# ADDRESSING AIR POLLUTION IN SOUTH KOREA THROUGH THE TRANSPORT SECTOR

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#### **CLIMATE ACTION**

Stance: Government



**Target 13.1:** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

Target 13.2: Integrate climate change measures into national policies, strategies and planning.

**Target 13.3:** Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.



#### "Climate change is one of the most pervasive and threatening issues of our time, with far-reaching impacts in the twenty-first century." UN Environment Programme

Climate affects our economy and society.

# Why air pollution?

Two of the planet's main environmental problems: climate change and air pollution.

Reducing air pollution would save lives and help slow the pace of near-term climate change.

# General Background



Air Pollution: mix of particles and gases that can reach harmful concentrations both outside and indoors



The World Health Organization (WHO) has warned that air pollution poses a major public health risk.



Asia accounts for 60% of the world's population, but two-thirds of all air pollution deaths.



Transportation sector is a major contributor to black carbon emissions and was responsible for 19% of global black carbon emissions in 2000.

## General Background



Global adoption of Euro VI standards could avoid 300 - 700 thousand premature deaths in 2030 by reducing particulates and copollutants emitted by on and off-road vehicles.



The plan to reduce air pollution through vehicular emissions coincides with the Paris Agreement to keep a global temperature rise in this century below 2 degrees Celsius.



First WHO Global Conference on Air Pollution and Health was held in 2018.

# The health impact of Air Pollution



# WHO IS MOST IMPACTED BY AIR POLLUTION?

#### Children

Pneumonia is the leading cause of death in children under five years of age. Air pollution is a major risk factor.

#### Women

Women working in smoky kitchens are exposed to high levels of household air pollution.

#### Outdoor workers

People who work outdoors, such as street vendors and traffic officers, are affected by air pollution.

## Problem: Air Pollution in Asia

#### How polluted are Asia's cities?

Times over WHO safe	National air pollution
level	deaths
14.3	1,795,181
10.7	212,433
9.2	2,784
7.3	1,944,436
5.7	166,598
4.8	60,627
4.5	211,916
3.6	20,474
2.6	17,832
2.5	10,479
2.4	60,467
80%	2,208
70%	122,576
70%	58,287
60%	4,361
	Times over WHO safe level 14.3 10.7 9.2 7.3 5.7 4.8 4.5 3.6 2.6 2.6 2.5 2.4 80% 70% 70% 60%

Sources: WHO, UN Environment, BreathLife. Air pollution metric: annual PM<sub>2.5</sub> exposure, 2018

## INDIA

Air pollution has acquired critical dimensions.

Recent study by Yale and Columbia university ranked India 126<sup>th</sup> out of 132 countries surveyed on environmental performance and worst for air pollution; far below all BRICS nations.

## INDIA

Transport plays a significant role in the nation's air quality problems.

1.1 million people in India die prematurely each year from diseases directly related to air pollution, making it the fifth leading cause of death in the country (2017 Global Burden of Disease).

Cost of air pollution amounts to 3% of their GDP.

Negative impact on agricultural productivity.

#### Major Causes of Air Pollution in India

#### **1.** The Burning of Fossil Fuels

Most of the air pollution takes place due to the burning of fossil fuels such as coal, oil, gasoline to produce energy for electricity or transportation.

#### 2. Transportation:

Vehicle emits carbon monoxide, hydrocarbons, nitrogen oxide, and particulate matter. When the vehicle pollution is high in the atmosphere, it creates a hole in the ozone layer contributing to smog and causing various health issues.



# Key Government Initiatives & Policy Measures

#### 2000

To address vehicular emissions: India adopted the European emission and fuel regulations for all categories of vehicles in 2000.

> To increase the uptake of electricity from renewable energy sources: Electricity Act in 2003: Proposed mandatory Renewable Purchase Specifications (RPS) for all states.



# Key Government Initiatives & Policy Measures



To promote cleaner technologies and alternate sources of energy to run vehicles: National Mission for Electricity Mobility (NMEM).



To enable common man to understand Air Quality: National 'Air Quality Index'



"One Color, One Number and One Description"



Index would be extended to 20 state capitals and 46 million plus cities over the next couple of years



#### Effect of emissions in China and the implications



## SOUTH KOREA



According to the 2016 Environmental Performance Index, South Korea was ranked 173/180 countries in terms of air quality.



The OECD estimated that outdoor air pollution was responsible for 359 premature deaths per million people in 2010 in South Korea.



This number is expected to triple to more than 1,100 per million people by 2060 unless mitigation efforts are successful.



An experiment conducted by NASA states that half of the air pollution is coming from local sources and the other half from transborder sources.



Local sources include vehicle emissions, industrial sites and power plants (Parallels, 2017).

## Approaches to vehicular pollution

Italian architect, Stefano Boeri, has suggested filling Chinese cities with vertical forest towers to absorb the CO2 and fine particulates in the air.

An aeronautical engineer proposed the use of a jet engine to blast Delhi's air pollution into the upper atmosphere where their toxic effects would not be felt by the population.

The UK has launched first ever bus to operate on human and food waste

Barcelona has implemented a super blocks scheme in its surrounding cities

South Korea has experimented with cloud seeding to create artificial rain with little success.

## Green Credit Card



An initiative that uses a **credit card** platform to provide various economic rewards for eco-friendly behaviors

In South Korea, this credit card has been issued to approximately 20 million people.

It encourages users to make low carbon lifestyle choices:

- Make more use of public transports
- Make paper-less transactions
- Consume less electricity, water, gas
- Offers discounts for electric car charging services and recycled automobile purchases
- Contributes to environmental fund when eco-friendly products purchased

These economic rewards are converted into Eco-Money Points within the credit card system  $\rightarrow$  could be used later for cash or various ways such as paying for public transport.

18,479,731 cards have been made since the start of the system (July 23 2011). This accounts for 36% of the total population.

20 Financial Institution 231 companies, 3,188 products, 797 public facilities, 45,552 stores are included in Green Credit Card System (Dec 2018)



#### Green Credit Card Users in South Korea (Since July 23 2011)

Ministry of Environment, 2015



The Highest Region Issuance Rate : Busan (24.4%) Energy Saving : Gwangju (17.9%) Eco Product : Gyeongnam (14.4%) Public Transport : Daegu (71.8%)

Issuance rate of all region is below 25%!! Especially, Seoul and Gyeonggi (which are the most populous region) showed only 12.6% and 12.9%.

Ministry of Environment, 2015



8,449,922 people used Green Card from July 2011 to June 2015

Total 8.74 billion won points accumulated

- = Energy Saving (57.6%)
  - + Public Transportation (36.9%)
  - + Eco-friendly Product (5.5%)

According to the frequency of use, public transportation accounts for 90%.

30s to 50s use green card the most!

- Green Card App
  - Personal Eco-money Points
  - Shows specific data how much the consumer contributed to the environment
  - Recommends various discount services
  - Current Environment information (O3, NO2, CO, fine dust etc.)
- BUT!!! Only 50,000 Downloads......



## Practical Environmental Effects

- 14 million cards! = 52% of economically active population (2016.10)
- <u>1.96 million tons of CO2 reduced</u>.
- 27.7 billion won was given to green credit card consumers as a form of ecomoney point.

 The analysis of the environmental performance of the GCC system for 2 years (2011~2013) by Jeong-In Kim et al. Sep 2013.



5.2 billion won Environmental Benefit

- = 1,502,398 tons of CO2
- = 140 tons of nitric oxides

= 2,470 tons of sulfur oxides



1 Green Card (per year)

- = 8,653 won Environmental Benefit
- = Reduced 250kg of CO2

# Strengths and Weakness of the current system

STRENGTHS	WEAKNESSES
Green credit card points can be widely used compared to unintegrated schemes like carbon points	Incentives encourage increased consumption patterns
Minimal implementation costs, cost effective policy	
Economic incentives encourage consumers to demand more eco-friendly products and services	



## **Introduction of 25 Clean Air Measures**





### 25 CLEAN AIR MEASURES FOR ASIA AND THE PACIFIC



# Clean Air Measures - Transport Sector

- Electric vehicles: Promote the use of electric vehicles
- Improved public transport: Encourage a shift from private passenger vehicles to public transport
- International shipping: Require low-sulphur fuels and control of particulate emissions
- Emissions standards for road vehicles: Strengthen all emission standards; special focus on regulation of diesel light- and heavy-duty vehicles
- Vehicle inspection and maintenance: Enforce mandatory checks and repairs for vehicles
- Dust control: Suppress construction and road dust; increase green areas

## Strategy Introduction



Implement the scientific solutions of the transport sector into the card

Improve use and popularity of the card and phone application

## Proposed Strategies

For increasing users and raising awareness of the credit card:

- 1. The phone application will be re-launched for **card holders** and **non-card holders**.
- 2. In addition to the existing functions of the credit card, **new functions** will also be included
- 3. Non-card holders will have the ability to use the new app only for non-purchase ecoactions eg. carpooling, using public transport, bicycles, 30-day challenge etc



3. Advertising and posters of the green credit card and its benefits in public transport; bus stops; crowded train stations such as Seoul, Myeongdong, banks and schools.

4. Increase the number of participating corporations.

-> Increase the benefits for the corporations.



To raise	A platform where users can create various <b>30-day green challenges</b> .
and encourage action from citizens:	Every month, the campaign with the most participants will be awarded green points.
	The challenge creator will be awarded the most green points while participants will also equally receive a smaller share of green points.
	This will be managed through a leader board

For enabling carpooling culture:

- 1. Through the phone application, take a selfie and upload to the platform before and after the ride.
- Green points will be awarded if 2 or more people are in the car for a baseline distance of 5km (determined by GPS tracker system) similar to the operation of the Nike Running application.
- 3. All phones must have the location switched on and be logged into the application to receive rewards for the carpool journey.



For reducing vehicular emissions:

- 1. Periodic Inspections: for new and older cards respectively 4 and 2 year checks
- 2. Emissions Inspection: Vehicles within 10 yrs, must be inspected every 2 years while vehicles exceeding 10 years, yearly inspection. If this schedule is adhered to and inspection is passed, points can also be accumulated or discounts for the inspection obtained.
- **3. Regular Vehicle Maintenance:** points are awarded for following a periodic vehicular maintenance schedule
- 4. CO2 taxing: When buying a car, discounts on the CO2 taxing scheme will be awarded once the cars subscribes to standard emission ratings

NB! Points will be acquired when maintenance and inspection certificates are uploaded to the app.The app will have a calendar function to set reminders to facilitate this habit.



#### For enabling eco-travels:

 Traveling with eco-friendly airlines, double the amount of miles/points that can be accumulated compared to a nonecofriendly flight option.

### greenolution

# Join The REVOLUTION GREENOLUTI Strategy continued

*For promoting the use of bicycles:* 

**1.** Offer discounts for the purchase of bicycles.

2. Offer discounts for the purchase of recycled bike parts.







*For promoting the use of electric vehicles:* 

- 1. Offer lower interest rates for the purchase of an electric car with the green credit card.
- 2. Increase the partnership with banks.

### Proposition

- Although our project is focused on the transport sector, it can later be applied to other sectors in the same way
- For example plastic reduction methods can easily be added to this incentive scheme.
- This project can be applied to other countries regionally and globally.



# Conclusion

Change in everyday attitude and habits



New innovations



# IF WE CAN'T ALL SWIM TOGETHER, WE WILL SINK. THERE IS NO PLAN B, BECAUSE THERE IS NO PLANET B.

BAN KI-MOON, SECRETARY-GENERAL, UNITED NATIONS, SPEAKING AT CLIMATE WEEK NYC 2014

### CONCLUSION

# Thank you!



# Questions and Answers



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