



# South Korea Fact Sheet

South Korea ranked as the 13th most polluted country in the world in 2016 in terms of average concentration of fine particulate matter, according to the Air Quality Life Index (AQLI), a pollution metric produced by the Energy Policy Institute at the University of Chicago. The AQLI shows that the average South Korean can expect to lose 1.4 years of life expectancy, because air quality fails to meet the World Health Organization's (WHO) guideline for fine particulate pollution.

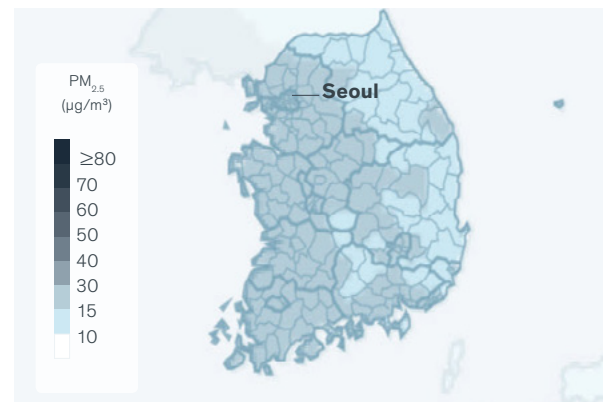
## KEY TAKEAWAYS

- Average particulate pollution levels in 2016 stood 14 percent higher than 1998 levels. South Korea's particulate pollution is now twice the average for the 36 member countries in the Organization for Economic Co-operation and Development (OECD) (see Figure 6).
- In 2016, 100 percent of South Korea's 50 million people lived in areas where the annual average particulate pollution level exceeded the WHO guideline.
- The western part of the country is the most polluted, with the highest levels of pollution in the northwestern provinces (see Figure 1).
- The capital Seoul, the largest city and home to about 10 million people, has the nation's worst pollution. The average resident will live 1.7 years less if the city's high pollution levels continue, relative to if the WHO guideline was met.
- Since 1998, the country's southwest has seen the greatest increase in particulate pollution, with residents losing up to 0.9 more years in Jeollabuk and Jeollanam Provinces (see Figure 4).

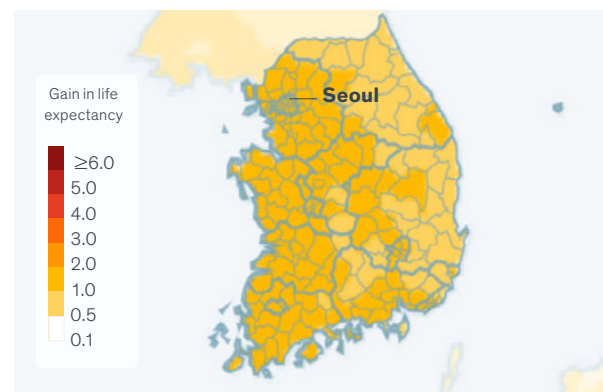
**“As countries navigate the dual challenges of sustaining economic growth and protecting the environment and public health, the AQLI shows not only the damage caused by pollution but also the enormous gains that can be made with policies to address it.”**

**Michael Greenstone**, Milton Friedman Distinguished Service Professor in Economics, the College, and the Harris School; Director, EPIC

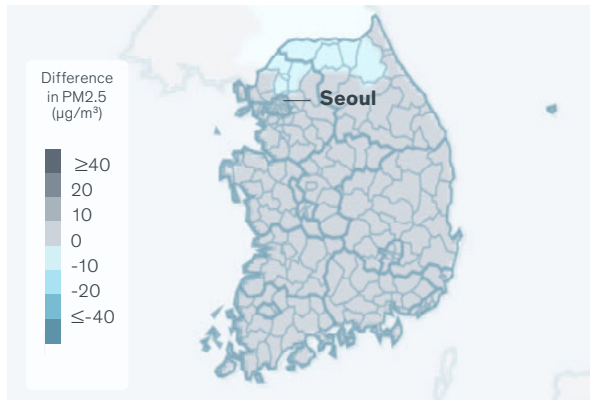
**Figure 1** · Annual Average PM<sub>2.5</sub> Concentration, 2016



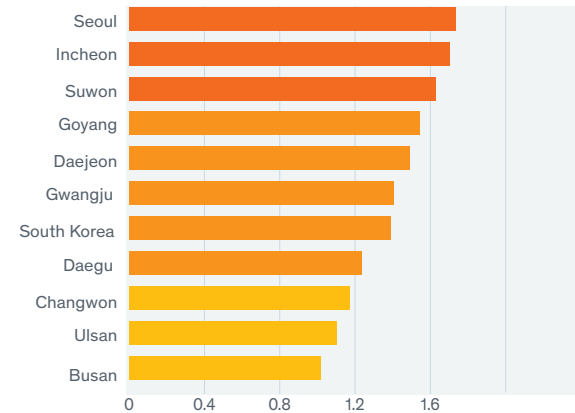
**Figure 2** · Potential Gain in Years of Life Expectancy through Permanently Meeting WHO Guideline for Annual Average PM<sub>2.5</sub>, 2016



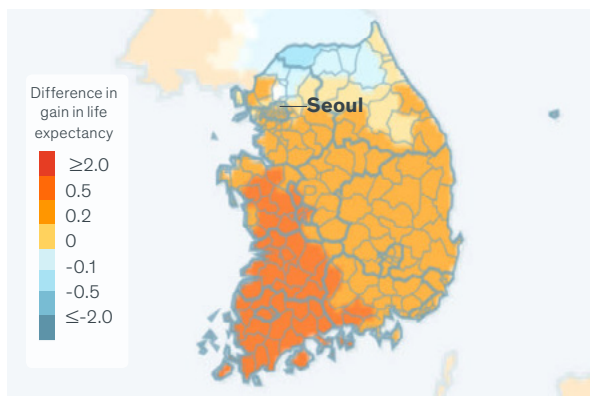
**Figure 3** · Annual Average PM<sub>2.5</sub> Concentration, 1998-2016



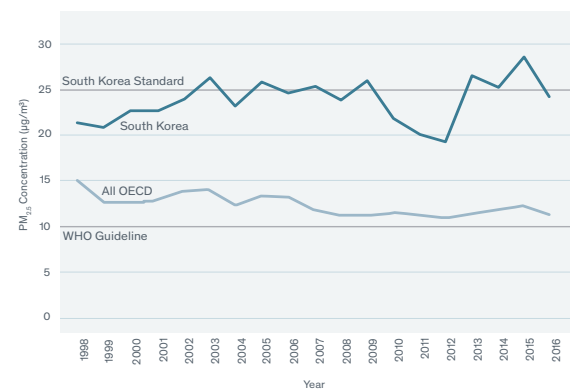
**Figure 5** · 10 Most Populous Cities and All of South Korea: Potential Gain in Life Expectancy through Permanently Meeting WHO Guideline for Annual Average PM<sub>2.5</sub>, 2016



**Figure 4** · Change in Life Expectancy Loss, due to Change in PM<sub>2.5</sub>, 1998-2016



**Figure 6** · Annual Mean PM<sub>2.5</sub> in South Korea and All of OECD 1998-2016



Note: The All OECD trend line is the population-weighted average of statistics of all OECD countries, including South Korea.

## ABOUT THE AIR QUALITY LIFE INDEX (AQLI)

The AQLI is a pollution index that translates particulate air pollution into perhaps the most important metric that exists: its impact on life expectancy. Developed by the University of Chicago's Milton Friedman Professor in Economics Michael Greenstone and his team at the Energy Policy Institute at the University of Chicago (EPIC), the AQLI is rooted in recent research that quantifies the causal relationship between long-term human exposure to air pollution and life expectancy. The Index then combines this research with hyper-localized, global particulate measurements, yielding unprecedented insight into the true cost of particulate pollution in communities around the world. The Index also illustrates how air pollution policies can increase life expectancy when they meet the World Health Organization's guideline for what is considered a safe level of exposure, existing national air quality standards, or user-defined air quality levels. This information can help to inform local communities and policymakers about the importance of air pollution policies in concrete terms.

[aqli.epic.uchicago.edu](http://aqli.epic.uchicago.edu)  @UChiEnergy #AQLI

**Methodology:** The life expectancy calculations made by the AQLI are based on a pair of peer-reviewed studies, Chen et al. (2013) and Ebenstein et al. (2017), co-authored by Michael Greenstone, that exploit a unique natural experiment in China. By comparing two subgroups of the population that experienced prolonged exposure to different levels of particulate air pollution, the studies were able to plausibly isolate the effect of particulates air pollution from other factors that affect health. The more recent of the two studies found that sustained exposure to an additional 10 µg/m<sup>3</sup> of PM10 reduces life expectancy by 0.64 years. In terms of PM2.5, this translates to the relationship that an additional 10 µg/m<sup>3</sup> of PM2.5 reduces life expectancy by 0.98 years. To learn more about the methodology used by the AQLI, visit: [aqli.epic.uchicago.edu/about/methodology](http://aqli.epic.uchicago.edu/about/methodology)

# 50 Most Populous Municipal-Level Divisions

Province-level division	Municipal-level division	Population (Millions)	PM <sub>2.5</sub> Concentration, 2016 (µg/m <sup>3</sup> )	Life Expectancy (Years) Gained by Meeting WHO Guideline of 10 µg/m <sup>3</sup>	Life Expectancy (Years) Gained by Meeting National Standard of 25 µg/m <sup>3</sup>
Daegu	Buk	1.5	23	1.3	0.0
Gyeonggi-do	Suwon	1.0	26	1.6	0.2
Gyeonggi-do	Anyang	1.0	26	1.5	0.1
Gyeonggi-do	Hwaseong	0.9	26	1.6	0.1
Gyeonggi-do	Goyang	0.9	26	1.5	0.1
Gyeonggi-do	Seongnam	0.8	25	1.5	0.1
Gyeonggi-do	Yongin	0.8	25	1.5	0.0
Seoul	Gangseo	0.7	28	1.8	0.3
Jeollabuk-do	Jeonju	0.7	27	1.6	0.2
Gwangju	Buk	0.7	24	1.4	0.0
Incheon	Gyeyang	0.7	27	1.7	0.2
Gwangju	Gwangsan	0.6	25	1.5	0.1
Gyeonggi-do	Yangju	0.6	23	1.3	0.0
Gyeongsangnam-do	Gimhae	0.6	20	1.0	0.0
Chungcheongbuk-do	Cheongju	0.6	26	1.5	0.1
Gyeonggi-do	Guri	0.6	27	1.7	0.2
Seoul	Nowon	0.6	26	1.6	0.1
Chungcheongnam-do	Cheonan	0.6	26	1.6	0.1
Seoul	Dobong	0.5	26	1.5	0.1
Incheon	Seo	0.5	27	1.7	0.2
Gyeonggi-do	Namyangju	0.5	24	1.3	0.0
Gyeonggi-do	Pyeongtaek	0.5	26	1.6	0.1
Seoul	Yeongdeungpo	0.5	27	1.7	0.2
Gyeongsangbuk-do	Pohang	0.5	20	1.0	0.0
Seoul	Seongbuk	0.5	28	1.8	0.3

Province-level division	Municipal-level division	Population (Millions)	PM <sub>2.5</sub> Concentration, 2016 (µg/m <sup>3</sup> )	Life Expectancy (Years) Gained by Meeting WHO Guideline of 10 µg/m <sup>3</sup>	Life Expectancy (Years) Gained by Meeting National Standard of 25 µg/m <sup>3</sup>
Gyeongsangnam-do	Changwon	0.5	22	1.2	0.0
Seoul	Mapo	0.5	28	1.8	0.3
Seoul	Dongjak	0.5	26	1.5	0.1
Daegu	Dong	0.5	22	1.2	0.0
Seoul	Eun-pyeong	0.5	26	1.5	0.1
Incheon	Bupyeong	0.5	27	1.7	0.2
Seoul	Gangnam	0.5	27	1.6	0.2
Gyeongsangbuk-do	Gumi	0.5	21	1.1	0.0
Seoul	Seodaemun	0.4	28	1.7	0.3
Seoul	Songpa	0.4	26	1.6	0.1
Gyeonggi-do	Bucheon	0.4	27	1.7	0.2
Seoul	Gwang-jin	0.4	28	1.8	0.3
Busan	Dongnae	0.4	20	1.0	0.0
Seoul	Gangbuk	0.4	26	1.6	0.1
Chungcheongbuk-do	Cheongwon	0.4	25	1.5	0.0
Gyeonggi-do	Siheung	0.4	27	1.7	0.2
Seoul	Dong-daemun	0.4	29	1.8	0.3
Seoul	Yongsan	0.4	27	1.7	0.2
Daejeon	Daedeok	0.4	25	1.5	0.0
Jeju	Jeju	0.4	18	0.8	0.0
Daejeon	Yuseong	0.4	26	1.5	0.1
Incheon	Nam	0.4	27	1.7	0.2
Gyeongsangnam-do	Masan	0.4	21	1.1	0.0
Gyeonggi-do	Paju	0.4	24	1.4	0.0
Daejeon	Dong	0.4	25	1.5	0.0