

Key developments of air sensors for air quality management and effective communication with policy makers and stakeholders

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Types of Measurement Systems

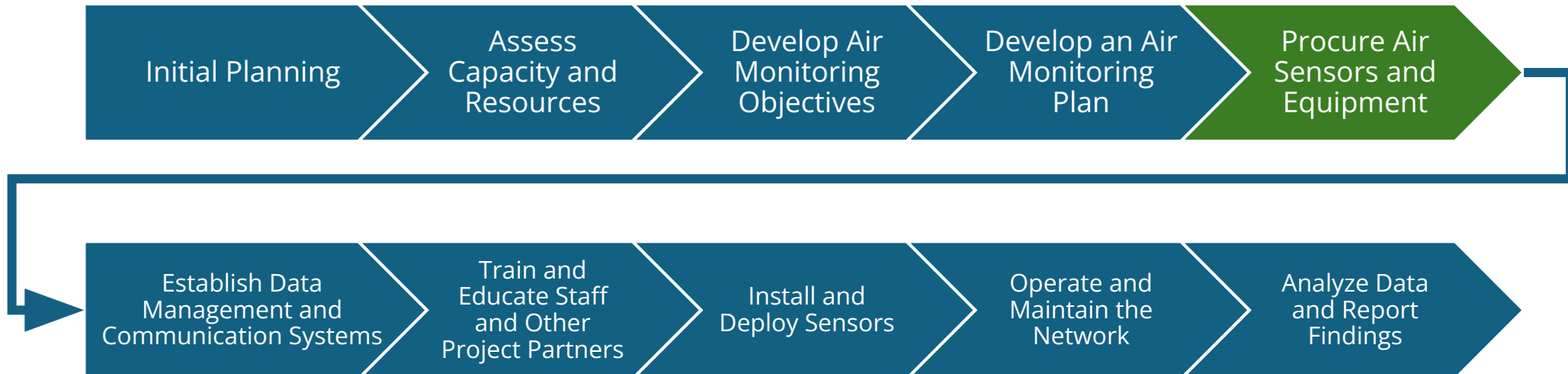
	Research Instruments	Satellite	Reference Instruments	Portable Instruments	Air Sensors (Low-Cost Sensors)
Cost	\$500,000 +	\$200,000 +	\$20,000 +	\$5,000 - 15,000	\$200 - 3,000
Ease of use	Expert	Expert	Expert	Expert	Anyone
Accuracy	Very Specific, Accurate	Specific, Accurate	Very accurate	Accurate	Varies
Data produced	Moderate	Moderate	Little	Moderate	Lots



Images from Bay Area Air District, European Space Agency, MassDEP, USGS, CDPHE

Low-Cost is Misleading

- Many sensors are “low-cost”
- However, successful monitoring programs involve many tasks to produce good data
- Important questions:
 - What is your end goal?
 - What does it take to get the data you need for action?



























Good News: "Some" Air Sensors Work

Air Sensors
Reference (Low-Cost
Instruments Sensors)

Activities 10+ years

- Surge in air sensor activity over the past decade
- Extensive performance evaluations
- Tested across different countries, climates, and pollution conditions
- Growing body of scientific studies
- Expanding use in real-world projects

	Particulate Matter		
	Ozone and Nitrogen Dioxide		
	Carbon Monoxide		
	Sulfur Dioxide		
	Black Carbon		
	Hydrocarbons & VOCs		
	Toxics		

	Accurate
	Sometimes accurate
	Not accurate

Organizations Are Using Air Sensor Data

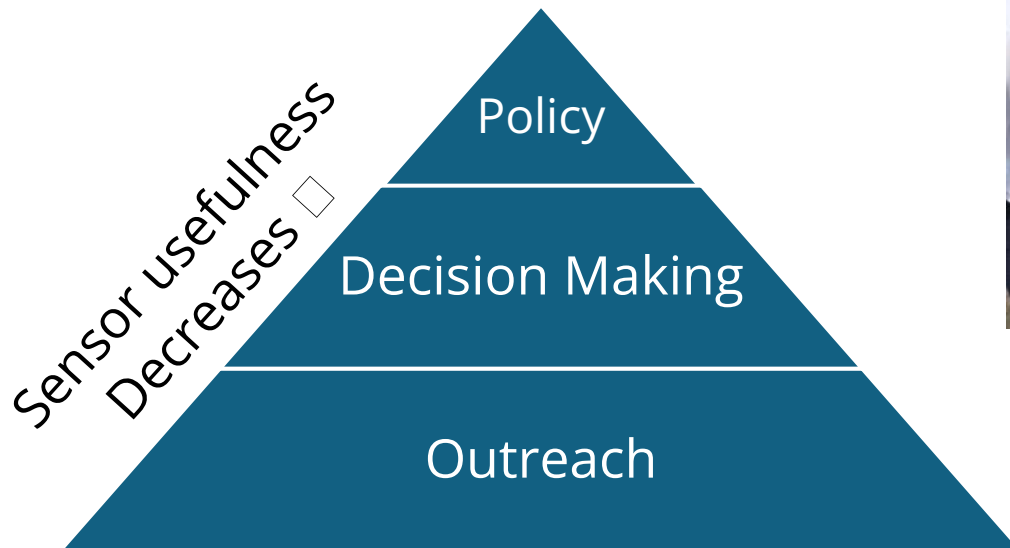
All types of organizations:

1. Governments
2. NGOs
3. Cities
4. Community Based Orgs
5. Academia



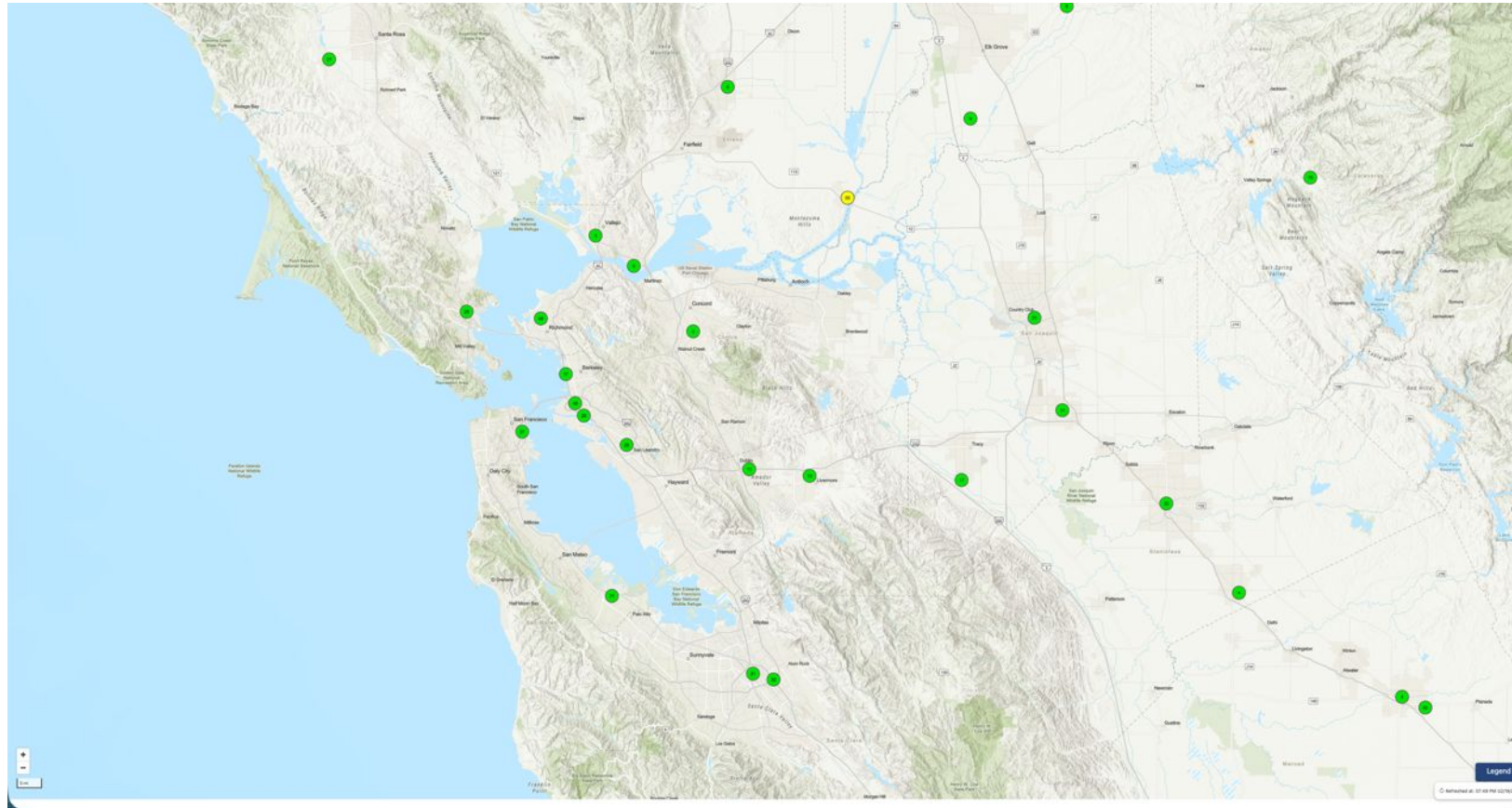
Clean Air Guides assist in air sensor operations at a regulatory monitoring station in Indore, India.

Data and advocacy led to community awareness and drove demand for action from the city (trash burning ban, traffic management, reduced bus idling)



Organizations Are Using Air Sensor Data

Government agencies now using PM_{2.5} sensor data for outreach and decision making.

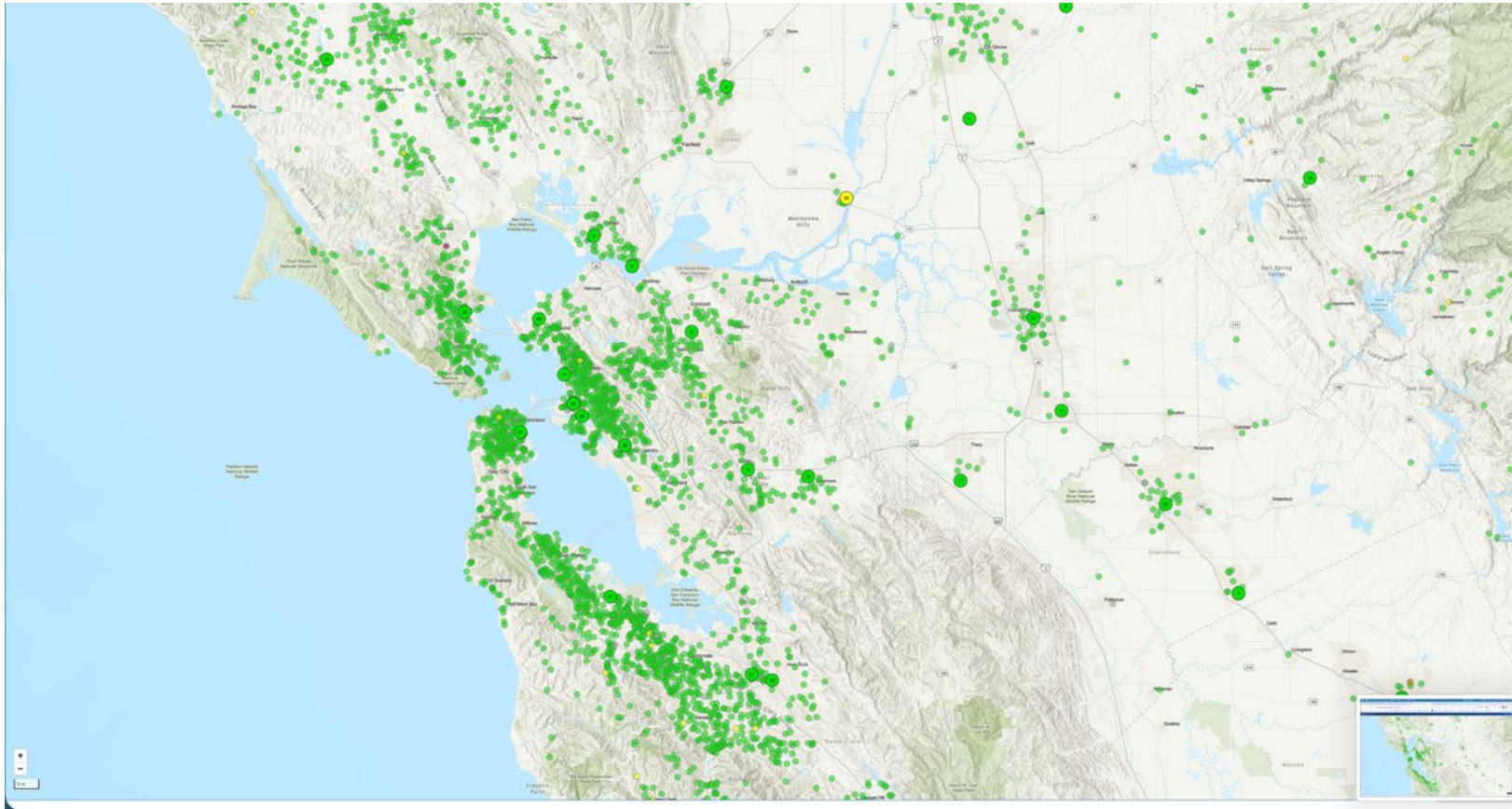


Example:
San Francisco, CA area

26 Regulatory PM_{2.5}
instruments operated by
air quality agencies.

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Example:
San Francisco, CA area

26 Regulatory PM_{2.5}
instruments operated by
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Merged with over 4000
PM_{2.5} air sensors.

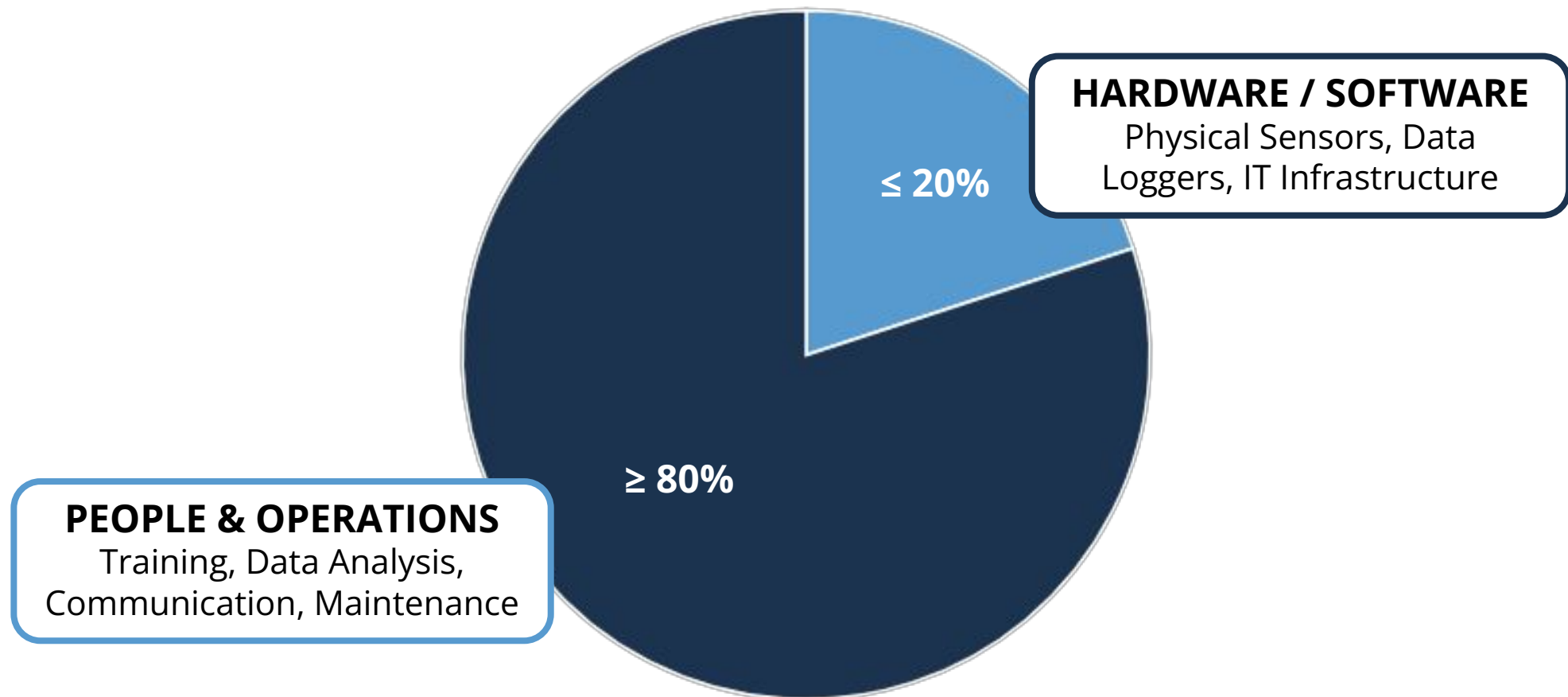
Hybrid Air Monitoring Networks are Best

- Air monitoring networks evolve over time.
- Grow by adding more sites and pollutants
- It's the combination of these different methods that produces a comprehensive picture of air quality



Invest in People, Not Technology

Follow the 80/20 rule of monitoring to make your project successful



Low-Cost is Misleading

Good News: "Some" Air Sensors Work

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