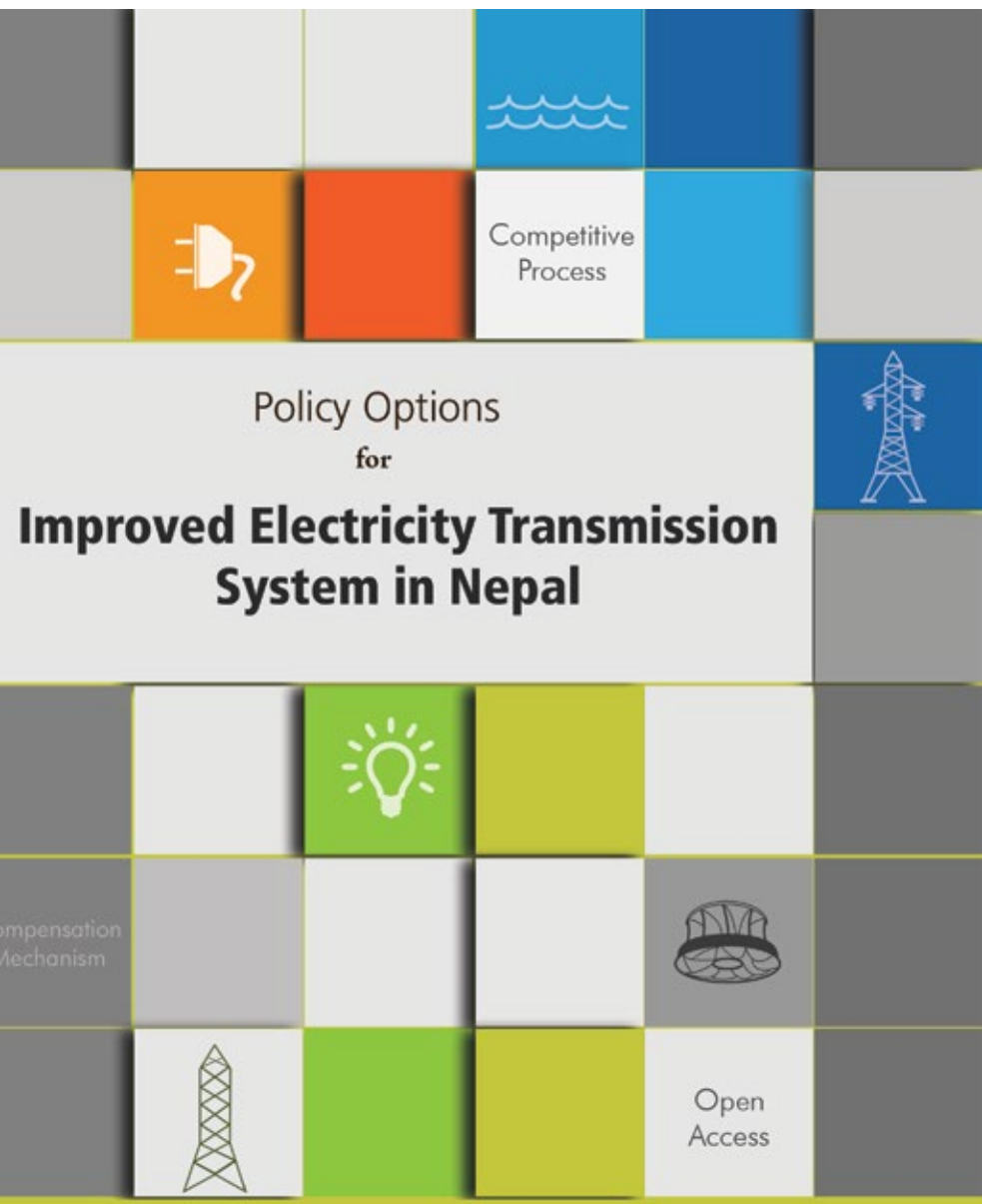


Policy Options

for

# Improved Electricity Transmission System in Nepal

**Pramod Rijal,**
**Surath Giri**
**& Serene Khatiwada**

Edited by
**Arpita Nepal**

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**Samriddhi, The Prosperity Foundation**
July, 2014

# Preface

The Nepal Economic Growth Agenda (NEGA), first released in 2012, is an annual effort of Samriddhi Foundation to identify key constraints to Nepal's economic growth and policy options for reform. This policy analysis paper titled "Policy Options for Improved Electricity Transmission System in Nepal" is prepared under the banner of NEGA 2014, which is preceded by NEGA 2012 and NEGA 2013. NEGA 2012 identified and discussed policy constraints in five growth sectors of Nepal viz. Agriculture, Education, Hydropower, Transport Infrastructure and Tourism. NEGA 2013 focused on six cross-cutting issues viz. Industrial Relations, Contract Enforcement, Anti-Competitive Practices, and Foreign Direct Investment, Public Enterprises, and Regulatory environment for doing business. NEGA 2014 builds on The Foundation's previous studies on hydropower, industrial relations and public enterprises.

Majority of hydropower projects in Nepal have not gone under construction due to the absence of transmission lines and thus it is one of the key constraints that has been keeping the country from realizing its enormous hydro potential and easing the prevailing electricity crisis.

Although having adequate transmission network is very essential for increasing electricity supply, it has been an area where major reforms have not been seen even after the formulation of two major legislations that guided the development of the sector – Hydropower Policy, 1992 and Electricity Act, 1992.

Nepal Electricity Authority (NEA) enjoys a practical monopoly over transmission and distribution systems in Nepal and has not been able to construct required amount of transmission systems due to problems in land acquisition, rigidity of the Public Procurement Act, poor financial health

of the institution, the lack of an effective tariff regime, lack of an efficient management practice and lack of an open access policy in transmission service.

Private parties have shown interest in building transmission systems in various corridors namely, Khimti, Nuwakot and Lamjung – but the lack of clear policies for private participation in transmission lines has hindered such development. Additionally, Independent Power Producers are compelled to sell electricity to NEA as a Single Buyer Model is operating in Nepal and NEA has shown reluctance in signing the Power Purchasing Agreement (PPA) by giving the reason of an excess of energy during wet season after 2017. This has severely constrained the pace of hydropower development in Nepal.

Samriddhi Foundation formed a team to conduct a study and consulted with various key stakeholders including developers, consultants, academicians, officials of Independent Power Producers' Association of Nepal (IPPAN), Nepal Electricity Authority (NEA) and Ministry of Energy (MoE) to find out major obstacles that hinder the growth of transmission lines – especially from a policy constraint perspective.

Based on the secondary research as well as information and input collected from stakeholders, the paper argues policy provisions allowing private sector to build their own transmission lines and open access on transmission service under specific regulation will help speed up the construction of transmission lines and consequently hasten the development of Nepal's hydropower sector. This will also introduce multiple buyers system in Nepalese electricity market and help manage demand and supply of energy on a market driven model. We sincerely hope that the challenges identified and recommendations suggested by this study will provide key inputs to all stakeholders in resolving the hurdles in transmission sector.

# Abbreviations and Acronyms

| | |
|---|---|
| NEA | Nepal Electricity Authority |
| PPA | Power Purchase Agreement |
| IPPAN | Independent Power Producers' Association, Nepal (IPPAN) |
| MOE | Ministry of Education |
| NEC | Nepal Electricity Corporation |
| IPP | Independent Power Producers |
| KM | Kilometer |
| KV | Kilo Volt |
| DoED | Department of Electricity Development |
| Ckt-km | Circuit Kilometer |
| GoN | Government of Nepal |
| MW | Mega Watt |
| COD | Commercial Operation Date |
| BOOT | Build – Own – Operate – Transfer |
| BT | Build – Transfer |
| EPC | Engineering, Procurement and Construction |

The Nepali year is based on the Bikram Sambat Calendar and is approximately 57 years ahead of the Gregorian calendar (2062/1/1=2005/4/14)

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# 1. Background

For almost a decade now, Nepal has been facing severe energy crisis. During the dry season, the power cuts last as long as 16 hours a day. The severe energy crisis has not only resulted in hardships of daily activities but also adversely affected industries ranging from manufacturing to service oriented. A huge discrepancy exists between the current demand and supply of electricity, the result of which is power cuts for the general public inclusive of industrial consumers.

Table 1: Trend in demand and supply of electricity in Nepal

| Year | Installed Capacity in MW | Generation Capacity in MW (Dry Season) | Load Forecast (system peak load in MW) | Deficit in MW (Dry Season) |
|---|---|---|---|---|
| 2012 | 747.16 | 261.16 | 1056.9 | 795.39 |
| 2013 | 837.64 | 293.17 | 1163.2 | 870.03 |
| 2014 | 1088.45 | 380.96 | 1271.7 | 890.74 |
| 2015 | 1247.75 | 436.71 | 1387.2 | 950.49 |
| 2016 | 1837.45 | 643.11 | 1510 | 866.89 |
| 2017 | 2088.45 | 730.96 | 1640.8 | 909.84 |

*Source: Vidyut (2069), P. 64. Year 23, Vol. 1.*

Ever since the establishment of Nepal Electricity Authority (NEA) in 1985 through the merger of different government owned entities like the Electricity Department, Electricity Development Board and Nepal Electricity Corporation (NEC), it has remained the most dominant player in Nepal's power sector, especially the hydropower sector. NEA is involved in all three primary aspects of electricity, namely, generation, transmission,

and distribution. Until 1992, NEA enjoyed absolute monopoly in the electricity market with regards to all of these aspects. However, during the liberalization drive of the early 1990s, electricity generation was opened up to the private sector with the introduction of Hydropower Development Policy and Electricity Act 1992. Since then, the number of independent power producers has also been increasing significantly. At the present, about 32.33% of the total power is being generated by the private sector and the rest is generated by small and large hydropower projects owned by Nepal Electricity Authority (NEA, 2013). In this process of gradual reform in power sector, the board of NEA has approved Community Electrification Distribution Bylaws, 2060, in 2002 which encourages rural electrification by buying electricity from NEA in bulk, which is then supplied to consumers through NEA owned distribution channels. These positive initiatives have encouraged construction of projects by Independent Power Producers (IPPs) with total capacity of 1586.15 MW (which are under different stages of development) but, majority of these projects have not materialized due to absence of transmission lines.

Nepal Electricity Authority remains the sole provider of transmission services. Although the Electricity Act 1992 has allowed private sector's participation in the transmission sector, the rules and regulations necessary to determine the wheeling charges, ownership structure, dispute settling mechanisms etc. have not been formulated yet. Therefore, the lack of transmission infrastructure has constrained hydropower development. For instance, construction of Khimti-Dhalkebar Corridor was supposed to be completed by 2010 but the construction work was delayed due to land rights and compensation issues in Sindhulimadi. The project has finally begun in January of 2014.

Thankot-Chapagaun Corridor has been under construction for more than a decade now. Similarly, Mai Khola Hydropower and Sipring Khola Hydropower, two power projects backed by independent power developers are about to start their generation but the construction of transmission infrastructure has fallen behind schedule putting the operation of these projects in quandary.

One of the contributing factors to the current electricity crisis is the high rate of transmission and distribution losses. There is a system loss of about 120,000 units per day that costs around NRs. 175 million a year. Most of these occur while transmitting power through longer distances from the western region to the eastern region (HNS, 2013). Following table shows the electric power transmission and distribution losses in Nepal:

Table 2 : Electric power transmission and distribution losses

| Year | Loss (mWh) | Loss (%) |
|---|---|---|
| 1991 | 180000 | 19.31 |
| 1992 | 184000 | 20.77 |
| 1993 | 197000 | 21.11 |
| 1994 | 217000 | 21.49 |
| 1995 | 236000 | 19.73 |
| 1996 | 255000 | 20.88 |
| 1997 | 262000 | 22.41 |
| 1998 | 284000 | 22.72 |
| 1999 | 323000 | 21.85 |
| 2000 | 352000 | 21.22 |
| 2001 | 180000 | 19.31 |
| 2002 | 417000 | 20.77 |
| 2003 | 442000 | 21.11 |
| 2004 | 656000 | 21.49 |
| 2005 | 718000 | 19.73 |
| 2006 | 815000 | 20.88 |
| 2007 | 845000 | 22.41 |
| 2008 | 896000 | 22.72 |
| 2009 | 1073000 | 21.85 |
| 2010 | 1094000 | 21.22 |

*Source: International Energy Agency (IEA Statistics © OECD/IEA, http://www.iea.org/stats/index.asp)*

This high loss rate of NEA (showing a steady incline instead of a decline) makes the financial health even worse and it cannot invest further in the development of transmission systems. Although, some authors from NEA (Vidyut, 2070 – Falgun issue) claim that the loss rate has declined from 34 percent to about 25 percent since 2013, this is yet to result in additional transmission infrastructure development. International experience shows that one of the most prominent solutions has been the introduction of private players under an Open Access System to increase the efficiency of transmission systems. This could readily be the solution that could be adopted in the case of Nepal as well.

# 2. Challenges of Transmission Infrastructure Development in Nepal

Under the current scenario, a private hydropower developer generates electricity and sells it to Nepal Electricity Authority through Power Purchasing Agreement (PPA). Then, Nepal Electricity Authority handles the transmission and distribution of the electricity. This arrangement has, however, created problems in transmission network development in Nepal.

Transmission system transmits electricity in bulk from the power stations to sub-stations and then to the end consumers. Nepal's transmission system extends from Anarmani in the east to Mahendranagar in the west. The Grid Sub-Station (GSS) capacity is 1310 MVA and there are 2076 km long transmission lines of 132 kV and 586 km long transmission lines of 66 kV. Except for the Bardghat – Hetauda section, majority of the lines are constructed in double circuit. NEA is planning to expand its transmission lines to 3272 kilometers which includes 78 kilometers of 33 kV, 1409 kilometers of 132 kV, 755 km of 200 kV and 1030 kilometers of 400 kV in the coming ten years (Thapa, 2013). Following are some of the challenges that the transmission infrastructure faces in Nepal:

## 2.1 Congestion in the Grid

It is necessary to expand transmission systems in order to increase the distribution of available power to meet existing and future demand. Timely expansion is needed for meeting contractual obligations for transmission with various power producers. There is congestion in various transmission systems namely Bardaghat-Bharatpur, Marsyangdi-Siuchatar,

Khimti-Bhaktapur, Marsyangdi-Kathmandu, (Rajbhandari, S., nd). A system collapse may take place due to tripping in any of the transmission lines. In Bhairahawa, expensive machines were damaged due to sudden power cut. That happened due to tripping which sometimes happens as much as three times within an hour (Bhusal, 2014).

Expansion in transmission system is needed not only for further independent power producers to enter the Nepalese market but also to sell electricity to India. The transmission network of Kanaiya and Kusuwa and other bordering areas like Raxwal-Amlekhgunj as well as Bhairawa can be improved into higher voltage for evacuating further 500 MW of power. Similarly, it is estimated that total capacity of 240 MW of energy will be connected to the national grid from various pocket areas if transmission lines of those areas are upgraded (Pradhan, G., personal communication, January 4, 2014).

## 2.2 Institutional bottlenecks

After the introduction of Electricity Act 1992, domestic and foreign investors got an opportunity to invest in hydropower sector of Nepal. Department of Electricity Development (DoED) provides licenses for survey and generation of hydropower development. However, Nepal Electricity Authority has a practical monopoly over construction and development of transmission and distribution lines. As a result, only 1,980 circuit-Kilometers (ckt-km) of transmission lines has been developed in a period of 100 years. However, Government of Nepal (GoN) is developing 3,235 ckt-km of transmission lines within the next decade which cost around US$1,379 million (Rajbhandari, S., nd). NEA, which possess practical monopoly over construction of transmission line is facing financial problem because only about 21 percent of the total cost is committed at present. Thus, underinvestment in transmission systems has limited the use of renewable energy and increased congestion.

Additionally, NEA has been stuck in some key planning parameters such as whether the transfer capacity of the grid should be 10,000 MW or 42,000 MW and the government has made recent plans for 32,000 MW

by the year 2025/26 B.S.(Rajbhandari, S., nd). Similarly, there is dilemma regarding planning horizon, some of the policymakers focus on 5 years and the remaining go for 30 years.

### 2.3 Costly Acquisitions

Given the linear nature of transmission lines and the geographical terrain of Nepal, it is very likely that a portion of transmission alignment will pass through forest areas. It takes a long time to get clearance from Ministry of Forest for the construction of transmission lines through forests, national parks and conservation areas. As a compensatory measure, for every single tree that is cut down, the project has to plant 25 trees in case of protected species, and, for common species 2 trees need to be planted (MoFSC, 1992). Likewise, the process of land acquisition is very cumbersome because affected people demand 100 percent compensation with ownership right of land. However, the Land Act ensures only 10 percent as compensation (MoLD, 1999). Additionally, Rule 88 of Electricity Regulation 1993 made a provision for the formation of Compensation Fixation Committee for providing compensation in lump sum to people whose land was used for construction of transmission line, but it has no mention of a certain percentage as compensation (Electricity Regulation 1993, p. 31). This creates confusion in providing compensation to the affected parties. Therefore, local people often protest against the construction of transmission lines on their private property. These kinds of disturbances increase differences between project identification and project construction time. As a result, new human settlement, housing plot and additional structures develop in the areas that sometimes lead into remapping of transmission route (Mishra, 2012).

### 2.4 Restrictive Public Procurement Act 2007

Public Procurement Act 2007 was promulgated with the intention of making procedures, process and decisions relating to public procurement open, transparent, objective and reliable (Public Procurement Act 2007, p.1). Promoting competition, fairness, honesty, accountability

and reliability in public procurement process was its primary objective. However, the tendency to take the law to the letter rather than the spirit has handicapped decision-making in public institutions (Kansakar, S. R., personal communication, June 25, 2014)[1]. The Public Procurement Regulations 2007 allows discretionary decision-making to Chiefs of public enterprises only up to decisions that cost less or equal to NRs. 150,000. Any decision involving higher amounts has to go through a lengthy process as described in the Regulations. In addition to this, according to the Public Procurement Act, construction of transmission lines should be awarded to the party with the lowest bid. However, there have been many instances where parties have bid an amount too low to make the project feasible (Manandhar, G., personal communication, April 15, 2014)[2]. After winning the contract, they are found to have raised their claims resulting in higher costs and thus, delays in construction of transmission lines (Manandhar, G., personal communication, April 15, 2014).

### 2.5 Policy level bottleneck

Although the Electricity Act, 1992 provisions for private sector participation in the construction of transmission lines, there have been no efforts made to frame by laws and regulations that would enable the private sector to participate in this sector. Therefore, private sector is reluctant to participate in the transmission line network due to uncertainties about ownership, tariff and wheeling charge regimes, and capacity specifications. Following case study illustrates this problem further.

### Transmission as a Key Bottleneck in Hydropower Development: A Case Study

*Himalayan Urja Bikas Company Pvt. Ltd. had acquired power generation license to develop Upper Khimti Hydroelectric Project which generates 12 MW and Upper Khimti II of 7 MW of electricity. The commercial operation date (COD) of Upper Khimti and Upper Khimti II were set as Nov. 16, 2015 and July 14, 2017. However, without the*

1 Mr. Sugat Ratna Kansakar is a former MD of Nepal Telecom and Nepal Airlines Corporation

2 Mr. Gagan Manandhar is an Incharge of Transmission Section, Nepal Electricity Authority

*certainty of transmission line, the completions of these projects were highly improbable. National Electricity Crisis Mitigation Action Plan 2008 has identified transmission systems as one the major bottlenecks in the development of hydropower sector. It is also mentioned in serial no. 7 about the participation of private sector in development of transmission system (MOE, 2008).The Three Year Interim Plan (2010-2013) has envisioned public, private and community participation in development of transmission lines for domestic use (The Three Year Interim Plan 2010-2013, p. 215). Therefore, the National Planning Commission invited interested private sectors for discussing issues on developing transmission system for their respective projects. This brought a positive effect in the Ministry of Energy which led to formation of a taskforce consisting of all key stakeholders under the coordination of Mr. Ganesh Prasad Raj, the General Manager of Grid Development Department, NEA on March 20th, 2012 (Report of Taskforce Prepared for the participation of private sector in Transmission Lines, 2069). Three different modalities (Hydro property, BOOT and BT) have been identified for the participation of private sector in transmission line construction.*

*On November 30, 2012, another taskforce was formed under the coordination of Mr. Rajeshwor Man Sulpaya, the General Manager of Transmission and System Operations, NEA, to formulate policy regarding cost determination. This taskforce estimated the cost of constructing 132 Kv, 30 km single circuits with a substation at Kharghang to be NRs. 470 billion. It was supposed to be built under BOOT (Built-Own-Operate and Transfer) model; however, despite all of these procedures, the construction of transmission lines by the Himalayan Urja Bikas Company could not materialize due to absence of a clear policy regarding transmission line development that fixes the rate of return, the rate of wheeling charge, ownership issues, user's right and other issues. Additionally, according to the Public Procurement Act 2007, such projects cannot be awarded to a private party without bidding.*

# 3. Towards Transmission Network Development

The vertically integrated state utility, NEA, responsible for supplying electricity could not meet the growing demand of electricity due to inefficient management, huge transmission and distribution losses and irrational tariff policies. Therefore, NEA has been the centre of focus for a number of reforms initiated in the power sector. The Hydropower Development Policy 1992 and Electricity Act 1992 broke the monopoly of NEA in power generation and introduced private power developers in the sector. Transmission and distribution of electricity, however, are still dominated by NEA. This reform initiative has converted the electricity market of Nepal from Monopoly Market Model to Single Buyer Model. If the private sector participates in generation, transmission and distribution as envisioned by Electricity Act 1992, the electricity market will operate in Whole Sale Competition Model which would automatically bring an end to the Single Buyer Model. Furthermore, there would be unbundling of NEA and the distribution companies thus formed would directly purchase electricity from Whole Sale Electricity Market (Bhat, 2012). Additionally, it would open avenues for invitation of private sector in development of transmission system.

### 3.1. Inviting Private Sector in Transmission System Development

In order to invite the private sector in all aspects of hydropower development, including transmission system, Hydropower Development Policy, 2001 was promulgated. It sought to give more autonomy to NEA in order to make it more efficient and effective. One of the reforms proposed for

the sector's development is unbundling of the currently vertically integrated Nepal Electricity Authority into three distinct companies handling three different aspects of power, i.e. generation, transmission and distribution. This policy would help restructure institutions in the public sector to create competitive environment by encouraging community institutions, local bodies and private sector to be involved in generation, transmission and distribution of hydropower. As per the policy, transmission and distribution licenses are given to private sectors with a validity of 25 years from the date of issuance. However, due to lack of accompanying Acts and Regulations, the policy has not been implemented till date.

Currently, private sectors are already interested in building transmission lines in specific corridors, namely, Khimti, Lamjung, Nuwakot and some more as cited in government's periodic plans (Three Year Plan Approach Paper 2010/11 - 2012/13, p. 143). However, the development of transmission lines could not be realized due to absence of concrete regulations that direct the rate of return, resettlement plan, and access and ownership issues. NEA is financially not in a good shape for arranging funds to develop required level of transmission network as the accumulated loss of NEA is more than 14 billion (NEA, 2013,p. 96). Therefore, new Acts and regulations should be promulgated to encourage involvement of private sector in transmission system development under Hydro Property, Built-Operate-Own-Transfer (BOOT) or Built-Transfer (BT) models.

### 3.2. Establishing a New Transmission Company

In 2012, Ministry of Energy came up with a concept paper on the formation of a separate company – National Grid Company – which would deal with the construction and management of transmission lines. Several government agencies like the Energy Ministry, Ministry of Finance, Home Ministry, Ministry of Industry and Commerce and NEA have been proposed as stakeholders in the new company. National Grid Company would have an authorized capital of NRs. 25 billion (Thapa, 2012). However, political instability and subsequent changes in government have prevented the plan from materializing.

The said company could facilitate the rapid construction of transmission lines as its survival would depend on revenue generated from wheeling charges and capacity booking. Hence, it would have a higher incentive than Nepal Electricity Authority to actively construct and efficiently manage transmission lines. The higher the amount of power generated and transmitted, the higher would be the revenue of the company. All this would be possible only through an Open Access policy, which would have a higher probability of taking effect if this body were to come into Nepal, compared to the sustained existence of NEA.

Currently, NEA has conducted Power Purchasing Agreements (PPAs) for more than 1600 MW and it is more likely that the expected generation capacity of NEA would be approximately 2500 MW by 2017 (NEA, 2012). When the production of electricity increases, it helps meet not only internal demand but also regional energy needs. So, the formation of an independent transmission company would be feasible in the long run.

After the power sector was restructured in Gujarat in 2005, transmission and distribution losses were reduced from 33.5 percent in 2005 to 21.14 percent in 2009 and profit increased from a negative IRs. 969 crores in 2004/05 to a positive IRs. 126 crores in 2008. Similarly, the electricity generation in the state increased from 23,000 MW in 2005 to more than 28,000 MW in 2009 (Vagliasindi & Besant-Jones, 2013). This may also happen in Nepal, if a separate transmission company were to be established with proper rules and regulations as it would ensure efficiency and transparency.

### 3.3 Open Access on Transmission Line Service

An open access is a system in which distribution companies and consumers are free to buy electricity from generating companies and correspondingly the generating companies have the freedom to supply any eligible consumers after paying necessary charges for using transmission service. It brings much needed competition in electricity market after opening market for access of power – which is in larger interest of

consumers. The generators need to pay wheeling charge for evacuation of power and the price is determined by an independent regulatory body.

### 3.3.1 Benefits of Open Access on Transmission Line Service

Opening access on transmission service is an initial step that leads to more efficient electricity market. Therefore, it is seen as an evolutionary process in developing competitive market that leads to larger productivity gains for the market participants. This creates ripple effects in a lot of areas; like lowering of unit costs. Since Open Access policy creates a variety of options for consumers from diversity in power supply contracts that take advantage of all the factors of the suppliers from geographical locations to scheduling. The ultimate effect of this wide variety of choices for the consumers is a competitive environment where there is a lower cost. In addition to this, customers can also choose from different suppliers at different time periods of the day. This not only increases the efficiency of the consumers but also increases the gross utility by adding the factor of reliability- the constant problem of power cuts would be lower as there is a diverse pool of suppliers who are competing with each other. An unreliable supply would mean a disadvantage in the market for a supplier (International Experience with Open Access to Power Grids, p.12).

Majority of the hydropower concentration in India, for instance, is based on the northern and the northeastern geographical locations. Thermal power generation based on coal is abundant in the eastern regions of India. This created a basic inequality in availability of power, mainly in the western parts of India, forcing the central government to prioritize a fully integrated national grid. The present status quo follows that 60 percent of the power generated in India in the near future will flow through the integrated national power grid (Mukherjee and Pratap, 2011). Additionally in India, around 15 percent of total volume of power flows from opens access and major portion of this power is generated by industrial facilities for their own consumption and the surplus power is supplied to consumers (International Experience with Open Access to Power Grids, p. 2).

Government of Nepal (GoN) has made provision in the budget that automobiles, agriculture appliances, aluminum, cement, chemical fertilizers and information technology related industries are given license to generate electricity for their industrial consumption (Budget Speech 2014/15, p. 16). These companies can sell their surplus power to consumers that are in dire need of power. Furthermore, it brings transparency in electricity market as open access process needs inputs from many stakeholders such as independent power producers, multiple buyers and consumers.

Open access provides a rich variety of power supply taking advantage of load, time and locational differences. It facilitates customers to switch between grids of different voltage levels that lead into improvements of efficiency and reliability gains. In this way, reduction in cost, and enhancement in quality of service are achieved with the introduction of new products and services (International Experience with Open Access to Power Grids, P. 12).

Nepal has a clear excess demand especially in the industrial sectors. The total revenue generated for Nepal Electricity Authority (NEA) during the fiscal year 2012/13 was NRs. 26.21 billion (NEA, 2013). The breakdown for the contribution in this total amount is as the following:

Table 3: Breakdown of contribution to NEA's total revenue

| S.N. | Description | Percentage |
|---|---|---|
| 1 | Domestic | 44.63 |
| 2 | Commercial | 10.61 |
| 3 | Non-Commercial | 5.32 |
| 4 | Export | 0.12 |
| 5 | Industrial | 34.44 |
| 6 | Others | 4.88 |

*Source: NEA's Annual Report: A Year in Review 2012/13, p. 108*

As the table indicates, the top two contributors for the fiscal revenue for NEA are domestic and industrial customers. Even more striking is the percentage of total industrial customers as a whole.

Table 4: Distribution of Total Customers

| S.N. | Description | Percentage |
|---|---|---|
| 1 | Domestic | 91.12 |
| 2 | Commercial | 0.5 |
| 3 | Non-Commercial | 0.58 |
| 4 | Industrial | 1.44 |

*Source: NEA's Annual Report: A Year in Review 2012/13, p. 104*

The percentage share of industrial customers in the entire customer pool is 1.44 percent and their contribution to the total revenue of NEA is 34.44 percent. This suggests that the revenue generated per percentage of industrial customers is the highest for NEA.

The very law of demand and supply suggests that the high price paid by the industrial customers is because of an excess demand, which cannot be met by the current supply-ceteris paribus. This suggests that there is a scope for an increment of the availability of electricity to industrial customers. The prospect of an Open Access system in Nepal enables the increment in this particular angle.

Additionally, excluding this very prospect, the current status quo dictates a supply crunch not only for the industrial customers but the whole consumer pool in Nepal and thus there is a regular arrangement of a load shedding schedule to reduce the peak hour load. This has sanctioned the industrial players to use a substitute measure to conduct their daily economic activity. The most prevalent measure practiced at present in Nepal as a whole is the generation of electricity through diesel powered generators. This status-quo has shot up the per unit price of electricity for the industrial players in Nepal. The current per unit price of diesel generated power is NRs.36/unit. This is very high compared to the current tariff charged by NEA. Even with the prospect of adding wheeling charges, leakages and other surcharges, it still would imply a lower tariff rate and a significant margin compared to the diesel powered option.

Lastly, the load-shedding experienced by the Nepalese industrial sector can also drastically be reduced through Open Access. The experiences in Manesar in the state of Haryana, India shows that industries obtaining energy from Open Access experience negligible power cuts from load shedding as compared to other counterparts obtaining electricity from the utility distributor-which averaged to 15 percent in the month of January, 2012. In the same area, other consumers were willing to pay additional charges for reliable power as most of the uncertain power cuts were substituted by diesel powered generators (Mercados EMI, 2012).

### 3.3.2 Cost of Open Access on Transmission Line Service

Most of the existing transmission lines are overloaded and there is no possibility of evacuation of power at the current time in Nepal. There are various incidents of tripping and interruption of power distribution even in hours when the regular load shedding is not happening, which essentially proves the overloaded nature of the transmission lines in Nepal.

Additionally, the feasibility of a full Open Access system in a developing network is questionable. Majority of the success stories of a full Open Access system are in countries which have far larger networks compared to Nepal. Nepal currently operates under 1000 MW network (Rajbhandari, S., personal communication, August 22, 2014)[3]. Monopoly interests may block market entry for third parties. Many of these cases take form of blocking from public view the system's availability to accommodate third-party transactions. The Sherman Act in the USA was formed for the very reason of antitrust interest of dominant parties interested in monopolizing the supply in the Open Access system. This requires any country that is planning to go into an Open Access model to first set a regulatory body that is unbiased, which would be responsible to look after these antitrust activities and any sort of dispute that may arise between parties. Furthermore, there should be a clear legal unbundling in case of Transmission and Distribution facilities from generation and supply- also the ownership matters of unbundling should be clear when setting the

3 Mr. Surendra Raj Bhandari is a Director at Nepal Electricity Authority.

legislation of Open Access. Many of the companies in India have been observed to place a high priority in energy sales rather than transporting its energy and other related services (International Experience with Open Access to Power Grids, P. 15).

There is a clear need for an institutional governance structure for the successful delivery of the open access system. There are several possibilities and ways that the government can intervene into the electricity market- if the regulatory body is not strong enough to neutralize government intervention through any legal or other measure, there is a government interest that could impede the development of a fully competitive environment. In addition, not only the government taking sides, the regulatory body itself might collude with local utilities and the government and deny eligible consumers from taking the benefits of open access system. Lastly, there needs to be a clear definition of guidelines to follow, as this could also give life to any external interest that renders the Open Access System unfair.

In India for instance, under Section 11 of the Electricity Act 2003, the state government has the right to issue directions to a generator in case of extraordinary circumstances. This clause is often used to deny a generator's request to sell power outside the state boundaries. Also, Section 37 of the Act allows the state to issue directions to the State Load Dispatch Center (SLDC) or regional load dispatch center "for maintaining smooth and stable transmission and supply of electricity to any region or state." This enables the state to impede SLDC and load dispatch centers' functioning, which ultimately reduces the benefit that could be derived out of the Open Access Systems (International Experience with Open Access to Power Grids, P. 17). Moreover there could also be a conflict of interest among vertically integrated utilities for grid access, dispatch decisions and for grid expansion planning. In order to avoid such incidents, the neutrality of a system operator toward all sellers and buyers should be clearly mentioned in laws. Furthermore, the representatives of all key stakeholders, including generators, transmission entities, and consumers should be there in the governing board of system operation.

Additionally, there should be a clear planning for the instances in the future. Majority of the problems witnessed in other countries that have implemented Open Access have shown that the regulators could be overwhelmed with the expansion required to be made. Thus a clear planning in advance about the possible grids and transmission lines should be made so that there would no disputes allowing this system to be successful.

Finally in the case of Nepal where neither contract enforcement nor legal system is robust, a strong dispute resolution mechanism should be in place. Normally when private players are in the scene of Open Access, a long time taken for a dispute to be resolved would discourage them. In addition, if the credibility of the system is to be questioned because of a lengthy resolution process, large investments that could come from the private sector- which would yield a large benefit- could be eroded.

### 3.3.3 Challenges in Implementing Open Access on Transmission Service

Nepal, a least developed country, lacks the institutional governance structure needed to enforce open access. Nepal Electricity Regulatory Commission Act could not be passed from the parliament – which is necessary for forming an independent regulatory body that is responsible for fixing wheeling charge, checking voltage and other quality aspects of electricity (Nepal Electricity Regulatory Draft Act, 2006). Additionally, there is no independent load dispatch center for running electric system in an effective manner. In such a scenario, open access provisions of the law may remain only on paper when the state intervenes in electricity market operations or there is a lack of technically sound, uniform, clearly formulated open access guidelines (International Experience with Open Access to Power Grids , P. 17). Successful implementation of open access is largely challenged by absence of adequate mechanism in the regulation that is required for monitoring day-ahead scheduling, and real-time dispatch.

# 4. Recommendations

An open access on existing transmission lines which are under utilization could be open for evacuating power for private sectors which can directly sell power to interested consumers, especially industries, at higher prices. It leads into generation of extra power as well as reduction on price of electricity due to competition among generators. As a result, the quality and reliability of electric service will be enhanced. Furthermore, it accelerates industrial and economic growth in the country.

According to the Public Procurement Act, construction of transmission lines should be awarded to the party with the lowest bid. However, there have been many instances where parties have bid an amount too low to make the project feasible. After being awarded the contract, they are found to have raised their claims resulting in higher costs. It delays the construction of transmission lines. Therefore, contract should be given to those parties whose cost is 10 percent above or below the estimated cost under Engineering, Procurement and Construction (EPC) system.

Compensation Fixation Committee is formed for providing compensation to people whose land is used for developing transmission lines. However, it has not mentioned a certain percentage as compensation which creates confusion. This causes delay in construction of transmission lines indefinitely. Therefore, shares of projects should be allocated to those people whose land is under acquisition for construction of transmission lines for creating sense of ownership among the affected people. It provides incentives for those people to facilitate in development of transmission as well as hydropower projects. The compensation given for land acquisition

while constructing transmission lines should depend on loss that is caused by transmission infrastructure so that the affected people feel that they are not cheated.

Formulation of clear cut policy for construction of transmission lines by private sectors under Hydro Property, Built-Own-Operate-Transfer (BOOT) and Built-Transfer (BT) models should be done so that development of power plants take place on time.

### 4.1 Conclusion

NEA has failed to develop the required amount of transmission networks for evacuation of power due to problems in land acquisition, impractical clause in Public Procurement Act, poor financial health of the institution, lack of an effective tariff regime, lack of an efficient management practice and also absence of an open access policy in transmission service. This has severely constrained the pace of hydropower development in Nepal. The formulation of set of policy and laws for allowing private sector to build their own transmission lines and open access on transmission service under specific regulation may solve this problem by inviting multiple buyers system in Nepalese electric system as it helps to manage demand and supply of energy on the basis of market-driven model.

Electricity Act 1992 has allowed the private sector's participation in transmission sector, but, private parties are reluctant to enter into this area because the rules and regulations necessary to determine the wheeling charges, ownership structure, dispute settling mechanisms etc. have not been formulated yet. In addition to this, if there is provision of open access in transmission service of Nepal, many developers generate electricity and supply to the much needed consumers after paying wheeling charges. It increases reliability of electricity service in the places which are affected by power cuts for several hours. Furthermore, Nepal will be able to achieve expected rate of economic growth that is needed to graduate into Developing Nation status by the year 2022.

# References


Bhat, S.S. Challenges of NEA. [Power Point Slides]. Presented at Conference organized by The Confederation of Nepalese Industries.

Bhatt, S.S. NEA Moving Forward: Power Purchase, Transmission and Distribution in Future Nepal. [Power Point Slides].

Bhat, S.S. (2012). Power Purchasing Agreement. (Vidyut, Year. 23, No. 1, p.6). Kathmandu: Nepal Electricity Authority.

Bajpai, P. and Sing, S.N. (2004). Electricity Trading In Competitive Power Market: An Overview And Key Issues. Presented at International Conference on Power Systems, ICPS 2004, Kathmandu, Nepal.

Bhusal, R. (2014, February 9). Reduction in Production due to Power Problem. Kathmandu: Nagarik.

Nepal Law Commission. (1993). Electricity Regulation 1993, p. 31. Kathmandu: Nepal.

European Federation of Energy Traders (EFET). (2000).Unbundling as a crucial factor in the completion of European Electricity and Gas Market Liberalisation. Amsterdam: EFET

Retrieved from http://www.efet.org/Cms_Data/Contents/EFET/Media/Documents/Public%20-%20Position%20Papers/18%20Sept.2000%20Unbundling.pdf

Energy Needs Ireland (ENI). (2013). Cost Benefit Analysis, p.11. Retrieved from http://eni.ucd.ie/2013/ENI_Cost_Benefit_Analysis.pdf

Gassner, Katharina; Popov, Alexander; Pushak, Nataliya. 2008. Does private sector participation improve performance in electricity and water distribution? Trends and policy options ; no. 6. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/2008/10/9949962/private-sector-participation-improve-performance-electricity-water-distribution

Goanna Energy Consulting Ltd (2010). Issues Facing Tasmania's Newly Contestable Electricity Customers. Australia: GEC Ltd.

Goel, P. (2013). PTC-India on Electricity Markets. [Power Point Slides]. Presented during Power Summit 2013 in Nepal.

Himalayan News Service. (2013-01-02). NEA losing millions with no transmission line. The Himalayan Times. Retrieved from http://www.thehimalayantimes.com/fullNews.php?headline=NEA+losing+million+with+no+transmission+line+&NewsID=360227

Indian Power Sector: Power Markets and PTC's Role. [Power Point Slides] Retrieved from http://energycenter.knust.edu.gh/downloads/7/72280.pdf on 12th January, 2014.

India Brand Equity Foundation (2013). The India Power Sector: Investment, Growth and Prospects. http://www.ibef.org/download/Power-Sector-040213.pdf

IPPAN (2014). Power Purchase Agreement (PPA) Concluded Projects. Retrieved from http://ippan.org.np/file_list/PPA%20Status%20List.pdf

Mercados Energy Markets International. (2012). International Experience with Open Access in Power Grids.

Mishra, S. K. (2012). Factor that Affect Construction of Transmission Lines. (Vidyut, Year. 23, No. 1, p.27). Kathmandu: Nepal Electricity Authority.

Ministry of Energy. (2069). Report of Taskforce Prepared for the participation of private sector in Transmission Lines. Kathmandu: Ministry of Energy.

Ministry of Energy (2069). Report of Taskforce on determining cost Policy for construction of transmission lines by private sector. Kathmandu: Ministry of Energy.

Ministry of Energy. (2008). National Electricity Crisis Mitigation Action Plan 2008. Retrieved from http://www.moen.gov.np/pdf_files/rastriya_vidhyut_sankat_nirupan_karyayojana-2065_38-points.pdf

Ministry of Finance. (2014). Budget Speech 2014/15. Retrieved from Ministry of Finance website: http://http://mof.gov.np/uploads/cmsfiles/file/Budget%20Speech%20Final%20English_20140715100825.pdf

Ministry of Forests and Soil Conservation. (1992). Forest Act 1992. Kathmandu: Ministry of Forests and Soil Conservation.

Ministry of Local Development. (1999). Local Self-Governance Act 1999. Kathmandu: Ministry of Local Development

Mukherjee, M., & Kumar, P. (2011). The Impact of the Global Financial Crisis on Investments in the Electric Power Sector: The Experience of India, Pakistan, and Bangladesh (56849-SAS. Washington, DC). World Bank.

National Planning Commission (NPC). (2010). Three Year Plan Approach Paper (2010/11 - 2012/13)p. 143. Kathmandu: NPC.

National Planning Commission (NPC). (2010). The Three Year Interim Plan 2010-2013, p. 215. Kathmandu: NPC.

Nepal Electricity Authority (2013). Annual Report 2013. Kathmandu: Nepal Electricity Authority

Nepal Electricity Authority (2014). Annual Report 2014. Kathmandu: Nepal Electricity Authority

Nexant. (2002). Regional Hydro-power Resources: Status of Development and Barriers Nepal. (p. 22). Nexant: USA

Rahman, S. H., Wijayatunga, P., Gunatilake, H., & Fernando, P.N. ( 2011). Energy Trade in South Asia: Opportunities and Challenges. Manila: Asian Development Bank. Retrieved from http://www.perpustakaan.depkeu.go.id/FOLDEREBOOK/energy-trade-south-asia.pdf

Rajbhandari, S. (n.d.). Status of Transmission Line and Expansion Plan in Nepal. [Power Point Slides]. Presented at Power Summit organized by Federation of Nepalese Chambers of Commerce and Industry (FNCCI).

Rajbhandari, S. (n.d.). Transmission System Planning and Expansion in Nepal: Status and Issue. [Power Point Slides]. Retrieved from

Thakur, K.C. Nepal Power Sector Reform Retrieved from http://www.sari-energy.org/Publications/NepalPowerSectorReform/NepalPowerSectorReform.pdf

Thapa, A. (2012, February 5). Nat'l grid company to be formed. The Kathmandu Post[Kathmandu].

Thapa, B. (2013, March 22). Transmission Line Challenges. New Spotlight, 06(19).

The World Bank. (2001). Nepal Proposed Power Sector Development Strategy. Energy Sector Unit, South Asia Regional Office. Retrieved from http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2001/04/24/000094946_0104110722025/Rendered/PDF/multi0page.pdf

The World Bank. (n.d.). International Experience with Open Access to Power Grids ( 016/13). Retrieved from The World Bank website: http://http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2013/12/23/000442464_20131223121202/Rendered/PDF/789770REVISED000Power0Grids0KS16013.pdf

Transmission Benefits Evaluation, p.4. Retrieved from http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2013IRP/2013IRP-SystemBenefitsTool-DRAFTWhtppr_11-5-12.pdf

USAID. (n.d.) Economic and Social Benefits: Analysis of Power Trade in the South Asia Growth Quadrangle Region. Retrieved from http://pdf.usaid.gov/pdf_docs/Pnadf431.pdf

Vagliasindi, M. (2013). Revisiting Public-Private Partnerships in the Power Sector. Washington D.C. :World Bank

# Annexes

Annex 1: Consultation Meeting on "Possibility of Multiple Buyers in Hydropower Sector in Nepal

| S.N. | Name | Designation | Organization |
|---|---|---|---|
| 1. | Dr. Sandip Shah | VP & Country Director | SN Power Nepal |
| 2. | Mr. Shashi Sagar Rajbhandari | CEO | Upper Solu Hydro Electric Company |
| 3. | Mr. Pradip Gangol | Liaison Officer | Upper Trishuli |
| 4. | Mr. Gyanendra Lal Pradhan | Chief | Energy Cell, FNCCI |
| 5. | Hon. Gagan Thapa | CA Member | Nepali Congress |
| 6. | Dr. Rabin Shrestha | Senior Energy Specialist | The World Bank |
| 7. | Mr. Prasiddha Pokharel | Hydropower Developer | SUBP Ltd |
| 8. | Mr. Lalamani Pokharel | Head, Energy Committee | UCPN-Maoist |
| 9. | Mr. Khadga Bdr. Bista | President | IPPAN |
| 10. | Mr. Dilli Ghimere | Chairman | NACEUN |
| 11. | Mr. Guru Neupane | Chief, Energy Cell | CNI |
| 12. | Mr. Tuk Prasad Paudel | Engineer | Mai Hydro |
| 13. | Ms. Barsha Shrestha | Deputy CEO | Clean Energy Development Bank |
| 14. | Sashi Shrestha | | |
| 15. | Dr. Dwarika Nath Dhungel | Former Secretary | GoN |

| | | | |
|---|---|---|---|
| 16. | Mr. Shanta Bdr. Pun | Former MD | NEA |
| 17. | Hon. Rabindra Adhikari | CA Member | CPN UML |
| 18. | Mr. Sher Singh Bhat | Deputy MD | NEA |
| 19. | Mr. Rahul Sharma | Consultant | ADB/UNDP |
| 20. | Mr. Deepak Rauniyar | CEO | HIDCL |

Annex 2: Members of the Taskforce on Private Participation in Transmission Lines

| S.N. | Name | Designation | Organization | Remarks |
|---|---|---|---|---|
| 1. | Mr. Ganesh Prasad Raj | General Manager | Grid Development Department, NEA | Coordinator |
| 2. | Mr. Sundarshyam Shrestha | Senior Engineer | DOED | Member |
| 3. | Mr. Kalpamohan Soti | Senior Divisional Engineer | Ministry of Energy | Member |
| 4. | Dr. Bhim Prasad Neupane | Project Director | Himalayan Urja Bikas Company Pvt. Ltd. | Member |
| 5. | Mr. Saroj Kumar Upadhaya | Director | Himalayan Urja Bikas Company Pvt. Ltd | Member |
| 6. | Mr. Shersing Bhat | Director | Electricity Trading Department, NEA | Invited Member |
| 7. | Mr. Dev Sharma Poudel | Director | Grid Development Department, NEA | Invited Member |

Annex 3: Members of Taskforce on Determining Cost Policy for Construction of Transmission Lines by Private Sector

| S.N. | Name | Designation | Organization | Remarks |
|---|---|---|---|---|
| 1. | Mr. Mr. Rajeshwor Man Sulpaya | General Manager | Transmission and System Operation, NEA | Coordinator |
| 2. | Mr. Dev Sharma Poudel | Director | 132 Kv Transmission Line, NEA | Member |
| 3. | Mr. Indra Kumar Chongtenlli | Under Secretary | Ministry of Energy | Member |
| 4. | Mr. Raju Maharjan | Senior Divisional Engineer | Ministry of Energy | Member |
| 5. | Dr. Bhim Prasad Neupane | Project Director | Himalayan Urja Bikas Company Pvt. Ltd. | Member |
| 6. | Mr. Saroj Kumar Upadhaya | Director | Himalayan Urja Bikas Company Pvt. Ltd | Member |
| 7. | Mr. Hari Prasad Pandey | Former Minister | Ministry of Water Resource | Invited Member |
| 8. | Mr. Kush Kumar Joshi | Former President | FNCCI | Invited Member |
| 9. | Mr. Shersing Bhat | Director | NEA | Member Secretary |

# Samriddhi, The Prosperity Foundation an introduction

Samriddhi, The Prosperity Foundation is an independent policy institute based in Kathmandu, Nepal. It works with a vision of creating a free and prosperous Nepal. Initiated in 2007, it formally started its operations in 2008. The specific areas on which the organization works are - Entrepreneurship development, Improving business environment, Economic policy reform and Promoting discourse on democratic values

Centered on these four core areas, Samriddhi works with a three-pronged approach—Research and Publication, Educational and Training, and Advocacy and Public Outreach. Samriddhi is dedicated to researching Nepal's economic realities and publishing alternative ideas to resolve Nepal's economic problems. Samriddhi is also known for creating a discourse on contemporary political economic issues through discussions, interaction programs, and several advocacy and outreach activities. With successful programs like "Last Thursdays with an entrepreneur" and "Policy Talkies", it also holds regular interaction programs bringing together entrepreneurs, politicians, business people, bureaucrats, experts, journalists, and other groups and individuals making an impact in the policy discourse. It also hosts the secretariat of the 'Campaign for a Livable Nepal', popularly known as Gari Khana Deu.

One of Samriddhi's award winning programs is a five day residential workshop on economics and entrepreneurship named Arthalya, which intends to create a wave of entrepreneurship and greater participation among young people in the current policy regime. Samriddhi was the recipient of the Dorian & Antony Fisher Venture Grant Award in 2009, the Templeton Freedom Award in 2011 and the CIPE Global Leading Practice Award in 2012.

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This policy analysis paper titled "Policy Options for Improved Electricity Transmission System in Nepal" is prepared under the banner of Nepal Economic Growth Agenda (NEGA) 2014, which is preceded by NEGA 2012 and NEGA 2013. NEGA is an annual effort of Samriddhi Foundation to identify key constraints to Nepal's economic growth and policy options for reform.

This specific policy analysis paper is based on the premise that absence of infrastructure to evacuate power generated through hydro plants is one of the key constraints in hastening the pace of hydropower development in Nepal, which sits on top of enormous hydroelectricity production potential. Based on the secondary research as well as information and input collected from stakeholders through consultations, the paper argues that policy provisions allowing private sector to build their own transmission lines and open access on transmission service under specific regulation will help speed up the construction of transmission lines and consequently hasten the development of Nepal's hydropower sector.

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