

## Editorial

Dear Reader,

The world's second richest country in inland water resources with as many as 6000 rivers, rivulets and tributaries, with the perennial nature of steep gradient of country's topography, Nepal can utilize its hydropower to meet not just its own electricity needs, but also serve energy hungry neighbors like Bangladesh and India. Current estimates are that Nepal has approximately 40,000 MW of economically feasible hydropower potential. Yet, Nepal has developed only approximately 600 MW of hydropower projects and most of the power plants in Nepal are run-of-river type with energy available in excess of the in-country demand during the monsoon season and deficit during the dry season. Nepal's 30 million people and most of South Asia's 1.7 billion people remain starved of electricity. Nepal's water resources must be utilized to create jobs and improve its economy. Besides, Nepal is mountainous country with 6.8 sunshine hours per day on average; this makes Nepal with high potential for wind and solar energy as well. Huge future returns are associated with today's risks. With the own demand for electricity growing at 9% annually, and with a desire to become an energy-independent country, It is time that both local and international players join hands to tackle the challenges that lie ahead in the energy industry.



**Ms. Flora Wong**

**Senior Event Producer  
Neoventure Corporation**

As a leap forward in the same direction, Neoventure has joined force with the Energy Development Council to organize "**Nepal Power Investment Summit (NPIS) 2016**", which has been scheduled for 31 May – 3 June, in Kathmandu. It combines with Conference, Exhibitions, Project Investment Seminar and Business Trade Mission creating a perfect platform for all concerned industrial players to share knowledge and to expand business contacts in this emerging exploration frontier. The theme of the Conference session is "Nepal – the Future Battery of South Asia". Topics addressed in the conference may cover T&D Analysis, BBIN Region Power Grid Interconnection, Hydropower Development, Wind and Solar Power Project Planning, Project Financing, Energy Policy Updates, IPP Lessons Learnt and others. Key stakeholders from government agencies, state utility company, IPPs, contractors, financiers, and others concerned players will gather during the event. Highlight of the event is as follows:

### **Conference & Exhibition (31 May – 1 June 2016)**

- \* 200+ professional participants from Government & Regulators, Power Utilities, IPPs, Energy Developers, EPC Contractors, etc.
- \* 30+ exhibitors will showcase the new technologies, products and capacities.
- \* Project Investment Seminar. Nepalese counterparts / projects owners will share their power generation and T&D projects with potential investors / contactors.

### **Business Trade Mission (2-3 June 2016)**

- \* Business meeting with concerned government departments, SOEs, and major private players for potential collaborations.
- \* Site Visit of selected projects or industrial parks showcased during the event.

Nepal Power Investment Summit 2016 will provide you with a one-stop learning and networking experiences to obtain the first-hand updates of Nepal's power market. We, hereby, would like to welcome your participation and let's work for the bright future of power development in Nepal!

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## EDC Activities

### Interaction program on “The three main problems of hydroelectricity sector development in Nepal”

On 7th February, 2016, Energy Development Council (EDC) and Water Resource and Energy Journalist Society Nepal (WAREJ) organized a discussion program on the topic "The 3 Main Problems of Hydroelectricity Sector in Nepal" at Babar Mahal Revisited, Kathmandu.

In the panelist, present were Deputy Prime Minister and Energy Minister Mr. Top Bahadur Rayamajhi, Land Reform Minister Mr. Ram Kumar Subba, Energy Secretary Suman Sharma, Joint Secretary Krishna Acharya of the Forest Ministry, MD of NEA Mr. Mukesh Kafle and Lawmaker and President of the parliamentary Agriculture and Water Resources Committee Mr. Gagan Thapa.



Mr. Bikash Thapa of WAREJ moderated the session. Mr. Sujit Acharya, Chairperson of EDC, Nepal's umbrella organization for the entire energy sector gave presentation about the three key obstacles in Nepal's hydropower development sector which were:

1. Signing of Expensive US Dollar PPA for Foreigners which is going to be announced by Government of Nepal in upcoming Energy Crisis Mitigation Plan, but not signing cheaper PPA's of Nepali Developers.
2. Ministry of Forest requirements from Nepali Hydropower Developers to pay a fee as Payment for Environmental Services for its contribution to saving more trees from being cut. The Ministry also requires Hydropower Developers who rent its land for 30 years (duration of the hydropower license) to pay a rental fee and also provide it equivalent amount of land it has rented for free.
3. Ministry of Land Reform applies land ceiling rule of 75 ropanis to hydropower projects in same manner as to individual land owners/ traders.

Mr. Rayamajhi said that it was necessary to sign PPAs in US dollar terms to attract foreign investment, particularly in storage-type projects. Expediting the construction of new hydropower projects and the reconstruction of plants damaged by the earthquake, developing at least one storage-type project and upgrading cross-border transmission lines will be major focus of the planned Energy Emergency.

## EDC lobbying addressed in the Government Bill

It is a pleasure to announce that the National Energy Crisis Reduction Program and The Electricity Development Plan for a decade that was approved by the cabinet was a result of EDC lobbying for many of the positive changes to be made in the energy sector - which is apparent from the 19 point plan EDC released and informed with various government departments and ministers much before this plan was approved. We have had the most major role in bringing through the changes in this governments thinking.

Below is the 19 point plan EDC had continually lobbying and the highlighted ones have been addressed in the present government bill.

### नेपालको ऊर्जा सुरक्षा

सि.नं.	गर्नुपर्ने निर्णयहरु	सम्बद्ध मन्त्रालय	समय सीमा
१.	विद्युतीय सवारी साधन, विद्युतीय खाना पकाउने चुल्हो र ऊर्जा सम्बद्ध सबै आयोजनामा सबै प्रकारका कर, महसुल तथा मूल्य अभिवृद्धि कर (भ्याट) ०.१% मा झार्ने	अर्थ मन्त्रालय/मन्त्रिपरिषद् निर्णय/अध्यादेश	अल्पकाल
२.	विद्युतीय सवारी साधन, विद्युतीय चुल्हो, सौर्य ऊर्जाका सामग्री, जलविद्युत्का इलेक्ट्रोमेकानिकल, हाइड्रोमेकानिकल उपकरणहरु 'एसेम्बलड इन नेपाल' का लागि निम्न सुविधाहरु दिने : क) आयातीत पार्टपूजामा शून्य भन्सार दर ख) शून्य मूल्य अभिवृद्धि कर ग) १० वर्षका लागि आयकर छूट र त्यसपछिको पाँच वर्षका लागि आयकरमा ५० प्रतिशत छूट घ) लगानीकर्ताले चाहेमा उक्त उद्योग स्वतः विशेष आर्थिक क्षेत्रभित्र राख्ने ङ) विद्युतीय सवारी साधनमा ११ औं वर्षको हासकट्टी एकैपटक गर्न पाउने व्यवस्था च) विद्युतीय सवारी साधनका लागि सरकारी बैंकबाट औसत बजारको ब्याजदरभन्दा २ प्रतिशत कममा ऋण उपलब्ध गराउने र विद्युतीय सवारी साधन उपयोग गर्ने र विद्युतीय चुल्हो प्रयोग गर्ने उपभोक्तालाई बजारको औसत ब्याजदरभन्दा तीन प्रतिशत सस्तोमा ऋण उपलब्ध गराउने छ) विद्युतीय सवारी साधनको एसेम्ब्ली प्लान्टलाई नियमित विद्युत आपूर्तिको ग्यारेन्टी गर्ने ज) सबै सरकारी स्वीकृति हटाउने झ) बहुवर्षीय नवीकरण हुने सुविधासहित	अर्थ मन्त्रालयमार्फत मन्त्रिपरिषद् निर्णय/अध्यादेश/वार्षिक बजेट	अल्पकाल

	<p>कम्तीमा ३० वर्षका लागि सरकारले लिजमा जग्गाको बन्दोबस्ती गरिदिने र एसेम्बली प्लान्टको निर्माण सामग्रीमा भ्याट नलिने</p> <p>ज) श्रम विवाद तथा आमहडतालका कारण बन्द भएमा र गुण्डागर्दीका कारण तोडफोड भएमा उचित क्षतिपूर्ति दिने</p> <p>ट) विदेशी कामदार र परामर्शदाताका लागि एकैपटक पाँच वर्षको बर्किड भीसा दिने</p> <p>ठ) एसेम्बली कम्पनीलाई 'कमर्सियल्ली इम्पोटेन्ट पर्सन' (सीआइपी) को सम्मान दिने</p> <p>द) नेपालमा बनेका त्यस्ता उत्पादनलाई विदेश निर्यात गर्दा कर र भन्सार नलिने</p>		
३.	सबै प्रकारका सौर्य ऊर्जामा समान कर युक्तिसंगत संरचना लागू गर्ने, वैकल्पिक ऊर्जा प्रवर्द्धन केन्द्र र नवीकरणीय ऊर्जा परीक्षण केन्द्रको पूर्व स्वीकृति अन्त्य गरी पारदर्शी प्रणाली अवलम्बन गर्ने	अर्थ मन्त्रालयमार्फत मन्त्रिपरिषद् निर्णय/अध्यादेश	अल्पकाल
४.	घरको छतमा सौर्य पाता (सोलार रूफ टप) प्रवर्द्धनमा जोड दिने र केन्द्रीइ नवीकरणीय ऊर्जा कोषमा सहज पहुँच वृद्धि गर्ने	अर्थ मन्त्रालय	अल्पकाल
५.	नेपाल-चीनबीच वीप्पा सम्झौता गर्ने	अर्थ मन्त्रालय/मन्त्रिपरिषद्	अल्पकाल
६.	नेपाल-चीनबीच विद्युत् व्यापार सम्झौता (पीटीए) गर्ने	ऊर्जा मन्त्रालय र मन्त्रिपरिषद्बाट स्वीकृति	अल्पकाल
७.	मन्त्रिपरिषद्ले नियुक्त गरेको स्वतन्त्र विज्ञको कमिटीमार्फत नेपालको विद्युत् ऐन मस्यौदा तीन महिनाभित्र तयार गर्ने	मन्त्रिपरिषद्	अल्पकाल
८.	देशभर सोलार माइक्रोग्रीड विकास गरी उपभोक्तालाई विद्युत् आपूर्ति गर्न निजी क्षेत्रलाई सहभागी गराउने	विज्ञान, प्रविधि तथा वातावरण मन्त्रालय/मन्त्रिपरिषद्	अल्पकाल
९.	सबै जलविद्युत् तथा ऊर्जा आयोजनासित 'लेऊ वा तिर' (टेक अर पे) मा आधारित विद्युत् खरीद सम्झौता (पीपीए) गर्ने, र प्रसारणयोग्य (डिस्स्याचेबल) पीपीए बन्द गर्ने	मन्त्रिपरिषद् निर्णयबाट ऊर्जा मन्त्रालय मार्फत नेपाल विद्युत् प्राधिकरणलाई निर्देशन दिने	अल्पकाल
१०.	आगामी सन् २०२० को डिसेम्बरभित्र पूरा भई व्यापारिक उत्पादन सुरु गर्ने सम्पूर्ण जलविद्युत् आयोजनाका लागि पीपीए दरमा वृद्धि र पीपीए अवधिभर वार्षिक वृद्धिको व्यवस्था गर्ने	मन्त्रिपरिषद् निर्णयबाट ऊर्जा मन्त्रालय मार्फत नेपाल विद्युत् प्राधिकरणलाई निर्देशन दिने	अल्पकाल
११.	सौर्य, फोहोर, र अन्य नवीकरणीय ऊर्जाबाट उत्पादित बिजुलीलाई पोस्टेड रेट घोषण गर्ने	मन्त्रिपरिषद् निर्णयबाट ऊर्जा मन्त्रालय मार्फत नेपाल विद्युत् प्राधिकरणलाई निर्देशन दिने	अल्पकाल
१२.	सय मेगावाटसम्मका आयोजनाका लागि वातावरणीय प्रभाव मूल्यांकन (इआईए) गर्नुनपर्ने त्यसको साटो प्रारम्भिक वातावरणीय परीक्षण (आईईईई) मात्र गरे पुग्ने र प्रसारण लाइनका लागि पनि सोही एउटै आईईईई गरे पुग्ने	ऊर्जा मन्त्रालय, वातावरण मन्त्रालयमार्फत मन्त्रिपरिषद्/अध्यादेश	अल्पकाल

१३.	जलाशययुक्त विद्युत् आयोजनाको पोस्टेड पीपीए दर घोषणा गर्ने	ऊर्जा मन्त्रालयमार्फत विद्युत् प्राधिकरणलाई निर्देशन दिने	अल्पकाल
१४.	हालै स्थापित राष्ट्रिय प्रसारण लाइन कम्पनीमार्फत नेपालमा निर्माण हुने सबै प्रकारका प्रसारण लाइन आयोजनासम्बन्धी ठेक्का नेपाली सेनालाई दिने र प्रारम्भिक वातावरणीय परीक्षण (आईईई) बाहेक सबै प्रक्रिया खारेज गर्ने	ऊर्जा मन्त्रालय र रक्षा मन्त्रालय मार्फत मन्त्रिपरिषद्	अल्पकाल
१५.	वनसम्बन्धी स्वीकृति केवल मन्त्रालय तहबाट मात्र गर्ने र हाल वन मन्त्रालयले जलविद्युत् आयोजनाहरूसित लिदै आएको 'वातावरणीय सेवा शुल्क' खारेज गर्ने र सरकारलाई जग्गाको साटो जग्गै उपलब्ध गराउनुपर्ने नियम रद्द गर्ने	वन र ऊर्जा मन्त्रालयमार्फत मन्त्रिपरिषद्	अल्पकाल
१६.	नेपाल विद्युत् प्राधिकरणको व्यवस्थापन विश्वव्यापी प्रतिस्पर्धामार्फत नियुक्तगर्ने, २५०० मेगावाट उत्पादन गर्ने र प्राधिकरणलाई नाफामा पुऱ्याउने शर्त राख्ने	मन्त्रिपरिषद् बाट ऊर्जा मन्त्रालय	अल्पकाल
१७.	विद्युत् प्राधिकरणलाई नदी प्रवाही (रन अफ रिभर) र १०० मेगावाटभन्दा मुनिका आयोजना निर्माणमा प्रतिबन्ध लगाउने	ऊर्जा मन्त्रालयमार्फत विद्युत् प्राधिकरणलाई निर्देशन दिने	अल्पकाल
१८.	प्रसारण शुल्क (व्हिलिङ चार्ज) तोकी निजी क्षेत्रलाई बिजुली उत्पादन गर्न दिने	ऊर्जा मन्त्रालय	अल्पकाल
१९.	गार्हस्थ्य विद्युत उत्पादनका लागि 'नेट मिटरिङ' र 'फिड इन ट्यारिफ' लागू गर्ने	ऊर्जा मन्त्रालय	अल्पकाल



## Meetings Corner

On 19<sup>th</sup> February, 2016, Dr. Himesh Dhungel - Country Director of MCC, United States, Ms. Stephanie Reed - Deputy Political and Economic Chief, Embassy of the USA and Mr. Michael Boyd - Senior Energy Policy and Strategy Advisor, USAID visited EDC office. The meeting was about the possible collaboration in the upcoming Nepal Power Investment Summit. There was keen interest from all the three departments and the delegates expressed multiple ways of collaboration.



On 22nd February, 2016, EDC paid a visit to the Norwegian Embassy to brief about the Nepal Investment Power Summit and met his Excellency, Mr. Knell Tormod Pettersen, along with Mr. Jan Eriksen, Counsellor and Mr. Bibek Chapagain, Energy Advisor of Norwegian Embassy. The meeting was led by Mr. Sujit Acharya, EDC Chairperson, who explained about the importance of the Summit and possible collaboration with the Embassy. His Excellency mentioned that the Embassy was scaling down their energy sector program in Nepal, nonetheless welcomed the idea of EDC organizing the Power Summit and wished us all the best for successfully organizing the event.



Mr. Roger Shen, MD of Neoventure, EDC partner for hosting the Nepal Power Investment Summit visited Nepal on 22<sup>nd</sup> February, 2016. A small gathering was organized to welcome him and to get introduced with the core team of event management for the Summit.

On 23<sup>rd</sup> February, Mr. Shen along with Mr. Kushal Gurung, EDC Executive Committee member, Bikash Thapa, Vice-president of WAREJ and Ms. Itnuma Subba, Executive Manager of EDC visited Mr. Mukesh Kafle, Managing Director of NEA. We have requested Mr. Kafle to be one of the key speakers in the Summit. He expressed his acceptance and also gave positive response to showcase their projects for investments and to host a delegate's business trade mission to NEA.



On 24<sup>th</sup> February, Mr. Shen and Ms. Subba visited Butwal Power Company. We have invited Mr. Uttar Kumar Shrestha, CEO of the company to participate in project investment seminar. Mr. Pratik Pradhan, Vice-president of the company was also present in the meeting and he mentioned that it would be effective to involve BPC in one of the panel discussion sessions. They also showed interest in business trade mission with the foreign delegates. On the same day, we also met Mr. Maheshwor Shrestha, MD of Himalayan Infrastructure Fund. He also showed his interest in participating in project showcase seminar.



On 26th February, we visited Mr. Radhesh Pant, CEO of Investment Board Nepal (IBN). We formally informed IBN about the Summit and requested their support and collaboration. As IBN is the main government body of Nepal responsible for facilitating foreign investment in the country, we requested IBN to be the "Government Organizer" in this Summit. The meeting concluded on a positive note as IBN agreed in principle to our proposal.



On the very day, we also met Mr. Suman Prasad Sharma, Secretary of Ministry of Energy. We invited him to be one of the speakers in the Summit and requested if they would want to endorse the Summit. In principle, Mr. Sharma agreed to our proposal and also showed interest in welcoming the foreign delegation to the ministry.





## EDC Advocacy through Himalayan Times

### Rural electrification in Nepal at snail's pace

Narayan Gyawali, Chairman of NACEUN, an EDC member organisation.

“The government should accumulate all investments from different sources and organize it under one umbrella”

Electrification in Nepal's rural areas is mandatory to support economic, social, educational and cultural development of the people. Though Nepal has a long history of electricity generation, priority has only been given to accessible villages, dense residences and city areas. Community electrification in rural regions with high investment but low profit is yet to be prioritized.

The government has assigned Nepal Electricity Authority (NEA) as the authorized agency to regulate electricity business.

Each and every rural electrification programme is linked with NEA. Nepalis who are compelled to earn their living in the remote regions are waiting for their areas to be electrified but NEA has not been able to address their aspirations.

NEA which is responsible for electricity generation, transmission and distribution is facing problems in each of those areas.

Generation is not enough so there are long load shedding hours and because of insufficient transmission line, generated electricity cannot be managed properly.

So far, transmission lines have not reached all districts.

The private sector is investing mostly in alternate energy to meet energy need of the people; be it solar energy or small micro- hydro projects.

The government has also increased grants in renewable energy through the ministry of science and technology, hence showing interest in rural electrification.

Though the government has invested in rural electrification due to the absence of integrated policy and since work execution is not under the same roof, complete electrification is yet to take flight.

Community rural electrification Even though the government annually allocates budget for electrification, rural electrification has not developed as expected. When people started to invest themselves the government introduced a policy to carry out electrification programme in partnership.



The programme is being continued studying various national and international projects.

Community rural electrification programme has been implemented by NEA with a provision that the government provides 80 per cent of the total cost and 20 per cent of the total cost is to be fulfilled by community's involvement.

It allows the community to manage electricity distribution through institutional arrangement. Acknowledging people's interest and involvement seen during the implementation process the government has increased its grant to 90 per cent simplifying and facilitating this programme.

This programme has been expanded in 51 districts and through 250 community entities more than 4,00,000 households have access to electric service now. As the programme is managed by community itself, non- technical leakage is usually zero per cent. Community involvement with investment of more than one billion in electrification development process is extant. Based on community's investment, the government manages the budget.

After the development and expansion of electrification in rural regions, there has been a drastic change in those regions. Communities are being made aware about the concept of community electrification and local democracy is being exercised in a unified way by establishing institutional management.

Challenges of community rural electrification: The major reason for sluggish rural electrification is the topography of the country.

Though the government has declared and emphasized on electrification, there are difficulties in terms of money collection because of severe poverty prevailing in these remote villages.

Other challenges in implementing this policy are unclear law and policies, political instability, differing opinions of government and ministers, amendments of regulations for institutional structure, failing to work according to the theory of decentralization, inefficient and unmanaged fund mobilization, not paying proper attention towards monitoring and quality control, et cetera.

How can rural electrification be sustainable? The government should review the development and expansion achieved in rural electrification. Reasons hindering development of villages from a long time should be identified. Models exercised by other countries and Nepal's Community Rural Electrification Programme (CREP) should be reviewed.

During the process of development, government should focus on giving services to villages. The government should accumulate all investments from different sources and organize it under one umbrella. Programmes should be conducted according to priority, organizational structure should be developed, and local body should be included with the theory of decentralization in mind.

(The article was published on Himalayan Times, 7<sup>th</sup> February 2016. Post is available at: [epaper.thehimalayantimes.com/Details.aspx?id=7438&boxid=42041604&dat=02/07/2016](http://epaper.thehimalayantimes.com/Details.aspx?id=7438&boxid=42041604&dat=02/07/2016) ).

### Wind power feasibility

Kushal Gurung, CEO of Wind Power Nepal & Executive Committee Member of EDC.

“Many argue that Nepal’s topography is not conducive for large scale wind farming”

Recently wind energy has become the talk of the town after the Prime Minister declared generation of electricity from wind energy.

This was followed by news that a proposal was tabled at the Investment Board Nepal (IBN) by a private company to generate up to 3000MW within three years, of which 300MW will be generated within a year. And quite amusingly the Cabinet authorized the IBN to go ahead on the project, even before assessing the credibility of such mega- scale proposal.

On hindsight, it is clear that the decision was taken in haste.

We see a lack of proper counsel to the government from its group of advisors and concerned authorities. But, on a brighter side, this episode did manage to bring the wind power into forefront of our energy discussion.

There is genuine concern among energy experts as to whether wind energy is commercially viable in a country like Nepal. To scrutinize this concern, it is necessary to analyze three key issues — the wind resources in Nepal, wind technology development in the world, and the cost of wind power generation.

Though we do not have proper country wide wind data, there are many commercial service providers who provide satellite wind maps for any region or country. Those reports show that there are certain pockets in Nepal, like Mustang, which have very good wind profile for commercial wind farming.

However, this is only an indicator for site selection. It is very important to collect wind data, for at least one to two years, using met mast at the site.

Many argue that Nepal’s topography is not conducive for large scale wind farming. This is a fair judgement, if one wishes to erect big wind turbines on hill tops. On the contrary, our good wind profile sites are actually along big river corridors and most of them have road access. There is now all- weather single lane road access to Jomsom, one the main wind sites, which could easily accommodate hydraulic trailers that can carry blades up to 25 metres tall, which means turbine size of up to 650KW. Cost of wind power generation has come down drastically in the last decade. It is slowly becoming a competitive source of energy, even without subsidy.

In 2009, the cost of wind power in North America on an unsubsidized basis was 13.5 cents per KWh. Today, the best-in- class unsubsidized wind can be built at three cents (Rs 3.25/ unit). A recent tender for 850MW of wind projects in Morocco, the bidding price was around three cents per unit. Cost of power generation, though, depends on wind profile of the site and favorable policies like Accelerated Depreciation Tax and concessional finance.

Despite all the potential, we are not yet ready to harness our wind energy within one year, as promised by the Prime Minister.

We still lack key infrastructures like transmission lines in good wind sites and wind data for reliable power generation forecasting.



However, the future does look promising, as wind technology continues to get better and cheaper. Let us hope we have all the necessary policies and infrastructure in place within the next few years.

(The article was published on Himalayan Times, 14th February 2016. Post is available at: [epaper.thehimalayantimes.com/epaperpdf/1422016/1422016-md-hr-34.pdf](http://epaper.thehimalayantimes.com/epaperpdf/1422016/1422016-md-hr-34.pdf) ).

### Call for integrated energy policy

Amrit Nakarmi, Professor at CES, Institute of Engineering & EDC Advisory Panel Member.

### Nepal unable to harness indigenously available hydropower

Nepal is facing the worst energy supply crisis and its economy has been brought to a standstill. This in turn is delivering a big blow to us Nepalis and has all economic sectors, such as, transport, industry, education, and health in turmoil.

In recent years, oil supply crisis has been a frequent phenomenon due to reasons such as; inability of Nepal Oil Corporation (NOC) to pay its dues to the Indian Oil Corporation (IOC), frequent strikes of different professional associations involved in petroleum distribution and seasonal demand surges of petroleum products.

Energy analysts were hinting about the occurrence of frequent oil supply crisis for the past several years because of Nepal's growing dependence on totally imported fossil fuel in meeting its energy requirements.

Nepal has not taken any kind of energy security measures to protect its people from an energy crisis. Petroleum imports in Nepal have almost quadrupled in physical terms in two decades from 550,000 kL in 1995 to 1.8 million kL in 2015 but in monetary terms jumped to Rs 125 billion in 2015 from Rs 20 billion in 2004, more than six times in a decade.

For end- use services like cooking which consumes more than 50 per cent of the primary energy supply in Nepal, cooking on electricity has become cheaper. But alas, Nepal has not been able to properly harness available hydropower.

However, policy- makers and government officials are much more keenly interested in export of hydro- electricity rather than developing it for domestic consumptions.

No wonder, unavailability of electricity has put more pressure on imported fossil fuels such as liquefied petroleum gas (LPG) and diesel.





Heavy dependence on imported fossil fuels has contributed in generating adverse effect in the balance of payment and emitting more green- house gases in Nepal. All these matters call for an integrated energy policy for sustainable economic development and energy security of the country.

An integrated approach is very essential as energy forms can be transformed and interchanged from one form to another and it has been shown from various energy analysis. Had Nepal harnessed sufficient and reliable electricity from hydropower resources, almost 50 per cent of petroleum imports could be curtailed and an outflow of 50 billion could be saved annually.

Diversification of oil import sources refers to the mix of state providers of oil. It is a policy designed to secure stable oil supply by reducing the risks that may arise from excessive dependence on a single import source. Nepal has not paid any attention to this fact despite several major petroleum supply disruptions.

Dependence on one supplier in the country as well as outside the country for petroleum products is causing fuel crisis in the country frequently. It is high time Nepal establishes an independent energy regulatory body for deregulation in electricity supply and petroleum marketing.

For the development of electricity supply, the current structure of Nepal Electricity Authority (NEA) is a bottleneck and it has to be unbundled for development of electricity market and hence, for energy security.

Similarly, monopoly of NOC has to be disbanded and private sector should be involved in marketing of petroleum products in the country.

This involvement of private sector will, of course, diversify supply in the country and will have many outside the country suppliers which definitely will reduce the supply disruptions.

The current situation is favourable for private participation in oil sector as domestic prices are higher than international oil prices. Regulatory body should make oil marketers bound for maintaining mandatory oil reserves in the range of 90 days' equivalent of daily sales which can help in meeting short term supply disruptions.

In conclusion, Nepal should take the current oil supply crisis as a major lesson take concrete steps as soon as possible and should not presume that oil supply will smoothen out soon and everything will be normal as before.

Energy is such a sector for which one may not have immediate solutions because it takes lot of proper planning, investment, policy and institutions in place.

Nepal should develop an integrated energy policy soon and must diversify both electricity and petroleum markets in the country. It is essential for sustainable development and energy security of the country.

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## Announcement from Butwal Power Company, an EDC member organization

### प्रेस बिज्ञप्ती

#### न्यादी जलविद्युत आयोजना (३० मे.वा.) को ऋण सम्झौता सम्पन्न

यस बुटवल पावर कम्पनी लि.को सहायक कम्पनी न्यादी हाइड्रोपावर लि.ले निर्माण गर्न लागेको ३० मेगावाट क्षमताको न्यादी जलविद्युत आयोजनाको लागि मिति २०७२ माघ २० गते (तदनुसार फेब्रुअरी ३, २०१६) का दिन ऋण सम्झौता सम्पन्न भएको छ। यस आयोजनामा एभरेष्ट बैंक लिमिटेडको अगुवाईमा नवल बैंक लिमिटेड, ग्लोबल आइएमई बैंक लिमिटेड, हिमालयन बैंक लिमिटेड, सनराइज बैंक लिमिटेड र जलविद्युत लगानी तथा विकास कम्पनी लिमिटेडको सहभागिताको सहवित्तियकरण समूहले रु ४ अरब ४० करोड ऋण लगानी गर्नेछ।

न्यादी हाइड्रोपावर लि. एक आयोजना विकास कम्पनीकोरूपमा रहेको छ। यस कम्पनीमा बुटवल पावर समूहको बहुमत शेयरधनीकोरूपमा र लमजुङ विद्युत विकास कम्पनी लि.को सहभागी शेयरधनीकोरूपमा शेयर स्वामित्व रहेको छ। आयोजनाका स्थानीय जनता तथा सर्वसाधारणलाई समेत आयोजना कम्पनीले शेयर जारी गर्ने योजना समेत रहेको छ।

न्यादी जलविद्युत आयोजना पश्चिम नेपालको लमजुङ जिल्ला अन्तर्गत बाहुनडाँडा गाविसमा अवस्थित छ। यस आयोजनाको विद्युत खरिद बिक्री सम्झौता सम्पन्न भईसकेको छ। ठेकेदारको नियुक्तिको प्रक्रियामा तिब्रता दिइएको छ र निकट भविष्यमानै सो कार्य सम्पन्न गर्ने लक्ष रहेको छ। यस आयोजनाको निर्माण कार्य २०७६ साल भित्र सम्पन्न गर्ने लक्ष लिइएको छ। यस आयोजनाको निर्माण सम्पन्न भएपछि, नेपालको हालको उर्जा अभावलाई न्यूनिकरण गर्नका लागि महत्वपूर्ण योगदान पुग्ने विश्वास लिइएको छ।



## Media Coverage

### १० वर्षमा १० हजार मेगावाट विद्युत उत्पादन गर्ने सरकारको घोषणा

काठमाडौं- योजना कार्यान्वयन र त्यसको निरन्तरता दिन नसकेको सरकारले फेरि १० वर्षमा १० हजार मेगावाट बिजुली उत्पादन गर्ने घोषणा गरेको छ। घोषणा गर्न लागिएको 'ऊर्जा संकटकाल निवारण तथा विद्युत विकास दशक'मा उक्त परिमाणको बिजुली उत्पादन गर्ने लक्ष्य राखिएको हो।

विद्यमान ऊर्जा संकट निवारण गर्दै जलविद्युतलाई आर्थिक विकाससँग जोड्नुको विकल्प नरहेकाले यो योजना अघि सारिएको उपप्रधान तथा ऊर्जामन्त्री टोपबहादुर रायमाझीले बताए।

'मन्त्रिपरिषदबाट यही साता संकट निवारणकाल घोषणा हुन्छ, १ वर्षमा जनताले महसुस गर्ने गरी लोडसेडिङ अन्त्य हुन्छ,' उनले भने, 'संकटकाल निवारणको अवधि १० वर्षको हुनेछ, सो समयभित्र १० हजार मेगावाट विद्युत उत्पादन गर्ने दीर्घकालीन योजना छ।'

जलस्रोत तथा ऊर्जा पत्रकार समाज (वारेज) र इनर्जी डेभलपमेन्ट काउन्सिल (इडिसी) ले राधधानीमा संयुक्तरूपमा आयोजना गरेको अन्तरक्रिया कार्यक्रममा बोल्दै मन्त्री रायमाझीले संकटकाल निवारण गर्न तत्कालीन, अल्पकालीन र दीर्घकालीन योजना ल्याउन लागिएको समेत जानकारी दिए।

यसअघि नेकपमा एमाओवादीका अध्यक्ष पुष्पकमल दाहाल प्रधानमन्त्री हुँदा तत्कालीन सरकारले १० वर्षमा १० हजार मेगावाट बिजुली उत्पादन गर्ने उद्घोष गरेको थियो। तर, उक्त योजना त्यसयताका कुनै सरकारले पनि कार्यान्वयन गरेनन्। त्यतिबेला उक्त योजना कार्यान्वयन गरेको भए पुनः संकटकाल घोषणा गर्नुपर्ने।

'एक वर्षभित्र जनताले महसुस गर्न सक्ने गरी लोडसेडिङ अन्त्य हुन्छ, विस्तृत अध्ययन गरेर नै सरकारले सबै कुरा बाहिर ल्याउन लागेको हो,' उनले भने, 'रातारात परिवर्तन हुन्छ भनेर अपेक्षा राख्नु हुन्न, सरकारले योजना बनाएको छ, त्यही योजनाले सबै संकट निवारण गर्न सक्छ।'

दाहाल नेतृत्वको सरकार बाहिरिएपछि माधवकुमार नेपाल नेतृत्वको सरकारले २० वर्षमा २५ हजार मेगावाट विद्युत उत्पादनको योजना बनायो। तुरुन्तै फेरिएको झलनाथ खनाल नेतृत्वको सरकारले साढे ४ वर्षमा २ हजार ५ सय मेगावाट विद्युत उत्पादन गर्ने भन्दै अर्को ऊर्जा संकटकाल घोषणा गरेको थियो।

एउटा सरकारले ल्याएको योजना अर्कोले कार्यान्वयन नगर्ने परिपाटीका कारण विगतमा लक्ष्यअनुसार कुनै काम हुन सकेन। वर्तमान सरकारले योजना कार्यान्वयन गर्नेभन्दा लोकप्रियताका लागि ऊर्जा संकटकाल निवारण घोषणा गर्न लागेको जानकारहरूको विश्लेषण छ।

मन्त्री रायमाझीले भने विगतमा कार्यान्वयन हुन नसकेको विषयमा आफू जिम्मेवार नरहेको र यो योजना कार्यान्वयन गराएर छाड्ने प्रतिबद्धता दोहोर्याए। '१ सय ४ वर्षमा हिउँदमा जम्मा ३/४ मेगावाटमात्र विद्युत उत्पादन हुन सक्थ्यो, यो परम्परा पछ्याएर काम हुँदैन, अब मैदानमा उत्रिएर काम गर्नुपर्छ,' उनले भने।

एक वर्षभित्र लोडसेडिङ कम गर्न अर्को वर्षको हिउँदसम्म जडित क्षमता १ हजार ५ सय मेगावाट पुग्ने उनले दाबी गरे। उनका अनुसार यसका लागि भारतबाट ४ देखि ५ सय मेगावाटसम्म आयात हुनेछ। आगामी दुई वर्षभित्र जलविद्युतबाटै लोडसेडिङ अन्त्य गर्न सकिने रायमाझीको दाबी थियो।

यस्तै, कार्यक्रममा ऊर्जा सचिव सुमनप्रसाद शर्माले संकटकाल जलविद्युत आयोजना निर्माणमा देखिएका समस्या समाधान हुने गरी ल्याउन लागिएको बताए। 'जति नै प्रयास गरे पनि केही वर्षसम्म भारतबाट विद्युत आयात नगर्दासम्म संकट कम गर्न सकिँदैन,' उनले भने, 'अल्पकालीन समयका लागि भारतबाट आयात गर्ने र दीर्घकालमा बढीको बिजुली भारत बेच्ने हो।'

वन, वातारण र जग्गा अधिग्रहणमा देखिएका समस्या सहज बनाउँदै जानुपर्ने हुँदा जटिल नीति नियम पन्छाएर दुरत गतिमा काम गर्नुपर्ने पनि शर्माले बताए। 'प्रसारण लाइन निर्माणमा वन क्षेत्र पर्ने हुँदा यसमा सरकारले सहजीकरण गर्नुको विकल्प छैन,' उनले भने, 'निजी जग्गाबाट लाइन विस्तार गर्दा झनै समस्या हुन्छ।'

जलविद्युत तथा पूर्वाधार आयोजना निर्माणक्रममा भूमिसुधारमा देखिएका समस्या समाधान गर्न मन्त्रालय तयार रहेको भूमिसुधार मन्त्री रामकुमार सुब्बाले बताए। 'समस्यामात्र देखाएर विकास निर्माण अघि बढ्न सक्दैन, वन, वातावरण, भूमिसुधार र ऊर्जा मन्त्रालयबीच सहकार्य गरेर काम गर्नुपर्छ,' उनले भने।

यसैगरी, वन, वातावरण र जग्गा सम्बन्धी समस्या समाधानका विषयमा सरोकारवाला निकायबीच सहकार्य गरेर काम भइरहेको भूमिसुधार सचिव मोहनकृष्ण सापकोटाले बताए। वन, वातावरण, जग्गा अधिग्रहण र विद्युत खरिद सम्झौता (पिपिए) मा सहजीकरण गर्न सकेमात्र स्वदेशी निजी क्षेत्रले आयोजना बनाउन सक्ने कार्यक्रममा सहभागी निजी प्रवर्द्धकको धारणा थियो।

बक्स

'ऋण नर्तिदासम्म डलरमा पिपिए'

उपप्रधान तथा ऊर्जामन्त्री टोपबहादुर रायमाझीले विदेशी लगानीका जलविद्युत आयोजनामा लगानी फिर्ता नहुँदासम्म अमेरिकी डलरमा विद्युत खरिद सम्झौता (पिपिए) गर्न सकिने बताएका छन्।

जलविद्युत उत्पादनमा स्वदेशी लगानी मात्र पर्याप्त नरहेको भन्दै विदेशी लगानीका आयोजनाको हकमा प्रवर्द्धकले बैंक ब्याज नतिर्दासम्म यस्तो सुविधा दिन लागिएको बताए। सरकारले घोषणा गर्ने तयारी गरेको ऊर्जा संकटकाल निवारणमा यस्तो सुविधा दिन लागिएको हो।

'डलरमा पिपिए गर्ने हुन्न भन्ने धारणा राख्न हुन्न, तर त्यसको व्यवस्थापन कसरी गर्ने भन्ने मुख्य कुरा हो,' उनले भने, 'लगानी र जोखिम व्यवस्थापनको अध्ययन गरेर बढीमा १० वर्षका लागि मात्र डलरमा भुक्तानी दिने वा पिपिए गर्ने प्रावधान बन्छ।'



सरकारले स्वदेशी लगानीका आयोजनाका लागि हिउँदको बिजुली मात्र खरिद गर्ने गरी पिपिए गर्ने गरेको र विदेशीको हकमा डलरमा गर्न लागेको भन्दै निजी प्रवर्द्धकले असन्तुष्टि व्यक्त गरेका थिए। इडिसीका अध्यक्ष सुजित आचार्यले सरकारले स्वदेशी लगानीकर्तालाई हतौत्साहित गर्न लागेको बताए।

'नेपाली रुपैयाँमा पिपिए गर्दा सरकारले जोखिम देख्छ, तर डलरमा गर्दा देख्दैन,' उनले भने, 'राजधानीमा आयोजित अन्तरक्रिया कार्यक्रममा उनले भने, 'निजी क्षेत्रले जलविद्युतमा लगानी नै नगर्न भन्दै पाखा लगाउन खोजेको छ।'

(The article was published in Nagariknews dated 8<sup>th</sup> February, 2016 and the link is available at: [nagariknews.com/main-story/story/54235.html](http://nagariknews.com/main-story/story/54235.html) ).

### Energy, Forest ministries argue about eco issues

The government is close to announcing an Energy Emergency to remove procedural hurdles in the way of the development of hydropower and transmission lines, but the Energy and Forest ministries still do not see eye to eye about certain issues.

Speaking at an interaction on Sunday organised by the Energy Development Council, officials of the two ministries expressed divergent views on whether the forest administration was a hurdle to hydropower development. They, however, agreed that a balance should be sought in the development of hydropower and conservation of forests.

Energy Secretary Suman Sharma said that the Forest Ministry should not forbid the felling of trees to erect transmission lines because their impact on the environment would be temporary. "Once the power lines have been constructed, trees grow there once again," he said. "It is very complicated to construct power lines on private land."

Hydropower developers have also identified forest clearance as being one of the major hindrances to the development of hydropower projects. Recently India's Satluj Jal Vidyut Nigam, the developer of the 900 MW Arun III Hydropower Project, complained that it was ordered to follow a parliamentary committee order under which the developer has to hand over an equivalent amount of private land surrounding the forest, according to Investment Board Nepal. The Natural Resources Committee under the previous parliament had also directed the government to create a legal provision barring the use of forest land for purposes other than forestry.

Joint Secretary Krishna Acharya of the Forest Ministry said that there wouldn't be any forests left in the country in a short period if they are allowed to be used for any purpose demanded. "As hydropower is the country's priority, we have made arrangements for a separate department to simplify tree cutting and acquisition of forest land for the hydropower sector," he added.

Acharya defended his ministry's actions and said that they could not permit forest land to be used and trees to be cut for some hydropower and road projects as they had come to the ministry without conducting an environment impact assessment (EIA).

"Many of them come to the ministry after receiving the contract," he added. He urged the developers and other ministries to involve the Forest Ministry from the beginning so that problems regarding forest clearance and acquisition of forest land could be solved early on.

Lawmaker and chairman of the parliamentary Agriculture and Water Resources Committee Gagan Thapa expressed unhappiness at government agencies for continuing to obstruct the development of energy projects.

### Energy Emergency policy ready

Deputy Prime Minister and Energy Minister Top Bahadur Rayamajhi said that his ministry had concluded formulating the policy on the planned Energy Emergency, and that it would “possibly” be declared by the next Cabinet meeting.

“We will brief the Prime Minister about the plan and try to get it endorsed by the next Cabinet meeting,” said Rayamajhi at an interaction on Sunday. As per the ministry’s plan, 10-year power purchase agreements (PPA) will be signed with developers in US dollar terms.

While there are concerns about the large payments that the Nepal Electricity Authority (NEA), the only power purchaser in the country, has to make to developers, Rayamajhi said that it was necessary to sign PPAs in US dollar terms to attract foreign investment, particularly in storage-type projects. Expediting the construction of new hydropower projects and the reconstruction of plants damaged by the earthquake, developing at least one storage-type project and upgrading cross- border transmission lines will be major focus of the planned Energy Emergency.

The government has also planned to announce producing 10,000 MW of power in the next 10 years. The Energy Emergency, which is expected to last for three to five years, will be declared under the theme of Energy Crisis Elimination Decade.

(The article was published in Kathmandu Post dated 8<sup>th</sup> February, 2016 and the link is available at: [kathmandupost.ekantipur.com/news/2016-02-08/energy-forest-ministries-argue-about-eco-issues.html](http://kathmandupost.ekantipur.com/news/2016-02-08/energy-forest-ministries-argue-about-eco-issues.html) ).

## Great disconnect in tackling energy crisis

Abhilasha Rayamajhi

NEA must function as a business entity and government must walk the talk

It is an irony that despite being endowed with tremendous hydropower potential, Nepal is facing an acute energy crisis. At present, daily 13 hours of power cut is the sad reality of the nation.

The government claims it will prioritize the energy sector and promises to end load shedding within a year by declaring an energy emergency and executing policies by fast track. However, stakeholders do not believe that the government is serious or actually intends to walk the talk. The failure of the energy emergency declared in 2008 and the inefficiency of the government has led the public to lose trust in such commitments.

Sujit Acharya, Chairperson of Energy Development Council (EDC) claims, “It seems the most inefficient and uneducated people are in the Nepal government and top



levels of management in Nepal Electricity Authority (NEA).” According to him, “the development of the hydropower sector has been disrupted mainly due to the bureaucracy and government officials themselves working for their selfish motives rather than national interest.”

#### PPA problems

Acharya presented the three key obstacles to development of the hydropower sector. He pointed out that the government of Nepal plans to announce the signing of Power Purchase Agreement (PPA) in US Dollars for foreign investors in the upcoming Energy Crisis Mitigation Plan but refuses to sign cheaper PPA for Nepali developers. “Signing dispatchable PPA means that NEA will purchase electricity only at the time of need. Banks and financial institutions will never finance hydropower projects with such PPA because it is risky to invest in projects that do not guarantee revenue,” he said. Therefore, hydropower projects developed by the Nepali private sector have been blocked, according to him.

#### Bureaucratic hurdles

Secondly, he stressed that the bureaucracy and red tape in the Ministry of Forest and Soil Conservation was a problem. “The Ministry requires hydropower developers to pay a fee for its contribution to conserve trees,” he stated during his presentation. While around 78 per cent of the population in Nepal still depends on firewood for fulfilling their energy needs, he said, The ministry requires Nepali developers who rent land for 30 years to pay a rental fee and also provide an equivalent amount of land that it has rented.” In order to rent this land and cut down trees a cabinet decision is required which takes approximately two years at the least. He claimed that the department of forest further intentionally delays project development by not even looking at the land or presenting problems for the land selected by the developer.



#### Complacent and confusing

Thirdly, he highlighted obstacles created by the Ministry of Land Reform and Management. He said, “The ministry applies the land ceiling rule of 75 ropanis to hydropower projects in the same manner as to individual traders. Then it takes another one to two years to get further approvals.” The land acquisition, land ceiling for generation, transmission and distribution of licenses is also a lengthy and uncertain process.

The problem is that there is lack of collaboration between the Ministry of Energy, Ministry of Land Reform and Management and the Ministry of Forest and Soil Conservation, which has led confusion and lack of efficiency in development of the hydropower sector.

In such a confusing situation Acharya questioned the seriousness of the Prime Minister, who recently stated that load shedding will end in a year, wondering if those in government understood the complexities of these problems and how the government itself is the biggest obstacle.

(The article is derived from Himalayan Times dated 14<sup>th</sup> February, 2016 and the full coverage is available at: [epaper.thehimalayantimes.com/epaperpdf/1422016/1422016-md-hr-29.pdf](http://epaper.thehimalayantimes.com/epaperpdf/1422016/1422016-md-hr-29.pdf) ).

## Media Coverage

### World's largest concentrated solar plant switches on in the Sahara

Phoebe Parke

(CNN)Morocco has switched on what will be the world's largest concentrated solar power plant.



The new site near the city of Ouarzazate -- famous as a filming location for Hollywood blockbusters like "Lawrence of Arabia" and "Gladiator" -- could produce enough energy to power over one million homes by 2018 and reduce carbon emissions by an estimated 760,000 tons per year, according to the Climate Investment Funds (CIF) finance group.

As His Majesty Mohammed VI of Morocco pressed a button on 4 February 2016, the first phase of the three-part project was set in motion.

#### **Harnessing the power of salt**

The solar plant, called the Noor complex, uses concentrating solar power (CSP) which is more expensive to install than the widely used photovoltaic panels, but unlike them, enables the storage of energy for nights and cloudy days.

Mirrors focus the sun's light and heat up a liquid, which, when mixed with water, reaches around 400 degree Celsius. The steam produced from this process drives a turbine and generates electrical power.

A cylinder full of salt is melted by the warmth from the mirrors during the day, and stays hot enough at night to provide up to three hours of power, according to World Bank, who partially financed construction of the plant through a \$97 million loan from the Clean Technology Fund.

"With this bold step toward a clean energy future, Morocco is pioneering a greener development and developing a cutting edge solar technology," said Marie Françoise Marie-Nelly, World Bank Country Director for the Maghreb.



"The returns on this investment will be significant for the country and its people, by enhancing energy security, creating a cleaner environment, and encouraging new industries and job creation."

### Setting an example

Imported fossil fuels currently provide for 97% of Morocco's energy need, the World Bank says . As a result the country is keen to diversify and start using renewable energy.

This goal was one of the reasons that Morocco was chosen to host the next United Nations climate change conference (COP 22) in November 2016, according to the CIF.



An aerial view of the solar mirrors at the Noor 1 concentrated solar power plant

"Africa, in general, and North Africa in particular, have tremendous potential for solar generation that remain largely untapped," Sameh Mobarek, Senior Counsel and World Bank's project manager told CNN.

"Morocco's leadership in this area may provide the model for other countries to follow in pursuing development of their energy sectors in a sustainable manner."

### Lasting impact

As well as lowering carbon emissions and dependence on fossil fuels, this plant is expected to increase the share of renewable energy in total electricity generation from 13% to 42%, according to CIF.

It is also hoped that the project will positively impact the surrounding area. Approximately 583,000 people live in Ouarzazate town 10km (6.2 miles) from the site.

The poverty rate there is 23% but the hope is that the cleaner energy and better supply will reduce the occurrence of flickering lightbulbs and malfunctioning hospital equipment.

(The article is derived from CNN and the link is available at: [edition.cnn.com/2016/02/08/africa/ouarzazate-morocco-solar-plant/index.html](http://edition.cnn.com/2016/02/08/africa/ouarzazate-morocco-solar-plant/index.html) ).

## The Home Design That Could Change the Economics of Solar Forever

Graham Winfrey

Portugal-based architectural project Houses in Motion has come up with a genius new design to make solar power much more cost-effective.

Turning sunlight into energy would be a lot easier if the Earth weren't constantly spinning.

Because solar panels work best when they're directly facing the sun--which happens only for a short period each day--most of the time, a significant amount of solar power falls by the wayside. To help solve this problem, Portugal-based design project Casas em Movimento (Houses in Motion) has come up with a revolutionary design using a rotating house whose photovoltaic roof follows the sun throughout the day, Fast Company reports. The interior of the house even has a section that stays stationary at all times, allowing you change and customize the layout throughout the day depending on how you want to use the space.

Architects are building the first house to use the design in the Portuguese city of Matosinhos. The project's creator, Manuel Vieira Lopes, professor of architecture at Portugal's University of Porto, is currently seeking potential buyers for a prototype version of the home. (A home just over 1,000 square feet would cost around 500,000 euros.) To see how the design works, check out the video below in the link: [www.youtube.com/watch?v=42b1JX9htAg](http://www.youtube.com/watch?v=42b1JX9htAg)

Casas em Movimento's solar panels produce about five times as much energy as the house needs, resulting in excess power that an owner could sell back to the utility grid. In the U.S., however, the program that credits solar energy generators for the electricity added back to the grid--called net metering--has taken a hit recently. Last month, Nevada, California, and Hawaii introduced cutbacks that are changing the economics of solar panels on rooftops, MIT Technology Review reports.

Some 20 other states are also considering similar changes, which could make it even harder to reach grid parity--when the cost of solar is comparable to the average price of power from the grid. If consumers no longer receive net metering fees, residential solar power "makes no financial sense," SolarCity CEO Lyndon Rive recently told The New York Times.

Still, in the long-term, solar power in the U.S. should have a very bright future. An Oxford University study published last month predicts that the price of solar will continue to fall 10 percent per year for several more years. By 2027, solar power should be able to provide 20 percent of the world's energy needs, according to the study.

(The article is derived from Inc. published on 17<sup>th</sup> February, 2016 and the link is available at: [www.inc.com/graham-winfrey/how-this-revolutionary-design-firm-is-hacking-the-sun.html](http://www.inc.com/graham-winfrey/how-this-revolutionary-design-firm-is-hacking-the-sun.html) ).

## The Consumerization of Energy Is Just Beginning

Bennett Cohen

In May 2015, Elon Musk revealed the Tesla Powerwall -- a stationary battery for homeowners that features essentially the same battery technology as Tesla's cars. Energy analysts pored over the specifications of the lithium-ion technology because of the promise it has to impact both transportation and electricity markets.

For most observers, the salient detail was the Powerwall's price. Weighing in at \$350 per kilowatt-hour, all-in -- well below the industry's expectations for battery cost evolution -- the device raised a lot of eyebrows.

What intrigued us most was that the Powerwall is clearly conceived as a consumer product. While its sleek design and hyped launch felt totally natural to those accustomed to following Apple, it served as a wakeup call to the energy industry: energy is being consumerized.

It's remarkable that fans went nuts over the launch of a battery -- a technology that usually just enables something interesting (like an iPhone) rather than being interesting in and of itself. Energy, the basic foundation of our prosperous lifestyles, is moving away from centralized power plants and closer to the customer. And customers choose winners and losers in radically different ways than do utilities or the other incumbents of the energy industry.

This disruption and consumerization of energy is being driven by a number of accelerating trends:

- a. The shift from a centralized to a more distributed energy system architecture
- b. The global drive toward lower-carbon energy
- c. The rollout of the internet of things
- d. Developing countries leap-frogging conventional power grids to consumer energy



### **From centralized to distributed energy**

As Amory Lovins and I wrote about in 2010, the power markets are clearly shifting away from cathedral-like coal and nuclear power stations toward modular, mass-producible, and highly scalable micropower technologies -- renewables, like solar and wind, and efficient combined-heat-and-power systems (mostly fueled with natural gas). The ascendancy of micropower is democratizing the future of the energy system, enabling everyone from individual homeowners to commercial and industrial customers to quickly select and obtain a portfolio of distributed solutions, avoiding the decade-long approval processes required to build multibillion-dollar coal or nuclear power plants.

### **The decarbonization of energy**

The Paris climate agreement made at least one thing clear -- the world intends to shift toward a lower-carbon energy system. Technologies like rooftop solar and home batteries can significantly contribute to decarbonizing the power sector. Having just committed to emission-reduction targets on the global stage, governments around the world will find it hard to side with incumbents to slow the adoption of these consumer energy technologies. In fact, governments will likely promote them, further accelerating the consumerization of energy.

### **The internet of energy**

The internet of things is moving out of a phase characterized by hype and uncertainty into one of scale and impact. Many sectors will be impacted, including energy. A proliferation of sensors and controls will enable an intelligent and resilient energy system made up of myriad distributed energy resources. The internet of things will also create a platform for new business models that derive additional value from distributed energy resources for both customers and energy markets.

### **Leap-frogging energy**

In countries like the U.S., we are slowly seeing a transition from the old energy system to the new. In contrast, developing countries in Asia and Africa are more often leap-frogging the centralized power system and going straight to consumer energy. Tired of waiting for a centralized solution to reach them, customers in countries as varied as Kenya and Nepal are choosing to purchase consumer solar-plus-battery power products from M-Kopa or Empower Generation. For many families and communities in these regions, their first experience of reliable electricity will come from a solar panel on their roof and a small battery on their wall. Though on a smaller scale, these are the same essential technologies and concepts behind Tesla's Powerwall.

The consumerization of energy is just beginning, and it represents a profound shift in the way we power society. Opportunities abound for entrepreneurs and investors, but most of all for consumers of energy.

Bennett Cohen is a senior investment associate with Shell Technology Ventures and chairman of Empower Generation.

(The article is derived from Greentechmedia published on 5th February, 2016 and the link is available at: [www.greentechmedia.com/articles/read/The-Consumerization-of-Energy-is-Just-Beginning](http://www.greentechmedia.com/articles/read/The-Consumerization-of-Energy-is-Just-Beginning) ).

### If you could have one superpower, what would it be?

By Bill and Melinda Gates

We were asked that question recently by some high school students in Kentucky.

They also asked us about our favorite breakfast cereal (Bill: Cocoa Puffs; Melinda: Wheat Chex); what animal we would want to be (Bill: a bonobo; Melinda: a white leopard); and if we know how to dance the Whip and Nae Nae (one of us does).

The superpower question was our favorite.

To fly. To be invisible. To travel through time. All good options.

Trying to keep up with our foundation work and our three children's schedules, we gave responses that will be immediately familiar to other parents.

"More time!"

"More energy!"

When we sat down to write this year's letter, those answers stuck with us. Sure, everyone wants more time and energy. But they mean one thing in rich countries and something else entirely when looked at through the eyes of the world's poorest families.

Poverty is not just about a lack of money. It's about the absence of the resources the poor need to realize their potential. Two critical ones are time and energy.

More than one billion people today live without access to energy. No electricity to light and heat their homes, power hospitals and factories, and improve their lives in thousands of ways.

Likewise, a lack of time creates obstacles too. It's not simply the feeling of not having enough hours in the day. It's the crippling effect of having to perform the backbreaking work that needs to get done when there's no electricity.

We are dedicating this year's letter to talking about the opportunities we see to overcome these often overlooked challenges. We're writing to high school students because you're the ones who will ultimately be solving these problems. (Our interests in time and energy are separate from our foundation's work on health and poverty. But it's all related. Solving these problems will make it easier to save lives and make the world a more equitable place.)

More time. More energy. As superpowers go, they may not be as exciting as Superman's ability to defy gravity. But if the world can put more of both into the hands of the poorest, we believe it will allow millions of dreams to take flight.



## More energy

Bill

At some point today, you'll probably do one or all of these things: Flip a switch for light. Take fresh food from a refrigerator. Turn a dial to make your home warmer or cooler. Press a button on your laptop to go online.

You probably won't think twice about any of these actions, but you will actually be doing something extraordinary. You will be using a superpower—your access to energy.

Does that sound ridiculous?

Just imagine, for a minute, life without energy.

You don't have a way to run a laptop, mobile phone, TV, or video games. You don't have lights, heat, air conditioning, or even the Internet to read this letter.

About 1.3 billion people—18 percent of the world's population—don't need to imagine. That's what life is like for them every day. You can see this fact for yourself in this photograph of Africa at night taken from space.



Africa has made extraordinary progress in recent decades. It is one of the fastest-growing regions of the world with modern cities, hundreds of millions of mobile phone users, growing Internet access, and a vibrant middle class.

But as you can see from the areas without lights, that prosperity has not reached everyone. In fact, of the nearly one billion people in sub-Saharan Africa, 7 out of every 10 of them live in the dark, without electricity. The majority of them live in rural areas. You would see the same problem in Asia. In India alone, more than 300 million people don't have electricity.

If you could zoom into one of those dark areas in that photograph, you might see a scene like this one. This is a student doing her homework by candlelight.

I'm always a little stunned when I see photographs like this. It's been well over a century since Thomas Edison demonstrated how an incandescent light bulb could turn night into day. (I'm lucky enough to own one of his sketches of how he planned to improve his light bulb. It's dated 1885.) And yet, there are parts of the world where people are still waiting to enjoy the benefits of his invention.

If I could have just one wish to help the poorest people, it would be to find a cheap, clean source of energy to power our world.

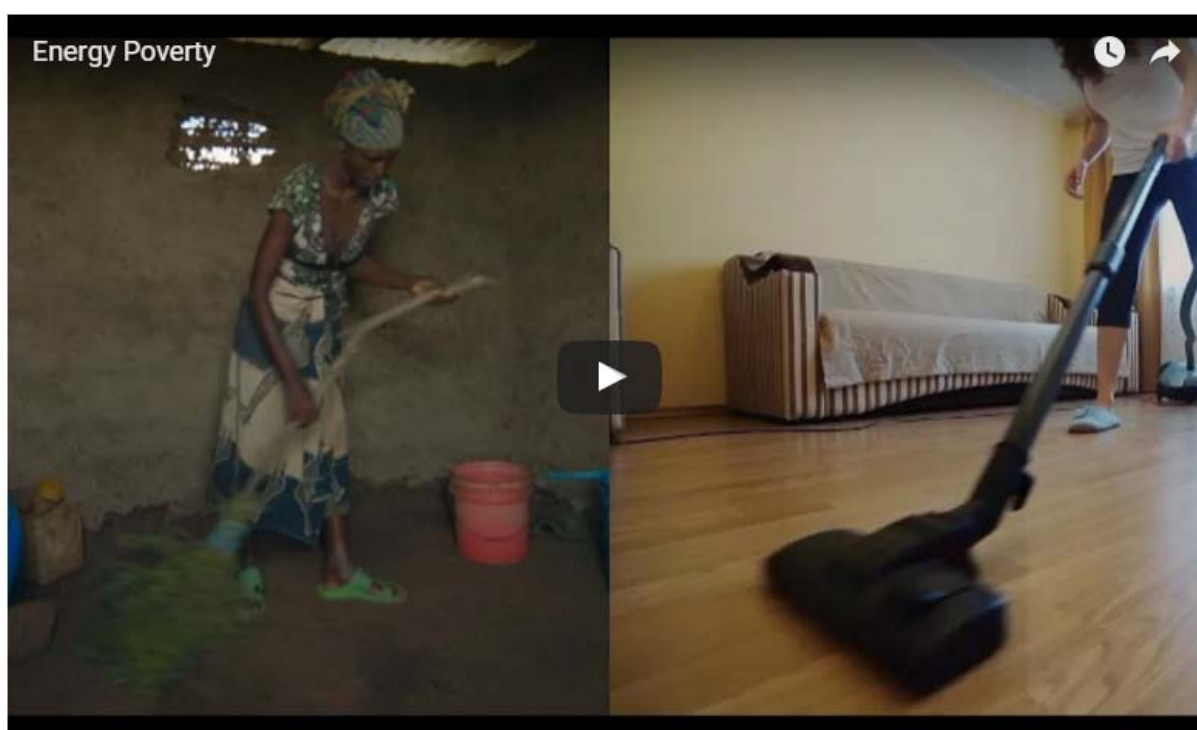
You might be wondering, "Aren't people just trying to stay healthy and find enough to eat? Isn't that important too?" Yes, of course it is, and our foundation is working hard to help them. But energy makes all those things easier. It means you can run hospitals, light up schools, and use tractors to grow more food.



A young girl studies by candlelight in Tanzania, 2015

Think about the history classes you're taking. If I had to sum up history in one sentence it would be: "Life gets better—not for everyone all the time, but for most people most of the time." And the reason is energy. For thousands of years, people burned wood for fuel. Their lives were, by and large, short and hard. But when we started using coal in the 1800s, life started getting better a lot faster. Pretty soon we had lights, refrigerators, skyscrapers, elevators, air conditioning, cars, planes, and all the other things that make up modern life, from lifesaving medicines and moon landings to fertilizer and Matt Damon movies. (The Martian was my favorite movie last year.)

Without access to energy, the poor are stuck in the dark, denied all of these benefits and opportunities that come with power. The link to the video below: [www.youtube.com/watch?v=xraThzKoXU8](http://www.youtube.com/watch?v=xraThzKoXU8)



So if we really want to help the world's poorest families, we need to find a way to get them cheap, clean energy. Cheap because everyone must be able to afford it. Clean because it must not emit any carbon dioxide—which is driving climate change.

I'm sure you have read about climate change and maybe studied it in school. You might be worried about how it will affect you. The truth is, the people who will be hit the hardest are the world's poorest. Millions of the poorest families work as farmers. Changes in weather often mean that their crops won't grow because of too little rain or too much rain. That sinks them deeper into poverty. That's particularly unfair because they're the least responsible for emitting CO<sub>2</sub>, which is causing the problem in the first place.



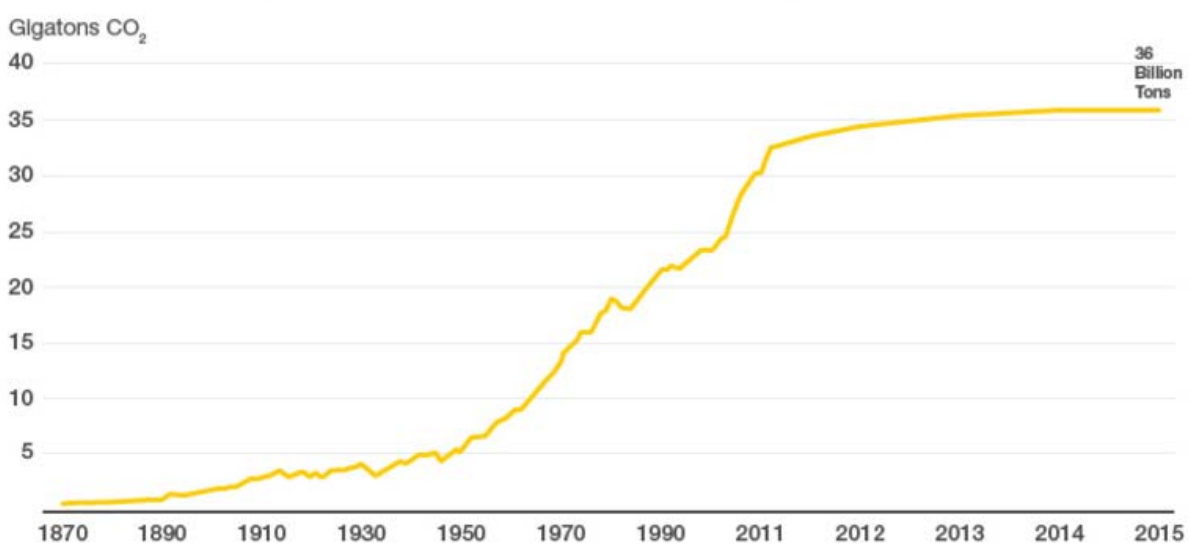
A farmer's dried-up cropland, Assam, India  
2014

Scientists say that to avoid these dramatic long-term changes to the climate, the world must cut greenhouse gas emissions by up to 80 percent by 2050, and eliminate them entirely by the end of the century.

When I first heard this I was surprised. Can't we just aim to cut carbon emissions in half? I asked many scientists. But they all agreed that wouldn't be enough. The problem is that CO<sub>2</sub> lingers in the atmosphere for decades. Even if we halted carbon emissions tomorrow, the temperature would still rise because of the carbon that's already been released. No, we need to get all the way down to zero.

That's a huge challenge. In 2015, the world emitted 36 billion tons of carbon dioxide to produce energy. This is a mind-boggling number. (It's worth remembering, because it will come in handy. For example, someone may tell you they know how to remove 100 million tons of carbon per year. That sounds like a lot, but if you do the math—100 million divided by 36 billion—you'll see that they're talking about 0.3 percent of the problem. Every reduction in emissions helps, but we still have to work on the other 99.7 percent.)

## GLOBAL CARBON EMISSIONS FROM FOSSIL FUELS



Source: International Energy Agency

How can we ever reduce a number like 36 billion tons to zero?

Whenever I'm confronted with a big problem I turn to my favorite subject: math. It's one subject that always came naturally to me, even in middle school when my grades weren't that great. Math cuts out the noise and helps me distill a problem down to its basic elements.

Climate change is an issue that has plenty of noise surrounding it. There are those who deny it is a problem at all. Others exaggerate the immediate risks.

What I needed was an equation that would help me understand how we might get our CO<sub>2</sub> down to zero.

Here's what I came up with:

$$P \times S \times E \times C = CO_2$$

↑                      ↑                      ↑                      ↑                      ↑  
 going            should            down            key            needs to  
   up                go up                some                                      be zero

That might look complicated. It's not.

On the right side you have the total amount of carbon dioxide (CO<sub>2</sub>) we put in the atmosphere. This is what we need to get to zero. It's based on the four factors on the left side of the equation: the world's population (P) multiplied by the services (S) used by each person; the energy (E) needed to provide each of those services; and finally, the carbon dioxide (C) produced by that energy.

As you learned in math class, any number multiplied by zero will equal zero. So if we want to get to zero CO<sub>2</sub>, then we need to get at least one of the four factors on the left to zero.

Let's go through them, one by one, and see what we get.

The world's population (P) is currently 7 billion and expected to increase to 9 billion by 2050. No chance it'll be zero.

Next, services. This is everything: food, clothing, heat, houses, cars, TV, toothbrushes, Elmo dolls, Taylor Swift albums, etc. This is the number that I was saying earlier needs to go up in poor countries, so people can have lights, refrigerators, and so on. So (S) can't be zero, either.

Let's take a look at (E). That's the energy needed per service. There's some good news here. Fuel-efficient cars, LED light bulbs, and other inventions are making it possible to use energy more efficiently.

Many people, and you may be one of them, are also changing their lifestyles to conserve energy. They're biking and carpooling to save gas, turning down the heat a couple degrees, adding insulation to their homes. All of these efforts help cut down on energy use.

Unfortunately, they don't get us to zero. In fact, most scientists agree that by 2050 we'll be using 50 percent more energy than we do today.

So none of the first three—population, services, and energy—are getting close to zero. That leaves the final factor (C), the amount of carbon emitted per each unit of energy.



Bill Gates Explainer: Energy Equation is available at: [www.youtube.com/watch?v=SpSMGxnpCmo](https://www.youtube.com/watch?v=SpSMGxnpCmo)



The majority of the world's energy, other than hydro and nuclear, is produced by fossil fuels like coal that emit an overwhelming amount of CO<sub>2</sub>. But there's some good news here, too. New green technologies are allowing the world to produce more carbon-free energy from solar and wind power. Maybe you live near a wind farm or have seen solar panels near your school.

It's great that these are getting cheaper and more people are using them. We should use more of them where it makes sense, like in places where it's especially sunny or windy. And by installing special new power lines we could make even more use of solar and wind power.

But to stop climate change and make energy affordable for everyone, we're also going to need some new inventions.

Why? Solar and wind power are reliable energy sources so long as the sun is shining and the wind is blowing. But people still need dependable energy on cloudy days, at nighttime, and when the air is still. That means power companies often back up these renewable sources with fossil fuels like coal or natural gas, which emit greenhouse gases.

It would help, of course, if we had a great system for storing solar and wind power. But right now, the best storage option is rechargeable batteries, and they are expensive. Lithium-ion batteries like the one inside your laptop are still the gold standard. If you wanted to use one to store enough electricity to run everything in your house for a week, you would need a huge battery—and it would triple your electric bill.

So we need more powerful, more economical solutions.  
In short, we need an energy miracle.

When I say "miracle," I don't mean something that's impossible. I've seen miracles happen before. The personal computer. The Internet. The polio vaccine. None of them happened by chance. They are the result of research and development and the human capacity to innovate.

In this case, however, time is not on our side. Every day we are releasing more and more CO<sub>2</sub> into our atmosphere and making our climate change problem even worse. We need a massive amount of research into thousands of new ideas—even ones that might sound a little crazy—if we want to get to zero emissions by the end of this century.

New ways to make solar and wind power available to everyone around the clock could be one solution. Some of the crazier inventions I'm excited about are a possible way to use solar energy to produce fuel, much like plants use sunlight to make food for themselves, and batteries the size of swimming pools with huge storage capacity.

Many of these ideas won't work, but that's okay. Each dead end will teach us something useful and keep us moving forward. As Thomas Edison famously said, "I have not failed 10,000 times. I've successfully found 10,000 ways that will not work."

But to find thousands of ways that won't work, you first need to try thousands of different ideas. That's not happening nearly enough.

Governments have a big role to play in sparking new advances, as they have for other scientific research. U.S. government funding was behind breakthrough cancer treatments and the moon landing. If you're reading this online, you have the government to thank for that too. Research paid for by the U.S. government helped create the Internet.

Bill Gates Explainer: A Mind- Blowing Fact is available at:  
[www.youtube.com/watch?time\\_continue=1&v=qtm9B9Ww9RA](https://www.youtube.com/watch?time_continue=1&v=qtm9B9Ww9RA)

But energy research and the transition to new energy sources takes a long time. It took four decades for oil to go from 5 percent of the world's energy supply to 25 percent. Today, renewable energy sources like wind and solar account for less than 5 percent of the world's energy.

So we need to get started now. I recently helped launch an effort by more than two dozen private citizens that will complement government research being done by several countries. It's all aimed at delivering energy miracles. You may be wondering what you can do to help.

First, it's important for everyone to get educated about this energy challenge. Many young people are already actively involved in climate and energy issues and I'm sure they could use more help. Your generation is one of the most globally minded in history, adept at looking at our world's problems beyond national borders. This will be a valuable asset as we work on global solutions in the decades ahead.

Second, if you're someone with some crazy-sounding ideas to solve our energy challenge, the world needs you. Study extra hard in your math and sciences. You might just have the answer.

The challenge we face is big, perhaps bigger than many people imagine. But so is the opportunity. If the world can find a source of cheap, clean energy, it will do more than halt climate change. It will transform the lives of millions of the poorest families.

I'm so optimistic about the world's ability to make a miracle happen that I'm willing to make a prediction. Within the next 15 years—and especially if young people get involved—I expect the world will discover a clean energy breakthrough that will save our planet and power our world.

I like to think about what an energy miracle like that would mean in a slum I once visited in Nigeria. It was home to tens of thousands of people but there was no electricity. As night fell, no lights flickered on. The only glow came from open fires lit in metal barrels, where people gathered for the evening. There was no other light for kids to study by, no easy way to run a business or power local clinics and hospitals. It was sad to think about all of the potential in this community that was going untapped.

A cheap, clean source of energy would change everything.

Imagine that.

(The article is derived from gatesnotes 2016 Annual Letter and is available at: [www.gatesnotes.com/2016-Annual-Letter?WT.mc\\_id=02\\_22\\_2016\\_20\\_AL2016\\_BG-OB\\_&WT.tsrc=BGOB](https://www.gatesnotes.com/2016-Annual-Letter?WT.mc_id=02_22_2016_20_AL2016_BG-OB_&WT.tsrc=BGOB)).

## Chinese billionaire to invest in solar projects in Nepal

Chinese entrepreneur Huan Ming is keen to invest in solar power projects in Nepal.

In a game-changing announcement to a packed house on Day 2 of the 'Make Nepal Green' seminar on Tuesday, Ming, who is also the recipient of the prestigious Right Livelihood Award, disclosed that he was investing in special solar projects in Nepal.

Responding to a question of Jalan Kumar Sharma, CEO of Nepal's Sana Kisan Vikas Bank, Ming, who is also the founder of Himin Solar Energy Group, said that a formal announcement was likely during Prime Minister K P Sharma Oli's China visit which is scheduled for next month.

Ming, who had the audience riveted with his exhibition of various innovative solar products, hinted that the different projects that he is planning would serve the needs of the rural poor and social entrepreneurs.

The two-day 'Make Nepal Green' seminar witnessed synergy and broad consensus among politicians, officials, bankers, farmers, civil society, and Laureates of the Right Livelihood Award which is also known as the 'Alternative Nobel Prize.'

Office of the Prime Minister and the Council of Ministers, Ministry of Agricultural Development, and Nepal Rastra Bank (NRB), among others, on Monday, had offered support to 'Make Nepal Green'.

NRB director Gopal Prasad Bhatta had asked the organizers to provide a full-fledged roadmap to make development recommendations in the pre-budget report.

The meeting ended with the drafting of the Kathmandu Declaration which formulates a vision to "promote and upscale sustainable agriculture, harness renewable energy, foster eco-tourism, and develop information communication technology".

"This draft Declaration will be circulated widely to build broad consensus across Nepal to 'Make Nepal Green' a success" said Nepal's Right Livelihood Award Laureate Shrikrishna Upadhyay.

(The article is derived from Republica published on 24<sup>th</sup> February, 2016 and is available at: [myrepublica.com/economy/story/37604/chinese-billionaire-to-invest-in-solar-projects-in-nepal.html](http://myrepublica.com/economy/story/37604/chinese-billionaire-to-invest-in-solar-projects-in-nepal.html) ).

## Welcoming new EDC member



The company was established on 2007 ICTC. Since its inception, it has worked with world renowned developers, investors, engineering firms, contractors and equipment vendors in the engineering, construction and supply of major hydro power and electric, distribution and substation projects in Nepal.





Presently it is developing two hydropower projects (23.5 MW Solu HEP and 2.8 MW Sisa Khola "A" HEP) which lie in the same vicinity. The projects are being executed through Upper Solu Hydro Electric Company (USHEC), an SPV with 80% ownership of ICTC Group Companies.


## List of EDC members






S. No.	Name of the Organization	Organization logo
1.	Nepal Electricity Authority	
2.	Alternative Energy Promotion Center	
3.	Chilime Hydropower Company Ltd.	
4.	Madhya Bhotekoshi Jalvidyut Company Ltd.	
5.	Rasuwagadhi Hydropower Company Ltd.	
6.	Sanjen Jalavidhyut Co. Ltd.	





S. No.	Name of the Organization	Organization logo
7.	Butwal Power Company Ltd.	
8.	Hydroelectricity Investment and Development Company Ltd.	
9.	IDS Energy Pvt. Ltd.	
10.	Arun Valley Hydropower Development Co. Ltd	
11.	Dantakali Hydropower Pvt. Ltd.	
12.	Reliable Hydropower Pvt. Ltd.	
13.	Himalayan Infrastructure Fund	
14.	Sanvi Energy Pvt. Ltd.	
15.	Dibyashwari Hydropower Ltd.	
16.	Shiva Shree Hydropower Co. Ltd	
17.	Chhyandi Hydropower Ltd	
18.	Saral Urja Nepal	
19.	Rara Hydropower Development Co. P. Ltd	



S. No	Name of the Organization	Organization logo
20.	Wind Power Nepal	
21.	Gham Power Pvt. Ltd.	
22.	Lotus Energy Pvt. Ltd.	
23.	Sun Farmer Nepal Pvt. Ltd	

S. No.	Name of the Organization	Organization logo
24.	CEDB Hydro Fund	
25.	Nabil Bank Limited	
26.	NMB Bank Limited	
27.	Global IME Bank Limited	
28.	Prime Commercial Bank Ltd.	
29.	Century Bank Limited	

S. No	Name of the Organization	Organization logo
30.	Transweld Pvt. Ltd.	
31.	TSN Energy Pvt. Ltd.	
32.	Waiba Infratech Pvt. Ltd.	
33.	North Hydro & Engineering Pvt. Ltd	
34.	Nepal Hydro & Electric Ltd.	

S.No.	Name of the Organization	Organization logo
35.	Nepal Hydropower Association	
36.	National Association of Community Electricity Users Nepal	
37.	Dudhkoshi Power Pvt. Co. Ltd	
38.	ICTC Energy Pvt. Ltd	



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