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:
- Identify gaps in supply & demand
- Structure regional RE zones
- Target optimal RE resources
- Design business models
- Assess risk
- Estimate capacity extension
- Target RE technology applications

**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

### 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

![Discounted Cash Flows (10% Discount Rate)]
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 1st 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.