowing local bodies and provincial governments to approve investment proposals worth up to Rs2 billion and Rs4 billion respectively, but the Cabinet removed these provisions before approving it. According to Dhakal, local bodies and provincial governments will be allowed to approve investments by other laws.

According to sources at the Prime Minister's Office and the Finance Ministry, Parliament is expected to pass the new legislation well before the Nepal Investment Summit slated for the last week of March. The government plans to present the new piece of legislation as a major legal reform to the foreign investors participating in the event in order to win their confidence to increase foreign direct investment in Nepal.

The new law, according to the Finance Ministry source, envisions establishing two wings at Investment Board Nepal—Public-Private Partnership Centre and Investment Centre. The role of the Public-Private Partnership Centre is to identify projects, manage public financing, control and oversee public-private partnership projects, develop a public-private partnership framework, advise and support agencies to implement public-private partnership projects, act as a knowledge centre and, in some cases, also work as a project bank. The Investment Centre will promote Nepal as an investment destination besides providing investment approvals.

As a majority of the infrastructure projects implemented by Investment Board Nepal are being developed under the public-private partnership model, the government wants to introduce the new law to replace the existing Investment Board Act, according to the source.

*16th February, 2019*

## PERMISSION TO SURVEY FOR 57 PROJECTS IN SOLAR ENERGY

The number of people wishing to invest in solar energy in the last days has been increasing. Electricity Department of the Department under the Ministry of Energy, Water Resources and Irrigation has issued permission for survey of 57 different projects till date. The capacity of the project is 468 MW. The government has also increased the number of people willing to invest in solar energy after the concept of energy mixing.

Solar energy, which is used only for small and domestic use in the past, has also begun commercially in the past. Nepal Electricity Authority has started construction of 25 MW solar power project in Nuwakot. The construction work of the project is continuing.

The Authority has also signed a power purchase agreement with a total of 61 MW capacity solar power projects produced from the private sector. A US company has expressed its desire to operate a 600 MW solar power project. According to the US company

Ski Power proposed to invest solar power, the Energy Minister and the Minister of Water has proposed a yearly re-proposal.

The department has also approved the survey for conducting a capacity of 120 Mw of solar power project to the Chaudhary group. The survey has been given for the construction of the solar system in Dhalkebar of Mahottoti.

Similarly, the department has received permission to construct a 50 MW solar power project in 50 MW in Bajura and Pawansi of Parsa. 10 MW capacity solar power project is going to be run by conducting a Greed Connected Solar Project. In the nine places of the country, the power company has received permission for conducting solar project.

Jhapa Energy has received permission from the survey saying that the project will be operational for 10 MW solar power projects. There has been plans to utilize alternative clean energy globally and move forward.

Only in India, only 14 GW of solar power has been produced in India. By the end of this year, the capacity will increase 38 GW. Similarly, 130 GW solar power has been produced in China. By 2020, 200 GW will be reached. 60 GW in the US, Japan has produced solar power equivalent to 46 GW.

The white paper, which has been publicized in the past month, has also started the concept of energy mixing using solar energy and air energy as a source of energy.

Energy, water resources and irrigation minister said that the government has kept high power in solar power like solar power, wind power and wind power. He informed that Nepal has also adopted the last round of operations in the field of renewable and clean energy.

Last year, investors have also attracted investors in the air power sector. Only recently, the Department has given permission for four projects to provide six MW capacity for wind power generation.

Similarly, Reliance Sugar Mill has also taken permission from the Department of Electricity to produce 15 MW power from the Uchka Khosta. Private sector has also sought additional dimensions of investment, along with the government's plan to effectively implement the concept of energy mixing.

# GLOBAL PERSPECTIVES

*26th February, 2019*

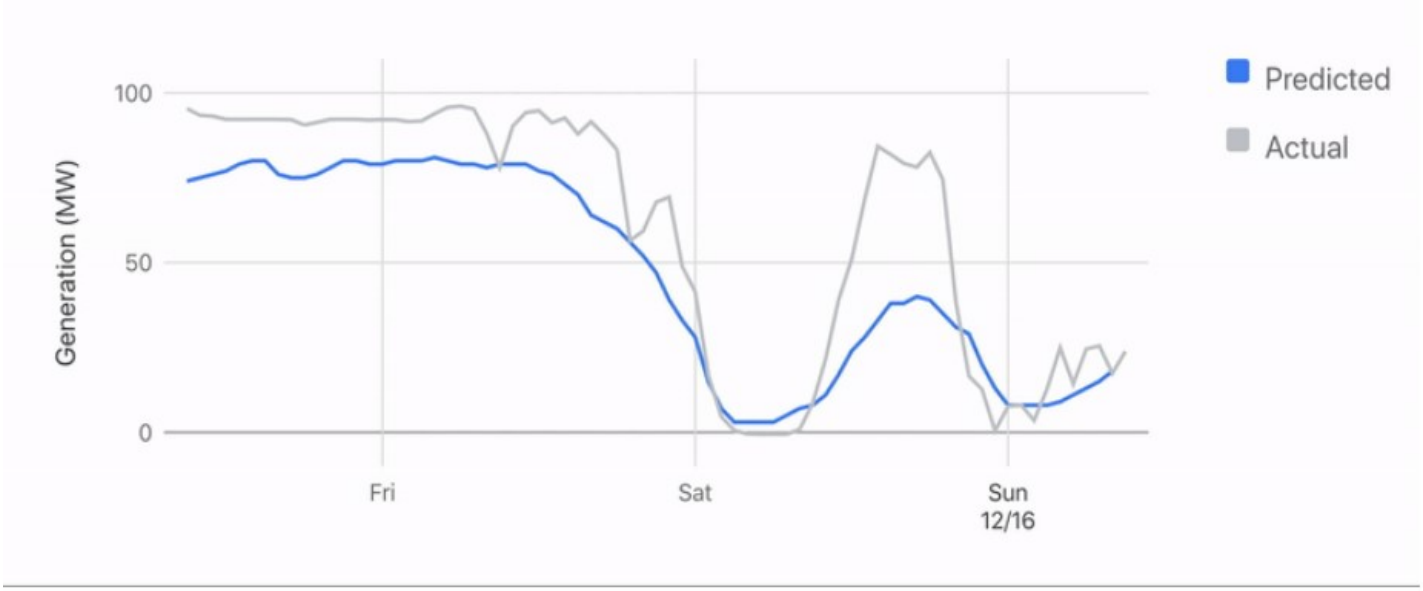
## GOOGLE AND DEEPMIND ARE USING AI TO PREDICT THE ENERGY OUTPUT OF WIND FARMS

Google announced today that it has made energy produced by wind farms more viable using the artificial intelligence software of its London-based subsidiary DeepMind. By using DeepMind's machine learning algorithms to predict the wind output from the farms Google uses for its green energy initiatives, the company says it can now schedule set deliveries of energy output, which are more valuable to the grid than standard, non-time-based deliveries.

According to Google, this software has improved the "value" of the wind energy these farms are providing by 20 percent over a baseline where no such time-based predictions are being performed. We don't know exactly what that value is in monetary terms or in terms of energy output. We also don't know where exactly this is being deployed, although Google works with wind farms largely in the Midwest, where some of its US data centers are located. Google was not immediately available for comment.

Last year, Google said it had finally reached the milestone of offsetting its energy usage with 100 percent renewable sources. That's largely thanks to energy purchase contracts and

investments with solar and wind farms that help power its data centers, as well as with renewable energy certificates that offset standard power grid usage in other markets.




When it comes to wind power, however, making use of that energy can be difficult because knowing how much a given farm will generate and how best to store and then deliver that energy to the grid changes every day. Google says "the variable nature of wind itself makes it an unpredictable energy source — less useful than one that can reliably deliver power at a set time," due to having to rely on nature to generate the needed electricity demands of the grid.

"We can't eliminate the variability of the wind, but our early results suggest that we can use machine learning to make wind power sufficiently more predictable and valuable," write Sims Witherspoon, a product manager at DeepMind, and Will Fadrhonc, Google's Carbon Free Energy program lead, in a co-authored blog post. "This approach also helps bring greater data rigor to wind farm operations, as machine learning can help wind farm operators make smarter, faster and more data-driven assessments of how their power output can meet electricity demand."

This isn't the first time DeepMind's AI expertise has been used in this way. Back in 2016, Google announced that it had cut the power costs of its data centers by 15 percent thanks to the AI lab's

help. In 2018, Google went further and gave these AI systems even more control. And there were reports in 2017 that DeepMind was in talks with the UK's national electricity grid agency to help it balance supply and demand.

This sort of work helps Google in an obvious way, but it also helps DeepMind. The company has done phenomenal work from a research perspective, but has yet to find substantial revenue streams. It loses a lot of money ($368 million in 2017), which has reportedly contributed to tensions between DeepMind and the mothership. If the company's software can be put to use in real-life scenarios outside the research lab, DeepMind could become a revenue-generating segment of the business that justifies its high costs.

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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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