



# Implications of declining costs of Solar, Wind and Storage Technologies on regional power trade in South Asia (BBIN Countries)

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“There is an urgent need to stop subsidizing the fossil fuel industry, dramatically reduce wasted energy, and significantly shift our power supplies from oil, coal, and natural gas to wind, solar, geothermal, and other renewable energy sources.”

- Bill McKibben

## Background

Each country is examining options for itself without regional perspective. South Asian countries are assessing the renewable potential aggressively. The focus is on how much renewable can be developed and absorbed by the grid of each country grid, and under what conditions?

India is examining the option of flexible coal and gas power plants for increasing renewable absorption in its own grid. Bhutan and Nepal have high-untapped hydro potential 26 GW and 80 GW respectively compared to their own demand, which is in the range of 1.5 GW for Bhutan and 0.4 GW for Nepal. It was expected that they could dramatically change their economies by selling hydropower to India and Bangladesh. However, falling REN prices have raised the issue of viability for expensive hydropower.

Regional power trade in South Asia is currently limited to bilateral government-to-government negotiations, which is

a slow process. For instance, on the eastern side, India exports about 500 MW to Nepal, 1200 MW to Bangladesh and 3 MW to Myanmar, and it imports around 1200 MW from Bhutan. While the government consent opens up trade, recently there is an increased interest in Power markets based on the current demand – supply which can primarily help to expedite the trade.

Decline in REN cost may reduce or increase the appetite for hydropower in the South Asian countries such as India and Bangladesh this is because REN generation will require flexible generation and hydro has the potential to be flexible. India alone has solar PV potential around 749 GW. Hence, keeping the past regional studies in the backdrop it is essential to analyse the implications of declining solar, wind and storage technologies cost on regional power trade in the South Asia.

## Focus of our Study

Recently, the nations within the South Asia region are working together towards greater energy cooperation. The study will focus on Bangladesh, Bhutan, India and Nepal (BBIN) countries in the South Asia region.

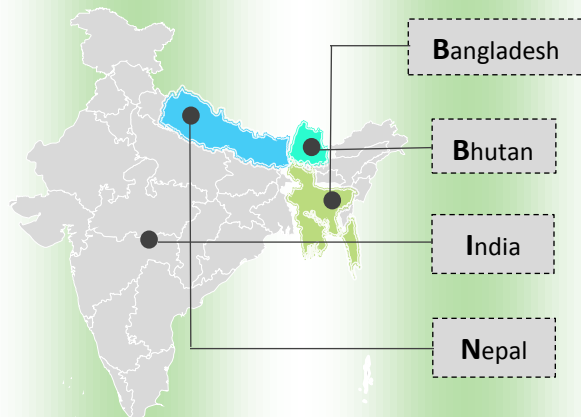


Figure 1: BBIN region selected for the project

The project will encompass in-depth study of global cost decline trends of three REN technologies, i.e., Solar, Wind and Storage Technologies.



Figure 2: REN technologies selected for the project

This project aims to develop a new model for Bhutan and update the existing electricity models for the BBIN region, it would involve stakeholder consultations/ meetings with key agencies in the BBIN region.

# Project Outline

To capture the impacts of declining solar, wind and storage technologies (REN) costs in South Asia region, a regional electricity model will be developed that will comprise of reference energy systems focusing on electricity capacity addition in BBIN countries using the bottoms up technology based model generator.

## Development of Electricity Models for BBIN Countries:

- Electricity models for trade among BBIN countries will be developed for making an integrated regional electricity model.
- The India (IITec- IRADe India Technology), Bangladesh (IBTec- IRADe Bangladesh Technology) and Nepal (INTec- IRADe Nepal Technology) models have already been developed, we will be updating the existing model with the current government policies and targets.
- Develop Bhutan country model from scratch.

## Stakeholder Engagement & Consultations with Key Agencies in BBIN Countries:

- Electricity models involve significant amount of data and assumptions for the Power/Energy system of a country. Data will be validated through focussed stakeholder meetings/consultations in respective BBIN country with sector experts.
- Stakeholder consultations/meetings will be undertaken in respective BBIN country with sector experts for validation of assumptions and results.

## Integration of BBIN Country Models into Integrated Regional Electricity Model:

- The validated national electricity models of BBIN countries will be integrated together form a regional electricity model as shown in Figure 3.
- The regional electricity model will help us to predict regional power trade among different trading partners at hourly level under different scenarios.
- Local partner organisations will be involved in organising stakeholder workshops in the respective BBIN countries.

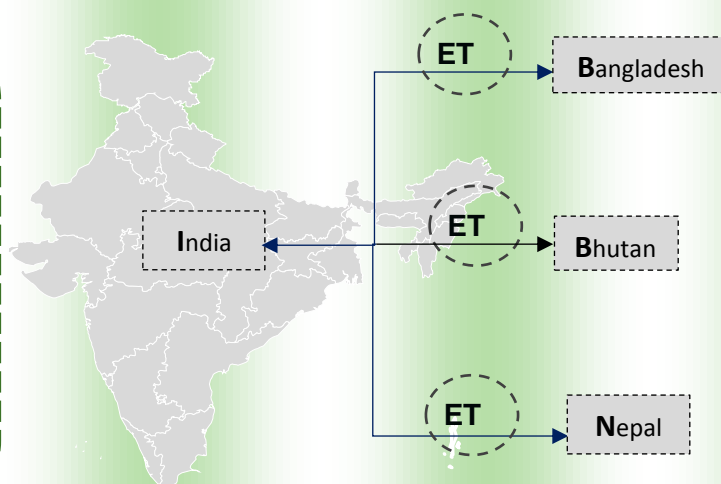


Figure 3: BBIN Countries Electricity Trade (ET) Model

## Outcomes

- **Policy Making & Consensus Building:** This project will provide evidence on benefits of increased regional cooperation on electricity trade for developing consensus amongst the BBIN countries within the South Asia region.
- **Local Partner Engagement:** It will be sought for data collection and validation of assumption & results.
- **Capacity Building:** Organise result dissemination workshops in all the selected BBIN countries with key stakeholders i.e., policy makers, planners and power sector experts, etc. The project findings or presented at global events so that the project findings will be presented at global level and for creating greater awareness.
- **Better Energy Policy:** With the awareness created through consensus building and capacity building, it is expected that the policy makers within the region will become more aware about the expected energy landscape in the future such as the role of REN and its implications on regional trade. This will help the policy makers in developing robust policy for their countries keeping the regional developments and electricity sector in consideration.

## About EEG

The Applied Research Programme on Energy for Economic Growth (EEG) is led by Oxford Policy Management. The programme is funded by the UK Government, through UK Aid. The Applied Research Programme on Energy and Economic Growth (EEG) produces cutting edge research on the links between energy and economic growth, working closely with policy makers in Sub-Saharan Africa and South Asia to build more sustainable, efficient, reliable and equitable energy systems. EEG is a five-year programme, led by Oxford Policy Management (OPM) and funded by the UK Department for International Development. For more information visit: [www.energyeconomicgrowth.org](http://www.energyeconomicgrowth.org)

## About IRADe

IRADe is an independent advanced research institute which aims to conduct research and policy analysis to engage stakeholders such as government, non-governmental organizations, corporations, academic and financial institutions. Energy, climate change, urban development, poverty, gender equity, agriculture and food security are some of the challenges faced in the 21st century. Therefore, IRADe research covers these, as well as policies that affect them.

IRADe's focus is effective action through multi-disciplinary and multi-stakeholder research to arrive at implementable solutions for sustainable development and policy research that accounts for the effective governance of techno-economic and socio-cultural issues. Being Asia Center for Sustainable Development, we have been carrying out policy research and its implementation for enabling socio-economic growth and charting pathways for sustainable development in South-Asia.

IRADe was established under the Society's Act, in 2002 at New Delhi. It is certified as a Research and Development Organization by the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology (MoST). It has also been selected as a Center of Excellence by the Ministry of Urban Development (MoUD) for urban development and climate change. In addition, it provides expertise to other ministries, national and international institutions and partners with other reputed organizations.

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