

# SUMMARY REPORT:

## NEPAL POWER INVESTMENT SUMMIT 2018

40,000 MW IN 10 YEARS

ASSEMBLE ELECTRIC IN NEPAL

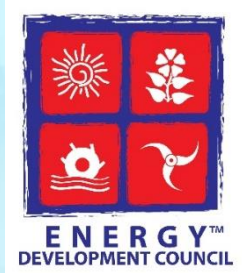


27-29 January, 2018

Soaltee Crowne Plaza

Kathmandu, Nepal

ORGANIZER



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# 1. OUTCOMES OF NPIS 2018

- Nepal will be the top destination in South Asia not only to invest in power infrastructure but also to export power to the neighboring nations like India and China
- Nepal is the only country in the world that offers the investors duty and tax-free access to the world's largest consumer market
- Investors must start an assembly plant in Nepal's special economic zone (SEZ) so as to drive their products into entire South Asian markets that are only one to 17 kilometers away while China being only 126 to 150 kilometers far
- Nepal needs to use electricity generated through its rivers, sun, wind and renewable resources to power Nepal's assembly plants and manufacturing units, to end usage of imported petroleum vehicles running on imported petroleum products in expensive rate and to switch our kitchen cooking gas from LPG that claims 45 percent of country's budget away
- The summit predicts to develop 40,000 MW of power in the next 10 years
- Energy Development Council (EDC) is creating all the database of 40,000 MW of power projects
- Regarding the financing requirement of US \$ 80 billion for financing the 40,000 MW power projects, Engineering, Procurement, Construction and Financing (EPCF) model to be the best solution and moved on to reveal that one of the main sponsors of the Summit was all set to offer up to US \$ 20 billion of EPCF for quality projects
- New stable government and subsequent formation of Energy Clearance Committee at the Prime Minister's Office are prerequisites for delivering 40,000 MW energy within a decade
- Nepalese will have per capita income of US \$ 5,000 once the country could develop 40,000 energy and the successful development of this amount of energy was yardstick for a prosperous economy of the country

## 2. INAUGURAL REMARKS BY RT. HONORABLE PRESIDENT



Rt. Honorable President of Nepal, Ms. Bidhya Devi Bhandari delivering inaugural remarks in NPIS 2018

Organizers of the Summit,

Hon. Deputy Prime Minister and Minister for Energy, Excellences and diplomats, Members of Energy Development Council, Local and foreign delegates, Energy sector related experts, Civil servants, Ladies and gentlemen

I would like to welcome all the local and foreign delegates who have come here to participate in the Nepal Power Investment Summit aimed at providing key role in the development of power sector in our country, and take this opportunity to wish you all a very happy New Year 2018. As the issues of energy development, supply and crisis have become a matter of global concern, I would like to thank and also extend my best wishes to the organisers for bringing potential investors and experts and organising this summit.

In the wake of major political change in the country, our main goal is to achieve rapid economic growth. We need to develop infrastructure to promote our economic development. Harnessing hydro power is an infrastructure development and also constitutes a base for prosperity.

In the current scenario, environment-friendly energy development generally means hydropower, solar energy, wind energy and waste-to-energy. Rapid development of renewable energy sources also requires our due attention in the context of negative consequences for environment posed by impact of climate change and excessive use of fossil fuels.



We, therefore, need to study, research, find out and develop all these sources. In our country, while talking about energy development, hydropower is the renewable, green and environment-friendly, pre-dominant and sustainable source of energy. Hydro resource is a valuable gift of nature for us.

Nepal is endowed with a large number of high mountains with plenty of glaciers leading to flow of more than 6000 rivers. I feel that we should give proper attention to the fact that our topography is also suitable for harnessing wind energy. It is, therefore, our onerous responsibility to utilize these multipurpose invaluable resources.

On one hand, our enormous natural resource is not being utilized, while on the other, majority of our population is deprived of access to even minimum electricity facility. I would like all the participants, who are keen to invest in Nepal, to imagine how a country, where it was explored decades ago that we have a hydro potential of 83000MW, has just a meagre production capacity of around 1000MW. With increasing infrastructure development and use of new technology, our actual potential could be lot more now. I believe it is a good thing for you to get an opportunity to invest in such a fertile sector. Hence, I would like to call upon both local and foreign investors to actively get involved in utilising our enormous hydropower resources.

Through this forum, I would like to assure you all that the government is committed to create a congenial atmosphere for investment by taking due consideration of the investors' interest and real needs. Similarly, I am confident that the summit will promote energy related new technology, skills, knowledge and help in creating investor-friendly environment. We need capital, technology, market feasibility and development of cross-border transmission line for implementation of large scale projects. The government will accord top priority to attract foreign investment in hydropower.

Everyday there is growing demand for electricity worldwide, however, the supply is not sufficient. On top of that, in Nepal and South Asia, where rapid development is being expected, demand for electricity is soaring. Hence, I reckon there is a good opportunity to invest in hydropower sector. I believe the development of hydropower in Nepal would benefit the neighbouring countries as well and would eventually contribute to economic development of the region. Hence, there is no doubt that the hydropower development is crucial in Nepal for meeting internal demand for household and industrial use as well for exporting surplus power to meet the demand of neighbouring countries.

Finally, I thank Energy Development Council for organising such an important summit and I would again like to extend my best wishes for the success of the summit. I am confident that interactions during the summit would provide substantial recommendations to the government for developing and facilitating realistic and effective strategy for sustainable development of energy in the country.

Thank You.

### 3. CLOSING REMARKS BY RT. HONORABLE PRIME MINISTER



Rt. Honorable Prime Minister of Nepal, Mr. KP Sharma Oli with the closing remarks in NPIS 2018

Distinguished guests, delegates participating in the summit, ladies and gentlemen.

I am very pleased to be with you all this evening. First of all, let me take this opportunity to warmly welcome you to Nepal and congratulate the organizers for successfully commencing this grand power investment summit. This event is very timely for the reason that Nepal has completed its political transition process and is entering to a new era of political stability, high and sustainable economic growth with social justice, and prosperity shared by all the citizens of the nation.

In the path towards economic progress and social transformation, Nepal needs to develop its abundant natural resources and fulfil the infrastructure gap, mainly in the areas of energy, water, transportation and tourism. We all agree that utilization of Nepal's main natural resources for rapid and sustainable development implies harnessing of its clean energy potential. This clean energy potential includes hydropower, solar energy, geothermal, wind energy, waste to energy and other untapped renewable sources.

More than 11500 pristine rivers flow from the Himalayas bestowing us with clean renewable energy which we require to develop our nation. It also presents to all of you herewith a solid business opportunity to transform such resources into the most respectable return you will hardly find anywhere within South Asia.

Similarly, the sun shines bright in our country, producing 5.5 hours of daily sunshine and 300 days of annual sunshine, making Nepal one of the best regions in the world to harness quality and reliable solar power. Abundant geo-thermal and waste to energy resources are waiting to be explored by investors like yourselves.

Nepal is the fountain of clean energy resources for the entire South Asia as nearly 70 per cent of the dry season flow and 40 percent of the annual flow of Ganga River, one of the biggest river in South Asia, is fed by rivers flowing from Nepal. To harness our abundant clean energy potential and transform our infrastructure into a domestically consumable electricity based one, large scale investments are required. The requirement of such large scale investments means an opportunity for both the local and foreign investors like yourselves. Let me mention here that IFC in its recent report has stated that Nepal will have a clean energy investment opportunity of US\$46 billion in the short term. Nepal government has also estimated the energy investment requirement of US\$ 31 billion from 2017 through 2030 to meet the target for energy for all and achieve high and sustainable development.

Distinguished participants,

We know that renewable, modern and affordable energy for all is one of the 17 goals of 2030 Agenda for Sustainable Development which Nepal is also committed to achieve. The SDG 7 on energy commits to (a) ensure access to affordable, reliable, sustainable and modern energy for all, (b) increase substantially the share of renewable energy source in global energy mix, and (c) double the global rate of improvement in energy efficiency. Achieving SDG7 will help achieve several other goals including end of extreme poverty, hunger, ill-health, gender balancing, water and sanitation and industrialization.

Modern energy is transformative as it (i) changes production relations, (ii) changes household activities and women's work burdens by means of providing machine supported food processing, grinding, cooking and preserving technologies, (iii) shifts business models, it changes industrial structure from traditional to modern and to power intensive ones, (iv) it changes transportation system, (v) protects the environment and reduces the use of conventional fuels, and (vi) it has a lot of implication for health, education and human development outcomes. Nepal aspires to be part of the sustainable development process by focusing on renewable energy. And to meet the target of SDG in our part and to go ahead, my slogan for our development is faster and sustainable development.

In this twenty first century, traditional fuel wood covers three fourth of energy demand in Nepal. Industrial, commercial and transport energy are mostly fossil fuel based. Current energy consumption at 140 kWh is very low compared with South Asian average of more than 700 kWh. Nepal intends to increase the consumption to 1500 kWh in 15 years which calls for rapid growth in electricity generation.

Our Party CPN (UML) aims to increase power generation to 15000 MW in 10 years with an energy mix of hydro, solar, wind, geothermal and other alternative energy sources. As per our Left Coalition Election Manifesto, we intend to increase installed capacity of electricity to 15000 MW in 10 years. This includes about 12000 MW of hydro, 2000 MW of Solar and 1000 MW of wind and other energy sources. To meet the peaking energy demand, we have to develop at least 5000 MW worth of storage and pondage type hydro projects and stop importing electricity within a few years. As one of the key development strategies, our party intends to ensure energy security to our citizens along with other securities such as food security.

Four Myths (illusions) about energy in Nepal as mentioned below must be understood. First myth is about demand for hydroelectricity to grow by a linear path of 10 or 12 per cent per annum. In fact, economic transformation and development of energy substitution technology in transportation, industry, business and household consumption will create demand for geometrical growth in power consumption.

The second myth is on hydropower as the only source of renewable energy. This myth is challenged by (i) long run implication on the hydrology of water sources and particularly for the distinct future of run of the river hydro projects, (ii) innovations and technological shift in solar and wind power, and (iii) growing installation of bio energy plants for household consumption.

The third myth is on Nepal's enough financial resources to harness water resources for hydropower generation. This myth can be questioned on account of our financial, technical and human resources available for energy. If we have to generate 5000 MW worth of power in five years, we need NRs 1000 billion or at least NRs 200 billion every year whereas total national savings are just NRs 300 Billion a year.

The fourth myth on power trading. Many of us think that we should never export electricity even when we have met our domestic demand. We know that we have been rather importing the same to meet our dire need for power. Electricity is of course a tradable good, and is heavily traded globally. But the same is considered a sin for some of us. Our demand for electricity for domestic consumption for an economic growth rate of 8 to 9 per cent can be met with hydropower installed capacity of only 15 thousand MW. But we are talking about producing 15 thousand MW in 10 years, and 25 thousand MW in 25 years. This only calls for cross border and regional trade in electricity and creating institutions and infrastructure for the same.

Regional cooperation in energy is also about energy trading in South Asia and we should create environment for energy trade also under the spirit of SAFTA and create regional energy infrastructure to facilitate the power trade. This is also necessary in the context of seasonality of power production and consumption, energy mix, cost effectiveness in transmission and distribution, substitution of energy demand by clean and renewable energy than fossil fuel based ones.



Creation of higher power demand at home calls for restructuring our transportation, industrial and business systems. We need to create new electric infrastructure by building electric trains, electric metros, electric vehicles and electricity based cooking. The result of such will be replacing of imported fossil fuels which in turn preserves the environment of Nepal and provides pollution free future for all our citizens. It will also result in reducing the trade deficit of Nepal caused by excessive imports and transform the nation from an import based economy to a domestic production and consumption based economy.

Our party CPN (UML) had in the past taken several initiatives for hydropower development which include the development of Karnali-Chisapani as tripartite project, many big projects under joint venture, transmission and distribution system upgradation, construction of cross border transmission lines, establishment of grid company, simplification of generation procedures, removal of obstructions in the projects sites, construction of road and other infrastructure, and strengthening of Investment Board of Nepal for developing projects and effective coordination at different levels.

We call upon all investors to come and invest in power sector in different capacity such as joint venture, BOOT, EPC, EPCF, or other models of participation. A summit like this is important to let the world know that Nepal's power sector is now an attractive destination for foreign investors to make infrastructure investments, particularly in power generation. I would like to urge all foreign investors to come and explore the opportunities Nepal offers to them and also to forge partnerships and life-long friendships with our citizens.

At the end, let me once again wish the summit a grand success in accomplishing the task of making the world aware of the opportunities in the power sector of Nepal and inviting them to be a stakeholder in the process. We look forward to working with you in coming days in power sector development for the country and the region as well.

Thank you very much.

# 4. PROCEEDINGS OF NPIS 2018

## DAY 1



Energy Development Council (EDC) is Nepal's only national level body that holistically represents the interest of the entire energy sector of Nepal. As an umbrella organization, the Council encompasses energy developers, energy associations, financiers and other funds, consumer institutions, contractors from both the private and government sectors involved in hydropower, solar, wind and other renewables, generating more than 80 percent of the nation's total electricity.

In an effort to attract foreign investors and developers to investment in and develop Nepal's energy sector and to kick start the momentum for development of 40,000 MW hydroelectricity within the next one decade and for establishment of assemble plant of electric vehicles in Nepal, the EDC organized second edition of annual Nepal Power Investment Summit in Kathmandu.

Keeping in view the financial requirement of US \$ 80 billion in investment to develop 40,000 MW, the event also aimed at facilitating Nepali project developers secure financing opportunities for their current and future projects.

Participated by representatives from multinational investment companies, world's famous speakers, government and non-government officials, investors, developers, contractors, consultants, think tanks, researchers, intellectuals, students and enthusiasts. The headline sponsors of the summit were Andritz of Austria, Human Construction Engineering Group of China and Dragon Capital of Vietnam.

## PLENARY KEYNOTE SESSION: OVERVIEW OF NEPAL POWER MARKET

1. **Opening Address** - Mr. Sujit Acharya (Chairperson of Energy Development Council)
2. **Lamp Lighting** - Rt. Honorable President of Nepal
3. **Keynote Address** - H.E Manjeev Singh Puri (Ambassador of India)
4. **Inaugural Remarks** - Rt. Honorable President of Nepal, Ms. Bidhya Devi Bhandari



Chairperson of EDC, Mr. Sujit Acharya delivering opening address at the NPIS 2018

Sujit Acharya, Chairman of EDC delivered his welcome remarks. He welcomed all the dignitaries, delegates, guests and participants for making to the event and also thanked all the stakeholders for their contribution to help make the summit happen.

Briefly introducing about EDC, Chairman Acharya presented a hopeful future scenario wherein Nepal will be the top destination in South Asia not only to invest in power infrastructure but also to export power to the neighboring nations like India and China. Stating that Nepal is the only country in the world that offers the investors duty and tax-free access to the world's largest consumer market, he requested the foreign participants to ASSEMBLE IN NEPAL. He also further urged the investors to start an assembly plant in Nepal's special economic zone (SEZ) so as to drive their products into entire South Asian markets that are only one to 17 kilometers away while China being only 126 to 150 kilometers far.

According to him, to power Nepal's assembly plants and manufacturing units, to end usage of imported petroleum vehicles running on imported petroleum products in expensive rate and to switch our kitchen cooking gas from LPG that claims 45 percent of country's budget away, Nepal needs to use electricity generated through rivers, sun, wind and renewable resources.



Moving further to talk on over-arching aim of the summit as well as to propose solution for the ever-lasting energy crunch in the country, he stressed that the summit was organized to kick start the process and efforts to develop 40,000 MW of hydroelectricity in the next 10 years. Comparing with the aim of the northern neighbor, India, which has declared to develop 100,000 MW of solar power in the next four years, Acharya said that 40,000 MW in the next one decade was not a non-realistic goal. He also claimed that EDC was resourced with all the database of 40,000 MW of projects, which according to him, was prepared by the EDC only. Regarding the financing requirement of US \$ 80 billion for financing the 40,000 MW power projects, the Chair of the inaugural session proposed EPC financing model to be the best solution and moved on to reveal that one of the main sponsors of the Summit was all set to offer US \$ 20 billion of EPC financing for quality projects. He however cautioned that a new stable government and subsequent formation of Energy Clearance Committee at the Prime Minister's Office were prerequisites for delivering 40,000 MW energy within a decade. He also demanded that the Committee to ensure all clearances within a year of application so that the developers could use rest nine years to find financing and complete construction of projects to meet the target. Acharya also claimed that Nepalese would have per capita income of US \$ 5,000 once the country could develop 40,000 energy and the successful development of this amount of energy was yardstick for a prosperous economy of the country.

Finally, introducing Nepal as the 'Powerhouse of South Asia' and asking the participants to make most out of Powerhouse, Acharya concluded his welcome remarks.



Rt. Honorable President, Ms. Bidhya Devi Bhandari inaugurating the summit by lighting *panas*

The Chief Guest of the event, President of Nepal, Bidhya Devi Bhandari entered the hall at 10:15 AM. All participants rose from their respective seats to welcome her, which was followed by the singing of national anthem. President Bhandari formally inaugurated the summit by lightening the *panas*. The Chief Guest of the session, President Bhandari was presented a book titled 'How to Develop a Hydropower Project in Nepal' for investors who seek to understand the step by step process of developing a hydropower project in Nepal.





Ambassador of India to Nepal, HE Mr. Manjeev Singh Puri delivering keynote address

The book unveiling was followed by keynote speech from Indian Ambassador, Manjeev Singh Puri who congratulating the organizer for organizing the Summit expressing his belief that the event would give stimulus for the energy development in Nepal. Stating that the development of energy would led to the economic development and prosperity of any nation said that the electricity development in Nepal would not only be win-win situation to both Nepal and India but also would help Nepal to balance bourgeoning trade deficit with his country.

He also moved further to say that as Nepal and India were tied by people-to-people association, the power can, in the similar manner could bind developing as well as developed countries including India. Informing that his government in India had launched '*SabkaSaath, SabakBikash*,' campaign, he suggested Nepal to not only focus on energy development but only on energy accessibility, sustainability, production, transmission and availability. Citing India's long standing and growing cooperation with the entire region, Ambassador Puri pronounced that Nepal stood on top of cooperation list of India.

According to him, India was always ready to cooperate with Nepal when it came to power sharing. Shedding light more on same, he expressed that as it takes time for Nepal to harness its energy potential and that the country is reeling under the energy crisis, India would always come forward to provide electricity to Nepal. Referring to the agreement between Nepal and India for the import of additional 100 MW energy during the visit of Prime Minister Sher Bahadur Deuba, he stressed that India would increase the supply with the enhancement and development of more cross-border transmission lines. Adding that democracy was all about sustainability, he stressed that growth come from electricity. Expressing that Nepal would be a major export of energy in the region, he uttered that the electric power needed to flow from South to North (Nepal to India). He also informed that his country has already signed power-trading agreement (PTA) with Nepal to provide ground for the latter to generate maximum amount of energy and to ensure regional market for the same.

He also stressed that as a neighboring country, India was ready to buy Nepal's surplus energy while if Nepal was to fulfill its current huge energy demand, the country needed to work faster, else the train will be missed.

He also expressed his worries that the water resources from Nepal was flowing down since times immemorial, the country had not still been able to harness it. Hence, he advised that it was a high time to look carefully into the matter and take immediate action to take advantage of the flowing water as the world was watching how well Nepal could manage its hydropower prospects.

Keynote speaker Puri also mentioned about the foreign direct investment (FDI) flowing in to Nepal from India in the hydropower sector and informed that Sutlej Jalvidyut Nigam was all set to carry out construction works for 900 MW Arun III Hydropower Project. According to him, entire construction team, machines and equipment as well as contractor were in place and that the construction works have begun. According to him, the success of Indian hydropower projects was being keenly looked by the world and that their success meant a huge inflow of FDI in Nepal's power sector from the entire globe as hydropower has attracted global attention.

He also said that everyone wanted to see progress in another 900 MW Karnali Hydropower Project and asked the Nepali stakeholders to work together to take forward Koshi and Pancheshwor Projects. He also expressed his grievance over the dillydally when it came to project execution maintaining that it was always easy to questions and doubt but difficult to find solutions and answers. He also voiced that Nepal and India should collaborate heavily in the energy sector, as the potential for mutually beneficial energy action was what India was looking for.

Shedding some light on the economy and energy situation of India, he claimed that the country's economy was one of the fastest growing in the world and expected it to grow by fivefold by 2040.

Also sharing the Indian government's vision to replace the fuel vehicle by electric one, he said the government was working to generate 40 percent energy from non-fossil fuel by 2030. He also uttered that Nepal held high prospects for renewable energy, for with energy comes the issue of sustainability and that one has to take care of climate and environment while generating energy. This was the reason why, according to him, the world was going in several other new and renewable forms of energy including, solar, tidal, wind and biomass.

## SESSION I: POWER INVESTMENT OPPORTUNITIES IN NEPAL

**Chair of the Session** - HE Mr. Manjeev Singh Puri (Ambassador of India to Nepal)

### PANEL DISCUSSION I: REGIONAL MARKET ANALYSIS

**Moderator**- Dr. Posh Raj Pandey (Executive Chairman, SAWTEE)

**Panelists:**

1. HE Ms. Mashfee Binte Shams (Ambassador of Bangladesh to Nepal)
2. Prof. Suthiphand Chirathivat (Executive Director- ASEAN Studies Centre & Chairman- Chula Global Network)
3. Mr. Baikuntha Aryal (Acting Secretary- National Natural Resources & Fiscal Commission, GoN)



Indian Ambassador, Manjeev Singh Puri, chaired the first session. He drew background remarks saying that there was a rise of worldwide wave regarding green energy and subsequently production of electric powered vehicles. Stating that despite having good geography, Nepal could not do much due to the apathy of the government. Informing that there was a problem in cross-border transmission line, he also revealed that the government of Indian and Nepal was making huge efforts jointly.

He also added that at the time when the price of electricity was higher in Nepal, it could be adjusted only once the timely completion of cross-border transmission lines that were under-construction was ensured. Appreciating the efforts being made by Nepal government in the development of small, solar and other energy projects, he however commented that those were insufficient as there was the need for game changing situation with the development of mega projects and called for dam construction, which could lead to overwhelming change in socio-economic landscape. He also shared that his government was undertaking a number of dam projects in many parts of India for changing lives of people. Saying that even though his country had largest deposit of petroleum products, it was suffering, he moved to claim big dam projects were only remedy. In addition, he underlined on the need of FDI for Nepal and cautioned that the time was running out and any delay would be much costly.

After his background remarks, the first panel discussion began. Moderator of the discussion, Dr Posh Raj Pandey, Executive Chairman of SAWTEE and Panelists Mashfee Binte Shams, Ambassador of Bangladesh to Nepal; Prof. Suthiphand Chirathivat, Executive Director of ASEAN Studies Center and Chairman, Chula Global Network and Baikuntha Aryal, Acting Secretary of National Natural Resources and Fiscal Commission, Government of Nepal were called upon the dais.

Moderator, Posh Raj Pandey began with introductory remarks by stating rule of the session and directed the Panelists to conclude their presentation within the set time.

Pandey began by saying that Nepal had one of the largest hydropower potential in the world, as the country bragged potential of about 83,000 MW of which 42,000 MW was commercially viable. He also said that if the projects were built by utilizing the optimum capacity, the economically viable potential could be much higher. He also, stating that despite having that much of potential plus other huge potential of solar and wind energy, Nepal was limited with only 1,000 MW energy connected to its national grid, that too in the history of a century of hydropower development of Nepal.

He also brought scenario of increasing energy demand and said that by 2030 Nepal's total energy demand would reach 6,000 MW as in the regional level the demand was growing by more than 7 percent annually. He also further informed that the power deficiency hovered at around 31.7 percent and 12 percent in Bangladesh and India respectively. Despite having made initiatives to secure energy market of Nepal in the region by signing PTA with India back in 2014 and by undertaking a number of transmission and grid projects, much had not changed. He also said that Master Plans for the development of cross boarder transmission lines with India was at hands however, same has not been implemented as Indian government had pointed out a number of issues in the guidelines and called for table talks for resolving the issues.

After giving the introductory remarks, Dr. Pandey turned towards Baikuntha Aryal and raised a question, "How do you access the potential of Investment in Nepal's power sector?" to being the session. He asked Aryal to clarify on why, despite having signed a number of PPA with many developers, the projects were not taking off also requested him to present his take on the issues raised by Indian government in Master Plans for the development of cross boarder transmission lines.



The Panelist Mr. Baikuntha Aryal takes the floor with his reply.

He initially talked about his office and informed about few initiatives taken by his office. According to him, his office was trying to introduce a specific and robust type of mechanism for all national networks relating to energy. He also said works were being done towards the investment side to make sure how does a foreign investors brings in the FDI in more efficient manner, how the returns could be secured for them and how comfortably could they take back their profits. He also said preliminary research and data collection were being done in this effect.

Regarding the prospects of investment in Nepal, Aryal said that the country had a huge potential when it came to investment in hydropower sector. The potential was even higher given the crisis of energy during the dry season. He also thanked Indian government for collaborating with the Nepali one in helping curb the energy scarcity during the dry period and hence called for storage type of project. He however acknowledging the huge investment potential ruled out the private sector investment in storage type projects, as they were capital intensive and that the public, but not the private sector had to come forward to build such projects. He also referred to Budhigandaki storage project, which was in offing under the resource mobilization from the government sector. He also made it clear that private sector investment could be best used and mobilized in run of the river type of projects as they were relatively cheap. He also talking about the concept of energy mix and the urgency to work on that side maintained solar was the main source of energy to switch towards energy mix. It was when he also added that investment from the private sector could be much competitive in solar power sector, as it was what was happening. It is hence, he made it clear that the private sector should focus on run of the river and solar projects while the investment for bigger storage projects should come in from the government sector only.

He however also painted a gloomy picture brining the issue of transmission line, which according to him was the biggest constraint to attract investment in the energy sector. He also stressed that even through many projects were all set to complete their construction, they were being slowed down due to the lack of grid line. Stating that immediate actions needed to be taken for the improvement and expansion of power lines, he informed that the government had taken few initiatives in this direction, for instance, upgrading of Hetauda-Tankeshwor Grid Line and the agreement for the construction of Lapsefedi-Butwal Transmission Line. He also presented his belief that those projects would help to supply energy in the mid hills of the country. To sum up, he once stressed that everything could and should not be expected from the private sector and the government should invest in large-scale storage type projects.

Dealing with the second question regarding why despite having signed a number of PPAs, the development was not taking place, he held investment procedure and paper works as well as bureaucratic hassles as culprit. He also maintained that some projects were not moving ahead due to the disturbances and problems posed by the locals of the project site. He however informed that there was a law related to project management, which would be very helpful in dealing with all those uncertainties, problems and confusions.

He also pointed on the need of cooling period and concession especially for the foreign private sector investment and demanded for economic prosperity as the sole agenda from political parties. He, albeit, concluded that there were some signs of hope and one could be optimistic about the future of the sector.

Lastly, regarding the reservation of Indian government on power trade guideline, he accepted that the northern neighbor had been a bit rigid. Stating that the deal was between the two countries yet was likely to discourage private sector investment to invest in large projects and export energy to India. He requested the Indian government to be a bit flexible. He narrated his discussion with the government and public servants during his visit to Bangladesh a year ago, when the Bangladeshi government had shown interest to import as much as 500 MW energy from Nepal. He also underlined on the need of signing tripartite agreement among Nepal, India and Bangladesh to make the export happen to Bangladesh and to make the power transaction possible among those three countries.

Thanking Aryal, the session Moderator Pandey reached out for Indian Envoy, Puri stating that as India sits on center position to connect most of the South Asian countries, it was expected to perform as leader, he asked Puri as to how India could ensure cooperation in regional power development and trade. He also probed about the kinds of cooperation that India would look forward from South Asian countries.

Responding to the questions, Ambassador Puri voiced happiness for having India sited in the central position by sharing its border with most of the South Asian countries and placed in a manner to offer regional connectivity due to its geography. Talking about the country-to-country agreement for cooperation in power sector, he mentioned about agreement between Nepal and India, India and Bhutan and India and Bangladesh. He also claimed that the institutional arrangements were working to accelerate the regional cooperation, however called for larger network to work in power investment, for it is economic and affordable.

Giving a very tricky answer, he further moved that conversation over the differences were very important. However, he quipped that we had a tendency to ask many questions and referred that it's been so long we had been talking about Pancheshwor Project without concrete works being done and hence, the water was only flowing without it having properly utilized. He also asked all the stakeholders to ask themselves if had really been serious to implement the project. He also hinted at the blame game that the concerned were involved in and warned that it was easy to question than to really do work. He also remarked that private sector alone knew the practicality of getting things done while in government level there were only discussions and blame games going on. Also referring to the hydropower potential of Nepal, he also said it had been decades since there were discussions regarding the hydropower potential of Nepal worth 40,000 MW but nothing had changed. According to him, Indian government had already begun its domestic actions and was moving forward to generate power aggressively and stressed that one had to take initiatives to change the scenario. He also clarified that India was happy and always ready to work with its neighbors and there were multiple possibilities in doing so. He also stressed on the need to sitting down and talk over the differences amicably as, according to him, time and technology would wait for no one. He also said that it was a high time make the hydropower potential of Nepal a reality.

After India Envoy, Moderator Pandey asked Bangladeshi Ambassador to Nepal, Mashfee Binte Shams about the energy situation and expectation of Bangladesh from the region. Responding to which, the Ambassador took her turn and began with updating about her country's economy, which according to her was growing by six percent every year and recorded the growth of 7.5 percent last year. According to her, as economic transformation was taking place in her country, there was huge demand of energy and it was therefore, her government was committed to ensure to fulfill the energy demand by 2021. She also shared that it was also due to the same commitment; the government was investing hugely on natural gas as well as undertaking a thermal plant and two nuclear power plants with joint capacity of 4,500 MW under the support from India and Russia. She also added that her country was sourcing power currently from the South Asian region and that imports from India alone would stand at 650 MW and expressed that the import from India will rise very soon as a lot of projects were coming to function in India.

She also shared that her country was investing billions of dollars to develop hydropower project in Bhutan jointly with India and that discussions were underway with India and Bhutan to work on tripartite project. She also further said that, in the similar manner, her government was ready to invest in 500 MW project in Nepal with an objective to source energy from Nepal in the soon future. She also referred to good relationship between her country and India as well as Nepal and India in all terms including, political, bureaucratic and people-to-people level and expressed hope that the harmony should be cashed by working on joint hydropower projects and energy sharing. She also requested the Indian government to play a mediatory role in connect the power exchange between Nepal and her country as these countries can rely on Indian transmission system for energy trade. She also finally ended her remarks by stressing on the keenness of her government to work in cooperation with Nepal.

After the remarks from Bangladeshi Envoy, Shams, Moderator Pandey turned towards Prof. Suthiphand Chirathivat to ask what South Asian countries could learn from the experience of ASEAN.

In the beginning Prof. Chirathivat clarified that he was not an energy expert and it was hence, he would speak more on regional cooperation and lessons that South Asian countries could learn from ASEAN. He however said before thinking into ASEAN, country like Nepal that has not been able to harness its huge hydropower potential could learn much from Bangladesh and India, the countries that were doing wonder in power generation. He suggested that it was very important for Nepal to think on how it could implement its projects on timely manner and added that hydropower development was a tiresome job if not worked smartly, but could be game changer in the economic transformation of Nepal. Moving towards the middle-income countries, he maintained that power was liberating as Thailand, Malaysia, Vietnam and Lao, among others were doing wonder in the sector of energy. Mentioning that South Asia had average economic growth of around five percent per year while Bangladesh and India had strong growth. Regarding electricity development, he suggested that South Asia had its country specific models as India had different model to Bangladesh and that Bangladesh had different model to Bhutan. He however, noted that there was a problem when it came to electricity in South Asian region.

He moved to talk about ASEAN saying that it was a large network with some big countries as well as some inefficient. According to him, ASEAN aimed at having 20 percent of the total energy from renewable sources by 2025 and hence, it needed generation of fuel by using natural gas and other renewables. Stating that the regional framework started in 1997, he updated that the network recently had developed Second Master Plan laying focus on two things: pipeline for gas and grid connectivity, which was an advanced area. He also recognized the interconnection and cross-border transmission as being very significant. He suggested that securing the local demand should be a matter of concern for country-specific national planners. At the same time, he also maintained that electrification, accessibility and power tariff was an issue of concern for South Asia. He also maintained that modern and advanced technology should have to be used to lower the price of energy. Stating that big and hydroelectric projects might not be possible every time, he requested to go for developing any kinds of projects of whatever size and praised countries like Laos, Myanmar and Cambodia for achieving success by doing the same.

Suggesting for the power transaction and growth of South Asian region, he suggested to switching into multilateral cooperation, apart from limiting to bilateral one only. It was where he urged that 2-5 countries could work together for harnessing energy by building big projects and energy trading. He also moving further into suggestions, asked to minimize the energy price, saying that the price should have to be very transparent, and be mentioned in the cross-border power trading agreement, as electricity price should be fixed so that it would create win-win situation for both buyers and sellers. In context to Nepal, he ended up his remarks expressing belief that the country could be a trading hub.

Following the Q&A, session Moderator Dr. Pandey makes concluding remarks by summing up the discussion. He said that as technology keeps on evolving, one has to make best use of technology.



## A SHOWCASE ON ARUN-3 HEP



Mr. S.K Sharma (CEO- Satluj Jal Vidyut Nigam Limited Arun-3 Power Development Company Pvt. Ltd.) showcasing Arun-3 HEP

Following the Session I presentation session began. S. K. Sharma, CEO of Satluj Jal Vidyut Nigam Limited was called for the first presentation and he presented on, A Showcase on Arun 3 Hydropower Project.

He began his presentation by introducing on hydropower potential and energy situation of Nepal. He then gave a project background of Arun 3 Hydropower Project stating that the government of Nepal and his company signed the agreement on 3 March, 2008 to finally develop the project. He then gave technical details of his project saying that the project's dam height was 70 meter and type of the dam was concrete gravity dam. He also briefly talked about the salient feature of the transmission line of his project. According to him, the total length of transmission line was 217 km and was double circuit in nature. He also added that the line had 354 angle points and had 501 towers.

Introducing slightly on SJVN, he mentioned about benefits to Nepal government from the project. According to him, the government would receive 21.9 percent of the total energy produced free of cost. He also said that the government would receive Rs 400/KW energy for first 15 years of generation and Rs 1800/KW for next 10 years. Moreover, the government would also get 7.5 percent energy for the first 15 years of operation and 12 percent for next 10 years as energy royalty. At the same time, the government would also get 4.02 crore in non-refundable fee which has already been paid. Sharma also said that equity share to the project affected people worth Rs 100 crore would be given and that his company had already paid Rs 2.50 crore as survey license fee.

Moving further, he talked about direct benefits to Nepal government in monetary terms from the project stating that the government would get NRs. 15,469 crores in free power, Rs 10,685 in energy royalty, NRs. 7,710 crores in lifetime income taxes and NRs. 33,866 crores in lifetime financial benefits.

He also claimed that development of the project region, industrial development, rural electrification and local shares, development of infrastructure and financial support and capacity strengthening of the local people as other indirect benefits from the project.

Talking about the present status of the project, he informed that the DPR of the project was cleared while necessary manpower and equipment had been mobilized in the project site. He also said that the EIA and SEIA had been approved.

In this way, he gave an extensive information about Arun 3 project and its present status.

In his presentation, he also shared that the DPR of the project was approved on 20 January, 2015 and regarding the financial closure, he stated that debt portion funding amount Indian Rs 728 crore had been arranged and finally mentioned that the process of signing of agreement and completing other formalities were on progress.

In this way, he gave an extensive information about Arun 3 project and its present status.

## HYDROPOWER INVESTMENT EXPERIENCE OF NEPAL



Mr. Deepak Rauniar (CEO-Employees Provident Fund) presenting on the topic "Hydropower Investment Experience of Nepal"

Deepak Rauniar, CEO of Employees Provident Fund (EPF) followed Sharma to present on Hydropower Investment Experience of Nepal. He began by giving a brief introduction of EPF and moved to informing about the projects having loan investment of the Fund. According to him, the Fund had committed a total of Rs 1.04 billion debt investment for three hydropower development companies – National Hydropower, Chilime Jalavidhyut and Alliance Power and the hydropower projects that these companies developed jointly contribute a total of 29 MW energy and their construction have already been completed.

He also named other five companies – Sanjen Jalavidhyut, Rasuwagadhi Hydropower, Madhyabhotekoshi Jalavidhyut and Super Dord—for which the Fund has committed a total of debt investment worth Rs 27.10 billion. The projects undertaken by these companies are all in under construction phase and once completed, they will contribute a total of 776.3 MW in the national grid.

During his presentation, he also mentioned that the country was lacking bigger projects and is financing, bilateral and multilateral finance, sovereign guarantees, country rating, USD PPAs and third country export of power. He also discussed about the progresses being taking place and he pointed out some of them as happening of mid-sized projects below 100 MW, innovation from the part of independent power producers, enhanced governance and social responsibility in the power sector, enhanced recognition and adoption of better practices and development of projects on consortium model.

The EPF Chief then moved to discuss about National Energy Crisis Mitigation and Electricity Development Decade Concept Paper and Plan, which was introduced back in 2016 AD. According to him, the plan has proposed open and unconstrained as well as short, medium and long-term target to resolve energy crisis. He also informed that the plan has brought about a concept of electricity development decade, which will focus both on energy generation and transmission expansion.

Giving a brief update about the country's power sector scenario from 2016 to 2018, he informed that the electricity demand in 2016 was 1,300 MW while the capacity was limited to 829 MW (hydro-776 MW and thermal 53 MW). However, total installed capacity during the dry season was only 300 MW while import from India stood at 230 MW.

Giving a review of the energy situation of 2017, he said that the demand reached to 1,423 MW while total capacity was only 1,029 MW contributed by hydro (976 MW) and thermal (53 MW). He also informed that the capacity during the dry season was 387 MW and the import from India increased to 580 MW. At the same time, Rauniar also forecasted the energy situation for the year 2018, when, according to him, the demand would reach to 1,837 MW with total capacity of 2,209 MW (NEA: 830 MW, IPPs 600 Mw and solar 200 MW).

Dwelling upon the plan to change the scenario, he said that a holding company for electricity generation, Electricity Generation Company Limited; a separate company for transmission lines, Rastriya Prasaran Grid Company Limited and a separate company for hydroelectricity engineering, NEA Engineering Company Limited were in motion.

He finally concluded his presentation by stating that the story of hydroelectricity generation in Nepal remained mostly of missed opportunities, yet of hope and great aspirations.

## POWER SCENARIO IN INDUSTRIAL SECTOR: SPECIAL ECONOMIC ZONE



Dr. Chandika Prasad Bhatta (Executive Director- Special Economic Zone) presenting on the topic "Power Scenario in Industrial Sector: SEZ"

Dr. Chandika P Bhatta, Executive Director of Special Economic Zone Authority came upon the dais with his presentation on Assemble Electricals in Special Economic Zone (SEZ) of Nepal. He began by talking about power business in SEZ stating that SEZ would be a best client for power producer and SEZ would be the best place for electric assembly industry. Talking about the power deficiency, he also claimed that there was a high scope of investment in solar panel assembly for faster energy crisis management that the assembly would be best housed within SEZ. Referring to the soaring foreign trade every year, he also maintained that assemble of electric products would support to reduce trade deficit and hence, the Nepal government had placed higher priority for the establishment of export oriented industries in the SEZ.

According to him electric vehicles, electric two/three wheelers, solar panels and different electromechanical components could be produced in the assemble plant and stressed that the plant was much crucial for replacing fossil fuel driven automobiles, controlling vehicular pollution and harvesting solar energy for immediate crisis management. Talking about the market of electric vehicle, solar panel and electromechanical components in global and South Asian region, he stressed that Nepal would be the best location for assembly industries as world's two giant markets were neighboring to Nepal. According to him, assemble plants were best to be established in SEZ as it offers world-class infrastructure, one stop services and special financial benefits hassle-free environment. He also claimed that SEZ was strike-prohibited zone and had special security arrangements.

He also argued that Nepal was one of the best investment destination for manufacturing sector as world's largest market was around Nepal. He also recognized prepared infrastructure for industrial set-up, investment friendly environment, formulation of new rules and regulations, ease of doing business (easy entry, transparent and faster working procedure and easy exit), additional financial benefits in SEZ, one stop services in SEZ and consensus among the political parties for economic prosperity for being instrumental in attracting FDI in the sector.



To conclude his presentation, he summarized that Nepal has high scope of investment on energy sector due to the big gap between demand and supply, as the gap will still aggravate when rapid industrialization begins in near future. He finally summed up saying that solar panel assembly promotes clean energy while it is useful for rapid power crisis management.

## SESSION II: REGIONAL MARKET UPDATES

**Chair of the Session** - HE Ms. Mashfee Binte Shams (Ambassador of Bangladesh to Nepal)



HE Ms. Mashfee Binte Shams (Ambassador of Bangladesh to Nepal) chairing Session II

Ambassador of Bangladesh to Nepal, Mashfee Binte Shams chaired the first session. She drew background remarks stating that the power sector had turned to be a global concern, than a domestic one and underlined on the need for power trade among the countries calling for regional power grids to increase power supply.

Drawing a picture of destitution, she mentioned that electricity trade within South Asian region was insignificant and insufficient and that the power supply between Nepal and India, India and Bhutan and India and Bangladesh was a matter of huge concern.

Maintaining that energy was very vital in the modern world as lack of the same could cripple lives; she suggested that electricity campaign could play a major role in resolving energy crisis, reducing carbonization and elevating lives. Characterizing South Asia as a group of countries with large and unevenly distributed power potentials, she brought into the notice that the region had growing power demands, as countries were aspiring to grow economically. The lack of supply adequate power, according to her would not create problems in household level but would also impart the entire economy.

She also pointed out that the electricity generation, grid problems had not only made the energy costly but had also boosted carbon emission as well as use of coal, and diesel based generators. According to her, addressing the challenge would require efficiency of electricity technology.

Talking about her own country's situation, she briefed that Bangladesh had an installed capacity of 16,000 MW energy, which however was not enough to meet the growing economy that had grew by 7.5 percent and hence, the situation had been a real headache for the planners of her country. This was where she linked that there was a huge room for regional cooperation, which would alone enable clear energy to be tapped in the region.

She also expressed her mindfulness regarding hosts of complexities for promoting regional trade due to regulatory and legal as well as technology, and geography related challenges and hinted at the need for sitting together to work out on the issues. She also, stating that the need for cooperation was more than one would expect urged for harmonization of grid codes covering power system, security system as well as monitoring codes. The existing as well as aspiring electricity trade between Nepal, India, Bangladesh and Bhutan should be promoted to the level of regional trade, she opined adding the countries needed more boarder interconnections and trilateral as well as multilateral power trade agreement.

Ambassador Shams also informed that her country had been participating in all sub-regional and regional initiatives for the promotion of regional cooperation in energy and was ready to share cross-border infrastructure as well as to promote competitiveness across the regional markets. She however pointed at the urgent need for consolidated cross border policies for power section

## INDIAN ELECTRIC VEHICLES SCENARIO & RELEVANCE TO NEPAL



Mr. Sohinder Gill (CEO, Hero Electric) presenting on the topic "Indian Electric Vehicles Scenario & Relevance to Nepal"

Sohinder Gill, CEO of Hero Electric was called to deliver his power point presentation on Indian Electric Vehicles Scenario and Relevance to Nepal. He began his presentation by briefly introducing his company and informed that, established in 1957, Hero Group had an annual turnover of US \$ 7 billion and also talked about Society of Manufacturers of Electric Vehicles, India.

Also talking about the transportation sector of India, he said that 47 percent of the total population (57 crores) travel on foot, bicycle and bus while the other 16 percent population (19 crores) travel on two-wheelers, three wheelers and buses.

Towards the electric vehicle (EV) segment, Gill informed that 99 percent of EVs in India were e-scooters and e-rickshaws. According to him, his government believed that targeting specific electric vehicle market segments based on economics could drive national adoption quickly and hence, had introduced an unique concept to India, battery swapping.

Shedding light on Nepal's EV space, the country had not been able to fully adopt the EVs due to the customers' dilemma over if they should own one or not, as they look for higher level of efficiency, power and quality in the cheap price. Also making a comparative analysis between the petroleum vehicle and EVs, he said that lithium batteries were the costliest part of EVs (higher the speed/range more the batteries) that was priced today at US \$ 250/kWhr. He also moved further to inform that an 80 kmph 70 km range scooter would cost double of petrol scooter and running cost would be similar to petrol scooter. He however suggested that if the government offered around 20 percent subsidy, the scooter would cost similar to petrol and continued that with that equation, there would be a mass shift to "value for money" electric scooters as the customer would save more than Rs.150,000 in the "total cost of ownership".

In his presentation, he made a number of suggestion to Nepal government including, the formulation of good quality and certification standards to weed out bad quality, provision of incentives for assembly of such a certified “Value for money” e-scooter, introduction of 25 percent subsidy for e-scooters in year 1 and taper to 10 percent in next 3 years and provisioning of charging points in offices, shopping centers and public parking. He also encouraged local industry players to scout India/China for the right partner, experiment with limited quantity of mini electric buses and fleet taxis and spread awareness through media and government adoption in a big way. He summed up his presentation claiming that implemented those suggestions; Nepal could become a leading EV country with ‘value for money’ EVs.

## ONE BELT & ONE ROAD TOWARDS WIN-WIN COOPERATION



Mr. Tan Ding (MD of Overseas Branch, Hunan Construction Engineering Group) presenting on the topic “One Belt One Road towards Win-Win Cooperation)

Tan Ding, MD of Overseas Branch, Hunan Construction Engineering Group, China came forward to make his presentation on One Belt and One Road towards Win-Win Cooperation.

He began his presentation by introducing his company and said that business coverage of Housing Building, Roads, Bridges, Power Grids, Water Supply and Drainage, Water Conservancy, Environmental Protection, Equipment Installation and other fields were eight business areas of his company. Even though his presentation was supposed to talk on One Belt and One Road Towards Win-Win Cooperation, he focused much on his own company and said his company's business cooperation modes included six major categories of Foreign Aid Projects, International Bidding Projects, EPC + F Projects, BOT Projects, BT Projects and PPP Projects.



## ENERGY SITUATION, REGIONAL GRID CONNECTIVITY, RELIABILITY, ACCESSIBILITY & SECURITY OF ENERGY



Mr. Kulman Ghising (MD, Nepal Electricity Authority) talks about Energy Situation, Regional Grid Connectivity, Reliability, Accessibility and Security of Energy

Managing Director of Nepal Electricity Authority (NEA) was called upon the dais to deliver his presentation. He began his remarks by stating that today many aspects drove the electric market and new sources of demand had emerged within the region. He also added that the trend of electrical vehicle was emerging in the world and the demand for the same was soaring and claimed that it would increase the demand for energy.

He also moved to talk about the per capita consumption of the energy and informed that Nepal remained at the bottom with only 165 unit per person per capita consumption of energy a year while India had 1,000 unit consumption and China had 4,000 NW consumption.

Further stating that if South Asian countries plan to consume electricity at the level of china only, then the region would require more than 1500 GW of electricity, which currently is limited with 350 GW of electricity and hinted at huge demand of electricity in the region. He also said that in that worrisome scenario, if we plan to replace petroleum vehicles with the electric ones, the situation would turn worst and he elaborated if we replace were to replace only 10 percent of our existing vehicles with electric ones, it will require more than 300 GW of electricity.

Also claiming that the new source of demand with innovation was rising, he added that the question was how to optimally utilize our resources to stay prepared to deal with the future situation. During his delivery, he proposed grid connectivity at local, sub-regional, regional and global level to be the best solution and mentioned that the same was being practiced universally. However, according to him, we were lagging behind in that aspect, yet the initiative for the connectivity had taken place in different forms. He expressed his confidence that it would help optimize the resources so as to meet the demand with minimum price to the consumers. In this point, he recognized the pivotal role of India and said without the Indian cooperation there would not be accessibility within the region and without the accessibility, the market integration was not possible. He also thanked sub-regional grouping clubbed by India, Nepal, Bhutan and Bangladesh and expressed that the clubbing would benefit the region to optimize the resources. Besides that he also acknowledge the initiatives to connect Nepal and China, as, according to him, by connecting Nepal's system with China, Nepal would have global connectivity while connection with South Asia will only ensure connectivity with Central region.

While talking about the sufficient electricity, he noted that we should also make sure reliable and lasting supply, which was a matter of concern at present. He referred to the stoppage of chronic load shedding in Nepal, and said even when there is a power cut for short period; he and his office received many queries asking if the load shedding had again started. It was therefore, he stressed that it was not only stoppage of load shedding, but also reliability of the system that people were expecting for and added Nepal needed to have robust system for which aggressive connectivity and investment in the sector. According to him, reliability and quality supply were the areas his office was currently working on after having successfully ended the power cuts.

Also talking about energy security, he said that Nepal was relying on imported energy from India and the country spent Rs 16 billion to import energy and another more than US \$ 1 billion to import petroleum products and made it clear about the vulnerability of the situation when it came to energy security.

In this way, NEA Head Ghising talked about energy situation, regional grid connectivity, reliability, accessibility and security of energy.

## INTRODUCTION TO ASIAN INFRASTRUCTURE INVESTMENT BANK



Mr. Rajat Mishra (Principal- Private Sector Operations Specialist, Asian Infrastructure Investment Bank) presenting on "Introduction to AIIB"

Rajat Misra, Principal- Private Sector Operations Specialists of Asian Infrastructure Investment Bank (AIIB) made a presentation on Introduction of Asian Infrastructure Investment Bank.

As suggested by the topic, his presentation focused on introducing AIIB initiatives by illuminating on the context of its establishment of the bank and shed light on mandate, features, importance and scope of the Bank. According to him, AIIB as the *Lean, Clean and Green* infrastructure investment bank for the 21<sup>st</sup> century, focused on three priority themes, which included sustainable infrastructure (sustainable energy, transport and cities), cross-country connectivity and mobilization of private capital for infrastructure. He also talked about the long-term aim of the Bank, which was to be a "go-to" institution for providing infrastructure-financing solutions in and to client countries.

Moreover, in his presentation slide, he mentioned about three key activities of the bank, which, according to him were;

- AIIB Partners – pursuing and executing transactions based on third party referrals, as well as a few readily investable non-sovereign projects
- AIIB Leads – involves originating, structuring and executing stand-alone deals.
- AIIB Creates Markets - Implementation entails opening up new markets and creating deal flow

Moving further to Forms of AIIB Financing Available, he said that the bank would offer sovereign-backed financing in the form of loan and non-sovereign-backed financing in the forms of loan, equity and others that include bonds, credit enhancement (e.g. guarantees), funds, etc. At the same time, he also talked about the key features of investment of AIIB, which according to him were;

- Financing can be single product or combination
- Investment in infrastructure or productive sectors
- A cap of total investment to crowd in co-financiers
- No controlling stakes, unless under exceptional circumstances
- Usually no tied projects (procurement must be open)
- Strong environment and social safeguards

In this way, Misra, through his presentation gave an extensive introduction to AIIB and finally summed up his delivery stating that AIIB was set up to complement existing institutions and address Asia's development needs by focusing on infrastructure project financing. He also made a conclusion that the bank had made significant progress in first two years since inception in January, 2016 as started with 57 member countries (regional and non-regional); the Bank expanded to 84 and had crossed US\$ 4.2 billion in loan and equity investments by the end of 2017.



## LOW HEAD HYDROPOWER SOLUTIONS



Mr. Alexander Bihlmayer (MD-ANDRITZ, Myanmar) presenting on "Low Head Hydropower Solutions"

Alexander Bihlmayer, Managing Director of ANDRITZ, Myanmar came to make a power point presentation on Low Head Hydropower Solutions. He divided his presentation into five topics, including, key considerations for choosing low head HPP solutions, boundary conditions and application range, project examples and plant references, key selection criteria and project development aspects and conclusions.

Moving forward to key considerations for choosing low head HPP solutions, he referred factors like maximum energy yield, operational flexibility, low construction cost, low environmental impact, for instance, fish friendliness and ecological safety and easy and low cost maintenance were some of the reasons why IPPs needed to go for low head HPP solutions. He also claimed that his company offered world-leading technology in low head hydropower bulb turbines and informed that his company had over 80 years of experience with providing services to 749 power projects that produce 12,800 MW and enjoyed over 70% market share for large BULB units. Under project examples and plant references, he presented a short profile of Chi Khe / Vietnam - Plant Optimization, YEOJU / KOREA -Optimizing Construction Schedule and Ashta I and II / Albania Innovative Plant Design to display success of his company in delivery better services. In his presentation, he also mentioned that factors like new plant (Greenfield site) with good geological conditions, wide operating range, no restrictions to grid requirements and no space restrictions allowing river barrage with spillway and adjacent powerhouse, among others as key selection criteria and project development aspects of his company.

Lastly, he claimed that his company, ANDRITZ had extensive know-how based on 8 decades of experience and 750 installed units and that the company helps IPPs throughout the project development processes including, assessment of site conditions and development needs, choosing the best technology for a particular site conditions and assisting in technical layout, project cost and scheduling and financial engineering.

With it, the session II came to the end.

## SESSION III: INVESTMENT OPPORTUNITY EVALUATION OF RENEWABLE ENERGY IN NEPAL

**Chair of the Session** - HE Mr. Roland Schafer (Ambassador of Germany to Nepal)



HE Mr. Roland Schafer (Ambassador of Germany to Nepal) chairing Session III

German Ambassador to Nepal, Roland Schafer chaired the session and began the discussion by giving a background remarks. He said that his country, Germany was supporting Nepal from the past and was also ready to extend the support in the future too as the country was looking for economic adventure. Stating that the political vision and commitment for the economic prosperity was visible in Nepal, he expressed his optimism about the partnership between Nepal and Germany.

He, a son of Electrical Engineer, shared his childhood story as to how he saw the hydropower development in his country and said the sound of turbine and flowing energy was very natural to him. Stating that electricity was all about the connectivity, he said the present was a high time for international connectivity, as power does not limit to a single country. It was the reason why his country had invested 31 million euros for the development of transmission line in Nepal.

Talking about the progress of energy developed in his country, he announced that Germany was about to dismantle a law that allowed feeding solar energy in the grid at a fixed price as solar energy industry had taken off in Germany. He however mentioned that his government had invested huge amount of money in development of solar energy in far-fetched villages of Nepal so as to electrify those areas as they lack connection with national grid and called for the support from international partners for electrification and connectivity development in Nepal.

He also claimed that even if the size of hydropower is small and fixes a certain price, the price has to be intact until the operation of the plant. He also said that so as to prevent harms to Nepal from climate change, his country had been investing in climate impact measurement system in Nepal. He also demanded for good regulation, competitive and stable price and promised that if that were fulfilled, the German investors were ready to invest in Nepal. Stating that now was not the time for Nepal to stay shrunken with energy sufficiency but energy surplus, he maintained that the need for connectivity both within and cross-border was pressing to export Nepal's energy to the neighboring countries. Finally, expressing his optimism about Nepal's future regarding the power development, he concluded his opening remarks.

## INVESTMENT CHECKLIST OF DRAGON CAPITAL IN PRE-EMERGING MARKET



Joseph J. Hoess, Director of Dragon Capital presented on Investment Checklist of Dragon Capital in Pre-emerging Market. The presenter began his presentation by giving a glimpse of demand and supply situation of energy in Nepal. He also projected future growth in power demand keeping in view the replacement of household and small business diesel generators, value-added and light industry fueled by trade between world's largest consumer markets and development and modernization of tourism industry. Towards the international front, he expected that Nepal would be able to export its generated energy to the giant economies like India and China.



Hoess observed few of the obstructions seen in the hydropower development of Nepal. According to him, the outdated/unreliable feasibility studies and data was the primary problem. The situation was, according to him, more aggravating in the light of complexity of building high-head hydropower facilities, lack of access and/or evacuation infrastructure and limited access to local bank debt. He also moved ahead to refer managing the myriad of political and bureaucratic relationships as the biggest constraint in developing hydropower in Nepal.

Commenting on the role of NEA as sole power monopoly, the presenter claimed that the historical role of NEA had been outdated while handing the works relating to generation, transmission and distribution would led to conflict of interest. He further stated that monopoly control over Nepal's national grid ensures power security and permits NEA to focus on load management and transmission and distribution infrastructure. Speaking on the urgency of competitive energy price, he claimed that domestic tariffs, when taken as a whole, should be revised to be commercially viable based on the present usage pattern.

## PANEL DISCUSSION II: CONNECTING RENEWABLES TO THE GRID

**Moderator-** Mr. Bishal Thapa (Managing Director, Saral Urja)

### Panelists:

1. Mr. Nawa Raj Dhakal (Director, AEPC)
2. Mr. Jitendra Bhattarai (General Manager, Surya Power)
3. Mr. Kushal Gurung (CEO, Wind Power Nepal)
4. Mr. Sanjeev Neupane (MD, Api Power Company)





Bishal Thapa, Managing Director of Saral Urja moderated the discussion while the panelists included Nawa Raj Dhakal, Director of AEPC; Jitendra Bhattarai, General Manager of Surya Power and Kushal Gurung, CEO of Wind Power Nepal. The Moderator and Panelists took on the stage, and the Moderator Thapa gave his opening remarks.

He began his remarks by sharing two news- one good news and another a bad one. According to him, the bad news for Nepal was that the story of hydropower was dead in the country and the whole discourse on the same had turned obsolete. Saying that despite having higher potential, the country could not harness its resources and ended up being a failure in hydropower development.

He however shared a good news that the present and the future was time for renewable energy. Renewables were where the future was. According to him, there were technology, accessibility, affordability, sustainability, resources, skills and finance in renewable energy and urged all that it was a perfect time to kick off.

Making the opening remarks, he turned to a panelist Nawa Raj Dhakal and asked a question, "If you go to the government and say that the time for hydropower is over, how you think would be the response from the government?"

Responding to the question, panelist Dhakal said that whenever we talked about energy, we would only talk about electricity; whenever we talk about electricity, we talk about hydro and that too big hydropower projects. It was the reason why, according to him, the country lagged behind and stuck with only 1,000 MW hydro in the history of 100 years in Nepal. He informed that even though around 100 small and off-grid alternative energy plants like bio-mass, solar and small hydro projects have contributed 30 MW energy electrifying 18 percent of the country's total population. He at the same time claimed that it was the right time for the off-grid renewable energy projects to connect in national grid and urged that the country should generate from wherever possible, however and of whatever amount and should be connected to the national system.

He further reiterated that small plants could contribute a lot as there had been examples from across the globe. According to him, his office, AEPC had also conducted the experiment lately and clarified that they had installed a rooftop solar of 15 KW on the top of Solar Power Company and connected to the national system while two other mini-hydro had also been connected to the national grid.

Referring to the country's marching towards the federal system, Dhakal informed that alternative energy of up to 1 MW had gone to the purview of local government and the local authority could do anything ranging from issuing the license to developing the project itself. He brought a point saying if all the projects developed this way from the local government were connected to the national grid, the situation would change for good. This way, he inexplicitly responded to the question underlining the need for development of alternative energy projects.

Moderator Thapa then asked to Jitendra Bhattarai, the challenges of having connected the solar power to the national grid (the rooftop solar panel had been installed at Surya Power, the same company Bhattarai worked as General Manager).

Bhattarai responded to Thapa stating that it had been six months since the energy produced from the solar panel was connected to the national grid. He said that even though NEA had connected the surplus energy produced from the solar panel to the national grid, his company had not yet received a single penny. So much so, that, he added NEA had kept the grid connection affair in total secret as there was no law for the solar power to be connected to the national grid and said so as to resolve the matter, his company and NEA were in regular talks. It was hence, he suggested that the government should had to have concrete policies and plans before conducting any actions. Such was the situation that there PPA rate for the solar power had also not been fixed. He also expressed his grievance that the country still things hydroelectricity as the sole source of energy and hence, implementing new things in the energy sector was a challenged as no one had paid attention towards alternative energy.

It was then turn for Kushal Gurung to speak as a panelist who was asked by the moderator about the opportunities of renewable energy in Nepal.

According to Gurung, his company was working to collect data through the country regarding the viability of developing wind energy and to make sure, if the wind energy projects were bankable or not. He further said that the preliminary studies suggest that the wind energy was feasible, yet, he also added, it was not about the wind energy being feasible but it was more about the necessary policies and infrastructure from the side of government. In this way, he hinted at the laxity of the government when it came to development of alternative energy.

He also further elaborated that Nepal could have wind energy of around 3,000 MW however in the face of emerging modern technology, the figure could be higher. He however referred that despite the government announcing to prioritize connecting energy produce from wind and solar projects to the national line back in 2016, nothing had so far done. It was hence, according to him, despite there having a number of prospects, nothing was happening due to the policy and structural issues from the government's part. He also reported that the government lacked commitment to develop renewable energy.

After the panel discussion, moderator Thapa summed up saying that generation, connection, distribution of renewable energy was the future of Nepal, and democratization of energy was what Nepalese was looking for.

This was how the second panel discussion came to the end. With the panel discussion, the first day of the summit also concluded.

## DAY 2

### KEYNOTE SPEECH BY EDITOR-GLOBAL POLICY, BLOOMBERGY NEW ENERGY FINANCE



Ms. Vandana Gumber (Editor-Global Policy, Bloomberg New Energy Finance) delivering keynote speech on Day 2 of the NPIS 2018

The second day Summit began at 9:15 AM with Key Note Speaker Vandana Gumber, Editor-Global Policy for Bloomberg New Energy Finance delivering her Key Note Speech on The Three Revolutions. She began her presentation by giving a brief introduction about her company and informed that established in the year 2004; the company had 200 employees in 15 locations of six continents. She also added that her company generated over 700 insight reports annually and had 2,500 global client base. Mentioning about the Three Revolutions, she began to discussion on clean energy, storage and mobility.

Further moving into the investment in clean energy, she mentioned that a total sum of US \$ 333 billion was invested in the clean energy in 2017 sector in the global level, up from US \$ 325 billion in the previous year. Talking particularly about China, she said that the country had invested a total of US \$ 107.2 billion in clean energy in 2016, which rose to US \$ 132.6 billion in the last year. She also said that China was not only the biggest investor in clean energy, but also was largest manufacturer of electric vehicles as the global cities were phasing out their ICE vehicles. In addition, while giving a larger picture of global new investment in clean energy, solar was the one to attract highest level of investment, which increased to US \$ 161 in 2017 from US \$ 137 in 2016. The investment in solar was followed by wind energy where a total of US \$ 107 billion had been invested in the last year.

According to her, the reason why countries were interested to invest in clean energy was its competitive rate, both for the manufacturers and the consumers. Making projections for 2018, she claimed that the year would see the installation of 107 GW new solar power in the global level while the new installation of new wind power will be 59GW worldwide. She also made a forecast of the global lithium-ion demand by market segment, according to which there will be demand of 1,300 GWh energy to run electric vehicles in global level. Moving to battery packs production, she claimed that South Korea would be the single largest market in 2018, for the second consecutive year while the price of the battery will dip by 10-15 percent.

After delivering her presentation, she gave a message for Nepal saying that many global companies were committed to build vehicles powered by renewable energy and the present was the high time for Nepal to show its commitment to switch towards clean energy-power vehicle as it had very huge potential in the country due to its large hydropower prospects. He also said that hydro-resourced countries like Nepal should take initiatives to come up with new campaigns to promote electrical vehicle and it would be done in sustainable and economic manner.

## SESSION I: 40,000 MW IN 10 YEARS: ISSUES, CHALLENGES & EXECUTION

### ENABLING LONG TERM ENERGY FINANCE IN LOCAL CURRENCY



Mr. Nishant Kumar (Executive Director, GuarantCo) presenting on "Enabling Long Term Energy Finance in Local Currency"

The first speaker under the first session was Nishant Kumar, Executive Director of GuarantCo. He appeared upon the dais with his presentation on Enabling Long Term Finance in Local Currency.



Kumar began his presentation by introducing his company and said the mission of his company was to be a *market* driven guarantee solutions provider aimed at enhancing availability and role of local currency debt finance (where applicable) for infrastructure related endeavours. He also briefed about the sectors where his company had investment and talked about few of his company's achievements according to which his company had US \$ 700 million of guarantees written between Sub Sahara Africa (47%), South Asia (49%) and Others (5%) across 46 projects to date and had attracted US \$ 3.7 billion private sector investment. He also said his company had commitment to invest worth US \$ 1.7 billion in fragile states and had ensured 19.4 million additional people with access to infrastructure and another 14.8 million people with improved access to infrastructure.

According to him, his company was a best to collaborate with as it works as a financier, borrower/issuer as well as supplier of EPC, equipment and others.

He further moved to share that Nepal was a priority country for GuarantCo as it aimed to help build sustainable financing capacity in domestic financing market by collaborating with Nepalese funding institutions and introducing new approaches to project risk evaluation and financing. He also talked about local currency financing which according to him were:

- Local currency finance matched currency of revenue to debt service.
- Even if a project had the right to pass on currency losses, prices/tariffs might be unaffordable - contractual agreements might fail.
- Involving local lenders could reduce the risk of discriminatory action.
- Local currency financing would enable productive recycling of savings within the country rather than increasing the country's external debt burden.
- Involving local lenders would help build capacity to finance future projects.

He also presented some case studies regarding the success of financing and cooperation of his company to some of the global firms/projects.

## DEVELOPMENT OF FRANCIS TURBINE AT K.U. TO INITIATE A NEW BUSINESS IN HYDROPOWER MARKET UNDER HIMALAYAN BASINS



Dr. Biraj Singh Thapa from Turbine Testing Lab of Kathmandu University started his presentation on Development of Francis Turbine at Kathmandu University to Initiate A New Business in Hydropower Market Under Himalayan Basins.

As a number of other speakers and presenters, he began his presentation by giving a glimpse of hydropower development in Nepal and also talked about opportunities by comparing Nepal's slow power sector development with other fast developing nations to eventually establishing the point that investing in hydropower sector was still an investment in virgin sector and offered lots of prospects to the investors.

Purely technical, he then talked about turbine design philosophy and performance. Moving into the turbine manufacturing experience of Nepal, he said that the first turbine was manufactured in Nepal back in 1962 which was 5 kW propeller. He also mentioned about first Crossflow turbine manufactured in Nepal in 1973, first Pelton turbine in 1975 and said that till 2016 Nepal had manufactured 58 unites of turbines with unit capacity up to 100 kW.

Moving to talk about his University's development of Francis Turbine, he said that the project actually began in 2012. Informing on some of the activities and aim of Department of Mechanical Engineering, Kathmandu University, he informed that the Department's aim was to prepare Nepalese hydropower industry capable to produce hydro turbines addressing local and regional technical challenges through continuous research and development activities.

However, he also accepted that there were many challenges in that respect and pronounced some of the issues as challenges, which according to him were: formation of the project consortium and company, role of design experts in overall business, response from hydropower market and existing players, design competence and guarantee issues on turbine design, industrial capacity for turbine manufacturing, system integration of components from different suppliers, acquiring and completing the pilot project, conflicts and mutual interest between partners and support from hydropower industry and the government.

## ATMOSPHERIC WATER GENERATION: THE NEXT RESOURCE REVOLUTION



It was the turn of Brian Sheng, Founding Partner of Fresh VC and Lead Investor for FND to make a presentation. He presented on Atmospheric Water Generation: The Next Resource Revolution, by stating that there would come a time when revolutionary innovation would be introduced to change everything. He claimed that his company's idea of atmospheric water generation was game changing and revolutionary. Pointing at the crisis of pure and safe drinking water that persisted globally, he referred to the data of WHO, according to which, 844 million people across the globe did not have access to clean drinking water while a huge big chunk of global population depended on surface water for survival. According to him, purifying dirty water to make it pure for consumption was almost impossible, he said that it was his company's innovation to think that there was a huge lot of water in atmosphere in the form of cloud and air, but the world had no ability to source it.

According to him, the level of humidity was a blessing to source the atmospheric water and presented a data of average humidity level of many cities. According to him, the annual average humidity of Kathmandu was 78 percent while Abu Dhabi had average humidity level of 62 percent. Similarly, Cape Town, Jeddah and Ulaanbaatar had annual average humidity at 78 percent, 62.8 and 58 percent respectively.

He further stated that even though human kind receives immense amount of water from atmosphere in the form of rain, it did not responded the need of mankind and hence, his company had introduced the concept of atmospheric water sourcing. He also talked about the problems of other forms of water purification stating that it would require longer project time, need water source and use of chemicals and had possibilities of re-contamination. Referring to a report from the U.S. Council of Environmental Quality, he also said that the risk of cancer to the people who drink chlorinated water was 93 percent higher than those whose water does not contain chlorine. He also, during his presentation, served a technical details as to how did his Atmospheric Water Generation machine extracts the water from atmosphere and purifies it to make it drinkable.

According to him, the machine first extracts the humid air from the atmospheric source and does the air purification. Following the purification of air, the machine then generates water out of the air. After having have collected water, the machine then conducts multi-layer filtration and purification to make it high quality portable water.

He claimed the Atmospheric Water Generation system through which one can bring to earth water from the sky to be one of the 21<sup>st</sup> century's best innovation aimed at curbing worldwide pressing water crisis issue. He also claimed that the technology would be very appropriate for South East Asia where the humidity level is higher. Informing that people were very excited about his technology, he stated that his company was looking forward to work with partners including investors, governments, I/NGOs and others to help the company to bring this technology to the world population. Finally, he pleaded to make the future bright and secure by best utilizing his technology.

## ASSET DEVELOPMENT OF RENEWABLE ENERGY



Kiran Jethwa, Founder and Managing Partner from Fumase, Malaysia came forward with his presentation, Fumase: Energy, Water and Waste; Asset Management and Asset Development. His presentation entirely focused on offering introduction to his company, Fumase.

He informed that Fumase, LLC was an Asset Management and Asset Development company based out of USA with focus on Renewable Energy, Water and Waste sectors; and geographic focus on South East Asia and South Asia. He also added that Fumase originated with an advisory background and its sectors of focus included energy, water and waste. He also said that his company's works included advisory (policies, energy mix, tariff, due diligence etc.), partnering in technology in all sectors, project development including solar power projects in Malaysia (40MW), Philippines (30MW), India (1.5GW) and Nepal as well as waste to energy projects in Malaysia, India, Nepal and Philippines, development fund and construction fund.



Talking about some of the achievements of his company, he mentioned that his company had generated predictable, long-term annuities, geographic and sector diversification and developed Greenfield projects and acquired operational projects. He also said that 24 X 7 renewable energy was his company's strategy and hence was working in all renewable energy sector like, solar, biomass and energy storage, which the company called 'integrated power'.

## PANEL DISCUSSION III: ACCELERATING HYDROPOWER DEVELOPMENT: KEY CHALLENGES

**Moderator-** Mr. Anil Chitrakar (President, Siddharth Inc.)

### Panelists:

1. Mr. Pratik Pradhan (Vice President, Butwal Power Company)
2. Mr. Alexander Schwab (MD-ANDRITZ, Vienna)
3. Mr. Sushil Pokharel (Executive Committee Member, EDC & Chairman, Sushmit Energy)



Anil Chitrakar, President of Siddharth Inc. moderated the session while the Panelists included Pratik Pradhan, Vice President of Butwal Power Company; Alexander Schwab, Managing Director of ANDRITZ, and Sushil Pokharel, Secretary of EDC.

Moderator Chitrakar began expressing his belief that everybody at the Summit were of the belief that the country needs hydropower development in accelerating pace.

The first Panelist to speak on was Pratik Pradhan, so said that the government's reluctance to sign PPA in foreign currency was the biggest hurdle in Nepal's energy sector. According to him, there was a gap between what government promised and what it did when it came to signing PPA in dollar. He however, expressed his optimism saying that the government had recently agreed to sign the PPA as demanded in foreign currency with certain conditions. For instance, signing of PPA in dollars to the projects having capacity of 100 MW and loan replacement of 10 years. He also said that it would help to attract foreign investors in Nepal. He also talked about another problem, which according to him was the issue of energy price. Mentioning that the government used to fix a flat rate for the projects of up to 25 MW, the same had now been applied to the projects with capacity of 100 MW, 140 MW and 180 MW. He said that it was very discouraging to the projects with higher capacity. He opined that the rate should be fixed and adjusted as per the fluctuation in the rate of dollars. Also talking about the hope, he expressed that it was very positive that banks and financial institutions in Nepal had strengthened capacity and that they were financing bigger projects of up to 100 MW.

According to him, the ceiling fixed by the government in land was another hurdle as according to the state, previously any hydropower project would use only 75 ropanis of land. He however said that there was talks with government going on and the government had shown flexible to change that ceiling. He also said that with the government declaring the hydropower as a priority investment sector, there were reforms being seen. Unbundling of NEA into different generation and transmission companies was another positive sign, which had taken place within very short period of time. According to him, PPA in dollar issue was somehow a hurdle, yet said that once the issue would be resolved, everything would be fine.

Dealing with the constraint side, Pradhan complained that Nepal's hydropower sector was lucrative, but only in papers while the IPPs would not agree on that as they were tensed. He further shed light that the assurance that the developers as well as shareholders having their return in 10 years was solely limited to paper but not in reality. According to him, the major challenge for the developers was the issue of power evacuation. Moreover, there were also local level challenges, as locals would come up with many demands and expectations. He also informed that there was a project all set to go for production but the locals vandalized it. Also explaining further about the problem of power evacuation, he said that his company was doing a project in Lamjung, which was about to end but there was no grid line in place prompting the construction works to be delayed. He then demanded that the government should ensure security to the projects in whatever way or form. He also claimed that the regulations should have to be in place. He added that there were technical as well as legal problems for export-oriented projects. He finally summed up the challenges as:

- Grid moving slowly than generation.
- Rule of law and absence of government.
- Design issues in a river where many projects are being designed.

Alexander Schwab followed Pradhan, who responding to the questions of the Moderator, informed that his company had been doing hydro business in Nepal for last four decades. He again, as other speakers mentioned that despite having one of the leading hydro potential, Nepal has started and done nothing. He also moved further to say, there were hundreds of studies conducted by the World Bank and expressed his wonder about the progress not being taken place. He blamed political instability and the subsequent impediments. He however hailed the political stability that Nepal achieved last year and expressed his hope that everything would now change as the new government would work for introducing concrete policies, manage funding and electricity price. According to him, the direction would be straight, things would change for good, and that the problems being faced by investors and developers would soon disappear. He also added that the government and the people had gradually begun to accept privatization, yet urged that there should be balance between affordability and consumption. Elaborating further on the same, he said that food and drinking water were the first need of people and once they secure food and water, the society would move towards the journey of development. Adding that one would need electricity was major prerequisite for development; he said with the development, the demand for energy would also increase. According to him, electricity was basic commodity for citizens of any country and they needed to have energy in cheaper price. He also cited that once a family have had electricity at their home, they would have freezer, mobile charger and other many things and people getting used to with the modern commodities would again push the development further. It was where he again demanded that the price of electricity should be in accordance to the income of the people. He also opined that Nepal having such a huge hydropower resources should fix the price keeping in mind the long-term sustainability. He also further mentioned that to keep things in balance, it was much crucial for the private investment to be poured in small and medium sized hydro projects, which were very important to electrify rural areas, while it was the government who should be responsible to develop larger projects.

To be specific about the problems and challenges, Alexander said that in most of the cases, whenever any developers wanted to develop a project, they come up with simple design, made cross checks and move further. However, delays were tremendous. He also mentioned that if the project was being financed privately, one have to have a good project since the early beginning. He also brought an international reference that the projects worldwide would complete their financing, finalizing contract and financial closure within a year and a half. However, according to him, the time was much longer in Nepal due to many problems and it was then difficult for the investors to wait till the longer period. He hence, demanded that there should be regulation in place and the political task should ensure win-win situation both for the country and the investors.

Talking about some of the positive signs being seen in the hydropower sector, panelist Sushil Pokharel told that the discussions being taken place during the summit in itself was a positive event. He also said that the urge of the summit to develop 40,000 MW energy within a decade of which 80 percent would come from hydropower projects was another positive move. He also recognized the participation from delegates and investors from across the globe was another positive sign.

According to him, the one door policy system introduced by the government in the energy sector was encouraging. Informing that he himself had been developing 100 MW worth projects, he claimed that things were moving forward, which however was not the case five years ago. According to him, international investors were 'dying' to invest in Nepal's energy sector and claimed that he had not seen any signs of negativity and added even if there were some, the present was the high time to change risks into opportunities. Also informing that the legal rigidity had gone as the government had amended the law allowing the investors to take back 25 percent of their profits, it would foster foreign investors to come to Nepal with their investment schemes.

Moving further Pokharel said that the issue of demand and consumption should be calculative. He also said that there was demand in Nepal, yet there were potential to sell the energy outside the country informing that there were high demands in international market, if considered the bigger aspect. He however stressed that no matter the project was big or small, the investors would look for return in investment. He demanded that it was the PPA to address the issues and concerns and said that we had to begin to work to make the foreign investment to happen in the country.

Pokharel again stressed on the positive aspect accepting that there were problems in the past, however with the formation of stable government, the indications for betterment were there. According to him, FDIs were queuing up at Nepal Investment Board. He also mentioned that just a decade ago, wherever the private developers planned to develop mini projects, there were whole lot of problems to first deal. But, according to him, today private players were developing many hydropower projects of medium size while skilled human resource and better technology were at place with the banks and financial institutions were capacitated to finance projects. He summed up expressing his confidence that those reforms and enabling environment will help draw attention of foreign investors and that the future of Nepal's energy sector was bright.

The Moderator Anil Chitrakar said summed up the whole discussion saying that things do not change overnight and there were lots of things in place indicating the hope in future.



## INTRODUCTION TO TOKYO ELECTRIC POWER COMPANY



Mr. Chi Yuki Suzuki (Senior Engineer, Tokyo Electric Power Company) gives introduction to Tokyo Power Company

Chi Yuki Suzuki, Senior Engineer, TEPCO came to make a power presentation on his company, TEPCO, a Renewable Power Company from Japan. He attempted to shed light on the nature, works, and areas of investment, profile as well as the strategy for the hydropower business in the global market including Nepal of his company through the presentation. According to him, TEPCO is the biggest power utility in Japan, established in 1951, and provided electricity in the Tokyo metropolitan area and its surrounding area. He informed that the company's electricity sales stood at 250 billion kWh in 2016 and accounted for about 30 percent of the nation's electricity consumption and added that his company's sales of US \$ 50 billion was ranked 8<sup>th</sup> in the world.

Suzuki also informed that his company's power generation sources, total capacity of around 70GW, had been diversified including thermal, nuclear, hydro and renewable, considering stability, economic and environmental aspects.

Regarding the global business, TEPCO had already provided more than 600 consulting services in about 70 countries, and invested in total of 5GW power projects so far. These investments were only in Thermal power projects. He also revealed that the company also decided to invest also in hydropower projects especially in Asian countries, using extensive experience in Japan and said that that was the reason why he came to participate in the summit.

As for the renewable energy, TEPCO, he said, owned and operated 163 hydropower plants, three solar and 1 wind power plant in Japan and added total capacity of hydropower was 10 GW, including reservoir type and pumped storage type.

He also added more that based on the accumulated experience, his company were seeking for new investment opportunities with a special focus on overseas hydropower projects and informed that their target capacity was from 30MW to 500MW including green and brown fields. He also stating that the main target area for investment was South East and south Asian countries especially Nepal and informed that in Nepal, they would like to invest in the hydropower project with local partners.

According to him, his company had already met some Nepalese companies to discuss the future corroboration and stated that they were so reliable that he was assured to build a strong relationship with them. During his presentation, he also opined that Nepal should develop the storage type of hydropower plants to bridge the gap between supply and demand especially in dry season and moved further to say TEPCO had a lot of experience of the storage type in Japan. It was when he expressed his belief that his company could contribute strongly to the development of storage type projects in Nepal as well as provide owner's engineering services for design, construction and Operation and Maintenance.

According to him, in addition to the technical contribution to the project, TEPCO could bring high quality civil contractors and electrical-mechanical manufacturers from Japan to Nepal for the enhancement of profitability for the project. He also committed to take initiative in arranging financial framework with Japanese public financial institutions such as JICA and JBIC who could offer a good loan terms.

Finally, he ended his presentation by saying that TEPCO would like to contribute to further development of friendship between Nepal and Japan through the hydropower project.

## SESSION II: FOREIGN DIRECT INVESTMENTS IN ENERGY PROJECTS

**Chair of the Session - Mr. N.L. Sharma (Chairman, Satluj Jal Vidhyut Nigam)**



Mr. N.L. Sharma (Chairman, Satluj Jal Vidhyut Nigam) chairs Session II of Day 2 at NPIS 2018

The Chair of the Session N.L. Sharma Chairman of Satluj Jal Vidyut Nigam took to the dais and extended his opening remarks.

He began his remarks by giving a good news saying that his company was going to invest about US \$ 1.2 billion in the construction of Arun III project in Arun River of Sankhuwasabha district and claimed that the company would make that amount of investment in the coming five years.

He also talked about other different benefits including, employment generation of seven million days, and skill upgrade of as much as 3,000 local youths and urbanization of the project location, among others.

In his remarks, he claimed that energy was basic requirement for any civilization and that per capita consumption of energy was very crucial and was one of the measuring rod of development. Giving a figure of per capita consumption of energy, he said the figure was 12,000 units per year for the US, 1,100 units for India and mere 134 units for Nepal.

Mentioning that since the hydro was capital-intensive sector with long gestation period, most lender and investors don't have long term outlook. It was hence, according to him, optimizing and innovative ways of financing was need of the hour. He moved further to say that even in his country, India, most of the big business as well as corporate houses had stayed away from hydro sector because of land, environment and forest issues as well as local and social level problems and said that it was the duty of any government to ensure safe playing ground for the investors.

Recalling that his company had faced financial problem while developing its first 1,500 MW hydropower project in India, he expressed his belief that financing in the energy sector comes from within if worked in committed manner. Urging on the need of investment in Nepal's energy sector, he added that lack of power had resulted in the import of plethora amount of petroleum products and contributing to Nepal's trade deficit. Recognizing the inability of Nepal's banks and financial institutions to finance large hydropower projects, he claimed that there was no option left other than attracting FDI in the sector. He however identified some of the hurdles in securing FDI, which according to him were, political situation, lack of tax incentive, absence of land acquisition mechanism, problem in land and forest clearance, weak transmission line and grid connectivity, and others.

Finally, he wrapped his remarks stating that energy would enable to scale to new heights and that asses to energy was critical very critical in the modern time and world.

## PANEL DISCUSSION IV: FDI IN NEPAL'S POWER SECTOR

**Moderator-** Mr. Rajen Kandel (Director, Kandel Group)

**Panelists:**

1. Mr. Apar Neupane (Vice President-Finance, Equicap Asia Pte. Ltd.)
2. Mr. Naoki Nishimura (Representative, JICA)
3. Mr. Gorakh Rana (Head-Commercial Banking and Global Banking, Standard Chartered Bank)
4. Mr. Joseph J. Hoess (Director, Dragon Capital)



Panel Discussion IV: (From Left) Mr. Gorakh Rana, Mr. Joseph J. Hoess, Mr. Naoki Nishimura, Mr. Apar Neupane, Mr. Rajen Kandel

The summit moved towards second panel discussion of the day on FDI in Nepal's Power Sector. Rajen Kandel, Director of Kandel Group moderated the session where the panelists were Apar Neupane, Vice President of Finance at Equicap Asia Pvt. Ltd; Gorakh Rana, Head of Commercial and Global Banking at Standard Chartered Bank; Joseph Hoess, Director of Dragon Capital and Naoki Nishimura, Representative from JICA.

The Moderator Kandel stating that even though the first hydropower project in Nepal was developed back in 1911 during the premiership of Chandra Rana. He also said that he, as a Non-resident Nepali in UK had been making efforts to encourage British investors to come to Nepal with their FDI in Nepal's hydropower project. He then asked his panelists that even though many investors were willing to invest in Nepal why was not it happening.

The first panelist Apar Neupane replied saying he had been working with many FDI companies since many years and observed that the hydropower development consisted of many stakeholders, including, developer, contractor, government, locals and many others. He claimed that all those stakeholders had their own interests and added it was because of the difference in interest, it was not easy for a project to be successfully developed.



He also suggested that if the interests of all stakeholders were synchronized, developing hydropower project was an easy game. He also further said that when it came to large projects, the market was the major constraint and claimed that Nepal had no market to sell energy generated from big projects and hence suggested that if only there were cross boarder markets, FDI would come to Nepal in mega scale.

Gorakh Rana answered to the same question said that it was due to the trust issue that the FDI was not coming to Nepal. Elaborating further, he stated that most of the investors would seek project financing from Nepal itself while BFLs in the country lacked that capacity. He hence, demanded that there needed to have a lot of education among the investors. He however said that there were some positive signs of late. Discussions regarding the creation of market in neighboring countries was a positive development.

Joseph Hoess to respond to the same question blamed political instability for the FDIs not coming to Nepal. He also talked about bureaucratic and procedural problems saying that his company had been working in Nepal since 2016 and that they had to come across new faces every time while getting approval from government or to clear many formalities. He however referring to the political breakthrough that Nepal recently achieved expressed his hope that the instability would no longer last. He also stressed on the fact that as an investor, he would expect return as soon as possible, and added that nobody would be interested to invest in Nepal if s/he has to spend five years doing basic works. He also talked about lack of connection grid as a reason for FDIs to not come to Nepal.

Naoki Nishimura from JICA pointed at the challenges relating to implementation as major barrier for FDI. He said even though there were many agreements with government, no work had been progressed. Talking about government developed projects; he accused NEA for not making timely payment to the contractor, eventually delaying the project. He added further that, the delay would not cost much to the government as it developed project with concessional loan but the private sector could not lift the burden.

To further the discussion, Moderator Kandel said that of late Nepalese themselves were doing many projects, yet they could not finance big sized projects and asked for suggestions from the panelists for doing mega projects by Nepalese in joint venture with foreign investors.

Speaking on the issue, Apar Neupane said that even though Nepali private developers were enhancing their capacities in terms of execution and project operation. He however maintained that alone was not sufficient to win the trust of foreign investors. According to him, the Nepali private sector needed to improve their corporate governance and transparency and claimed that without making improvements in the areas of governance and transparency, no foreign companies would join hands with the Nepalese.

Explaining further on the same, Naoki Nishimura said that as per the international practice, local partner would have to come up with the investment of its share to develop projects with foreign investor in joint venture. But however in Nepal, he added local partner would commit finance through equity which is not a reliable source.

At the same time, local banks also do not have capacity to lend that amount of money to the Nepali developers. It was therefore, he suggested that the government had to guarantee financing of the project on behalf of local partner while, since local issues could be dealt effectively by local partners; the foreign investors would like to develop projects in JV modality.

Another panelist Joseph Hoess also blamed lack of financing and access to finance for the major reason for the JV not happening.

The Moderator Kandel asked panelist Gorakh Rana why was his bank was not willing to bank hydropower projects. Serving an answer, he said that his bank had a structured way of approaching hydro projects and moved further to say that those projects have longer gestation period yet; the amount involved would be very huge and the risk was high. He however made it clear that his bank was not totally unwilling to fund projects and informed that his office was, of late, in negotiation with some large developers and ensured that if the conversation went well, the bank would finance those projects.

Moderator Kandel then asked for suggestions from the panelists to the foreign investors.

Offering his suggestion, Apar Neupane said that as most of the foreign investors come from developed countries with proper systems at place; they expect the same here in Nepal. However, after coming to Nepal they would see huge gap between what they expected and what they found here. Even though they would do risk assessment, they could only mitigate half of the total identified risks. Stating that hydropower development took longer time and that the investors need to have patience, he suggested them to find a good local partner here to understand the situation here and to work for efficient problem solving. He also suggested them to better understand the situation of Nepal before coming here and get prepared for every uncertainties during the project development.

Gorakh Rana also suggested for partnership between the foreign investors and Nepali local partners.

Turning towards Joseph Hoess, Kandel said what foreign investors would need in Nepal so that they could invest.

Responding to the question, Hoess said that investors would need assurance for safe investment return. He also said that they would expect support and facilitation while conducting predevelopment works like license, permits, EIA clearance and other basis things. He also said that the power evacuation was biggest hurdle and demanded the issue to be resolved. He also reiterated that no investor would be interested to invest in Nepal if it took them five years to do preparatory works before construction. He also said the foreign investors needed a private company to take care of transmission works so that the projects could sell their energy once the construction of the project ended.

Speaking on the same, Naoki Nishimura said that comparing to other counties; the investors would think that there was no balance between the risk and return.

## NRN'S ROLE IN ENERGY SECTOR IN NEPAL



Mr. Bhaban Bhatta (President, Non-Resident Nepali Association) presents on the topic "NRN's Role in Energy Sector in Nepal)

Bhaban Bhatta, President of Non-Resident Nepali Association made a presentation on NRNs as Nodal Points in Energizing Power Sector. Briefly introducing his Association, he informed that it was a voluntary association of 5 million non-resident Nepalese all over the world (except SAARC countries) and the motto was for Nepali by Nepali. He also said that established in 2003 with its headquarters in Kathmandu, the Association had over 70,000 registered members and had presence in 78 countries across the globe. He also informed that NRNA had recently initiated "Ujyalo Nepal" campaign. Taking about the potentials of the Association, he said that the members were rich in knowledge, experience and resources and were willing to be nodal points for Nepal to be prosperous.

Speaking on NRNA's contribution to Nepal's energy sector, he claimed that hundreds of individual NRNs had invested millions of dollars in hydropower and had recently pledged US \$ 100 million in infrastructure development. Moving forward he also informed that Sanima Group had developed Sunkoshi (2.6 MW) and Sanima Mai (22 MW) and both the projects were in operation. He also updated that the company was doing Middle Tamor (75MW), Swet Ganga (28.1 MW), and had contemplated Tamor Sanima (285MW). According to him, NRN Infrastructure and Development Limited (an investment company focusing on hydropower) was involved in development of Swet Ganga, Dordi Khola Project (27 MW) and Middle Tamor hydel projects.

NRNA President Bhatta also mentioned about TBI Group, his personal venture and said that it had been awarded with survey license for Tamakoshi III (650MW). The Group, which had invested in several energy projects as joint promoter, had also pledged US \$ 50 million in development of renewable energy sector in Nepal. According to him, TBI was promoting electric vehicles in Nepal and was planning to set up an electric vehicle production plant.

Claiming that NRNs was a nodal point for investment, he said that they were prospective investors and they were the major source of remittance.

## PANEL DISCUSSION V: EQUITY FINANCING

**Moderator-** Mr. Bharat Acharya Vice-Chair for Employers Council, Nepal & Executive Member of FNCCI)

### Panelists:

1. Mr. Krishna Raj Parajuli (MD, Everest Equity)
2. Mr. Siddhant Raj Pandey (Chairman & CEO, Business Oxygen)
3. Mr. Tim Gocher (Founder & CEO, Dolma Impact Fund)
4. Mr. Semanta Dahal (Advocate & Partner, Abhinawa Law Chambers)



Mr. Bharat Acharya started the panel discussion with a remark to go through various financial models for investment in the renewable energy project. He then questioned all the panelist about the state of equity financing.

Mr. Parajuli (Everest Equity) started with a positive note about Nepal having lots of opportunity for equity investors and dominantly in energy sector. And stressed on this being the right time to kick-up or accelerate the investment in energy sector. With 10,000 MW of power generation from hydroelectric needing approx. 20 B \$ of investment is required. And to talk about 30:70 ratio of equity and debt, there's still need of 6B\$ to raise. He explained about ways to raise this fund, 1. Through FDI- which is icebreaking thing in context of Nepal providing private equity funds or SNVs. 2. Alternative Investment Fund- it's like private equity venture capital fund. He stated that Security Board of Nepal set plan to formulate policies to raise fund from public or institutions like insurance companies, Citizen Investment Trust, Employee Provident Fund. He added, either they directly invest in energy portfolio, they may not have the fund management excellence to invest in the projects but there are other fund managers who can invest that fund in the portfolios.



Then, Mr. Siddhant Raj Pandey started off by saying that equity is not new to Nepal and has been in the market for some years now. He pointed out very important thing about FDIs, he said that to bring FDI in a country is not just about the capital, it is about the knowledge that is transferred from nations, groups and organizations who have done it, tried it and tested it and up bring to this country so that we can adopt this measures to develop Nepal's alternative forms of finance.

After brief introduction about Business Oxygen he talked about despite there being lots of hurdles, equity financing can be done. Beauty of Nepal is that the investment process takes time but it happens and it is a learning process for BO2 as well as government officials.

After Mr. Pandey, Tim Gocher (Dolma Impact Fund) picked up on a positive note from Mr. Siddhant's points about FDI can be done in Nepal mentioning that they have made 8 investments so far and going to make 3 more and all of this in just over a period of 3 years. And mentioned some hurdles or challenges Dolma Impact Fund or any other offshore- onshore equity financing company faces in Nepal. First being bureaucratic hurdle one has to go through but also states you find some kind of willingness of individuals very often. He gave an example of just having to sign a paper binding the shareholders and wire the money next day in other countries they invest in, but in case of Nepal, you have to go through lots of approvals to get the money in. This process can take up to 3-7 months as per his experience.

Then the moderator moved to the legal aspect of the issue and questioned Mr. Semanta Dahal (Abhinawa Law Chambers). Mr. Semanta drew comparison among South Asian nations energy portfolio. And said that Nepal is the only country with around 50% of its total generated electricity is from private sector. And said equity funding is very good opportunity in Nepal.

Later after discussion on the equity financing and FDIs, moderator summed up the session by stating that talking about equity fund in Nepal is itself a great news to the investors and the country. Expressed need of clear cut equity financing framework for both domestic and international equity fund ventures. He said all this discussion was about institutional level equity financing rather than individual. And concluded the session with very positive and welcoming note for the investors present in the crowd saying there are lots of opportunity and possibilities in Nepal to explore.

## SESSION III: EMERGING ENERGY OPPORTUNITIES IN NEPAL

**Chair of the Session – HE Ms. W.S Perera (Ambassador of Sri Lanka to Nepal)**



HE Ms. W.S. Perera (Ambassador of Sri Lanka to Nepal) chairs Session III

Ambassador of Sri Lanka to Nepal, W.S. Perera chaired the session. She delivering the opening remarks said that hydro, wind and solar were emerging and very important source of energy. She said that Nepal was developing renewable energy rapidly and in the country dominated by hydroelectricity, solar and wind could be important supplements. Saying that due to the over exploitation of petroleum products, there were higher demand for renewable energy and the world was going towards the energy mix. She also noted that hydro, solar and wind energy in Nepal had not been sustainably utilized due to its geographical, political and technical as well as economic reasons. He also observed that at a time when hydropower projects were moving in sluggish pace, the use of renewable energy was a viable alternative.

Mentioning that solar power was only in use in Kathmandu, she maintained that Nepal was yet to exploit its solar energy potential to fulfill its present energy need. Ambassador Perera suggested that Nepal needed to enhance the use of renewable energy and decrease its reliability upon the traditional hydro based energy. Saying that for any country to be developed, energy plays a very crucial role she added that while the rich countries could use nuclear power as a source of energy, Nepal's energy sector was lagged behind.

She also mentioned that her government had committed some amount to invest in Nepal's hydropower sector during the Investment Summit held in Nepal a couple of years back and concluded her remarks by expressing her belief that that in the future, Nepal would be able to generate the required energy and develop the country.

## PROSPECTS OF RENEWABLE BASED DISTRIBUTED GENERATION IN NEPAL



Mr. Ram Prasad Dhital (Executive Director, AEPC) presents on the topic "Prospects of Renewable Based Distributed Generation in Nepal"

Mr. Ram Prasad Dhital delivering his presentation started off stating a tragedy of Nepal despite having huge resources, country has a strong dependence over traditional fuels. Two third of energy requirement is met by the traditional fuel. He also stated that 42,000 MW of hydropower is economically viable in Nepal. He then showed the data estimated by SWERA and AEPC saying 3000 MW potential is from wind, 1830MW from solar PV and 2100 MW from grid connected PV.

Then he mentioned about increasing electricity demand for water supply, irrigation and community sales. And moved onto the stat about Nepal's demand being 150 unit per capita. Furthermore he highlighted on what motivates him to work in this sector by stating recent constitution allowing local government to handle all sorts of mechanism for projects less than 1 MW and motivating more investors in this sector. He also stated that AEPC's major focus was to:

1. Contribute to national economy
2. Contribute to economic, social, institutional fronts
3. Reduce greenhouse gas emission

He then concluded his presentation by stating there's a hope and opportunities ahead and also claiming that as country is being federated, objectives are redefined for every personnel in government. Adding to that, recommended central authority to focus on being knowledge center while local government be developed to provide services at local level.

## TWO-WHEELER E-MOBILITY TRENDS IN NEPAL



Mr. Shikshit Bhatta (Founder, Tootle) presents on "Two-Wheeler E-Mobility Trends in Nepal"

Mr. Shikshit Bhatta presented on the topic Two-wheeler E-Mobility Trends in Nepal. He pointed out the vulnerability in Kathmandu's transport system for people who are visually impaired, differently abled and anyone who has to find a ride, it's really difficult. He stresses in the vulnerability by talking about non-transparent public transport system and congestion of taxis in the road. He said everyone has to struggle to find a commute in Kathmandu, be it a women, child, an expat or foreigner who has trouble negotiating price with a taxi. Also, said that the solution to this problem is right there in the large number of motorcycles that is running in the city. He explained this problem of not finding proper means of commute can end if we were to share these resources (motorcycles) from point A to B.

Moving on to his venture, he said TOOTLE- is simply an app which enables commuters to share ride from point to point. Also pointed out that this is solving a huge problem of unemployment. With a data of around 2000 people leaving country for employment in the Middle East, he said that this can aid to this problem too. He stated that if a person has a motorcycle, then he/she is able to earn around US\$ 20 a day in a country where average daily income is US\$2. Also, pointed out that, one in every three person who takes a ride is female and females are the most vulnerable group when taking public transport and claims that they can trust Tootle for mobility.

Now, in the sustainable point of view, he said sharing vehicle has much bigger impact as it reduces the distance covered by the number of vehicles, leading to less need of vehicles, and less need to manufacture steel and other materials. He said this means less consumption of fuel and less carbon monoxide emitted in the atmosphere. He said there's a need of sustainability in mobility trends and concluded his presentation.



## WORLD ENERGY ISSUES MONITOR



Ms. Juhi Rajput started her presentation with brief introduction about World Energy Council. She talked about World Energy Issue Monitor. She mentioned that they monitor nation's energy issue and make a report on it and stated that Nepal will be included in 2018's report as the study is under developmental stage.

She then explained how to read or understand issue monitor step by step with all its aspects. She said that through this monitor they try to assess degree of impact. She explained about all the criteria to monitor the energy issue one by one.

## PANEL DISCUSSION VI: NEW ENERGY TECHNOLOGIES IN NEPAL

**Moderator-** Mr. Bhusan Tuladhar (Chief Technical Advisor-UN-Habitat)

**Panelists:**

1. Dr. Rabindra Dhakal (Senior Scientist, NAST)
2. Mr. Shree Raj Shakya (Acting Director, CES, IOE, Horizontal Hydro Turbine)
3. Mr. Prakash Aryal (Senior Officer Bio-Gas, AEPC)
4. Mr. Aashish Chalise (CEO, Saral Urja)



Mr. Bhusan Tuladhar, UN Habitat was the moderator of the session. He enthusiastically started the panel discussion with pledge to make this discussion interesting, He asked panel to discuss new energy opportunities, technologies emerging in Nepal. He straightaway asked every panel to introduce their line of work and where they are at their venture.

First one to answer was Dr. Rabindra Dhakal, who was chemical engineer by profession said he was working in waste, bio-polymer functionalization and whatever materials that they need. He said that the mobile that we carry contains gold, the plastic bags we use and throw them on the streets are collected by municipals are dumped in some site and never used. He said there are all sorts of wastage that are dumped and without having proper management and reuse of these materials, are dumped. In this context, he highlights some glimpses of his work at NAST, what he can do as a senior scientist,

1. He has just started research activities regarding some waste cooking oil to convert it into more functional material that is bio diesel, which is very popular in European and other eastern nations.
2. He has been working in waste plastic and convert in to fuel for trucks.

He said, although many institutions claims to lower waste plastic by banning the use of plastic but through various examples seen, this was not the solution for waste plastic.

Further elaborating his statement, he said, without proper management, integrity, and these waste plastics will hide and eventually end up at the river. With a positive note, he said, they have introduced new technology- pyrolysis process which can efficiently, economically convert waste plastics into fuel. Stressing on the context, he said that in some case, 1 kg of plastic can be converted into 1L of diesel that can be used in trucks and other vehicles.

Then, Mr. Tuladhar asked the panelist if all his technology and process was commercially viable?

Mr. Dhakal replied with yes, but only if the production is done in larger scale. He said there are some challenges at municipal and ground level that needs to be addressed. According to him, challenges were to collect the waste plastic needed at the facility and in significant amount. He said if facility is run above 1 ton of waste plastic, produced oil could be technically and economically viable.

Then, Mr. Tuladhar moved to the 2<sup>nd</sup> panelist with a question- he asked Mr. Prakash, "Nepal has more than 300,000 biogas plants as mostly only of household level. When we scale it up and have larger bio gas plants and then when we extend the use of that biogas and not just limit it for cooking purpose but other uses as well. What are the possibility and what is happening in Nepal?"

Mr. Prakash Aryal answered with a slight background on people focusing tremendously on the traditional technology and producing biogas at household level from cattle waste. But he also said that AEPC has recently intervened in some plants to scale up biogas plant and says that they are emphasizing in developing commercial biogas plant and waste to energy plants. He added, there has been investment in commercializing biogas plant by returned migrant workers with the establishment of cattle farm. And, said that this project was very much economically and commercially viable as:

1. Completely reliant on the domestic products where blockade if happens won't have any effect.
2. It is around 10Rs per kg cheaper than LPG
3. They are able to produce 96% pure methane, whole joule capacity is quite similar to that of LPG and can be used 100% from the cylinder unlike LPG in which around 1 kg is stuck and cannot be used that amount.

He moved on to third panelist Mr. Shree Raj Shakya and asked him about low head hydropower and what he is upto regarding this?

Mr. Shakya replied saying that they are basically researching and developing human resource. He said, when you talk about 40,000 MW in 10 years, its ambitious yet reachable but for this it is very necessary to consider technology diversification.

He said, Nepal has to recognize the need of decentralized power generation rather than centralized power generation and for this, low head hydropower is very essential as only 2-3m head is needed to produce electricity and through technology diversification, we would be able to generate electricity from irrigation project or through sewage flow. For sewage flow and production of electricity, he gives an example how it can be done and emphasizes on technology diversification. Also, he mentioned about huge need of investment in Research and Development sector in Nepal. He also said that his inventions are in preliminary stage and have tested to operate at 46% efficiency.

Then, moderator turned to the fourth panelist Mr. Ashish Chalise and asked him about his venture.

Mr. Chalise replied by saying he was the only one in the panel who was not from technical field. He said that Saral Urja have worked in solar sector and have worked in unserved area as well as urban areas. He said that they have developed 2 micro-grids, one was of 18KW solar and another of water pumping project. With an example of their micro-grid working mechanism, he explained there is good point about private sector in this kind of project, as if something goes wrong, private companies would be there to maintain the project within days and make them up and running in no time while if the project was grant funded or government led, it is hard to imagine the project being recovered. He claimed that the problem in energy sector does not lie in technology and says the technology is right there and can be adopted, but challenge is to create ecosystem where finance, marketing, awareness and other stakeholders come together to scale this up. With a statement of capability of producing 2000MW from rooftops in Kathmandu, he ended his discussion.



## ENERGY SCENARIOS, DEVELOPMENT OF RENEWABLE ENERGY FOR SUSTAINABLE ENERGY DEVELOPMENT & ENERGY SECURITY IN NEPAL



Prof. Dr. Amrit Nakarmi (Centre for Energy Studies, Institute of Engineering)

Prof. Dr. Amrit Nakarmi from Centre for Energy Studies, IOE started his presentation with a brief overview of energy sector of Nepal. He then gave an insight on needed policy interventions that Nepal has to do to enhance energy consumption. He mentioned that Nepal's electricity consumption is the lowest in South Asia with the help of graph.

Then he moved on to economic evaluation and concluded his presentation with some points:

1. Nepal's energy policy should focus on electrification in all economic sectors through harnessing renewable energy
2. Substituting use of fossil fuels by electricity and electricity market development
3. Nepal's economy will be strengthened through sustainable energy development and energy security.

## ENDLESS POWER WITHOUT FOSSIL FUEL & SELF CHARGING EV TECHNOLOGY



Mr. Guganesan Rangaswamy (Founder & CEO, CleanEnergy Logan Innovations Pte. Ltd. Presents on the topic "Endless Power without Fossil Fuel & Self-Charging EV Technology"

Mr. Guganesan Rangaswamy, Founder & CEO of CleanEnergy Logan Innovations Pte. Ltd. through his presentation discusses solution for climate change. He claimed that root cause of climate change is "EGO" system. Adding to his claim, he said that humans have started using up all the resources for their uses and didn't bother about other beings. And said that there is huge need of mindset change from EGO system to ECO system to address the problem of climate change.

Moving further with his presentation, he discussed about absolute/permanent solutions with the help of examples. He gave an example of using lever, pulley and wheel and axle to minimize effort for bigger impact. And, he says cutting down the expense is easier than earning money with the help of another example of gearbox. Their roadmap included:

1. They are in process of launching a pilot 4MW power plant
2. Working with one of the leading Automotive company to implement the APS in Truck & Bus with 170 KW motor drive
3. Launching our own luxurious car, passenger Auto & Mini Truck named as "Get Lost" by June 2018

He then concluded his presentation with possibility of replacing fossil fuel, biomass & Nuclear units by Akhathiren CleanTechnology to avoid emission and reduce Greenhouse Gas Emissions and claimed that all existing automotive can be converted to EV's which can get self-charge and run until the battery life.

## DAY 3

### INTERNATIONAL TRAINING PROGRAMS BY WORLD RENOWNED ORGANISATIONS



International Training Programs by World Renowned Organisations

On the final day of the event, trainings on much needed topics were provided by the world renowned organizations. Altogether, there were 4 training programs. One training was held on 28<sup>th</sup> January which was on Hydropower Economics, Financing and Risk and rest 3 were on the final day (29<sup>th</sup> January). Trainings on Micro-grids; Engineering, Procurement, Construction and Financing (EPCF) and Sustainable Energy Development and The Role of Hydropower were held.

More than 80 participants attended these training programs combined. Training on Micro-grids was provided by Dr. Zhang Zizhong and Mr. Li Zhe from NARI State Grid China. The presenters included topics like development profiles of distributed generation and micro-grid; distributed generation connection technology, micro-grid connection technology. They also presented NARI's solution for micro-grid with an example of typical micro-grid project. Training on EPCF was provided by Mr. Yu Hong (Sinosure), Mr. Gong Li Xin (China Construction Bank) and Mr. Tan Ding (Hunan Construction Engineering Group) who also was our one of the speaker. They provided training on ECA Financing, presented necessary procedures to get finance from China Construction Bank and how to implement EPCF. Training on Sustainable Energy Development and The Role of Hydropower was provided by Mr. Jorge Gastelumendi and Ms. Amy Newsock from The Nature Conservancy along with Mr. Tom Solberg from ICH. Major topic presented were on Hydropower by Design (HbD) Approach and Identification of River Pathways.

## 5. PRESENTATION OF SPEAKERS

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# 7. CONFERENCE AGENDA

## MAIN CONFERENCE DAY ONE

27 JANUARY

Hall: Megha Malhar

### Plenary Keynote Session Overview of Nepal Power Market

- 0845 - 0945 Registration & Tea
- 0945 - 1015 Master of Ceremony
- 1015 - 1020 Arrival of Rt. Honorable President of Nepal
- 1020 - 1025 Opening Address by Chairperson of Energy Development Council
- 1025 - 1030 Lamp Lighting by Rt. Honorable President of Nepal
- 1030 - 1035 Special Remarks by Ms. Bhawani Rana, President, Federation of Nepalese Chambers of Commerce & Industry
- 1035 - 1040 Special Remarks by Honorable Secretary General of SAARC Secretariat, Nepal
- 1040 - 1045 Keynote Address by His Excellency Mr. Manjeev Singh Puri, Ambassador of India to Nepal
- 1045 - 1050 Launching of A Handbook "How to Develop a Hydro Power Project in Nepal"
- 1050 - 1055 Inaugural Remarks by Rt. Honorable President of Nepal
- 1055 - 1100 Thank You Note from the Organiser
- 1100 - 1105 Photo Session & Farewell to Rt. Honorable President of Nepal

### Session I: Power Investment Opportunities in Nepal

- 1105 - 1110 Chair of the Session - H.E. Mr. Manjeev Singh Puri, Ambassador of India to Nepal
- 1110 - 1200 **Panel Discussion I: Regional Market Analysis**  
**Moderator:** Dr. Posh Raj Pandey, Executive Chairman, SAWTEE  
**Panelist**  
**Chair:** H.E. Mr. Manjeev Singh Puri, Ambassador of India to Nepal  
 H.E. Ms. Mashfee Binte Shams, Ambassador of Bangladesh to Nepal  
 Prof. Suthiphand Chirathivat, Executive Director, ASEAN Studies Centre & Chairman, Chula Global Network  
 Mr. Baikultha Aryal, Acting Secretary, National Natural Resources & Fiscal Commission, Government of Nepal
- 1200 - 1215 **A Showcase on ARUN-3 HEP**  
**Mr. S. K. Sharma**, CEO, Sattuj Jal Vidyut Nigam Limited Arun-3 Power Development Company Pvt. Ltd. (SAPDC)
- 1215 - 1230 **Hydropower Investment Experience of Nepal**  
**Mr. Deepak Rauniar**, CEO, Employees Provident Fund (EPF)
- 1230 - 1245 **An Overview of Energy Scenario in SAARC Region & Various Initiatives By Member States**  
**Mr. Ali Haider Altaf**, Director, Energy, Transport, Science & Technology, SAARC Secretariat

- 1245 - 1300 **Power Scenario in Industrial Sector: Special Economic Zone**  
**Dr. Chandika Prasad Bhatta**, Executive Director, Special Economic Zone Authority, MOI, GON

### 1300 - 1400 Delegate Lunch

### Session II: Regional Market Updates

- 1400 - 1405 **Chair of the Session - Her Excellency Ms. Mashfee Binte Shams, Ambassador of People's Republic of Bangladesh to Nepal**
- 1405 - 1420 **Indian Electric Vehicles Scenario & Relevance to Nepal**  
**Mr. Sohinder Gill**, CEO, Hero Electric
- 1420 - 1435 **One Belt & One Road Towards Win-Win Cooperation**  
**Mr. Tan Ding**, MD of Overseas Branch, Hunan Construction Engineering Group Co. Ltd.
- 1435 - 1455 **Introduction to Asian Infrastructure Investment Bank**  
**Mr. Rajat Misra**, Principal Private Sector Operations Specialist, Asian Infrastructure Investment Bank (AIIB)
- 1455 - 1520 **Potential of ASEAN Energy Market Integration & Its Progress**  
**Prof. Suthiphand Chirathivat**, Executive Director, ASEAN Studies Centre & Chairman, Chula Global Network
- 1520 - 1540 **Low Head Hydropower Solutions**  
**Mr. Alexander Bihlmayer**, Managing Director, ANDRITZ, Myanmar

### 1540 - 1605 Afternoon Refreshment and Network

### Session III: Investment Opportunity Evaluation of Renewable Energy in Nepal

- 1605 - 1610 **Chair of the Session - His Excellency Mr. Roland Schäfer, Ambassador of Germany to Nepal**
- 1610 - 1625 **Investment Checklist of Dragon Capital in Pre-emerging Market**  
**Mr. Joseph J. Hoess**, Director, Dragon Capital
- 1625 - 1640 **Asset Development of Renewable Energy**  
**Mr. Kiran Jethwa**, Founder and Managing Partner, Fumase
- 1640 - 1730 **Panel Discussion II: Connecting Renewables to the Grid**  
**Moderator:** Mr. Bishal Thapa, Managing Director, Saral Urja  
**Panelist:** Mr. Nawa Raj Dhakal, Director, AEPC  
 Mr. Jitendra Bhattarai, General Manager, Surya Power  
 Mr. Kushal Gurung, CEO, Windpower Nepal
- 1730 **Cocktail Dinner for all the participants**



## MAIN CONFERENCE DAY TWO

28 JANUARY

Hall: Megha Malhar

0900 - 0910 Master of Ceremony

0910 - 0920 Opening Address by Her Excellency  
Ms. Yu Hong, Ambassador of China to  
Nepal

0920 - 0940 Key Note Speech by Ms. Vandana  
Gombar, Editor-Global Policy,  
Bloomberg New Energy Finance

0940 - 0950 Atmospheric Water Generation: The Next  
Resource Revolution  
Mr. Brian Sheng, Founding Partner, Fresh VC and  
Lead Investor, FND

0950 - 1020 Morning Refreshment and Network

### Session I: 40,000 MW in 10 Years: Issues, Challenges & Execution

1020 - 1025 Introduction to Tokyo Electric Power  
Company

1025 - 1040 40,000 MW in 10 Years  
Mr. Sujit Acharya, Chairperson, Energy Development  
Council

1040 - 1055 Enabling Long Term Energy Finance in  
Local Currency  
Mr. Nishant Kumar, Executive Director, GuarantCo

1055 - 1110 Development of Francis Turbine at  
Kathmandu University to Initiate A New  
Business in Hydropower Market Under  
Himalayan Basins  
Dr. Biraj Singh Thapa from Turbine Testing Lab,  
Kathmandu University

1110 - 1150 Panel Discussion III: Accelerating  
Hydropower Development: Key Chal-  
Moderator: Mr. Anil Chitrakar, President, Siddharth  
Inc.  
Panelists: Mr. Uttar Kumar Shrestha, Chief Executive  
Officer, Butwal Power Company  
Mr. Alexander Schwab, Managing Director, ANDRITZ  
Vienna  
Mr. Bhanu Pokharel, President, Nepal Hydropower  
Association

### Session II: Foreign Direct Investments (FDI) in Energy Projects

1150 - 1155 Chair of the Session - Mr. N. L. Sharma,  
Chairman, Satluj Jal Vidyut Nigam

1155 - 1245 Panel Discussion IV: FDI in Nepal's  
Power Sector  
Moderator: Mr. Rajen Kandel, Director, Kandel  
Group  
Panelists: Mr. Apar Neupane, Vice-President, Finance  
at Equicap Asia Pte. Ltd.  
Ms. Naoki Nishimura, Representative, JICA  
Mr. Gorakh Rana, Head of Commercial and Global  
Banking, Standard Chartered Bank  
Mr. Joseph Hoess, Director, Dragon Capital

1245 - 1345 Delegate Lunch

1345 - 1400 NRN's Role in Energy Sector in Nepal  
Mr. Bhaban Bhatta, President, Non-Resident Nepali  
Association

1400 - 1450 Panel Discussion V: Equity Financing  
Moderator: Mr. Bharat Acharya, Vice-Chair for  
Employers Council, Nepal and the Executive Member of  
FNCCI  
Panelists: Mr. Krishna Raj Parajuli, Managing Director,  
Everest Equity,  
Siddhant Raj Pandey, Chairman and CEO, Business  
Oxygen  
Mr. Tim Gocher, Founder & CEO, Dolma Impact Fund  
Mr. Semanta Dahal, Advocate & Partner, Abhinawa Law  
Chambers

### Session III: Emerging Energy Opportunities in Nepal

1450 - 1455 Chair of the Session - Her Excellency  
Ms W.S. Perera, Ambassador of Sri Lanka  
to Nepal

1455 - 1510 Prospects of Renewable based distributed  
generation in Nepal  
Mr. Ram Prasad Dhital, Executive Director, Alternative  
Energy Promotion Centre, Ministry of Population &  
Environment, Government of Nepal

1510 - 1525 Two-Wheeler E-Mobility Trends in Nepal  
Mr. Shikshit Bhatta, Founder, Tootle, Nepal

1525 - 1540 World Energy Issues Monitor  
Ms. Juhi Rajput, FEL Board, World Energy Council

1540 - 1600 Afternoon Refreshment and Network

1600 - 1650 Panel Discussion VI: New Energy  
Technologies in Nepal  
Moderator: Mr. Bhusan Tuladhar, UN-Habitat  
Panelists: Dr. Rabindra Dhakal, Senior Scientist,  
Faculty of Technology, NAST (Plastic Waste to Energy)  
Mr. Shree Raj Shakya, Acting Director, CES, IOE,  
(Horizontal Hydro Turbine)  
Mr. Prakash Aryal, Senior Officer Bio-gas, AEPC  
(Compressed Bio-gas)  
Mr. Ashish Chalise, CEO, Saral Urja (Solar Microgrids)

1650 - 1715 Energy Scenarios and Development of  
Renewable Energy for Sustainable Energy  
Development and Energy Security in Nepal  
Prof. Dr. Amrit Nakarmi, Professor, Center For Energy  
Studies, Institute of Engineering

1715 - 1730 Endless Power Without Fossil Fuel &  
Self-Charging EV Technology  
Mr. Gugesan Rangaswamy, Founder & CEO,  
CleanEnergy Logan Innovations Pte. Ltd.

1730 - 1800 Special Remarks by Former Prime Minister  
of Nepal by Honorable K.P. Sharma Oli

1800 - 1805 Vote of Thanks by Organiser

1805 Cocktail Reception for speakers only

Disclaimer: EDC does not bear any responsibility for any speakers, moderators, panelists for not showing up at the summit for whatsoever reasons.



## DAY TWO

28 JANUARY

### Parallel Session After Lunch

#### 1400 - 1700 Training on Hydropower Economics, Financing and Risk

- Economic & Financial Analysis: Procedures & Requirements in Feasibility Study
- Issues & Risks in Project Financing & Ways to Monitor & Mitigate Risk

Mr. Truls Høltedahl, Norconsult  
Mr. Inge Lovasen, Statkraft

*Training Room: Marva*

### Parallel Session From Morning

#### 1000 - 1700 Energy Mart

Showcase of various national and international exhibitors who will launch and showcase their new technologies, products and capacities.

*Venue: Rose Garden*

## MAIN CONFERENCE DAY THREE

29 JANUARY

### Parallel Session From Morning

#### 0900 - 1200 Training on Microgrids

- Development Profiles of Distributed Generation and Micro-grid
- Distributed Generation Connection Technology
- Micro-grid Connection Technology
- NARI's Solution for Micro-grid
- Micro-grid Typical Project

Dr. Zhang Zizhong, NARI State Grid China  
Mr. Li Zhe, NARI State Grid China

*Training Room: Madhavi*

#### 0900 - 1200 Training on Engineering, Procurement, Construction and Financing (EPCF)

- ECA Financing - Sino-sure Products Introduction  
Yu Hong, Sino-sure (China Export & Credit Insurance Corporation)
- China Construction Bank Financing Introduction  
Gong Li Xin, China Construction Bank
- Implementation of EPCF  
Tan Ding, Hunan Construction Engineering Group

*Training Room: Malshree*

### 1200 - 1400 Lunch For Trainee Participants Only

### Parallel Session From Afternoon

#### 1400 - 1700 Training on Sustainable Energy Development and The Role of Hydropower

- Hydropower by Design (HbD) Approach
- Identification of River Pathways

Mr. Jorge Gastelumendi, The Nature Conservancy  
Ms. Amy Newsock, The Nature Conservancy

*Training Room: Marva*

### Parallel Session From Morning

#### 1000 - 1700 Energy Mart

Showcase of various national and international exhibitors who will launch and showcase their new technologies, products and capacities.

*Venue: Rose Garden*



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