

Are We There Yet?

A Brief Update on Progress Towards Better Indoor Environments for All

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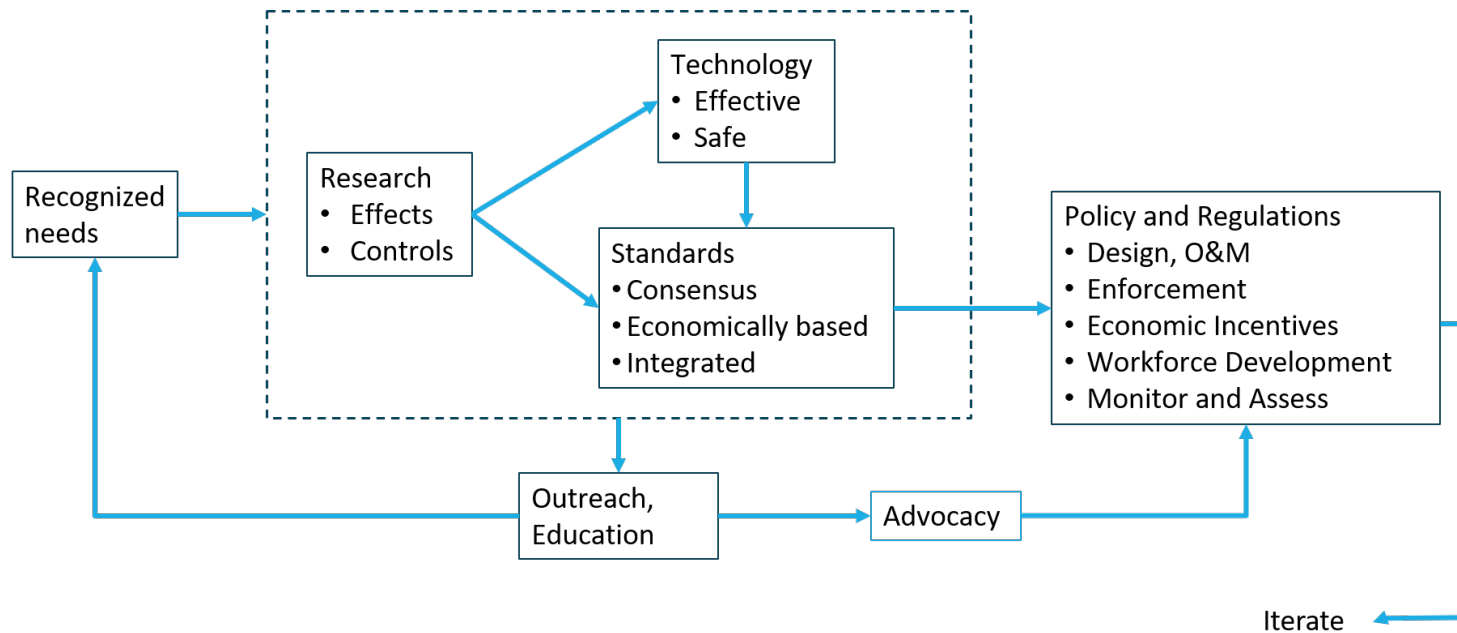
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College of Engineering

**ARCHITECTURAL
ENGINEERING**

Brief assessment

- More progress than if Covid hadn't emerged
- Less progress than hoped for
- Science and technology gains are significant
- Policy and regulatory wins are mostly symbolic
- (Too) many voices
- Research trends – monitoring, AI – will they do what we hope for our buildings? TBD

There are reasons why progress is elusive

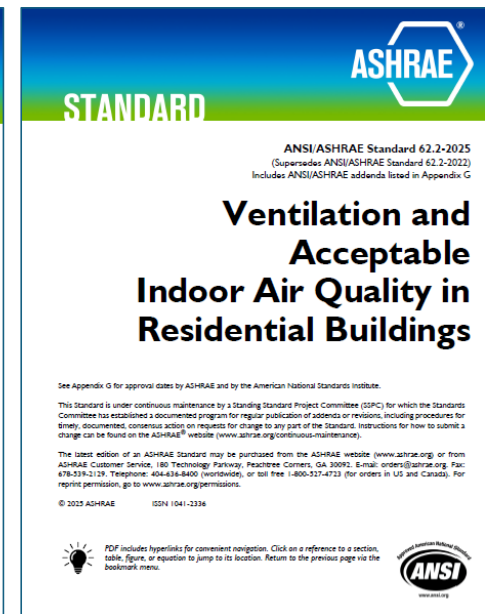
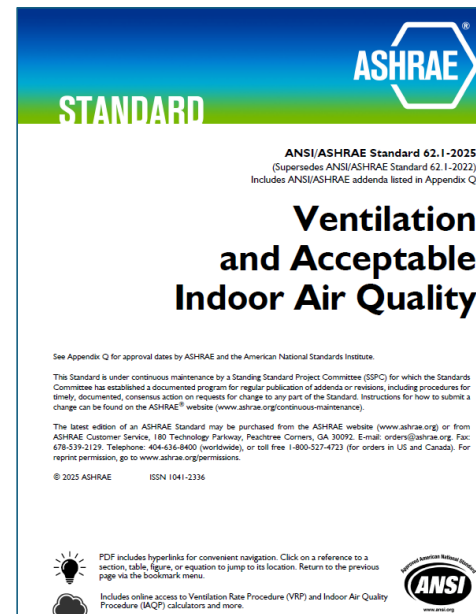


Constraints

- Science-based
- Sustainable
- Economical
- Equitable

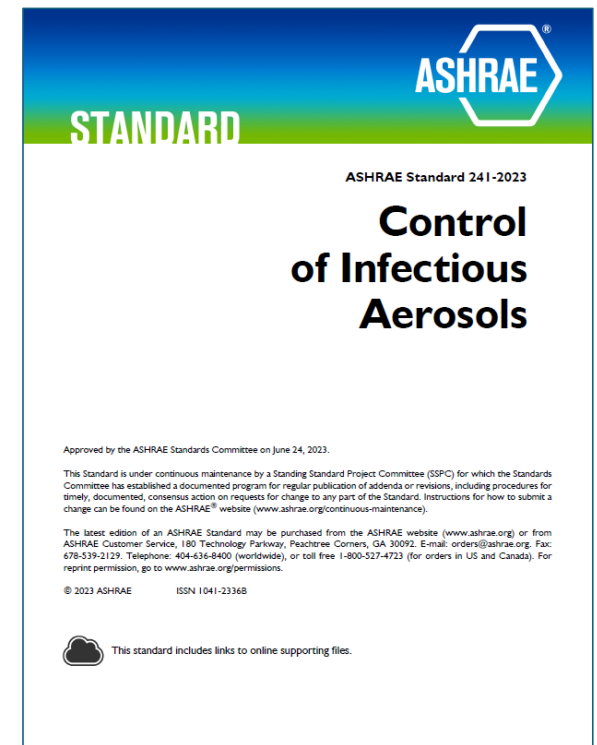
Minimum Design Standards

- Non-residential buildings
 - Improvements to performance path
 - Pre-Covid filtration requirements
 - No significant changes related to resilience
- Residential buildings
 - New performance path – based on estimated harm –PM2.5, NO2, HCOH, bioeffluent
 - Infectious aerosol appendix incorporates key 241 requirements



Resilience – Airborne Disease Transmission

- Continuing work on ASHRAE Standard 241
 - ANSI public review
 - 2nd public review planned for 2026
- Progress on standards for air cleaner testing
 - Performance
 - Safety
- Declining vaccination rates and other factors increase need for effective engineering controls
- So far, have avoided H5N1 influenza spillover



Resilience – Wildfire Smoke



(Anthony Souffle/Minnesota Star Tribune via AP)

July 16, 2026



Live AQI+ global major city ranking ⓘ

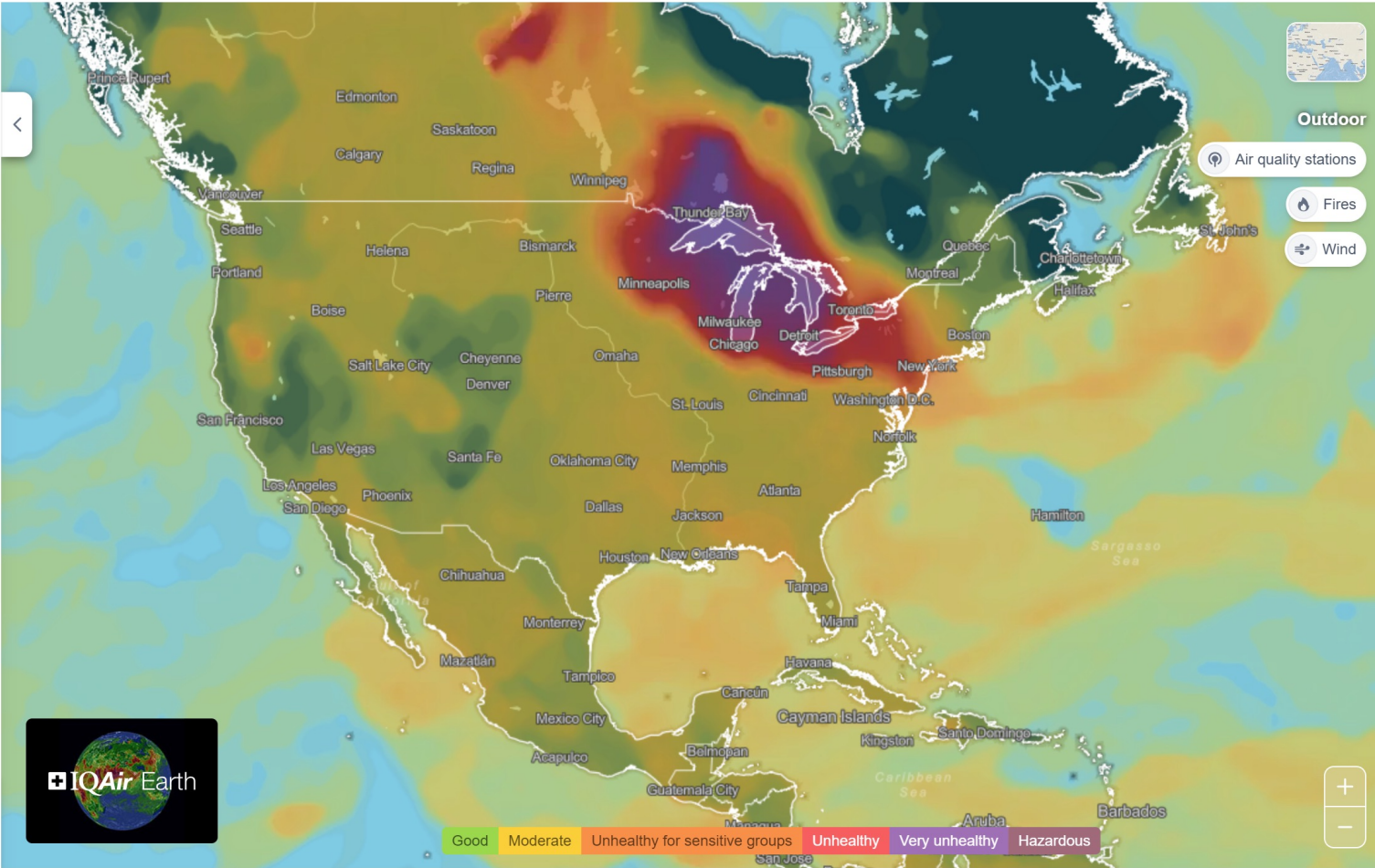
JUL 16, 2026 14:00–15:00

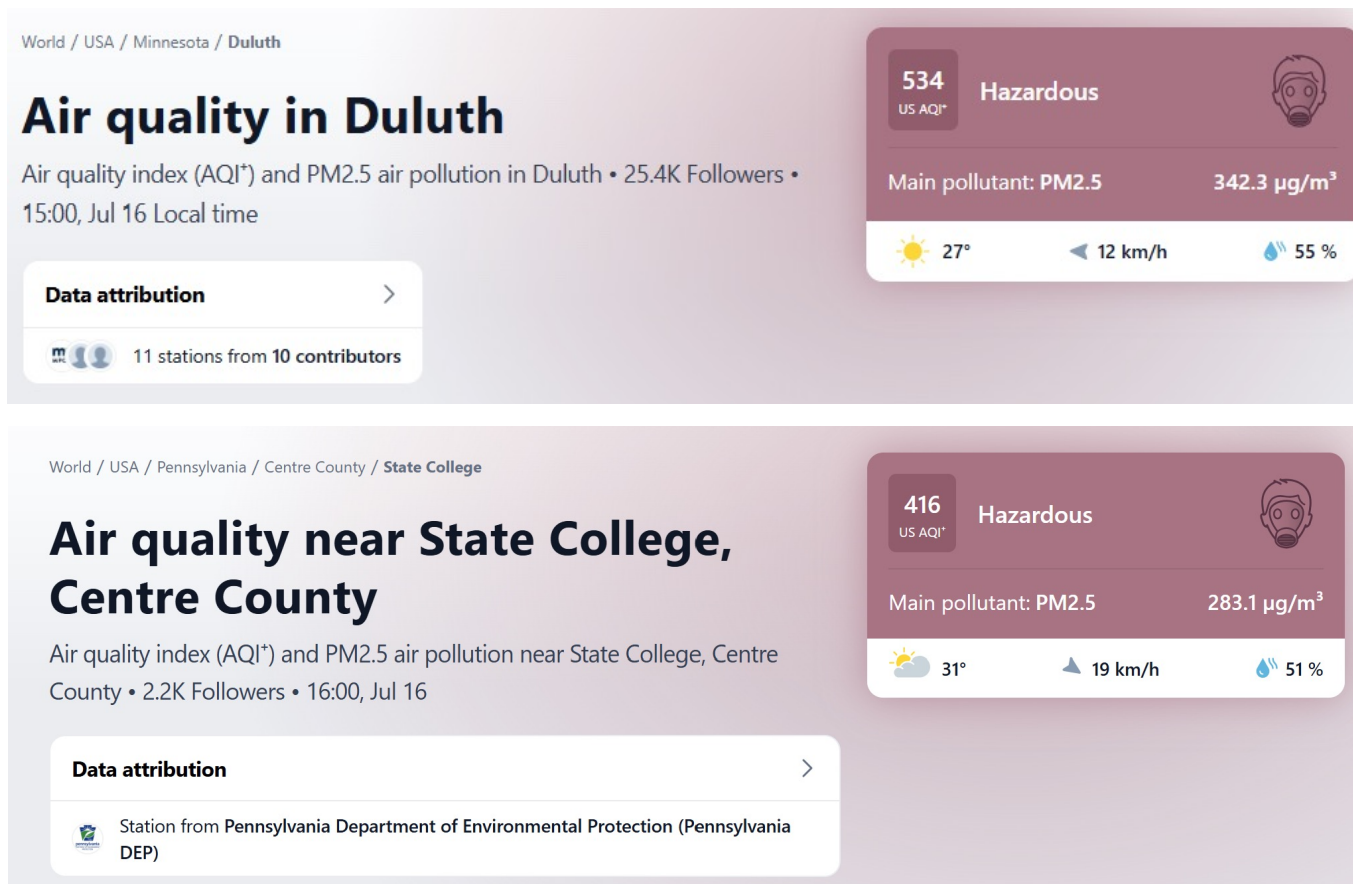
#	MAJOR CITY	US AQI*
1	Chicago, USA	388
2	Minneapolis, USA	271
3	Detroit, USA	260
4	Kinshasa, Democratic Republic of th...	167
5	Toronto, Canada	163
6	Lahore, Pakistan	161
7	Delhi, India	160
8	New York, USA	158



Become a citizen scientist
Get a monitor and contribute air quality data in your city.

See full ranking →





US National Ambient Air Quality Standards (NAAQS) for PM_{2.5}

- Annual average: 9 $\mu\text{g}/\text{m}^3$
- 24-hour average: 35 $\mu\text{g}/\text{m}^3$ 98th percentile averaged over three years

World / USA / Minnesota / Crosslake

Air quality in Crosslake

Air quality index (AQI*) and PM2.5 air pollution in Crosslake • 685 Followers • 13:00, Jul 16 Local time

Data attribution



Data provided by a satellite-derived model

163*
US AQI*

Unhealthy



Main pollutant: PM2.5

72.3 $\mu\text{g}/\text{m}^3$



30°

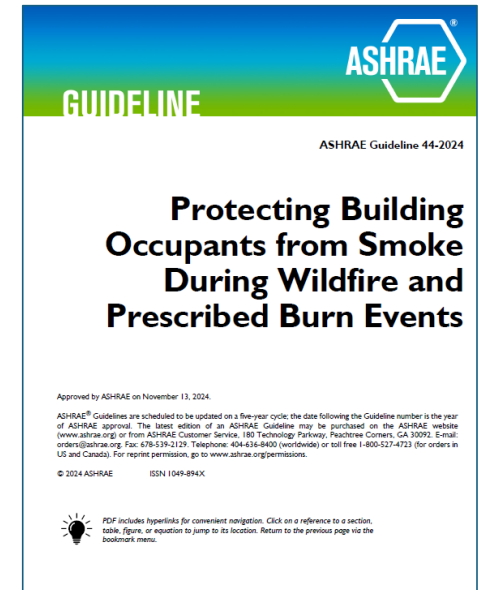


12 km/h

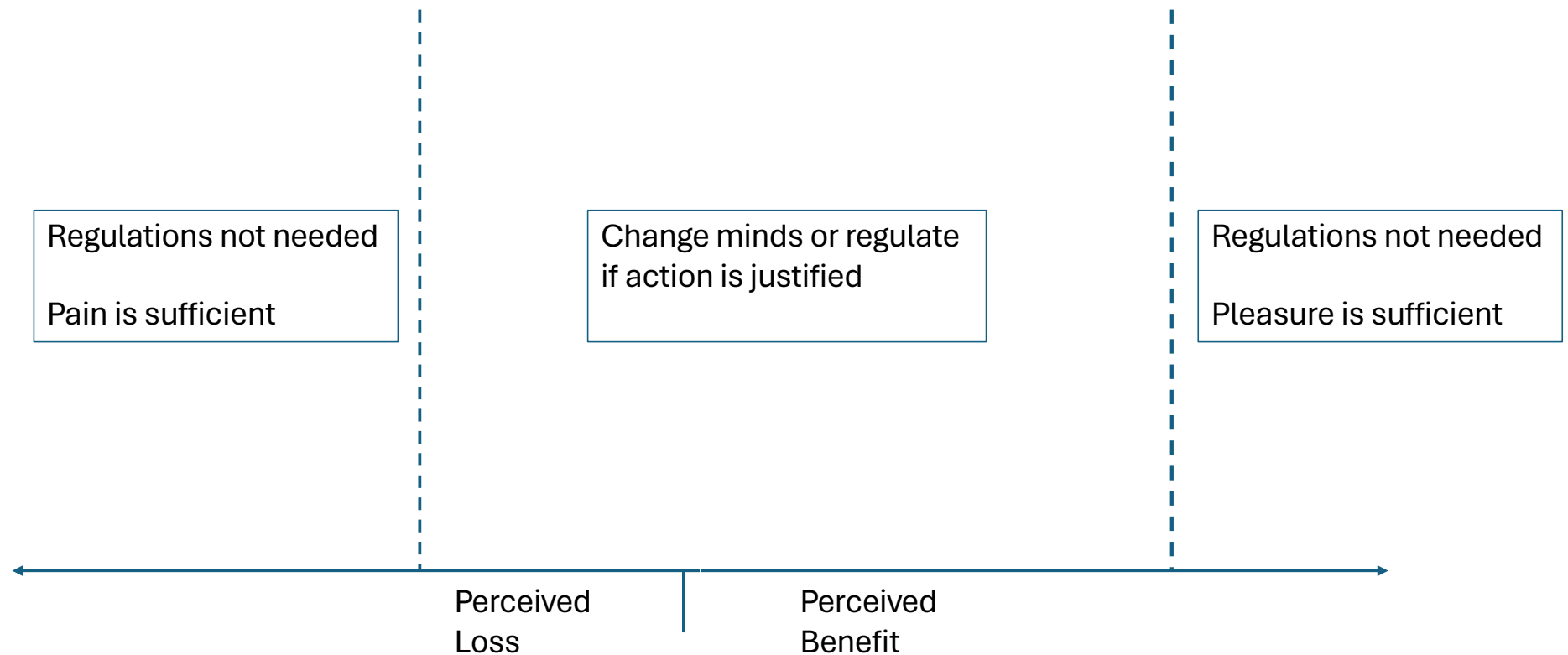


52 %

- Mechanically ventilated building – high efficiency filtration of outdoor air + positive pressurization
- Naturally ventilated building – close ventilation openings, use portable air filter(s)



A case for regulation – behavioral science in one bad graph

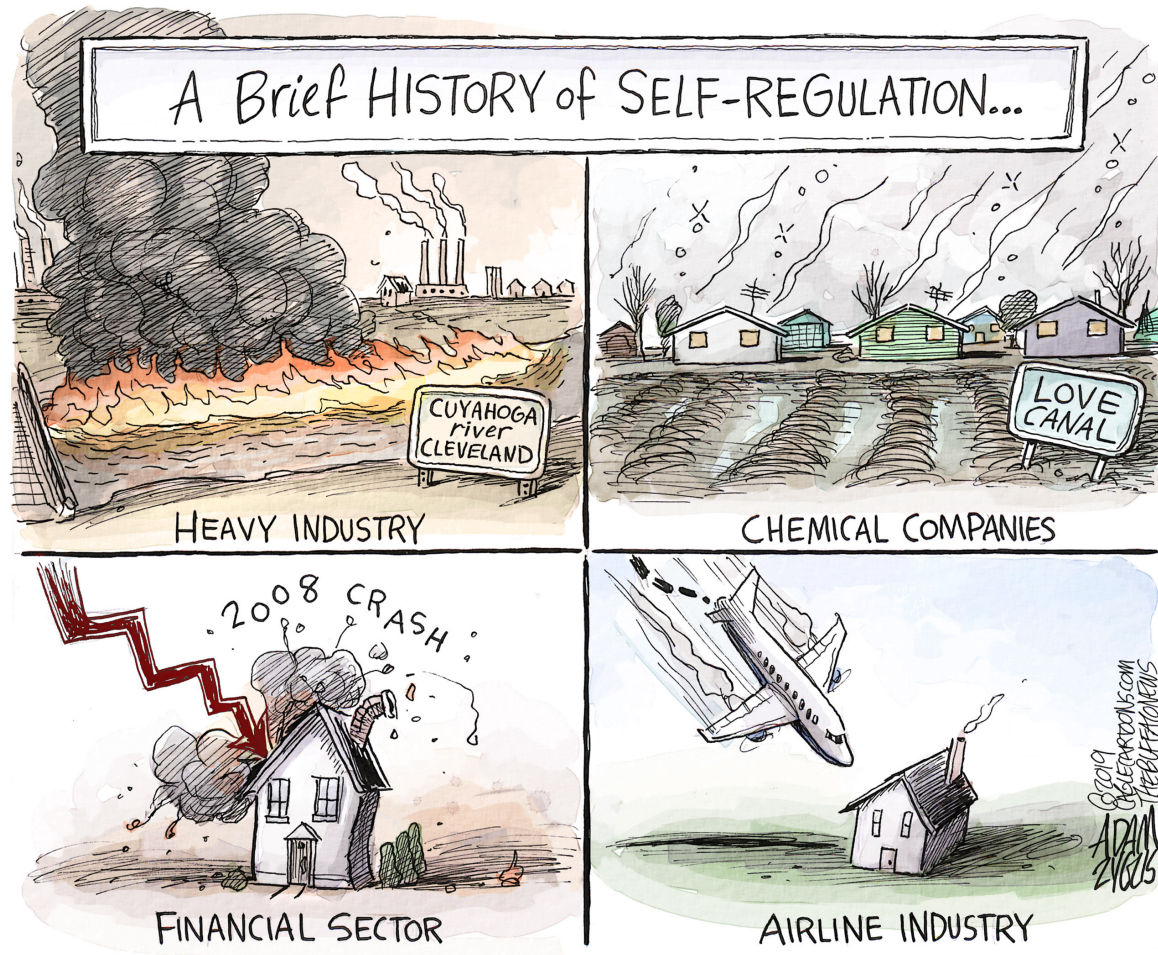


Policy and Regulations

- Adoption of ASHRAE Standard 241-2023
 - UAE (direct adoption)
 - Singapore (modifications to two standards)
 - Canada (New Brunswick schools)
- Legislation *introduced*...
 - Two bills in US Congress
 - >20 state bills, often with grassroots support
- Scientific organizations taking an interest.
- Operational requirements remain aspirational



Policy and Regulations



(Image credit: Adam Zyglis | Copyright 2019 Cagle Cartoons)

...sometimes good ideas even sell themselves...

House Hunters Value Clean Air in Their Homes More Than Views and Other Luxuries

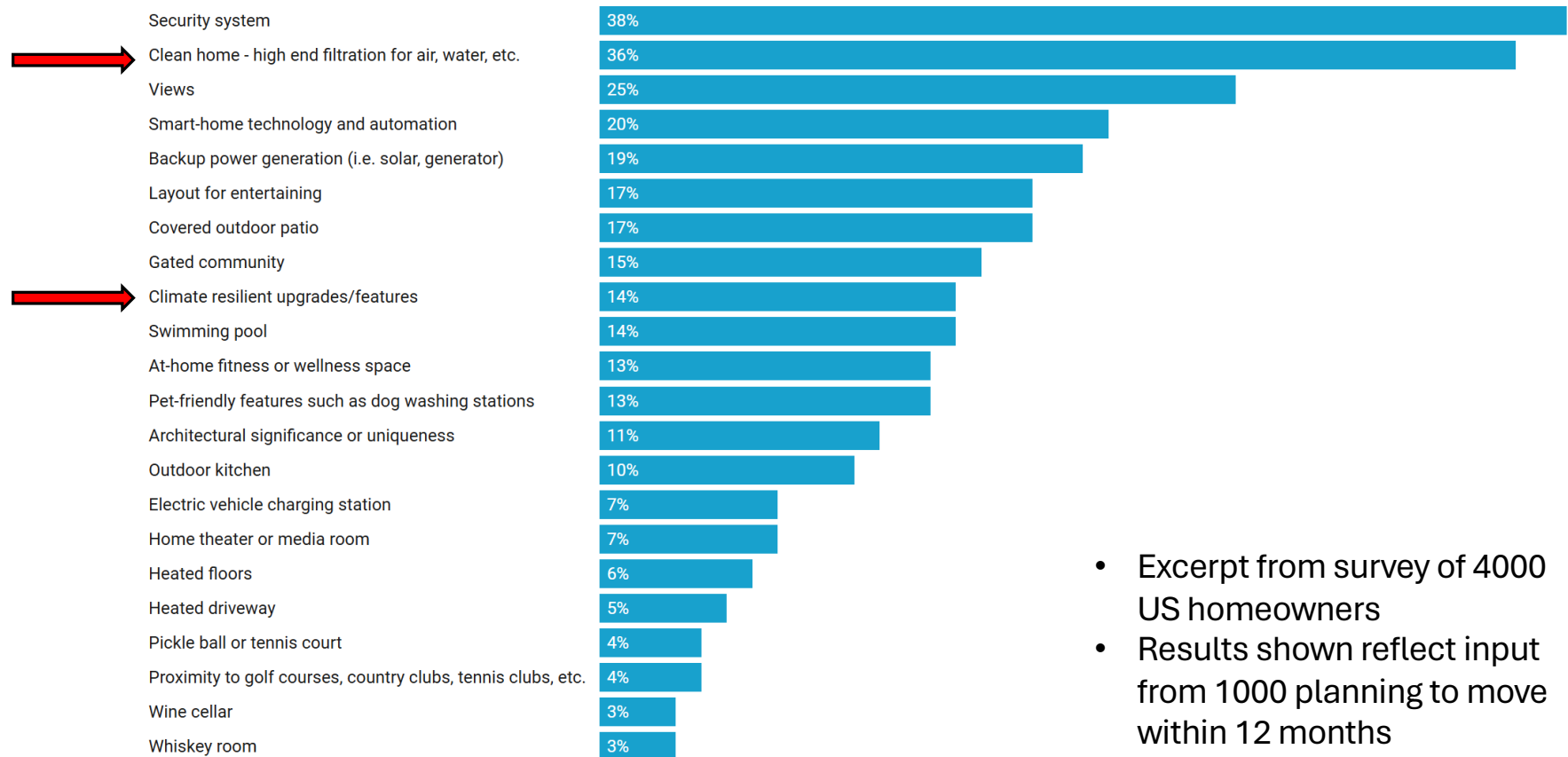
Published on July 21st, 2026 by [Dana Anderson](#)



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- *36% of U.S. residents who plan to move within the next year say a clean home with high-end filtration systems for air, water, etc. is one of the most important features when it comes to their next home. That makes it the most common priority for house hunters, along with security systems, per a recent Redfin survey.*
 - *The heavy wildfire smoke blanketing the Midwest and Northeast last week puts the survey results into perspective: Homebuyers want a place that protects their health amid climate-related disasters.*
 - *Every generation ranks clean homes at or near the top of their priority lists, outranking luxury amenities like home theaters and tennis courts.*

www.redfin.com/news/house-hunters-value-clean-homes-survey

When thinking about the next home you live in, what are the top 3 most important features/amenities for this home?



- Excerpt from survey of 4000 US homeowners
- Results shown reflect input from 1000 planning to move within 12 months

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