[EQuiPD] Equity in Air Quality Policy & Data Ecosystem

Self-assessment and recommendations tool

Please read the following information carefully before you start your self-assessment.

Introduction

The Equity in Air Quality Policy and Data Ecosystem (EQuiPD) self-assessment tool will help you understand your city's ability to effectively manage, use, craft, and implement policies at the intersection of air quality and equity - informed by air quality, health and equity data. Designing inclusive and equitable air quality policies is a major opportunity for cities as the benefits of such policies have the potential to deliver on borader city agendas such as:

1. Reducing health inequities
2. Improving accessibility, wellbeing, and resilience
3. Delivering fair green jobs and a just transition
4. Tackling cost of living challenges and supporting local economies
5. Empowering and building coalitions of clean air advocates and allies

EQuiPD helps you identify gaps across your city's data ecosystem and is accompanied by recommendations, rationales and language that will help your team advocate for the needed resources to strengthen this ecosystem. As a result of the self-assessment you will recieve tailored recommendations on how to strengthen: your city's underlying data resources, technical capacities to manage and process data, and partnerships for sharing and integrating air quality, health and equity data, which together compliment your city's efforts to ensure more equitable policy outcomes - that are sustainable and reach more people, leaving no one behind.

The scope of this tool is limited to evaluating data specific skills and capacities within a city, which include community engagement as far as data collection, validation and application to policy are concerned. However, this aspect of the tool should not be considered stand-alone; these questions and recommendations should fit within a city's broader framework that supports inclusive community engagement and empowerment processes to co-deliver ambitious action with residents. For further guidance on inclusive and meaningful community engagement in air quality policy making, users of this tool are encouraged to consult other tools and resources that engage more deeply with the nuances, complexities and best practices of

Further Reading

Clean air, healthy and thriving communities: Opportunities for city leadership

Contents of this assessment

This tool includes: an overview/ introduction (not editable), a section on how to use the self-assessment tool (not editable), a list of self-assessment questions (editable), a scoring section (not editable - this gets filled out automatically once a city completes the self-assessment in tab 1); and recommendations (not editable - this gets filled out automatically once a city completes the self-assessment in tab 1); Definitions and Glossary of terms (not editable, for awareness only); QCount (not editable, for information only); Scoring table (not editable - this gets filled out automatically once you complete the self-assessment and is the backend calculator that drives the graph/figure shown on the 'scoring' tab.)

The only section that you are required to fill in and edit is: column D in the 'self-assessment' tab. Everything else is filled out automatically.

A PDF with high level information and the full list of questions is also available in case you want to see an overview of the key elements found within the tool.You can download the PDF from the same platform where you accessed this excel document.

Please note that C40 is continuously improving this tool. If you wish to share suggestions for feedback or improvement, please email the Air Quality team at C40: c40airqualityteam@c40.org

Further Reading

Considerations before you start

Further Reading

It is recommended that your team fills out as many sections as possible.

(a) There are up to 80 questions in the tool. Consider filling out each section at different stages and times in your schedule over a week.
(b) You may need to seek out colleagues in your - or other - department(s). The purpose of the tool is to also encourage you to break silos and work across air quality, health, economic and social departments.

How to use the self-assessment tool

Rationale behind the questions

The EQuiPD self-assessment contains 80 questions regarding data in our city. These questions are broken down across different **categories** of a data ecosystem: (a) how data is collected, (b) linked, (c) disaggregated and integrated, (d) analyzed, and (e) communicated. The strengths that cities have to do well within each of these categories are defined by different capacities of skills and resources, in this tool, these are defined as **domains** and assess a city's: (a) technical capacity, (b) data integration capacity, (c) internal processes, and (d) participation and empowerment. You can find more detail about how this tool uses each of these terms following the link to further reading. -->

Most importantly, all the questions in this tool have been designed specifically to understand how your city is factoring equity across all categories of the data ecosystem. To understand this, this tool uses three crosscutting themes that influence how communities are differently impacted by exposure to - and risk of - air pollution:

Distributional Equity
Equity and air quality data is useful in and of itself to develop a more complete understanding of your city. This theme examines whether benefits, risks, costs, and opportunities from policies are fairly distributed among different social, economic, and demographic groups. Questions generally revolve around assessing health inequalities, cost of living, and fairness of air quality actions to better understand the components of air pollution injustice.

Socioeconomic Resilience and Opportunity
Equity and air quality data is useful in and of itself to develop a more complete understanding of your city. This theme examines whether benefits, risks, costs, and opportunities from policies are fairly distributed among different social, economic, and demographic groups. Questions generally revolve around assessing health inequalities, cost of living, and fairness of air quality actions to better understand the components of air pollution injustice.

Access and Inclusivity
Ensuring equitable outcomes along the five equity impact areas outlined by C40. This theme addresses equitable access to information, services, public resources, infrastructure, participation in decision-making, and physical environments for all communities, especially those historically marginalized. Questions focus on accessibility and inclusion to services, public spaces, and information as well as engagement and decision making around data.

Answering the questions

Self-scoring is necessary as you have the best knowledge of your own city's capacities. The scoring scale for all questions is described at the top of the 'self-assessment' tab.

****Note: Questions marked '*' are essential to answer and should not be skipped. Other questions will help add nuance for EQuiPD to understand your city's policy and data ecosystem and are highly recommended to answer.**

As you make progress in developing your city's data ecosystem for equitable air quality policies you are encouraged to redo this assessment again in the future and reflect on growth over time.

After assigning scores to all questions, you can directly upload this document into the online tool for visualization and identification of strengths and gaps as well as recommendations or examples to enhance and prepare your city's data ecosystem for equitable policy development.

Further Reading

Additional descriptions on categories, domains, and themes of equity used throughout this tool

Further Reading

You can find a more detailed description of the scoring system in the 'self-assesment' tab

[EQuiPD] Equity in Air Quality Policy & Data Ecosystem

Self-Assessment

How to score your answers

The EQuiPD self-assessment contains 80 questions regarding data in our city. These questions are broken down across how data is collected, linked, disaggregated and integrated, analyzed, and communicated. Your responses to these questions will be used to calculate scores across six categories within four ecosystem domains and three themes of equity (see [1] for more detail). As you make progress in developing your city's data ecosystem for equitable air quality policies, you are encouraged to redo this assessment again in the future and reflect on growth over time.

***Note: Questions marked '*' are essential to answer and should not be skipped (these are listed first). Other questions (expandable with [+] on left of screen) will help add nuance for EQuiPD to understand your city's policy and data ecosystem and are highly recommended to answer.*

If a question is not applicable to your city, leaving the score blank will exclude it from scoring.

Self-scoring is necessary as you have the best knowledge of your own city's capacities. The scoring scale for all questions is described as follows. You may assign fractional scores (e.g., 2.5) if you fall between two scores. Questions you believe are best answered using a yes or no can be scored as 3 (yes) or 0 (no).

0 No implementation or unknown.

1 Limited implementation. Pilot work is underway related to some aspects of this question, but it is not sustainable or will not provide long-term actionable insights.

2 Partial implementation. There is operational work related to this question that is ongoing but may be limited in terms of equity integration (e.g., it has not reached marginalized neighborhoods or cannot fully quantify or address potential disparities).

3 Full implementation. Long-term, sustainable, and transparent ability to address this question. Equity is given full consideration with disaggregation (when applicable) across multiple characterizations (i.e., demographic, socioeconomic).

After assigning scores to all questions, you can directly upload this document into the online tool for visualization and identification of strengths and gaps as well as recommendations or examples to enhance and prepare your city's data ecosystem for equitable policy development.

[1] Additional descriptions on categories, domains, and themes of equity used throughout this tool

Glossary of Terms

Self-Assessment Questions

Preliminary	Answers	
City name? (Use dropdown list to select from C40 cities, or enter 'Not listed')		*Required for upload to web app*
Other city (write here, formatted as "Country - City")		
Name of person filling out this self-assessment?		
Date completed		*Required for upload to web app*
Are you willing to share your results with other C40 cities? (Yes/No)	Yes	*Must be 'Yes' for upload to web app*

	Data Collection (Health, Air Quality, Demographics, Socioeconomics)	Score (0-3)	Notes
1	*Do air pollution monitoring locations prioritize high-risk groups (for example., children, elderly, people with pre-existing conditions) and neighborhoods with historical underinvestment?		
2	*Does your city collect/have access to air pollution data at high spatial and temporal resolution, especially in areas of concern and prioritize high risk groups (e.g., children, elderly, underinvested neighborhoods)? Spatial and temporal resolution should be high enough to identify specific neighborhoods and other areas of your city that are disproportionately impacted by air pollution.		
3	*Does your city collect/have access to air pollution data from point, area, and mobile sources, including power plants, shipping lanes, transportation hubs and routes, and industrial areas?		
4	*Does your city collect/have access to regarding the type of energy sources (coal, oil, gas, renewables, etc.) used by households in your city, as well as the location and number of such households? For example, do you know the location and number of households that have access to “clean energy,” which includes energy sources that produce no greenhouse gas emissions during their production or use?		
5	*Does your city collect/have access to detailed social, demographic, and economic data about its residents and where they live? These datasets might include resident age, sex and gender, income, migration status, county of origin, racial or ethnic identity, religious affiliation, primary language spoken, education level, employment status, and occupation. They might also include area-level variables like poverty rates or joblessness rates. This data is critical to understanding the sociodemographic composition of neighborhoods and how some groups might be affected by air pollution and air quality policies more than others.		
6	*Does your city collect/have access to real-time meteorological forecast data for your city and the surrounding areas? Meteorological data can be important both for air quality monitoring and for alerting residents to potential health hazards. Such data is particularly important for cities that experience extreme weather events.		
7	*Does your city collect/have access to data on accessibility that can characterize inequities for specific high-risk populations, such as low-income or elderly populations? For this question, “accessibility” refers to whether all city residents–regardless of their physical or intellectual abilities–can interact with the information on air quality and related issues that you provide.		
8	*Does your city have data on the accessibility of clean air shelters or green zones for high-risk groups? Specifically, can you analyse access via low-pollution routes (e.g., green corridors, public transit) versus high-exposure routes?		

9	*Does your city collect/have access to health outcome data at high spatial and temporal resolution? For example, does it collect/have access to data on the number of daily visits to specific clinics or hospitals (and the causes for those visits), or the number of child absences from city schools? "High spatial resolution" means that you know the approximate location (residential address, address of medical facility, or neighborhood) of the health event. "High temporal resolution" means daily or, at a minimum, weekly counts, though yearly counts can still be helpful when modeling the impacts of air pollution policies over long periods of time. Note: this question only asks whether the city government collect/have access tos this data directly. Separate questions later in the questionnaire will ask about data sharing with hospitals, ministries of health, and other groups that may have health data.	
10	*Does your city collect/have access to labor market data (e.g., by gender, race/ethnicity, age, region, occupation) on current workforce composition, sectoral vulnerabilities related to air quality policies and energy transitions, and potential for participation in green job sectors?	
11	*Does your city collect/have access to data on the combined impacts of air quality interventions on employment in economically disadvantaged communities? For example, are potential job losses or gains due to air quality interventions monitored? For this question, consider all types of "air quality interventions,", including transitions to clean (or cleaner) energy, clean (or cleaner) transportation, clean (or cleaner) waste management systems, or any other policy or program meant to reduce air pollution.	
12	*Does your city systematically keep track of and report track and report data gaps (for example, missing, unavailable, or non-disaggregated data, such as lack of gender breakdown) in its datasets that might disproportionately impact marginalized communities? For this question, "datasets" include all datasets relevant to equity analyses, such as data on health burdens, employment opportunities, economic activity, accessibility (e.g., transportation), etc.	
13	*Does your city have systems for documentation and version control for all of its datasets?	
14	*Do air quality modeling staff collaborate with staff maintaining air quality monitoring networks so that they can bias-correct model predictions?	
	Additional important questions to consider (expand using [+] on left)	

	Data Partnerships and Linkages	Score (0-3)	Notes
26	*Does your city employ staff or consultants responsible for maintaining and linking air quality, environmental, demographic, health, economic, and other datasets and data pipelines? A "data pipeline" can include computing scripts–often in Python, R, or a similar language–that can make data available for analysis and sharing.		
27	*Has your city established data sharing partnerships between each department within your city that collects datasets that are important for analyzing the equity impacts of air quality policies? These departments in your city may include environmental and air quality departments, planning departments, health departments, transportation departments, and economic development or employment departments. Partnerships may take many forms, including regularly scheduled communication among departments, cross-department working groups, or data sharing agreements and Memorandums of Understanding.		

28	*Has your city established partnerships and processes to share air quality data with relevant officials in other levels of government, including state / provincial and national levels, that affect your city? Relevant officials may include those in ministries of health, public health, environment, transportation, economic development, infrastructure, and others.	
29	*Has your city established partnerships and processes to share health and economic impact/disparities data with relevant officials in other levels of government, including state / provincial and national levels, that affect your city? Relevant officials may include those in ministries of health, public health, environment, transportation, economic development, infrastructure, and others.	
30	*Does your city have the capacity to link air pollution model data (versus monitor data), particularly where either regulatory or low-cost air pollution monitor data is sparse? Air pollution model data (rather than monitor-based data) are often produced by outside experts. Thus, model-based data often needs to be linked. This question asks whether your city has the capacity to link this type of data.	
31	*Does your city link data on housing conditions, energy use patterns, household activities and behaviors, and indoor air pollutant sources?	
32	*Are emission and/or air quality datasets linked with workforce data (e.g., employment sectors, wages, occupational health)?	
33	*Does your city link source-specific emissions monitoring data to health and economic datasets? For example, traffic-related NO2 data could be linked with childhood asthma rates, or shipping sulfur data could be linked with respiratory hospitalizations.	
	Additional important questions to consider (expand using [+] on left)	

	Data Disaggregation and Integration	Score (0-3)	Notes
41	*Does your city map historical data (e.g., data over many years) on environmental burdens (air pollution, heat waves, floods, chemical exposures, etc.) and sociodemographic characteristics (including poverty rates, migration status, race / ethnicity of residents, etc.) across neighborhoods? Put differently, can you visualize on a map the number of environmental burdens each neighborhood in your city has experienced over time to understand whether and where high-risk groups may face higher levels of total environmental burdens? Burdens may include floods, heat waves, toxic chemical contamination, and other environmental burdens?		
42	*Is your city able to disaggregate air quality data to measure how different groups in your city–and particularly marginalized communities and high-risk groups–are exposed to different levels of air pollution? This process generally requires cities to be able to link and map sociodemographic and air pollution data, and to understand both (1) how air pollution differs across neighborhoods and (2) sociodemographic characteristics of groups living in highly polluted neighborhoods.		
43	*Are you able to disaggregate all other environmental data sources–including those measuring point / source emissions, meteorology, floods, and chemical use–by sociodemographic characteristics? As in the question above related to air pollution data, this ability is central to understanding health and economic equity impacts of air pollution.		
44	*Can your city disaggregate labor market and economic data sources--including those job creation, job loss, and other economic costs-–by sociodemographic characteristics?		
45	*Are all health outcomes related to air pollution exposure disaggregated by sociodemographic characteristics such as race, income, age, gender, and geography?		
46	*Does your city disaggregate air pollution, environmental, health, and economic data by multiple sociodemographic characteristics simultaneously? For example, some cities may disaggregate air pollution exposure by one characteristic (e.g., nativity) at a time. However, more detailed equity analyses consider the impact of intersecting facets of identity and social position. As such, they may disaggregate data based on two or more characteristics (e.g., nativity and poverty status) at the same time. In these cases, you might consider how air pollution exposure differs among, for example, low-income migrant residents, high-income migrant residents, low-income native residents, and high-income native residents.		
47	*Do your city's analyses incorporate spatially and temporally aligned (i.e., "harmonized") demographic, air quality, health, and economic outcome data? In other words, if you use demographic, air quality, health, and economic data in your analyses, were the various types of data collected during the same time period and at the same spatial scale (for example., street-level, neighborhood-level, city-level, province-level, etc.)?		
	Additional important questions to consider (expand using [+] on left)		

	Data Analysis and Modeling	Score (0-3)	Notes
50	*Does your city have access to computing resources including computers and statistical analysis software (e.g., R, SAS, or similar software, as well as GIS software) that can (1) process large-scale datasets and (2) estimate differences in air pollution risks across different population groups? It is important that these computing resources are powerful enough to handle large datasets and to estimate how health and economic outcomes are affected by air pollution (i.e., so-called "exposure-response datasets and risk models").		
51	*Does your city systematically measure the effects of air quality policies to ensure they reduce inequities in air pollution exposure and related health economic effects? For example, the AQUA tool from C40 is one tool that can be used to measure health effects, but your city may choose other tools for this purpose.		
52	*Are health risks from air pollution explicitly modeled for multiple sociodemographic characteristics, and do these risks consider non-chemical stressors?		
53	*Are baseline population and health outcome incidence data available?		
54	*Are analyses stratified by sociodemographic characteristics to assess whether high-risk groups benefit equally from interventions?		
55	*Do evaluations attempt to assess whether health and economic disparities among marginalized communities (compared to communities who are not marginalized) from air pollution and air quality policies are narrowing or widening over time?		
56	*Are policy-based scenarios evaluated for distributional fairness (who benefits most/least)?		
57	*Are health and equity outcomes among marginalized communities or high-risk groups (children, elderly, people with chronic illness) explicitly quantified?		
58	*Do health and economic impact assessments of air quality policies include analyses of differential burdens across diverse groups and local economies (e.g., low income workers)?		
59	*Does your city analyze health and economic costs associated with policy compliance or adaptation and how this is distributed across communities and businesses of different sizes?		
60	*Does your city have programs or policies to ensure that members from marginalized communities, high-risk groups, or areas disproportionately impacted by air pollution are engaged in decisionmaking about how to interpret and analyze air pollution data from your city?		
	Additional important questions to consider (expand using [+] on left)		

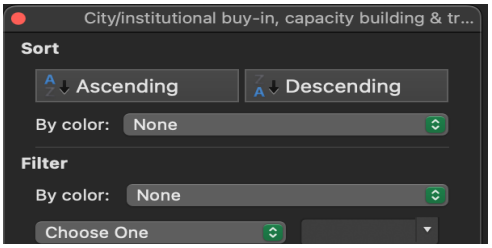
	Data Communication	Score (0-3)	Notes
69	*Can the public access your city's air quality and emissions data for free? Public access could include internet-based tools or apps. Note: This specific question refers only to the ability of the public to access your data. It does not refer to whether the public actually uses whatever tools may exist.		
70	*Are public-facing data platforms designed with community input to ensure accessibility (e.g., mobile-friendly, low-data consumption, interactive maps) rather than relying solely on raw data files?		
71	*Are real-time air quality alerts and warnings, resources, and recommendations for protective actions available to residents in all neighborhoods in your city? For this question, consider whether these resources (alerts, recommendations, etc.) are disseminated through multiple platforms, including websites, apps, text messaging, or other media.		
72	*Are policy effects evaluated and reported back to communities in a transparent and publicly accessible way?		
73	*Are local community members and business leaders actively engaged in decision-making regarding data sources, data use, and data analyses, not just consulted after the fact?		
74	*Are stakeholders within the government able to access and distribute quality-assured air quality data?		
	Additional important questions to consider (expand using [+] on left)		

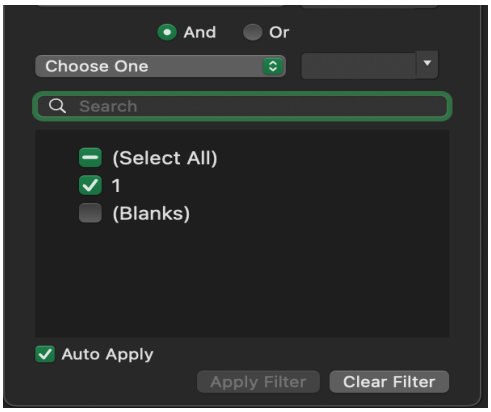
Finished? Visit the 'Scoring' tab to see your results

[EQuiPD] Equity in Air Quality Policy & Data Ecosystem

Recommendations

This is an optional activity to further explore and understand the results of your assessment as well as access recommendations related to different categories, domains, and/or equity themes. To investigate a particular area of interest, use the dropdown arrows in the right-hand columns (cells H7-T7) and check '1' (uncheck 'Blanks') for the areas you are interested in learning more about. See Figure at right to see an example of how to filter. The resulting questions shown will be directly relevant to the areas you have selected to filter.





	Data Collection	Score	Recommendations
1	*Do air pollution monitoring locations prioritize high-risk groups (for example., children, elderly, people with pre-existing conditions) and neighborhoods with historical underinvestment?	0	Develop a structured siting protocol that evaluates sensitive populations, land use, and pollution sources to ensure monitors are placed where health, social, economic inequities are highest. Examples: Install monitors near schools located by major roadways; add sensors in neighborhoods with high asthma hospitalization rates or high rates of joblessness or poverty.
2	*Does your city collect/have access to air pollution data at high spatial and temporal resolution, especially in areas of concern and prioritize high risk groups (e.g., children, elderly, underinvested neighborhoods)? Spatial and temporal resolution should be high enough to identify specific neighborhoods and other areas of your city that are disproportionately impacted by air pollution.	0	Deploy more sensors in environmental justice neighborhoods where pollution varies block-to-block. Examples: Install sensors along heavy truck freight routes; add outdoor sensors around senior housing complexes affected by idling buses.
3	*Does your city collect/have access to air pollution data from point, area, and mobile sources, including power plants, shipping lanes, transportation hubs anc routes, and industrial areas?	0	Integrate all major emissions inventories, including industrial, commercial, and mobile sources, into a unified city emissions tracking database. Examples: Merge port cargo handling equipment emissions with truck movement data; integrate airport ground operations emissions into citywide inventory.
4	*Does your city collect/have access to regarding the type of energy sources (coal, oil, gas, renewables, etc.) used by households in your city, as well as the location and number of such households? For example, do you know the location and number of households that have access to “clean energy,” which includes energy sources that produce no greenhouse gas emissions during their production or use?	0	Gather or estimate household fuel-use patterns to identify indoor and outdoor emissions sources. Examples: Map homes still using wood stoves; identify multifamily buildings heated with older oil boilers.

5	*Does your city collect/have access to detailed social, demographic, and economic data about its residents and where they live? These datasets might include resident age, sex and gender, income, migration status, county of origin, racial or ethnic identity, religious affiliation, primary language spoken, education level, employment status, and occupation. They might also include area-level variables like poverty rates or joblessness rates. This data is critical to understanding the sociodemographic composition of neighborhoods and how some groups might be affected by air pollution and air quality policies more than others.	0	Develop neighborhood- or block-level demographic datasets to support granular equity analyses and pollutant-exposure comparisons. Examples: Map block-level renter density; compile household-income distributions at sub-neighborhood scales.
6	*Does your city collect/have access to real-time meteorological forecast data for your city and the surrounding areas? Meteorological data can be important both for air quality monitoring and for alerting residents to potential health hazards. Such data is particularly important for cities that experience extreme weather events.	0	Integrate real-time meteorological forecasts with pollution modeling for better short-term predictions. Examples: Ingest hourly wind direction forecasts to predict smoke movement; apply inversion forecast data during winter stagnation periods; or simply record air temperature highs and lows alongside air quality data.

7	*Does your city collect/have access to data on accessibility that can characterize inequities for specific high-risk populations, such as low-income or elderly populations? For this question, “accessibility” refers to whether all city residents–regardless of their physical or intellectual abilities–can interact with the information on air quality and related issues that you provide.	0	Conduct accessibility audits and study barriers that limit public access to air quality information. Examples: Survey speakers of non-native languages about website usability; analyze whether mobile users can navigate the dashboard easily.
8	*Does your city have data on the accessibility of clean air shelters or green zones for high-risk groups? Specifically, can you analyse access via low-pollution routes (e.g., green corridors, public transit) versus high-exposure routes?	0	Map clean-air shelters and measure their accessibility by transit and walking. Examples: Identify libraries with HEPA filtration; evaluate whether shelters near industrial zones have transit service after 20:00 (8:00pm).
9	*Does your city collect/have access to health outcome data at high spatial and temporal resolution? For example, does it collect/have access to data on the number of daily visits to specific clinics or hospitals (and the causes for those visits), or the number of child absences from city schools? “High spatial resolution” means that you know the approximate location (residential address, address of medical facility, or neighborhood) of the health event. “High temporal resolution” means daily or, at a minimum, weekly counts, though yearly counts can still be helpful when modeling the impacts of air pollution policies over long periods of time. Note: this question only asks whether the city government collect/have access tos this data directly. Separate questions later in the questionnaire will ask about data sharing with hospitals, ministries of health, and other groups that may have health data.	0	Create secure, geocoded feeds of de-identified health data to track pollution-related illnesses. Examples: Receive weekly asthma-related ER visit counts by neighborhood; map clinic visits for COPD exacerbations.
10	*Does your city collect/have access to labor market data (e.g., by gender, race/ethnicity, age, region, occupation) on current workforce composition, sectoral vulnerabilities related to air quality policies and energy transitions, and potential for participation in green job sectors?	0	Acquire workforce and labor sector datasets to evaluate impacts of environmental policies on workers. Examples: Map diesel mechanic employment by racial or ethnic identity or country of origin; identify neighborhoods dependent on refinery-related jobs.
11	*Does your city collect/have access to data on the combined impacts of air quality interventions on employment in economically disadvantaged communities? For example, are potential job losses or gains due to air quality interventions monitored? For this question, consider all types of “air quality interventions,”, including transitions to clean (or cleaner) energy, clean (or cleaner) transportation, clean (or cleaner) waste management systems, or any other policy or program meant to reduce air pollution.	0	Require job impact assessments for major clean air interventions to understand workforce consequences. Examples: Model job shifts from gas station closures; evaluate employment impacts of electrifying municipal fleets.

12	*Does your city systematically keep track of and report track and report data gaps (for example, missing, unavailable, or non-disaggregated data, such as lack of gender breakdown) in its datasets that might disproportionately impact marginalized communities? For this question, “datasets” include all datasets relevant to equity analyses, such as data on health burdens, employment opportunities, economic activity, accessibility (e.g., transportation), etc.	0	Maintain a transparent registry documenting data gaps that hinder equity assessments. Examples: Note missing small business fuel use data; flag insufficient temporal coverage for neighborhood-level PM2.5.
13	*Does your city have systems for documentation and version control for all of its datasets?	0	Use version-controlled repositories to store datasets, code, and metadata. Examples: Maintain emissions inventory scripts in GitHub; track model update history through tagged releases.
14	*Do air quality modeling staff collaborate with staff maintaining air quality monitoring networks so that they can bias-correct model predictions?	0	Hold regular coordination meetings between modeling and monitoring teams to align assumptions and calibration. Examples: Update modelers on new monitor calibration methods; inform monitoring teams about modeling parameter changes.
15	Are members from marginalized communities or high-risk groups–or from areas disproportionately impacted by air pollution in your city–engaged in decisionmaking about where to locate air pollution monitors? Marginalized community members may include low-income residents, racial or ethnic minority groups, migrants, linguistic minorities, religious minorities, Indigenous peoples, women, or any other oppressed or disenfranchised group.	0	Create a community advisory panel with real decision-making power in monitor placement to ensure lived experience shapes data coverage. Examples: Allow residents to vote on final monitor placements in two high-pollution corridors; rotate panel membership annually to include renters from impacted zones.
16	Are labor unions, worker cooperatives, and community organizations actively engaged in decisionmaking about where to locate air pollution monitors? Spatial and temporal resolution should be high enough to identify specific neighborhoods and other areas of your city that are disproportionately impacted by air pollution.	0	Include unions and community groups in siting workshops so occupational and local knowledge informs placement. Examples: Hold sessions with custodial worker unions to map indoor/outdoor hotspots; invite public housing tenant groups to identify overlooked pollution areas.
17	Are smaller, un-inventoried, unconventional, hyper-local, or illegal sources of air pollution tracked by your city, preferably in consultation with marginalized communities and high risk groups? Such sources may include backyard burning or unlicensed chemical use.	0	Set up a reporting system where city residents can submit reports of emissions from small and unconventional sources that are often missed in inventories. Examples: Register generators used by food trucks; log emissions from small auto-body shops using solvent-based paints.
18	Does your city government have partnerships with industry, transportation, and agricultural sectors to improve emission inventories?	0	Convene an emissions-improvement working group with major sectors to update inventories annually. Examples: Meet quarterly with refinery operators to review flaring data; coordinate with warehouse operators to track truck fleet turnover.
19	Does your city have the ability (sensors, expertise, etc) to gather indoor air quality data across diverse housing types and locations (e.g., underinvested neighborhoods, high-rise apartments)?	0	Deploy portable indoor air sensors with partners such as housing authorities to understand indoor exposures. Examples: Place sensors in public-housing units during winter heating season; monitor indoor PM2.5 in childcare centers near freeways.

20	Does your city collect/have access to data on indoor air quality proxy measures? "Proxy measures" include any data points that indicate potential indoor air quality problems. For example, mold complaints or mold abatement requests can indicate homes with poor indoor air quality.	0	Incorporate housing complaints and code enforcement requests as indicators of indoor air quality issues. Examples: Flag ventilation failure complaints; track mold reports as indicators of moisture-driven air quality concerns.
21	Does your city track and make available data on cumulative impacts to health and equity (e.g., drinking water quality, pesticide use, chemical exposures)?	0	Build an integrated hazard dashboard combining environmental, health, and exposure indicators. Examples: Show PM2.5 and ozone next to heat-index alerts; visualize multi-day wildfire smoke forecasts alongside hospital surge data.
22	Do you collect/have access to data on how air quality-related costs (such as energy or transportation expenses) affect households and businesses?	0	Track household energy and transportation burdens to understand economic stress linked to pollution and energy transitions. Examples: Analyze utility bill data for low-income households; survey commute distances for car-dependent neighborhoods.
23	Are members of communities that are disproportionately impacted by air pollution engaged in the design and review of data systems that monitor labor market data and other job-related outcomes? For this question, "job-related" outcomes include opportunities to participate in job retraining, job placement, and green job creation programs. This is important because air quality policies may not be equitable if they result in economic hardship for high-risk groups. Instead, equitable air quality policies should provide benefits to high-risk groups, including economic and job-related benefits.	0	Hold co-design workshops with workers and communities to shape labor data systems used in policy decisions. Examples: Host sessions with delivery drivers affected by zero emission zones; collaborate with warehouse workers on job quality indicators.
24	Does your city collect/have access to data to track economic transitions related to air quality (e.g., shifts in employment, consumer prices, small business closures/openings)?	0	Monitor economic indicators linked to environmental transitions to anticipate job shifts or cost burdens. Examples: Track employment changes after electrifying port drayage; monitor small business costs related to new emissions standards.
25	Is there a mechanism (for example, regular meetings in neighborhoods across your city) to ensure that community-generated data and lived experiences are collected and used by city government staff for policy, resource allocation, and program design?	0	Create a platform for uploading community-generated observations, sensor data, or complaints. Examples: Let residents submit odor events via a mobile app; allow upload of community low-cost PM2.5 sensor data.

	Data Partnerships and Linkages	Score	Recommendations
26	*Does your city employ staff or consultants responsible for maintaining and linking air quality, environmental, demographic, health, economic, and other datasets and data pipelines? A "data pipeline" can include computing scripts–often in Python, R, or a similar language–that can make data available for analysis and sharing.	0	Assign a dedicated data engineering team to maintain pipelines and ensure data quality. Examples: Automate ingestion of real-time sensor feeds; implement validation checks for emissions updates.
27	*Has your city established data sharing partnerships between each department within your city that collects datasets that are important for analyzing the equity impacts of air quality policies? These departments in your city may include environmental and air quality departments, planning departments, health departments, transportation departments, and economic development or employment departments. Partnerships may take many forms, including regularly scheduled communication among departments, cross-department working groups, or data sharing agreements and Memorandums of Understanding.	0	Establish formal agreements between departments to standardize data sharing. Examples: Sign a Memorandum of Understanding (MOU) enabling health and environment departments to share de-identified health data; formalize sharing of traffic data from transportation agencies.
28	*Has your city established partnerships and processes to share air quality data with relevant officials in other levels of government, including state / provincial and national levels, that affect your city? Relevant officials may include those in ministries of health, public health, environment, transportation, economic development, infrastructure, and others.	0	Create standardized exports of air quality data to state-level or national authorities. Examples: Send monthly PM2.5 aggregates to the state air board; provide quarterly NO2 reports to national agencies.
29	*Has your city established partnerships and processes to share health and economic impact/disparities data with relevant officials in other levels of government, including state / provincial and national levels, that affect your city? Relevant officials may include those in ministries of health, public health, environment, transportation, economic development, infrastructure, and others.	0	Share health and environmental disparity data with higher-level (e.g., state or national) governments to support funding and policy alignment. Examples: Report racial disparities in asthma to national environmental protection ministries; share cumulative burden maps with national environmental justice offices (if any).
30	*Does your city have the capacity to link air pollution model data (versus monitor data), particularly where either regulatory or low-cost air pollution monitor data is sparse? Air pollution model data (rather than monitor-based data) are often produced by outside experts. Thus, model-based data often needs to be linked. This question asks whether your city has the capacity to link this type of data.	0	Use modeled estimates when monitors are sparse or absent. Examples: Use CMAQ for industrial zones without sensors; apply WRF-Chem for wildfire-smoke scenarios.
31	*Does your city link data on housing conditions, energy use patterns, household activities and behaviors, and indoor air pollutant sources?	0	Link housing and indoor-source datasets to understand compounded risks. Examples: Overlay gas stove prevalence with poor ventilation buildings; map old HVAC systems in wildfire smoke-prone areas.

32	*Are emission and/or air quality datasets linked with workforce data (e.g., employment sectors, wages, occupational health)?	0	Link emissions hotspots with wage, employment, and economic data. Examples: Overlay warehouse clusters with low-wage worker density; compare refinery-adjacent neighborhoods' income levels.
33	*Does your city link source-specific emissions monitoring data to health and economic datasets? For example, traffic-related NO2 data could be linked with childhood asthma rates, or shipping sulfur data could be linked with respiratory hospitalizations.	0	Connect emissions from specific sources to localized health outcomes. Examples: Link refinery SO2 levels to asthma visit clusters; map traffic-related NO2 to cardiovascular incidents.
34	Are satellite products linked with other air pollution monitoring data and with health and economic data (e.g., hospitalizations, asthma prevalence)? Satellite-derived air quality data can complement air quality monitoring data, particularly where monitoring data is sparse.	0	Use satellite-based datasets to fill spatial gaps in monitoring coverage. Examples: Blend TROPOMI NO2 with ground monitors; use MODIS AOD to estimate PM2.5 in rural outskirts.
35	Does the city or sponsor collect/have access to long-term air quality monitoring data from national or state / provincial governments? By "long-term," this question refers to data collected over several years. Ideally, this data will be at high spatial and temporal (e.g., daily) resolution as well.	0	Import multi-year regional datasets to strengthen long-term analyses. Examples: Incorporate a decade of ozone data from state networks; use 15 years of PM2.5 trends from national sites.
36	Does your city have access to historical meteorological data for your city and the surrounding areas that can be linked to other data sources? Historical data can be helpful when estimating air pollution over time.	0	Integrate historical meteorological records for trend analysis and modeling. Examples: Include 20-year wind roses in source-apportionment; use multi-decade temperature data to study heat-pollution interactions.
37	Can your city obtain and link data from low-cost sensors maintained by non-governmental organizations or private individuals?	0	If possible, build APIs to ingest community sensor data with automated quality checks. Examples: Validate PurpleAir sensors using co-located reference monitors; automatically remove spurious humidity-driven spikes.
38	Is dedicated technical support provided to community groups managing their own low-cost sensor projects to ensure data quality and sensor calibration?	0	Run calibration clinics to help residents maintain sensor accuracy. Examples: Host weekend calibration events at libraries; provide loaner calibration equipment for community groups.
39	Is your city able to link and map yearly data on instances of floods, heat waves, toxic chemical contamination, and other environmental burdens?	0	Integrate long-term environmental burden datasets into a unified GIS platform. Examples: Combine diesel truck corridor maps from 2010–2025; merge historical noise data with PM2.5 burdens.
40	Are multiple years of historical land use and zoning data available to link to other data sets? This type of data linkage can support air quality projections, health impact projections, and economic policy impact projections, among other topics.	0	Digitize historical zoning maps to understand legacy drivers of pollution patterns. Examples: Scan older industrial zoning maps.

Data Disaggregation and Integration	**Score**	**Recommendations**

41	*Does your city map historical data (e.g., data over many years) on environmental burdens (air pollution, heat waves, floods, chemical exposures, etc.) and sociodemographic characteristics (including poverty rates, migration status, race / ethnicity of residents, etc.) across neighborhoods? Put differently, can you visualize on a map the number of environmental burdens each neighborhood in your city has experienced over time to understand whether and where high-risk groups may face higher levels of total environmental burdens? Burdens may include floods, heat waves, toxic chemical contamination, and other environmental burdens?	0	Map cumulative burdens combining environmental, social, and economic stressors. Examples: Combine PM2.5, heat, and truck-traffic metrics; integrate pollution with poverty and overcrowding data.
42	*Is your city able to disaggregate air quality data to measure how different groups in your city–and particularly marginalized communities and high-risk groups–are exposed to different levels of air pollution? This process generally requires cities to be able to link and map sociodemographic and air pollution data, and to understand both (1) how air pollution differs across neighborhoods and (2) sociodemographic characteristics of groups living in highly polluted neighborhoods.	0	Overlay demographic data on exposure maps to detect inequities. Examples: Compare PM2.5 by racial or ethnic identity (or country of origin, nativity, etc) across neighborhood units; examine ozone differences by income levels.
43	*Are you able to disaggregate all other environmental data sources–including those measuring point / source emissions, meteorology, floods, and chemical use–by sociodemographic characteristics? As in the question above related to air pollution data, this ability is central to understanding health and economic equity impacts of air pollution.	0	Require demographic disaggregation across all environmental datasets. Examples: Break pollution exposure by age groups under 5 and over 65; map burdens for households with non-native language speakers.
44	*Can your city disaggregate labor market and economic data sources--including those job creation, job loss, and other economic costs--–by sociodemographic characteristics?	0	Disaggregate labor and economic datasets to reveal inequities. Examples: Analyze job quality for port truck drivers by education; compare wages for workers in high pollution industries.
45	*Are all health outcomes related to air pollution exposure disaggregated by sociodemographic characteristics such as race, income, age, gender, and geography?	0	Require de-identified, demographically stratified health outcomes. Examples: Publish asthma ED visits by income bracket; track COPD hospitalizations by age group.

46	*Does your city disaggregate air pollution, environmental, health, and economic data by multiple sociodemographic characteristics simultaneously? For example, some cities may disaggregate air pollution exposure by one characteristic (e.g., nativity) at a time. However, more detailed equity analyses consider the impact of intersecting facets of identity and social position. As such, they may disaggregate data based on two or more characteristics (e.g., nativity and poverty status) at the same time. In these cases, you might consider how air pollution exposure differs among, for example, low-income migrant residents, high-income migrant residents, low-income native residents, and high-income native residents.	0	Conduct intersectional analyses to understand overlapping vulnerabilities. Examples: Study exposure among low-income seniors; analyze pollution burdens for disabled residents in industrial zones.
47	*Do your city's analyses incorporate spatially and temporally aligned (i.e., "harmonized") demographic, air quality, health, and economic outcome data? In other words, if you use demographic, air quality, health, and economic data in your analyses, were the various types of data collected during the same time period and at the same spatial scale (for example., street-level, neighborhood-level, city-level, province-level, etc.)?	0	Standardize spatial and temporal units across datasets for comparability. Examples: Convert all PM measurements to hourly averages (if possible); align demographic data to the same neighborhood boundaries.
48	Do models incorporate local source contributions to identify drivers of inequitable exposures using resident-collected air quality data that is integrated with official datasets?	0	Use community sensors to refine source attribution and exposure tracking. Examples: Detect truck traffic PM spikes during peak hours; identify smoke intrusions during backyard burning.
49	Are community-generated data sources and data from lived experiences integrated into official city data sources?	0	Include qualitative community reports alongside quantitative datasets. Examples: Add odor complaints to refinery datasets; include residents' noise logs near highways.

	Data Analysis and Modeling	Score	Recommendations
50	*Does your city have access to computing resources including computers and statistical analysis software (e.g., R, SAS, or similar software, as well as GIS software) that can (1) process large-scale datasets and (2) estimate differences in air pollution risks across different population groups? It is important that these computing resources are powerful enough to handle large datasets and to estimate how health and economic outcomes are affected by air pollution (i.e., so-called "exposure-response datasets and risk models").	0	Provide adequate computing infrastructure for advanced modeling and analyses. Examples: Offer cloud-based workspaces for dispersion modeling; supply GPU resources for machine-learning exposure estimates.
51	*Does your city systematically measure the effects of air quality policies to ensure they reduce inequities in air pollution exposure and related health economic effects? For example, the AQUA tool from C40 is one tool that can be used to measure health effects, but your city may choose other tools for this purpose.	0	Conduct before-and-after policy analyses to measure real-world impact. Examples: Compare PM2.5 (or total truck traffic) before and after truck-route changes; assess ozone improvements after industrial emission reductions.
52	*Are health risks from air pollution explicitly modeled for multiple sociodemographic characteristics, and do these risks consider non-chemical stressors?	0	Model health risks using multi-pollutant exposures and demographic factors. Examples: Estimate asthma risk increases from PM2.5 and NO2 combined; evaluate cardiovascular risks from long-term ozone exposure.
53	*Are baseline population and health outcome incidence data available?	0	Publish regularly updated population and health baseline datasets. Examples: Release 2026 population denominators; update asthma incidence base rates yearly.
54	*Are analyses stratified by sociodemographic characteristics to assess whether high-risk groups benefit equally from interventions?	0	Stratify policy impact analyses across demographic groups. Examples: Evaluate benefits of a wood stove ban by income quartile; assess exposure reductions among children after street redesign.
55	*Do evaluations attempt to assess whether health and economic disparities among marginalized communities (compared to communities who are not marginalized) from air pollution and air quality policies are narrowing or widening over time?	0	Track multi-year trends in environmental and health disparities. Examples: Monitor 15-year NO2 inequity trends; track long-term changes in asthma rates in environmental justice communities.
56	*Are policy-based scenarios evaluated for distributional fairness (who benefits most/least)?	0	Assess which groups benefit most or least from new policies. Examples: Identify which neighborhoods saw the biggest PM2.5 drop after port electrification; determine which groups saw minimal improvement.
57	*Are health and equity outcomes among marginalized communities or high-risk groups (children, elderly, people with chronic illness) explicitly quantified?	0	Quantify distribution of benefits for vulnerable populations. Examples: Measure reductions in indoor PM2.5 for low-income homes; calculate smoke-day risk reductions for medically fragile residents.
58	*Do health and economic impact assessments of air quality policies include analyses of differential burdens across diverse groups and local economies (e.g., low income workers)?	0	Analyze how environmental burdens differ across communities. Examples: Compare highway noise levels across census tracts; evaluate heat risk disparities in tree-poor neighborhoods.
59	*Does your city analyze health and economic costs associated with policy compliance or adaptation and how this is distributed across communities and businesses of different sizes?	0	Evaluate how compliance and adaptation costs vary across groups. Examples: Study EV-fleet upgrade costs for small delivery firms; analyze HVAC-retrofit burdens for low-income landlords.

60	*Does your city have programs or policies to ensure that members from marginalized communities, high-risk groups, or areas disproportionately impacted by air pollution are engaged in decisionmaking about how to interpret and analyze air pollution data from your city?	0	Create resident interpretation panels to review findings. Examples: Hold quarterly map review sessions with community reps; invite residents to annotate exposure graphs.
61	Does your city use open-source data analysis tools (e.g., R, QGIS) for its analyses? Using open-source tools can ensure your city's technical capacity is robust because they do not require your city to purchase new software every few years.	0	Use open-source tools for transparency and reproducibility. Examples: Use R for epidemiological models; use QGIS for mapping cumulative burdens.
62	Are data fusion techniques used to combine remote sensing, ground-based, and modeled data to enhance exposure assessment?	0	Apply data fusion methods combining monitors, satellites, and models. Examples: Use AOD satellite-derived PM2.5 blended with ground data; integrate WRF-Chem outputs with local sensors.
63	Are model assumptions and data limitations clearly documented and communicated?	0	Publish metadata documenting methods, assumptions, and uncertainties. Examples: Provide calibration uncertainty for monitors; include model-bias estimates in reports.
64	Are exposure models evaluated for accuracy where monitoring data may be sparse?	0	Validate model results using independent datasets. Examples: Compare modeled PM2.5 to anchor monitors; compare modeled NO2 to satellite retrievals.
65	Are appropriate concentration–response functions available and applied?	0	Use locally relevant concentration-response functions for health analyses. Examples: Apply neighborhood-specific asthma incidence–PM2.5 coefficients if available; use local cardiovascular response functions.
66	Is population-specific epidemiological literature used for equity analysis? (i.e., using research from/with affected populations)	0	Use epidemiological studies from comparable or local populations. Examples: Apply findings from a nearby county's asthma cohort; use state-level particulate-mortality research.
67	Do evaluations report whether health outcomes (e.g., fewer hospital visits, lower asthma rates) improve after interventions?	0	Publish health improvements after interventions. Examples: Report fewer asthma visits following roadway redesign (if any); show reduced ER visits after indoor air filter installations (if any).
68	Does the city have a clear mechanism to engage marginalized groups or their representatives in (1) evaluating, inputting on—or objecting to—the data collected and assumptions underpinning equity impact analyses and (2) shaping how this information is used to inform targeted policy design, implementation and monitoring?	0	Provide formal feedback systems for residents to challenge assumptions. Examples: Online forms for disputing model results; structured review meetings to correct data errors.

	Data Communication	Score	Recommendations
69	*Can the public access your city's air quality and emissions data for free? Public access could include internet-based tools or apps. Note: This specific question refers only to the ability of the public to access your data. It does not refer to whether the public actually uses whatever tools may exist.	0	Maintain a public open data portal for real-time and historical air data. Examples: Post daily PM2.5 levels downloadable in CSV; provide multi-year pollutant trend files.
70	*Are public-facing data platforms designed with community input to ensure accessibility (e.g., mobile-friendly, low-data consumption, interactive maps) rather than relying solely on raw data files?	0	Co-design public-facing platforms with accessibility and multilingual features. Examples: Offer Spanish and Chinese versions of dashboards (or versions in other locally relevant languages); make mobile friendly visualizations.
71	*Are real-time air quality alerts and warnings, resources, and recommendations for protective actions available to residents in all neighborhoods in your city? For this question, consider whether these resources (alerts, recommendations, etc.) are disseminated through multiple platforms, including websites, apps, text messaging, or other media.	0	Provide real-time alerts through multiple communication channels. Examples: SMS smoke alerts during wildfires; radio notices during industrial incidents.
72	*Are policy effects evaluated and reported back to communities in a transparent and publicly accessible way?	0	Hold public meetings and publish plain language summaries of results. Examples: Quarterly briefings with neighborhood groups; infographics explaining new regulations.
73	*Are local community members and business leaders actively engaged in decision-making regarding data sources, data use, and data analyses, not just consulted after the fact?	0	Include community and business leaders in data governance structures. Examples: Invite trucking company reps to advisory committees; include environmental justice organizations in decision meetings.
74	*Are stakeholders within the government able to access and distribute quality-assured air quality data?	0	Ensure government staff have training and access to high quality datasets. Examples: Provide GIS training to health department analysts; teach environmental staff how to query emissions databases.
75	Does your city track public engagement with any publicly available air quality data? This could include simply counting the number of visits to relevant webpages, and it would be a helpful datapoint to consider when building equitable air quality policies.	0	Track engagement metrics to evaluate communication effectiveness. Examples: Count app downloads during wildfire season; measure webpage visits on high pollution days.
76	Are there frequent, accessible training opportunities provided to communities and neighborhoods on how to use monitors, and store/access and interpret air quality data?	0	Offer community training workshops on air-quality concepts and tools. Examples: Teach residents how to interpret PM2.5 graphs; train volunteers to maintain sensors.
77	Is air monitoring data translated into non-technical summaries and available in the primary languages spoken by residents in the monitored communities?	0	Provide multilingual, accessible translations of data and visualizations. Examples: Infographics in Spanish and Vietnamese (or other locally relevant languages); audio versions for visually impaired residents.
78	Are communities meaningfully engaged in governance and capacity-building on issues related to data sources, data use, and data analysis, and management alongside technical agencies as key partners and knowledge bearers?	0	Include equity organizations in data system co-design and capacity building. Examples: Collaborate with environmental justice nonprofits; train neighborhood coalitions in data interpretation.

79	Are mechanisms in place to ensure that the data and findings used for just energy transition planning and air quality policy implementation are communicated to and validated by marginalized community members relevant to your city and context?	0	Conduct targeted outreach to communities most affected by pollution. Examples: Distribute wildfire smoke flyers in frontline neighborhoods; host tabling events at local markets.
80	Are health sector and community organizations able to influence and actively engaged in decision-making regarding data sources, data analyses and data use for targeting, designing, implementing and monitoring policies, as well as communication -- not just consulted after the fact?	0	Form a joint data council linking health, environment, labor, and community stakeholders with formal decision power. Examples: Monthly cross-agency council meetings; annual community review sessions for priority setting.

[EQuiPD] Equity in Air Quality Policy & Data Ecosystem

Definitions

Categories

Data-sharing partnerships & management tools
Robust capacity in data collection, analysis, and public transparency is essential for equitable air quality policies. This means systems that detect health and economic disparities, integrate diverse datasets, and map cumulative environmental burdens by community and socioeconomic status. Open access to data, strong local partnerships, and active involvement of marginalized communities in monitoring and decision-making help ensure that interventions are both effective and just. Regular, transparent reporting and evaluation of outcomes are crucial for accountability and ongoing policy improvement.

City/institutional buy-in, capacity building & training
Building and sustaining robust technical and organizational capacity is vital for equitable air quality policy-making. This involves having political buy-in to channel resources and mandate and accessible tools and trained staff to map, analyze, and communicate air quality gradients, their health and equity impacts, as well as resources for ongoing public and community training. Budgets and leadership structures must support long-term system upgrades, prioritize high-burden communities, and ensure regular, transparent evaluations—including independent audits and mechanisms for community input. Effective capacity also requires cross-sector coordination, sustained funding, and a commitment to policies that target disparity reduction and reflect the needs and diversity of the most affected populations.

Public support & engagement
Ensuring that air quality policy-making addresses the diverse needs of all communities, especially the most vulnerable is critical to building public support & engagement. This means collecting and sharing data on access to clean air spaces, transportation, and public warnings, while tailoring resources and risk communications in multiple formats and languages. Economic impact assessments and compliance costs should explicitly analyze and address differential burdens, and feedback mechanisms must enable meaningful input from marginalized groups. Accessible and inclusive information about air pollution, impacts from policies and live tracking of changes over team can be game changing when it comes to building public support and addressing backlash. Sustained training, participatory processes, and investments in clean air monitoring infrastructure—combined with regular evaluation of health outcomes, public accountability, and integration of citizen data—ensure that policies are both effective and equitable for populations such as low-income, elderly, Indigenous, and minority residents.

Health & economic impact modeling

Equitable air quality policy-making relies on comprehensive, accurate modeling and monitoring systems that explicitly quantify health and economic impacts of particular policies for vulnerable and marginalized groups. This involves ensuring exposure and scenario-based models reflect real-world conditions through collaboration with monitoring networks, validation in data-sparse areas, and integration of fine-scale demographic and economic data. Analyses must be stratified by factors such as income, age, race, and geography, translating results into meaningful, accessible formats (e.g., public dashboards, maps, and plain-language summaries) that inform both policy and community resilience efforts. Ongoing community input, transparent communication of methods and limitations, and regular updates ensure that modeling truly supports fair distribution of benefits and burdens, strengthens preparedness, and provides targeted support to those most affected by air pollution and regulatory changes.

Estimating air pollution

Ensuring equitable air quality policy-making demands comprehensive monitoring and modeling systems that achieve high spatial and temporal coverage (especially in historically underserved neighborhoods) and prioritize addressing impacts to vulnerable groups such as children and the elderly. This includes integrating data from diverse sources (e.g., reference monitors, low-cost sensors, models, satellite data, and meteorological stations) into accessible, central repositories and using analytical tools to assess how air quality, health, employment, and energy costs vary across communities. Collaboration among city staff, technical experts, and community partners in siting, operating, and interpreting monitors and models is essential for accurate, quality-assured data that drives action. Making all monitoring and modeling outputs user-friendly and publicly accessible, while linking environmental, health, workforce, and housing data, enables targeted interventions and supports transparency, accountability, and more equitable outcomes.

Source & emission inventories

Equitable air quality policy-making requires systematic monitoring and evaluation of emissions, land use, and zoning decisions with a strong focus on communities facing the greatest risks, such as low-income and minority neighborhoods near industrial sites. Maintaining and openly sharing data on point, area, and mobile emission sources—alongside vehicle inspection programs, fenceline monitoring, and accessible records of land use changes—ensures transparency and helps link environmental and economic impacts to public health outcomes. Incorporating input from disproportionately exposed groups, workers, and community organizations into emission assessments, zoning, and policy review enables more just and inclusive decisions. Partnerships across government, industry, and labor, along with accessible platforms for data, green jobs, and retraining opportunities, support ongoing improvements, accountability, and equitable transitions, particularly for those most affected by pollution and economic changes.

Domains

Technical Capability
The city government's infrastructure, expertise, and resources for accurately monitoring, analyzing, and managing data. This includes the availability of appropriate equipment, digital platforms, skilled personnel, and technical support.

Data Integration
The ability to combine and align air quality data with other relevant data sources (such as health, demographic, geographic, and socioeconomic data). This includes systems and processes for data sharing, interdepartmental data flows, interoperability, and the consolidation of data into actionable insights to inform policy and interventions.

Internal processes
The city government's organizational procedures, policies, and practices for managing air quality, health, and equity initiatives. This covers strategic planning, interdepartmental coordination, budgeting, workflow management, staff training, and evaluation mechanisms to ensure effective implementation and accountability.

Participation and Empowerment
The involvement and engagement of external parties—such as community groups, residents, businesses, academic institutions, nonprofits, and regional or national governmental agencies—in planning, decision-making, and program implementation related to air quality, public health, and equity. This includes collaboration, transparent communication, and shared governance where appropriate.

Themes

Distributional Equity
Equity and air quality data is useful in and of itself to develop a more complete understanding of your city. This theme examines whether benefits, risks, costs, and opportunities from policies are fairly distributed among different social, economic, and demographic groups. Questions generally revolve around assessing health inequalities, cost of living, and fairness of air quality actions to better understand the components of air pollution injustice.

Socioeconomic Resilience and Opportunity
Equity and air quality data provide fundamental information for assessing policy outcomes. This theme relates to communities and workers ability to adapt, benefit, and thrive amid policy-driven changes—such as job transitions, economic shifts, and changes in cost of living—while promoting fair access to new opportunities (e.g., green jobs, retraining). Questions generally focus on economic opportunities (including green jobs and training), cost of living, and access to information and public spaces to better understand the drivers of air pollution injustice

Access and Inclusivity

Ensuring equitable outcomes along the five equity impact areas outlined by C40. This theme addresses equitable access to information, services, public resources, infrastructure, participation in decision-making, and physical environments for all communities, especially those historically marginalized. Questions focus on accessibility and inclusion to services, public spaces, and information as well as engagement and decision making around data.

Glossary of terms

air pollution model data (rather than monitor-based data)	Pollution estimates produced by computer models (using emissions, weather, and other inputs) instead of only relying on measurements from physical monitoring stations.
air quality interventions	Policies or actions taken to reduce air pollution or people's exposure to it (e.g., emission controls, traffic restrictions, cleaner fuels).
area-level variables	Measures that describe characteristics of a place (e.g., neighborhood poverty rate, housing density) rather than individual people.
bias-correct model predictions	Adjusting model-based estimates to reduce systematic errors (biases) so that predictions better match observed data.
collect/have access to	The ability to obtain, store, and use data, including whether communities, agencies, and researchers can realistically access and work with the information.
concentration-response functions	Mathematical relationships that estimate how much a health outcome changes when air pollution concentrations increase or decrease by a certain amount.
cumulative impacts	The combined effects of multiple stressors (e.g., air pollution, other environmental hazards, and social/economic burdens) on people and communities over time.
data fusion techniques	Statistical or computational methods that blend multiple data sources (e.g., monitors, models, satellites) to produce more accurate and complete pollution estimates.

data gaps	Important information that is missing, incomplete, biased, or not collected at all, making it hard to fully assess pollution or equity impacts.
data pipeline	The end-to-end process by which data are collected, cleaned, merged, analyzed, and turned into information for decision-making.
data systems	The tools, databases, standards, and processes used to collect, store, integrate, and share data across agencies or organizations.
disaggregate	Break down data into smaller groups (e.g., by race/ethnicity, income, age, or neighborhood) to reveal differences that are hidden in averages.
disproportional impacts of air pollution	When certain groups or communities experience more harm from air pollution than others (e.g., higher exposure, worse health outcomes, or greater economic burden) especially when those groups are already socially or economically disadvantaged.
distributional fairness	The extent to which the benefits (e.g., cleaner air) and burdens (e.g., remaining pollution) of policies are shared equitably across different groups and places.

economic impact assessments	Analyses that estimate the monetary costs and benefits of air pollution and related policies (e.g., healthcare costs avoided, productivity gains).
epidemiological literature	Scientific studies that examine how exposures (like air pollution) are related to health outcomes in human populations.
equity impacts	How a policy or intervention changes conditions for different groups, especially whether it reduces or worsens existing inequalities.
exposure-response datasets	Data that show how different levels of pollution exposure are associated with changes in health outcomes (e.g., hospital visits, deaths).
health and economic impact/disparities	Differences between groups in health outcomes (e.g., asthma, heart disease) and economic outcomes (e.g., healthcare costs, lost work days) related to air pollution.
health impact assessments	Analyses that estimate how changes in pollution or policies will affect health outcomes (e.g., cases of asthma or premature deaths avoided).
high spatial resolution	Data that are mapped to small geographic units (e.g., generally census blocks or neighborhoods), allowing you to see fine-scale differences across communities.
high-risk groups	People who are more likely to be harmed by air pollution, such as children, older adults, people with chronic diseases, or pregnant people.
historical underinvestment	Long-term patterns where certain communities have received fewer resources and infrastructure (e.g., transit, green space, clean energy), often due to discriminatory policies.
joblessness rates	The proportion of people in an area who are unemployed or not working, often used as an indicator of economic vulnerability.
just energy transition	Shifting from fossil fuels to cleaner energy in ways that are fair, protect workers and vulnerable communities, and reduce existing inequities.
link/harmonize data	Combine datasets (e.g., pollution, health, and sociodemographic data) using a common key such as location or time to enable integrated analysis.
marginalized communities	Communities that have been socially, economically, or politically excluded or disadvantaged, often experiencing higher pollution and fewer resources.
real-time meteorological forecast data	Up-to-date weather predictions (e.g., wind, temperature, humidity) which may be incorporated to model and forecast air pollution.

satellite products	Air quality, meteorological, and environmental data derived from satellite measurements, often used to estimate pollution in areas without ground monitors.
sociodemographic characteristics	Population features such as income, race/ethnicity, language, age, education, and housing status that can shape vulnerability to pollution.

spatial and temporal resolution	How detailed data are in space (geography) and time (e.g., neighborhood vs. city; hourly vs. yearly averages).
spatially and temporally aligned (i.e., "harmonized")	Making sure different datasets use compatible locations and time periods so they can be accurately combined and compared