



# AGENDA

- 1 QCA Method
- 2 Process for Applying QCA
- 3 Renewable Energy Evaluation
- 4 Theory of Change
- 5 Country Case Studies
- 6 Developing & Scoring Factors
- 7 Results and Interpretation
- 8 Some validation of conclusions

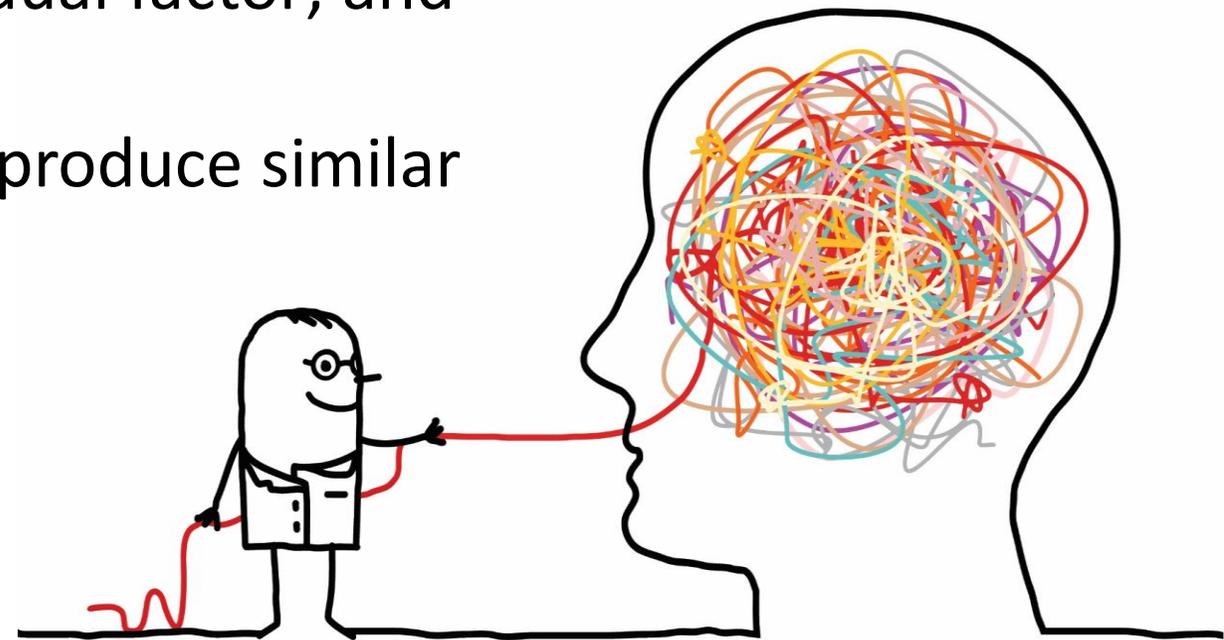
# QUALITATIVE COMPARATIVE ANALYSIS

QCA is based on two primary assumptions:

- 1) change is often the result of different combinations of factors, rather than on any one individual factor; and
- 2) different combinations of factors can produce similar changes

**Charles Ragin**

*who is credited with developing QCA*



# METHOD: QUALITATIVE COMPARATIVE ANALYSIS (QCA)

- Developed in the 70's, relatively 'new' in application in evaluation
- Analytical technique used for qualitative study of macro social phenomena
- An akin method to quantitative model testing (such as, structural equation modeling)
- Case-Oriented and set-theory method
- Helps identify causal patterns across multiple cases using Boolean algebra

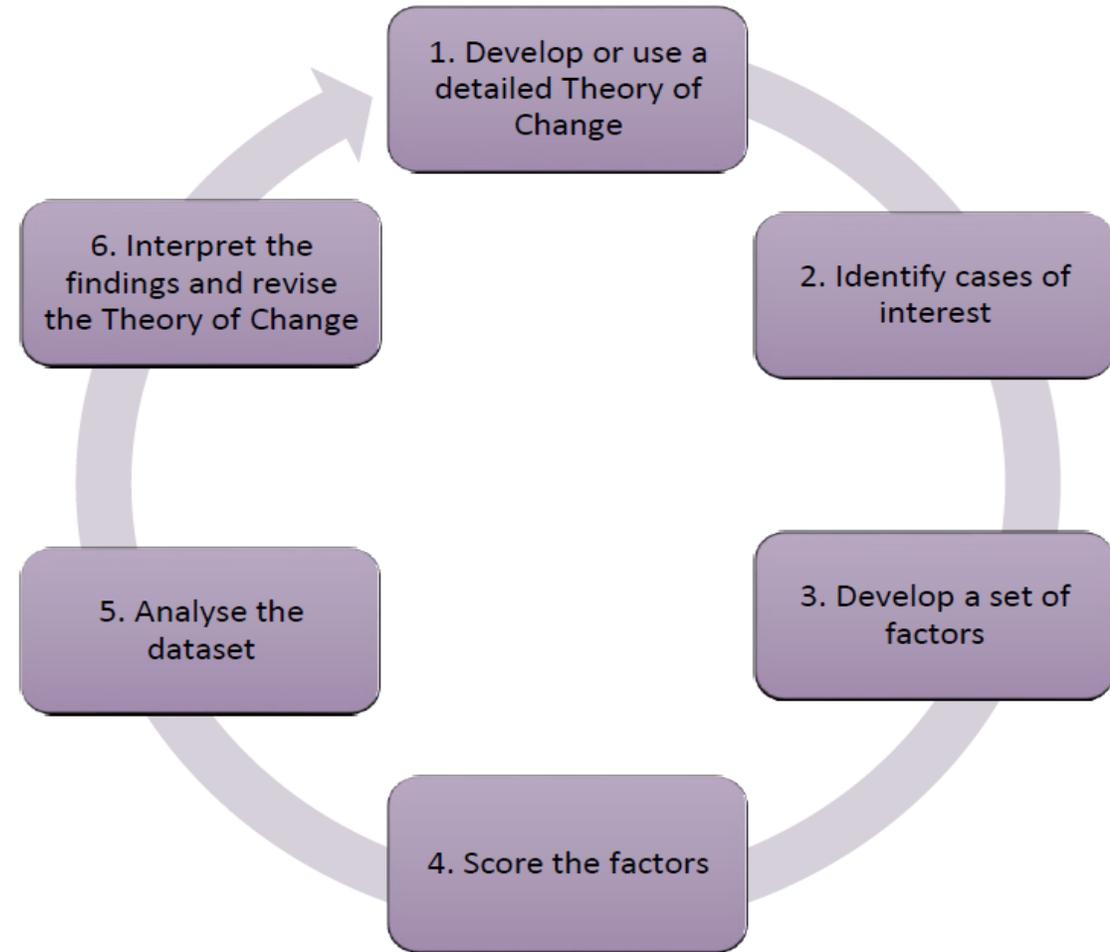
## Where can QCA add value?

- Analysis of multiple cases in complex situations
- Identify causal links and explain conditions under which change happens
- Allows for generalization across a group of case studies
- Valuable for small N evaluations (e.g. 5 to 50)

# METHOD: PROCESS FOR APPLYING QCA

## QCA uses both quantitative and qualitative analysis

- In-depth **QUALITATIVE** understanding of cases and subject matter
- **QUANTITATIVE** generation of findings generalizable across wider population



SOURCE: Intrac

# RE EVALUATION: WBG SUPPORT TO RENEWABLE ENERGY

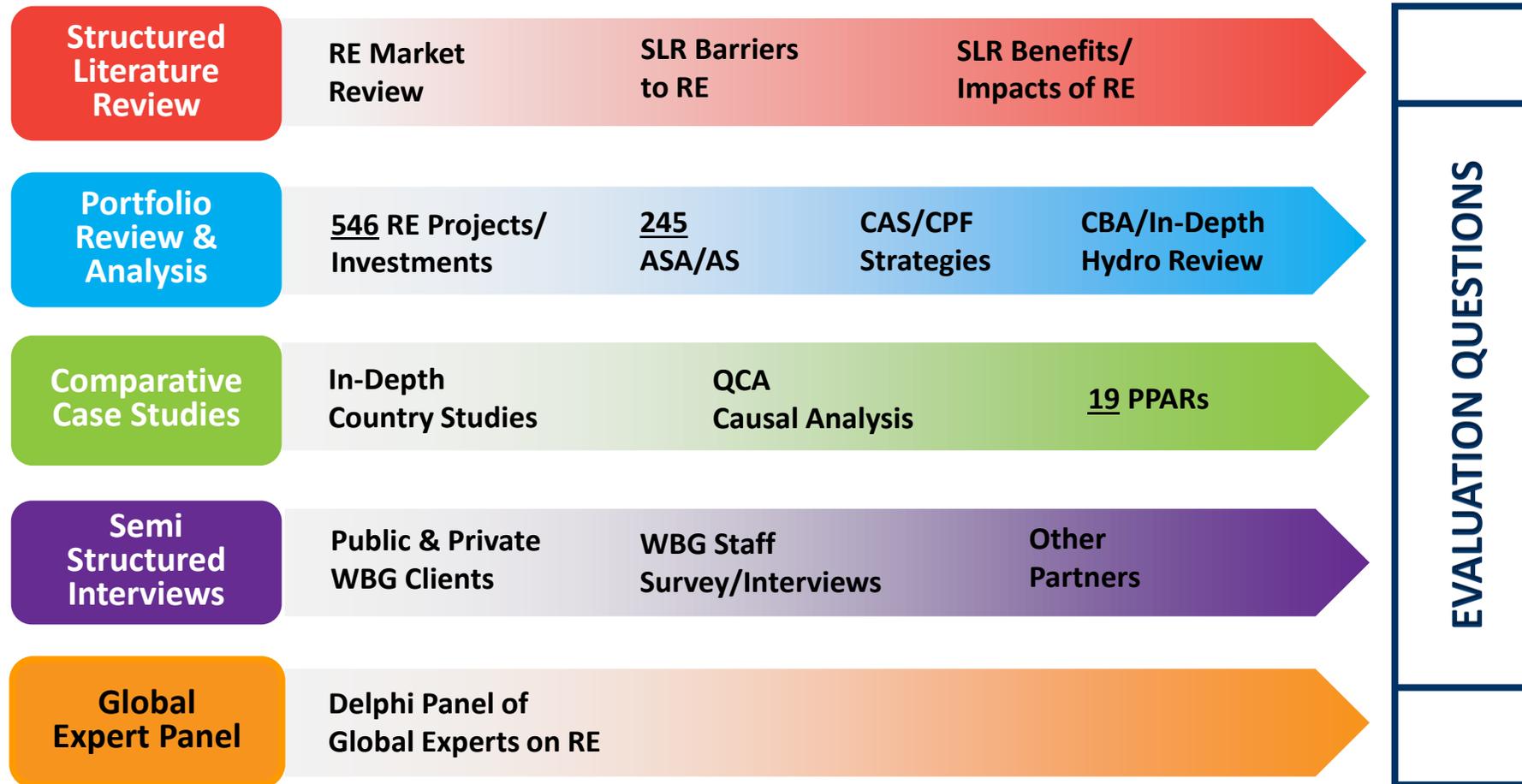
## WHY QCA?

- 1) Validate Theory of Change
- 2) Identify pathways for scaling-up RE investments

- Renewable Energy (RE) can help meet **energy** demand and **environmental** sustainability
- SDGs and Paris Agreement stress RE as a **key solution**, with momentous scale-up envisaged
- Dynamically **evolving** sector expected to continue to disrupt energy sector
- Presently over **25%** of global electricity is produced from RE



# RE EVALUATION: MULTI-METHOD APPROACH



# RE EVALUATION: THEORY OF CHANGE

## INPUTS



WORLD BANK GROUP

+ Financing

+ Global Knowledge



Partnerships

## KEY TYPES OF BARRIERS ADDRESSED

1

Inadequate Policies & Regulations

2

Inability to Integrate RE to Power System

3

Insufficient Design & Technical Standards

4

Inadequate Institutional Capacity

5

Significant Investment Risks

6

Constraints to Mobilizing Financing

## DEVELOPMENT OF RE

Increased  
**RE**  
Capacity & Generation



Displace  
Fossil-Based  
Capacity & Generation

## ENERGY & ENVIRONMENT BENEFITS

Increase  
Electricity  
Supply to Grid

+ Improve access to electricity

+ Reduce energy insecurity

Avoid Global  
Pollution

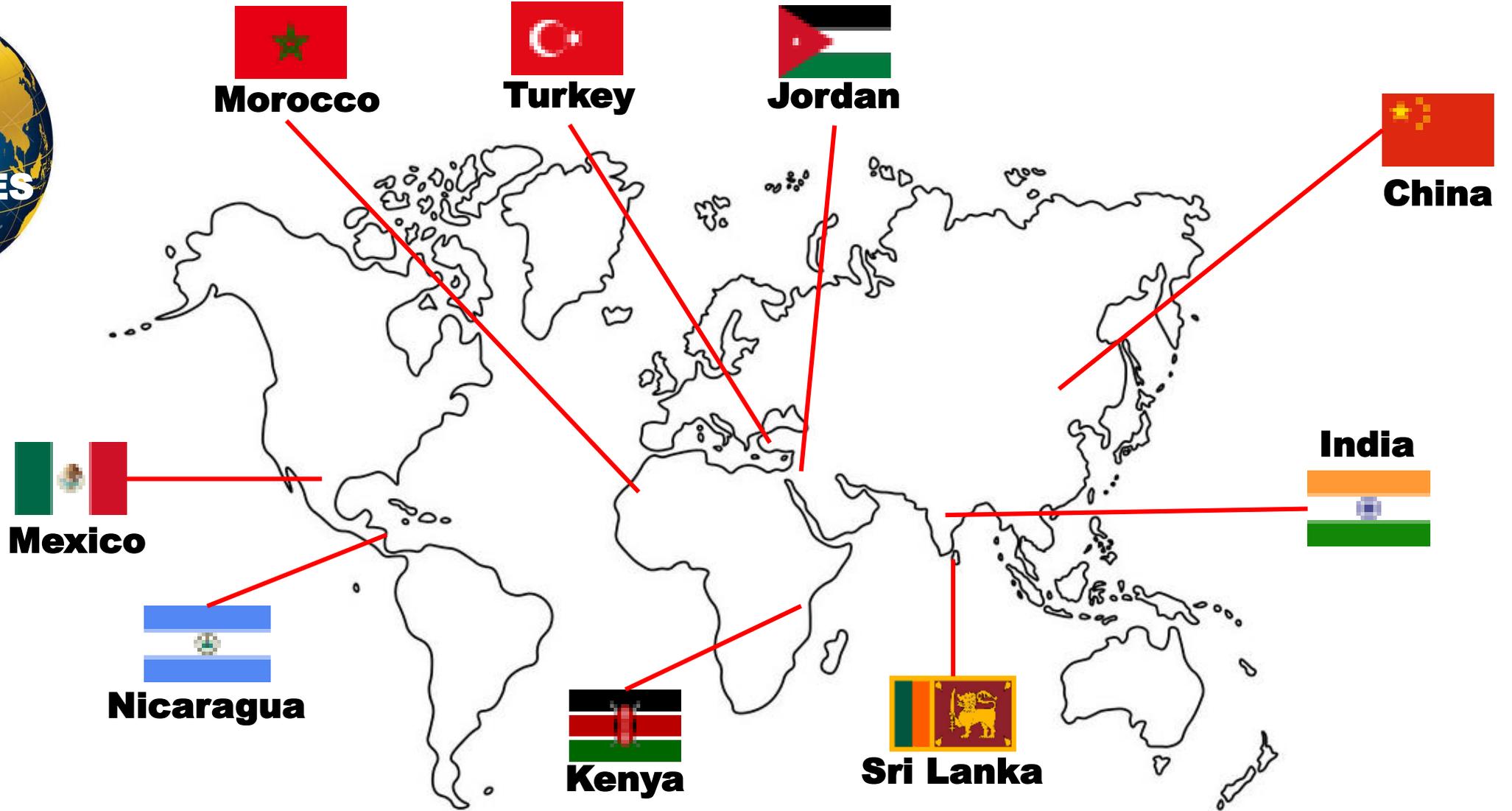
+ Avoid local pollution

## CONTRIBUTION TO BROADER DEVELOPMENT IMPACTS

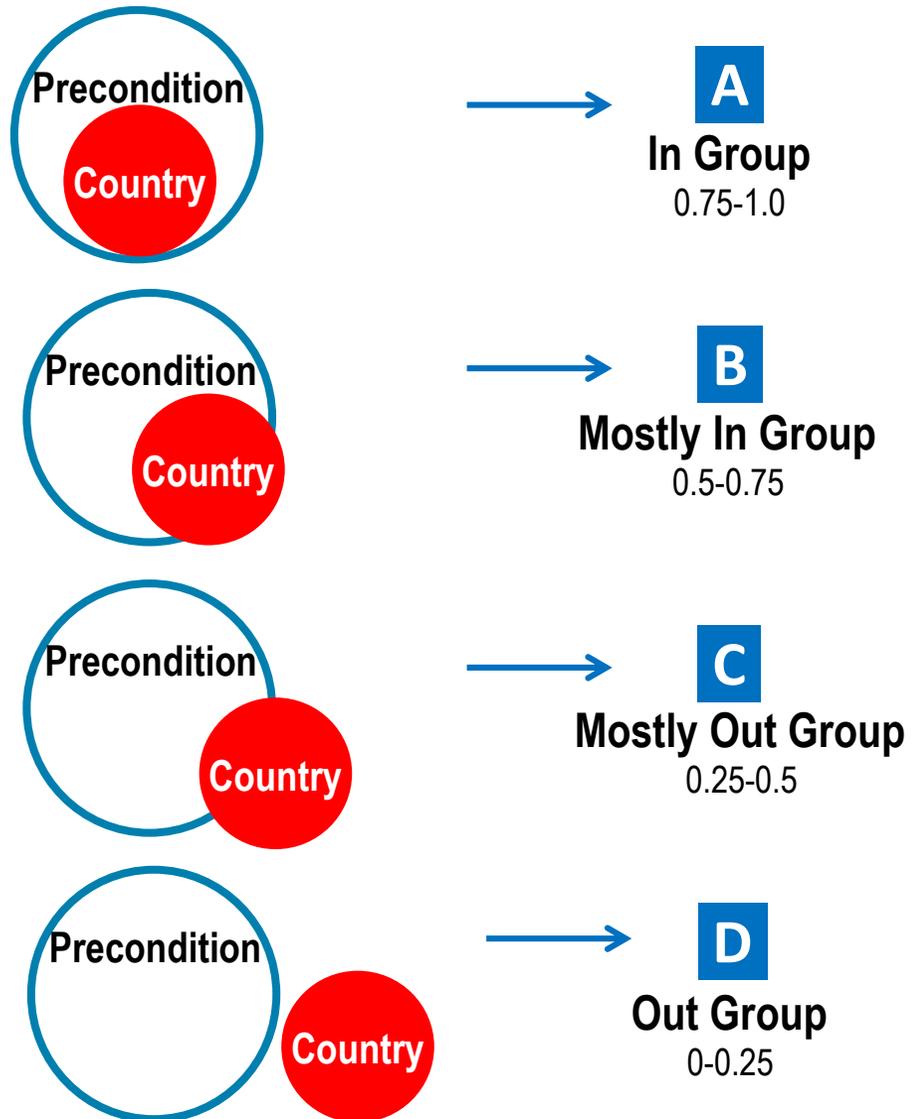
- Contributes to economic **growth**
- Supports improvements to quality of life, including for **poor**
- Helps protect local & global **environment**

Assumed contributions from interrelated sectors

# RE EVALUATION: COUNTRY CASE STUDIES IN EMERGING MARKETS



# RE EVALUATION: DEVELOPING A SET OF FACTORS



## EXAMPLE: Policy and Regulatory Framework

Substantial & adequate legal & policy framework is adopted and being enforced, w/ policy measures and regulations in place, including funding, where required to incentivize

Significant legal framework in place but w/ noticeable shortcomings in regulations & enforcement, & despite lack of policy clarity, there are some policy-based incentives available

While legal framework exists there is little clarity in implementing policies and regulations, lack of enforcement, and limited or no incentives to invest in RE

Insufficient legal & policy framework with critical shortcomings, and inadequate incentives to mobilize investments in RE

# RE EVALUATION: SCORING AND CALIBRATION

Country	BARRIERS						OUTPUTS	OUTCOMES	
	Policy and Regulatory	Integration into Power Systems	Improvements to Design & Technical Standards	Strengthen Institutional Capacity	Mitigate Investment Risks	Mobilize Financing	Development of RE	Energy Benefits	Environmental Benefits
China	A (0.80)	B (0.70)	A (0.90)	A (0.90)	B (0.70)	A (0.90)	A (0.84)	A (0.79)	A (0.94)
India	A (0.85)	A (0.80)	B (0.55)	A (0.90)	B (0.60)	B (0.70)	B (0.56)	C (0.36)	B (0.61)
Jordan	A (0.80)	B (0.70)	B (0.70)	C (0.40)	B (0.60)	C (0.40)	C (0.48)	C (0.27)	C (0.41)
Kenya	B (0.70)	D (0.20)	A (0.80)	C (0.40)	B (0.60)	A (0.80)	C (0.40)	C (0.38)	C (0.30)
Mexico	B (0.70)	A (0.90)	B (0.70)	B (0.70)	B (0.60)	B (0.60)	B (0.69)	B (0.60)	B (0.69)
Morocco	B (0.55)	B (0.60)	C (0.40)	C (0.40)	B (0.60)	C (0.40)	B (0.54)	C (0.37)	B (0.58)
Nicaragua	B (0.70)	B (0.60)	C (0.40)	C (0.40)	C (0.40)	C (0.40)	B (0.64)	B (0.57)	B (0.60)
Sri Lanka	C (0.45)	B (0.60)	B (0.60)	C (0.40)	B (0.70)	C (0.40)	B (0.64)	B (0.55)	B (0.68)
Turkey	A (0.80)	A (0.90)	A (0.90)	A (0.80)	B (0.70)	A (0.80)	A (0.86)	A (0.80)	A (0.90)

## PROCESS OF DEVELOPING MARIX

- 1) Specialists assess and score barriers during case preparation
- 2) Debrief w/ case specialists
- 3) Calibration workshop for final alignment

# RE EVALUATION: ANALYSIS AND INTERPRETATION #1

**RESULTS**

## KEY TYPES OF BARRIERS ADDRESSED

- 1 Inadequate Policies & Regulations
- 2 Inability to Integrate RE to Power System
- 3 Insufficient Design & Technical Standards
- 4 Inadequate Institutional Capacity
- 5 Significant Investment Risks
- 6 Constraints to Mobilizing Financing

**TOC Validated.**  
**All six barriers have  
causal link with energy &  
environment outcomes;**

Given validation, further adjustments to ToC was not necessary

## RE EVALUATION: ANALYSIS AND INTERPRETATION #2

**RESULTS**

### KEY TYPES OF BARRIERS ADDRESSED

- 1 Inadequate Policies & Regulations
- 2 Inability to Integrate RE to Power System
- 3 Insufficient Design & Technical Standards
- 4 Inadequate Institutional Capacity
- 5 Significant Investment Risks
- 6 Constraints to Mobilizing Financing

**Countries that successfully addressed all six barriers scaled-up RE as a result**

Observed in China; India; Mexico; Sri Lanka; Turkey

WBG broadly helping client countries reform correct barriers

## RE EVALUATION: ANALYSIS AND INTERPRETATION #3

**RESULTS**

**Policy & Integration were found to be essential (necessary conditions) under all successful reform scenarios**

Observed in Nicaragua and Morocco



WB experienced w/ policy reforms; major challenge for IFC/private. Helped identify gap w/ Integration where WBG has more limited experience.

# RE EVALUATION: ANALYSIS AND INTERPRETATION #4

**RESULTS**



**Policy & Integration + Risk Mitigation was additional pathway to scaling-up RE**

Observed in Jordan and Morocco

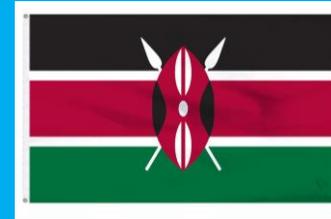
Especially mobilizing private sector investments



Renewable electricity growth still needs to accelerate significantly to meet long-term sustainable energy goals.

This growth is possible if governments address the three main challenges to faster deployment: **policy** and regulatory uncertainty; high investment **risks** in many developing countries; and system **integration** of wind and solar PV in some countries.

**Renewables 2019**  
**International Energy Association**



**KENYA**

- A scale-up in RE did not lead to a corresponding increase in the avoidance of CO<sub>2</sub>
- It reflects the displacement of hydropower by geothermal
- Displacement of one renewable for another would have less incremental environmental impact!

# CONTACT IEG

[ieg.worldbank.org](http://ieg.worldbank.org)

