

# Air Quality Policy Implementation System and Future Initiatives

23 September 2025



Ministry of Environment  
National Air Emission Inventory  
and Research Center

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# 1. Major Policy Implementation System

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# Major Air Pollution Management System

## Particulate Matter



- Policies for reducing air pollution are implemented with different objectives, durations, and intensities depending on the pollution situation.
- Emergency reduction measures are issued when high concentrations of PM ( $50 \mu\text{g}/\text{m}^3$ ) are detected, according to the disaster response system

|                  |                  | Regular Measures                                                                                                              | Seasonal Management                                                                                 | Emergency Measures                                                                                                                 |
|------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Period           |                  | Year-round                                                                                                                    | Dec-Mar                                                                                             | On issuance                                                                                                                        |
| Objective        |                  | Improve annual average levels                                                                                                 | Reduce frequency of high PM                                                                         | Minimise peak concentrations                                                                                                       |
| Policy Intensity |                  | Low ★                                                                                                                         | Medium ★★                                                                                           | High ★★★                                                                                                                           |
| Main Policy      | Power · Industry | <ul style="list-style-type: none"><li>• Upgrade emission standards</li></ul>                                                  | <ul style="list-style-type: none"><li>• Restrict operation of some coal power plants</li></ul>      | <ul style="list-style-type: none"><li>• Output cap on all coal power plants</li></ul>                                              |
|                  | Transportation   | <ul style="list-style-type: none"><li>• Early scrappage and retrofit subsidies for old diesel vehicles (Grade 4, 5)</li></ul> | <ul style="list-style-type: none"><li>• Operation restrictions on Grade 5 diesel vehicles</li></ul> | <ul style="list-style-type: none"><li>• Driving restrictions and alternate day driving for vehicles in the public sector</li></ul> |
|                  | Living · Other   | <ul style="list-style-type: none"><li>• Supervision of agricultural waste burning</li></ul>                                   | <ul style="list-style-type: none"><li>• Strengthened dust control at construction sites</li></ul>   | <ul style="list-style-type: none"><li>• Adjust or suspend operation times for public construction sites</li></ul>                  |

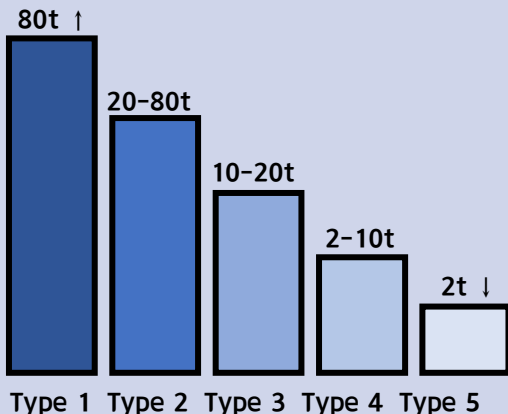
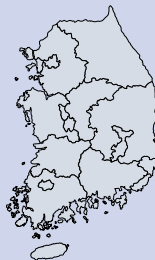
## Ozone



Intensive measures  
during high-concentration periods  
(May-Aug)

| Emission Reduction Measures                                                                                                                                                                                                                                         | Public Action Guidelines                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Joint inspections of large NO<sub>x</sub> and VOC emitters</li><li>• Expand drone and mobile monitoring in large petrochemical complexes</li><li>• Provide technical support to small businesses and gas stations</li></ul> | <ul style="list-style-type: none"><li>• Monitor ozone alerts and reduce outdoor activities</li><li>• Avoid outdoor exercise</li><li>• Limit outdoor learning for children</li><li>• Use public transport instead of personal vehicles</li><li>• Reduce usage of sprays, paints, and thinners during alerts</li></ul> |

# Industrial Emission Management System

| Classification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Emission Standards      | Monitoring              | Total Emission Control |       |        |        |        |        |        |       |        |      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|------------------------|-------|--------|--------|--------|--------|--------|-------|--------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Emission sources are classified from Type 1 to Type 5 based on the amount of air pollutants emitted (SOx, NOx, dust combined).</p>  <table><caption>Emission Ranges by Type</caption><thead><tr><th>Type</th><th>Emission Range (t/year)</th></tr></thead><tbody><tr><td>Type 1</td><td>80t ↑</td></tr><tr><td>Type 2</td><td>20-80t</td></tr><tr><td>Type 3</td><td>10-20t</td></tr><tr><td>Type 4</td><td>2-10t</td></tr><tr><td>Type 5</td><td>2t ↓</td></tr></tbody></table> | Type                    | Emission Range (t/year) | Type 1                 | 80t ↑ | Type 2 | 20-80t | Type 3 | 10-20t | Type 4 | 2-10t | Type 5 | 2t ↓ | <p>Emission standards are set for each pollutant.</p> <ul style="list-style-type: none"><li>- Under the Air Quality Management Area Act, local governments may apply stricter standards.</li><li>- In Special Control Zones (e.g., Ulsan/Mipo &amp; Onsan, Yeosu/Geonjeon Industrial Complex), special emission caps are enforced</li></ul> | <p>Types 1–3: Use TMS to send real-time emission data from stacks to a control center.</p> <p>Types 4–5: Use IoT devices to check if control systems are running properly.</p> <ul style="list-style-type: none"><li>- (TMS) Real-time measurement of emission concentrations of regulated pollutants → Transmitted to the control center</li><li>- (IoT) IoT devices attached → Determine proper operation of control facilities through electric current signals</li></ul> | <p>High-pollution areas are designated as <i>Air Quality Control Zones</i>, with total emission limits set per region every 5 years.</p> <p>Targets: High-emission facilities (Types 1–3) emitting over 4 tons/year of NOx/SOx or 0.2 tons/year of dust</p> <div><p>&lt; Current Status of Air Quality Management Zones &gt;</p><ul style="list-style-type: none"><li>· Nationwide 4 zones (Seoul Metropolitan Area, Central Area, Southeastern Area, Southern Area), 15 metropolitan cities and provinces, 77 cities and counties</li></ul></div> |
| Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Emission Range (t/year) |                         |                        |       |        |        |        |        |        |       |        |      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Type 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80t ↑                   |                         |                        |       |        |        |        |        |        |       |        |      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Type 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20-80t                  |                         |                        |       |        |        |        |        |        |       |        |      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Type 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10-20t                  |                         |                        |       |        |        |        |        |        |       |        |      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Type 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2-10t                   |                         |                        |       |        |        |        |        |        |       |        |      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Type 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2t ↓                    |                         |                        |       |        |        |        |        |        |       |        |      |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

# Vehicle Management System

## Internal Combustion Engine(ICE) Vehicles

| Emissions · Noise                                                                                                                                                                                                                                                                                                                                                                                                                                | Greenhouse Gases                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Restrictions                                                                                                                                                                                                                                       | Emission Reduction                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Manufacturers must obtain certification before sale to meet emission and noise standards.</p> <ul style="list-style-type: none"><li>- Certification required for any major model change</li><li>- Emission standards follow U.S. for gasoline/LPG cars, EU for diesel and noise.</li><li>- Manufacturers are responsible for recall during emission warranty (10 years for diesel vehicles, 15 years for gasoline and LPG vehicles)</li></ul> | <p>Manufacturers Must comply with CO<sub>2</sub> emission limits.</p> <ul style="list-style-type: none"><li>- Applies to passenger vehicles and small vans/trucks</li></ul> <p>※ Vehicles over 3.5 tons (medium and large): pilot project for voluntary greenhouse gas emission reporting underway (2023-)</p> <ul style="list-style-type: none"><li>- 97g/km (2021) → 95g/km (2023) → 70g/km (2030 goal).</li></ul> <p>※ U.S. target (2032): 45.4g/km, EU: 0g/km by 2035.</p> | <p>Grade 5 diesel vehicles are restricted during seasonal management (Dec–Mar) and emergency reduction days.</p> <p>New registration of diesel vehicles for specific uses (e.g., school buses, delivery) is restricted in AQM areas from 2024.</p> | <p>Support for early retirement and installation of emission control devices (DPF, PM-NOx)</p> <ul style="list-style-type: none"><li>- Targets include Grade 4, 5 diesel vehicles and pre-2004 construction equipment.</li><li>- Targeted vehicles: Grade 5 diesel vehicles</li></ul> |

# Vehicle Management System

## Zero-Emission Vehicle Deployment

(ZEVs) by 2030: Electric Vehicles (EVs): 4.2 million units, Hydrogen Vehicles (FCEVs): 300,000 units

(Charging Infrastructure) by 2030: EV Chargers: 1.23 million units, Hydrogen Stations: Over 660 stations

| Deployment                                                                                                                                                                                                                                                                  | Infrastructure Plan                                                                                                                                                                                                                                                                                                                                                                       | Institutional support                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Differentiated subsidies to promote high-performance, eco-friendly vehicles.</p> <ul style="list-style-type: none"><li>- EV: Promote affordable, safe, high-performance models</li><li>- FCEV: Support for operating costs (e.g., hydrogen stack replacement).</li></ul> | <p>Expansion of accessibility-, convenience-, and safety-centered chargers deployment.</p> <ul style="list-style-type: none"><li>- EV chargers: rapid chargers installed at mobile hubs (e.g., motorway rest areas), fire-safe slow chargers installed at residential areas</li><li>- Hydrogen: High-capacity, liquefied hydrogen stations and hybrid facilities (CNG+Hydrogen)</li></ul> | <p>Zero-emission vehicle deployment promoted through manufacturer low-emission vehicle supply targets, mandatory purchase/lease system for public institutions, and zero-emission vehicle transition campaigns</p> <ul style="list-style-type: none"><li>- ZEV Sales Mandate: Manufacturers must meet a quota of eco-friendly vehicles.</li><li>- Public Sector Procurement: Mandatory ZEV purchases/rentals</li><li>- ZEV Campaigns: Encourage private companies to pledge full(100%) ZEV transition by 2030</li></ul> |

# Three Major Mid- to Long-Term Plans

## 1. 3rd Comprehensive Plan for Air Quality Improvement (2023–2032)

### Goal

- Reduce annual average PM2.5 concentration to 12  $\mu\text{g}/\text{m}^3$  by 2032
- Achieve 50% compliance rate for 1-hour ozone standard nationwide

### Key Strategies

- ✓ Establish a health-focused air quality management system
- ✓ Enhance emissions management at industrial sites
- ✓ Accelerate reduction of emissions from mobile sources
- ✓ Effectively manage and reduce emissions from the living areas
- ✓ Strengthen scientific capabilities and practical international cooperation

## 2. 2nd Comprehensive Fine Dust Management Plan (2025–2029)

### Goal

- Achieve 13  $\mu\text{g}/\text{m}^3$  annual average of PM2.5 by 2029

### Key Strategies

- ✓ Simultaneously reduce greenhouse gases and PM levels
- ✓ Focused management of environments near citizens (e.g., subways, kitchens)
- ✓ Enhance protection for sensitive/vulnerable populations during high pollution periods
- ✓ Strengthen policy foundations for ammonia and VOCs
- ✓ Expand Asian cooperation through ODA

## 3. 2nd Regional Air Quality Management Plan (2025–2029)

### Goal

- By 2029, achieve regional targets of 13–15  $\mu\text{g}/\text{m}^3$  of PM2.5

\* Seoul Capital Area: 21 → 15, Central Area: 20 → 15  
Southern Area: 16 → 12, Southeastern Area: 17 → 13

### Key Strategies

- ✓ Reduce total allowable emissions in Air Quality Management Areas by 30% compared to 2023 by 2029
- ✓ Develop tailored regional strategies based on emission source characteristics
- \* Capital Area: High population density and transport emissions → Promote scrapping of old diesel vehicles and electrification of construction equipment
- \* Central Area: Many large power plants → Strengthen total emission controls for large facilities

## 2. Achievements to Date

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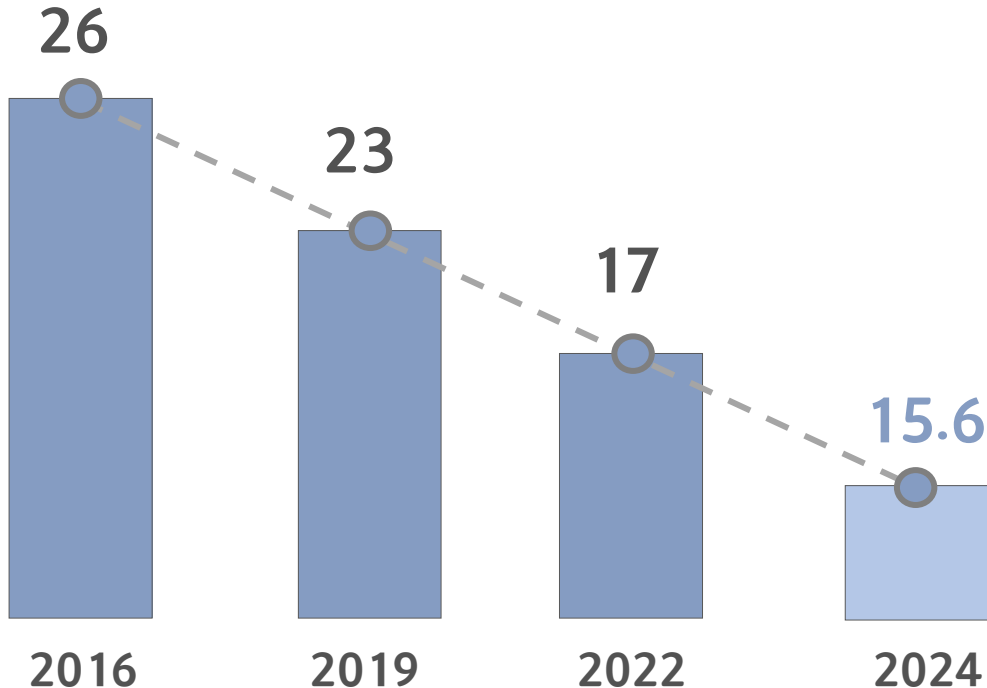
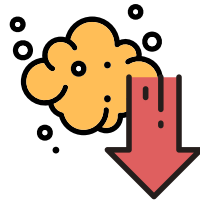
## Achievements to Date

### Reduction in Air Pollutant Emissions Leading to Improvement in PM levels

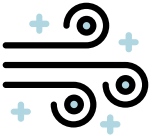
Since 2016, focused reduction policies targeting large emitters (industry, transport, etc.) have led to a decline in PM2.5 levels and precursor emissions.

#### PM2.5 Levels ( $\mu\text{g}/\text{m}^3$ )

Lowest-ever nationwide annual average PM2.5 concentration recorded since measurements began.



#### Improved PM2.5 Levels During High-Pollution Season (Dec–Mar)



During the 6th Seasonal Management Period (Dec 2024 – Mar 2025):

Achieved the lowest recorded fine dust concentrations during high-pollution season.

Increase in the number of “Good” air quality days, and decrease in “Bad” days.

| Category                 | Before | 1 <sup>st</sup> | 2 <sup>nd</sup> | 3 <sup>rd</sup> | 4 <sup>th</sup> | 5 <sup>th</sup> | 6 <sup>th</sup> |
|--------------------------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| $\mu\text{g}/\text{m}^3$ | 33.4   | 24.4            | 23.4            | 23.7            | 23.2            | 24.6            | 20.3            |
| Good                     | 13     | 28              | 35              | 40              | 34              | 47              | 54              |
| Bad                      | 35     | 22              | 18              | 18              | 20              | 15              | 12              |

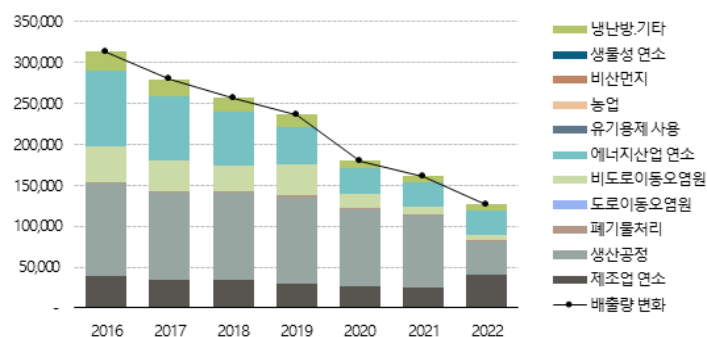
- “Good” day: daily average PM2.5  $\leq 15 \mu\text{g}/\text{m}^3$
- “Bad” day: daily average PM2.5  $\geq 36 \mu\text{g}/\text{m}^3$

## Achievements to Date

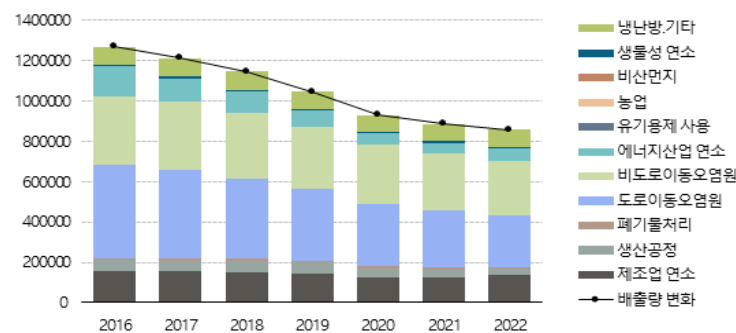
# Reduction in Key Precursor Emissions (SOx, NOx)

Emissions of major PM2.5 precursors like SOx and NOx are steadily decreasing.

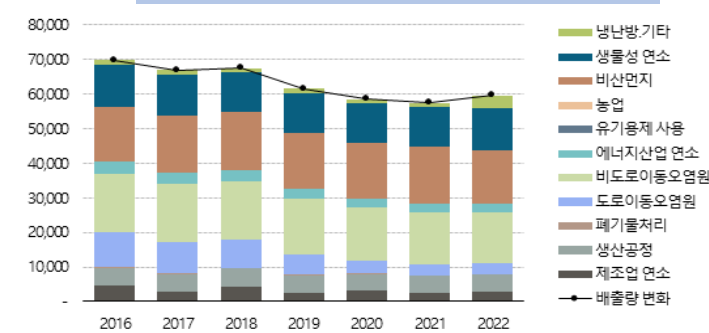
### SOx



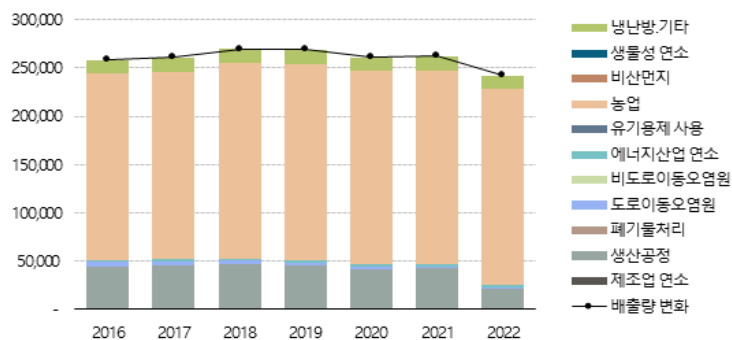
### NOx



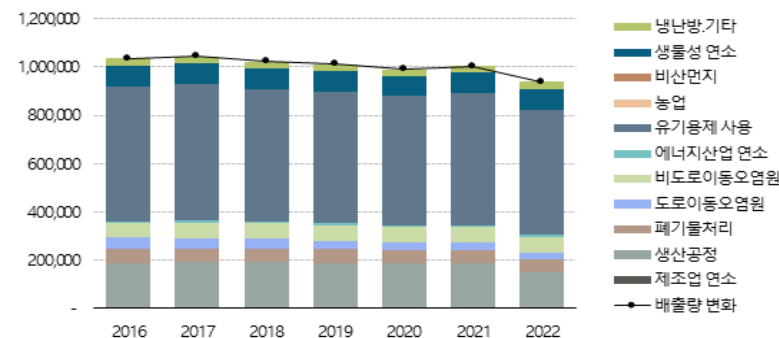
### PM 2.5



### NH3



### VOCs



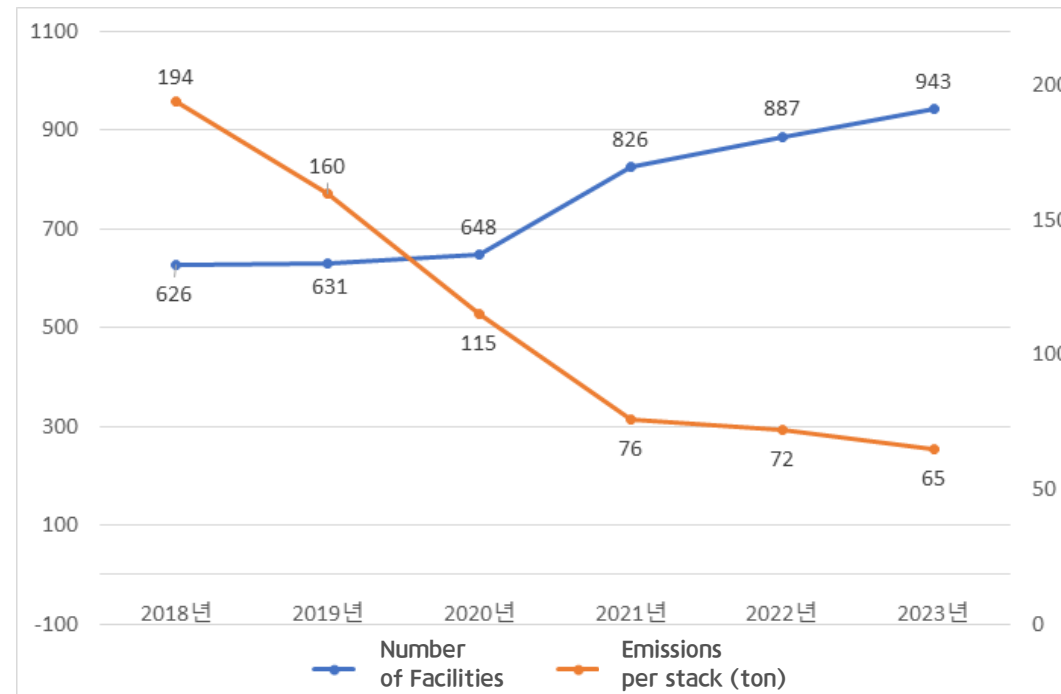
## Decrease in Industrial Emissions



- **Large-scale facilities:** Expansion of TMS (Tele-Monitoring Systems) and tighter regulatory oversight have reduced pollutant emissions per smokestack.
- **Small-scale facilities:** Since July 2023, mandatory installation of IoT-based monitoring devices enables remote supervision to ensure pollution control systems operate properly.

\* For small businesses, 90% of installation costs are subsidised to ease the financial burden.

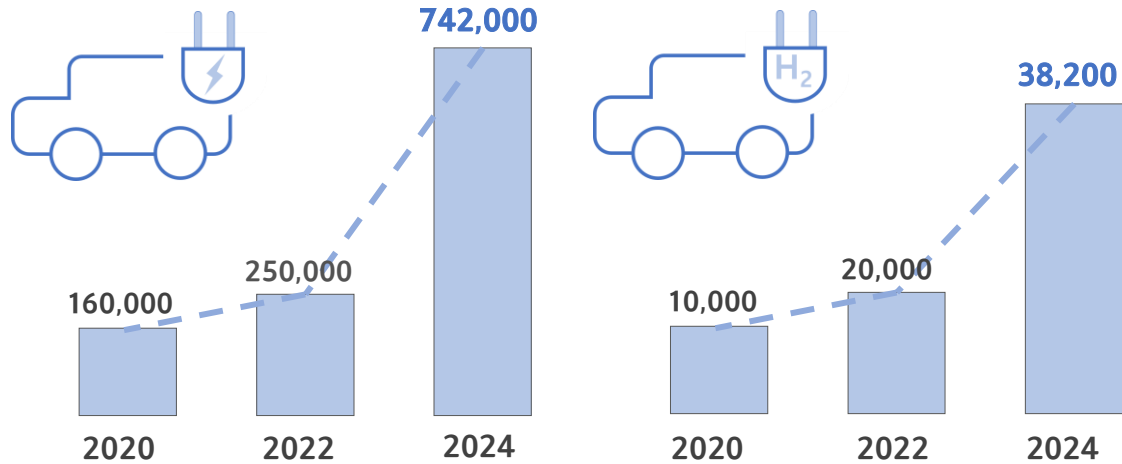
Number of TMS-equipped facilities and emission trends per stack



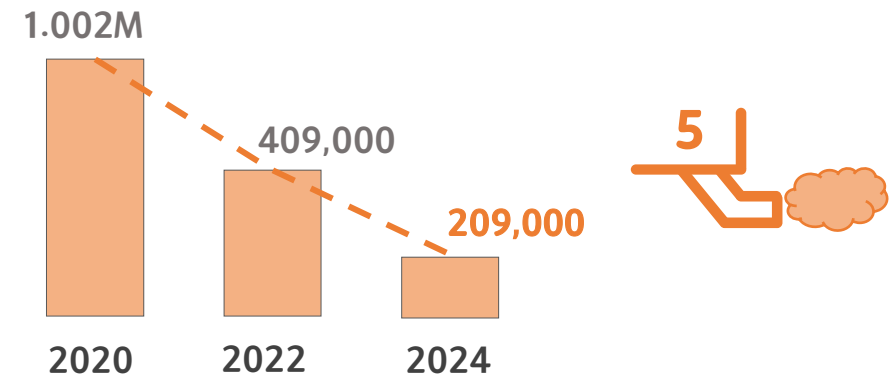
## Achievements to Date

# Efforts in the Transportation Sector: Transition to ZEVs

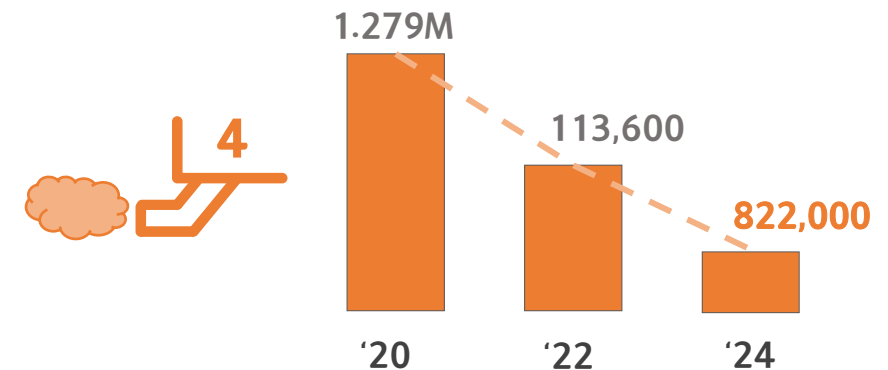
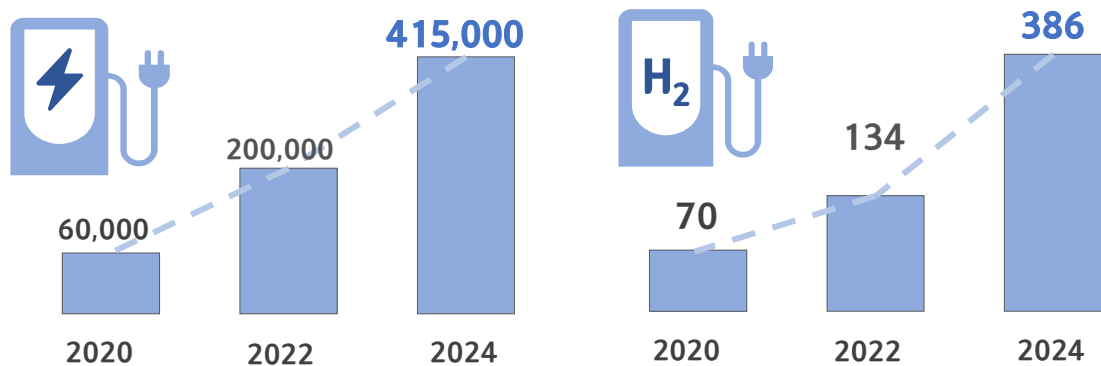
### ZEV Deployment



### Old diesel vehicles (Grade 4, 5)



### Charging infrastructure



\*ZEV adoption is outpacing the number of old diesel vehicles, signaling visible growth in the ZEV ecosystem

# 3. Policy Environment

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# Policy Environment

## Rising Ozone Concentrations

Due to climate change and rising temperatures, ozone levels are increasing.

## Need for Localised Air Quality Management

Implement differentiated management plans tailored to local characteristics as some regions are currently failing to meet the air quality standards.

## Stagnation in ZEV Demand

Factors such as global economic slowdown and the EV adoption chasm are contributing to a decline in demand.

## Transition in Transportation Management System

Global policy paradigm shifting from conventional exhaust emission management of operating vehicles to non-exhaust pollutants and Life Cycle Assessment (LCA) of greenhouse gas management.

### 문화일보

2025년 04월 24일 (목)

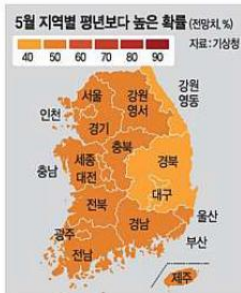
사회 12면

5월 기온 평년보다 높을 확률 80%  
올여름 더위, 더 빨리 더 세계 온다

고기압성 순환에 이상고온 증가  
지난해 이어 '역대급 폭염' 예고

■ 4월 더위가 심하지 않은 가운데 5월 기온이 평년 이상일 확률이 80%에 달하는 등 때 이른 무더위가 예고됐다. 전 세계 기상학계는 최근 몇 년 새 지구적 문제로 대두되는 여름 역대급 폭염이 올해도 이어질 가능성을 높게 보고 있다.

24일 기상청은 '3개월 전망'을 통해 "동인도양과 북인도양의 높아진 해수면 온도로 인해 한반도 부근에 고기압성 순환이 발달할 것으로 예상한다"



### 대규모 아파트 입주 시작 오송, 축사 악취 민원 빗발

A 김마나 기자 | © 송인 2024.11.20 16:10

오송생명과학단지 근처 26년 운영  
지나해부터 올해까지 민원 100건 접수  
청주시 "2018년 소유주 변심 철거 무산"  
농장주 "빠른 시일내 저감대책 마련"



### YTN

"25% 관세"에 '초긴장'..."자동차 수출액 9.2조 원 감소"

2025년 02월 20일 00시 30분



### 프랑스 탄소배출 기준 전기차 보조금 추진...탄소 무역장벽 확산

A 오영진 기자 | © 송인 2023.08.09 14:39 | □ 뉴스 4165 | □ 1면

탄소배출 기준 및 재활용 평가, 합산 60점 이상 차량에만 보조금 지급  
"진행된 프랑스...자동차 산업 발전 도모하기 위한 유리한 제도 마련"  
유럽연합 첫 번째 환경기준 보조금 기준, 보호무역주의 확대 조짐



## 4. Air Quality Policy – Future Direction

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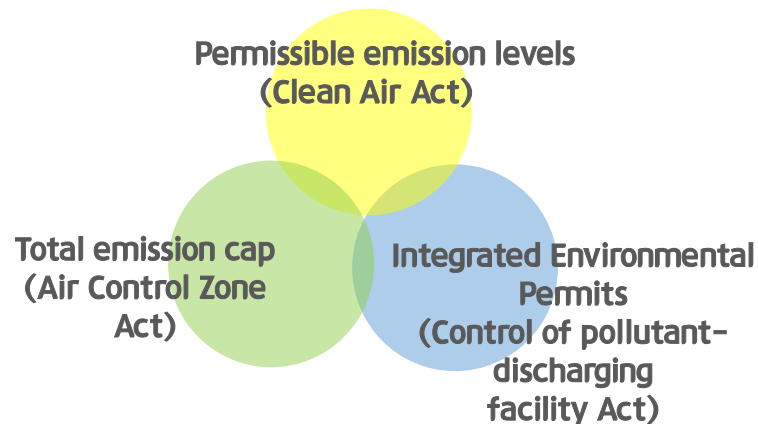
## Reduction of Key Emission Sources

### Efficient Emission Management in Air Control Zones

- || Reduce total allowable emissions in air control zones
  - Gradual reduction of total permissible emissions in air control zones (since 2020)
  - Provide support measures to various industries
- || Enhance effectiveness through advanced total cap system
  - Strengthen permissible emission levels for major polluters
  - Develop roadmap for effective management considering industry-specific emission levels and reduction technologies

### Restructure of Industrial Emission Management System

- || Create a mid- to long-term roadmap for permissible emission levels
  - Integrate permissible emission levels, total emission caps, and integrated environmental permits → Streamlined industrial emission management



### Industrial Sector

### AI & Big Data-Based Monitoring

- || Smart monitoring of industrial emissions using ICT and AI
  - Build a smart surveillance system using drones, mobile monitoring vehicles, big data
    - \* Real-time monitoring using advanced equipment → Analyse high-concentration areas and emission sources with big data → Use AI models to detect suspicious illegal emitters



## Reduction of Key Emission Sources

### Accelerate ZEV Deployment

#### || Expansion of ZEV deployment

- Expand subsidies for actual demand groups (e.g., youth, families with multiple children).
- Reform the subsidy system based on performance and safety
- Establish mid-term ZEV supply targets (2026–2030)

#### || Improve Charging Infrastructure

- Transition to hydrogen stations from CNG stations
- Mass deployment of smart-controlled and mobile chargers
- Promote PnC, V2G, and battery subscription and on-demand charging services

### Reduce Old ICE Vehicles

#### || Support for early scrappage of old diesel vehicles + EV conversion expansion

- Continue early retirement of Grade 4 and 5 diesel vehicles
- Gradual electrification of heavy-duty vehicles, construction machinery, and two-wheelers

#### || Designate and operate low-emission zones

- Only ZEVs or vehicles permitted by municipal ordinance can operate
- Search for areas to designate low-emission zones

### Transportation Sector

### Align with Global Trends in Vehicle Policy

#### || Implementation of LCA for vehicles

- Support for SMEs in automotive parts, build GHG emissions DB to estimate domestic GHG, develop LCA roadmap

#### || Build management system for non-exhaust wear particles

- Establish a system for estimating non-exhaust emissions
- Develop domestic test methods and permissible emission levels for brake wear particles

## Reduction of Key Emission Sources

### Living Environment

#### Manage Regional Air Quality & Odour Issues

##### || “Clean Air in My Neighborhood” support package

- Provide focused support to vulnerable areas and residential zones near industrial parks

\* Field survey → Technical support and facility improvement → Follow-up management



#### Reduce Volatile Organic Compounds (VOCs)

##### || VOC control in living areas

- Strengthen VOC control by using toxic air monitoring networks to intensively monitor VOC-heavy areas (e.g., petrochemical complexes)

\* Operate public-private consultative bodies → Conduct diagnostics and monitoring → Propose and apply mitigation plans → Implement full-cycle management

- Develop water-based paints, and roadmap to manage organic solvents (e.g., paint, thinner)

#### Mitigate ammonia emission sources

##### || Ammonia control

- Expand energy recovery of livestock manure (target: 23% by 2029)
- Provide financial support for installing pollution prevention facilities at livestock manure sites

##### || Enhance ammonia monitoring

- Expand aerial ammonia measurement targeting key sources

\* By 2026: pig farms → 2026–27: cattle farms, roads  
→ 2028–29: industrial and residential areas

## Air Quality Management in Response to Climate Change

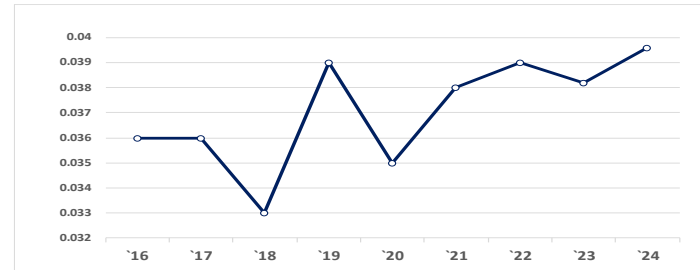
### Strengthen Ozone Control

#### || Develop intensive control measures for high ozone episodes

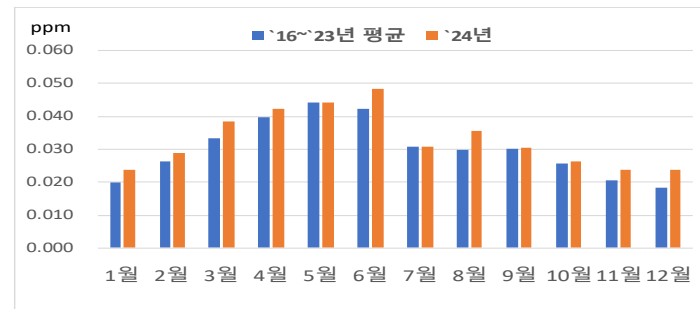
- Establish summer ozone management strategy
- Reassess list of VOCs (currently 37 types) contributing to ozone formation

#### || Upgrade ozone forecast information services

- Expand ozone forecasting services
- Develop integrated forecasting model (observation + numerical modelling + AI)



Hourly average concentration trends (May-Aug)



Monthly concentration trends (Averages during 2016-2023 and 2024)

### Expand atmospheric impact research in response to climate change

#### || Analyze air quality effects of carbon neutrality implementation and build mitigation system for both air pollutants and greenhouse gases

- Study air quality impact of low-emission fuel processes
- Establish integrated management framework considering synergy and trade-offs in air pollutants between air quality management and carbon neutrality policies
- Strengthen indoor hazardous substance control in response to climate change

## Meticulous Pollution Management in Daily Life

### Focused control of pollution sources in residential areas

#### || Noise and air quality control in underground stations

- Conduct noise surveys inside subway cars and noise control
- Support air purifier replacement at stations prioritised by pollution and congestion levels

#### || Reduce cooking fume emissions

- Build monitoring system for cooking facilities
- Provide reduction equipment to large emitters

### Protection of sensitive and vulnerable groups

#### || Strengthen measures during high-concentration episodes

- Diversify fine dust forecasts, implement flexible seasonal management tailored to local conditions, expand emission reduction measures for large private facilities

#### || Improve environments of facilities used by vulnerable groups (e.g., daycare centres)

- Continuously improve indoor air quality at facilities used by children and the elderly

### Improvement of indoor air quality

#### || Manage air quality in multi-use facilities

- Apply stricter PM2.5 standards to 5 types of facilities (e.g., large stores, cram schools, libraries) starting in 2026
- Operate certification system for facilities with excellent indoor air quality (from 2026)

#### || Strengthen indoor radon control

- Expand radon reduction consulting services
- Develop and distribute ventilation guidelines

# Strengthen Scientific Capacity and Effective International Cooperation

## Strengthen Science-Based Policy

- || Identify emission sources and develop reduction technologies
  - Diversify R&D on PM precursors
    - \* Identify causes of PM2.5 and ozone and develop mid- to long-term R&D for mitigation technologies
- || Advanced monitoring and forecasting systems
  - Conduct 3D observations (ground-air-satellite) to improve accuracy in PM source analysis
- || Regional Research Expansion
  - Build localised air quality forecasting system by establishing L-NEAS
  - Expand region-specific studies via local centers and specialised graduate programmes
- || Upgrade air pollutant emission data management
  - Establish inventory for unaccounted sources (e.g., farmland, ports) and improve statistics
  - Improve PM policy impact analysis (from national to regional level)

## Lead International Cooperation and Support Overseas Expansion of Korean Industries

- || Lead international cooperation in Asia
  - Continue Korea-China PM cooperation, expand policy exchange and joint research in conjunction with the establishment of Korea-China-Japan Joint Action Plan (2026-2030)
  - Multilateral cooperation with international organisations (UNDP, UNEP, etc.) to lead air quality improvement across Asia
    - \* (UNDP) Support air quality improvement in Asia using environmental satellites
    - (UNEP) Develop regional action plans for air pollution in Asia-Pacific
- || Promote diversified overseas market entry for the air quality industry
  - Support overseas expansion of Korean industries (e.g., ZEVs, fuel alternatives) through ODA
    - \* Mongolia: Integrated ICT-based air management system
    - Indonesia: Deployment of ZEV charging stations

## 5. Expected Outcomes

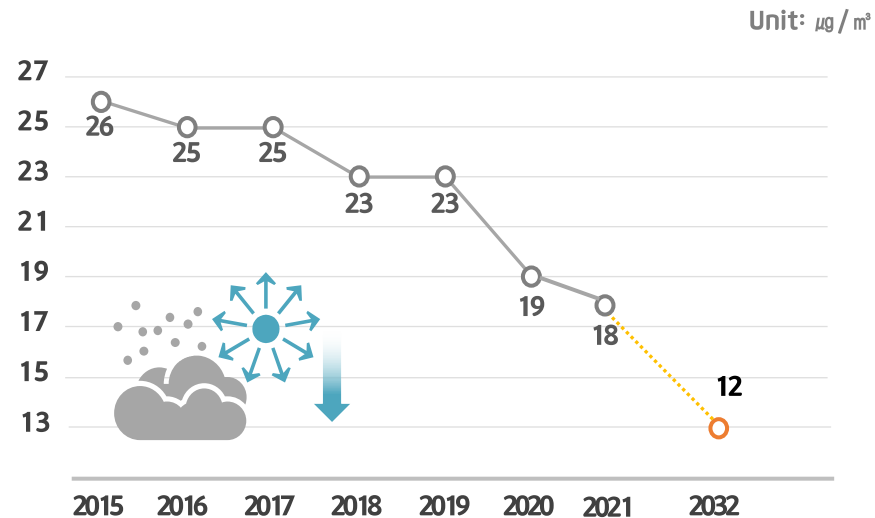
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## Expected Outcomes

Based on 3rd Comprehensive Air Quality Improvement Plan (2023–2032)

### Improvement in PM2.5 levels

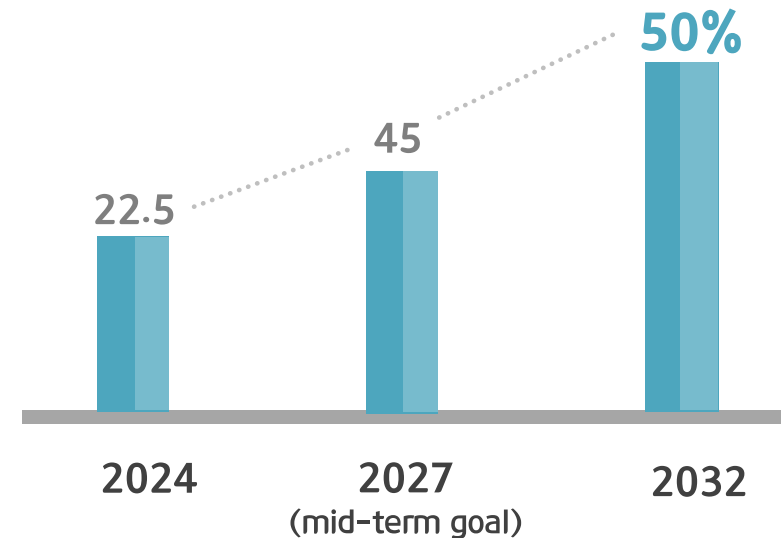
Nationwide PM2.5 levels to reach OECD median range



\* PM2.5 levels : 2021  $18\mu\text{g} / \text{m}^3$  → 2032  $12\mu\text{g} / \text{m}^3$

### Improvement in ozone levels

Achieve 50% attainment rate for the 1-hour ozone standard nationwide



- Attainment Rate (%) = Number of stations meeting environmental standard / (Stations with  $\geq 75\%$  valid annual data) \* 100

# Racing for Clean Air!



Ministry of Environment

National Air Emission Inventory  
and Research Center