



Case Studies on Gwangju’s Low Carbon Development and Policies

Kim, Tae Ho
Chief, Planning and Cooperation Office
International Climate and Environment Center

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About International Climate and Environment Center

- ❖ Purpose : To research and develop policies on climate change response, support green lives of

citizens, and create a low-carbon green city (Form of structure :

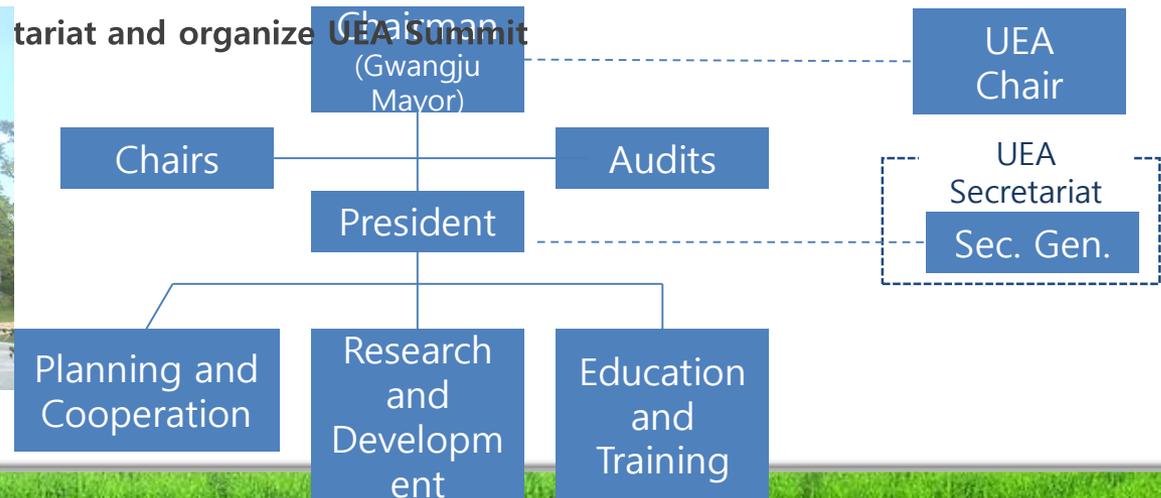
Foundation)

- ❖ Structural Basis : Gwangju Ordinance No. 100, 2011. Key Functions on Climate Change Response, Article 18

- ✓ R&D and education/training on climate change and other environmental issues
- ✓ Develop and implement programs for low-carbon green lifestyles
- ✓ Exchange and cooperation on climate change between cities and organizations



* ICEC also runs 'Fine dust office for safety of citizens' since Nov. 2018.





1. Current Status on Climate Change Response

Current Status on Climate Change Response

Trend in Korea

Key plans of Korean National Government

	Green Growth 5-Year Plan	Energy Basic Plan	Emission Trade Scheme Basic Plan	Climate Change Adaptation Plan	Climate Change Response Basic Plan
Status	Phase 3('19.5) : '19~'23	Phase 2 ('14.1) : '14~'35	Phase 1 ('14.1) : '15~'24	Phase 2 ('15.12) : '16~'20	Phase 1 ('16.12) : '17~'36
Planning Period	Every 5 years by 2050	Every 5 years for 20 years	Every 5 years, by decade	Every 5 years	Every 5 years for 20 years

Organizer	Government Policy Coordination Office	Ministry of Trade, Industry, and Energy	Ministry of Strategy and Finance	Ministry of Environment	Government Policy Coordination Office
	Green Growth 5-Year Plan : Phase 3				

- ❖ Vision : Realize Inclusive Green Nation
(economy and environment in harmony → fortify inclusiveness of green growth)
- ❖ Strategies
 - Responsible GHG reduction and sustainable energy transition
 - Innovative green technology/industry and fair green economy
 - Realize green society together and fortify global green cooperation
- ❖ Characteristic : Policy Agenda and build system
- ❖ → Focusing on actual/practical action plans



Current Status on Climate Change Response

Trend in Korean Municipalities

- Highlighted roles of municipalities (local governments)
 - ❖ Cities are '**Culprits and also Victims**' to the climate change
 - ❖ Climate change response may be local, but its impact is global → **Local administration is important**
 - ❖ Cities' **voluntary efforts** and **inter-cities collaboration** in the international society (playing active roles)

- **Plans for local governments' climate change response**
 - ❖ Paris Agreement highlights roles of not only national government but also local ones

	Local Green Growth Plan	Local Energy Plan	Local Climate Change Response Plan	Local Climate Change response Comprehensive Plan
Contents	GHG reduction/ green industry	energy efficiency/demand/ renewable energy	impact and vulnerability assessment	GHG reduction / adaptation
Period	5 years per phase	5 years per phase	5 years per phase	5 years per phase
Related national plans	green growth 5-year plan	energy basic plan	climate change adaptation plan	climate change response basic plan

* Local governments are developing local energy plans with citizen participation in accordance with national's 'renewable energy 3020' implementation plan

Case Studies of 3 cities in Korea

Analysis of 3 cities : Jeju, Gwangju, Suwon

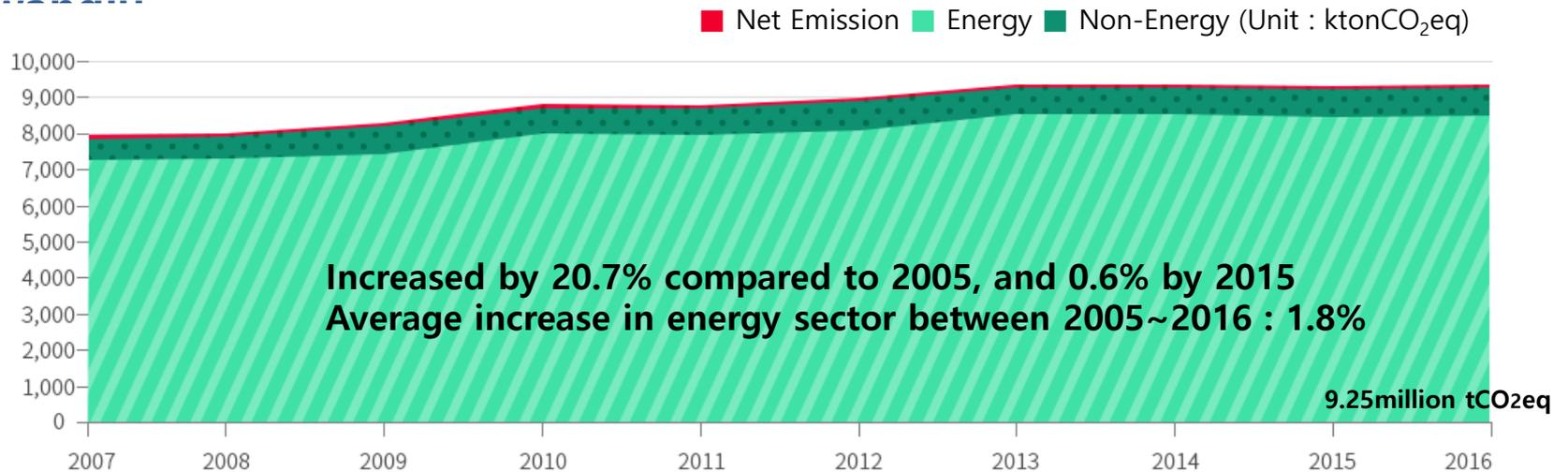
		Jeju	Gwangju	Suwon
Basis	Motivation (Year)	World environment hub roadmap (2009)	AP international solar energy conference (2004)	Announced environment capital (2011)
	Initiation(Year)	Announced CFI 2030 Jeju during WCC (2012)	Model city of climate change response (with MoE, 2008)	
	Basis	Connected to green growth basic plan	Local ordinance	Local ordinance
	Name of Plan	2020 Jeju WEH basic plan, 2030 CFI Jeju	Carbon neutral city2050, General plan for climate change	General plan for environment capital, general plan for climate change response
	Review Committee	WEH organizing committee	Gwangju climate change citizen committee	Suwon climate energy committee
Implementation Process	Inventory	Made during planning	Analyze/announce annually	Register cCR and analyze annually
	Assessment	Annually	Annually	Annually
	Type	Led by Municipality	Led together by municipality specialized organization	Led by municipality, also with citizen participation
Focus	Responsibility	Make announcement (connected to national govt.)	Make announcements (connected to local govt.)	Join international program(cCR)
	Additional Policies	in addition to national policies	in addition to national policies	in addition to national policies
	Integration(Economy, Society,	Consider during planning	Consider when making some	Consider when making



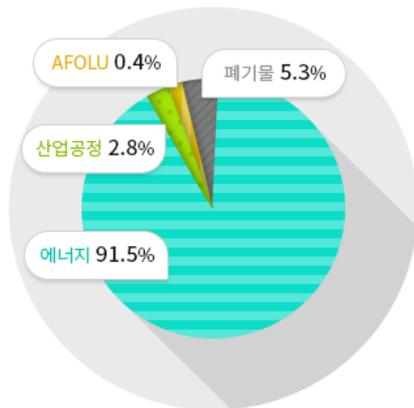
2. Emissions in Gwangju and Policies to Reduce GHG

Emissions and Policies in Gwangju

Current status of GHG emissions in Gwangju

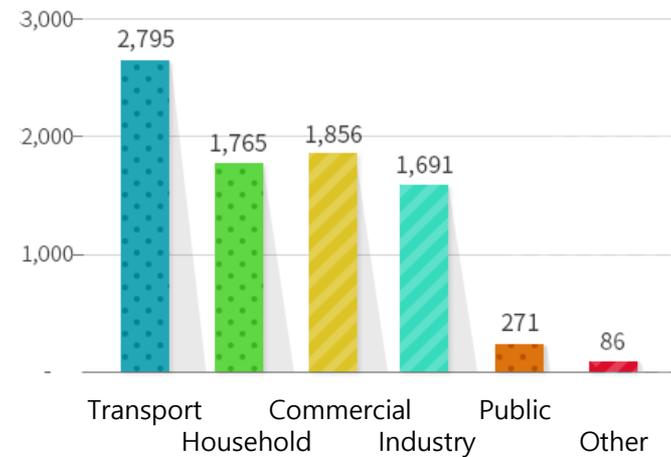


GHG emissions in 2016 by sector



Energy Industrial Process AFOLU Waste

GHG emissions in energy sector in 2016

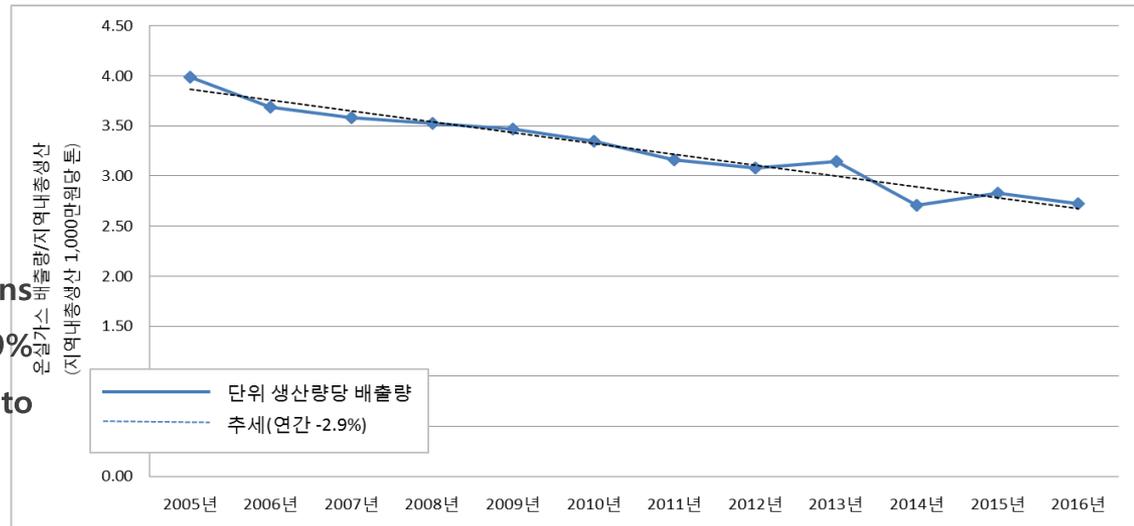


Emissions and Policies in Gwangju

Current status

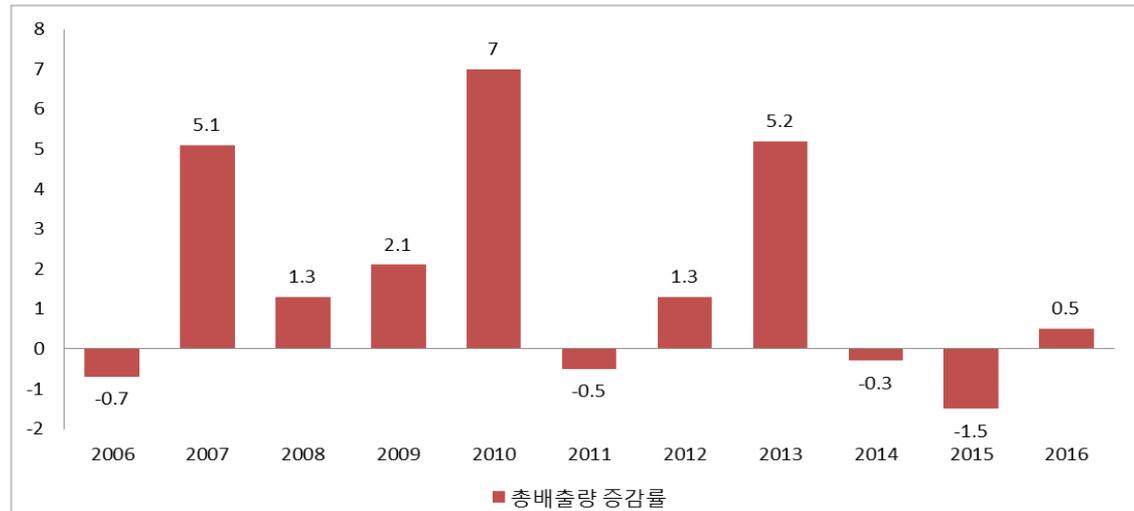
Emissions per GRDP

- ✓ Average GRDP per last 11 years : 6.9%
- ✓ Carbon concentration : -2.9%
- ✓ Carbon concentration drops,
but not low enough to reduce emissions
- ✓ Actual average emissions increase by 1.9%
- increase not fast enough compared to
economy growth



Emissions Increase/Decrease

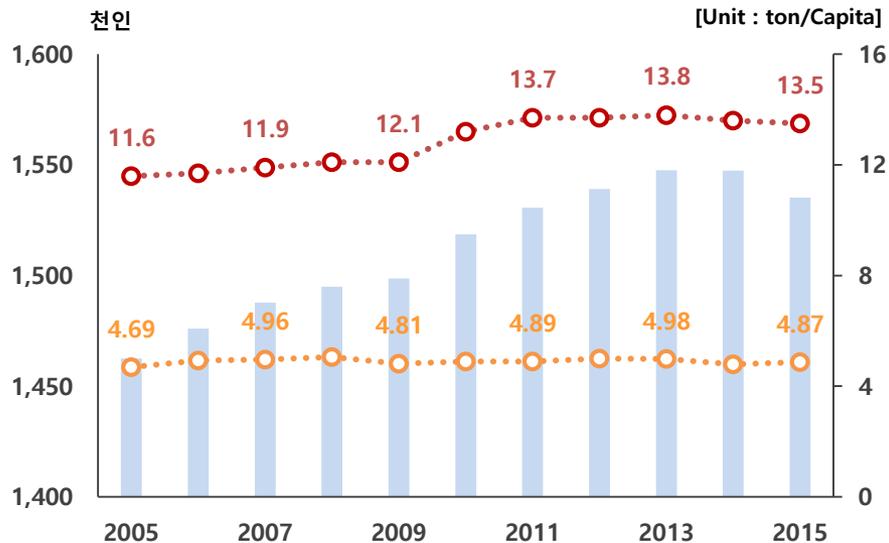
- ✓ Progressive increase : 2000~2004
- ✓ Big leap in every 3 years since 2005
- ✓ Progressive decrease since 2014,
getting stable



Emissions and Policies in Gwangju

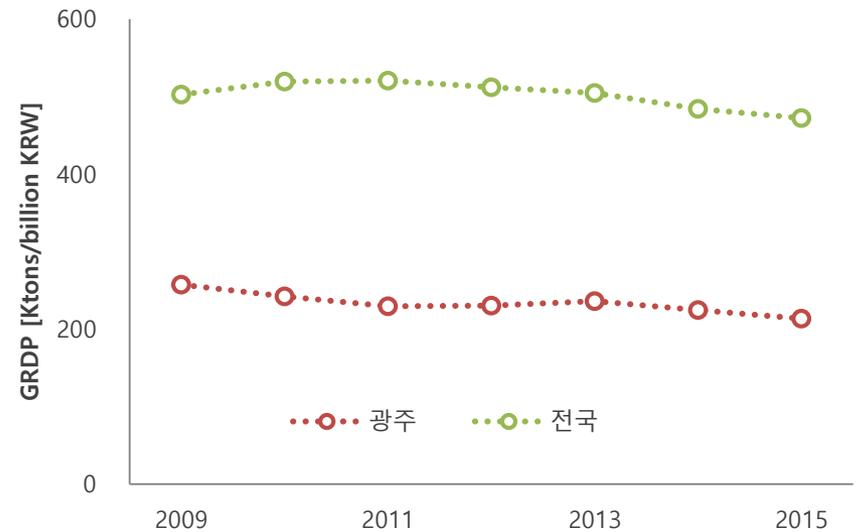
Emissions based on reduction inventory

■ Emission per capita : increase → decrease



	2005	2010	2015
Reduction Inventory(Kton)	5,710	6,399	6,949
Population(Thousand)	1,408	1,468	1,491
Emission per capita, Gwangju (ton/Capita)	4.1	4.4	4.7
Emission per capita, national (ton/Capita)	11.6	13.2	13.5

■ Emission per GRDP : decrease → decoupled

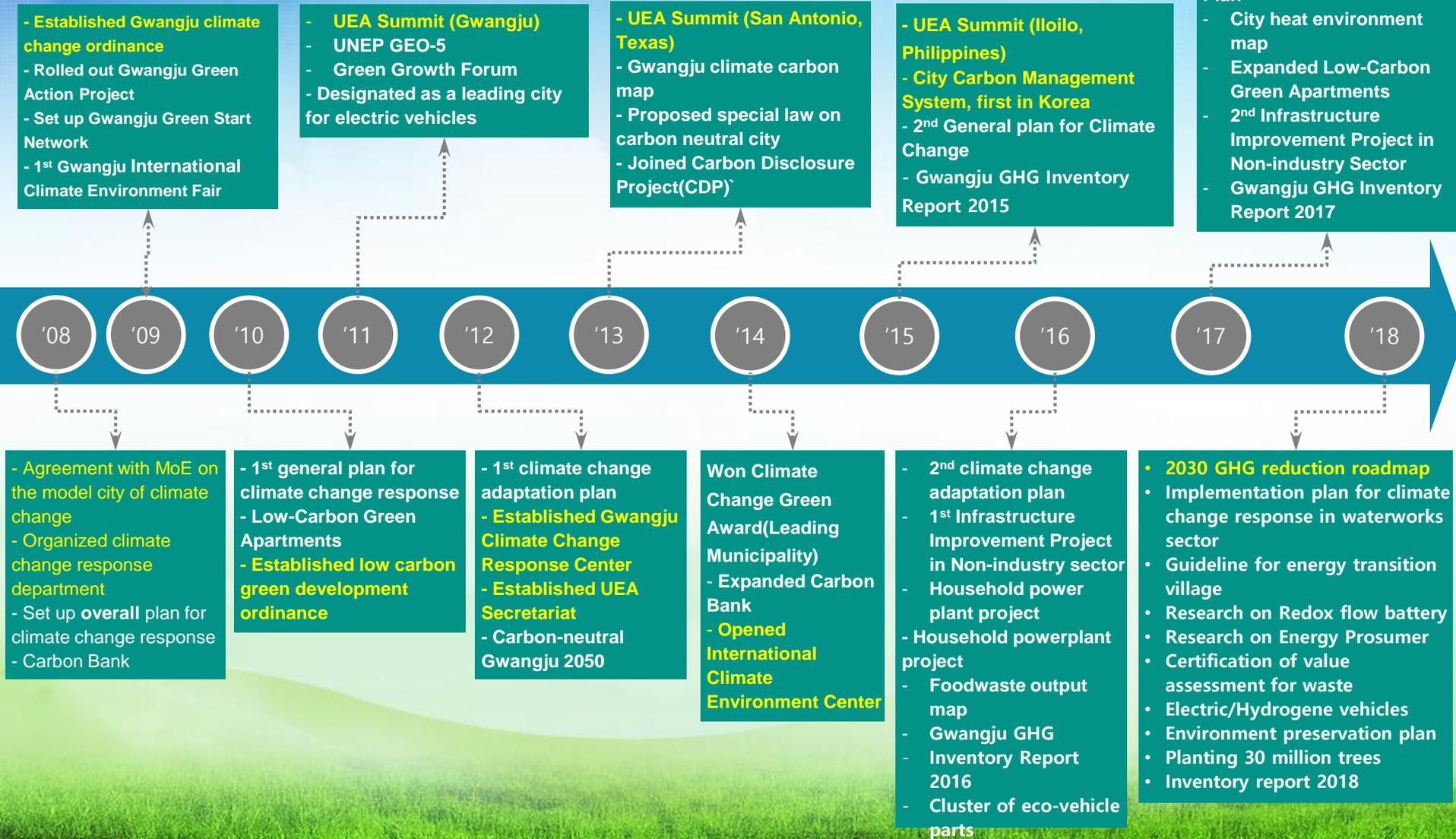


	2009	2010	2011	2012	2013	2014	2015
Reduction Inventory(Kton)	6,132	6,399	6,376	6,660	7,030	7,024	6,949
GRDP(billion KRW)	23,834	26,401	27,789	28,914	29,763	31,295	32,516
Emission per GRDP (ton/billion KRW)	257	242	229	230	236	224	214
National Average	503	520	521	512	505	484	472

- Reduction Inventory : inventory in responsibility of Gwangju municipality (71% of entire emission : 29% are out of Gwangju's responsibility)

Emissions and Policies in Gwangju

Gwangju's Efforts for Climate Change Response



Emissions and Policies in Gwangju

Summary on Gwangju's Climate Change Response

■ Vision and Strategy : Carbon Free by 2050

- ❖ Goal : Reduce 30% by 2020, 40% by 2030, and Carbon Free by 2050 (BAU Scenario)
- ❖ Strategies : 69 Initiatives in 4 Sectors
 - ✓ GHG Reduction(48) : Carbon Bank, Centralized Energy Supply, etc.
 - ✓ GHG Offset(7) : Carbon Neutral Program in Environment Infrastructure, etc.
 - ✓ Climate Change Adaptation(4) : Vulnerability Analysis in Forest, Monitoring Disease Information, etc.
 - ✓ Green Lives(10) : Green Start Network, Local Food, etc.
- ❖ Duration : 5 Years (2016~2020)
- ❖ Legal basis : Gwangju climate change response ordinance
- ❖ Emission Trend/Projection : 9.25mil. tCO₂eq(1.3% of entire nation) in 2016 / 11.58mil. tCO₂eq by 2030 (25.8% increased compared by '2015)

Key Characteristics

- ✓ Lead policies higher than legally, administratively required
- ✓ Yearly assessment on systematic implementation of policies
- ✓ GIS-Based Urban Carbon Management/Monitoring System
- ✓ Systematic education and training led by citizens
- ✓ Operate special organization for expertise and sustainability



Emissions and Policies in Gwangju

Outcomes in 2018, and Planning in 2019

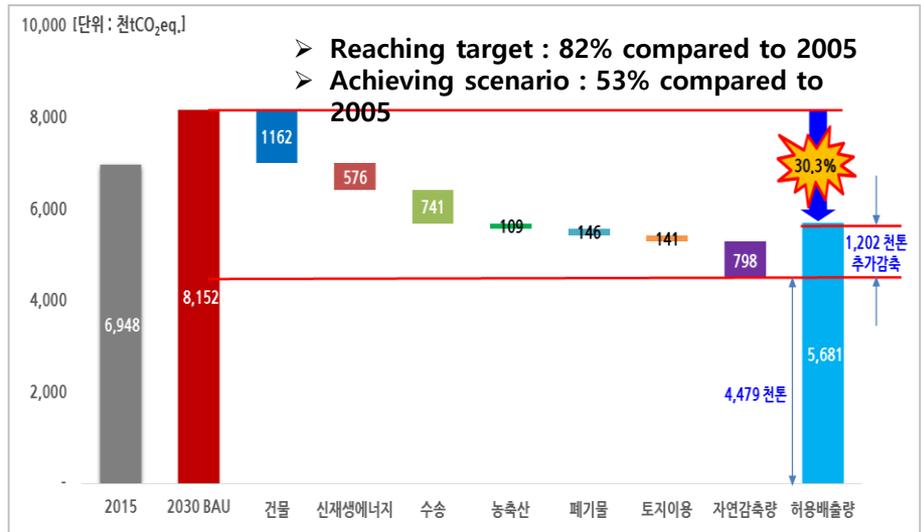
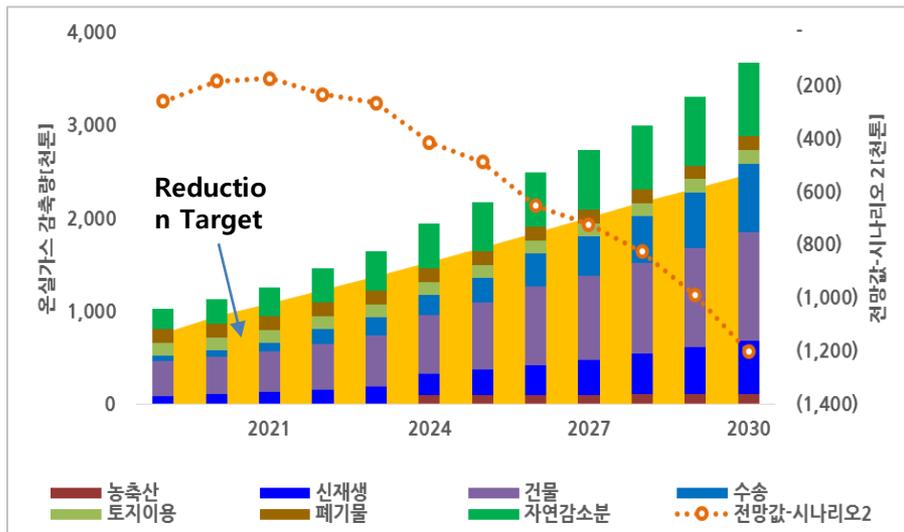
- ❖ Outcomes in 2018 (except adaptation)
 - ✓ Practical mitigation policy : Citizen's Practice Committee on Fine Dust
 - ✓ Join Carbon Points : 351 thousands households(59%), highest rate among metropolitan cities
 - ✓ Low Carbon Green Apartment (40 apartment buildings)
 - ✓ Eco-vehicles (824 EV, 166 hydrogen vehicles and 1 hydrogen station)
 - ✓ Support lowering vehicles' emissions (3,661), LNG hybrid bus(20)
 - ✓ Planting 30 million trees initiative to respond to heat wave and heat island
 - ✓ Climate Change Response Education (840 times for citizens, 93 eco-instructors, 940 exhibition halls)
 - ✓ Environmental Education in schools(develop textbooks for 3~4 grade, green curtains in 10 schools, 10 schools for education, 5 schools for outstanding school award)
- ❖ Revenue in 2019 : 171 billion Korean Won (37.6 from national, 117.9 from municipal, 15.5 from private)
 - ✓ 118.8 bil. KRW for Mitigation, 5.8 bil. KRW for Offset, 23.7 bil. KRW for adaptation, 22.7 bil. KRW for Practice

Year	Emissions (A)	Reduction Plan (B)	Reduction Outcomes	Compared to B (%)	Compared to A (%)	Remarks
2016	9,251	689	617	89.6	6.6	
2017	9,311	568	521	91.7	5.6	2017~2019 : Projected Figures
2018	9,621	506	457	90.3	4.8	
2019	9,771	486	-	-	-	

Emissions and Policies in Gwangju

Gwangju GHG reduction roadmap 2030

- ❖ Vision : Gwangju, a green city leading low-carbon development
- ❖ Target : 30.3% of reduction by 2030 compared to BAU scenario
(*as recommended national government)
- ❖ Key Strategies
 - Environment : Green space ⇨ lower temperature and secure green area safe from fine dust, boost carbon absorption
 - Economy : new energy economy ⇨ foster new economy and job opportunities, also reduce GHG
 - Society : Low carbon society ⇨ low-carbon lives with citizens and communities through green lives





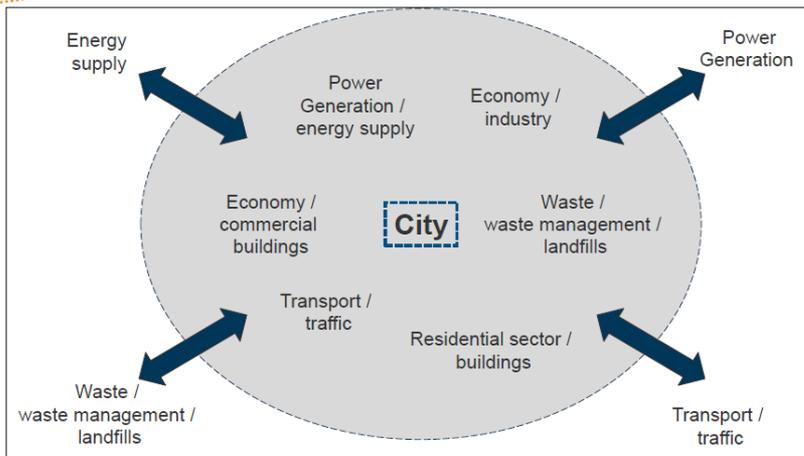
3. Best Practices of Gwangju for Climate Change Response

Best Practice of Gwangju

Basis of Climate Change Response

“Characteristics of mitigation and adaptation for climate change response are **convergence (or complimentary).**” Actions such as **planning, policies, ECO², technologies, and governance** based on convergence can maximize its impact.

※ ECO² : ‘**E**cological Cities as **E**conomic Cities’, similar with Greenomics. It aims to create synergy by seeking both ecological and economic sustainability.



Emission Sources inside the city



- Monitoring
- Scenario analysis and prediction
- Impact assessment and prediction
- Environment change analysis
- Develop policies

+



- Develop and apply technologies
- Management plans (in consideration of resiliency and sustainability)
- Develop policies
- Develop monitoring technologies
- **Capacity building (participation/promotion /education)**

+



- Develop and apply for energy transition and efficiency
- Develop and apply energy saving technologies
- Develop policies
- Develop monitoring technologies
- **Participation, promotion, education**

Best Practice of Gwangju

Set up infrastructure and system for implantation of policies

“Collaboration for climate change response needs to be done at a high level in legislative and deliberative manners.”

- ❖ Legal basis : Gwangju climate change response ordinance, Basic ordinance for low-carbon green growth and sustainable development
- ❖ Related Plans
 - National : Green Growth 5-year plan, Environment preservation plan, Climate change adaptation plan
 - Gwangju : Implementation plan for sustainable development, General plan for climate change response
 - Non-legal : Gwangju carbon-neutral 2050, Gwangju 1°C cooler project, Gwangju climate action plan(2018-2030), Gwangju GHG reduction roadmap 2030
 - Review : Gwangju civil committee for climate change response
 - Department : Climate and air department (Environment Ecology Bureau)
 - Specialized Organization: International Climate and Environment Center
- ❖ Assessment Structure
 - Submit implementation plans by each organization, aiming to develop 5-year plans
 - 4 types of projects : reduction, offset, adaptation, green lives
 - ~~➤ Project assessment (2 times a year) → achievement analysis (compared to target)~~
 - Emission accounting and analysis : GHG inventory report, emission information, etc.

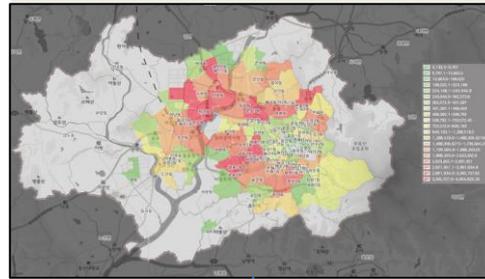
Best Practice of Gwangju

Carbon management and monitoring in the city

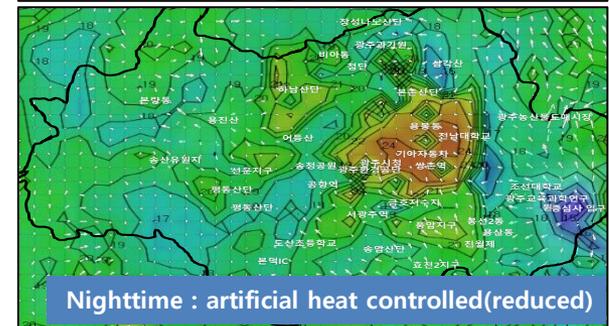
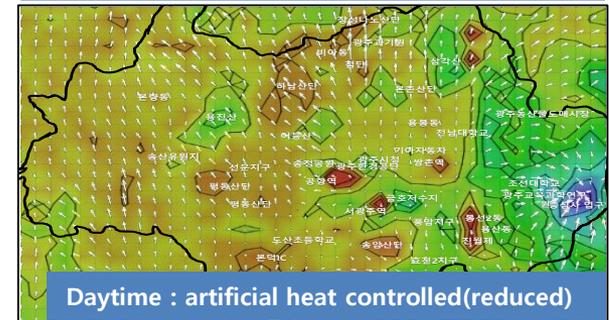
GHG Projection &



Food waste Map(Multi residence Units)



Thermal Environment Analysis

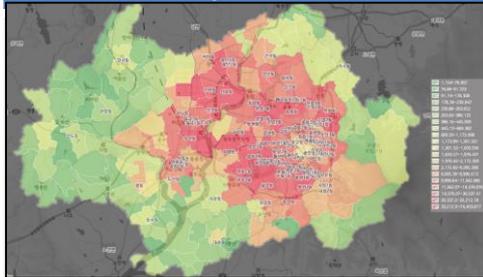


Environment and Carbon Management based on Database

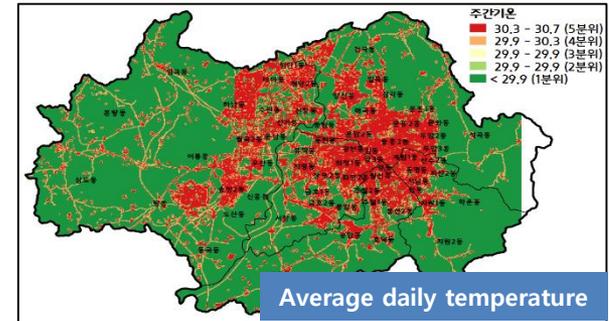
Inventory Analysis (every year)

Vulnerability Assessment (every 5 years)

Urban Carbon Management System

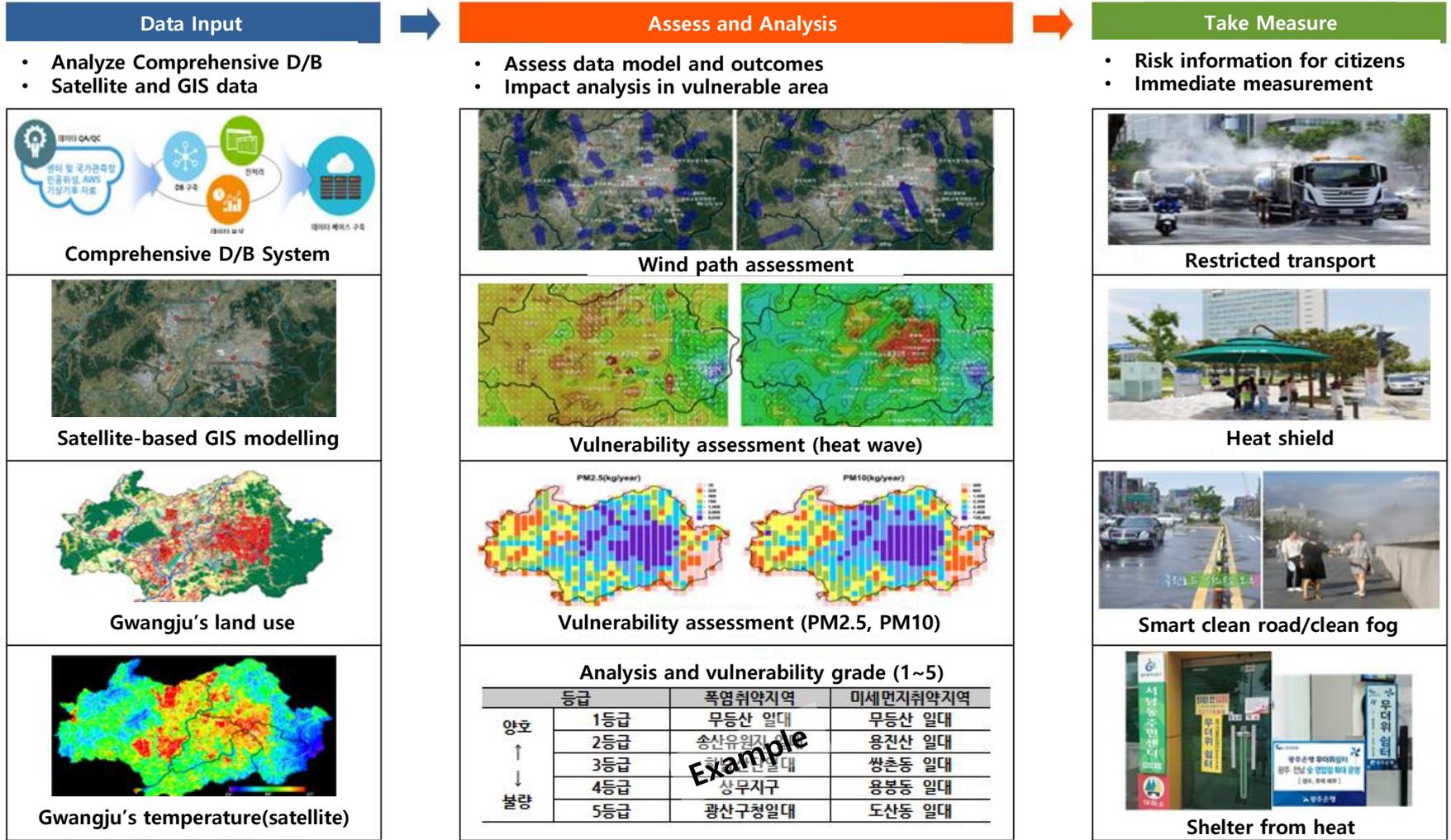


GHG Information in my



Best Practice of Gwangju

Gwangju-style climate change platform (heat waves, fine dust) / under development



Best Practice of Gwangju

Policies on climate change response with citizen participation

Gwangju 1°C Cooler Project



Cool and Green City with Citizens

Carbon Bank



Reduced 85ktCO₂eq in 2018

Low-Carbon Green Apartment



Reduced 10,909tCO₂eq in 2010~2018

Specialized Organization



Climate Action Based on Citizen Participation

[Governance]



Together Green Village



Solve environment issues led by citizens

Electric Vehicle City Project



1,284(~2018), 944tCO₂eq reduced

Energy transition up to 20%



467ktCO₂eq by 2030(BAU 5.7%)

Best Practice of Gwangju

Virtuous Circle : Education-Public Awareness-Citizens' Action

Education

- Education for instructors
- Green jobs (train instructors and consultants)
- Education contents (on/offline)



Education for instructors



Green jobs (instructor, consultant)



Education contents

Public Awareness

- Education for the vulnerable (elder citizens living alone, etc.)
- GHG consulting (household, commercial, school)
- Education targeting to citizens



Education for the vulnerable



GHG consulting (home, shop, school)



Education for citizens



Education for students

Citizen's Action

- Capacity building for the vulnerable
- Citizen-led program (low-carbon green apartment)
- Citizen-led green lives (green leaders)



Using public transportation



Sharing books, urban farming



Planting trees



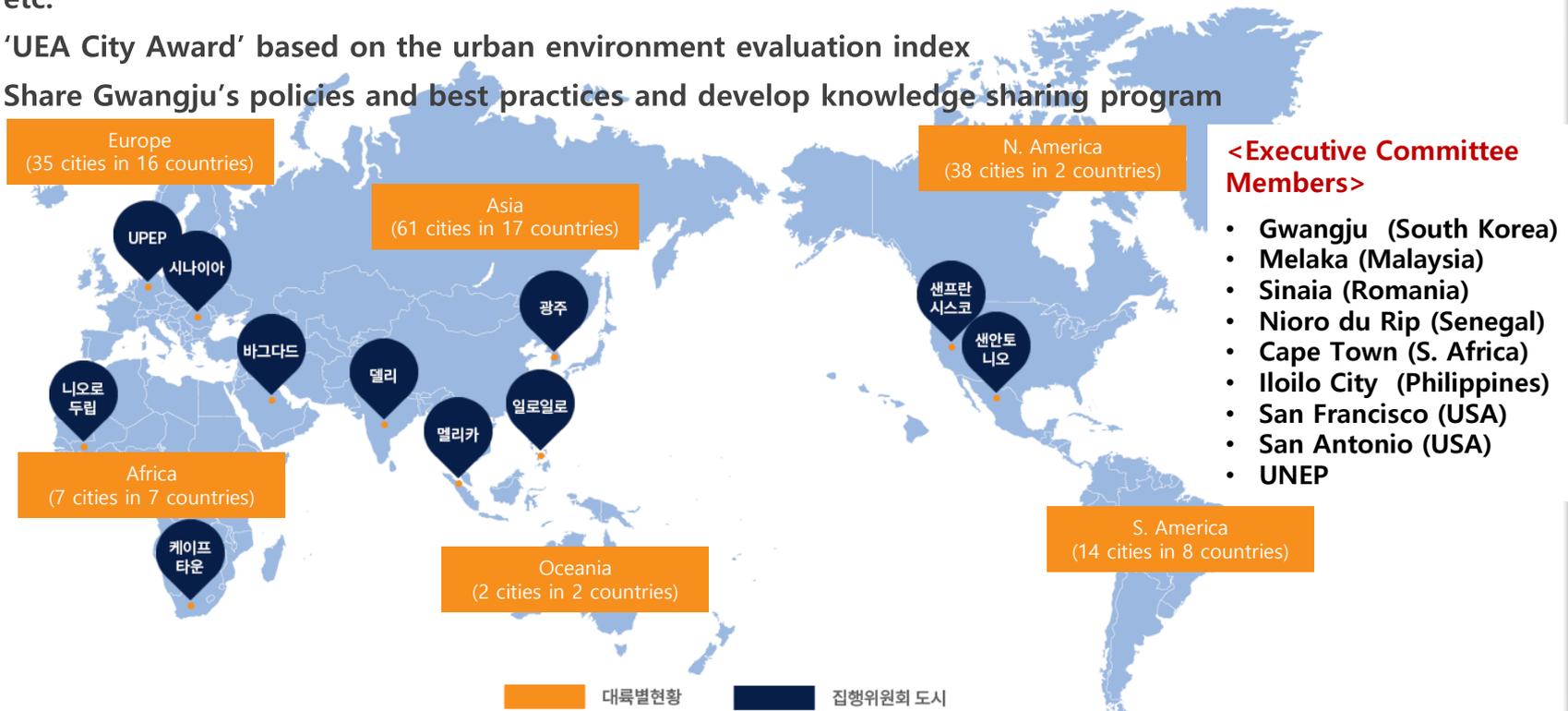
GHG emission reduction

Best Practice of Gwangju

City-wide international collaboration under UEA network

• UEA(Urban Environmental Accords) : a collective of 156 cities (in 52 countries) committed to environment and climate actions

- Organize UEA Summit (biannual event), share best practices, run training programs, etc.
- 'UEA City Award' based on the urban environment evaluation index
- Share Gwangju's policies and best practices and develop knowledge sharing program



<Executive Committee Members>

- Gwangju (South Korea)
- Melaka (Malaysia)
- Sinaia (Romania)
- Nioro du Rip (Senegal)
- Cape Town (S. Africa)
- Iloilo City (Philippines)
- San Francisco (USA)
- San Antonio (USA)
- UNEP

- UEA was founded in San Francisco(California) in 2005, and UEA Secretariat was established in Gwangju in 2012.

Thank you for your attention!

solar@icecgj.or.kr

