



The Value of Clean Air

November 2022



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Foreword

Three years ago, I bought an indoor air quality monitor for my living room and, whilst I will try to avoid cliché about how it “changed my life forever”, I will say that it has changed my perception of my home’s indoor environment, made me more aware of how it interacts with my health and, as a result, altered some of my behaviours.

When it comes to real estate investment, the topic of air quality is often discussed as being new and emerging but in many ways it is not. Many major European cities have developed to have wealthier and more affluent neighbourhoods to the west and lower income neighbourhoods to the east, largely due to the prevailing wind direction coming off the Atlantic Ocean driving pollution from west to east. The natural knock-on effect of this is to impact the price of real estate, thereby arguably making air quality one of the longest standing and most significant drivers of real estate valuations in our cities.

Whilst the battle for clean air on our cities’ streets is far from won, significant improvements driven by legislation and the technology in our vehicles, factories, and power plants have vastly improved the status quo when it comes to the outdoor air quality of our cities and left them visibly cleaner and fresher.

However, recent technological improvements in sensing, data analysis, and Artificial Intelligence can now give us a view like never before into the invisible and often most dangerous elements of air quality. With this new knowledge, the battleground has expanded to encompass not just the air on our streets, but in and around our homes and workplaces.

The air quality sensor in my own home has made me acutely aware of how, even when sat alone working in the living room, the carbon dioxide levels rise rapidly when the windows and doors are closed. Meanwhile, whilst cooking on the hob or burning candles Volatile Organic Compound (VOC) levels can jump dramatically. In short, some normal day-to-day activities impact the air we breathe more than we might expect.

Increased levels of air pollution have been linked to some of Europe’s leading causes of death including heart disease, stroke, lung disease and lung cancer¹, and has been found to adversely affect every organ of the body at all stages to life². Elevated levels of common pollutants including carbon dioxide have also been shown to negatively impact productivity and critical business skills such as decision making and crisis response^{3,4}.

At DWS, we are committed to the protection of our real estate occupants’ health and the advancement of their wellbeing. With this in mind, we have already begun investing in indoor air quality monitoring technology in a number of our commercial office assets to properly measure and manage pollutant levels for our occupiers and provide them with a healthy and productive environment.

We also fully acknowledge the importance of air quality management within the residential sector. Residential real estate, where people spend more than 90% of their time, has a primary purpose of providing safe shelter. Indoor and nearby air quality management is a natural extension of this primary purpose, as it addresses occupiers’ health and wellbeing. This white paper represents an important step in gauging residential occupiers’ understanding of and attitudes towards the topic of air quality. The outcomes provide a clear signal for the value of investing in clean air initiatives.



Simon Cripps
ESG Specialist, Real Estate, DWS

“At DWS, we are committed to the protection of our real estate occupants’ health and wellbeing and we have begun investing in indoor air quality monitoring technology”

¹ European Environment Agency (2021)

² Schraufnagel et al. (2019)

³ Allen et al. (2016)

⁴ Kuhn (2019)

Executive Summary

DWS, in partnership with the environmental charity Global Action Plan, designed a survey of over 5,000 participants to understand the importance of air quality to residential tenants in Germany, the Netherlands, and the UK. **The results demonstrate that not only do tenants consider air quality as a significant factor in their property selection process, but they would be willing to pay more to improve air quality in a home they already occupy.** The results also show that there is a lack of understanding around what factors really affect air quality both inside and outside the home. This provides an opportunity for property managers and institutional real estate owners to plug the information gap and introduce active asset management strategies that lead towards cleaner, safer homes for residential tenants in the long term.

Key Insights

- 1 / Three quarters of mid-market renters consider air quality an important factor when choosing a home.**
- 2 / Over half of renters are concerned about the impact of air pollution on their health, while having a low level of understanding about the measures available to minimise their exposure to air pollution both indoors and outdoors.**
- 3 / Equally, over half of renters said that they would be more likely to renew their tenancy if a property had been managed to minimise air pollution, even if it meant paying more.**
- 4 / Renters consider landlords highly responsible for managing air quality within their homes, yet very few have received air pollution information or advice from landlords.**

Property managers are best positioned to play a role in educating tenants on air pollution through in-depth knowledge of the physical real estate and continuous residents' engagement. While installing air pollution monitors in and around properties would lead to data driven insights about air quality, property managers should also seek to be active change agents, advocating for local improvements with public bodies.

From an institutional investors perspective, with Environmental, Social, and Governance (ESG) targets likely

to feature more prominently in investment strategies, fiduciary asset managers, such as DWS, should prioritise asset-embedded amenities to address residents' unmet needs. While new built stock would be a natural focus in attaining ESG targets, including air quality and energy efficiency, fiduciary managers should also consider extensive refurbishment of older, less energy-efficient stock with low air quality and poor air ventilation, as an active asset management approach to improve tenant retention, capture investment performance, and make a positive environmental and social contributions.

1 / Introduction

What is air pollution?

Air pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere.⁵

It is the single largest environment health risk in Europe, and a major cause of premature death and disease⁶. It contributes to some of Europe's leading causes of death including heart disease, stroke, lung disease and lung cancer⁷, and has been found to adversely affect every organ of the body at all stages to life⁸.

The good news is that levels of outdoor air pollution are decreasing across European Union (EU) Member States. Between 2005 and 2019 the EU-27 saw a 33% decrease in attributable deaths to (fine particulate matter) air pollution⁹. However, according to the World Health Organisation (WHO), more than 90% of citizens across Europe are still exposed to annual levels of (fine outdoor particulate matter) air pollution above which adverse health effects are known to occur¹⁰. A similar trend can be observed in the UK¹¹.

Table 1. Premature deaths attributable to air pollution in the EU-27 and the UK in 2019.

	EU-27 ¹²	UK ¹³
Premature deaths attributed to chronic exposure to fine particulate matter in 2019	307,000	33,000
Premature deaths attributed to chronic nitrogen dioxide exposure in 2019	40,400	5,750

Exposure to any amount of air pollution can be damaging to health; the greater the exposure the greater the risk.¹⁴ Even short-term exposure can cause a range of health impacts including damage to lung function, exacerbation of asthma symptoms and increased blood pressure.^{15,16} Longer-term exposure to air pollution has been linked to low birth weight, premature birth and stillbirths^{17,18,19}, as well as to the serious illnesses referenced above.²⁰

The main air pollutants of concern for human health across Europe are:

- Nitrogen oxides (NOx) are a group of gasses that are formed during the combustion of fossil fuels. The two dominant gases are nitric oxide (NO) which reacts with oxygen to form nitrogen dioxide (NO2) which is harmful to human health.²¹
- Particulate Matter (PM) – tiny bits of solid and liquid materials that are generally invisible to the naked eye. The size and composition of PM is important. Very small particles below 2.5 microns in size (PM2.5) are of greatest concern as they can penetrate deep into the lungs and even the brain.²²
- Volatile Organic Compounds – produced by numerous products and processes that are placed and run within the home. Levels are particularly high immediately after construction and fit-out but are also produced by everyday activities in the home such as cooking and cleaning.

⁵ World Health Organisation (2021)
⁶ European Environment Agency (2021)
⁷ Ibid
⁸ Schraufnagel, D.E., et al. (2019)
⁹ Ibid 1
¹⁰ World Health Organisation (2021)
¹¹ Department for Environment Food and Rural Affairs, National Statistics Emissions of air pollutants in the UK 1970 to 2019 – Nitrogen oxides (NOx), 2021.
¹² Ibid 1
¹³ Client Earth (2021)
¹⁴ Ibid 16.
¹⁵ Public Health England (2018)
¹⁶ Yang et al (2018)
¹⁷ World Health Organisation (2015)
¹⁸ Klepac et al. (2018)
¹⁹ Leiser et al. (2019)
²⁰ Smith et al. (2020)
²¹ European Environment Agency (2022)
²² You et al. (2022)

Air pollution in cities and the home



Cities are hotspots for air pollution. Road transport is the primary source of nitrogen oxide, and a significant source of particulate matter air pollution across European cities. Meanwhile, the consumption of residential and commercial energy is the primary source of particulate matter. Both are present in high densities in urban environments leading to significant localised challenges with air pollution.

Furthermore, trends in aging and urbanisation of the European population mean that more, and older, people are exposed to these elevated levels of air pollution.²³ Older people, as well as children and those with existing health conditions, are particularly sensitive to air pollution.²⁴

Levels of indoor air pollution, where Europeans spend 90% of their time, are often much higher than outdoor levels.

Contrary to common belief, indoor environments can be five times more polluted than outdoor air.²⁵

Indoor air pollution in the home is mostly the result of everyday activities such as cooking and cleaning, levels of humidity, the presence of mould, and proximity to busy roads and other outdoor sources of air pollution.²⁶ Meanwhile the increase in the “air tightness” of modern buildings has exacerbated the issue as pollutants tend to get trapped inside rather than leaking through the façade; **embedding an inherent conflict between the traditional lens of real estate sustainability focusing on energy efficiency and the emerging theme of indoor air quality.**

Policies to tackle air pollution

The EU first established ambient air quality standards for key air pollutants in 2005 based off WHO air quality guidelines, with a subsequent significant update to guidance issued in 2021²⁷. Where levels exceed standards Member States must prepare an air quality plan to address sources of pollution and ensure compliance²⁸. Furthermore, as part of the European Green Deal’s Zero Pollution Action Plan, member states have been set the goal of reducing premature deaths caused by air pollution by 55% by 2030 (compared to 2005 levels).

There are currently no indoor air quality regulations relating to peoples’ homes in Europe. In 2021, the European Parliament adopted a non-binding resolution to enshrine indoor air quality into legislation.²⁹ In the absence of clear legislative directives, the onus is on landlords and real estate owners to proactively collaborate with their tenants and other key stakeholders to create a safe and healthy living environment.

²³ Ibid 1

²⁴ Global Action Plan (2022)

²⁵ United States Environmental Protection Agency (2021)

²⁶ European Ventilation Industry Association (2022)

²⁷ European Commission (2022)

²⁸ European Commission (2022)

²⁹ European Industry Association (2022)

2 / Scope

DWS is one of the world’s leading investment management organisations. Within real estate, DWS’s mission is to deliver investors superior long-term risk-adjusted returns, predictable income generating opportunities, preservation of capital, and diversification. The application of ESG principles and strategies is central to this mission.

Air Quality, and more broadly Health & Wellbeing, is an integral theme in a modern real estate investment ESG strategy. However, the value of and attitudes towards air quality among renters are not currently well understood.

Within this setting, Global Action Plan was commissioned by DWS to explore:

- The current levels of understanding and the relevant importance of air quality to renters in DWS’ key markets of Germany, the Netherlands, and the UK.
- The specific stakeholders that are key to improving the health and wellbeing of local citizens and the natural environment around case study assets in Munich, Germany and The Hague, Netherlands.
- Local sources of air pollution in these areas from publicly available monitoring stations.
- Experiences of key stakeholders in taking steps to reduce pollution and their needs and expectations of other stakeholders in the area (including DWS).
- The types of activities that can be pursued around the case study assets to reduce air pollution and generate social outcomes for the occupiers and the local community.
- What is being done to address pollution already in these locations, in order to identify the gaps and the uniquely valuable roles that can be played by different stakeholders (including DWS) in closing them.

In order to achieve these outcomes, the approach of this study has been built around two main component parts:

1. Three nationally representative polls of mid-market renters in, Germany, the Netherlands, and the UK and
2. Interviews with residents and local stakeholders in and around DWS residential assets in Munich, Germany and The Hague, Netherlands.

3 / Approach

The goal of this work was to identify opportunities, enablers and resources required for a community-engagement led approach to improving neighbourhood air quality. It was informed by three nationally representative polls of

mid-market renters in the UK, Germany and the Netherlands and interviews with residents and local stakeholders in and around three DWS residential assets (two in The Hague, Netherlands, and one in Munich, Germany).

Poll of mid-market renters in Germany, the Netherlands, and the UK

In April 2022, an online survey was conducted with mid-market renters in Germany, the Netherlands, and the UK. The survey comprised 15 questions exploring:

- 1 / Renters' attitudes, knowledge and behaviour in relation to both indoor and outdoor air pollution;
- 2 / Renters' priorities when making decisions about where to live (location and property type);
- 3 / Renters' opinions about who holds responsibility for managing air pollution where they live;
- 4 / Renters' willingness to pay more to rent a property that had been managed to minimise air pollution.

The survey was designed by Global Action Plan and DWS and distributed via an online omnibus poll by Opinium market research agency, ensuring the demographic and geographic breakdown of respondents was representative of the populations of each country.

To be eligible for inclusion in the survey, respondents had to meet the following criteria:

- Live in the Germany, the Netherlands, or the UK
- Be between 20-55 years old³⁰
- Privately rent their main property rather than owning it (excluding social housing)
- Spend 20% to 50% of their monthly income on rent (to qualify as "mid-market renters").

2,000 respondents completed the survey in each of Germany and the UK, with 1,026 respondents in the Netherlands, for a total of 5,026 responses.

4 / Poll Results

How much of a priority is air quality for mid-market renters in Europe?



KEY OBSERVATION #1

Three quarters of mid-market renters consider air quality an important factor when choosing a home.

When choosing the location and characteristics of a property to rent, air quality appears to be a relatively high priority for mid-market renters. In terms of location, the

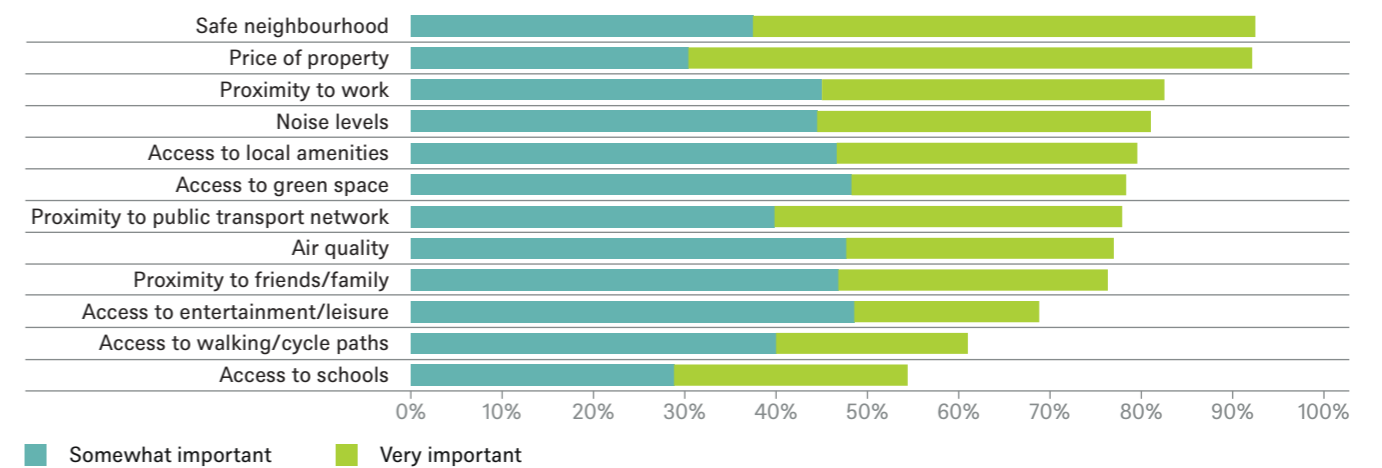
price and safety of the neighbourhood and access to local amenities or work were the most important factors, with over 90% of respondents considering them "important"

³⁰ OECD (2022)

(i.e. "somewhat" and/or "very important" vs. "not at all" and/or "not very" important). However, local air quality was also one of the deciding factors to over three quarters of

respondents in all three nations (Figure 1), scoring higher than schools, cycle paths or local entertainment and leisure facilities.

Figure 1. "How important, if at all, are the following factors to you when considering the location of a new home?"



There were key differences between age groups in terms of which factors they prioritise in choosing the location of a new home. For younger age groups, air quality was considered more important than proximity to work, public

transport networks and entertainment options. For older age groups, air quality rose significantly up the rankings, featuring as more important than even accessibility and proximity to friends and family.

Table 2. "How important, if at all, are the following factors to you when considering the location of a new home?" (total % ranking factor as "somewhat" or "very important")

	Age 18 - 24	Age 25 - 34	Age 35 - 44	Age 45 - 50
Price	92%	92%	92%	92%
Safe neighbourhood	92%	92%	94%	92%
Low noise	73%	80%	85%	86%
Local amenities	77%	79%	81%	84%
Air quality	69%	76%	82%	82%
Close to public transport network	79%	77%	79%	77%
Close to work	85%	84%	82%	72%
Close to friends/family	76%	78%	76%	71%
Green space	66%	71%	72%	69%
Entertainment	71%	70%	67%	64%
Walking/cycle paths	53%	62%	64%	64%
Schools	51%	56%	57%	41%

What air quality factors are most important?



KEY OBSERVATION #2

The most important factors affecting air quality for renters are ventilation and limiting mould and damp. Transport-related amenities such as access to EV-charging points are less of a priority.

When considering the building itself the price of the property, security, and the amount of space were rated somewhat or very important by the highest proportion of respondents in the UK and the Netherlands. However, evidence of mould/damp (a sign of poor ventilation and, as such, a proxy for indoor air pollution) was rated as important by over 90% of respondents in the UK and Germany and 87% of respondents in the Netherlands, demonstrating the importance renters place on having well-ventilate homes. Those already living in basement flats rated mould/damp as a particularly important factor in property selection, presumably due to experience of this issue.

In contrast, renters considered secure bike parking, the availability of EV charging points and off-street car parking lower priorities when choosing where to live, with only around a third of respondents considering the availability of EV charging points as important. This may be because renters tend to live in properties for shorter periods of time than property owners, and therefore do not see the same need to 'future proof' their property choice, for example, by considering EV charging points for future. They may also live closer to urban areas than those who own properties, reducing reliance on vehicle ownership.

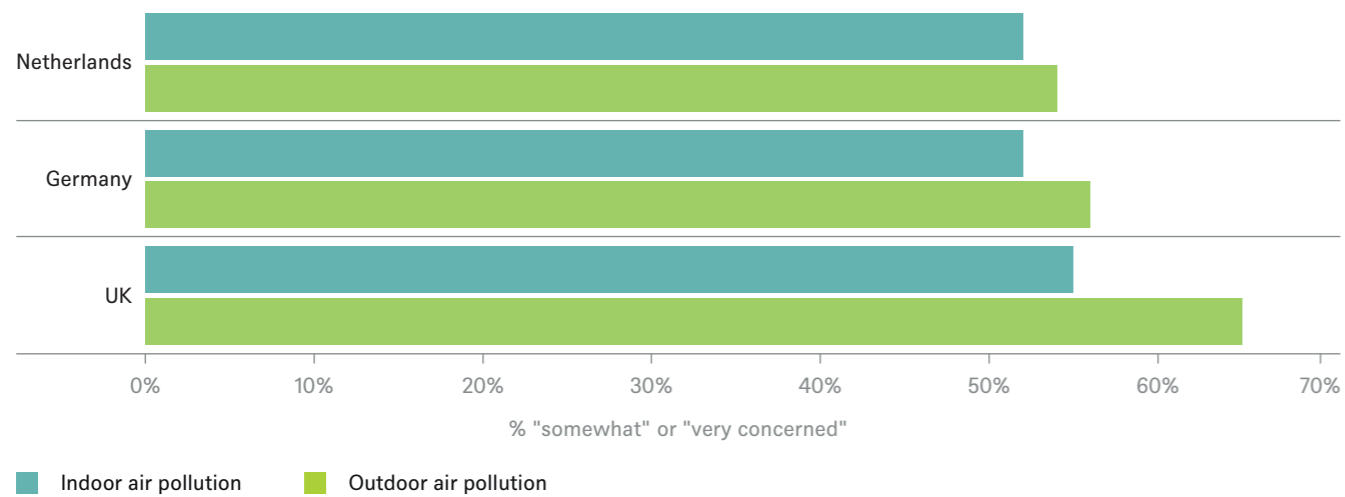
How much of an issue is air quality for renters?



KEY OBSERVATION #3

Over half of renters are concerned about the impact of air pollution on their health

Figure 2. "How concerned, if at all, are you about the impacts of indoor and outdoor air pollution on your health?"



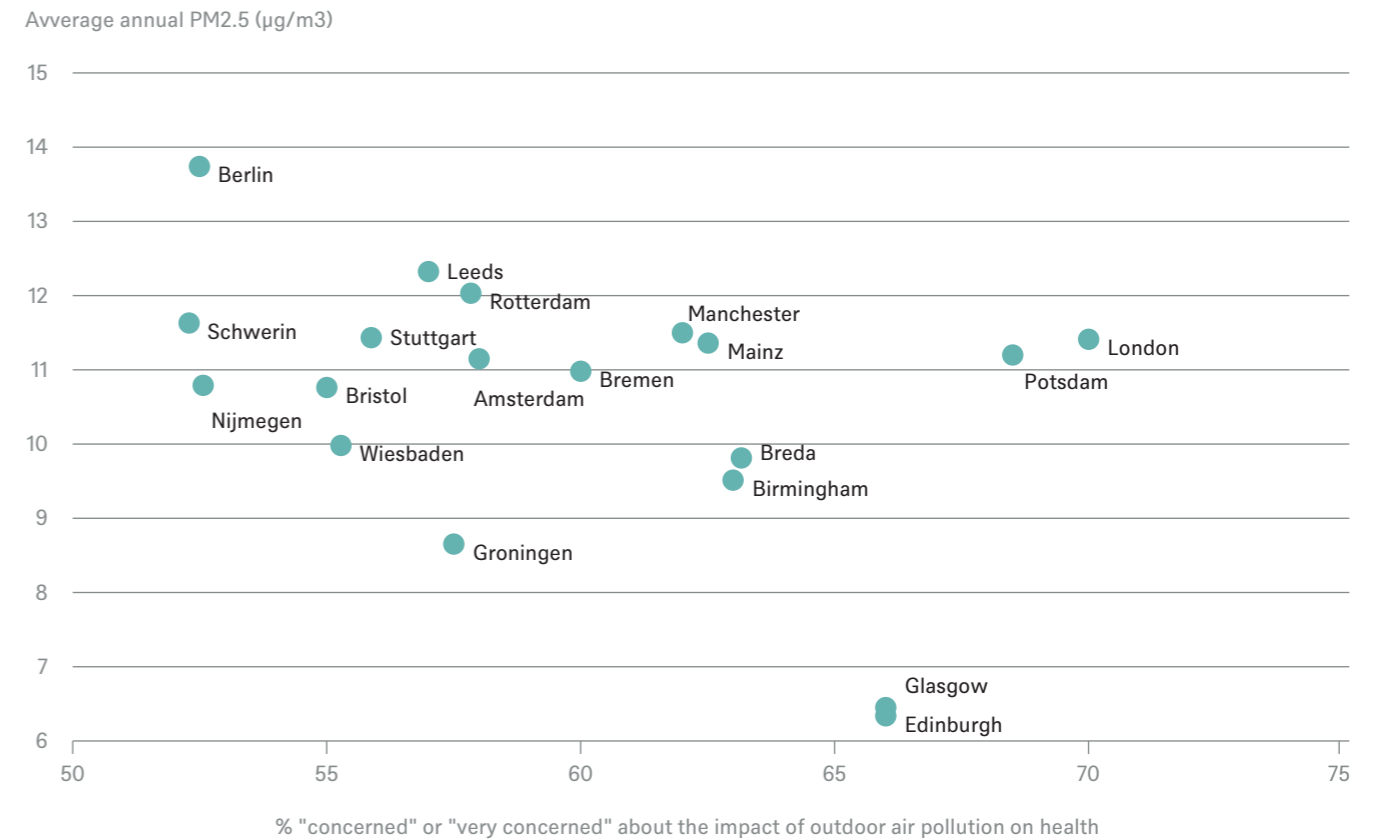
Concern about the impacts of indoor and outdoor air pollution were very similar across the three countries with just over half of respondents concerned about the impacts of indoor and outdoor air pollution on their health. The fact that the differential between indoor and outdoor air pollution concern was small was perhaps surprising given that media messaging about outdoor air pollution tends to be more widespread.

Concern was highest among UK renters with over 65% of respondents concerned about the impacts of outdoor air pollution on health and 55% were concerned about the impacts of indoor air pollution on their health. In Germany 56% were concerned about outdoor air pollution and 52% about

indoor air pollution. While in the Netherlands, 54% were concerned about the impacts of outdoor air pollution on health and 52% about the impacts of indoor air pollution.

When comparing major cities with one another the differences in opinions were relatively limited, with the exception that London-based renters showed higher levels of concern regarding outdoor pollution compared to other major UK cities as well as those in Germany and the Netherlands. There was no correlation between actual levels of air pollution by city and concern shown in the survey, demonstrating yet again the lack of awareness about real levels of exposure to air pollution on an everyday basis.

Figure 1. How concerned, if at all, are you about the impacts of outdoor air pollution on your health?



Source: GAP/DWS Air Quality Survey, 2022; WHO Ambient Air Quality Database, 2019

Case Study: Munich, Germany



Location: This DWS residential asset is situated in the north-west urban district of the city of Munich.

Air quality issues: While air quality on the site is generally good, within a sought-after suburban setting, local traffic issues, proximity to a major transport artery, and nearby industrial land uses (e.g. building materials plant) provide challenges for improving outdoor air quality.

What do residents think? All interviewed residents would be more likely to renew their tenancy if they knew a property was being managed to improve air quality. According to one resident: "Guaranteeing good air quality should be standard."

The strong sense of community ownership of the issue of air quality is evidenced by the fact that 70% of interviewed residents have already taken measures to improve local air quality and 30% would be willing to pay extra to achieve further improvements.

What can Property Managers and Institutional Real Estate owners do? Given the awareness of local residents about air quality issues, and willingness to participate in improving air quality, there is scope for property managers to educate residents further about specific measures they can take. Traffic calming around the site may be another area of focus.

Would renters be more willing to renew their tenancy if a property had been managed to minimise exposure to air pollution?



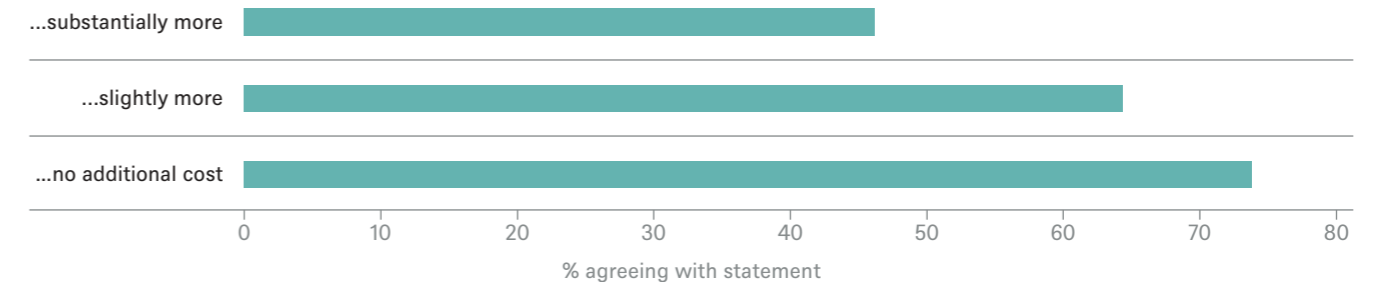
KEY OBSERVATION #4

Over half of renters said that they would be more likely to renew their tenancy if a property had been managed to minimise air pollution, even if it meant paying more

Renters were asked whether they would be more likely to renew their tenancy knowing that their property had been managed to minimise their exposure to air pollution. Almost three quarters of residents said they would be more likely to renew, with over half saying they would still renew if it meant paying slightly more, and over 40% of tenants across all three countries (including 52% in the Netherlands) saying they would still renew even if it meant paying substantially more. Respondents in the largest cities tended to be most willing to pay more to minimise their exposure to air pollution.

Figure 2. "To what extent do you agree with the following statements?"

Knowing a property had been managed to minimise my exposure to air pollution would make me more likely to renew my tenancy, provided it meant paying...



How much do renters understand about air pollution mitigation measures?



KEY OBSERVATION #5

Renters have a low level of understanding about the measures available to reduce air pollution both indoors and outdoors.

To gauge renters' understanding of the individual actions they could take to mitigate air pollution in their homes, they were given a list of measures proven to minimise exposure and contribution to air pollution both i) in the local area and ii) inside of their homes and asked whether they thought each action was an effective way to reduce air pollution.

driving as an effective way to reduce outdoor air pollution. However, that still left a third of respondents not identifying active travel rather than driving as a way to reduce air pollution. Slightly lower proportions recognised the benefits of using public transport and of turning off vehicle engines when stationary, but these actions were still widely recognised as ways of reducing air pollution (Figure 5). Only around a third of respondents in each country recognised solid fuel stoves/woodburners as a source of air pollution, despite woodburner emissions being responsible for the highest figure in health-related costs across Europe³¹.

Outdoor air pollution

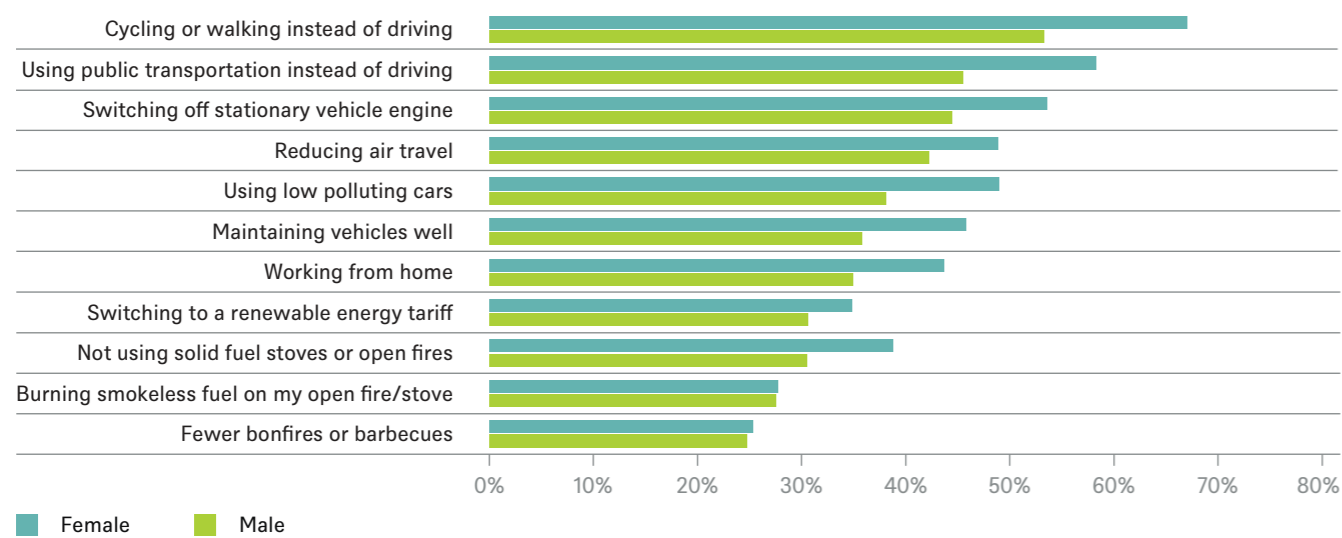
Around two-thirds of respondents in each country correctly identified active travel (e.g. cycling or walking) instead of

³¹ Delft (2022)

The findings differed in key ways by gender. Generally, female respondents were more optimistic that measures to reduce the level of outdoor air pollution were effective. The gap in perception of effectiveness was over 25% in relation to measures that

reduced pollutive car use, namely cycling, walking, using public transport, or using a low-pollution car such as an e-vehicle. Female respondents were also more expectant that working from home would reduce outdoor air pollution.

Figure 3. Which of the following do you think are effective ways to reduce the level of outdoor air pollution in your home? (%)

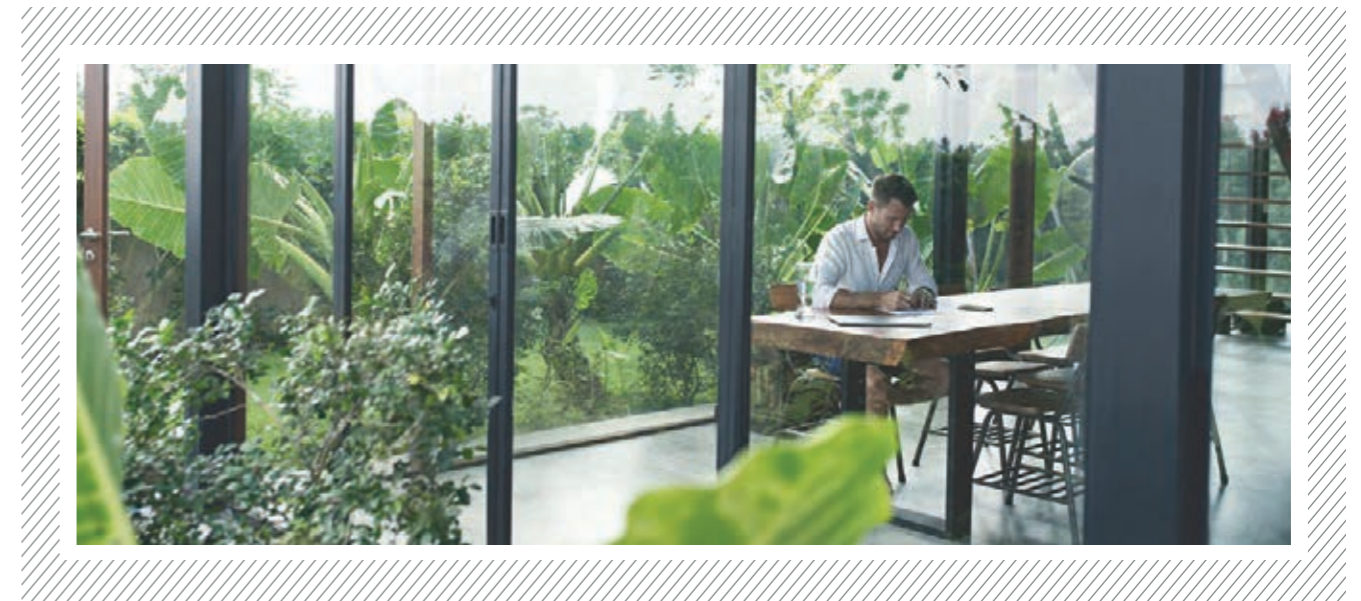


When compared with the results for the question “Do you actively do any of the above to help reduce the level of outdoor air pollution?”, the survey revealed some major gaps in perception of effectiveness in reducing air pollution and what respondents were actually doing. The biggest area where respondents were not taking action was in using electric cars.

Reducing air travel was also something respondents thought would improve outdoor air quality but were either unwilling or unable to put into practice. However, switching to a renewable energy tariff was a measure respondents found easier to put into practice compared to how effective they thought it was in relation to reducing air pollution.

Table 3. Differences in perception of effectiveness and action. Outdoor air quality.

	“Do you actively do any of the above to help reduce the level of outdoor air pollution?”	“Which of the following, if any, do you think are effective ways to reduce the level of outdoor air pollution in your local area?”
Cycling or walking instead of driving	1	1
Maintaining vehicles well	2	5
Using public transport instead of driving	3	3
Turning off engine when stationary	4	8
Working from home	5	6
Reducing air travel	6	2
Switching to a renewable energy tariff	7	8
Not using solid fuel stoves or open fires	8	7
Fewer bonfires or barbecues	9	11
Using low polluting cars	10	3
Burning smokeless fuel on my open fire/stove	11	10



Indoor air pollution

Avoiding smoking and regularly ventilating homes by opening windows frequently were the most well recognised ways of reducing indoor air pollution. Around half of respondents across the three countries recognised the use of extractor fan as a means of minimising indoor air pollution yet only around a quarter recognised the need to use lids on saucepans and use low VOC paints and varnishes. Again, awareness of the harms caused by open fires was low, with over three quarters of respondents

failing to recognise ‘not using a solid fuel stove or open fire’ as an effective way of reducing air pollution. Respondents’ level of awareness about indoor air pollution were similar across the three countries.

Again, the ranking of how effective respondents thought a measure was did not necessarily correspond with action. This was particularly noticeable with regard to smoking, presumably because many respondents do not smoke or feel unable to quit to improve indoor air quality.

Table 4. Differences in perception of effectiveness and action. Indoor air quality.

	Do you actively do any of the above to help reduce the level of indoor air pollution?	Which of the following, if any, do you think are effective ways to reduce the level of indoor air pollution in your home?
Opening the windows frequently	1	2
Using an extractor fan in the kitchen and/or bathroom	2	4
Keeping dust levels low	3	6
Having plants in the house	4	3
Avoid smoking in the house	5	1
Keeping windows closed during high traffic or smog	6	7
Making sure my boiler is well-maintained	7	5
Cooking with lids on saucepans	8	10
Using natural/eco air fresheners or cleaning products	9	9
Not using a solid fuel stove or open fire	10	8
Using low emission paints, varnishes and glues	11	12
Burning smokeless fuel on my open fire/stove	12	11
Choosing low emission carpets and/or furniture	13	13

Case Study: Rijswijk, The Netherlands



Location: This DWS residential asset is situated in the western part of the Rijswijk municipality, within the greater Den Haag area in The Netherlands.

Air quality issues: Proximity to a number of busy roads means outdoor air quality is generally acceptable, with potential for sensitive groups of people to experience minor symptoms from long-term exposure. This lower-than-expected outcome is expected, given the urban setting of the asset and its closeness to the more polluted greater Den Haag area.³²

What do residents think? Residents were generally not well-informed about the actions they could take to reduce air pollution, with a notable exception of one tenant who had devices installed to monitor air quality. The aforementioned resident is a valuable local stakeholder with their continuous data capturing and monitoring, which showed that opening windows at certain times of the day contributes to worsening indoor air quality, contrary to common views.

What can Property Managers and institutional Real Estate owners do? In keeping with the survey findings, there is a clear gap in residents' understanding about air quality. This provides an opportunity for Property Managers to develop a deeper engagement with tenants by providing residents with better information about the specific local issues affecting the property and what they can do about them. Property managers are very well placed to actively support and lobby on pertinent issues for local residents, such as the introduction of environmental zones at the Municipality of Rijswijk (an initiative which is at decision making phase as the time of this report), particularly in the area around Prinses Beatrixlaan.

Institutional Real Estate owners might consider installing air purification filters as part of the building's ventilation systems as a way to capitalise on the latent demand for better quality managed residential properties. Furthermore, with local traffic identified as an issue around the property, many residents are already looking for alternatives to car transport such as walking, cycling, or car clubs. Improving access to bicycle storage facilities would be an implementable solution to support residents' efforts of moving away from car transport.

³² BreezoMeter, accessed on 10th of August 2022



Who do renters consider responsible for managing indoor air quality in rental properties?



KEY OBSERVATION #6

Renters consider landlords primarily responsible for managing air quality within their homes, yet very few had received air pollution information or advice from landlords.

When renters were asked to rank who they considered who held the most responsibility for managing air quality inside rented properties³³, respondents in the UK and the Netherlands properties believed landlords held the most responsibility, while respondents in Germany believed residents held the most responsibility with landlords a close second.

Respondents in the Netherlands put a greater responsibility on Local Authorities, ranking them second most responsible after landlords. In contrast, respondents in the UK ranked Local Authorities joint-third with building developers (after residents and landlords) while German respondents ranked Local Authorities fifth after residents, landlords, building developers and resident associations.

Despite placing high responsibility on them for managing air pollution in their homes, very few respondents had received information on air pollution from their landlords. Around one third of respondents in the Netherlands had received information on air pollution from landlords (Table 5), this dropped to around 20% in Germany and around 15% in the UK.

Table 5. Have you ever received information about the following types of air pollution from your landlord?

Have you ever received information on the following from your landlord?	Germany	Netherlands	UK
Indoor Air Pollution	20%	32%	15%
Outdoor Air pollution	17%	29%	14%

³³ Respondents ranked stakeholders from a list including landlords, residents, resident associations, building developers, local authority, central government, other.

What are the air quality opportunities for property managers and investors?

DWS and GAP conducted polls and case studies clearly evidence that residential tenants are concerned about air pollution and its impact on their health. Furthermore, air quality considerations do play a noticeable role in selecting the property of choice for tenants. However, renters appear to have limited awareness on how to manage air quality. We believe these results clearly illustrate several opportunities for property managers and institutional investors.

Opportunities for Landlords and Property Managers

Opportunity 1: Landlords and Property Managers could play a role in educating renters on air pollution.

Renters consider landlords to be responsible for managing air quality, particularly inside properties. However few landlords and/or their properties managers currently have an active focus on this area. Landlords and property managers could play a stronger role educating tenants on best-practice ventilation when cooking and cleaning, and the 'ideal' use of a property's Mechanical Ventilation and Heat System (particularly relevant to new-builds) so that they maximise ventilation and heat, minimising damp, mould and air pollution exposure simultaneously. Equally and at the same time, they should seek to provide guidance to tenants on how they could change their cooking, heating, and transport behaviours to minimise contribution and exposure to air pollution (e.g. encouraging walking or cycling by providing information on routes and cycle parking or discouraging them from indoor burning).

Opportunity 2: Install air quality monitors to identify and prioritise most impactful ways of addressing indoor and adjacent areas air quality.

There is a lack of understanding in how to use and operate properties to optimise for air quality. Installation of air quality monitors could empower residents to take actions that reduce their exposure to indoor air quality pollution. Active community engagement that addresses privacy concerns and "best practice" awareness-raising campaigns are key implementation requirements to achieve the desired changed in behaviour outcome.

Opportunity 3: Landlords and Property Managers could act as powerful change agents between tenants and local government.

Through continuous resident engagement and the use of technology, Landlords could hold valuable, micro-location data that has the potential to influence local governments decision making. Through case studies and site-specific air quality monitoring, Landlords and Property Managers could harness grass root residents initiatives that lead to public sector mandated and enacted local air quality improvements and ensure sustainable and long-term air pollution reduction, thus directly impacting on residents Health and Wellbeing.

Opportunity 4: Embed air quality management KPIs into the service requirements of residential properties.

Through a bonus and malus mechanism, and using Health and Wellbeing KPIs, which include measures of air quality, landlords could incentivise property managers to make a measurable positive impact on residents' lives. For example, an active focus on renewable energy usage and improvements to common and adjoining areas plants and vegetation could result in energy savings alongside improving air quality for residents.

Implications for institutional residential investors

Implication 1: Satisfying unmet consumer needs is good business.

The results of DWS and Global Action Plan research clearly show that taking active steps in addressing the needs of residential tenants for clean air makes good business sense, through a willingness to pay a rental premium for properties managed to optimise air quality.

Implication 2: Asset embedded Health and Wellbeing measures could be a product differentiator

Residential tenants across Germany, the Netherlands, and the UK are largely uninformed how to take steps to improve the indoor air quality of their homes. This presents an opportunity for institutional investors that prioritise asset embedded amenities, such as air quality monitors, to offer a differentiated residential experience, with a focus on enduring and local consumer insights driven wants, such as clean air.

Implication 3: Achieving ESG targets through active asset management

New built real estate, with its superior energy efficiency and air ventilation systems, tends to feature prominently when discussing how ESG targets are attained. Fiduciary investment managers should also consider looking into extensive refurbishment of older properties with lower air quality and poorer air ventilation, as an active asset management approach to improve tenant retention, capture above-market rental growth, and make a positive environmental and social contributions.

Authors:



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Martin joined DWS in 2021 and has over 15 years of equity and debt real estate investment management experience across the United Kingdom and Europe. During his real estate career, Martin has acted in a principal capacity acquiring, disposing, lending, and borrowing against Living assets with vast experience investing in the sector covering residential, student accommodation, hospitality, and senior living, with strong expertise in development funding and structuring. Prior to joining DWS, Martin was the Head of Residential and Impact Investments at LaSalle Investment Management where he was responsible for portfolio management and investments in the residential sector, working on UK and European mandates. Previously, Martin was a Portfolio Manager at Aviva Investors where he also launched the firms pan-European long income strategies. Martin holds an MBA from University of Oxford and a Summa Cum Laude BA from Whittier College in California, USA. He is a CFA® Charterholder and a Certified Person under the FCA's Senior Managers and Certification Regime.



Dr Lucy Anderson, Research & Impact Lead, Global Action Plan

Lucy is an interdisciplinary researcher with a PhD and 15 years of experience conducting impactful research in the environment and sustainability sector. Lucy has published in leading international journals and written policy reports examining the effectiveness of pro-environmental behaviour change initiatives and the role of citizen science and community participation in environmental research. Lucy has strong expertise in designing and leading quantitative and qualitative social research programmes to inform behaviour-change campaigns. She has also consulted for policy bodies, national and international NGOs and as an independent evaluator for international funding bodies on the monitoring, evaluation and impact-measurement of multi-million environment and social development projects.



Siena Golan, Property Research Analyst, DWS

Siena Golan is a Research Analyst at DWS. She joined DWS in 2019 from CBRE and covers residential and commercial transactions in Southern Europe, as well as ESG-related research. She is a Member of the Royal Institute of Chartered Surveyors, qualifying through the Research route in 2018, as well as the ULI and IPF. Siena has a MSc in Real Estate from the University College of Estate Management, and MA (Cantab) in Geography at the University of Cambridge

Special contributions:



Simon Cripps, ESG Specialist, DWS

Simon has spent the last six years working as an ESG Specialist in the commercial real estate investment industry, working with numerous global investment managers on their ESG strategies including a number of GRESB sector leaders. Simon specialises in enhancing energy efficiency and indoor environmental quality within buildings, and joined DWS in March 2021 to support their European and APAC asset management teams with the delivery of asset-level ESG initiatives. Simon graduated with a BSc in Geography from the University of Exeter and an MSc (cum laude) in Sustainability Science & Policy from the University of Maastricht, and is a member of the Institute of Environmental Management and Assessment.



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Ben is a sustainability professional with over 10 years of experience managing a diverse portfolio of sustainability projects. Ben's expertise is in community engagement on air quality, climate change and wellbeing, developing insight into public attitudes and behaviours on environmental issues. He has an academic background in Psychology (BSc) and Climate Change Management (MSc).

A collaboration between DWS and Global Action Plan

About DWS - Real Estate

DWS has been investing in real estate assets for more than 50 years. As part of the Alternatives platform, the real estate business has nearly 350 employees in more than 25 cities around the world and EUR 80.5 billion in global real estate assets under management (June 30, 2022). Providing a diverse range of strategies and solutions across the risk/return and geographic spectrums, we offer core, value-added and opportunistic real estate, real estate debt and real estate securities. The real estate investment business employs a disciplined investment approach and aims to deliver attractive long-term risk adjusted returns, preservation of capital and diversification to its investors, which include governments, corporations, insurance companies, endowments, retirement plans, and private clients worldwide.

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We offer individuals and institutions access to our strong investment capabilities across all major liquid and illiquid asset classes as well as solutions aligned to growth trends. Our diverse expertise in Active, Passive and Alternatives asset management – as well as our deep environmental, social and governance focus – complement each other when creating targeted solutions for our clients. Our expertise and on-the-ground knowledge of our economists, research analysts and investment professionals are brought together in one consistent global CIO View, giving strategic guidance to our investment approach.

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About Global Action Plan

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