

# Development of Ambient Air Quality Monitoring System in Shanghai

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<http://www.sem.gov.cn>



# Outline

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- ◆ **Introduction**
- ◆ **Ambient Air Quality Monitoring Network**
- ◆ **Air Quality Management for Shanghai EXPO**
- ◆ **Future Prospect**



# Introduction

## Shanghai

### Location:

Shanghai sits on the **Yangtze River Delta** on the China's eastern coast

### GDP:

**\$10,537** per capita, annual increment of **10%**

**Area:** over **5,800** km<sup>2</sup>

**Population:** over **18 million**

### Climate:

**northern subtropical maritime monsoon climate**, sunshine, plenty of rainfall and distinctive seasonal difference



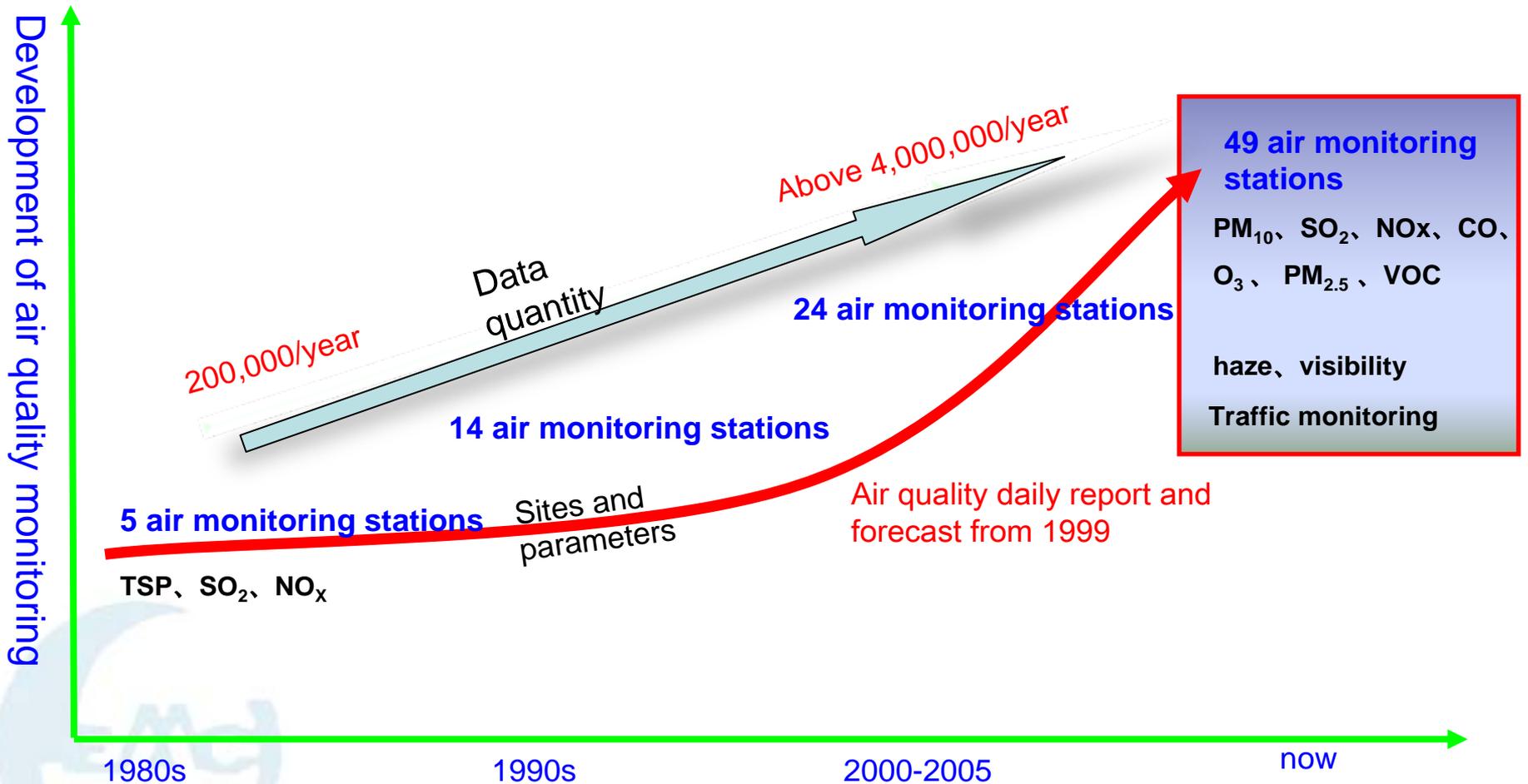
# Introduction

## Shanghai Environmental Monitoring Center (SEMC)

- ✓ Established in 1983 with about 200 staff
- ✓ SEMC is the state level, leading environmental monitoring center under MEP in China
- ✓ SEMC is the authorized agency to notify the environmental quality to the public and government, including ambient air, surface water, soil, noise, etc.
- ✓ Extensive cooperation with domestic researching institutes/universities
- ✓ International exchange with USEPA, Italy, WB, ADB, UNEP etc.



# Air Quality Monitoring System



# Air Quality Monitoring Network

## Criteria Pollutants Monitoring

- ◆ Ambient Air Stationary Monitoring :

Automatic:  $PM_{10}$  ,  $SO_2$  ,  $NO_x/NO_2/NO$  ,  $CO$  ,  $O_3$  ,  $PM_{2.5}$

- ◆ Manual methods-lab analysis :

Falling dust, TSP, acid rain, Pb, F<sup>-</sup> and ion etc.

- ◆ Near road traffic pollution monitoring:

2 mobile, 1 stationary:  $CO$ , NMHC,  $SO_2$ ,  $PM_{10}$

- ◆ Industrial VOCs Monitoring:

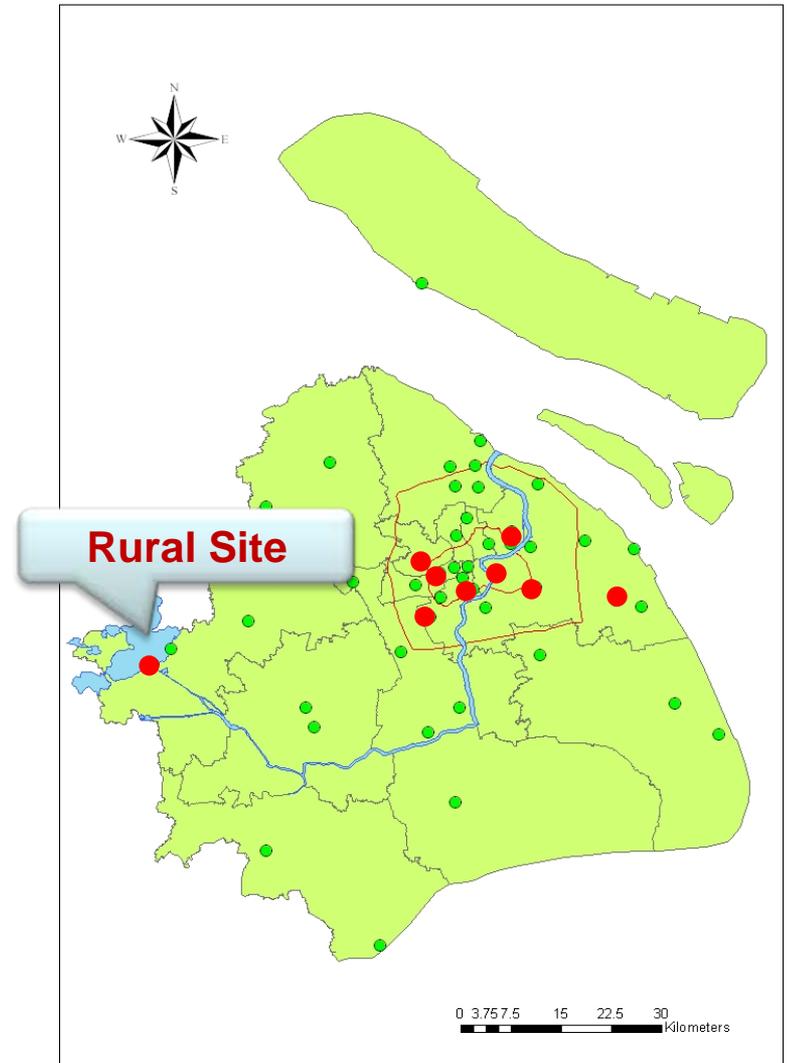
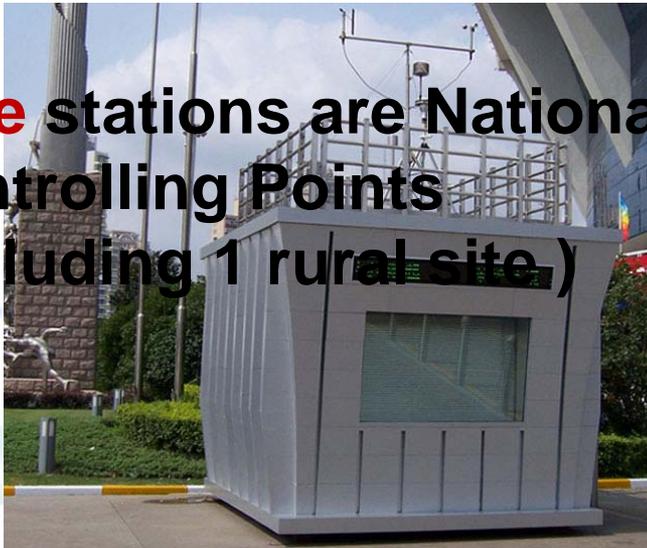
3 pilot stations

# Air Quality Monitoring Network

## Automatic Monitoring

**49** automatic monitoring stations, covering **18** districts and counties

**Nine** stations are National Controlling Points (including 1 rural site.)

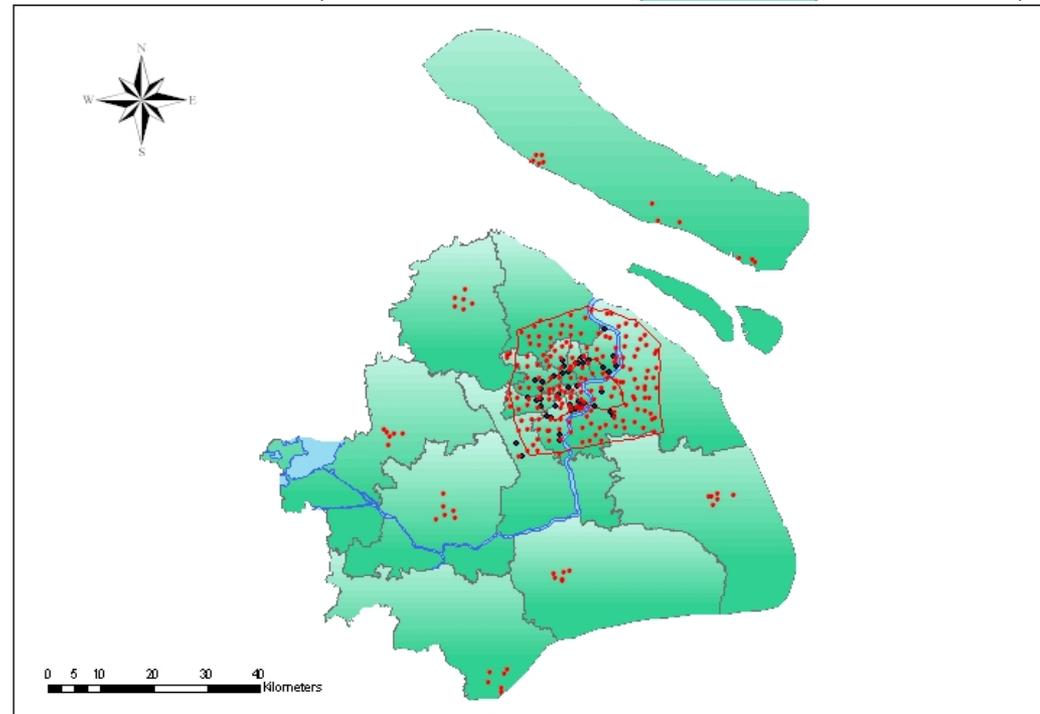
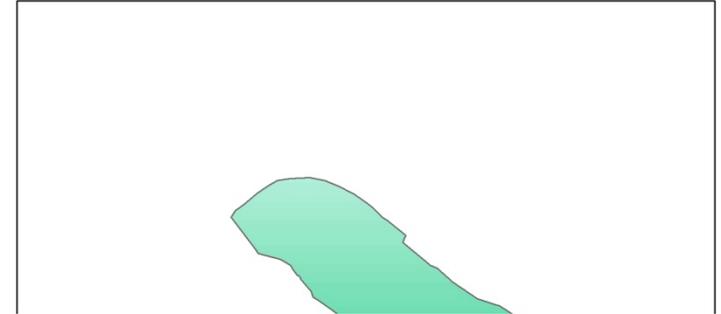


# Air Quality Monitoring Network

Manual methods-lab analysis

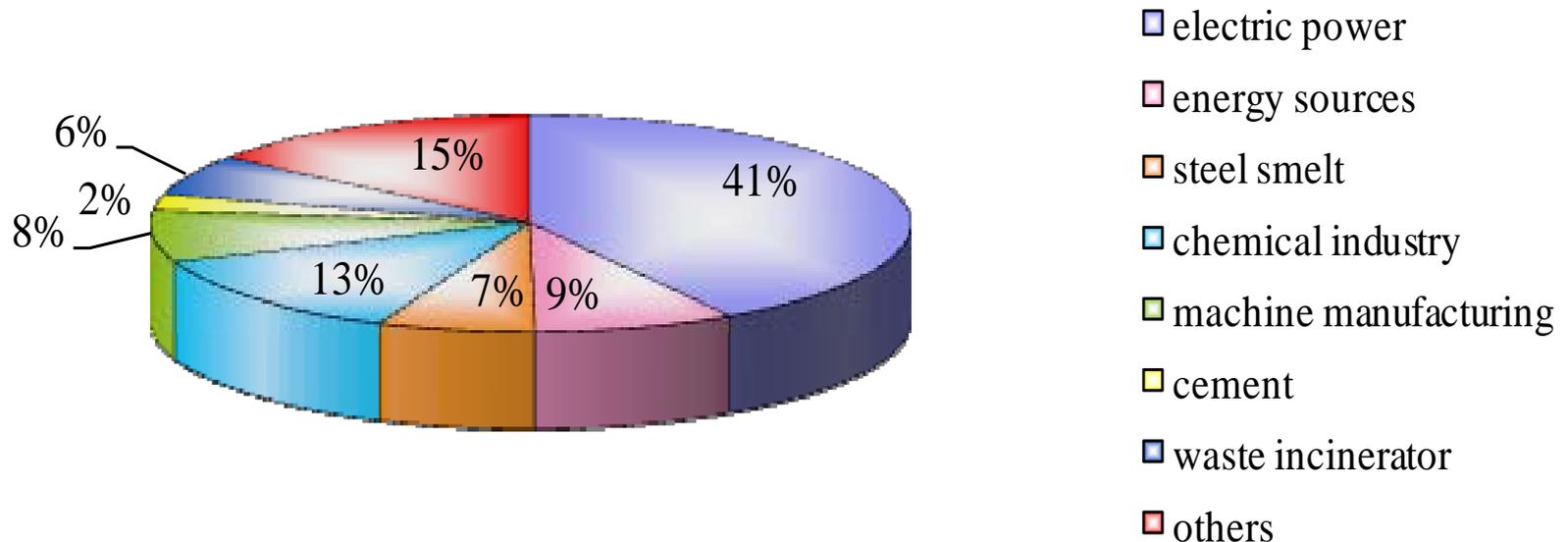
More than **20** manual method sites

More than **270** points of fall dust



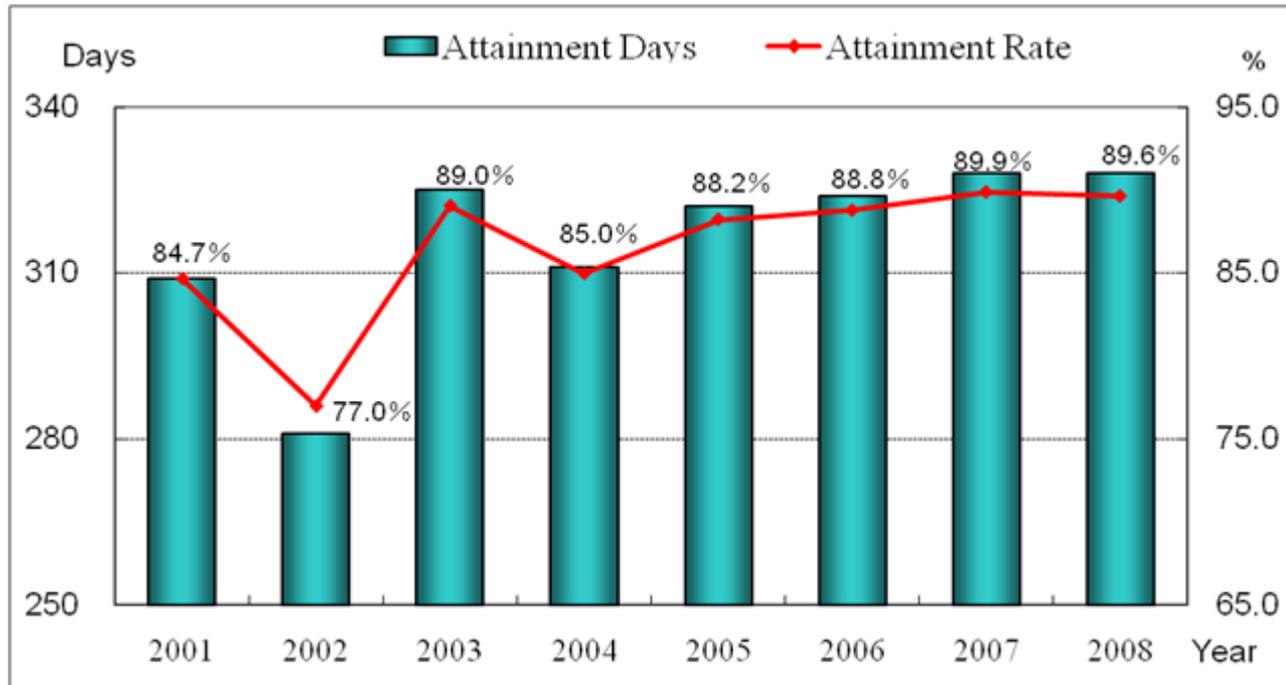
# Pollution Sources Monitoring — CEMS

## Status quo of installation of CEMS



About **210** sets of CEMS for major pollution sources including power plant, coal fired boilers

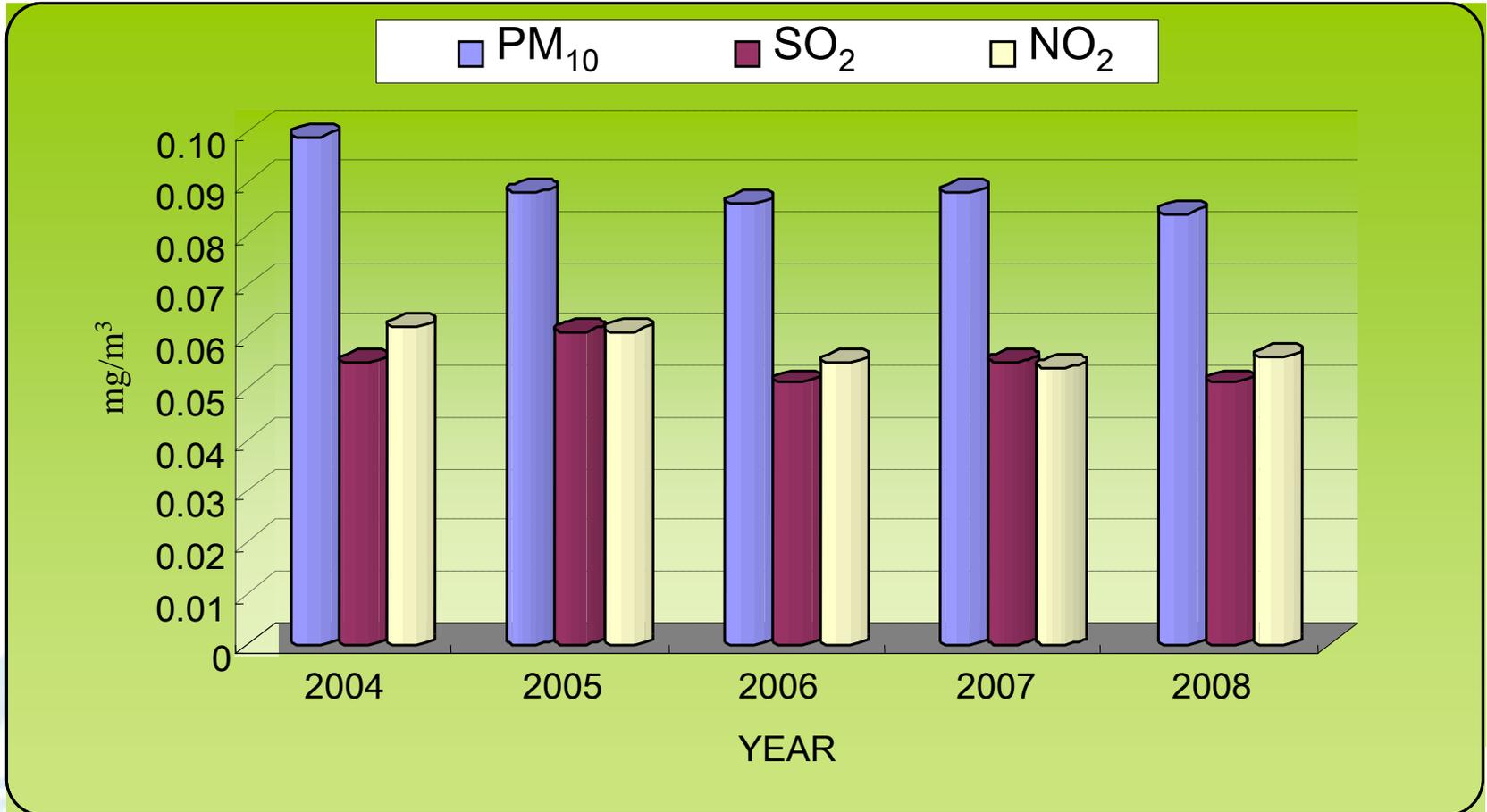
# Air Pollution Index (API)



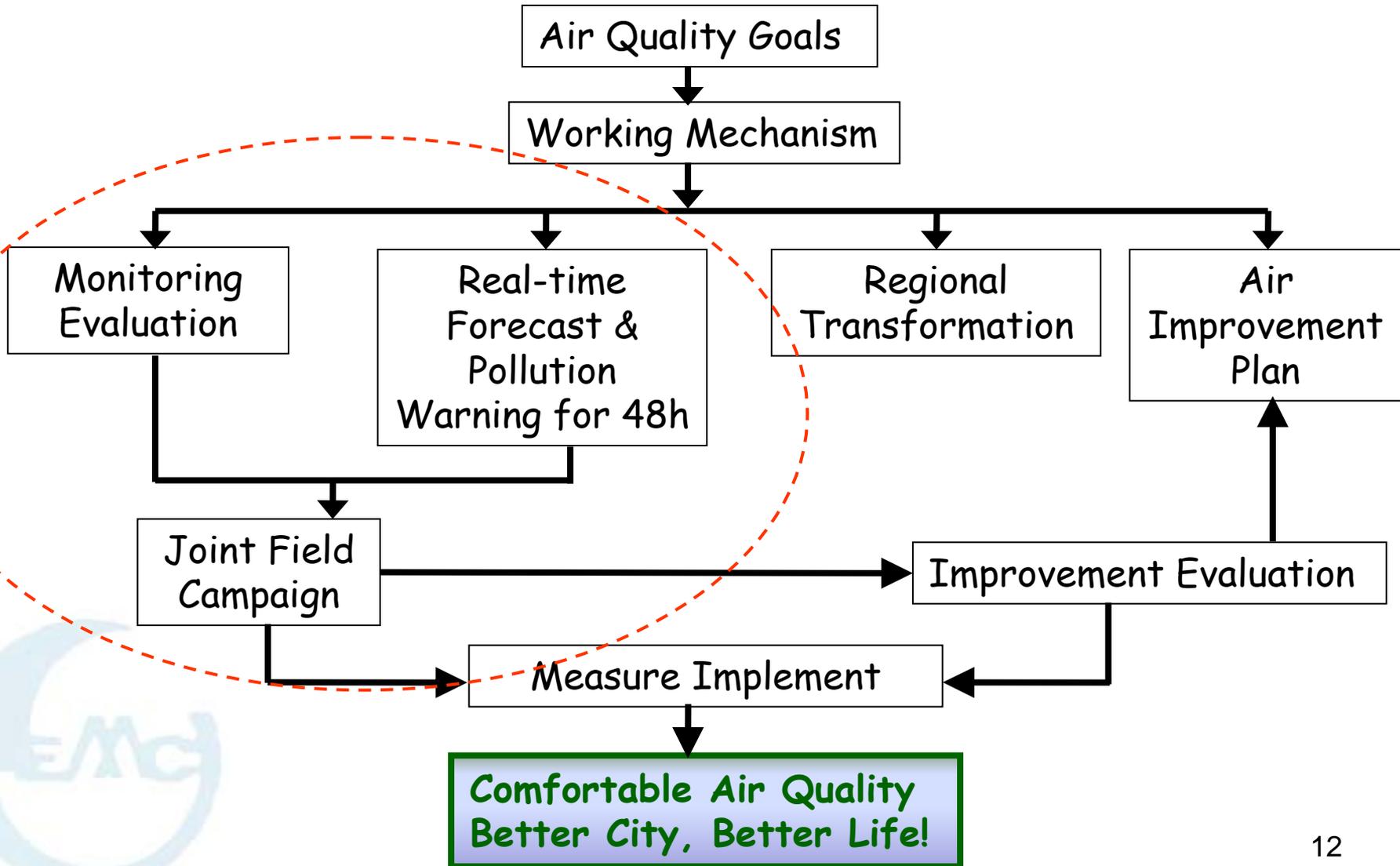
**Attainment rates have achieved 85.0% for last 6 years.**



# Annual Concentration



# Air Quality Management for Shanghai EXPO



# Goal for Air Quality Management – 2010 Expo

- ◆ Local emission sources control plus regional emergency emission control
- ◆ The preliminary emission sources,  $PM_{10}$  and  $O_3$  should be mainly controlled.
- ◆ Conventional measures and emergency action:
  - ✓ **Conventional measures:** three-year planning for environmental protection
  - ✓ **Emergency action:** emission controlling measures in short period based on air quality forecasting

accessibility, operational and economic effectiveness

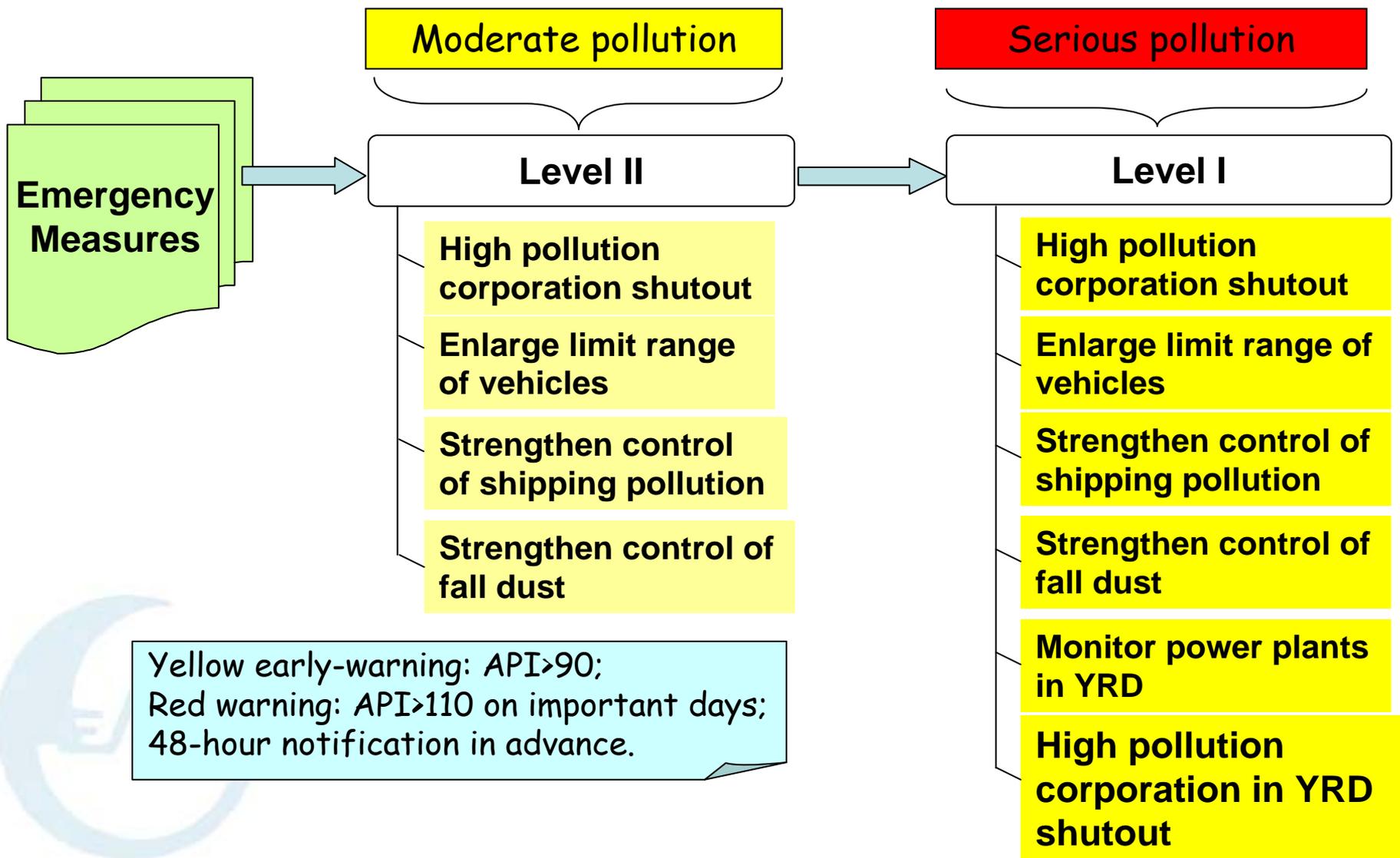
# Regular Measures

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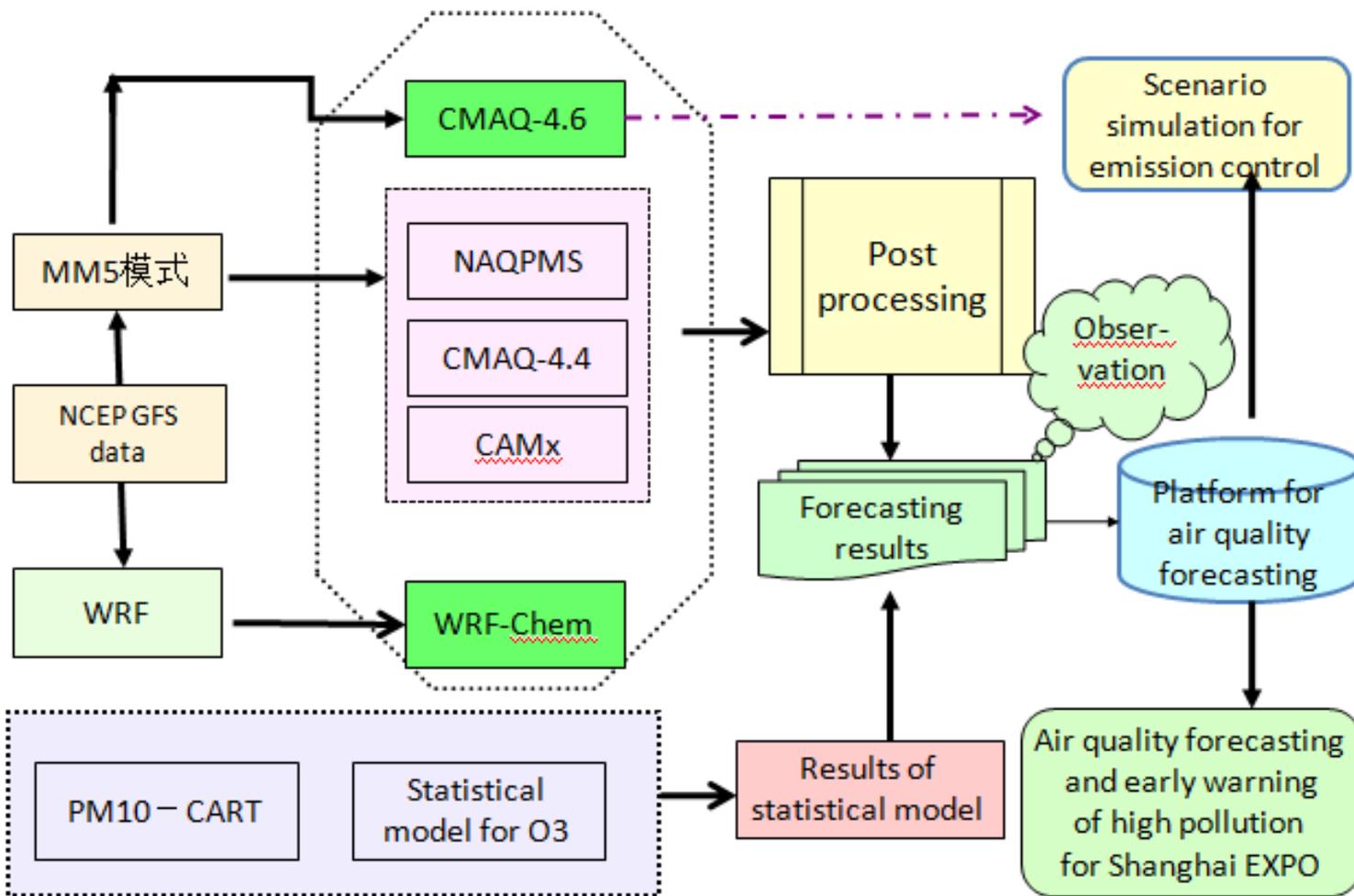
**Based on the forth “three-year action plan for environmental protection”**

- ◆ Promoting coal desulfurization and denitrification facilities
  - ✓ Completion of power plant desulfurization-17 plants
- ◆ Controlling the emissions of motor vehicles
  - ✓ Implementation of State IV standard for new vehicles
  - ✓ Oil and gas recovery in filling stations
  - ✓ Phasing out the old vehicles
- ◆ Strengthening the control on fugitive dust

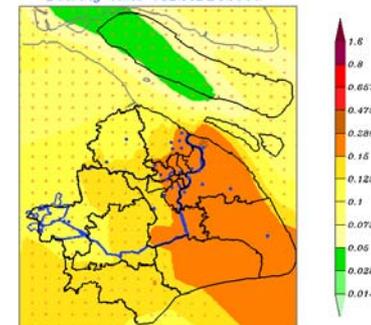
# Emergency Actions



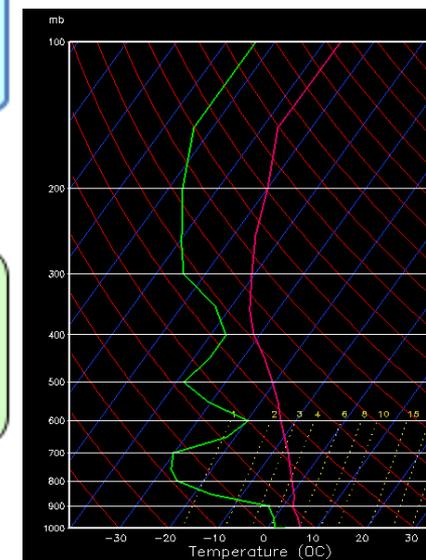
# Air Pollution Forecast System



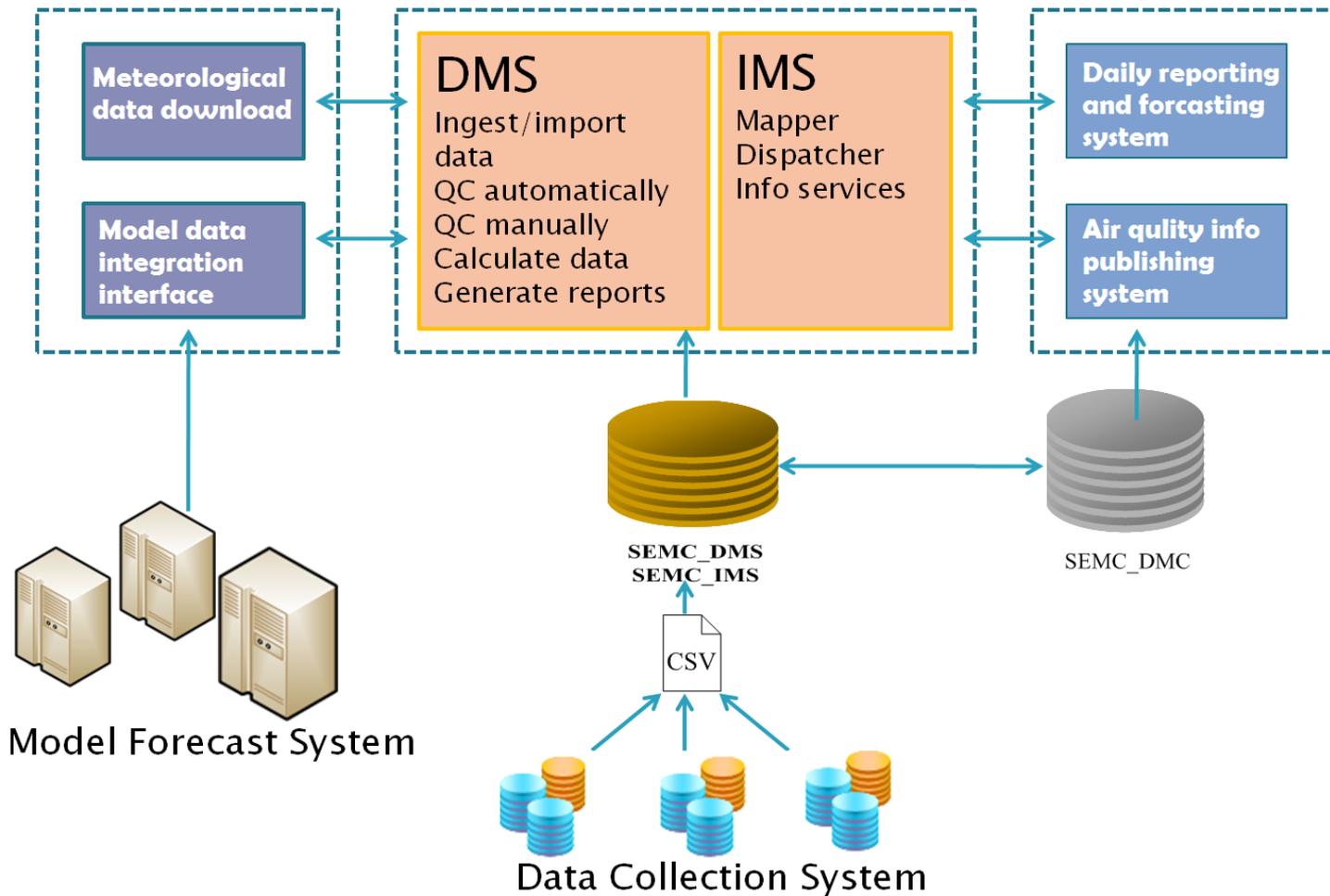
Surface SO2 (mg/m3) 00Z20DEC2007  
Beijing time 00Z20DEC2007



irs forecast 70



# Application of Airnow-I system in Shanghai



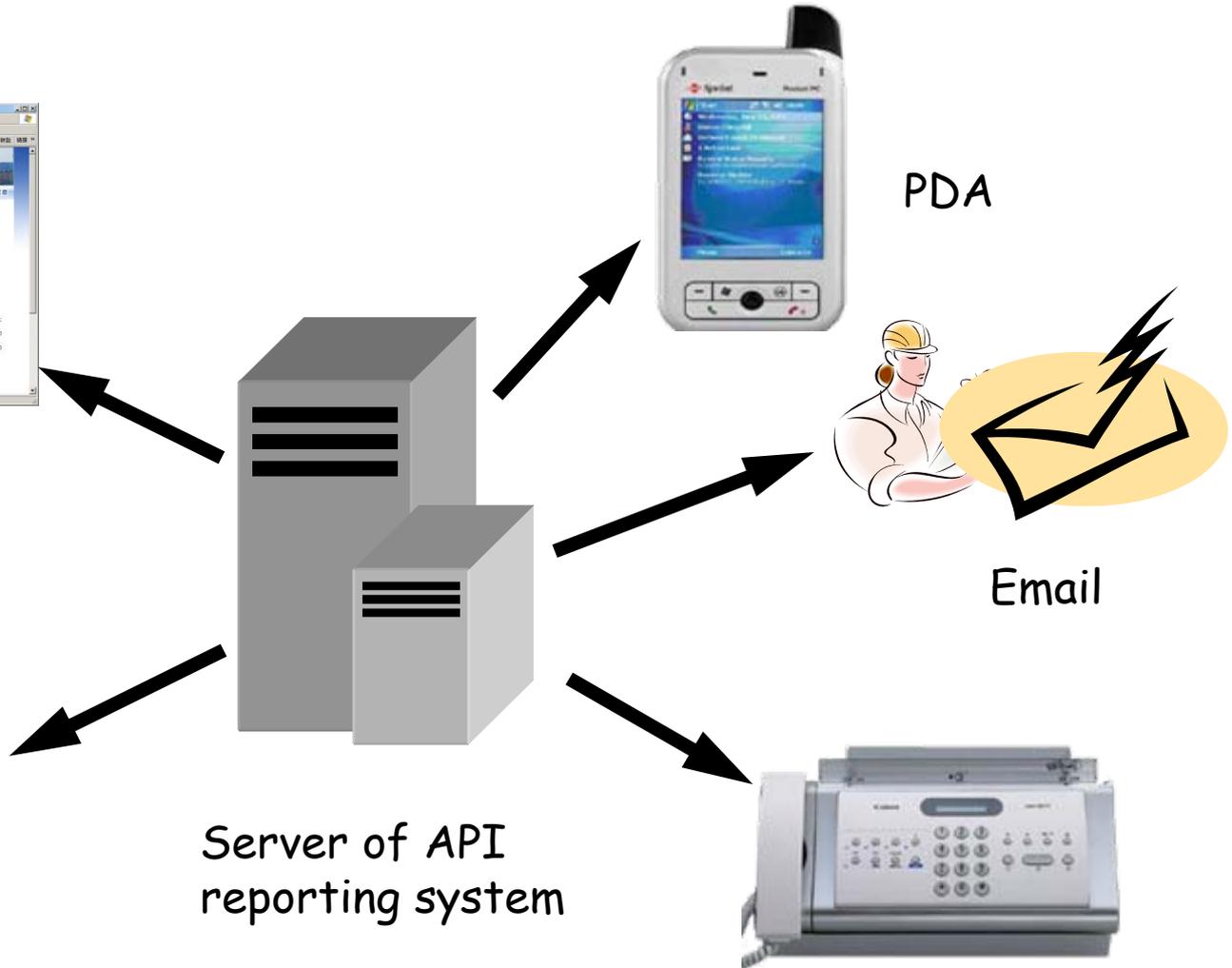
# Air Quality Notification & Forecasting



Website



Electronic screen



Server of API reporting system

Fax

# Joint Campaign

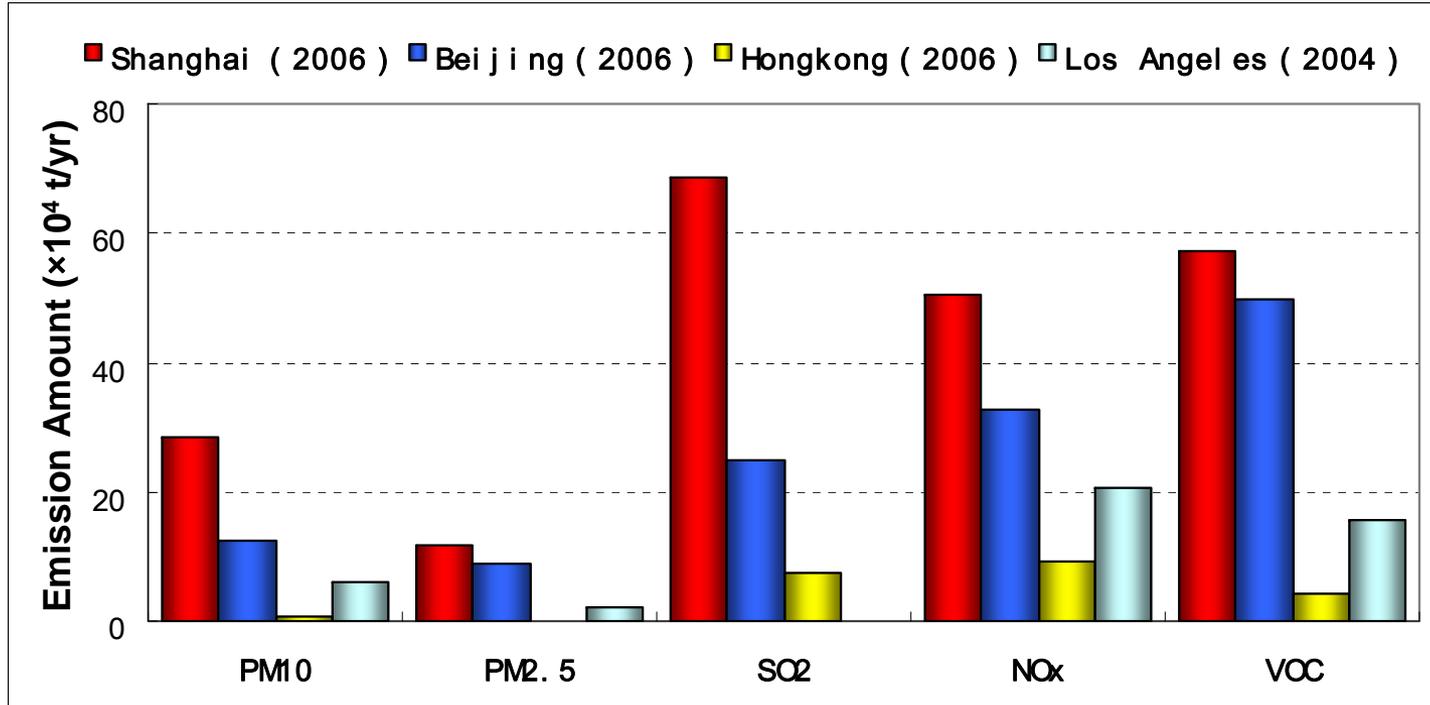
## Joint campaign in spring festival

- ✓ The influence of increasing of people activities on ambient air quality
- ✓ The observation of fine particulate matters, especially  $PM_{2.5}$  pollution

## Joint campaign in May

The observation on fine particulate matters, visibility, ozone and related precursors , evaluating the performance of emission control.

# Emission Inventory



**The emission amount of various pollutants in Shanghai is relatively higher than other big cities.**

# Our Challenges

- ◆ Pollution type has changed.

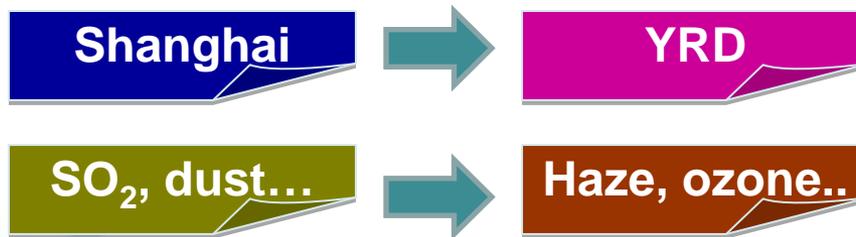


Air Toxic  
Haze  
O<sub>3</sub>  
Acid rain  
Fine PM

- ◆ Composition of pollution sources is complicated.



- ◆ Regional complex air pollution is obvious.



Current monitoring system cannot satisfy pollution control requirement!

# Future Prospect & Challenge

- ◆ Pay more attention to secondary pollutants, such as haze, ozone, etc
- ◆ Establish integrated monitoring network of PM<sub>2.5</sub>, visibility, ozone and its precursors
- ◆ Adding more pollutants into API to make better understanding with public sense
- ◆ How to optimize the current network to cover different objectives- parameters? sites? Data analysis?
- ◆ How to set up the regional network- mechanism? Unified methods & QAQC? Funding?

*Thank You!*

Q & A

Welcome to  
2010 Shanghai EXPO

