ITU Report
The case of Korea: the quantification of GHG reduction effects achieved by ICTs

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ITU Symposium on ICTs,
the Environment and Climate Change

KAIT Korea Association for ICT Promotion

KOREA COMMUNICATIONS COMMISSION

RRA NATIONAL RADIO RESEARCH AGENCY

ITU International Telecommunication Union

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Contents

Section 1

Background and Introduction

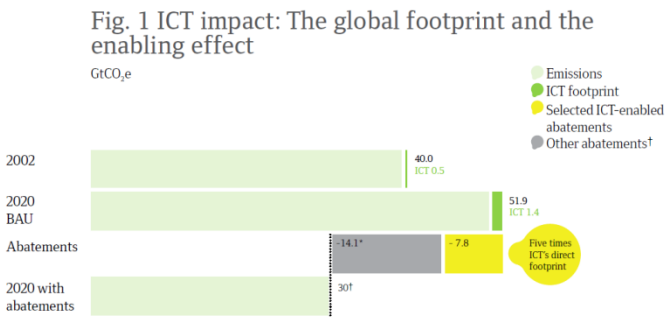
Background: global

Importance of ICT toward GHG emission abatement has been studied globally

- Gartner report, 2007

> “ ICT Industry is responsible for 2% of global carbon emissions ”

- GeSI: <SMART 2020>, 2008



> “ Identified global emissions abatements in 2020 is five times of its own footprint ”

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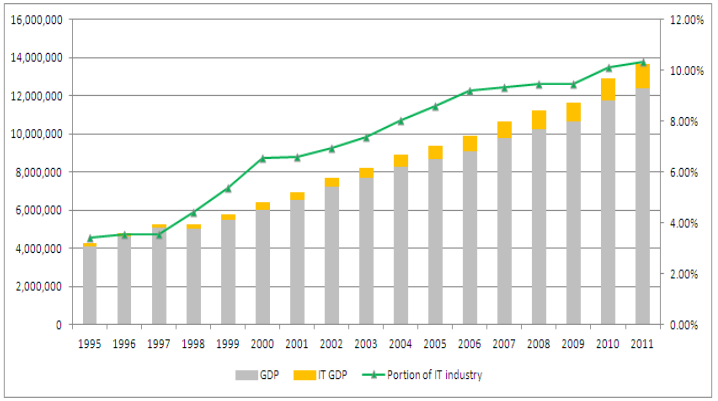
Background: domestic

- Growth in ICT industry with increasing proportion of GDP

ICT Industry has grown to be a core industry covering 10.35% of GDP in 2011



- ICT, a key implementation tool for climate change mitigation

“Develop green technologies as future growth engines”

-Korea’s five-year plan for Low Carbon Green Growth

- Green Climate Fund

A host country of the secretariat of the UN Climate Fund

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Introduction

“A study on social GHG abatement by the use of ICT”

The purpose of the study was to;

- Demonstrate the potential GHG abatement of “Greening by ICTs” solutions in Korea between 2011 and 2020.

The scope of the study included;

- Role of ICT in climate change mitigation in national level;
- Contribution of ICT services to abate GHG emission;
- Development of methodology to calculate GHG emission abatement; and
- Quantification of potential GHG abatement in Korea.

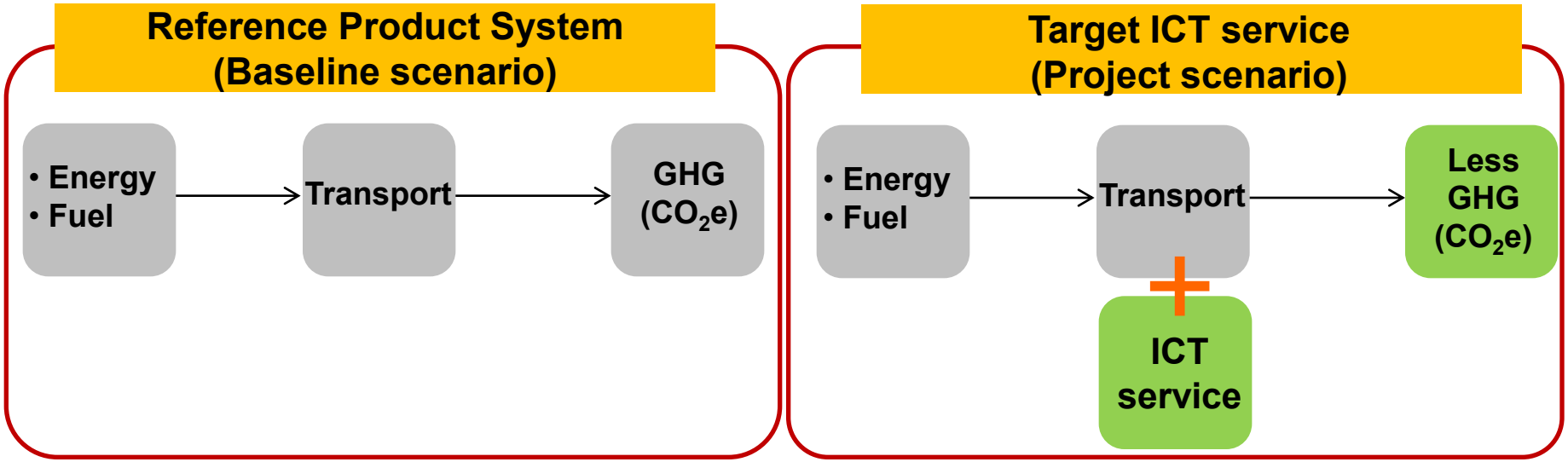
Section 2

Approach and methodology

Approach: ITU-T L.1410 Part 2

According to Part 2, we have applied Gap Analysis between Reference Product System and Target ICT service.

First Order Effects	The impacts created by the physical existence of ICT and the involved processes
Second Order Effects	The impacts created by the use of ICT service. This effects include the immediate abatement or increase in GHG emission after adopting ICT services
Other Effects	As 'rebound effects', the impacts created by the aggregated effects that consider time gained for end-user phase as well



Comparisons between the systems on the basis of achieving **the same functional units**

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Approach: ITU-T L.1410 Part 2

We have applied quantification formulas by categories and second order effects based on Part 2.

Sector	Categories	Quantification
Transport	**Movement of people**	*Energy abatement = Unit energy consumption for each type of fuel × Fuel consumption r educed*
	Movement of goods	*Energy abatement = Unit energy consumption for each type of fuel × Fuel consumption reduced*
Buildings	**Improved efficiency of office space**	*Energy abatement = Unit energy consumption × Amount reduced*
	Power consumption & Energy consumption	*Energy abatement = Unit energy consumption for each type of fuel × Fuel consumption reduced*
	Storage of goods	*Energy abatement = Unit energy consumption × Amount reduced*
	Improved work efficiency	*Energy abatement = Energy consumption per m^2 × Area used per person (m^2) × Workload improved (person-year)*
Industry	**Consumption of goods**	*Energy abatement = Energy consumption to produce one unit of the product × Amount reduced*
	Waste	*Energy abatement = Unit energy consumption for each type of waste × Amount reduced*

Scope Boundary: Analyzed 14 ICT services

1. Current offering from ICT industry players

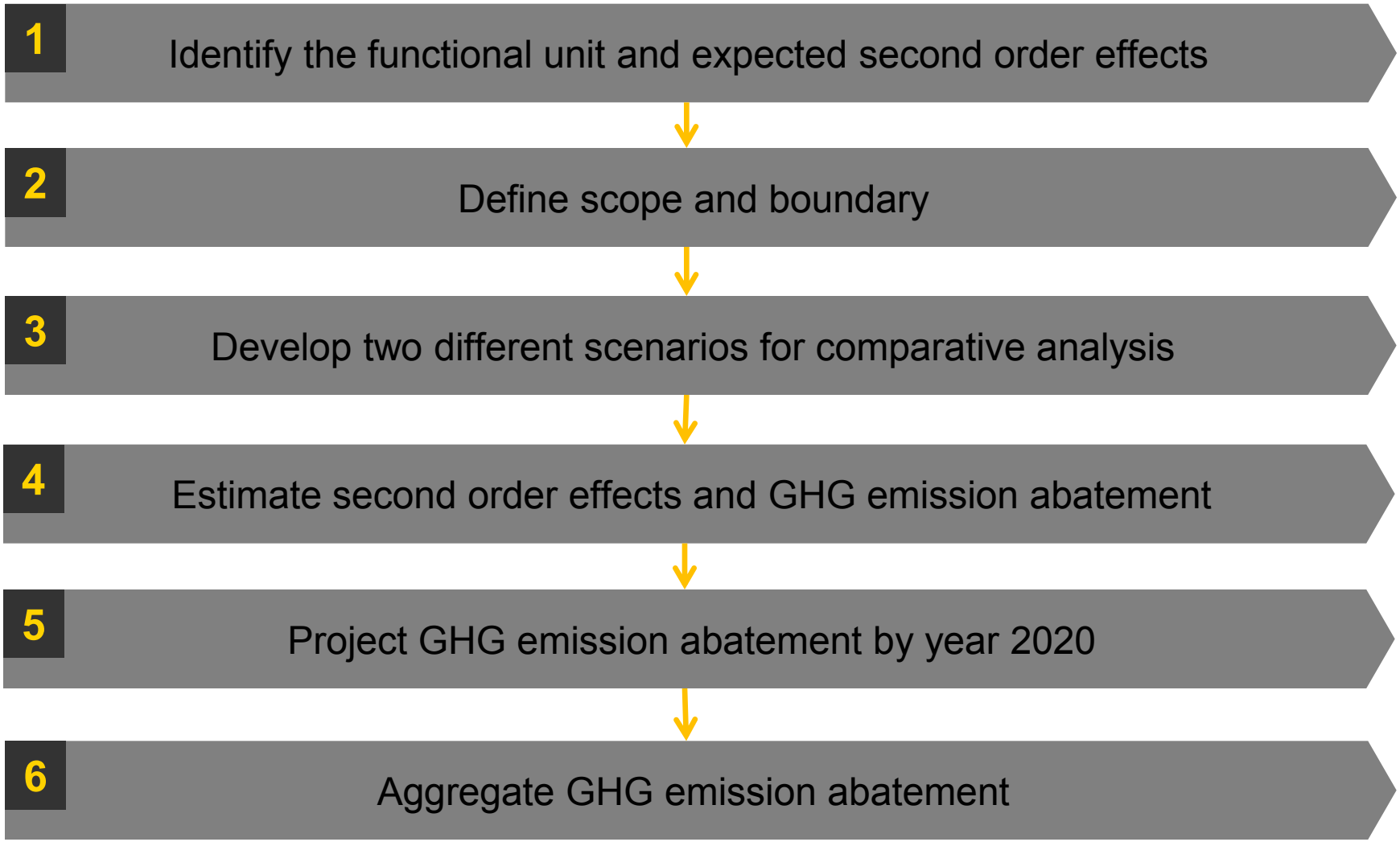
2. Global Benchmarking

3. Government's ICT strategy and plans

14 ICT services for analysis

Transportation	Buildings	Commerce	Production
1. Real-time Navigation (RTN)	7. Home Energy Management System (HEMS)	9. e-Commerce	14.Smart Motor
2. Bus Information System (BIS)		10. e-Government	
3. e-Logistics		11. e-Municipality	
4. Telepresence	8. Smart Grid	12. e-Health	
5. e-Learning		13. e-Publication	
6. Smart Work			

Methodology: 6 Steps of workflow



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Section 3

A case study: Real-time Navigation

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1 Identify the functional unit and effects

- **Definition**: A GPS-based service that provides real-time information of optimal routes and traffic condition to the destination.

- **Functional unit**: Movement of people from A to B in certain conditions such as time and cost.

Types of Effects	Positive effects	Negative effects	Impact on GHG emission
First Order Effects		As usage of RTN increase, production and network usage for RTN increases	**(+) Increase**
Second Order Effects	As driving time and distance decreases, fuel consumption decreases		**(-) Decrease**
Other Effects	As life span of vehicles increases, production for vehicles decreases	As users' spare time increases, energy consumption from other industry increases	**(+) and (-) Ambiguous**

2 Define scope and boundary

Boundary for transport	
Applicable vehicles for installing RTN	
Non-business cars, vans, trucks and business cars (assumed as taxis)	
No. of vehicles that are able to install RTN (assumed that every possible consumer possesses his own vehicle)	9 million vehicles
Average annual travel distance per vehicle*	14 thousand km

Boundary for population/consumer	
Possible consumers for using RTN	
The LBS users among mobile internet service subscribers	
Mobile internet service subscribers**	48 million subscribers
% of internet service subscribers using LBS service**	19.3%
People who are able to use RTN	9 million people

* 2008, Korea Transportation Safety Authority
** 2010, Korea Internet & Security Agency

Real-time Navigation (RTN)

3 Develop two different scenarios

Reference product system (baseline)	ICT service (project scenario)
Impacts on travel distance and fuel consumption while "possible consumers" don't use RTN	Impacts on travel distance and fuel consumption while "possible consumers" install and use RTN

No. of vehicles that are able to install RTN	9 million drivers (or vehicles)
Average annual travel distance per vehicle	14 thousand km
Total distance travelled before adopting RTN	**139billion km**

% of travel distance navigated by RTN*	16%
% of fuel reduced**	8.7%
Travel distance reduction after adopting RTN	**2billion km**

* <T-map user statistics>, SK telecom
** <Nissan SKY Project> , Nissan Motor

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4 Estimate the GHG abatement in base year

By adopting ITU-T quantification category "Movement of people", reduced travel time in 2011 after implementing RTN is;

Reduced distance by RTN	2 billion km
Actual Average Mileage	8.32km/l
Fuel saved by the reduced distance travelled	239,886.66kl
Emission factor of fuel	2.47 tCO2e/l
Emission abatement by RTN in base year	**592,520 tCO2e**

5 Project the GHG abatement by 2020

Considering about,

- RTN service users

	2011	2020
Travel distance navigated by RTN`	16%	70%

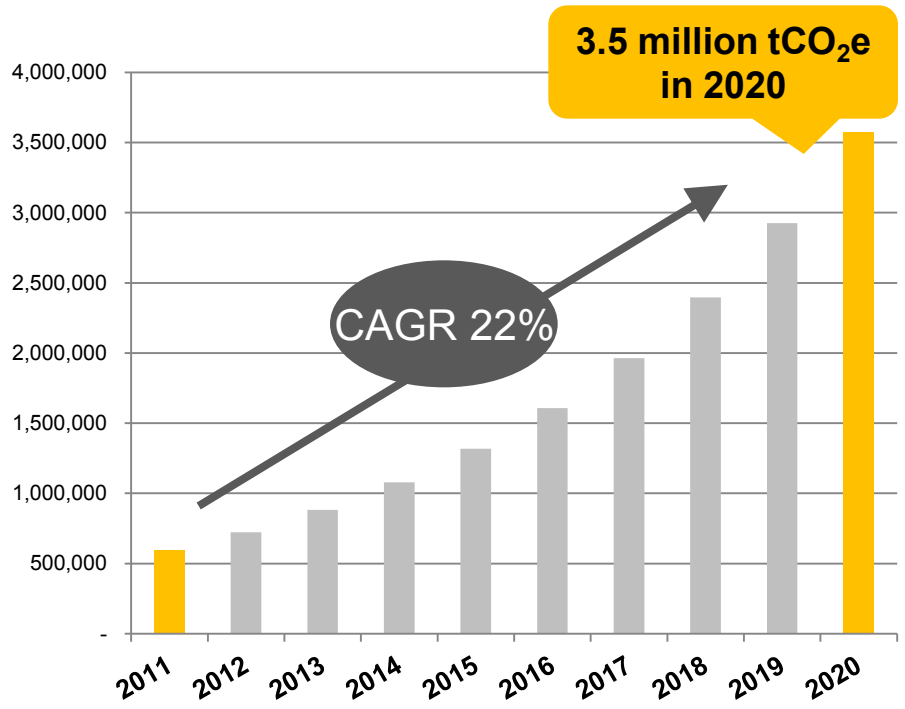
- The number of usage per user

	2011	2020
Internet service subscribers using LBS service	19.3%	90%

- Growth in automobile industry

	CAGR
Growth rate of car registered	3.28%

Potential GHG abatement by RTN by 2020
(unit: tCO2e)



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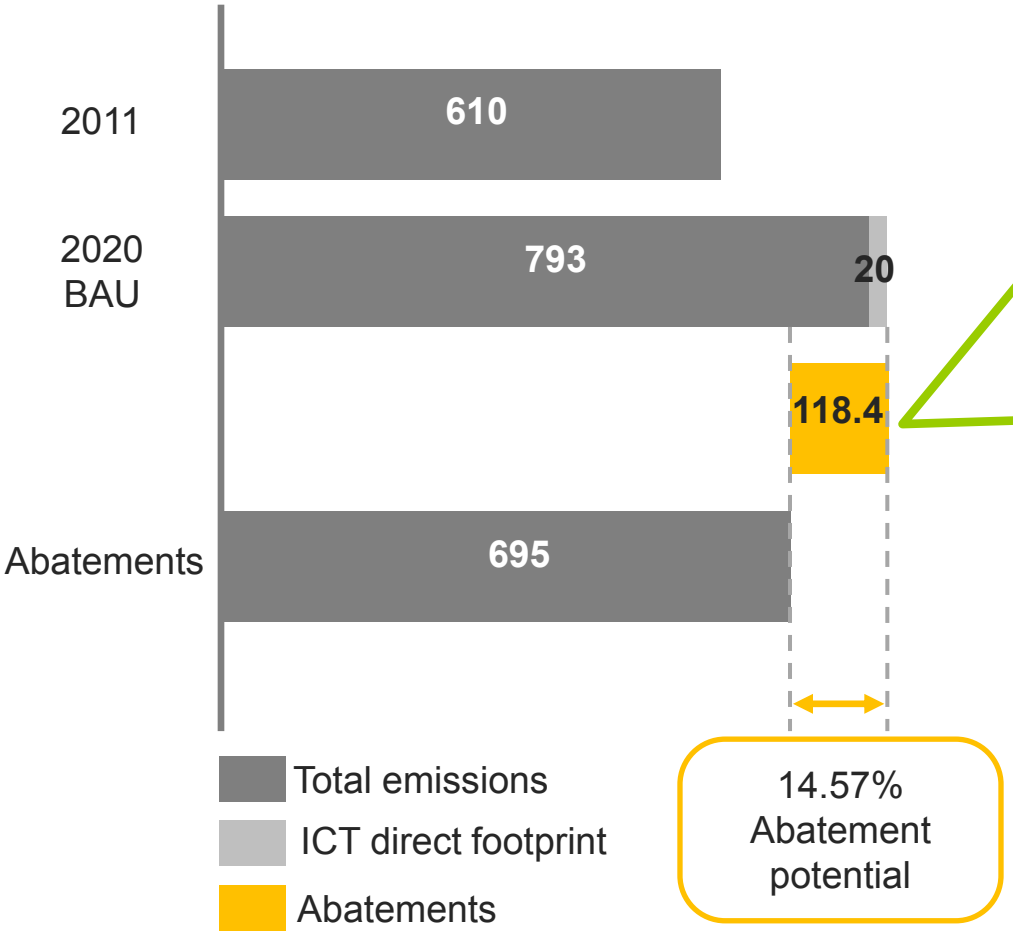
Section 4

Potential domestic GHG abatement

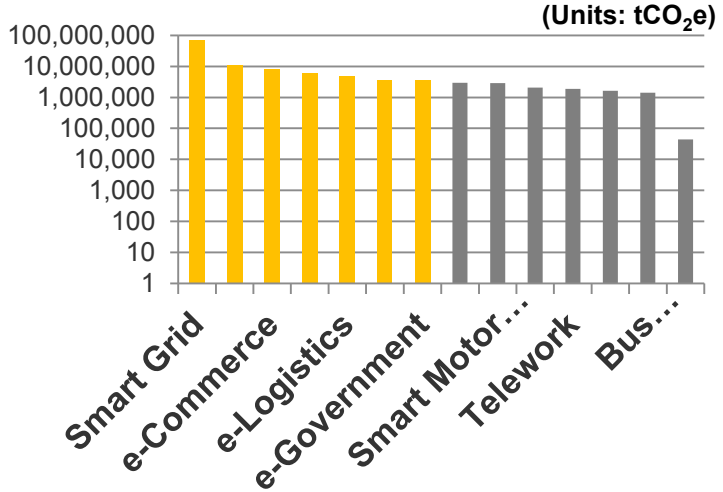
Conclusion

Potential GHG abatements by adopting ICT services is expected to be more than 5 times of its direct footprint.



Potential GHG abatements of ICT services is 5.8 times of ICT's direct footprint.

- Expected GHG abatement of each ICT services in 2020.



- Financial value via ICT services in 2020 is expected to be about USD 72 billion in terms of energy savings.

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Implication

The significance of the study was;

- The first case study which fully applied L.1410 Recommendation Part 2: and
- The first study on assessing GHG abatements by the use of ICT in Korea (of Republic).

The limitation of the study was;

- Absence of LCA approach for first order effect.

The recommendation for further study is;

- Prioritization of 14 ICT services in terms of possibility of standardization;
- Applying LCA approach for first order effect; and
- Planning for developing CDM methodology.

Thank you