Banning indoor wood burning: Utrecht case study

This is one of four city case studies prepared by the Institute for European Environmental Policy for the Clean Air Fund. The study examines the planned introduction of a policy in Utrecht to phase out residential wood burning by 2030, representing a pioneering approach in the Netherlands. In addition, this brief explores the social implications of this measure, with a particular focus on vulnerable groups and public health impacts. This case study is structured around Utrecht's air quality challenges and policy response, followed by an assessment of the social dimensions of the planned ban, including stakeholder perspectives, expected impacts, implementation challenges, and transferable lessons for other cities.

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Utrecht is the capital of the province of the same name, located in the central Netherlands. It is the fourth most populous city in the country and one of the wealthiest metropolitan regions in the European Union, with among the highest levels of GDP per inhabitant (Eurostat, 2024). Despite its strong socioeconomic performance (see Annex 1), Utrecht continues to face air quality challenges, many of which originate from sources outside the municipality. To address these challenges at the local level and to align with the World Health Organisation's (WHO) air quality guidelines, the municipality has implemented a range of measures, including low-emission transport zones and a ban on outdoor wood burning. Most recently, Utrecht adopted a policy framework aimed at **phasing out indoor wood burning by 2030 through a ban** on all wood-burning appliances. This sets the city to become the first municipality in the Netherlands to implement a comprehensive ban on indoor wood burning.

Utrecht-specific air pollution challenges

Since 2017, Utrecht consistently complied with EU limits for nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) (Municipality of Utrecht, 2024). Utrecht has also been compliant with the EU 2030 annual target outlined in the Ambient Air Quality Directive since mid-2022 (Municipality of Utrecht, 2025). Nevertheless, air pollution exceeds the WHO limits for diverse pollutants (IQAir, 2025). A key challenge for the city is that approximately 80% of its air pollution originates from sources outside the municipality, emphasising the need for coordinated action at regional and national levels (Municipality of Utrecht, 2024). Despite this, locally controllable sources remain significant. Residential wood burning accounts for 25% of total $PM_{2.5}$ emissions in Utrecht, just above the national average of 23%, making it the second-largest contributor after transport emissions (Municipality of Utrecht, 2025; 2026; Gehring, 2026).[1][2] This issue is expected to grow further, as a projected 30% population increase by 2040 is likely to boost domestic heating demand and raise associated emissions (Municipality of Utrecht, n.d.).

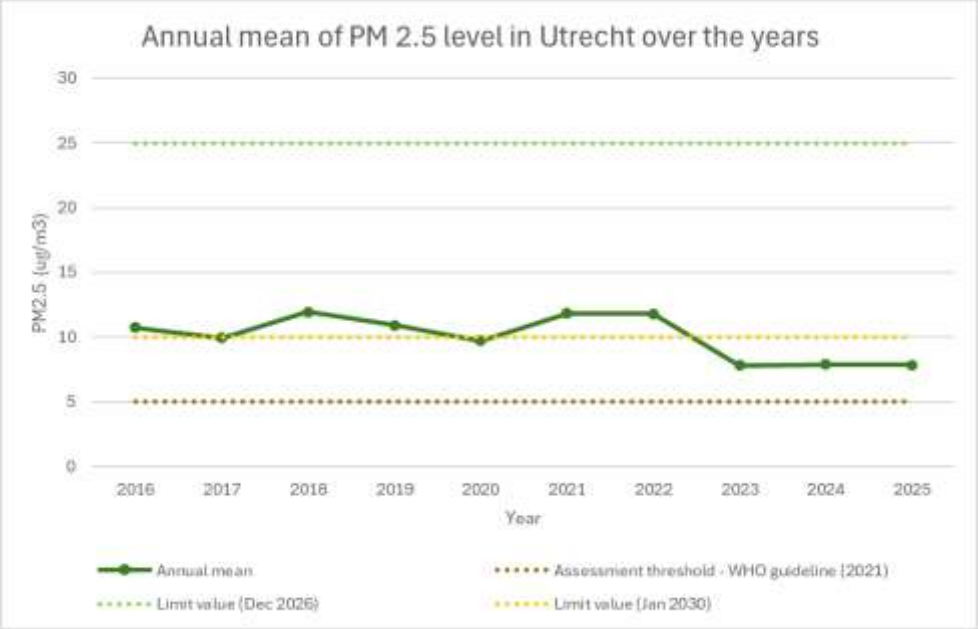


Figure 1. Annual mean of PM 2.5 levels in Utrecht between 2016 and 2025, assessment threshold and limit values from the Air Quality Directive 2024/2881. From IEEP, 2026. Based on data from (EEA, 2024) and (Luchtmeetnet, 2026).

[1] A low-emission zone for vehicles currently already exists in the city centre and will be extended to further neighbourhoods in 2027, and to the whole of Utrecht in 2030.

[2] A low emission zone is a designated area where only specific vehicles are allowed, depending on their emission requirements (Ceccato, Rossi, & Gastaldi, 2024). Eleven Dutch municipalities have low-emission zones (Milieuzones, n.d.). In Utrecht, there is a low emission zone in place that affects diesel cars, delivery vans and buses (Municipality of Utrecht, 2025).

Figure 1 (see above) presents the annual mean of $PM_{2.5}$ in Utrecht[3] over recent years. While the annual mean remains below the EU limit values for both December 2026 and January 2030, it still significantly exceeds the WHO guideline levels. While the yearly average of $PM_{2.5}$ went down to 7.9 µg/m^3 in 2025, it is important to mention that there are significant seasonal discrepancies, with the $PM_{2.5}$ value going up to 18.2 µg/m^3 in the winter, far above the EU limit of 10µg/m^3 and the WHO limit of 5µg/m^3 (Luchtmeetnet, 2026). This pattern can be explained by an increase in the use of wood-burning appliances during the winter months, as wood burning predominantly occurs indoors during autumn and winter, while outdoor wood burning is more common in spring and summer (Interviewee 5, 2026).

Bearing this in mind, it is evident that air pollution poses a significant threat to the health of Utrecht's population. Approximately 4.5% of total health loss is attributed to an unhealthy living environment, including air pollution as a primary contributing factor (RIVM, 2024). Wood burning alone accounts for 13% of the adverse health effects caused by air pollution within the Netherlands (Interviewee 2, 2026). However, there is insufficient evidence to determine which particulate matter comes from woodburning or other sources (Gehring, 2026). Research demonstrates a positive and statistically significant association between asthma onset in children and exposure to $PM_{2.5}$, PM_{10} and NO_2 (Khreis et al., 2016; Han, et al., 2021). In Utrecht, the rate of childhood asthma is 28% higher than the national average in the Netherlands (Municipality of Utrecht, 2024). Children are particularly vulnerable to wood smoke because their lungs are still developing and they have higher breathing rates compared to adults (Interviewee 2, 2026). Even at relatively low levels, chronic exposure to air pollutants such as $PM_{2.5}$ increases the prevalence of cardiovascular disease significantly (Khoshakhlagh et al., 2024). On average, 13% of adult Utrecht residents have cardiovascular diseases, and almost half (45%) of Utrecht's population above 65 years indicates that they have a heart or cardiovascular disease, which can be seen as a direct consequence of chronic exposure to air pollutants (Municipality of Utrecht, 2026). In addition, short-term increases in air pollution may cause exacerbations in people's existing diseases (Gehring, 2026).

Furthermore, there is growing evidence for effects of $PM_{2.5}$ on other health outcomes, such as diabetes, neurodegenerative diseases, neonatal deaths and cancers other than lung cancer (Gehring, 2026). Additional evidence highlights behavioural and health impacts: increased medication usage on days with high emissions from wood firing demonstrates that the movement of residents with respiratory issues is limited during these days (Gehring, 2026; RIVM, 2022). 4% of people living with lung diseases have been hospitalised because of wood smoke (Interviewee 2, 2026). These health concerns are reinforced by public experience: one in three people are bothered by the smoke of wood burning in Utrecht, and 17% experience some form of health burden due to air pollution (Municipality of Utrecht, n.d.; Municipality of Utrecht, 2025). Furthermore, in Utrecht, outdoor wood burning is the leading cause of air quality-related health complaints and indoor wood burning ranks fourth (Interviewee 2, 2026).

[3] The values consist of the mean of the two measuring stations within Utrecht: Utrecht-Kardinaal de Jongweg and Utrecht-Griftpark.

Local legal pressure and policy response

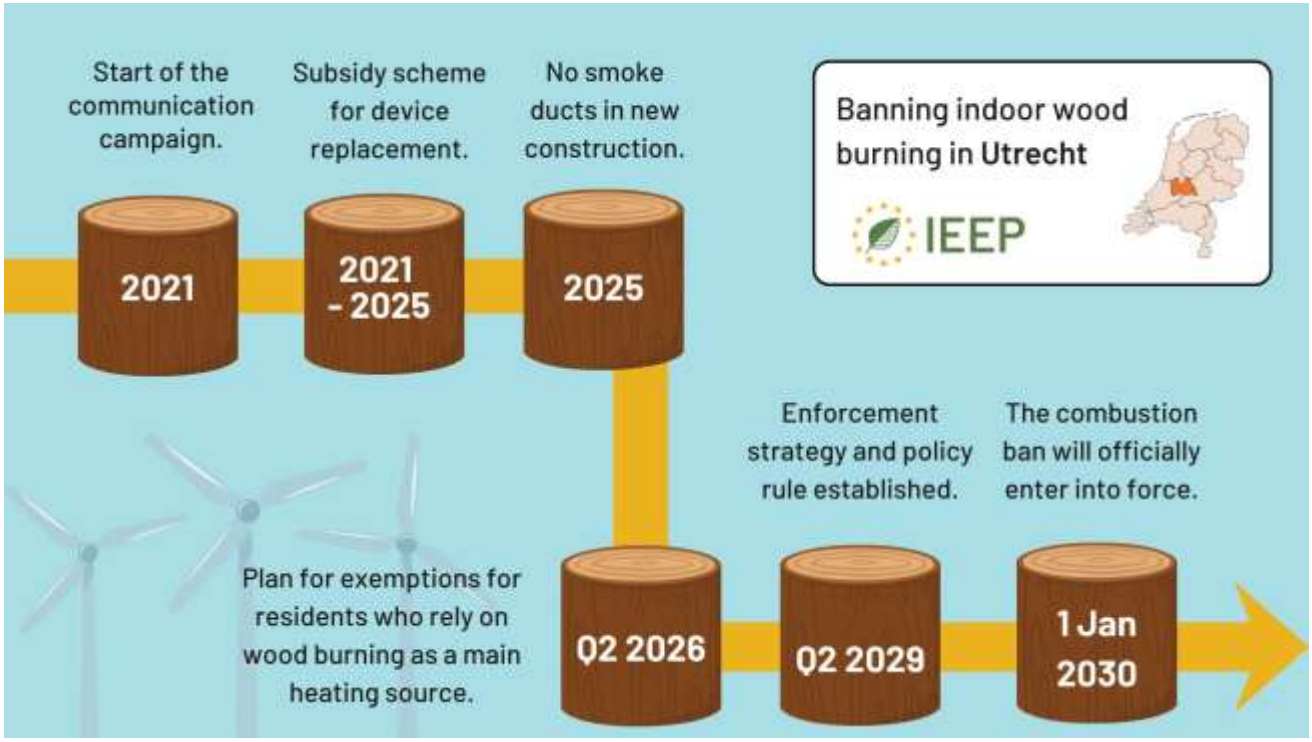
As mentioned above, most of Utrecht's air pollution originates from outside the municipality's jurisdiction, specifically from highways. Therefore, regulatory efforts need to be focused on locally controllable sources, such as residential wood burning, emissions from transport and construction sites (Interviewee 1, 2026).[4] Utrecht's policy strategy is concentrated on reducing emissions from domestic combustion, where municipal policy has direct influence. Communication campaigns aimed at discouraging wood burning have been ongoing since 2021, emphasising the health impacts of poor air quality from wood combustion (Municipality of Utrecht, 2021). In addition, the municipality implemented the prohibition of smoke ducts in new municipal buildings and a ban on outdoor wood burning in public spaces from 2025 onwards (Municipality of Utrecht, 2025).

To further step up efforts against air pollution, Utrecht has introduced a **phased regulatory framework leading to a full indoor wood-burning ban from 2030 across the entire municipality of Utrecht**, covering the use of all wood-burning appliances, including wood stoves, open fireplaces, and pellet stoves. The decision by the Municipality of Utrecht to introduce such a ban is driven by the city council's ambition to comply with the WHO guidelines (Interviewee 1, 2026) as well as health, environmental and social factors. The ban reflects a shift toward more health-based air quality governance, in line with the precautionary principle (European Union, 2016). Considering that the health costs of air pollution in Utrecht reach nearly 400€ million per year in health-related damages (Houtrookvrij, 2026), the city's ambitions can also be viewed from an economic perspective. According to CE Delft (2024), a **wood-burning ban is one of the most cost-effective measures to reduce $PM_{2.5}$ related health damage.** This is particularly relevant given that wood stoves are rarely used as the primary source of heating in Utrecht, where most households rely on natural gas (Interviewee 1, 2026; RIVM, 2024). In 2024, only about 0.5% of the population depended on the use of a wood-burning stove as primary heating source (RIVM, 2024). therefore, the use of fireplaces and residential wood-burning stoves can be seen as a supplementary heating method Interviewee 1, 2026; WHO, 2015).

The ban will apply to residential users, who use woodburning mainly for recreational purposes, as well as small-scale commercial installations under 100kW, although exemptions are being considered for specific businesses such as traditional bakeries and pizzerias (Municipality of Utrecht, 2025). Consequences for breaching the ban remain unclear at this stage, although financial penalties are expected to be introduced as part of the enforcement framework (Interviewee 1, 2026).

[4] Interviewee 1 is a policy advisor on air quality for the Municipality of Utrecht

TIMELINE



Social aspects – Investigations and Stakeholder Consultations

This section examines the policy development process surrounding Utrecht's planned approach to residential wood burning, with a particular focus on its potential (and expected) social impacts. As the ban will only enter into force in 2030, the insights gathered during the interviews were particularly important for the development of this section.[5]

Social consideration during the design

Social considerations were made during the process of designing the wood burning ban. The municipality recognised concerns related to affordability, particularly for the small number of residents relying on wood burning as a primary heating source. These considerations contributed to the decision to develop exemptions, which are currently being studied and assessed further by the municipality. The municipality also plans to include a clause allowing individual exemptions in cases where residents cannot afford an alternative form of heating and have not qualified for a general exemption (Interviewee 1, 2026). A subsidy scheme for the removal of wood-burning stoves was set into place from 2021 until late 2025 (Municipality of Utrecht, 2021), but no continuation is planned for the next 5 years, with policy shifting towards exemptions rather than financial support. In the future, however, there may still be scope to introduce targeted subsidies to support vulnerable households in transitioning to cleaner heating options (Interviewee 1, 2026).

[5] Methodological remarks can be found in Annex 4

Socio-economic patterns in Utrecht differ from typical environmental inequality trends. While groups with lower socio-economic security often reside in neighbourhoods with higher $PM_{2.5}$ pollution (RIVM, 2024), a correlation cannot be identified in Utrecht. The SES-WOA score[6], an indicator of neighbourhood socioeconomic status based on residents' wealth, income, and educational attainment, shows the opposite pattern in Utrecht, as neighbourhoods with a higher SES-WOA score have the highest $PM_{2.5}$ concentration, demonstrating that wood burning is used recreationally rather than as a primary heating source (Interviewee 1, 2026; CBS, 2022). An exception is Vleuten-De Meern, where relatively high SES coincides with lower $PM_{2.5}$ levels, likely due to lower urban density and greater distance from major roads (Government of the Netherlands, 2026). There is no clear evidence that certain neighbourhoods are disproportionately affected by wood smoke specifically, as households are not required to register wood-burning stoves, and available data are primarily based on complaints (Interviewee 1, 2026). According to an interviewee from the municipality, residential wood burning emissions are relatively evenly distributed across population groups, as most vulnerable households live in social housing and multi-storey buildings where wood stoves are uncommon, while wood-burning households are more often higher-income homeowners (Interviewee 5, 2026). The differences observed may partly reflect reporting behaviour rather than true exposure to wood smoke, with evidence suggesting that higher-income residents are more likely to submit complaints, either due to higher stove usage in their neighbourhood or greater familiarity with municipal reporting systems (Interviewee 1, 2026; Interviewee 1, 2026). Although only 5.1% of Utrecht residents experienced energy poverty[7] in 2024, slightly below the national average (CBS, 2025), lower-income neighbourhoods still report higher levels of perceived air pollution and odour nuisance (Municipality of Utrecht, 2026).

Stakeholder's engagement

The development of Utrecht's residential wood-burning ban involved stakeholder engagement to gather information from the public on the proposed measures (Interviewee 1, 2026). The municipality conducted a multi-method approach in 2023, including an online survey via DenkMee, street conversations, held with 205 residents across 10 city locations[8] (STIPO & Municipality of Utrecht, 2024), and two think tank meetings, supplemented by findings from the Climate Panel (Municipality of Utrecht , 2024). The online questionnaire on wood burning received over 1,000 responses from residents (Municipality of Utrecht , 2024). The consultations gathered residents' views on air quality, combining surveys with more in-depth qualitative discussions. Stakeholder discussions also included cooperation with the municipal health and social departments, as well as environmental and health-focused NGOs.

[6] In this context, the SES-WOA score shows how different neighbourhoods within Utrecht score relative to others (CBS, n.d.). The neighbourhoods with higher scores were Leidische Rijn and Wijk West, Binnenstadt and Noordwest, while Zuid, Zuidwest, Oost, Overecht and Noordwest had lower scores

[7] Energy poverty refers to when households cannot access essential energy products or services. It can occur when a household must reduce its energy consumption to an extent that has a negative effect on the inhabitants' wellbeing and health (European Commission, 2025).

[8] More information on the location of interviews can be found in Annex 5.

However, consulting vulnerable and hard-to-reach groups throughout the process has been challenging. To address this, the municipality has commissioned a consultancy firm to conduct more targeted interviews with potentially affected households, especially those who may depend on wood burning for primary or secondary heating purposes (Interviewee 1, 2026).[9]

Public acceptance, resistance and perceptions

Public responses to residential wood-burning regulation are divided (Milieu Centraal, 2026). According to stakeholder insights, approximately 50% of residents support stricter regulation or a ban on wood burning due to health and environmental concerns, while the other 50% oppose it (Interviewee 2, 2026). However, the ban was met with less opposition than anticipated (Interviewee 1, 2026). Opposition has mainly come from commercial parties selling wood stoves, political parties on the right of the political spectrum and individuals driven by concerns about restrictions on personal freedom and lifestyle choices, with arguments emphasising that wood burning should remain a private decision (Interviewee 2, 2026; Interviewee 1, 2026). The results of the municipal questionnaire on a potential ban on wood stove use show mixed public opinion: 41% of respondents considered it a good idea, 46% opposed it, and 13% were unsure (Municipality of Utrecht , 2024).

Support tends to come from individuals affected by respiratory illness, health professionals, environmental organisations, and political groups on the left of the political spectrum (Interviewee 2, 2026). Additionally, this group also emphasises the right to clean air and the disproportionate health burden placed on individuals with respiratory conditions. Stakeholders, in general, highlight that while wood burning is often associated with comfort and "cosiness," there are alternative ways to achieve these experiences. On the contrary, there is no alternative to clean air (Interviewee 2, 2026). The municipality also noted that supportive groups tend to be less vocal in public debates than opponents (Interviewee 1, 2026). Although concerns about affordability exist, they appear relatively limited. Affordability is not a primary driver of wood burning in Utrecht, as gas remains comparatively inexpensive and households tend to reduce heating consumption rather than switch to wood burning (Interviewee 5, 2026).

While some argue that wood burning can serve as a backup heating source during energy price spikes, only 8% of the population actually uses wood burning as a secondary heating source (Interviewee 2, 2026). Data indicate that recent energy price increases and energy security concerns have not led to increased residential wood burning in Utrecht. Instead, households are more likely to adopt air conditioning systems or heat pumps for heating, rather than using wood-based combustion (Interviewee 5, 2026). As mentioned above, the majority of households use wood burning for recreational purposes rather than necessity (Interviewee 1, 2026). To enhance public acceptance, Utrecht has complemented the policy with communication campaigns on the health impacts of wood burning. The municipality also

[9] The results of the consultations are available in Dutch here: Raadsvoorstel Beleidsnota Luchtkwaliteit

plans to prioritise awareness-raising and warning measures during the initial implementation phase, before gradually introducing stricter enforcement (Interviewee 1, 2026).

Expected impacts of the ban

As the ban has not yet come into force, the impact assessments are based on stakeholders' expectations, informed by the current situation in the city and the evidence available to date. The municipality expects the ban to have mainly positive health impacts and anticipates limited negative social consequences, as residential wood burning in Utrecht is predominantly associated with higher-income households (Interviewee 1, 2026). Similarly, health organisations do not anticipate particularly major social concerns. On the contrary, they argue that a municipality-wide ban would simplify enforcement by applying the same rules across all neighbourhoods rather than relying on localised restrictions (Interviewee 2, 2026). To assess whether the ban reduces inequalities, information is required on differences in exposure between socio-economic groups both at baseline (i.e. prior to implementation) and after the introduction of the ban (Gehring, 2026).

Health impacts. A ban on residential wood burning is expected to significantly reduce peak $PM_{2.5}$ concentrations during winter months, moving closer to the Municipality of Utrecht's goal to achieve the 2021 WHO limits by 2030. As a result, reduced concentrations are expected to have positive health effects, including lower rates of respiratory symptoms and asthma incidence among children, reduced cardiovascular morbidity and mortality among adults, and decreased healthcare costs associated with pollution-related diseases. Stakeholders anticipate that eliminating residential wood burning, combined with effective enforcement, would improve air quality at the hyperlocal level, leading to cleaner ambient air and reduced exposure to harmful $PM_{2.5}$ (Interviewee 2, 2026). This would particularly benefit individuals with pre-existing respiratory conditions, such as asthma, for whom wood smoke is a known trigger (Interviewee 2, 2026). Expected health gains include fewer acute exacerbations ("lung attacks"), reduced symptom burden, and lower rates of hospital admissions related to respiratory illness, ultimately decreasing the healthcare costs associated with pollution (Interviewee 2, 2026). The predicted health improvements will be tracked through measurements by the Dutch National Institute for Public Health and the Environment (RIVM), the Municipal Health Service (GGD) and the Lung Monitor (Interviewee 2, 2026).

Implementation challenges[10]

1. Enforcement difficulties

A major implementation challenge identified by the Municipality of Utrecht concerns the enforcement of the planned residential wood-burning ban. Local enforcement officers, rather than police, will be responsible for monitoring compliance, but their powers are limited

[10] Several limitations apply to this study; these are further discussed in Annex 4.

because they cannot enter private property without permission (Interviewee 1, 2026). The municipality, therefore, expects enforcement to rely heavily on citizen complaints and local reporting mechanisms such as the 'Stookwijzer'.[11] Monitoring air pollution levels is considered important to assessing the effect of the woodsmoke ban; however, monitoring will likely be limited to a few monitoring stations and "standard" pollutants such as $PM_{2.5}$ (Gehring, 2026). Other additional measurements, such as levoglucosan, the most specific marker for woodsmoke, are recommended in order to assess changes in wood burning (Gehring, 2026). The municipality has suggested alternative monitoring methods, such as heat detection systems or $PM_{2.5}$ measurements (Interviewee 1, 2026). Furthermore, perceptions of wood smoke by neighbours could be used to monitor compliance with the ban at a low cost (Gehring, 2026). This could be supported by Article 5:37 and Article 6:162 of the Dutch civil code (DCL, n.d.).

2. Behavioural resistance and social acceptability

A second challenge relates to behavioural resistance and public acceptance. Residential wood burning has become a highly polarised issue (Interviewee 2, 2026). While many residents support stricter regulations because of the health impacts of wood smoke, others view restrictions as an infringement on personal freedom and autonomy. Opposition is particularly strong among households that burn wood recreationally, the wood-burning stove industry, and political parties on the right of the political spectrum (Interviewee 2, 2026). Managing these competing narratives will be essential for maintaining public support and ensuring compliance.

3. Cultural attachment to wood burning

Beyond practical concerns, residential wood burning is associated with **cultural traditions and the perception of cosiness**. Many households burn wood recreationally rather than for heating. As a result, behavioural change may be difficult even when alternative heating technologies are available. The municipal questionnaire suggests limited willingness to discontinue wood stove use, as 50.5% of respondents reported that they were not willing to stop using their wood stove or fireplace (Municipality of Utrecht , 2024). Health organisations argue that effective communication should focus on the personal experiences of people suffering from wood smoke exposure and the associated health impacts rather than solely presenting technical or environmental arguments (Interviewee 2, 2026).

Transferable lessons and recommendations

The ban on indoor wood burning in Utrecht represents an interesting case study of a pioneering policy in a country where most municipalities have so far introduced only temporary restrictions during periods of poor air quality or adverse weather conditions, relying on tools such as the Stookwijzer and citizens' reporting. This ban is also notable for its long-term planning horizon, spanning nearly a decade, with communication efforts beginning in 2021 and implementation scheduled for 2030.

[11] More information on the Stookwijzer can be found in Annex 6

While some early transferrable lessons can be identified mainly in relation to the pre-implementation phase, some challenges have emerged. One key difficulty encountered by the authors was identifying stakeholders outside the municipality with detailed knowledge of Utrecht's planned indoor wood-burning ban, in particular for the scope of this piece of work. Although various organisations and NGOs active in air quality, health and awareness campaigns and researchers were familiar with the broader issue of wood smoke, many had limited knowledge of the proposed policy in Utrecht. These challenges may partly reflect the fact that the ban is still under development, with important elements such as exemptions and enforcement arrangements to be finalised. Consequently, detailed knowledge of the policy appears concentrated among a relatively small group of stakeholders involved in the policy process, suggesting that communication has not yet reached all relevant stakeholders beyond those directly involved in developing the measure. However, given that the ban is not scheduled to enter into force until 2030 and key elements of the policy are still being finalised, there remains considerable time for broader outreach and stakeholder engagement before implementation. It will therefore be crucial for the municipality to sustain and further strengthen its information campaigns.

Key lessons that can already be drawn at this stage are summarised as follows:

1) **Include public engagement early and implement gradually**

The Utrecht case illustrates the importance of a phased approach when implementing such policies. Before proposing a complete indoor wood-burning ban, the municipality implemented communication campaigns, subsidy schemes for stove removal, restrictions on outdoor wood burning, and prohibitions on smoke ducts in new buildings. Extensive public consultations, surveys, workshops, and stakeholder engagement activities were also conducted. Gradual policy implementation is likely to improve public acceptance and allow municipalities to identify potential social impacts before introducing more restrictive measures.

2) **Address social concerns through targeted exemptions and support measures**

Although wood burning in Utrecht is predominantly recreational, the municipality recognised that a small number of households may rely on wood-burning appliances for heating. Consequently, exemptions and potential support measures are being developed to prevent unintended impacts on vulnerable households and to minimise risks of energy poverty. Other municipalities considering similar restrictions should conduct early assessments of household heating needs and develop targeted support mechanisms where necessary.

3) **Emphasise the positive impacts, especially the public health benefits, of air quality policies**

Striving for compliance with the WHO targets for air quality, the Municipality of Utrecht framed the development of the policy's campaign around the multiple co-benefits of a healthy environment and clean air, highlighting the positive impacts on citizens' well-being. It also underscored the disproportionate constraints placed on individuals with respiratory conditions, whose freedom is compromised during periods of elevated pollution. Public health, as a cross-cutting concern affecting an entire community, can act as a unifying issue, which in this case has likely contributed to the relatively low level of opposition to the ban.

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Annex 1 Socio-demographic data for Utrecht

Socio-demographic data for Utrecht	
Area coverage	93.77 km^2 (A)[12]
Population density	4,033 habitants/km^2 (B)*
GDP per capita for the province of Utrecht:	EUR 75,651 (C)
GDP per capita of the Netherlands:	EUR 62,381 (D)
Utrecht's average annual wage	EUR 75,651 (E)
The Netherland's average annual wage	EUR 62,381 (F)
EU average annual wage	EUR 39,800 (G)

*The value is provisional for 2026

[12] A (City population, 2026) Additionally, the province of Utrecht has a population of 1,415,322 million and covers an area of 953.4km^2; B (Municipality of Utrecht, 2026);18.4% of the population is between 0-17 years old, 70.3% between 18-64, and 11.3% is 65 or older. C (CBS, 2026); D (CBS, 2026); E (CBS, 2026); F (CBS, 2026), G (Eurostat, 2025)

Annex 2 National air quality and trends

The Netherlands has experienced improvements in air quality since the 1990s (Government of the Netherlands, 2026). The implementation of low emission zones ("milieuzones") in several Dutch cities alongside stricter vehicle emission standards and a gradual shift towards electric mobility, has led to a marked reduction in transport-related emissions (CBS, 2025; Government of the Netherlands, n.d.). Nevertheless, in 2025 the $PM_{2.5}$ concentrations remained at 9.7 $\mu g/m^3$ in the Netherlands, 1.9 times higher than the WHO guideline value (IQAir, 2025). Although levels have declined since 2005, the majority of particulate matter in 2024 was emitted by households, primarily due to the use of fireplaces and wood-burning stoves (CBS, 2025). Air pollution is still associated with approximately 11,000 deaths annually in the Netherlands, with particulate matter exposure accounting for around 4% of the national disease burden (Municipality of Utrecht , 2024; Health Council of the Netherlands, n.d.). As a major European transport and logistics hub, a substantial share of its air pollution originates from transboundary sources. In the Netherlands, on average air pollution is associated with a reduction in life expectancy of approximately 10 months and 750,000 individuals experience health issues due to wood smoke (Interviewee 2, 2026). For one quarter of these people, exposure can even trigger a lung attack. The main driver for the Netherlands to implement such bans is to improve the air quality as well as reply to concerns of people experiencing nuisance from wood burning (Milieu Centraal, 2026).

Annex 3 EU legal and policy contexts

The updated EU framework on ambient air quality and cleaner air is set by Directive (EU) 2024/2881, which entered into force in 2024, replacing previous directives 2004/107/CE and 2008/50/CE. The Directive introduced more stringent and updated limits for pollutants and mandatory monitoring of ultrafine particles to improve air quality within the European Union. The Netherlands currently complies with these updated commitments, being the first EU Member State to integrate ultrafine particle measurements into its national air quality monitoring network as a standard practice (RIVM , 2023). In parallel, EU air pollution policy is also shaped by Directive (EU) 2016/2284, which sets binding national emission reduction commitments for key pollutants such as nitrogen oxides, particulate matter, sulphur dioxide, ammonia, and volatile organic compounds. The Netherlands currently meets these commitments. Furthermore, all new wood-burning stoves marketed within the EU from 1 January 2025 must comply with the Ecodesign directive (EU regulation 2015/1185). Earlier developments in air quality policy include a formal request submitted by the Netherlands to the European Commission under Article 22 of Directive 2008/50/EC, seeking a postponement of the deadline for meeting nitrogen dioxide (NO_2) limit values, as well as a temporary exemption from complying with particulate matter standards in certain zones where exceedances were still occurring. The European Commission approved this request in the same year, concluding that the conditions for derogation were met, which allowed the Netherlands additional time to comply without being considered in breach of EU law. This decision was later challenged in the Court of Justice case 'Council of the European Union v Milieudefensie (C-401/12 P to C-403/12 P)' in 2015, in which the Dutch environmental organisation Milieudefensie argued against the legality of the approval. However, the Court ruled that their action was inadmissible, meaning the challenge failed on procedural grounds. In 2017, Milieudefensie won a separate court case against the Dutch government, arguing that air quality in several areas exceeded the limits set by Directive 2008/50/EC (Milieudefensie, n.d.). The court ruled that the government must take additional measures to ensure compliance with EU air quality standards.

At a national level, residential wood burning is not governed by a specific standalone legal framework. Instead, it is primarily governed indirectly through general nuisance provisions under Dutch civil law, particularly Article 5:37[13], and Article 6:162[14] of the Civil Code. Furthermore, the Netherlands adopted the Clean Air Accord in 2021-2023, a national agreement between the central government, provinces, and municipalities aimed at improving air quality beyond EU minimum requirements, targeting WHO levels and encouraging measures to reduce emissions from key sources including residential wood burning and traffic (RIVM, 2024). However, it is not legally binding and does not create enforceable obligations. Instead, local municipalities can decide to what extent legal measures should be taken. Tools such as the heating guide 'Stookwijzer' are used in some municipalities to determine whether wood burning is allowed (RIVM, n.d.).

[13] The Burgerlijk Wetboek is the core legal basis for nuisance between neighbours, stating that property owners may not cause unlawful nuisance (including smoke, odours, noise, soot).
[14] General tort law; applies when nuisance becomes excessive and causes harm.

Annex 4 Methodological remarks & limitations

This case study is based on a combination of desk research and semi-structured stakeholder interviews. Five interviews were conducted in May 2026 with representatives from the Municipality of Utrecht (Interviewee 1 & 5), a national health organisation specialising in air quality and respiratory health (Interviewee 2), Milieu Centraal (Interviewee 3), and Utrecht University researcher Ulrike Gehring, an expert in air pollution and public health (Interviewee 4). Interviewees were selected based on their expertise, involvement in the policy process, or knowledge of the health, environmental and social dimensions of residential wood burning. In addition, the Wood Smoke Free Foundation provided targeted written input on the health impacts of wood smoke exposure and the rationale for residential wood-burning restrictions.
The desk research drew on municipal policy documents, consultation materials, air quality monitoring data, public health statistics, socioeconomic datasets, and academic literature. Key sources included publications and datasets from the Municipality of Utrecht, the Dutch National Institute for Public Health and the Environment (RIVM), Statistics Netherlands (CBS), the Wood Smoke Free Foundation, and peer-reviewed research on wood smoke and public health impacts. Insights gathered from stakeholders significantly enriched the analysis and helped contextualise the expected impacts and implementation challenges of the proposed ban.

As the residential wood-burning ban has not yet entered into force, this case study is based on expected rather than observed impacts. This limits the ability to draw conclusions about actual health and social outcomes, as implementation results do not exist yet. In addition, key policy elements such as exemptions and enforcement mechanisms are still under development, which introduces uncertainty regarding how consistently and effectively the ban will be applied in practice (Interviewee 1, 2026). Data limitations further affect the reliability of the analysis. Wood-burning appliance ownership is not registered in Utrecht, preventing precise identification of affected households and limiting the ability to assess exposure patterns across socioeconomic groups. Instead, there is a reliance on complaint data to enforce the ban, which may be systematically biased toward more vocal or higher-income residents, thereby potentially misrepresenting actual exposure (Interviewee 1, 2026). Finally, stakeholder knowledge of the proposed ban is concentrated among actors directly involved in the policy process, which restricts the diversity of perspectives captured and may lead to an overrepresentation of institutional viewpoints in the findings.

Annex 5 Location of the street interviews conducted by the Municipality of Utrecht

Figure 2. The location of street interviews ((STIPO & Municipality of Utrecht, 2024)

For the street interviews, the municipality selected ten points across neighbourhoods in Utrecht that were diverse in terms of socio-economic characteristics of residents, type of housing (from spacious owner-occupied homes to social rental apartments), location in the city, and the mobility situation (ease of use of public transport, parking facilities, proximity to major traffic hubs).

Annex 6 Information on the air quality guidance tool 'Stookwijzer'

The **Stookwijzer** is a Dutch air-quality advisory colour-coded tool that provides daily guidance on when it is not advised to use wood stoves or fireplaces based on air pollution levels and weather conditions. It is not a mandatory tool, but municipalities can choose to adopt it as part of their local air quality policies. In municipalities such as Amersfoort and Voorst, the colour of the Stookwijzer determines whether wood burning is allowed or not (Longfonds, n.d.). The National Institute for Public Health and the Environment reported 1,750,000 visits of the Stookwijzer during the 2024–2025 heating season, with over 22,000 reports having been made (RIVM, n.d.)

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