

Environmental Information

exchange
Network

EN2015



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2015 Exchange Network National Meeting

Supporting the Business of Environmental Protection

September 29–October 1, 2015
Sheraton Philadelphia Society Hill Hotel
Philadelphia, Pennsylvania

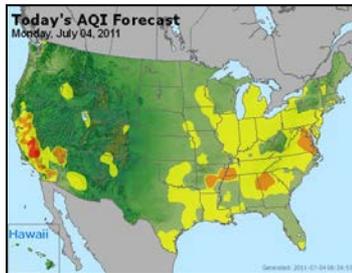
<http://www.exchangenetwork.net/en2015>

ABSTRACT

Since 1998, the AirNow program has been collecting, processing, and distributing realtime air quality data. This presentation will briefly outline the system and delve into the AirNow Application Programming Interface (API), which allows service-based data access for a variety of purposes.

Status

- Year Round 24/7 coverage/delivers real-time data (ozone & particles) for 50 States, 6 Canadian Provinces and 24 U.S. National Parks
- Next-day AQI forecasts for over 400 cities (summer) and over 300 cities (year-round)
- State-of-the-science information about air pollution health effects for the public, media and stakeholders
- Partnerships with The Weather Channel, USA Today, CNN, weather service providers, NOAA National Weather Service



Background



- ✦ **Regulatory requirement for cities > 350,000 people**
- ✦ **State and local agencies are required to report the AQI to the public daily**
- ✦ **When AQI > 100, agencies must also report sensitive groups**

Inputs To AirNow

From:

- State
- Local
- Tribes
- NPS
- USFS
- Mexico, Canada



What:

- **Forecasts (AIRNow Tech)**
 - more than 400 forecast cities
- More than 4000 monitors in realtime into DMS – Data Management System
- Meteorological Data in realtime to DMS

AirNow and CDX

For nearly 10 years, AirNow has accepted realtime data at its NEIEN node

- **Pioneered the capability with the AQDE states – NY, NJ, DE, CT**
- **Wisconsin also uses this capability**

Uses a subset of the AQS schema

- **Compatible with state submissions to AQS**
- **Requires very little alteration of existing state systems**

Direct Public Reach

Who:

- Parents
- Schools
- Daycares
- Coaches
- Businesses
- Healthcare Workers

How:

- AIRNow Website
 - over 4.8 million page views/year
- Smartphone App
 - more than 45,000 installed on iPhones
- School Flag Program (Uses AIRNow EnviroFlash)
- CEU Training for Health Professionals
- Teacher Training Toolkit
- More than 2000 followers of AIRNow on Facebook and Twitter



“Several parents I know have discussed with me the importance to them of code orange days and how they are used to limit their child's outdoor activity in daycare in order to reduce their exposure to unhealthy levels of ozone and pm.” (Erica Snyder, New Jersey Dept. of Environmental Protection)

“The information on the [AIRNow.gov] web site has helped by having another tool to get information out and help start a new program for air quality (school flag).” “We would like the students and teachers to check out the material on AIRNow.” (Jim Carey, Klamath County)

S/L/Tribal Reach

S/L/Tribes Use AIRNow Outputs:

- Distribute Forecasts
 - Over 210 million people covered by Agency issued ozone forecasts.
- Distribute Real Time Data
- Issue Action Day Notices

Critical Tools:

- AIRNow EnviroFlash
 - Active pushing of information from the states to the public
 - ✧ Over 250,000 subscribers
 - ✧ Over 11,000 followers of State EnviroFlash Twitter feeds
 - ✧ Action Day notifications to schools participating in the School Flag Program
- AIRNow Web Site
 - Access to State and local AQI Information, forecasts, maps, and web sites

Welcome to EnviroFlash! Air quality affects how you live and breathe. Like the weather, it can change from day to day, or even hour to hour. Up-to-date information allows you to make decisions based on air quality forecasts. EnviroFlash comes to you through a partnership between the US EPA and your state or local air quality agency - notifying you about air quality so you don't have to go searching for it!



“Joining EnviroFlash has not only saved our agency money, but has also modernized and expanded the reach of our air quality communication efforts. EnviroFlash allows our agency to leverage our investment in daily air quality forecasting and gives Minnesotan’s the opportunity to customize the types of air quality information they receive based on their needs.” – Cassie McMahon, Minnesota Pollution Control Agency

Media Reach

Daily Media Impressions – about 3.7 million viewers

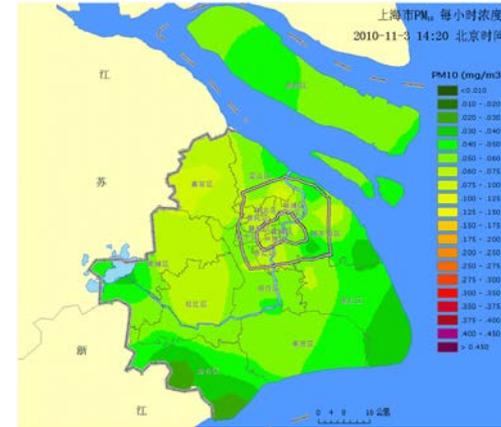
- USA Today
 - Weather page – 3rd most popular page
- Weather Channel
 - Local on the 8's twice per hour, local forecast pages on weather.com
- CNN – when a news story
- Weather Service Providers:
 - Direct information to TV, radio, newspapers
 - Weather Underground
 - Accuweather
 - Weather Vue



“AIRNow is a valued and trusted resource for local and national air quality data” – Jeff Smith, WABC, New York

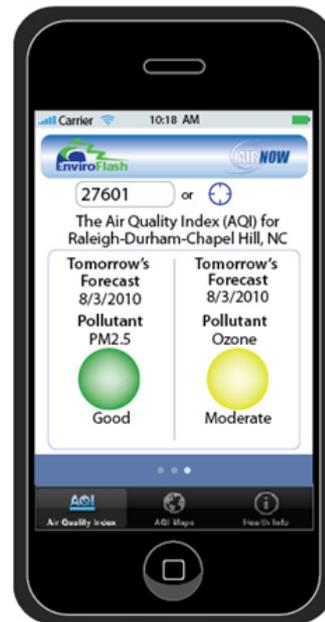
What is AirNow-International?

- AirNow-in-a-box
- Goals
 - Provide tools for AQ management to interested countries
 - *Exchange environmental data internationally*
 - Make advances in air quality knowledge and applications
 - Build a community of people and organizations
- Successful pilot at the 2010 World Expo
- Second pilot in Monterrey, Mexico, followed by other states



AirNow API

- Massive data flow inbound
- Many stakeholders interested in using the data in a variety of ways
- 10 years ago, built a “data mart” of sorts to supply file-based products
 - Inflexible, slow, virtually one file format per user
 - Difficult to use in app development
- AirNow API is now our primary data distribution vehicle



API Description and Features

AirNowAPI.org

A central portal providing access to web services, RSS feeds, and file products, giving developers the tools needed to integrate air quality data into software applications (e.g., websites, mobile apps)

API Features

- **Key web services** requested by users
 - Forecasts and observations by zip code or lat/lon
 - Historical peak values by zip code or lat/lon
 - KML web services
- **A query tool** makes it possible for users to assemble and run web service requests, helping developers to quickly grasp the proper format of the API's REST-type requests and to view outputs

Current Observation By Latitude and Longitude

1 Latitude: *
Longitude: *
Distance: miles
Format:

2 Generated URL
`http://www.airnowapi.org/aa/observation/latLong/current/?format=application/json&latitude=37.7813&longitude=-122.4725&distance=25&API_KEY=3085988E-D56F-E511-A5516C`

3 Output

```
[{"DateObserved":"2013-11-15","HourObserved":11,"LocalTimeZone":"PST","ReportingArea":"San Francisco","StateCode":"CA","Latitude":37.75,"Longitude":-122.43,"ParameterName":"O3","AQI":17,"Category":{"Number":1,"Name":"Good"}}, {"DateObserved":"2013-11-15","HourObserved":11,"LocalTimeZone":"PST","ReportingArea":"San Francisco","StateCode":"CA","Latitude":37.75,"Longitude":-122.43,"ParameterName":"PM2.5","AQI":37,"Category":{"Number":1,"Name":"Good"}}]
```

API Features (continued)

- **Documentation** provides developers with quick answers, including
 - Inputs for each web service with a description, the required format, and examples
 - Outputs returned by the web service with descriptions of each field
 - Frequently asked questions
 - An “Air Quality 101” page with information about the data

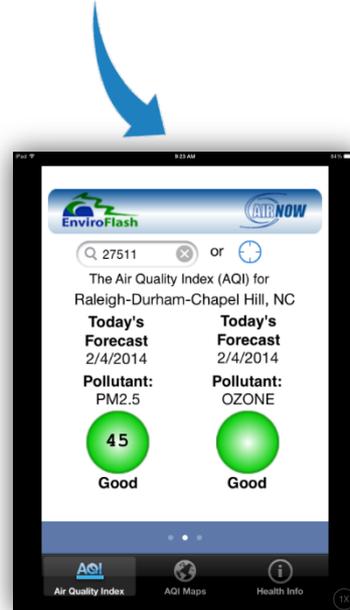
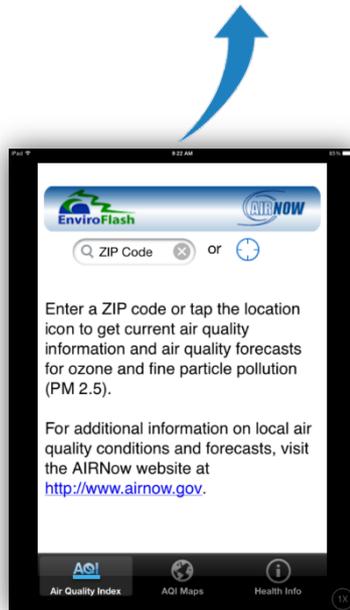
| Inputs | | | |
|---------------------|---|--------------------------|-----------------------------------|
| Parameter | Description | Format | Example |
| zipCode | Zip code | Text | 94954 |
| date (optional) | Date of forecast. If date is omitted, the current forecast is returned. | Date String (YYYY-mm-dd) | 2012-02-01 |
| format | Format of the payload file returned. Options: <ul style="list-style-type: none">• CSV (text/csv)• JSON (application/json)• XML (application/xml) | Text | application/json |
| distance (optional) | If no reporting area is associated with the specified Zip Code, return a forecast from a nearby reporting area within this distance (in miles). | Number | 150 |
| API_KEY | Unique API key, associated with the AirNow user account. | Text | 4d36e978-e325-110ec1-06002be10318 |

| Outputs | | | |
|---------------|--|--------------------------|------------|
| Parameter | Description | Format | Example |
| DateIssued | Date the forecast was issued. | Date String (YYYY-mm-dd) | 2012-02-01 |
| DateForecast | Date for which the forecast applies. | Date String (YYYY-mm-dd) | 2012-02-02 |
| ReportingArea | City or area name for which the forecast applies. | Text | Napa |
| StateCode | Two-character state abbreviation. | Text | CA |
| Latitude | Latitude in decimal degrees. | Number | 38.33 |
| Longitude | Longitude in decimal degrees. | Number | -122.28 |
| ParameterName | Forecasted parameter name. | Text | Ozone |
| AQI | Numerical AQI value forecasted. When a numerical AQI value is not available, such as when only a categorical forecast has been submitted, a -1 will be returned. | Number | 45 |

Using the AirNow API

Mobile Apps pass user requests to the API and display the response.

`http://www.airnowapi.org/aq/forecast/zipCode/?format=text/csv&zipCode=27511&date=2014-02-03&distance=25&API_KEY=9985988E-D56F-E511`



What's next for the API

More spatial API services

- Share spatial data, rather than just point
- Enable dataflow into the EPA GeoPlatform
- Reengineer the mapping engine used to provide public maps on AirNow.gov

Prepare for growth

- API calls are already causing performance hits
 - We've limited users to 500 calls per hour
- API is growing rapidly
 - American Lung Association uses the API for their app
 - State department post in India is using API for their pages
 - App developers are signing up
 - We are migrating old file-based products to the API, i.e. feeds for Weather Channel, USA Today, CNN