

# STI for SDGs with special focus on Energy and Citizen's involvement

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# 1. SDG Targets Related to STI

## Targets on STI International Cooperation



Target 17.6, 17.7, 17.8

## Targets on utilization of technologies for the implementation of SDGs



Target 1.4, 2.a

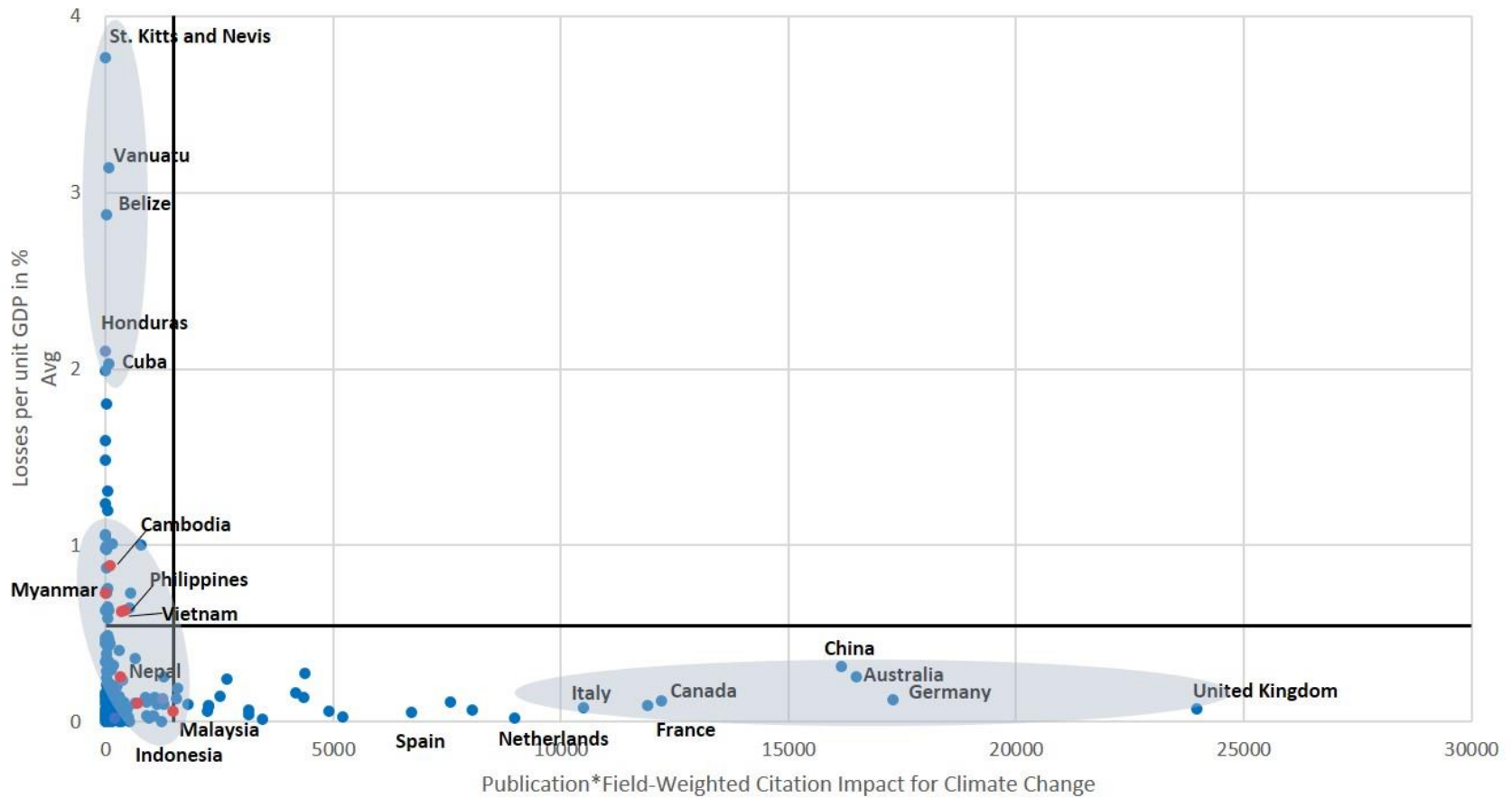


Target 4.b, 5.b



Target 7.a, 7.b, 9.b, 9.c, 14.a

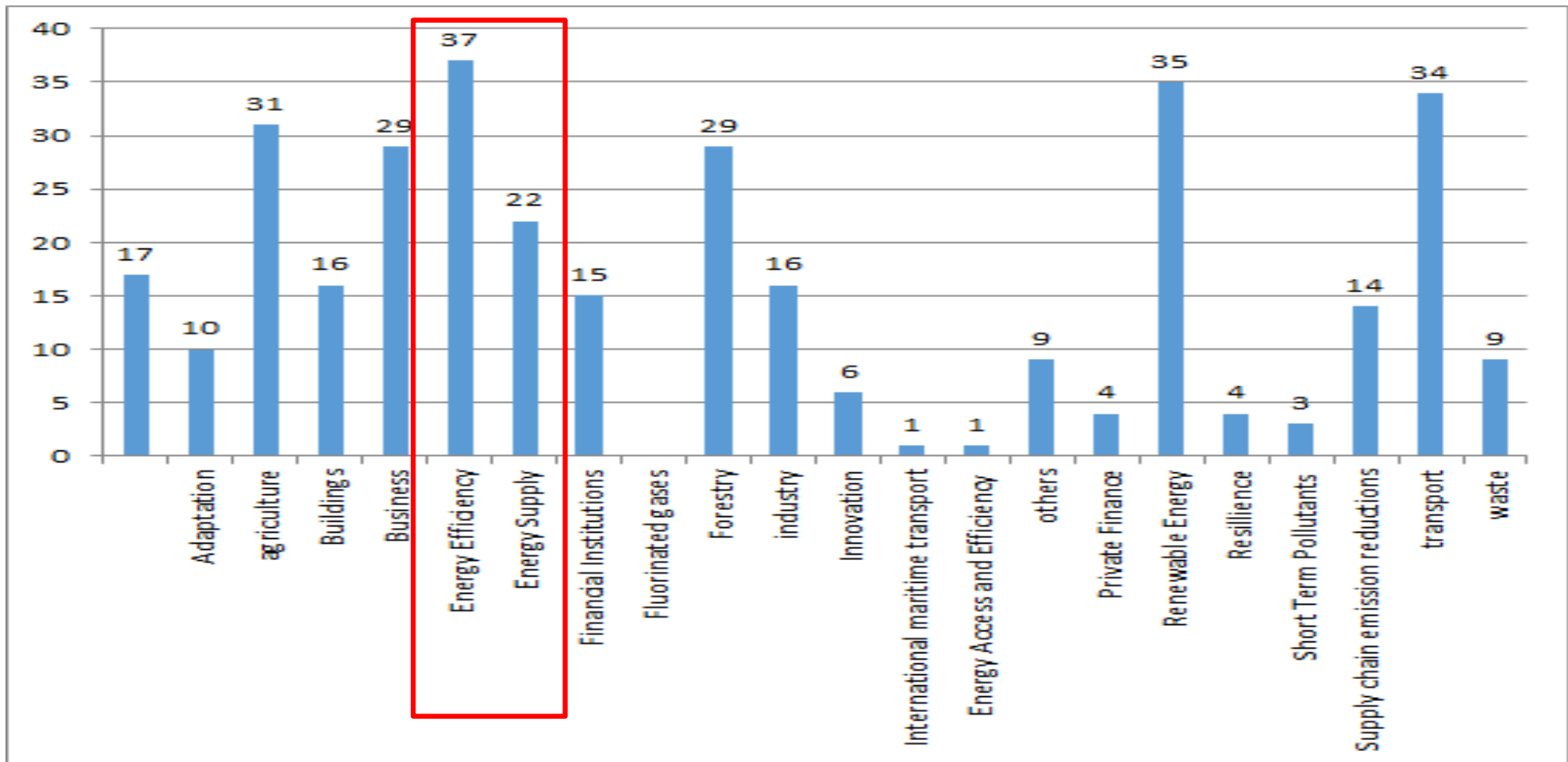
## 2. Climate Tech Gap



자료: 저자정리

### 3. Global Climate Initiatives

Energy related initiatives: 14% of total climate initiatives in number of projects



Source: Analyzed around 200 climate initiatives on UNEP's Climate Initiatives Platform (2016)

# 4. Korean CTCN Network Members



*47 Korean network members out of 389 in total*



As of November 2017

# 5. Korea Energy Technology

## 1 Microgrid Design & Analysis -KIER

### Issues of power systems rely on the centralized electrical grid

- Interruption of power supply can be occurred by natural disasters
- Potential power outages due to the supply-demand imbalance

### High reliability microgrid design technology

- Renewable energy penetration ratio enhancement technology
- Frequency and voltage control technology / Outage time reduction technology
- Distributed power generation capacity design and analysis technology

## 3 Low Cost Micro Solar Desalination-ETRI

### Multi effect solar still (MES)

- Normal solar still wastes the latent heat of water vapor, for single usage. However, MES recycles the latent heat repeatedly by multi-layered evaporating/condensing stacks. Therefore, it can distillate saline water more effectively. MES has been known and studied since half centuries ago. Its productivity was both theoretically and experimentally proven to be 10~20 liter/m<sup>2</sup> per day. However, it has been scarcely used for practical water source, due to relatively high cost
- Contrast to the previous MES, by replacing expensive metal plates in existing MES to roll to roll processable plastic film, new technology could reduce its cost and weight very much. Newly designed structure of the evaporation/condensation layers and spacers between the layers enabled the system stable without using heavy materials

## 5 Stand-alone Off-grid Photovoltaic

### Design and operation techniques of high performance off-grid PV system

### Construction of hybrid power system using PV and renewable power sources and energy storage

- Design of optimized off-grid PV systems for environmental conditions of installed areas
- Continuous power supply using energy storage system
- Hybrid PV power system using renewable energy sources (ex. wind power)

## 2 Solar Thermal Desalination-KIER

### Eco-friendly desalination technology without greenhouse gas emissions since no fossil fuels are used

- Solar desalination technology with low operating cost and easy maintenance owing to simultaneous production of hot water (solar thermal) for evaporation and electricity (photovoltaic) for pumps from sun
- Applying a MEMS(Multi Effect Multi Stage) distiller optimized for solar desalination process
- Potential for utilization of heat energy (approx. 70°C water) produced by waste and biomass combustion

## 4 Onshore Lanstallable WEC Solution for Less Populated and Costal Areas-ENGINE INC

### Multi-Directional PTO (Power Take Off) Technology

- INWave's underlining technological novelty is embedded in its energy harvesting dynamics. It is a three-dimensional flexibility of INWave's WEC's energy absorbing unit that allows it to reciprocate with all on-coming wave motions and thus maximize production of electricity.
- Significantly more economically efficient even in small scale by comparison with more conventional technologies, which are limited to a uni-directional movement.

## 6 The Photovoltaic Power Generation and Water Purification System

### Solar Puri System

The micro-grid electricity and drinking water supply system utilizing water resources and solar power to serve 30~50 families. (Dimension: 12m(L) x 6.3m(W) x 3.5m(H))

# 6. African Union-Republic of Korea STI Workshop 2017



Ministry of Science, ICT  
and Future Planning



African Union



SCIENCE AND  
TECHNOLOGY POLICY  
INSTITUTE



National Research  
Foundation of Korea



KISDI



Korea-Africa Center

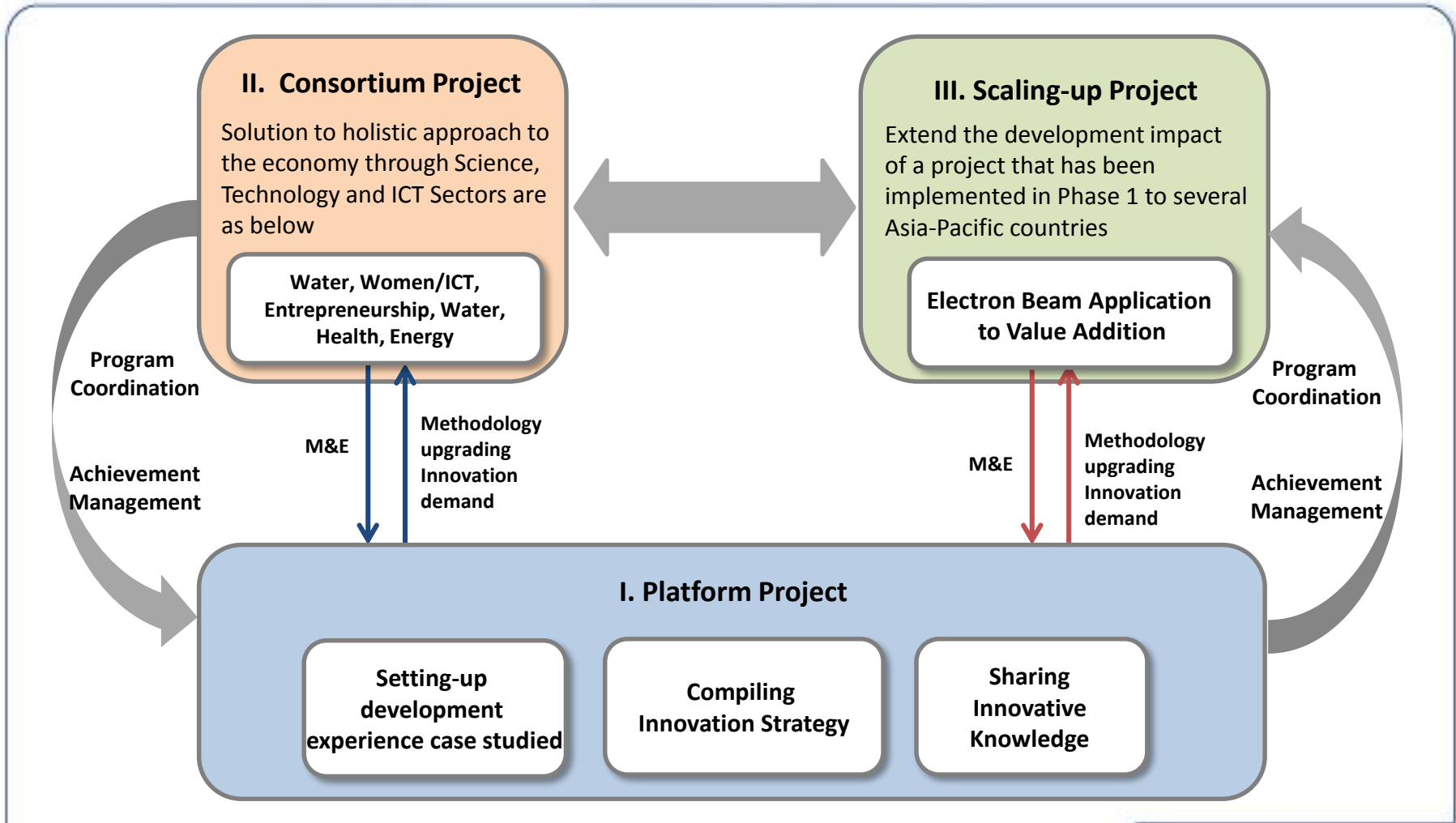
## AU-ROK STI Workshop 2017

“Africa-Korea STI Cooperation, achieving SDGs for the Future”

- Date: 25-27 April, 2017
- Venue: African Union Commissions Conference Complex, Addis Ababa, Ethiopia
- 80 participants (AU, RoK, Korea Ethiopia Embassy, Research Institutes etc)
- 12 Invited STI researchers from AU member states (9 countries)
- Developed 12 Project Concept Papers on different fields of STI



# 7. ROK-UNDP 2 Phase Program





# 8. Asean-RoK Inno-Code 2017

## 1 Background

- **What is Inno-Code 2017 ?**
  - “Inno” refers to “Innovation” while “CoDe” refers to “Co-development.”
- **Purpose**
  - To establish support mechanism such as **mentorship** and **nurture STI knowledge**
  - To foster mutual understanding among the future generations of ASEAN and ROK (APASTI 2016-2025 Action 3.1~3.2)

## 2 Overview

- **ASEAN-ROK Vision Innovation Competition : Inno Code 2017 : Achieving the SDGs Together**
  - **Topic** : What are some negative impacts of climate change in local communities of ASEAN? What are some innovative solutions to address those issues?
  - **Who** : ASEAN-ROK Undergraduate/Post graduate (Under 30)

## 3 Competition

- **When & Where**
  - July 2017 / Siem Reap, Cambodia
- **Competitors : 11 team**
  - ROK, Vietnam, Lao, Philippine, Singapore, Cambodia, Thailand, Indonesia
- **Process**
  - DAY 1 : Cultural Exchange, Team work
  - DAY 2 : Collaborative research, Mentoring
  - DAY 3 : Presentation and Award Ceremony

## 4 Sectors of Suggested proposal

<b>3</b> Cambodia Animal Protection	Lao PDR Solar Energy	<b>2</b> Philippine Recyclable Energy
Singapore Bio-Sand (Toilet)	Vietnam Electricity	Thailand Flooding
Indonesia Waste management	ROK 1 Micro Plastic	<b>1</b> ROK 2 Water
ROK 3 Forest Fire	ROK 4 Drought	

# 9. Project outcomes – (3) Raising public awareness

## 01 7<sup>th</sup> Creative Design Contest

- **Purpose** : To develop and disseminate appropriate technology to marginalized people (The other 90%)
- **Date / Venue** : May 22, 2015(Fri), Seoul National University
- **Activities** : 340 undergraduate/graduate students (75 teams) attended, 20 teams awarded through evaluation  
(1<sup>st</sup>: oral presentation, 2<sup>nd</sup>: exhibition)



### <Awardees>

Prize	Provider	Universities, team, (name of invention]
1 <sup>st</sup>	Minister of MSIP	Gyeongsang Univ,'Pharmglory', (Life Heat Source)
2 <sup>nd</sup>	President of NRF	Inha Univ,'Tapio Clinic', (preventing epidemics: Tapiotizer)
	President of Sanhak Foundation	KAIST, 'KAIDEA', (Braille Printer for blind people)
3 <sup>d</sup>	President of UNITEF	Kangwon Univ,'Wisdom of Columbus',

# 10. Korean S&T Innovation Centers

## S&T Innovation Centers

2013. 07  
Phnom Penh,  
Cambodia

2014. 07  
Luang Prabang,  
Laos

2015. 07  
Pokhara, Nepal



**Asia** (currently, 3 centers in operation)  
Target countries : **Cambodia, Laos, Nepal,**  
Mongolia, Myanmar, Bangladesh,  
Vietnam, Indonesia, Philippines

**Africa** (No centers in operation)  
Target countries : Nigeria, Ethiopia,  
Uganda, Cameroon, Kenya, Tanzania, DR Congo

# 11. Project outcomes – (2) S&T Innovation Centers

## Cambodia

### Innovative Water Center

- **Research area**
  - De-watering the polluted drinking water (arsenic and metals, organic matter)
  - Cost-efficient pumps and de-watering facilities by using new renewable energy
- **Implementing Organization**
  - Scientists Without Borders



## Laos

### Sustainable Energy and Agriculture Center

- **Research area**
  - Self-generating energy through indigenous plants & agricultural byproducts
  - Producing agricultural processed goods by establishing small enterprises based on villages
- **Implementing Organization**
  - Sharing and Technologies Incorporated



## Nepal

### Innovation Technology & Entrepreneurship Center

- **Research area**
  - Developing New renewable energy
  - Developing agricultural appropriate technology
  - Organizing appropriate technology training for young entrepreneurs based on technology
- **Implementing Organization**
  - Handong University





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