COMMUNICATING AIR QUALITY

REPORTING AIR QUALITY INFORMATION TO THE PUBLIC

Electronic board showing the ISPU

JAKARTA'S AIR QUALITY REPORTING

DKI Jakarta uses an air pollution index locally known as ISPU (*Indeks Standar Pencemar Udara*), as a tool for communicating air quality for public health protection. The index describes how clean or unhealthy the air is, and what associated health effects might be a concern (USEPA, 2014). An air quality index translates raw data (e.g., pollutant concentrations) to a number on a scale that is further divided into bands that correspond to a defined pollution concentration (Clean Air Asia, 2016).

HOW THE AIR QUALITY INDEX WORKS

The air quality monitoring data (PM_{10}, SO_2, CO, NO_2, and O_3) from the five (5) continuous monitoring stations' of DKI Jakarta's air quality monitoring network is used to generate the index report after it has passed quality assurance and quality control procedures.

The average of all hourly data of continuous stations per parameter is used as input/feed the calculator, which means that the data from the previous day is used in the ISPU report for the following day. The ISPU are reported and is valid for 24 hours from 15:00 of previous day to 15:00 of next day. The daily ISPU is determined by the parameter with the highest score which is then designated as the "critical parameter". The ISPU uses a descriptor and color code to reflect the air quality status as per the ranges in the table below.

Color coding is essentially a simple and effective way of raising the public's attention when air pollution is reaching unhealthy levels.

Breakpoints of criteria pollutants concentration for the PSI system, DKI Jakarta

Range of ISPU values	Max ISPU value	Breakpoints					Descriptor and color code
		24-hr PM_{10} ($\mu g/m^3$)	24-hr SO_2 ($\mu g/m^3$)	8-hr CO (mg/m^3)	8-hr O_3 ($\mu g/m^3$)	1-hr NO_2 ($\mu g/m^3$)	
0 to 50	50	50	80	5	118	*	**Good (*Baik*)**
51-100	100	150	365	10	157	*	**Moderate (*Sedang*)**
101-200	200	350	800	17	235	1,130	**Unhealthy (*Tidak Sehat*)**
201-300	300	420	1,600	34	785*	2,260	**Very Unhealthy *Sangat Tidak Sehat*)**
Above 300	400	500	2,100	46	980*	3,000	**Hazardous (*Berbahaya*)**
	500	600	2,620	57.5	1180*	3,750	

**When 8-hour O_3 concentration exceeds 785 $\mu g/m^3$, the PSI sub index is calculated using the one hour O_3 concentrations*

The ISPU is published on BPLHD's website (http://llhd.jakarta.go.id). The website also contains information on the known health and environmental effects associated with each category.

Electronic board showing the air quality levels from DKI 3 monitoring station

RECOMMENDATIONS FOR DKI JAKARTA'S ISPU REPORTING SYSTEM

PUBLISH REGULAR UPDATES

The temporal resolution of the ISPU can be improved from reporting daily to a shorter-term (e.g. 3-hour or hourly). An hourly report of ISPU from all the continuous monitoring station can be made available since the parameters are available on an hourly basis. The gradual upgrade of the manual sites to continuous would allow ISPU calculation for these sites.

USE VARIOUS REPORTING CHANNELS

The underlying objective of sharing AQ information is to better inform the public, and so, the public must have access to data on multi-media platforms. Several platforms are now available to share air quality information (television, newspapers, and billboards), and there is an increasing trend in the use of technology such as mobile phone applications to make information more accesible. This and other form of online publishing, such as sending an email to specific organizations can also allow them to further provide air information to the public, in a significantly cheaper manner (ADB & Clean Air Asia, 2014).

Aside from the official website, DKI Jakarta can make use of various channels to publish the ISPU, such as SMS (text messaging), social media and mobile phone applications. Email to related organization can also allow them provide the information to the public.

AQI Value	Actions To Protect Your Health From Particle Pollution
Good (0–50)	None
Moderate (51–100*)	Unusually sensitive people should consider reducing prolonged or heavy exertion.
Unhealthy for Sensitive Groups (101–150)	The following groups should reduce prolonged or heavy exertion: • People with heart or lung disease • Children and older adults
Unhealthy (151–200)	The following groups should avoid prolonged or heavy exertion: • People with heart or lung disease • Children and older adults Everyone else should reduce prolonged or heavy exertion.
Very Unhealthy (201–300)	The following groups should avoid all physical activity outdoors: • People with heart or lung disease • Children and older adults Everyone else should avoid prolonged or heavy exertion.

* For particles up to 2.5 micrometers in diameter: An AQI of 100 corresponds to 35 micrograms per cubic meter (averaged over 24 hours).

For particles up to 10 micrometers in diameter: An AQI of 100 corresponds to 150 micrograms per cubic meter (averaged over 24 hours).

USEPA AQI values and the corresponding proposed actions in cases of high particle pollution

PROVIDE HEALTH ADVICE TO THE PUBLIC

In the interest of public health protection, the reported ISPU should provide health warnings that include cautionary information and suggested measures targeted at susceptible groups (i.e., school children, elderly, or people with heart or respiratory illness) or the public (ex. EPA AQI).

The inclusion of $PM_{2.5}$ health impacts can also increase the value of the ISPU. It is suggested to develop $PM_{2.5}$ breakpoints once there is sufficient data available (i.e., once continuous $PM_{2.5}$ monitors are available for all monitoring stations).

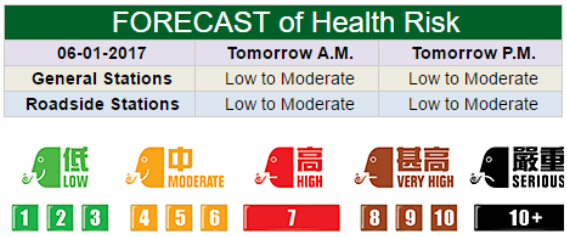
A contingency plan or emergency response plan is also proposed to be developed in preparation for high pollution episodes, especially for the sensitivity people or outdoor workers.

AIR QUALITY FORECASTING

While the information from the existing five (5) continuous monitoring stations is used for the ISPU reporting, the spatial representativeness may be limited given that the Greater Jakarta region is spread across 40 km x 40 km. This gap can be supplemented with modeling. The emissions inventory work conducted under the Breathe Easy Jakarta project provided the necessary confidence to extend the dispersion modeling efforts to establish a short-term air quality forecasting system.

In the long term, the government of DKI Jakarta should have contingency plans in place (i.e., shut down power plant, odd/even number vehicle scheme, and mandatory use of BRT).

In Hong Kong, an air quality forecast is provided as part of their Air Quality and Health Index (AQHI) which serves as an alert before the onset of serious air pollution episodes.



A sample of Hong Kong's AQHI forecast as published on their website

REPORTING AREA OF COVERAGE

Another valuable feature of a sound air quality index system is the area coverage of the report. An important requirement for delivering a citywide ISPU report is the existence of an air quality monitoring network that has a comprehensive spatial coverage. As currently practiced by DKI Jakarta, the highest ISPU value and pollutant of concern reported as the citywide ISPU. While it may be helpful to highlight the contributing factor to the state of the air quality in the city, the usefulness of the information may be lost upon translating to a citywide ISPU report.

Indexes can be enhanced with the use of other data visualization tools such as geographical information system (GIS) to show the spatial variation of air quality levels and distribution of air pollutants.

Considering the extensive resource requirements in establishing a dense monitoring network, DKI Jakarta should primarily focus on delivering useful site-specific ISPU reports by disclosing which areas are covered by the monitoring station to better equip the public on what information to recognize.

For more information on the assessment findings and recommendations, please refer to the full report:

Air Quality Monitoring System Assessment Report and Recommendations for DKI Jakarta

SIM-AIR: AIR QUALITY INDEX CALCULATOR

The Simple Interactive Models for better air quality (SIM-air) is a set of software-based integrated air pollution analysis tools that illustrate how cities in developing countries can implement Integrated Air Quality Management (IAQM) techniques. It includes a simple air quality index calculator that uses monitoring data to estimate real time or forecasted air quality index. The tool was used for DKI Jakarta and was developed as part of the Breathe Easy Jakarta project.

The tool can also be utilized to analyze both the historical and the real time data from the monitoring stations in DKI Jakarta to know how the air quality levels faired.

Descriptor	AQI	Risk Message
Good	0 - 50	No message
Moderate	51 - 100	Unusually sensitive individuals (ozone)
Unhealthy for Sensitive Groups	101 - 150	Identifiable groups at risk – different groups for different pollutants
Unhealthy	151 - 200	General public at risk; groups at greater risk
Very Unhealthy	201 - 300	General public at greater risk; groups at greatest risk

The different categories used in the SIM-air Air Quality Index calculator.

BREATHE EASY JAKARTA

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