

ISEP COUNTRY BRIEF



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Despite decades of complex political conflict, Nepal has entered the era of stable socioeconomic development. As no proven fossil fuel resources Nepal enjoys, encouraging the use of renewables become a viable solution to sustainable energy structure and long-term economic development.



Hydropower in Nepal

RENEWABLE ENERGY IN NEPAL

BACKGROUND

Nepal is a landlocked Himalayan country of South Asia with a population of 26.4 million (2015) and a GDP of around USD 75 Billion (2016) with agriculture being the largest component (nearly 75%). Having experienced decades of political instability, Nepal, became a Republic in 2008 with King relinquishing sovereign power to the people's democratically elected government. Nepal showed a robust economic growth momentum afterwards, with **70% GDP growth during 2008-2015** (World Bank, 2015). Unfortunately, the devastating earthquake in 2015 hit Nepal's development hard, making its GDP fall into the negative zone during this time (FY 2016) and most of the attention being devoted to relief and reconstruction. However, Asian Development Bank forecasts its economy would rebound to show a 6.9% of GDP increase in 2017 and thereafter. National electrification rate in Nepal according to IEA and World Bank hovers around 75% with the urban areas (Kathmandu Valley) being fairly energy sufficient as compared to the rural mountainous regions. The country also faces high peak load issues with long power cuts quite common in most area (even though they are connected to the national grid). The perception of the power sector also remains unsatisfactory because of high tariffs, high system losses, high generation costs, high overheads, over staffing, and lower domestic demand.

ENERGY MIX AND RENEWABLE POTENTIAL

Except for a minor portion of lignite, Nepal is not endowed with fossil fuel resources as almost no oil, gas, or coal reserve has been discovered domestically. Currently, the country's energy mix is composed of **biomass (81.50%), oil (9.87%), coal (4.67%), and hydropower (2.57%)**. Biomass, in the form of firewood, agricultural residues, and animal wastes, constantly provides the majority of Nepal's energy supply because of the lack of traditional fossil fuel resources, the under-development of renewable energies and the affordability problem for its population, especially rural population. Moreover, **100% of Nepal's oil and 98% of coal supply is imported** from international market, mostly India and China.

Despite the absence of fossil fuel resources, Nepal has huge potential for developing renewable energies, especially hydropower. Abundant river resources and a steep gradient render Nepal a favorable environment for developing hydro projects. It is estimated that Nepal has potential hydropower generation capacity of 42,000 MW. However, the actual hydropower generation capacity is limited to 902 MW as of 2016, approximately **2% of**

total potential. The development of other renewable energies in Nepal remains inadequate, with a 34 MW solar generation capacity as of 2016 and less than 20 kilowatts from wind energy.

Recognizing the importance of hydropower for improving electricity access rate, restructuring a more sustainable energy industry, reducing poverty, and encouraging economic growth, Nepalese government issued renewable energy subsidy policies in [2012](#) and [2016](#) to encourage the very poor households to use renewables. Policy 2012 provided subsidies to 5 components, including technical support, business development, program management, studies/audits/reviews, and a Central Renewable Energy Fund (CREF), which enjoyed two thirds of the total 170 million USD subsidies and served as the core financial institution responsible for the delivery of subsidies. The 2016 policy recognized the existing challenges in 2012 policy of mobilization of commercial investment and renewed Policy 2012 after its five-year term. Alternative Energy Promotion Centre (AEPC) remained the nodal agency for execution functions and CREF would now be managed by a commercial bank selected by GoN. The subsidy amount was expected to cover 40% of the total costs. Solar PV mini-grid enjoyed a subsidy of 1,410-1,640 USD per kWp, and mini and micro hydropower 750-1,175 USD and 190-300 USD respectively.

NEPAL AND INTERNATIONAL PARTNERSHIPS

In 1996, the GoN established the Alternative Energy Promotion Center (AEPC) with the purpose of developing and promoting renewable energy technologies in Nepal. Since then, it has been able to attract support from bilateral and multilateral Development Partners, including but not limited to ADB, Danida, DFID, the EU, KfW, the Norwegian Ministry of Foreign Affairs, SNV, UNDP and the World Bank. Among these partnerships, WB has cumulative investment into Nepal's energy industry of 1.14 billion and ADB is the funding partnership of two hydropower projects, the Kali Gandaki 'A' and the Khimti, which supply almost 30% of Nepal's annual energy generation. Most recently, Nepal has signed an agreement with a Chinese company to build its largest hydroelectric project with an estimated investment of 2.5 billion USD.

BARRIERS AND POLICY RECOMMENDATION

Nepal is experiencing an energy crisis due to the ever-increasing demand and insufficient modern supply, which reflects certain deficiencies in Nepal's energy industry. First of all, the high dependence on India's fossil fuel imports. Nearly all fossil fuel demand in Nepal is met by imports from India and in fiscal year of 2016 only, Nepal imported electricity equivalent to 17 billion rupees from its southwest neighbor. Nepal itself does not produce oil, gas, or coal products and has extremely limited transportation options due to its landlocked nature. As a result, almost all of Nepal's fossil fuel imports rely on the contract with Indian Oil Corporation and its oil storage is only for 20-day use. To address the problem, Nepal has to **increase its storage level to months use and diversify its import strategy.**

Secondly, inadequate planning and investment in generation, transmission, and distribution capacity makes Nepal's hydropower industry progress in a slow manner. The responsible institution for Nepal's electricity-related issues, Nepal Electricity Authority (NEA), should issue **more comprehensive and clear regulation and policy**, come up with **stronger incentives** for private and foreign investment, and strengthen internal management capacity. Besides, since Nepal has huge potential for not only medium and small hydro, but also large hydro projects, the **infrastructure** of long-distance transmission should be constructed and meet adequate standard. Meanwhile, Nepal should develop a set of up-to-date tariff and subsidy policies to further replace the dependence on foreign fossil fuel import with domestic renewable generation. **Solar home systems and solar micro-grids** in off-grid rural areas can serve as another alternative and should be recognized as a priority.



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KEY SOLUTIONS

- 1. Diversify fossil fuel imports and create long term value added partnerships with India and China.*
- 2. Strengthen national oil/gas resources' strategic storage capacity.*
- 3. Make electricity generation from renewables a national priority and publish supporting regulation and policies.*
- 4. Strengthen grid infrastructure extending it to remote mountainous regions on the back of de-centralized generation.*
- 5. Provide competitive financing, tariff and taxation policies to attract investors.*

ABOUT ISEP

Hosted at the Johns Hopkins School of Advanced International Studies (SAIS), the Initiative for Sustainable Energy Policy (ISEP) uses social and behavioral science to design, test, and implement sustainable energy policies in emerging economies. ISEP identifies opportunities for policy reforms that allow emerging economies to achieve human development at minimal economic and environmental costs. The initiative pursues such opportunities both pro-actively, with continuous policy innovation and bold ideas, and by responding to policymakers' demands and needs in sustained engagement and dialogue.

