# AIRSHED-BASED MANAGEMENT

## Lessons From the California Air Resources Board (CARB)

*Instruments and Institutions for India's National Clean Air Program (NCAP) Workshop on Relevant International Experiences*

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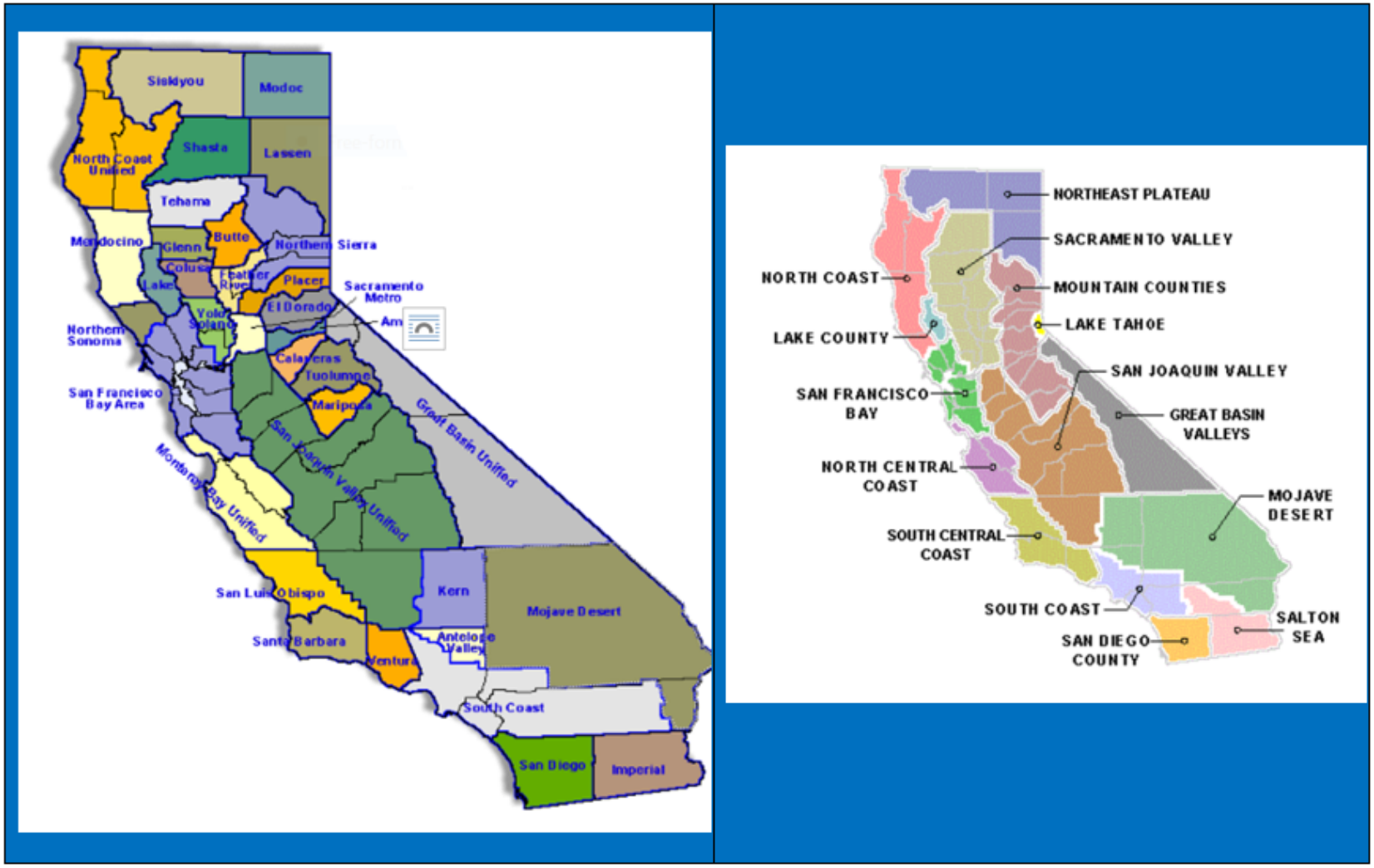
# 1. Background

- CARB established in 1967 to respond to the worst air quality situation in United State, which was characterized as a crisis.
- CARB is the primary agency in California responsible for maintaining healthy air quality.
- Realized that mobile sources transported across county boundaries could only be controlled by counties collaborating on air pollution control.
- Resulted in the establishment of the *California Air Act* allowing one or more counties to form "*air districts*".
- To manage air quality and air resources in California at a regional scale, the Air Resources Act of 1967 divided California further into "Air Basins" following similar geographic, typographic and meteorological conditions.
- CARB leads the efforts in California to address AQM planning and implementation.
- Air quality models were developed and enforced by CARB based on sound science.

# California: 35 Air Districts, 15 Air Basins and 58 Counties



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# 2. What does CARB do?

- Guides and oversees AQM activities of the 35 local “air districts”.
- Sets emission standards for mobile sources and develops programs that protect those at greatest risk (children, elderly, people with lung and heart diseases).
- Measures California’s progress in reducing pollutants using the most extensive AQ monitoring network in the US.
- Researches causes and effect of pollution problems and outlines cost and benefits of various abatements scenarios that are being built into AQM plans.
- More recent focus on low-income groups and strive to ensure that a substantive share of the income from fines (case settlements) benefits low-income and disadvantaged communities that are disproportionately impacted by air pollution.
- Leads California’s efforts to reduce climate change emissions including measures that promote a more energy efficient and resilient economy.
- Ensures that all AQM-related regulations in California undergo scientific peer review (usually by the University of California system of academic institutions).

# 3. CARB's structure and employees.

- CARB consists of 16 members: (i) 4 as technical experts on core AQM subjects (e.g. medicine/health, chemistry, physics, meteorology, engineering, business/law); (ii) 5 represent different regional control agencies (South Coast AQMD, Bay Area AQMD, San Diego County APCD, San Joaquin Valley APCD (SJV), Sacramento and one region from rural areas); (iii) 2 public members (iv) 1 Chair (only full-time member).

- South Coast ,Bay Area AQMDs and the San Joaquin Valley are regarded as the most air polluted areas in the US.

- 2 members representing the environmental justice community (1 appointed by the senate and 1 by the assembly) and 2 nonvoting members (also 1 appointed by the senate and 1 by the assembly).

- The chief legislator ensures that low-income and disadvantaged communities disproportionally impacted by air pollution are represented, for example, that "regional control agencies" and public members include representatives from these communities.

- Has about 1350 employees, mostly engineers and scientists (accounting for more than ¼ of all professionals working on AQM in CA). (Does not include employees in the 35 "air districts").

- Is engaged in more than 800 air quality programs in CA, divided in 35 topics.

# 4. Regulatory and legal powers and enforcement.

- California is the only state in the US that is permitted to issue emission standards for mobile sources under the federal Clean Air Act, subject to a waiver from US EPA. Other states may choose to follow CARB or federal standards but may not set their own standards.

- Based on legislation and standards set by either the federal government or by CARB, CARB regulates and enforces regulations for **mobile sources** that crosses borders of the air districts.

- The 35 “air districts”, (i.e. regional agencies under CARB), regulates **stationary sources** of air pollutants within their respective districts. Each air district enforces state and federal AQ laws and the rules adopted by each air district's Governing Board.

- Mutual Settlement Programs within each district offers the “Air District” and the source an opportunity to settle alleged violations without expensive and time-consuming litigation.

# 5. Examples of settlement cases:

- On average, CARB settles annually about 200 violation cases of state-wide engagement while each of the 35 “air districts” settle violation cases within their respective “air districts”.
- Examples of the around 1040 settlement cases CARB carried out from 2014 to August 2019 based on their enforcements of regulations and standards set by CARB:
- The Unilever case from 2014: Through routine inspections of consumer projects sold in CA, CARB disclosed that a company excessed VOC emission of 17 tons.
- The Volkswagen (VW) case from 2015: Based on CARBs technical testing capacity in enforcing its strict emission standards, it played a leading role in disclosing “defeat device software” applied in VW vehicles in the US 2009-15. CARB prepared also the “consent decree” between VW, CARB, US-EPA, and US DOJ that settled the VW case. Total settlement of USD 14.7 Billion
- The Fiat-Chrysler (FC) case from 2019: Like the VW case from 2015, CARB played the leading role in disclosing the use of “defeat devices software” to circumvent emission control in FC-cars in the US and CA and in the settlement case between FC, CARB, US-EPA and US DOJ.

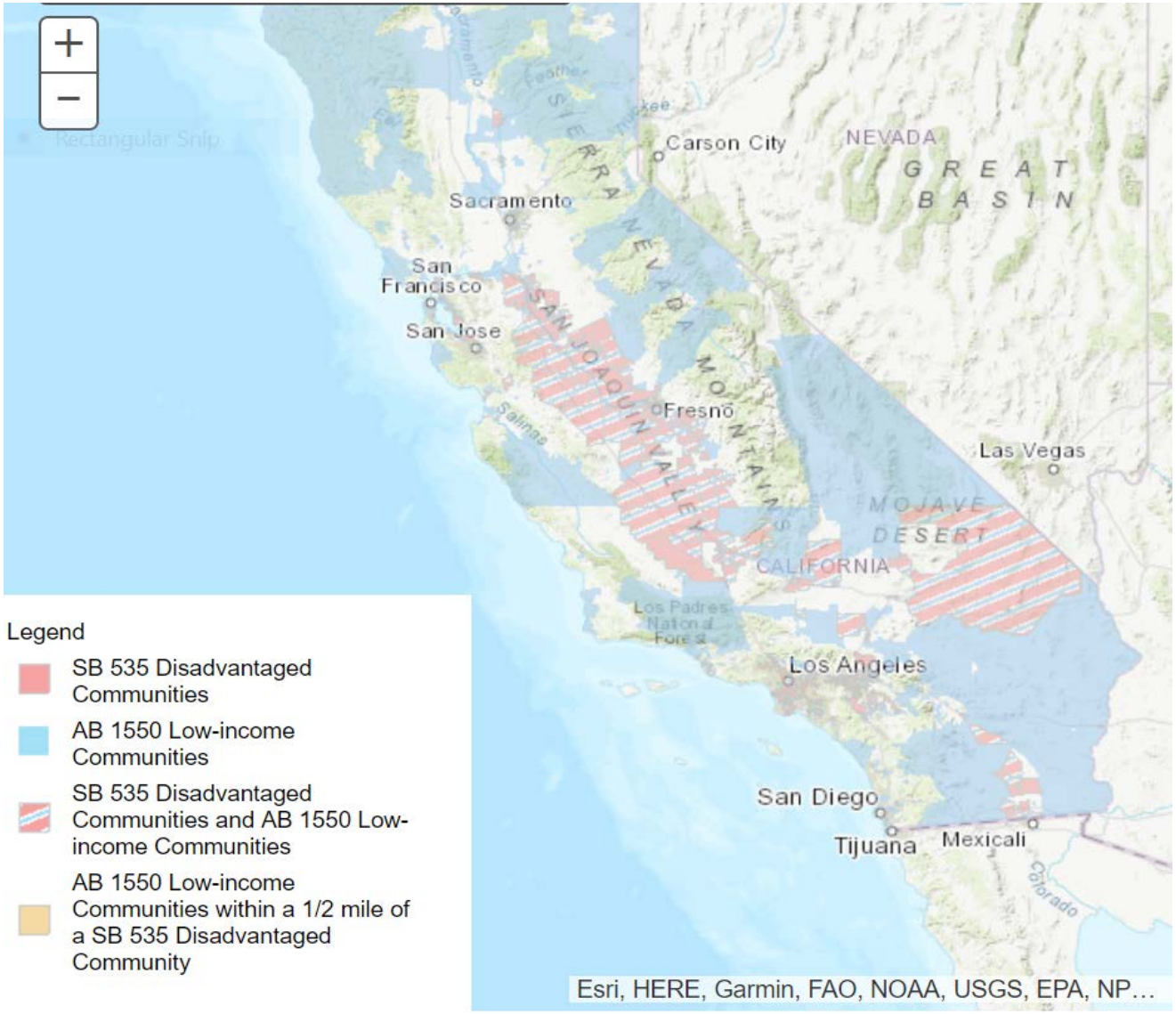
# 6. Examples of achievements by CARB (air quality and emissions):

- Current car fleet in CA is 99% cleaner than in 1970 (start-up of control).
- Since 2010, emissions of heavy-duty engines reduced by 98% compared to pre-control conditions.
- Ground level ozone ($O_3$) concentrations reduced by 60% compared to pre-control conditions through catalytic converters, low and zero-emission cars and trucks and cleaner fuels.
- On track to scale back to 1990 emission levels by 2020 and further reduce GHG emission levels by 40 % by 2030 and 80% by 2050 (both based on 1990 levels).

# 7. Supporting low-income and disadvantaged communities:

- CARBs funding mechanism is based on both fees, settlements and government (federal, state, county) -funded programs.
- About 15 programs targeted for AQM are established. Each program is managed by CARB and distributed to 35 air districts according to relevance by each air district (forms of polluters, low income and disadvantaged communities etc.).
- Most of the development funds from CARB is allocated to air districts with largest low-income and disadvantaged population groups.
- More well off air districts like Bay Area AQMD and South cost AQMD are largely funding their operations through fees and income grants from their respective counties while a low-income air district like San Joaquin Valley APCD is largely covering its income from program allocations.
- 87 % of the total revenue of San Joaquin Valley APCD comes from allocated program sources.
- 38 % of the revenue for Bay Area AQMDs and about 22% of the revenues for South Coast AQMDs.(both more well off “air districts) comes from program allocations.

# Supporting low-income and disadvantaged communities (cont):

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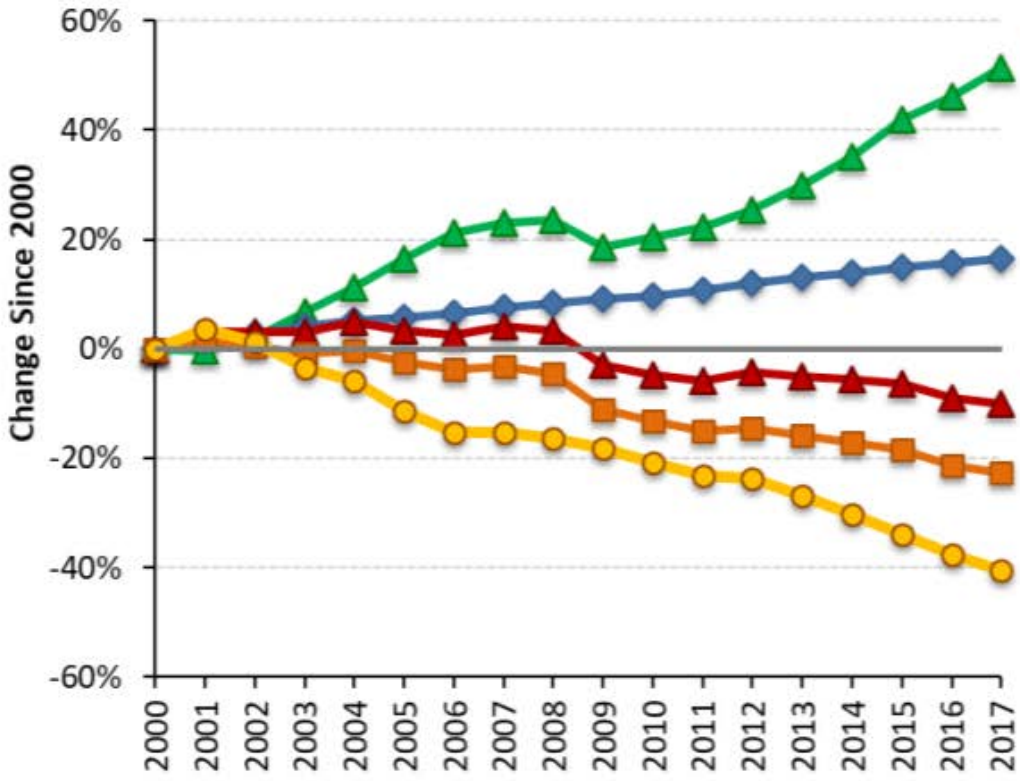
# 8. Some key Lessons?

- California could not substantively improve its air quality without establishing airshed management through CARB, 15 air basins and 35 air districts due to the mobile and transboundary nature of air pollutants.
- Mainly focusing on state-domestic capacity, leading technical, managerial and legal (settlement) capacities were established to enforce the strict emission and air quality standards.
- The “overlaying” structure of 1. state (CARB), 2. air basins (airsheds), 3. “air divisions” and 4. counties have worked well in California.
- Significant financial resources from CARB have been increasingly directed to improve air quality for low income and disadvantaged communities.
- Been able to combine economic growth, improvements in local air quality and reduction in GHGs

# 9. California's economic growth and reduction in GHGs (while improving the local air quality):

Figure 2a. Change in California GDP, Population, and GHG Emissions Since 2000




| Metric | Associated 2017 Value |
|---|---|
| GDP | 2.6 trillion (2012 $) |
| Population | 39.6 million |
| GHG Emissions | 424.1 MMT$CO_2e$ |
| GHG Emissions per Capita | 10.7 metric tons $CO_2e$ per person |
| GHG Emissions per GDP | 164 metric tons $CO_2e$ per million dollars |

# Some suggestions to consider for India:

- Build on *local scientific AQM communities* within own state/country (in CA: Stanford, Caltech, UC and state colleagues; in India could be within NCAP Knowledge Network Universities lead by IIT Kanpur and other highly engaged institutions such as TERI, NEERI, CREEW etc).

- Establishing an Air Resources Board (ARB) type of organization in the part of India with the most severe air pollution, the Indo-Gangetic Plain (IGP) ("crisis" location). IGP has geophysical conditions that make air pollution more difficult to control than in other parts of India, also with high density and lower income population.

# Some suggestions to consider for India (cont.):

- Consider an ARB that may go beyond a single state (e.g. a region within the IGP or a selected number of states that have substantive numbers of “non-attainment” cities).

- An ARB worked well in a large state like CA. CAs GDP is about USD 3 trillion, or slightly larger than India’s GDP of about USD 2.7 trillion. CAs land area of 424,000 $km^2$ is about the same as the combined area of Uttar Pradesh, Bihar and West Bengal (431,000 $km^3$) forming most of the Central and Eastern part of the IGP.

- Combine richer and lower income areas within the same geographic area (establish the basis for focusing on improving air quality for low income and disadvantaged communities.

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