

China-US Collaboration on Promoting Renewable Energy through Belt & Road Initiatives

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US-CHINA COOPERATION IN CHINA AND BEYOND

CCS, GEI, GIEC, CAS-ISD 2009 to Present



Global Environmental Institute (GEI)

<u>Mission:</u> Design, execute and support market-based models and policy recommendations that solve environmental problems in order to achieve development that is economically, ecologically and socially sustainable.

Quick Facts:

- Chinese, non-profit, NGO
- Founded & based in Beijing
- Est. 2004
- Partners and Projects active across 10 countries & in China (see map)

Expertise:

Energy and Climate Change, Overseas Investment, Trade & the Environment; Ecosystem Conservation & Community Development; Marine Conservation

Outline

- Why are we doing projects in BRI countries (Southeast Asia and South Asia)?
- How are we applying REI Toolkit for renewable energy planning?
 - South Asia: Sri Lanka
 - Southeast Asia: Myanmar
- Lessons learned from overseas projects

1. Renewable Energy Development in BRI Countries

Challenges & Opportunities

- Paris Agreement: Clear Renewable Energy Targets in Nationally Determined Contributions(NDCs)
- Developing countries' needs: international support, including RE planning, technology, financing and capacity building, to achieve their RE development goals.
- Abundant RE resources and rapid growth of renewable power: e.g., Solar Power Potential in Southeast Asia and South Asia

GEI's Insights: Out of 70 BRI countries, 57 countries (82.4%) have clear carbon peaking goals, and 30% of all BRI countries propose renewable energy/power targets in NDCs



GEI Insight: China's solar installment is shifting to developing countries (especially BRI Countries)



2. Collaboration on Renewable Energy Assessment & Implementation

Objectives:

Provide technical support for developing renewable energy & achieving NDCs' commitment

Ongoing Pilots:

- Sri Lanka: Solar power planning t to establish a Low-Carbon Demonstration Town
- Ø Myanmar: Capacity Building & Solar Power Planning

2.1 Sri Lanka Pilot:



NDC Target :

 20% emission reduction in energy sector & 50% renewable power by 2030

Current Energy Structure:

- Coal & Oil (52%) mainly imported
- Hydropower (44%), vulnerable to climate change
- Renewable Power (solar, biomass, wind) very low (4%)

Conclusion:

RE development is needed for achieving NDC's commitment

REI Toolkit for RE Planning

1. GIS tool for RE Potential Assessment

2. RE Sector/Technology Scoping

3. Technology Application MCA Screening

4. Microeconomic Analysis for RE Technology/Policy

5. Financial Mechanism and Risk Analysis



Gampola Town:

 Area: 0.518 Km² in Kandy City, central province; *Population:* 50,000, but 300,000 travel to Kandy and Nuwara Eliya through Gampola town



Solar Power Planning for Gampola Town:

Solar Resource of Gampola:

 Average solar radiation: 6.51kWh/m²/day, and is identified as the optimal for solar power development (China's ranking system of solar energy resources)

Technology Selection (Rooftop solar PV):

- Identify 8 Public buildings (2 hospitals, 4 schools, 1 bus station and 1 train station) for installing rooftop solar PV
- Estimate the areas of each building by using GIS tool



Base Hospital					
Polygon Label	Area (square meters)				
G101	197				
G102	393				
G103	463				
G104	996				
G105	1121				
G106	372				
G107	266				
G108	377				
G109	358				
sum	4543				

Figure 2-1-3 Excel Calculation

Туре	Area (m²)	Estimated output (kWh/ day), ୩ =15%	Estimated output (kWh/ day), ୩ =17%	Estimated output (kWh/ day), ୩ =21%
Base Hospital	4543	1798.3	2038.1	2517.7
CBT bus station	947	374.9	424.8	524.8
Int. School	1168	462.3	524.0	647.3
St Andrews School	1628	544.4	730.4	902.2
Suwab hospital	1020	403.8	457.6	565.3
Train station	4897	1938.5	2196.9	2713.8
Wick National School	5410	2141.5	2427.1	2998.1
Zahira School	3065	1213.3	1375.0	1698.6
合计	22678	8977.0	10174.0	12567.8

Conclusion for rooftop solar panel installation in Gampola:

- Total areas covered: 22. 68m²
- Estimated power potential: 2.98MW (17%)
- Estimated investment: 2.33 million USD
- CO2 reduction is estimated as below:

Solar Panel Type	Energy conversion efficiency of solar panel	Annual Energy Generation (GWh)	Annual GHG emission Reduction (tonne)
Multicrystalline	Efficiency η =15%	3.3	2909
	Efficiency η =17%	3.7	3297
Monocrystalline	Efficiency η =21%	4.6	4073

Business Model Design for Rooftop Solar PV project



2.2 Myanmar Pilot (2018.6-):

Adapt REI Toolkit for making data-based and implementable renewable energy plan (starting with solar power)

Multiple stakeholders' engagement:

Ministry of Electricity and Energy;

Department of Research and Innovation, Ministry of Education;

Ministry of Natural Resources and Environmental Conservation;

NGOs, companies...

 $ightarrow \frac{Activities:}{2}$ Workshop & Trainings in 2018

<u>Next-steps</u>: Introduce green finance

Promote Myanmar's experience





3. Lessons Learned from Overseas' Projects

• Challenges & Needs:

- Engage multi-stakeholders: local participation/partners
- Flexibility: adapt tools for data and policy availability

Collaboration Approach:

- Identify local needs/situation for RE development
- Capacity building
- Pilot project
- Introduce green finance / investment

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