

# Low carbon technology assessment and technology transfer in selected Asian countries

Dr Mara Mendes

Senior Programme Specialist, Climate Change  
Regional Resource Centre for Asia and the Pacific (RRC.AP)

27-28 January 2016



**AIT**  
Asian Institute of Technology

# Regional Resource Centre for Asia and the Pacific (RRC.AP)

- Institute-wide within AIT
- Bridge the gap between the scientific understanding of sustainable development processes and sound policies at national and regional levels
- Secretariat for several conventions
- Activities
  - Research
  - Policy formulation
  - Knowledge management
  - Capacity building
  - Partnership and secretariat

# Presentation outline

- Project background
- Technologies selected for assessment
- Project activities and progress
- Findings

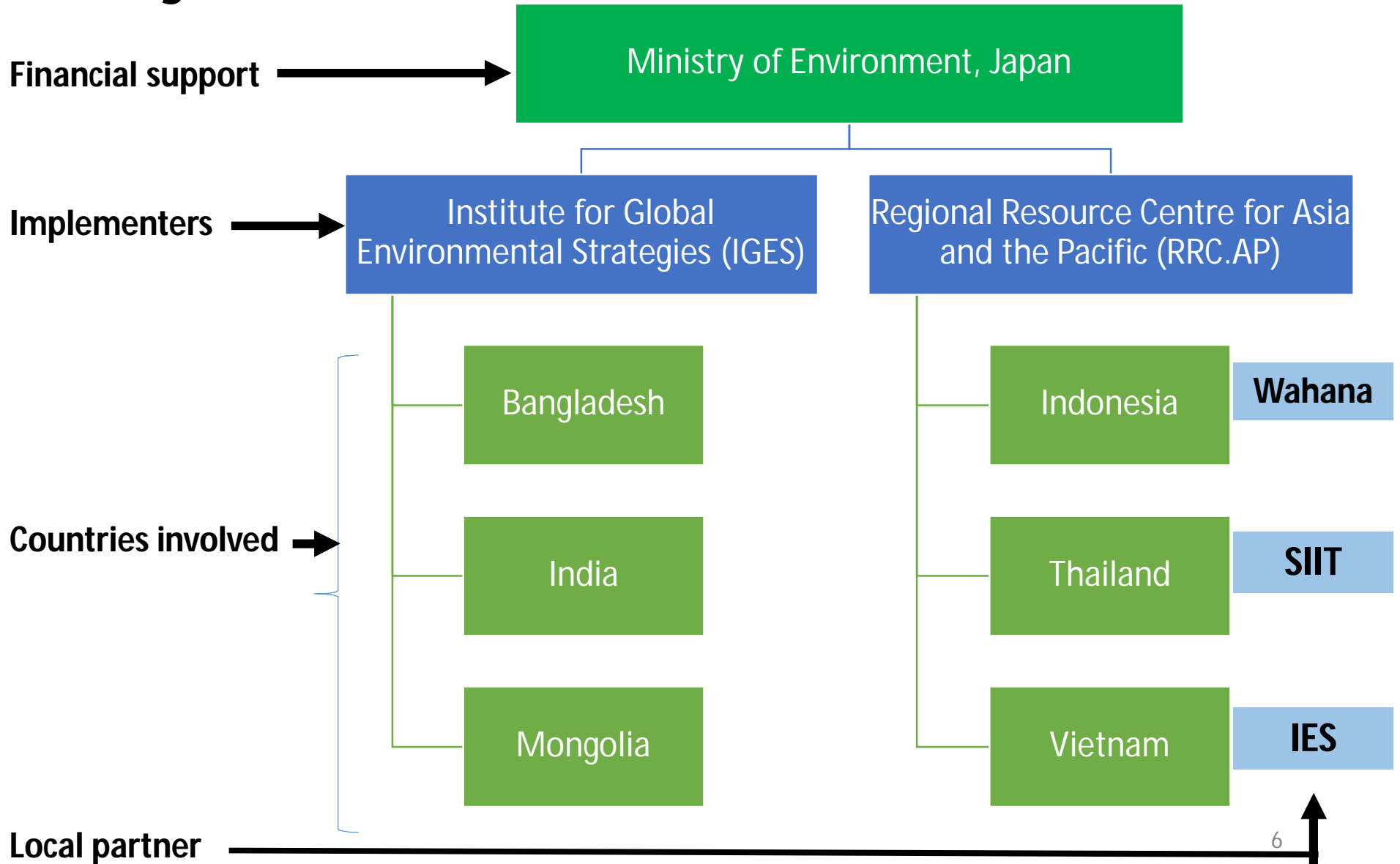
# Background

- Low-carbon technologies have potential to
  - Reduce GHG emissions
  - Reduce energy consumption
  - Save operating cost for the user
  - Co-benefits, such as lowering air pollution
  - New business opportunities and job creation

# Background

- O&M cost is crucial
  - Investment decision in a technology should not be only based on the initial cost
  - There could be significant differences in O&M cost between technologies of different brands
  - Life cycle cost assessment provides actual information for decision makers
- Japanese low-carbon technologies
  - Japanese technologies are well known for their reliability and long lifetime
  - Suitable to reduce life cycle cost

# Project structure



# Technologies & countries for assessment

Bangladesh

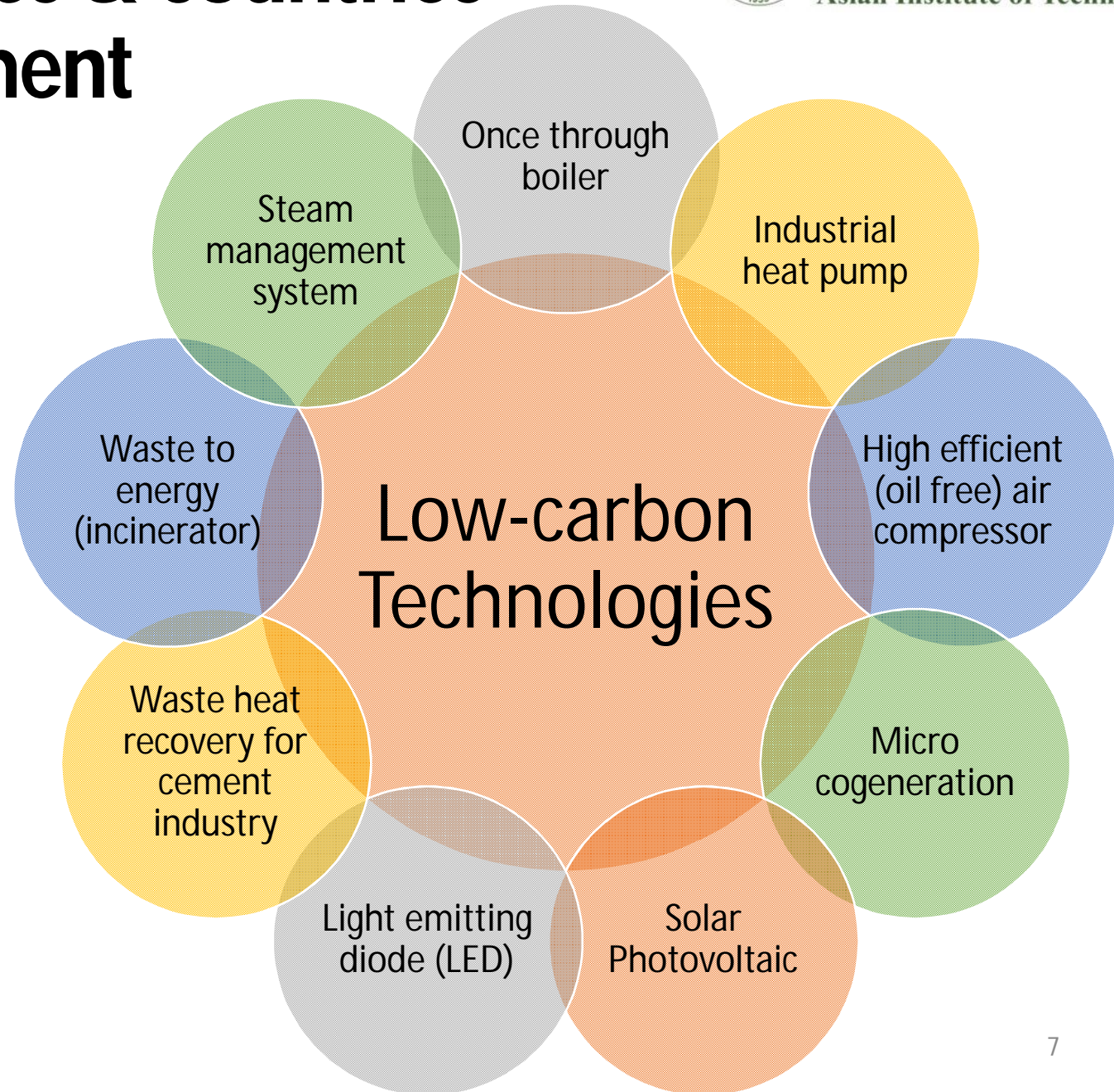
India

Indonesia

Mongolia

Thailand

Vietnam



# Project components

1. Comparative assessments of low carbon technologies
2. Country condition assessments: data collection by country counterparts
3. SWOT assessments on the transfer of low carbon technologies:
4. Financial schemes assessments



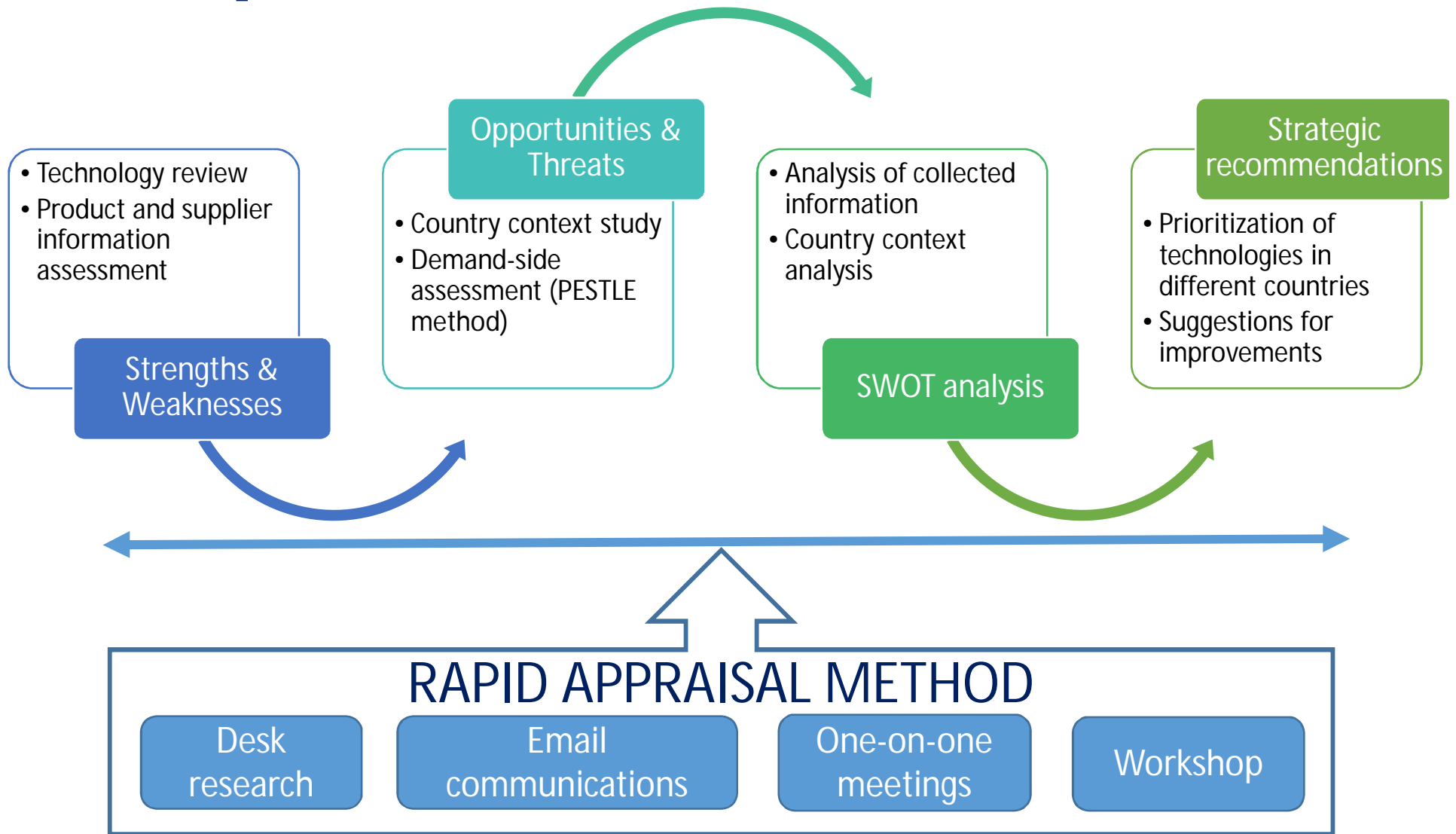
# Assessment for technology transfer



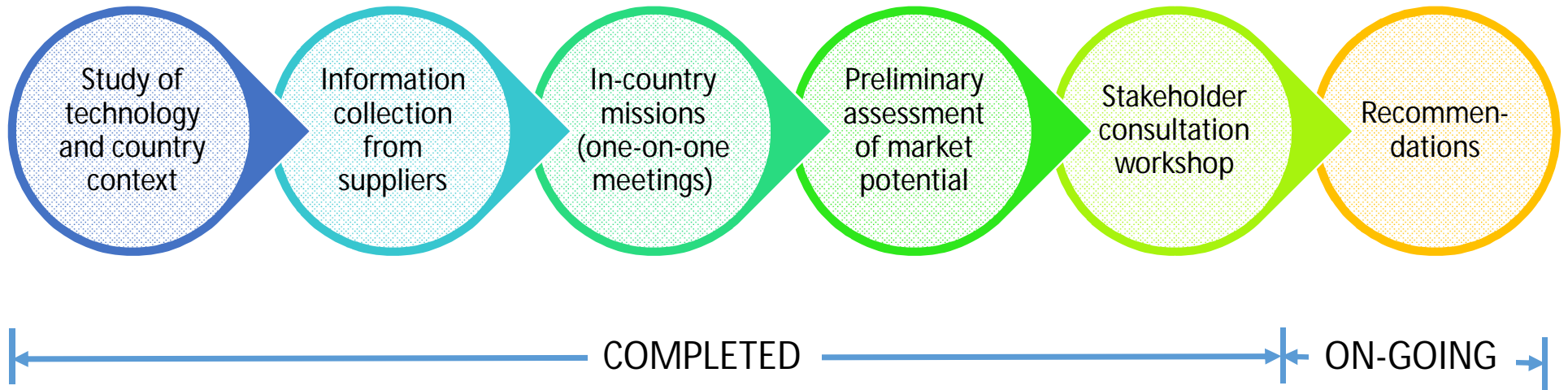
SWOT assessments on the transfer of low carbon technologies:

- SW – Internal:  
self evaluations by supply side (& technology users to cross-evaluate)
- OT - External:  
data collection by country counterparts
- Comprehensive analysis of SWOT and recommendations

# Proposed activities



# Work progress



# Factors for strengths & weaknesses analysis

Aspect	Criteria
<b>Techno-logical</b>	Innovativeness
	Reliability
	Durability (life span)
	Energy efficiency
	Size and weight
	Ease of installation
	Ease of maintenance
	Operational performance
<b>Economic</b>	Initial cost
	Maintenance cost
	Investment payback period

Aspect	Criteria
<b>Environ-mental</b>	CO2 emissions reduction
	Other environmental benefit: (waste water reduction, water consumption reduction, better air quality, etc.)
<b>Business</b>	Supplier's aftersales service availability in the country
	Supplier's business experience in the country
	Delivery time

# Strengths and weakness factors



Name of technology		Name of country			Subject of relative evaluation
		Competing technologies in that country			
Proposed factor	Importance** (c)	Strength** (a)	Weakness* (b)	Reason for score	(a-b)
		0-2 points	0-2 points		
<b>Technological characteristics</b>	Innovativeness				
	Reliability				
	Durability				
	Energy efficiency				
	Size and weight				
	Ease of installation				
	Ease of maintenance				
<b>Economic viability</b>	Operational performance				
	Initial cost				
	Equipment maintenance cost				
<b>Environmental characteristics</b>	Investment payback period				
	Amount of carbon dioxide emissions reduction				
<b>Business reliability</b>	Environmental performance (waste water & exhaust)				
	Maintenance service providers availability				
	Business experience in that country				
	Delivery time				

Each individual factor is assessed and scored as either "Strength" or "Weakness", depending on the results.

Relative evaluation in terms of the competitor

# Opportunity and threat factors

## PESTLE Analysis

Marketing principles: tool to track environment where the technology is operating or to be launched.

### FACTORS:

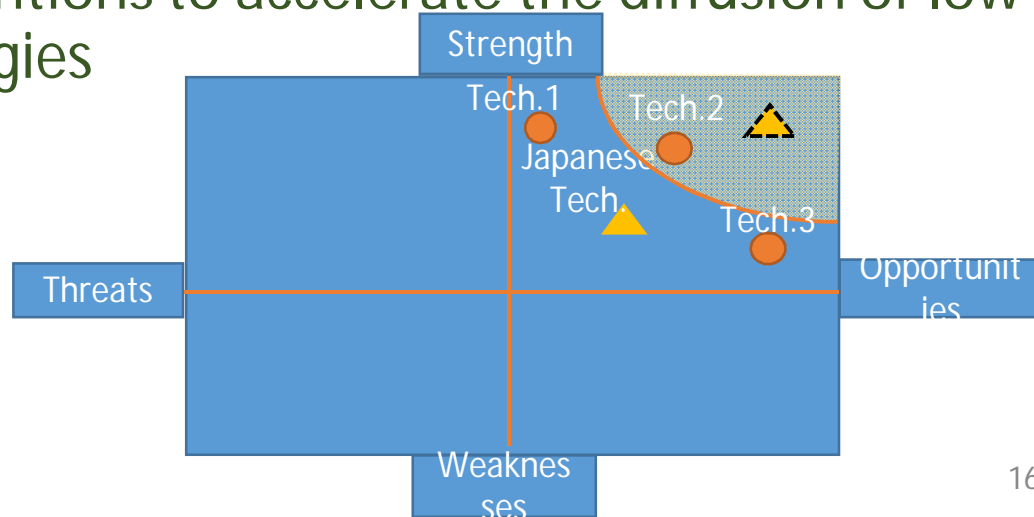
- **P – Political** - the extent to which a government may influence the economy or a certain industry
- **E – Economic** - economy's performance that directly impacts a company and have resonating long term effects
- **S – Social** - social and cultural environment of the market
- **T – Technological** - innovations in technology that may affect the operations of the industry and the market favorably or unfavorably
- **L – Legal** – laws and policies that affect the market
- **E – Environmental** - influence or are determined by the surrounding environment.

# Factors for opportunities & threats

<b>Political</b>	Domestic and geopolitical stability
	Diplomatic relations with Japan
	Presence of strong incentives and policies
<b>Economic</b>	Market size and economic growth (including population, etc.)
	Presence and strength of competition
	Current energy prices (fuel, electricity for commercial) and trend
	Financial strength and purchasing power of end users
<b>Social</b>	Attitude toward Japanese products (Japanese brand power )
	Tolerance for long investment payback periods
	Cultural suitability of product use
<b>Technological</b>	Presence of infrastructure for product use
	Ease of hiring local engineers (design, construction, maintenance)
	Ease of local procurement of refrigerants, oils, and parts, etc.
<b>Legal</b>	Presence and strength of customs duties
	Specifications (harmonic content with international standards)
	Regulations (energy saving, environmental regulations)
	Standards (labelling, MEPS***, IBR)
	Presence of protection for intellectual property rights
<b>Environmental</b>	Natural environment (temperature, humidity, water quality, air quality, disaster frequency, etc.)

# Technology mapping

- Technology mapping can be performed based on SWOT analysis, helping to
  - Set of recommendations to reduce weaknesses & threats
  - Set of recommendations to enhance the strengths & opportunities
  - Strategic interventions to accelerate the diffusion of low carbon technologies





# Preliminary findings

# Needs assessment

Targeted technologies	High potential to very high potential
<b>Industrial heat pump</b>	<b>Thailand</b>
<b>High efficient air compressor</b>	<b>Thailand, Vietnam</b>
<b>Micro co-generation</b>	<b>Thailand</b>
Solar power generation (Eco-house)	<b>Indonesia</b>
Waste heat recovery (Cement waste heat power plant)	<b>Indonesia, Vietnam</b>
High efficient lighting system (LED)	<b>Vietnam</b>

# Case: LED in Vietnam

# Light Emitting Diode

## Opportunities and Threats

### ➤ Market Potential of Japanese technologies

- With a growth rate of 15-20 % per year, LED has high demand in Vietnam in street and residential sector
- Unreliability and lower life (5000 hrs.) of present products in market
- Willingness of country for adaptation of efficient LED (US\$ 12,000,000 budget for streets lighting in Ho Chi Minh City by 2017)
- Competition from local producers such as Rang Dong and Dien Quang

### ➤ Investment decision of users in Japanese technologies

- Initial Cost as issue as expensive Japanese products and expect support in investment

# Light Emitting Diode

## Opportunities and Threats

- Accelerating diffusion of Japanese technologies
  - Positive attitude towards Vietnamese people and willing to pay extra
- Market Strategy
  - National Strategy like 'Green Proposal for Public Lighting' can provide financial support on Japanese LED technology to compete with other technology
- Policy Perspective
  - No specific incentives or policy to support LED but has banned the production of some non efficient bulbs
  - Awareness towards energy efficiency but not towards benefit of reducing operating cost, coordinated awareness program required

# Findings & recommendations

- High initial cost is an issue for low carbon technologies
  - Need develop country and technology specific studies / demonstration on life cycle cost
  - Need awareness about life cycle cost (policy makers & technology users)

# Findings & recommendations

- Payback period is important factor
  - End of subsidies to fossil fuels and fossil fuel based electricity generation
  - Review of electricity tariff to incorporate climate change related costs
  - Need incentives for RE & EE
  - ESCO

# Findings & recommendations

- Customs and import taxes: opportunity
  - All three countries can reduce import tax for RE & EE
- Existence of local partners / after sales services: important factor for technology user
- Local content policy is an issue raised in Indonesia



# Acknowledgement

Asian Institute of Technology

- Mara Regina Mendes
- Hiromi Inagaki
- Yousre Badir
- Anis Zaman
- Shobhakar Dhakal

Institute for Global Environmental Strategies

- Kentaro Tamura
- Rabhi Abdessalem
- Mika Tachibana
- Mihoko Yoshida
- Masahiro Suzuki

# Thank you!

Mara Regina Mendes, PhD  
Senior Programme Specialist, Climate Change  
Regional Resource Center for Asia and the Pacific (RRC.AP)  
[mara.mendes@rrcap.ait.asia](mailto:mara.mendes@rrcap.ait.asia)