

# Renewable Energy Implementation Toolkit:

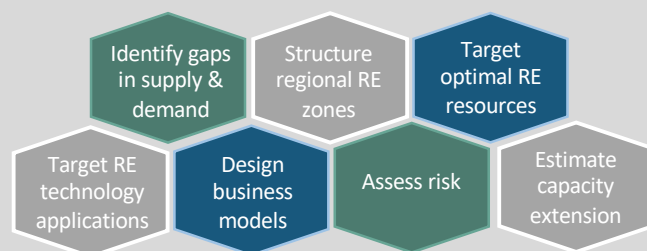
## Science-based Policies for Sustainable Growth



Renewable energy (RE) technology will help China achieve low-carbon growth but policy-makers need quantitative evidence and an implementation strategy.

In 2017, Global Environmental Institute (GEI) recognized these needs. Working with domestic and US partners, we created and piloted a science-based toolkit that made RE policy-making efficient, effective & successful, called the Renewable Energy Implementation (REI) Toolkit.

The REI Toolkit includes 4 Tools that collectively:



### 8 STEPS OF REI TOOLKIT:

1. Technology Implementation Document
2. Supply/Demand Analysis of Provincial and Local Areas
3. Technology Application Multi-Criteria Analysis (MCA) Scoping
4. Technology Application MCA Screening Survey
5. Low-Carbon Development Multi Criteria Baselines
6. Business Implementation Model Framework
7. Risk, Return, and Impact Requirement Assessments
8. Emissions Trading and Energy Policy Impacts

## Spatial Analysis Tool

- Analyzes energy supply and demand with LCD toolkit;
- Identifies renewable energy zones (REZs) with GIS in order to analyze wind, solar, biomass, and hydro resources potential at regional and local scales;
- Characterizes technology application potential.

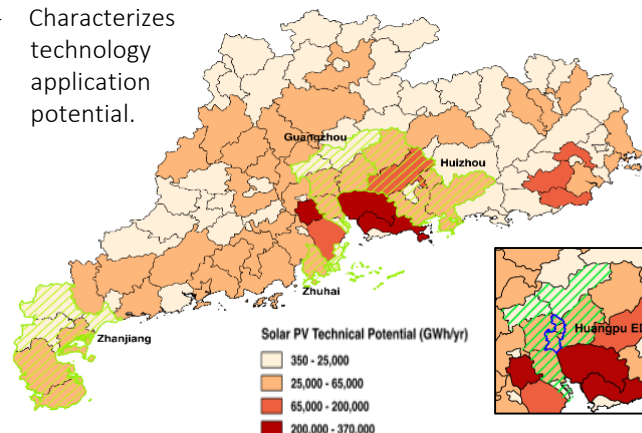


Image: Solar resource assessment for Guangdong Province and Huangpu EDZ pilot region for solar PV programs.

## Technology Application MCA Scoping Tool

- Uses inputs from the Spatial Analysis Tool and other sources;
- Provides empirical and expert based ratings for a range of public policy and market goals and potential technology applications.

### Empirical Ratings

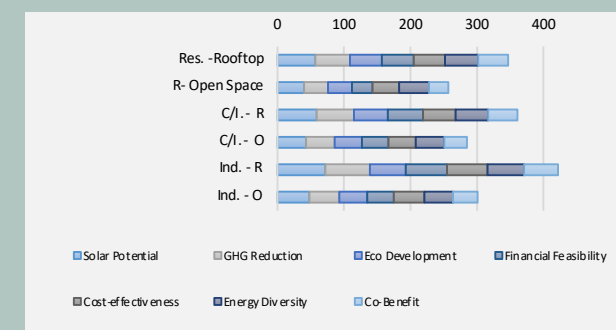
- GHG Reductions
- Cost-effectiveness
- Lifetime Production
- % Energy Supply Shifts
- % Annual Demand Met
- RE Technology Capacity
- Levelized Cost of Electricity

### Expert Ratings

- NDC/LCD Goal Alignment
- Energy Security & Access
- Economic Competitiveness
- Resource Stability & Access
- Air & Water Health Benefits
- Public & Private Investment
- Market & Program Feasibility

## MCA Technology Screening Tool

- Involves public and private stakeholders;
- Considers critical performance criteria;
- Selects high priority technology applications with high implementation feasibility;
- Reviews and prioritizes potential technology applications against benchmarks provided by the MCA Scoping Tool.

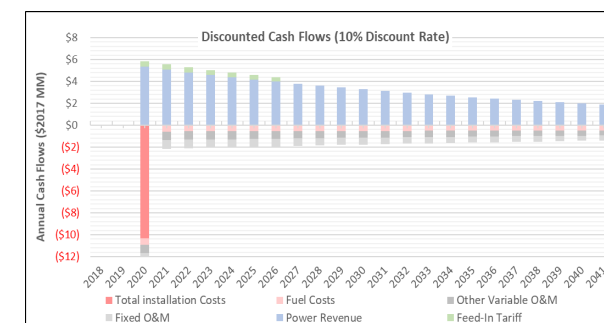


Graph: Solar PV identified as the highest priority RE Technology for Huangpu EDZ

## Business Model Implementation Tool

- Describes the actions, agreements, mechanisms, responsible parties, and information required at each implementation stage;
- Analyzes risk/return financing and social impact;
- Evaluates risk adjusted discounted cash flows, expected value and return on investment, and other financial and policy impact metrics and scenarios.

### Financial and Social Impacts



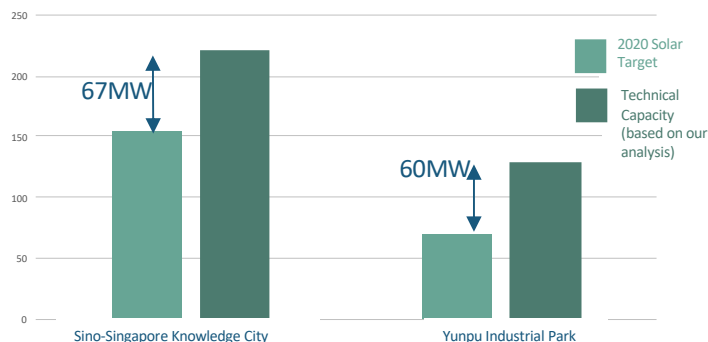
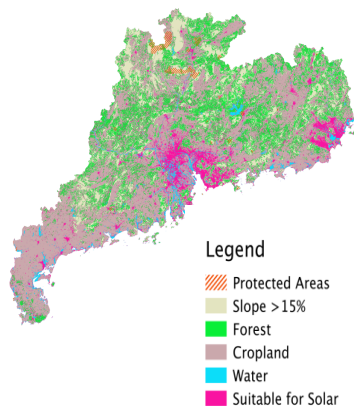
## Scoping RE in China's Economic Zones: Guangdong Huangpu EDZ Pilot

From 2016-2017, GEI coordinated a team from CCS and GIEC to do the first-ever renewable energy capacity calculation for a special economic zone in China.

Focusing on the Huangpu Economic Development Zone (EDZ) in Guangdong Province, we developed a RE plan for the EDZ to efficiently reach its low-carbon growth goals and lead the development of other EDZs throughout Asia.

### The Case:

- Huangpu EDZ (Sino-Singapore Knowledge City & Yunpu Industrial Park) aims for 302MW PV Solar power by 2020;
- The EDZ needed a specific implementation plan and strategy; as well as policy and financial support from the District Government;
- We conducted analysis & facilitated communication between the parties.



### RESULT:

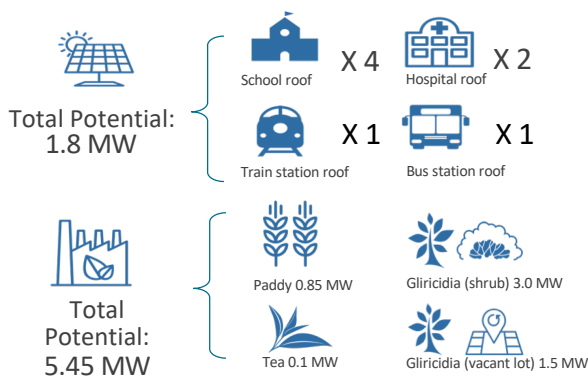
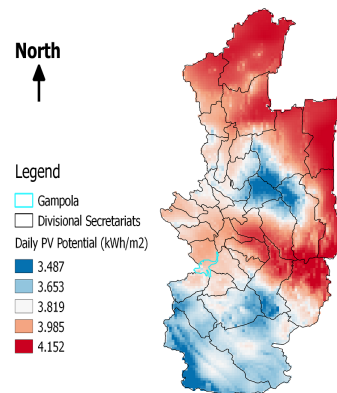
- Our analysis showed that the Huangpu EDZ needed 67MW and 60MW of solar energy within its two parks if it was to meet 2020 goals.
- Through intensive exchanges, we increased willingness for PV power generation and helped the parties to formulate business models and supportive policies.

## Planning Sri Lanka's 1<sup>st</sup> Low Carbon Town: Belt and Road RE Pilot

Ensuring that the Belt and Road Initiative is a green Chinese initiative requires capacity building on the local level. Working with the Sri Lanka Ministry of Mahaweli Development and Environment, GEI conducted a pilot scoping and planning of Sri Lanka's first ever low-carbon town in 2017. This work was shared at COP24 in Bonn, Germany.

### The Case:

- Sri Lanka aims to reduce GHG by 20% before 2030;
- Gampola's location and infrastructure made it a suitable fit for our project;
- Using solar power and biomass power, we used GIS tools and RE technology screening to plan how Gampola could be 100% powered by renewable energy;
- We calculated the cost-benefit analysis and financial mechanism analysis.



### RESULT:

- Started by recommending that Gampola add 1.8MW Solar PV as a first step to becoming 100% green town.
- This work will improve electricity access, help spur local development and conserve Sri Lanka's precious ecosystems.



Global Environmental Institute (GEI) is a leading Chinese, non-governmental, non-profit organization based in Beijing since 2004. We conduct research and pilot projects in order to make policy recommendations that simultaneously realize economic growth and environmental conservation.

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