AREP
GAW

Section 5
How Are Forecasts Used?

Protect Public Health

Operate Emissions Reduction Programs

WMO
OMM

Basic Pollutants – Important Meteorology (1 of 2)

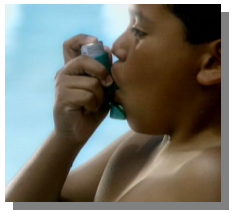
- Processes that influence pollution
  - Sunlight
  - Horizontal dispersion
  - Vertical mixing
  - Transport
  - Temperature and moisture (affect chemistry)
- Large-scale to local-scale meteorology

Basic Pollutants – Important Meteorology (2 of 2)

- Aloft ridges of high pressure and troughs of low pressure
- Rising and sinking air
- Surface highs and lows
- Vertical temperature structure
  - Inversions
  - Stability
  - Mixing
- Clouds and precipitation
- Winds
  - Synoptic scale
  - Meso- and local-scale
  - Transport (surface and aloft)

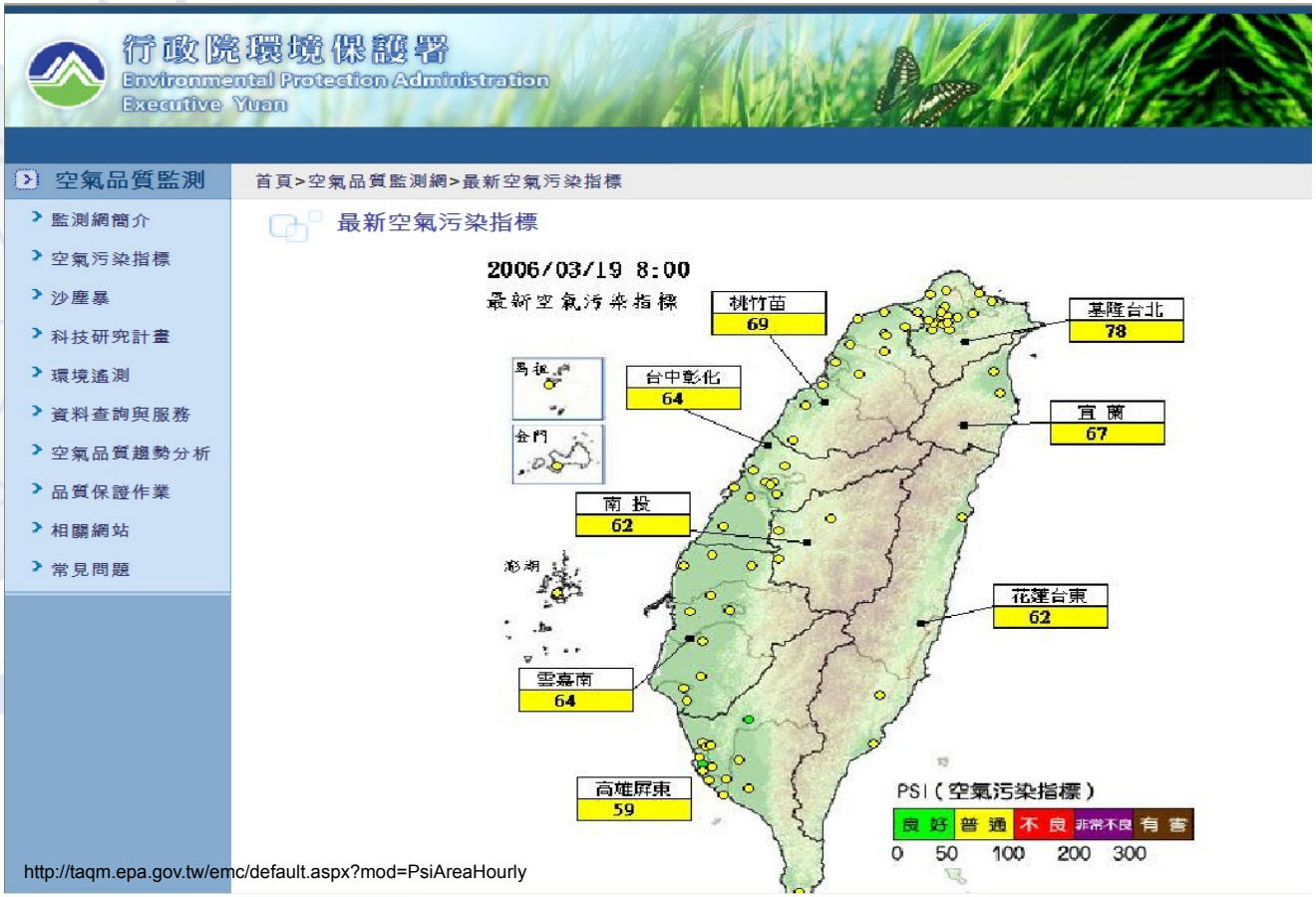
Protect Public Health

- Forecast allows the public to plan
  - Activities to avoid exposure to unhealthy air
  - Outdoor activities
  - Health and medical care
- Forecasts are used by
  - Air quality agencies (communications office)
  - Media (television, newspaper, radio, and web)
  - Public (general and sensitive individuals)
  - Schools (scheduling outdoor activities)
- Critical forecast issues
  - Timeliness (when do users need it)
  - Localized forecasts
  - Multi-day (one-to-five day) forecasts are useful
  - Easy-to-understand format



Protect Public Health (Example)

Taiwan EPA web site showing current and forecasted air quality conditions



Operate Emissions Reduction Programs (1 of 2)

- Types of programs
  - Voluntary (not required)—sometimes called “Action Day Programs”
  - Mandatory (required)

- Forecast needed for
  - Advanced planning to prepare for communication and taking action
  - Notification of stakeholders
- Critical forecast issues
  - Participation depends on forecast timeliness and accuracy
  - Emissions are affected (may affect forecast verification)

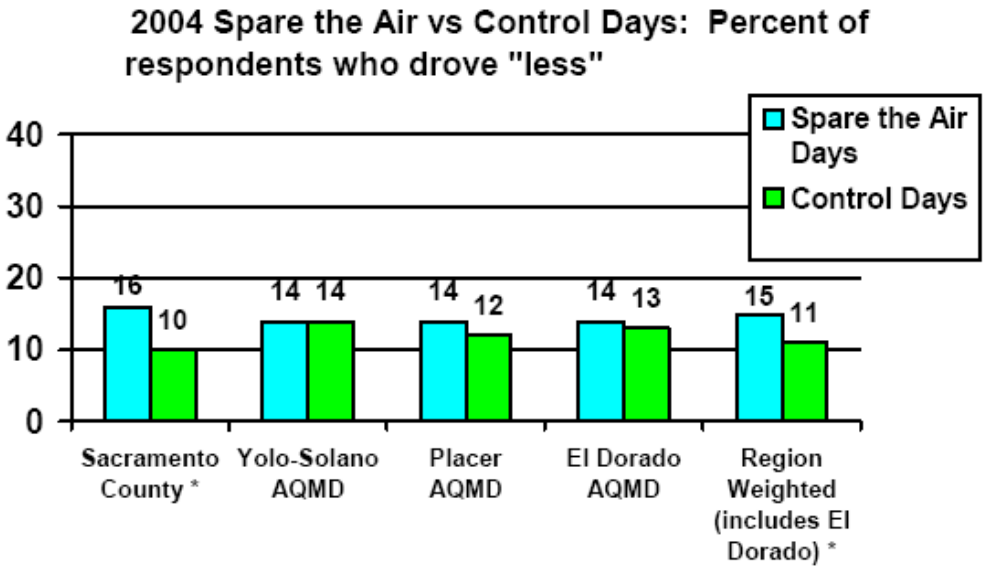
Operate Emissions Reduction Programs (2 of 2)

- Voluntary emissions reduction program
  - Spare The Air (STA) Program (Action Day) in Sacramento, California, USA
  - Objective – Seeks public involvement to voluntarily reduce emissions on forecasted Spare The Air Days
- How are forecasts used
  - Spare The Air Day is triggered by a one-day forecast
  - On Spare The Air Days
    - Notify the public by television, public service announcements, radio, newspaper, fax, and web
    - Ask the public to reduce emission-producing activities
      - Reduce driving by carpooling (several people in one vehicle) and taking public transit
      - Reduce use of paints, solvents, etc.

Source: www.sparetheair.com

How Are Forecasts Used? (1 of 4)

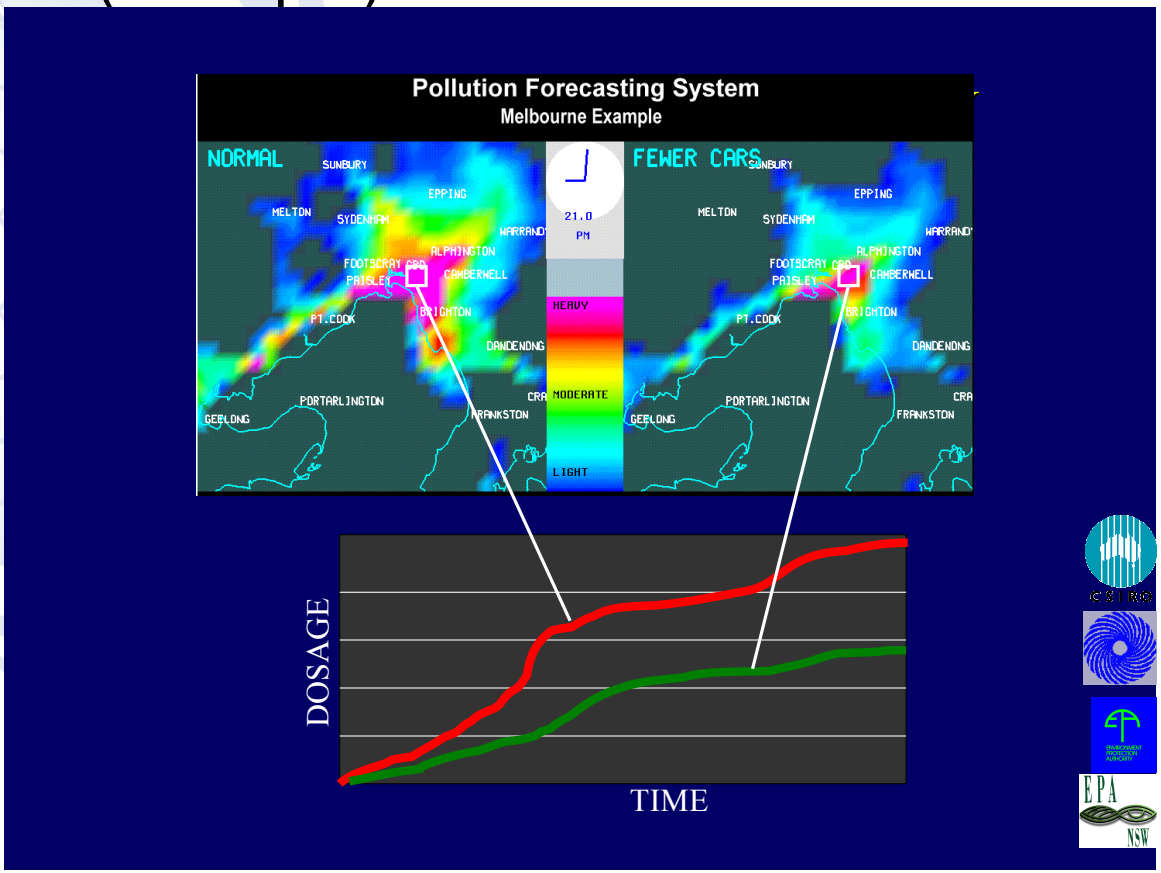
1. Evaluate voluntary program results
   - Compare driving habits on STA and non-STA (control) days
   - Evaluate reduction in driving
   - Calculate reduction in emissions



Source: http://www.cleanerairpartnership.org/images/Final%20Evaluatio&ir%20Campaign.pdf

How Are Forecasts Used? (2 of 4)

2. Operate mandatory emissions reduction programs (example)



"Green" Scenario – on days of forecast high pollution, develop a forecast with reduced traffic that could result from public warnings, to show the improvement of air quality: Melbourne on a high smog day and with a 25% reduction in traffic.

How Are Forecasts Used? (3 of 4)

3. Conduct special sampling
   - Several types of programs
     - Localized special monitoring
     - Regional monitoring
     - Field studies
   - Forecast are needed for
     - Advanced planning to prepare monitoring or equipment (aircraft, samplers, other sensors)
     - Sampled pre-episode conditions (day before high air quality concentrations)
   - Critical forecast issues
     - Obtaining detailed forecast
     - Allowing sufficient time to prepare monitoring equipment and personnel

How Are Forecasts Used? (4 of 4)

4. Conduct special sampling (example)

Winds and air pollution forecasts are used in the design of day-by-day sampling strategies in major studies providing data for impact assessments for new industries or expansions of industrial facilities. The photo is from a study of power stations in the Latrobe Valley of Victoria

Summary

- Forecasts allow for planning (activities, exposure avoidance, health care) and action
- Forecasts are used by air quality agencies, media, public, industries, and schools
- Critical forecast issues include
  - Timeliness
  - Localized forecasts
  - Multi-day
  - Easy-to-understand format (Air Index)