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Policy Report

# Improving air quality with residential heating policies

A compendium of local approaches across Europe



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## CORRESPONDING AUTHORS

*Irene Chiocchetti (ichiocchetti@ieep.eu).*

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### **IEEP AISBL office**

IEEP - Norrskén House Brussels  
72 Rue du Commerce  
1040 Bruxelles Tel: +32 (0) 2738 7482

### **IEEP AISBL - UK registered address**

Acre House 11/15, William Road  
London NW1 3ER

# CONTENTS

1. INTRODUCTION.....	1
1.1 Scope, coverage and classification of measures .....	2
2. List of measures by city.....	5
3. Conclusions .....	24
4. Bibliography .....	26
5. Annexes.....	43
5.1 Methodological note.....	43
5.2 Additional cities implementing local clean heating measures .....	45

## 1. INTRODUCTION

At EU level, clean air and clean heating policies are increasingly embedded in broader social and just transition frameworks. The European Green Deal's "leave no one behind" principle, alongside the Renovation Wave Strategy and the Fit for 55 package, signals increasing policy recognition that housing, energy poverty, air pollution, and health must be addressed in an integrated way. The latest [report by the European Environment Agency](#) (EEA), tracking the progress of the 8th Environmental Action Programme's objectives, shows that the European Union (EU) is on track to reach its 2030 target of reducing premature deaths caused by exposure to fine particulate matter (PM) by at least 55% compared to 2005 levels, a key objective under the Green Deal's the "Zero Pollution" agenda.

Between 2005 and 2023, premature deaths caused by exposure to PM2.5 above the World Health Organisation's guideline levels fell by 57% in the EU, resulting from recent policies targeting air pollution. Emissions from PM2.5 also decreased by 38% during the same period, with emission reduction in heating systems playing a significant role. Most regions reporting the highest reductions in attributable mortality in 2023 compared to 2022 are in countries that also recorded the highest cuts in emissions from the residential, commercial and institutional sector. However, the EEA also reports that air pollution remains one of Europe's deadliest environmental threats, calling for more action in this field.

This compendium<sup>1</sup> presents measures adopted by European municipalities to make urban heating systems more sustainable and to improve air quality, including examples inspired by or resembling the Low Emissions Zones (LEZs) for vehicles already in force in many European cities. The inventory showcases good practices to support air quality actions and help meet the objectives of the Ambient Air Quality Directive (AAQD) and other EU legislation, such as the Ecodesign Regulation, the Energy Performance of Buildings Directive (EPBD), and broader climate targets.

As the level of governance closest to citizens and businesses, municipalities play a crucial role in the effective implementation of air quality policies (Herreras Martinez, S, 2022), incorporating EU and national requirements while being aware of local needs. At the same time, EU policies have created a clear mandate and

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<sup>1</sup> The Policy Compendium is a tool that contributes to summarise information on successful local policy measure enhancing air quality at local level. It provides accessible and understandable resources for decisionmakers and stakeholders with vested interests in the implementation, implementing, monitoring, assessment and advocacy for air quality, clean energy and social acceptability of associated policies.

opportunity for cities to act on heating-related emissions. The Energy Efficiency Directive, for instance, requires municipalities with a population over 45,000 to prepare heating and cooling plans for their cities. Specifically, on clean air, local authorities are updating their Air Quality Plans, but guidance on how to implement socially acceptable clean heating measures is crucial. Therefore, the compendium maps actions and measures undertaken by municipalities across Europe to improve air quality, as well as potential societal challenges that can arise. This collection of measures is intended for local authorities, policymakers, and technical experts seeking concrete examples to reduce emissions from residential heating while addressing social and economic challenges.

The compendium also aims to raise awareness and facilitate exchange among European cities on air quality measures implemented elsewhere, with the potential to inspire them to adopt similar approaches, while recognising that competencies and economic capacities vary significantly across municipalities in Europe.

### 1.1 Scope, coverage and classification of measures

The main **types of policies** included are:

- Bans on burning wood or certain fireplaces;
- Bans on specific types of boilers fuelled by polluting fuels (such as wood, coal, and oil);
- Financial incentives for citizens encouraging behavioural change;
- Investments in building retrofits;
- Strategies promoting the switch from fossil fuel-based heating systems to clean technologies.

Some of these policies are activated only during specific implementation periods, for example, in winter when heating needs are higher, or under certain atmospheric conditions, such as light winds that increase the likelihood of smoke lingering over the city. On the other hand, other measures apply or have stricter requirements, only in certain parts of the city, mainly in the most populated and polluted areas, mirroring the functioning of LEZs for vehicles.

The compendium includes information on the **scope** of each measure, its specific **target**, the **year of entry into force**, as well as any **exemptions**, **criteria**, and **compliance mechanisms**, when available. Most policies foresee administrative sanctions for non-compliance, a few opt for corrective measures, while for some, information was unavailable.

When data were accessible, the analysis also included **socioeconomic factors** that enhance social acceptability, such as subsidy schemes, public consultations, information campaigns, and elements related to inequality issues and economic vulnerability. These aspects are deemed crucial to ensure a just transition, considering the EU's increasing emphasis on justice and distributional impacts in climate policy (for instance, through the Social Climate Fund and the revenues from the Emission Trading System for transport and building sector under the Fit for 55 package). As such, information on social and economic aspects of local measures can shed light on the key challenges that may impede the effective implementation of these policies, and, on the other hand, on the actions required to maintain public support, including vulnerable populations. This is particularly relevant since clean heating measures, whilst often implemented at local level, should be closely aligned with EU objectives to shield vulnerable consumers and mitigate energy poverty.

The compendium further indicates whether the **policies explicitly aim to improve air quality**. In some cases, air quality is not directly mentioned as an objective; however, other overall objectives, such as decarbonisation or emission reduction, have indirect benefits for air quality. For this reason, such measures were at times included. Based on this distinction, the cities are divided into three **main categories**:

- A. Specific regulations designed to directly improve air quality (direct impact);
- B. Policies aimed at improving air quality that are part of broader regulations or strategic plans (direct impact but broader framework);
- C. Standalone policies, subsidy schemes, or measures embedded in broader strategic frameworks that pursue overarching objectives, such as decarbonisation, which have positive effects on air quality, even without explicit reference (indirect positive impact).

## 1.2 Selection of cities

The compendium offers a comprehensive representation of the European territory, spanning from Northern Europe to Southern regions, including several examples from Northwestern, Central and Eastern Europe, where numerous cases from areas are experiencing more extreme temperatures and thus greater heating needs. The research began with capital cities, typically the most densely populated and polluted, followed by other large cities. Additional smaller municipalities were also identified throughout the research, to include the most relevant examples for the project's scope. The main selection criterion for

inclusion in the compendium was that the policies be designed and implemented at the municipal level. In some cases, national legislation was considered when it entrusted municipalities to adopt rules at the city level with a certain degree of discretion.

Annex 5.2 includes additional examples outside the scope of this work (for instance, due to differing governance levels), measures that are no longer in force, or announced initiatives, for which further information was not available. However, they offer noteworthy aspects which can offer valuable insights for other municipalities.<sup>2</sup>

The cities are ordered according to the level of impact on air quality of the policy reported, based on the three categories outlined above, and are colour-coded accordingly. Each measure includes the specific target of the policy represented by a symbol (see legend below), and additional information on the scope, entry into force, and socioeconomic factors.

The compendium is the starting point from which four case studies will be developed, beginning with Sofia (Bulgaria), [one of Europe's first](#) cities to implement a LEZ for heating systems.

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<sup>2</sup> For more information, see Annex 5.1 "Methodological note"

## 2. LIST OF MEASURES BY CITY

### How do countries improve air quality through heating policies?

Countries are ordered by sustainable residential heating policies aiming at improving air quality across Europe: **high (direct)**, **medium (part of broader frameworks)**, or **low (indirect positive impact)**



Wood



Polluting fuels



Financial incentives



Oil



Clean technologies



Retrofit



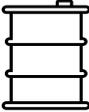
Coal

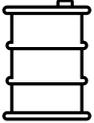


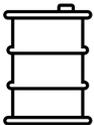
Undocumented fireplaces

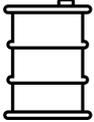
City	Name of the policy and year of entry into force	Scope of the measure and requirements	Socioeconomic considerations
 Amersfoort, Netherlands	<p><b><u>Policy rule on the duty of care for wood burning in Amersfoort</u></b>                      October 2024</p> 	<ul style="list-style-type: none"> <li>• Ban on indoor fireplaces, wood burning stoves and pellet stoves if the <a href="#">Stookwijzer</a> (i.e., Heating guide) is on code orange or red (high chances of smoke remaining in the air due to different factors, including wet weather or little wind).</li> <li>• Broader Framework: the city, along with 100 other municipalities, 12 provinces and the government have signed the Clean Air Agreement, which aims to improve air quality permanently and health by at least 50% by 2030 compared to 2016.</li> <li>• Citizens can raise complaints, if they observe breaches. The authorities will assess the situation and decide whether to take action.</li> <li>• Sanctions can go up to 850€.</li> </ul>	<ul style="list-style-type: none"> <li>• Communication: The municipality website provides sources of organisations working on air pollution and the effect of wood burning to raise awareness among citizens.</li> <li>• Financial support: the white goods scheme is a reimbursement for the repair or replacement of different devices, including stoves, for low-income households. However, no criteria regarding the efficiency of the stove are mentioned on the Municipality website.</li> </ul>

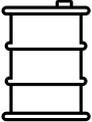
 <p>Amsterdam, Netherlands</p>	<p><b><u>Wood Burning Policy Framework (WBPF)</u></b> From 2026</p> 	<p>Includes five main measures with three related to residential heating:</p> <ol style="list-style-type: none"> <li>1. Awareness campaign about the risks of wood smoke via flyers, social medias and local campaigns in areas affected;</li> <li>2. Consultation process with residents from where nuisances are reported;</li> <li>3. Investigation into the regulation of wood burning in 2026 to check whether additional measures are legally and practically feasible, such as a ban on indoor burning in future new-build projects licensed from 1 January 2028 and a ban when the Heating guide (Stookwijzer) is at code red or orange in 2026.</li> </ol> <p>Applies to all types of wood burning, including indoor wood burning with stoves and fireplaces, and combustion stoves not connected to the heating network.</p>	<ul style="list-style-type: none"> <li>• Stakeholder engagement: public consultation on the Draft on the WBPF occurred between late October and December 2024; four open meetings where citizens could share their opinions.</li> <li>• Communication: information campaigns, both online and offline, encouraging changes in heating habits.</li> <li>• City situation: According to the WBPF, 42% of Amsterdam residents experience nuisance from wood smoke.</li> </ul>
 <p>Antwerp, Belgium</p>	<p><b><u>Ban on coal for residential heating</u></b> May 2024</p> 	<ul style="list-style-type: none"> <li>• Ban on coal introduced in the Police Code (article 72) by the Municipal Council.</li> <li>• Requires users of incinerators to take all precautions to avoid nuisance to the neighbourhood through odours, gases and other emissions.</li> <li>• Concerns users of multi-fuel burners, stoves, baking ovens, and open fireplaces, as well as incinerators.</li> <li>• In case of no compliance, administrative sanctions through the Police Code.</li> </ul>	<ul style="list-style-type: none"> <li>• Communication: The city council discourages citizens from burning wood for health reasons; if it's not possible, it invites them to follow some recommendations on how to heat their own homes safely.</li> <li>• Financial support: subsidies are available to improve insulation and install heat pumps.</li> </ul>

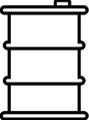
<p>Bergen, Norway</p>	<p><b><u>Regulation prohibiting the use of fireplaces without documented safety against pollution</u></b> From 01/01/2021 to 04/05/2023</p> 	<ul style="list-style-type: none"> <li>• Ban to reduce air pollution, accelerating the replacement of heating needs with environmentally friendly alternatives.</li> <li>• Applied to solid fuel fireplaces used for heating buildings, <i>de facto</i> banning old and non-documented stoves, and requiring strict documentation on stoves.</li> <li>• Exemptions: stoves reviewed as pollution-safe or if considered culturally and historically important, and storing fireplaces (i.e., soapstone and tiled stoves).</li> <li>• Risk of enforcement fines, but a fining system was planned to be established in the future. No control by the police in the houses.</li> <li>• The law was repealed during the outbreak of the energy crisis in 2023 due to soaring electricity prices, and because it was found that air quality improved.</li> </ul>	<p>Financial support: from the city to help households replace old appliances. A deposit scheme has been in place since 2017 (before the law entered into force), amounting up to NOK5000 per household. After the ban was lifted in 2023, the subsidy scheme remained.</p>
<p>Bristol, UK</p>	<p><b><u>Smoke Control Area order</u></b> 1956</p> 	<ul style="list-style-type: none"> <li>• Ban on emitting the chimney of a building, a furnace or any fixed boiler, only <u>approved appliances/fuels</u> or smokeless fuels (anthracite, semi-anthracite, gas, low volatile steam coal) are allowed.</li> <li>• <u>Exemptions</u> apply to certain types of appliances (e.g., stoves and pizza ovens with specific names and fuels).</li> <li>• Initially introduced in the UK in 1956, the current legal base is the 1993 Clean Air Act, but SCAs are designated by local authorities (section 18). In 1993, Bristol implemented the order in the entire city.</li> <li>• Sanctions for England: The Environment Act 2021 empowered local authorities to introduce financial penalties in case of breaches. Fines can go from £175 to</li> </ul>	<p>Stakeholder engagement: Slow the Smoke (2022) - research project led by Bristol City Council with support from the University of the West of England, Bristol (UWE) and Knowle West Media Centre (KWMC). It aims at achieving air quality benefits in the <u>short and long terms through the planned monitoring, engagement and awareness-raising activities in Ashley Ward (pilot area)</u> of the project).</p>

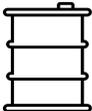
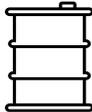
		<p>£300 for emitting smoke from a chimney, and up to £1000 for buying or selling unauthorised fuels, and for declaring a false type of fuel.</p>	
 <p>Bucharest, Romania</p>	<p><b>Heating distribution measures</b> From 2018 to 2022</p> 	<ul style="list-style-type: none"> <li>• Bucharest's Integrated Air Quality Plan (2018 - 2022) contains measures proposed by the Bucharest City administration to reduce pollution and bring down the concentration of emissions within the limits established by the law.</li> <li>• Measures concerning residential heating include the rehabilitation of heat distribution networks as well as the continuation of thermal rehabilitation programmes for residential blocks.</li> <li>• Planning tool without sanctions.</li> <li>• A new plan should be approved by August 2026.</li> </ul>	<p>Stakeholder engagement: Air quality study made by S.C. Westagem SRL, a company listed in the National Register of Environmental Protection Study Developers under no. 30.</p>
<p>Edinburgh, UK</p>	<p><b>Smoke Control Area order</b> 1959</p> 	<ul style="list-style-type: none"> <li>• Ban on emitting the chimney of a building, a furnace or any fixed boiler.</li> <li>• Only <u>approved appliances</u>/fuels can be used or any of the smokeless fuels (anthracite, semi-anthracite, gas, low volatile steam coal).</li> <li>• <u>Exemptions</u> apply to certain types of appliances (e.g., stoves and pizza ovens with specific names and fuels).</li> <li>• Initially introduced in the UK in 1956, the current legal base is the 1993 Clean Air Act (part III: creation of smoke control areas), but SCAs are designated by the local authority (section 18). Edinburgh applied the order in 1959, but only in 1995 was the whole city declared an SCA.</li> </ul>	<p>Social impacts: resistance and complaints, which were addressed with information campaigns, raising awareness and education.</p>

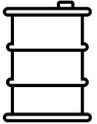
		<ul style="list-style-type: none"> <li>Sanctions for Scotland: Fines can be up to £1,000 for emitting smoke from a chimney, buying or selling unauthorised fuels, and declaring a false type of fuel.</li> </ul>	
 <p>Krakow, Poland</p>	<p><b>Krakow anti-smog resolution (ASR)</b> September 2019</p> 	<ul style="list-style-type: none"> <li>Ban on the use of solid fuels, such as coal, wood, and other biomass, for heating and non-heating purposes (not exclusively in private buildings), adopted by the Lesser (Małopolska) regional assembly.</li> <li>Exemptions: only gas fuels or light fuel oil are permitted in fuel combustion installations in Krakow.</li> <li>Inspection of compliance is carried out by the municipal police and authorised employees of the city of Krakow. In case of a violation, citizens can submit complaints via the Eco-intervention form (regional tool), which are sent to the local inspection body. The sanction for using unauthorised installations can go from 500 PLN (120€) up to 5,000 PLN (1200€).</li> </ul>	<ul style="list-style-type: none"> <li>Civil society engagement: Measures were taken after major protests against poor air quality, especially in 2013. NGOs had a key role in supporting the ASR in the city, such as the grassroots movement Krakow Smog Alert, which initiated the mobilisation in the city and across the country.</li> <li>Financial support: subsidies for citizens to replace solid fuel heating appliances through the Low Emission Reduction Programme of Krakow; subsidies to people who cannot afford to replace their coal heating system through the Local Protection Programme (implementation continues from 2023 to 2026, and beyond).</li> <li>Communication: advisors available to inform citizens, especially on how to replace their heating sources. The Municipality of Krakow benefits from EU-funded projects that help finance this consulting service and the general implementation of the ASR.</li> </ul>

<p>London, UK</p>	<p><b>Smoke Control Area order</b> 1956</p> 	<ul style="list-style-type: none"> <li>• Ban on emitting the chimney of a building, a furnace or any fixed boiler, only <a href="#">approved appliances</a>/fuels or smokeless fuels (anthracite, semi-anthracite, gas, low volatile steam coal) are allowed.</li> <li>• <a href="#">Exemptions</a> apply to certain types of appliances (e.g., stoves and pizza ovens with specific names and fuels).</li> <li>• Initially introduced in the UK in 1956, the current legal base is the 1993 Clean Air Act, but SCAs are designated by local authorities (section 18). Each borough has different implementation dates.</li> <li>• 5) Sanctions for England: The Environment Act 2021 empowered local authorities to introduce financial penalties in case of breaches. Fines can go from £175 to £300 for emitting smoke from a chimney, and up to £1000 for buying or selling unauthorised fuels, and for declaring a false type of fuel.</li> </ul>	<ul style="list-style-type: none"> <li>• City situation: recent research led by Horsfall, L. et al. (2025) found that wood burners were positively correlated with age and negatively correlated with measures of social deprivation. Also, affluent white communities were more likely to burn wood. However, air pollution affects more vulnerable households.</li> <li>• Citizens' involvement: the Association Mum for Lung is fighting for cleaner air. In 2024, they led research on wood burning and found that out of 5,600 complaints made between 2023 and 2024 in SMC in England, only 4 have resulted in a fine. Between 2024 and 2025, 9,274 complaints were reported in SCA. In Lambeth in London, this association led a Christmas advertising campaign to raise awareness of wood heating.</li> </ul>
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 <p>Lucca, Italy</p>	<p><b><u>Ban on low-performing biomass heat generators</u></b>                  From 01/11/2025 to 31/03/2026 – possibility of renewals</p> 	<p>The ordinance on Ambient Air Quality envisages specific measures to combat air pollution and reduce the risk of exceeding the daily limit value for fine PM:</p> <ul style="list-style-type: none"> <li>• ban on the use of low-performing biomass heat generators, including open fireplaces (unless it is the only system used for heating the home and/or cooking food);</li> <li>• ban on the use of biomass for heating in new or renovated buildings and a ban on open-air burning;</li> <li>• prohibition on exceeding the limit of 18°C (with a tolerance of 2°C) for average temperatures in homes, commercial spaces and businesses, and public buildings;</li> <li>• obligation for commercial establishments and buildings with public access to keep the doors closed. The ordinance also invites citizens to implement a series of 'virtuous behaviours'.</li> <li>• Pecuniary fines in case of breaches.</li> </ul>	<p>/</p>
 <p>Madrid, Spain</p>	<p><b><u>Ban on coal-fired boilers</u></b>                  January 2022</p> 	<p>The Air Quality and Climate Change Ordinance:</p> <ul style="list-style-type: none"> <li>• Prohibits coal-fired boilers with the phase-out of oil-based boilers, and establishes "nearly zero" electricity consumption for new buildings;</li> <li>• Requires that all installations meet regulatory conditions and that the type of fuel is documented;</li> <li>• Lays out conditions and corrective measures on polluting vehicles, organisation of large events outdoors, and emissions from economic activities.</li> </ul>	<p>Financial support: available for citizens to help them replace polluting heating and cooling systems (pioneering aid programme launched by the Madrid City Council).</p>

		<p>Corrective measures and environmental mediation are used before imposing fines, allowing operators to implement the changes. In case of continuous non-compliance, fines up to €3,000.</p>	
 Riga, Latvia	<p><b><u>Ban on fossil fuel boilers</u></b>  <b><u>- Heating Regulations</u></b>                  2026</p> 	<ul style="list-style-type: none"> <li>• Ban on fossil fuel boilers or heating systems in new buildings or in case of replacement of old boilers and investments in new heating systems, for which permits will be released by the Heat Supply Commission.</li> <li>• Permits for new gas boilers after 2026 will require justification and will only be valid for 5 years.</li> <li>• Distinction of 3 zones with corresponding restrictions, established according to the level of pollution and the number of people affected, the type of territorial use and the availability of central heating.</li> <li>• City centre and surroundings will have stricter rules, while in the rest of Riga, designated as zone 3, where there are fewer heat pumps and central heating, there can be exemptions for biomass or gas heating systems, based on the cost-effectiveness of alternatives and on citizens' economic feasibility.</li> <li>• Ban on the installation of heating systems that use coal, lignite, peat and liquid fuels, including diesel, applies in all zones.</li> </ul>	<p>Social consideration: Gradual implementation, no abrupt changes for citizens; people's economic situation is considered.</p>

 <p>Skawina, Poland</p>	<p><b><u>Anti-smog resolution of the Malopolska Region – 2017</u></b></p> 	<ul style="list-style-type: none"> <li>• Progressive ban of burning solid fuels for residential heating, starting with a ban on using low-quality coal and wet wood in 2017, and finishing with a complete ban on using coal in domestic heating installations from January 1st 2030 (the latter only applies to Skawina and several other municipalities)</li> <li>• Applies to all entities within the municipality (i.e. residential and municipal buildings, industrial facilities, etc.)</li> <li>• Compliance is ensured by the Municipality</li> </ul>	<p>Financial support:</p> <ul style="list-style-type: none"> <li>• Subsidies to new heat source and energy retrofit from the governmental <a href="#">Clean Air Program</a></li> <li>• <a href="#">Subsidy programme</a> for the replacement of polluting old fuel boilers and stoves financed by the municipal budget and EU funds since 2016.</li> <li>• <a href="#">Stop Smog Programme</a> (2019-2023) is addressed primarily to residents affected by energy poverty through comprehensive thermal retrofitting and replacement of old polluting heat sources. The eligibility criteria were initially related to the residents' income and the technical condition of their buildings.</li> </ul> <p><b>Health impacts:</b> in 2011, 161 days exceeded daily norm for PM 10 concentration compared to 16 days in 2023.</p>
 <p>Sofia, Bulgaria</p>	<p><b><u>Heating Low Emission Zone (LEZ)</u></b> From 2025</p> 	<ul style="list-style-type: none"> <li>• Progressive ban on coal, coal briquettes and wood used for domestic heating.</li> <li>• Applies to 9 central districts, where there is a central heating and/or gas distribution network in accordance (effective from 01/01/25) and for the entire Municipality from 01/09/2029 (adopted on the 15th of December 2022).</li> <li>• Exemptions: "biomass pellets and briquettes, woody biomass and non-woody biomass, in accordance with</li> </ul>	<ul style="list-style-type: none"> <li>• Financial support: 2 programmes providing free consultation and free installation of new appliances (one funded by the Life Project, and the other one by the Environment Programme).</li> <li>• Communication: project to raise awareness and engage with citizens (i.e., "Sofia without smoke").</li> <li>• Stakeholder engagement: civil society group (including Za Zemiata) appealed to the court the Municipality's decision regarding the implementation of LEZs for transport and</li> </ul>

		<p>the Ecodesign requirements for solid fuel local space heaters."</p> <ul style="list-style-type: none"> <li>Sanctions: The Mayor of Sofia, or an authorised person, is in charge of controlling the application. Violation is punished under Articles 41a and 41b of the Clean Ambient Air Act (fines from EUR 26 to EUR 256).</li> </ul>	<p>heating. They acknowledge the importance of these LEZs to improve air quality but criticise the lack of inclusion of stakeholder consideration and the geographical scope of the measures.</p>
 <p>Warsaw, Poland</p>	<p><b><u>Anti-smog resolution of the Masovian Region</u></b> October 2023</p> 	<ul style="list-style-type: none"> <li>Ban on the use of hard coal and solid fuels produced by coal in household heating appliances.</li> <li>Original resolution on the introduction of restrictions and prohibitions on the operation of fuel-burning installations in the Masovian Region, amended by the Masovian Regional Assembly to add provisions concerning Warsaw.</li> <li>Exemption for appliances meeting certain requirements, such as solid fuel boilers installed before November 11, 2017, meeting the requirements of class 5 with the PN-EN 303-5:2012 standard.</li> <li>Fines are between PLN 20 and PLN 5,000 and up to PLN 500 in penalty proceedings.</li> </ul>	<p>1) Financial support:</p> <ul style="list-style-type: none"> <li>Stop Smog Program (national initiative): helping to replace the coal heat sources and the thermo modernisation of households, especially for those meeting energy poverty issues. The municipality takes care of all the formalities after residents apply.</li> <li>Warsaw Eco-grants for the modernisation of boilers which are heated by fossil fuel, heating oil or gaseous fuels. Financed or co-financed by the budget of the city.</li> </ul> <p>2) Consulting: participation in a non-competitive project started by the Mazovian region called "Mazovia without smog", as a project partner. This project, co-financed by the EU fund, enables Warsaw to employ Eco-advisors to advise and monitor people on energy and environment, including the implementation of air quality initiatives.</p>

			<p>3) Social perception: strong citizen support (scientists, doctors, ordinary citizens...). Some resistance to a reduction in coal production around Poland also occurred, notably from coal corporations, unions and some parts of the civil society.</p>
 <p>Utrecht, Netherlands</p>	<p><b><u>Ban on burning indoor wood</u></b> From 2030</p> 	<ul style="list-style-type: none"> <li>• Total ban on indoor wood burning, regardless of the pollutant level indicated by the <a href="#">Stookwijzer</a>.</li> <li>• Applies to residents and companies having a wood-fired combustion plant with less than 100 kw of rated thermal input.</li> <li>• Exemptions will be considered for residents who use stoves as their only source of heating and cannot replace their appliances (they will be defined in 2028)</li> <li>• Part of the Air Quality Program 2025-2030 (namely "<a href="#">Healthy air for everyone 2025-2030</a>"), explained in detail in the <a href="#">Implementation Programme</a>.</li> </ul>	<ul style="list-style-type: none"> <li>• Financial support: subsidy for the removal of wood-burning stoves and smoke ducts with a less polluting system (December 2021 - December 2025). Ended because of the low cost-effectiveness of the measure.</li> <li>• Communication: campaign to raise awareness of wood burning's effects and foster its reduction. For the period 2025-2030, new resources have been made available to expand it (started in 2021).</li> <li>• Additional measures: prohibition of chimneys in new buildings from 2025 when the Municipality is the client (but cannot prevent a homeowner from installing a chimney without a permit); ban on light wood fires outdoors since January 1, 2025.</li> </ul>



Ghent,  
Belgium

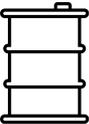
**Fostering fossil-free heating systems in homes and buildings - Ghent Heating Vision**

2024



- City's strategy to reach climate neutrality in homes and buildings' heating, including guidelines to design a concrete action plan to reach the objective.
- Focuses on investments for heat pumps and small-scale, low-temperature district heating networks as solutions to phase out fossil-fuelled heating systems. It also excludes biomass burning for air quality reasons.
- 3) "One-stop shop for renovation" for individual homes to help citizens switch to fossil-free heating systems, for which there were conspicuous funds in the 2020-2025 budget. Investments are also planned in the current budget for energy measures in social housing and to facilitate small heat networks based on renewables.

Social consideration: Ghent's vision sets the basis for a just transition, including affordability, speed and an inclusive approach. By prioritising social housing renovations and retrofitting large apartment buildings, the city aims to support the transition of vulnerable households.

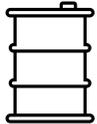
 <p>Malmö, Sweden</p>	<p><b><u>Seasonal and spatial limits on solid fuel-burning stoves</u></b> 2019</p> 	<p>The local environmental regulation of Malmö:</p> <ul style="list-style-type: none"> <li>• Between 1 April and 30 September, prohibits, in certain areas covered by a detailed plan and in densely populated areas, small-scale burning of solid fuel for heating and hot water production in a boiler that is not environmentally approved or equipped with an accumulator tank, or recreational burning with solid fuel.</li> <li>• It also provides recommendations on how and when to burn wood to limit pollution.</li> <li>• Sanctions: enforcement is handled by Malmö's Environment Department, and violations fall under Article 29§1 of Sweden's Environmental Code (Miljöbalken), which, depending on the breach, can result in sanctions, restriction orders and prosecution, in case of serious environmental crimes.</li> </ul>	<ul style="list-style-type: none"> <li>• Communication: in Sweden, local governments disseminate information on public websites to encourage awareness of cleaner wood-burning practices and to disseminate knowledge of specified local zoning regulations.</li> <li>• Much resistance as well. The Swedish National Board of Housing, Building and Planning's ban on installing old stoves in 2017 caused a strong negative reaction from the public, leading to a "wood stove rising" and the subsequent repeal of the regulation in 2019.</li> </ul>
 <p>Paris, France</p>	<p><b><u>Zero heating oil - Paris Climate Action</u></b> 2024</p> 	<ul style="list-style-type: none"> <li>• Target of zero heating oil in Paris by 2030.</li> <li>• Action part of the Climate, Air and Energy Territory Plan (PCAET) - local planning tool mandatory under national law for specific territories, with content dependent on local context. For Paris, the PCAET is called the Paris Climate Action Plan. The newest one (2024-2030 - 4th edition) integrates measures to target air quality from residential heating.</li> <li>• Additional measures are mentioned: the city aims to plead the State to strengthen subsidies to change oil boilers (A.207); help the energetic conversion of heating oil households (A88); and finish the conversion of Paris'</li> </ul>	<p>Stakeholder engagement: one month of public consultation for the Climate Plan.</p>

		<p>fuel centrals, especially on public service equipment (A89).</p>	
 <p>Aarhus, Denmark</p>	<p><b><u>District heating powered by geothermal energy</u></b> October 2025</p> 	<ul style="list-style-type: none"> <li>• Constitutes the most extensive geothermal project in the EU. The city is supplied with heat from a district heating grid that covers almost the entire city with geothermal reservoirs acting as its own storage facilities. The Aarhus geothermal plant will become part of a diverse energy mix, including air-to-water and seawater heat pumps, as well as waste-to-energy with Carbon Capture Storage.</li> <li>• Objective: transition from burning wood pellets to geothermal heat, decarbonising the heating system driven through electrification.</li> <li>• Part of the city's "<a href="#">Climate-neutral 2030</a>" strategy.</li> </ul>	<ul style="list-style-type: none"> <li>• Communication: neighbours informed directly at every project stage – through flyers, newsletters, and information meetings.</li> <li>• Stakeholder engagement: project in a dialogue with local businesses and associations to consider the local use of the area as early as possible.</li> <li>• However, three main pre-conditions for geothermal district heating: hot water flowing beneath the ground; existing district heating network and demand for heat; site for geothermal wells and a plant above-ground. It also requires specialised expertise.</li> </ul>
 <p>Bilbao, Spain</p>	<p><b><u>Decarbonisation of buildings - Heating and Cooling plan</u></b> 2024</p> 	<ul style="list-style-type: none"> <li>• Initial conceptual tool enabling the city to select the most appropriate strategies for achieving high energy efficiency and zero emissions from buildings by 2050, depending on the features of each district.</li> <li>• Broader framework: developed as a result of the city's participation in the EU Decab City Pipes 2050 project, it will help Bilbao build a H/C road map 2050 through best practices from other EU cities; it is also part of the city's SECAP.</li> <li>• Pilot project in the Zorrotzaurre district based on a geoexchange low-temperature network; developed and financed with a broad public-private partnership,</li> </ul>	<p>Stakeholder engagement: Considered as a successful urban governance model based on collaborative public-private partnerships, and involvement of local and central government, and private stakeholders.</p>

		<p>including municipal and regional authorities, and other stakeholders.</p> <ul style="list-style-type: none"> <li>• The city has also designed a vision of fully electrified heating and cooling systems.</li> </ul>	
 <p>Guimares, Portugal</p>	<p><b><u>Heat pumps and energy communities</u></b></p> <p>April 2022: Selected as a Mission City          March 2024: Received EU Mission Label for its Climate City Contract</p> 	<ul style="list-style-type: none"> <li>• Guimares is a Mission City under the EU’s Climate-Neutral and Smart Cities Mission (part of Net Zero Cities), aiming to achieve climate neutrality by 2030, including the decarbonisation of its heating and cooling systems.</li> <li>• Adoption of electrified heat pumps, complemented by the development of energy communities powered by renewable sources. These communities will contribute to the decarbonisation of the electric system.</li> <li>• The “Bairro C-Compromisso Carbono Zero” is the pilot project for these interventions, an area protected by the UNESCO heritage.</li> <li>• The projects are funded through a combination of the municipality's own budget and EU funds.</li> </ul>	<p>Communication: Information campaigns for citizens to raise awareness and knowledge.</p>
 <p>Hamburg, Germany</p>	<p><b><u>Heating funding programmes</u></b></p> <p>2021</p> 	<ul style="list-style-type: none"> <li>• Financial support to citizens who wish to install heat pumps and geothermal systems or low-interest loans for new heating or insulation systems.</li> <li>• Can be combined with federal subsidies covering at least 30% of the work, and up to 70% for people below certain income thresholds or for property owners who wish to replace their old gas or oil heating system particularly quickly.</li> </ul>	<ul style="list-style-type: none"> <li>• Communication: Free energy consultation is available.</li> <li>• Social impacts: citizens' income is taken into account to determine the financial support.</li> </ul>

		<ul style="list-style-type: none"> <li>• Both the federal government and the city of Hamburg have established funding programs.</li> <li>• Exception: The grants are not eligible for plants for process heat generation and for the replacement of plants commissioned less than 10 years ago.</li> </ul>	
 Helsinki, Finland	<p><b><u>Heat pump plant to produce carbon-neutral district heating and cooling</u></b></p> <p>Construction started in 2023, to be completed by 2025</p> 	<ul style="list-style-type: none"> <li>• Using waste energy from purified wastewater, it will reduce carbon dioxide emissions as it replaces heat production based on fossil fuels in the winter and produces district cooling in the summer.</li> <li>• Increases the security of the supply of heat production by reducing dependence on imported fossil fuels.</li> <li>• The demand for district cooling in Helsinki is on the rise, and the new plant enables local, carbon-neutral cooling production.</li> </ul>	<ul style="list-style-type: none"> <li>• Communication: the residents have been informed of the construction work</li> <li>• Engagement: nearby housing has been surveyed.</li> <li>• Social impacts: Customers will benefit as there is a better balance of price fluctuations.</li> </ul>
 Ivry sur Seine, France	<p><b><u>Low carbon strategy including district heating measures (based on geothermal energy)</u></b></p> <p>Adopted in 2024</p> 	<ul style="list-style-type: none"> <li>• Willingness to strengthen renewable energies by developing geothermal district heating (in 2025, approximately 50% of the heat used by the city was produced by geothermal heating)</li> <li>• Part of <a href="#">the municipal plan 2020-2026</a>, under the engagement of the city to make efforts to decrease GHG emissions in the heating sector.</li> <li>• Since July 2024, the district heating of the town has been managed by a public institution instead of a private company.</li> </ul>	/

 <p>Regensburg, Germany</p>	<p><b><u>Decarbonisation of heating systems - Municipal Heating Plan</u></b> Publication by June 2026</p> 	<ul style="list-style-type: none"> <li>• Part of the municipal heating plan.</li> <li>• Objectives: setting out a pathway for replacing gas and oil heating systems, finding targeted climate-neutral solutions for each district according to their features (e.g., city centre, protected by UNESCO), increasing geothermal energy, heat from sewer, river heat, and photovoltaics.</li> <li>• Indicates locations where there could be district heating networks to transport surplus heat from industrial plants to households.</li> <li>• Broader framework: the city has been selected by the Wärmewende project of the German Federal Foundation for the Environment (DBU) as a model municipality to identify marketable technologies as well as practical policy tools to promote decarbonisation in all German regions.</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholder engagement: plan drafted together with the Regensburg Energy Agency and other project partners; stakeholder dialogue is expected to take place for the design of all municipal heating plans.</li> <li>• National context: every German city has to draft their municipal heating plan according to the federal Heating Planning law, which requires new heating systems in new buildings to run on at least 65% renewable energy. However, the party of the current Chancellor has promised to abolish the federal Heating Planning law during the last electoral campaign, creating uncertainties and discouraging citizens from changing their heating systems.</li> </ul>
 <p>Stuttgart, Germany</p>	<p><b><u>Heating funding programme</u></b> October 2025</p> 	<ul style="list-style-type: none"> <li>• Municipal heating programme aiming to support Stuttgart residents, associations, and businesses in switching to a climate-neutral heat supply through a single funding programme.</li> <li>• Applies for the installation of heat pumps, pellet heating systems, and solar thermal systems, connection to a climate-neutral heating network, and supporting measures (e.g., installation of larger heating systems, removal of oil tanks, and centralisation of individual apartment heating systems).</li> </ul>	<p>/</p>

		<ul style="list-style-type: none"> <li>Available funding exclusively for existing buildings that can be combined generally with federal or state funding programmes.</li> </ul>	
 <p>Vienna, Austria</p>	<p><b>1) Spatial Energy Plans (Energieraumplan)</b>              Firstly introduced in 2018, by autumn 2023, every district had a SEP;</p> <p><b>2) Get Out of Gas – Vienna's Heating and Cooling 2040</b>              Launched in 2021</p> 	<p>Switching to clean heating through:</p> <p>1) Spatial Energy Plans (SEPs):</p> <ul style="list-style-type: none"> <li>Regulations introduced by the Province of Vienna, but the City Council can decide on their establishment and amendments.</li> <li>SEPs' objective: developing sustainable energy supplies for heating and hot water systems from climate-friendly energy sources (e.g., district heating, renewable sources) for new buildings applies in different situations, including the presence of existing district heating infrastructure.</li> </ul> <p>2) Get out of Gas - Vienna's Heating and Cooling 2040:</p> <ul style="list-style-type: none"> <li>Identifies the main areas of action to make the city climate-neutral by 2040.</li> <li>Guides people living in the city by showing which heat supply is best suited for buildings that are currently heated by oil or gas.</li> <li>Accompanied by two implementation programmes that should be developed over 2025 and 2026, enabling the gradual conversion of fossil fuel-based heating systems in existing buildings to district</li> </ul>	<p>Communication: A) Raise awareness and provide information to citizens. The city's environmental asset includes useful information for citizens, such as projects aimed at phasing out gas and those involving the potential use of geothermal energy. B) In its heating and cooling strategy, Vienna emphasises the importance of communication, consultation and citizen support.</p> <ul style="list-style-type: none"> <li>Non-financial support: Already offers numerous support services, some of which will be further developed (e.g., central consultation points for information on renovating or replacing heating systems). The Competence Centre for Renewable Energies also offers citizens advice on renewable energy solutions.</li> <li>Stakeholder engagement: Implementation programmes involve civil society along with municipal departments, businesses and companies.</li> </ul>

		<p>heating and renewables-based forms of heating by 2040.</p>	
 <p>Vilnius, Lithuania</p>	<p><b><u>Price subsidisation of centrally supplied thermal energy used for heating residential dwellings</u></b> 2026</p> 	<ul style="list-style-type: none"> <li>• Subsidy for a price proportion of centrally supplied heat for Vilnius district residents for the heating season 2025-2026, financed by the Vilnius District Municipality budget.</li> <li>• Applies if the price set by the heat supplier exceeds the average heat price in Lithuania announced by the State Energy Regulatory Council each month.</li> <li>• In 2023, a similar decision was taken by the municipality.</li> <li>• It only applies if the price set by the heat supplier exceeds the average heat price in Lithuania announced by the State Energy Regulatory Council each month.</li> </ul>	<p>The measure is a financial support to help citizens afford excessive electricity prices.</p>

### 3. CONCLUSIONS

This compendium is a collection of measures undertaken across Europe at municipal and local levels to improve air quality and energy efficiency in the heating sector. The result is a selection of 29 key EU and non-EU cities implementing a wide range of measures, either designed to directly improve air quality or generating a direct impact but embedded into broader frameworks, or eventually indirectly producing a positive impact on air quality, mainly through climate action.

The compendium shows that **affordable, clean heating is increasingly recognised as a need by European municipalities**, and that various measures resemble or are inspired by the logic of LEZ – through spatial targeting, gradual phase-in or conditional application.

While the identified measures target a wide range of actions -from phasing out polluting fuels and the use of fireplaces, to the implementation of retrofits, investments in clean technologies, financial incentives and district heating- and with different maturity or ambition levels, the common denominator is clear: **cities are gradually investing in local action against air pollution in the heating sector, strengthening the link between air quality and clean energy.**

A central reflection arising from the examples is the importance of considering how clean heating measures interact with social and economic circumstances. Across the cases reviewed, **approaches that combine gradual phase-in periods, supporting schemes, and well-designed communication strategies appear intended to facilitate implementation and respond to potential social concerns.** Information campaigns and public consultation may help address issues related to perceived fairness and affordability. The examples also point to the value of combining diverse and complementary measures, rather than relying on single instruments in isolation, to support a smoother transition.

As the level of governance closest to citizens, municipalities are well-placed to design clean heating actions tailored to local needs and conditions. The examples reported in the section above showcase leadership and innovation, especially considering the limited budget municipalities often face. Local action can be constrained by funding issues, national policy frameworks, data availability and lack of specific expertise or resources. This is why **integrating clean heating measures in broader local frameworks, such as Air Quality Plans or strategies, can strengthen local action without making it an isolated effect.**

The examples reported in this compendium also demonstrate that social and economic considerations are gradually being embedded in local policies. This is

a key requirement for clean heating measures, which can drive potential social impacts regarding impact distributions, housing conditions and availability of cleaner alternatives. A key consideration is to **provide adequate safeguards against the risk of exacerbating vulnerability to air pollution, energy price volatility, and the burden already taken by low-income, energy-poor households.**

Overall, this compendium provides an overview of different local approaches across Europe to tackle air pollution and improve energy transition, highlighting upcoming policies and emerging trends. While no blueprint exists for designing and successfully implementing air quality measures targeting heating, transferrable lessons can be drawn, if carefully tailored and nuanced to other cities' needs and contexts. Looking ahead, in-depth analyses on implementation processes and social outcomes are necessary, especially considering the intertwining energy transition, climatic impacts and air pollution effects on human and nature wellbeing.

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## 5. ANNEXES

### 5.1 Methodological note

The compendium is based on an in-depth mapping of municipal measures to make cities' heating systems more sustainable, with direct or indirect improvements in air quality. While the study strives for broad geographical coverage across EU Member States and other European countries, many cases concern cities with colder winter temperatures due to their greater heating needs. The research began with capital cities, typically the most densely populated and polluted, followed by other large cities, and additional municipalities identified throughout the research, to include the most relevant examples for the project's scope. The compendium also features measures from the UK and Norway, both of which provide valuable cases. It is worth noting that certain obligations of the AAQD still apply both in the UK as residual EU law, and in Norway, as part of the European Economic Area, although enforcement mechanisms are overseen by their respective national authorities.

As sources, the study incorporates information retrieved from municipal websites and the original policy texts, utilising translation tools when official English versions were not available. The compendium relies as well on academic literature and media outlets to gather complementary information.

The main selection criterion for inclusion in the compendium was that the policies be designed and implemented at the municipal level. In some cases, national legislation was considered when it entrusted municipalities to adopt rules at the city level with a certain degree of discretion. Regional or local legislations other than city-level legislations have also been considered under the same rationale, namely, when a municipality extended the scope of application or introduced additional initiatives. For example, in the case of the ban on solid fuels in Krakow, the ordinance was issued by the Małopolskie region specifically for the city; additionally, the municipality introduced financial support to help residents implement the policy. These criteria led to the exclusion of certain cities where the governance fell outside the scope of the project. In the case of the UK, the country's primary policy addressing air pollution is the implementation of "Smoke Control Areas", introduced under the Clean Air Act of 1956 (national law). Since then, many cities have adhered to these rules ([see map here](#)), but three examples in particular include interesting features: the city-wide scheme in Bristol; London, where each borough can decide to implement it; and Edinburgh, where the lists of authorised fuels and exemptions differ from those applicable in England.

The annex includes additional examples that fall outside the scope of this work but present noteworthy aspects. For example, it includes the bans on open firewood heating and inefficient wood-burning appliances affecting the city of Grenoble, which were enacted at the prefectural level. Another interesting case reported is an inter-regional agreement among four Italian regions covering the Po Valley area, one of the most polluted areas in Europe, prohibiting the use of low-efficiency stoves. The annex also includes significant examples of measures featured in cities' Sustainable Energy and Climate Action Plan 2030 (SECAP), and actions stemming from participation in EU-funded projects such as NetZeroCities but excluded them from the main compendium when no specific implementing policies could be identified. It is worth noting that a large number of European cities participating in the [Covenant of Mayors](#) are committed to drafting their SECAP, and hundreds of cities are involved in the [Net Zero Cities project](#), which made it impractical to include all of them in this analysis.

The compendium is intended as a starting point for future, extended mapping exercises. The absence of certain cities or countries from the list does not imply that air pollution in the heating system is disregarded in these places; in many cases, such issues are addressed through regional or national legislation, or via projects funded exclusively by national or EU programmes not covered in this work. Governance structure and the division of competences, including fund management, may differ greatly among countries.

Disclaimer: Translation tools were used to understand texts in other languages. If you notice any inaccuracies, please contact the authors.

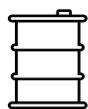
## 5.2 Additional cities implementing local clean heating measures

### How countries improve air quality through heating policies?

Countries are ranked by sustainable residential heating policies aiming at improving air quality across Europe: **high (direct)**, **medium (part of broader frameworks)**, or **low (indirect positive impact)**.



Polluting fuels - Wood



Polluting fuels



Financial incentives



Clean technologies

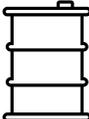


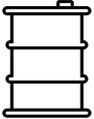
District heating



Retrofit

City	Name of the policy	Scope of the measure and requirements	Socioeconomic considerations
 Grenoble, France	<p><b>1) Ban on open fire-wood heating</b> 01/01/2024</p> <p><b>2) Ban on inefficient wood burning heating appliances</b> 01/01/2026</p> 	<ul style="list-style-type: none"> <li>Both bans aim to limit air pollution in cities covered by the Atmospheric Protection Plan of Grenoble (about 250 communes).</li> <li>Prefectural decree enacted by the department of Isère.</li> <li>The ban on inefficient individual wood-burning heating systems applies to appliances manufactured before 2002.</li> <li>Exemptions for the open fires ban if appliances are equipped with a performance-enhancing and emission-reducing device that allows them to achieve specific values (i.e., seasonal energy efficiency is greater than or</li> </ul>	<p>Financial support:</p> <ul style="list-style-type: none"> <li>Prime Air-Bois: subsidy to help households switch to heating systems with a labelled "flame 7 stars" (type of performant heating device).</li> <li>Programme launched and co-financed by the ADEME (state agency for ecological transition).</li> <li>Depending on the household's income, the metropolitan authority, gathering 49 municipalities, including Grenoble, offers up to</li> </ul>

		<p>equal to 45%, Particulate Matter (PM) emissions are less than or equal to 90 mg/Nm<sup>3</sup> ...).</p>	<p>2000€ and the city of Grenoble between 400€ and 800€.</p> <ul style="list-style-type: none"> <li>• Sponsorship system: when a household receives the Prime Air-Bois and recommends it to another household, both households gain an extra €100.</li> </ul> <p>City situation: A sociological study on the pollution caused by wood heating in the Grenoble agglomeration (2016) shows how wood heating is perceived by people. Most people do not consider it as an important cause of air pollution, while in reality, it represents more than 60% of air pollution causes.</p>
 <p>Milan, Italy</p>	<p><b>Ban on fossil fuel boilers</b>  <b>- Air and Climate Regulation</b>                  2020 - 2022</p> 	<ul style="list-style-type: none"> <li>• Art. 3 (Civil heating systems) originally banned new installations of diesel and biomass boilers and set deadlines for phasing out old ones.</li> <li>• Exemptions outside the city centre and in the absence of alternative heating systems, or where replacement or adaptation for heat generators was not technically possible. In this case, citizens were required to submit a certified technical report to the municipal administration.</li> <li>• In 2022, the Council of State annulled this article because it had not been notified to the European Commission, as it was a technical regulation that could</li> </ul>	<p>Stakeholder engagement: Involvement of different stakeholders in the design process and in the implementation, including in the design of the broader Air and Climate Plan.</p>

		<p>conflict with internal market rules. However, the Lombardy Region subsequently adopted even stricter regulations, applying to Milan as well: strict emission limits and technical requirements for biomass boilers instead of a blanket ban.</p> <ul style="list-style-type: none"> <li>• Broader framework: the City of Milan's Air and Climate Plan (2022) includes regulatory and infrastructural measures for the installation of heat pumps and renovations aimed at improving energy efficiency.</li> </ul>	
 <p>Several Italian regions around the Po valley: Lombardy, Veneto, Emilia-Romagna, Piedmont</p>	<p><b><u>"Accordo di Bacino Padano" - Inter-regional ban on low-efficiency stoves, allowing only A1 pellets</u></b></p> <p>2017, it applies during the coldest months, from October to April</p> 	<ul style="list-style-type: none"> <li>• Inter-regional agreement combining policy on heating and traffic emissions.</li> <li>• Focuses on particulate emissions in the Po Valley</li> <li>• After it entered into force in 2018, several revisions were made both to the joint document and specifically to each region by the authorities of the regions involved.</li> <li>• Each region can include exemptions.</li> </ul>	<p>Financial support: Subsidies are offered to citizens and enterprises.</p>

<p>Oslo, Norway</p>	<p><u>Subsidy scheme to replace old wood stoves with new installations based on cleaner wood-burning technologies</u> 1998 - 2020</p> 	<ul style="list-style-type: none"> <li>• Introduced in 1998 to encourage the replacement of old wood stoves.</li> <li>• By 2019, the support amounted to NOK 6,000 for residents within Ring 3 and NOK 1,500 for those living outside it.</li> <li>• In 2017, Oslo restricted the use of wood stoves, allowing only modern, clean-burning models that met strict emission standards, which prompted an increase in the available subsidies to accelerate the transition. However, the scheme was discontinued in 2020 after assessments showed no significant improvements in air quality (NILU, 2019). Since its inception, a total of NOK 38,980,635 has been disbursed through the municipal Climate and Energy Fund to support wood stove replacement.</li> <li>• Currently, subsidies are only available for all residents to switch to promote energy efficiency and renewable energy solutions, such as heat pumps, solar panels, and insulation upgrades.</li> </ul>	<p>City situation: From 1998 to 2015, it was estimated that approximately 8700 wood stoves were replaced via this economic support. Incentive-based policy instruments have been applied to motivate a change of wood-burning behaviour, in addition to information campaigns.</p>
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 <p>Ljubljana, Slovenia</p>	<p><b><u>Replacement of heating devices older than 20 years - Climate Neutrality Plan</u></b> Published in 2024</p> 	<ul style="list-style-type: none"> <li>• The Climate Neutrality Plan (funded by Net Zero Cities) outlines measures to reach climate neutrality by 2030 based on existing gaps within all sectors.</li> <li>• Includes actions to decarbonise heat supply energy sources, such as the decarbonisation of district heating systems and the phase-out of fossil fuels for individual heating systems with targeted technical interventions.</li> <li>• Requires that all heating devices older than 20 years be replaced, to tackle air pollution, especially during winter, and increase energy efficiency.</li> </ul>	<p>Stakeholder engagement: the plan was prepared by the "entire urban community". Stakeholder analysis involving neighbouring municipalities and international strategic partnerships has been conducted.</p>
 <p>Paris, France</p>	<p><b><u>Mandatory connection to urban district heating</u></b> 01/09/2022</p> 	<ul style="list-style-type: none"> <li>• Buildings located in the priority development area of the district heating - composed of more than 50% renewable and recovered energies - must connect if there are new buildings (building permit submitted before 01/09/2022 and buildings undergoing extension or elevation with specific criteria) and existing buildings that replace a collective heating system (buildings with individual heating systems undergoing major renovation work are not affected).</li> <li>• Development area includes all cadastral parcels with at least half of their surface area located less than 60 m from the heating district network + 15 "development operation" decided because of their energy strategies. If needed, this area will be assessed and revised every 3 years by the city.</li> <li>• Price of connection decided by the city.</li> </ul>	<p>Communication: map of the existing Paris District Heating network and the priority development area where the obligation applies.</p>

		<ul style="list-style-type: none"> <li>Implemented by a new regulation from the Energy Code and the Urbanism Code (national level).</li> </ul>	
 <p>Helsinki, Finland</p>	<p><b><u>Building the world's largest air-to-water heat pump to help decarbonise its district heating</u></b> Operational for the 2026-2027 winter season</p> 	<ul style="list-style-type: none"> <li>The construction of the Patola heat pump started in 2024. It will operate in temperatures as low as -20 °C and will be powered by electricity from renewable sources.</li> <li>The manufacturer says it is using CO2 as the refrigerant in this heat pump.</li> <li>The competition ruled out biomass as a solution due to the pressure it would put on Finland's forestry sector.</li> </ul>	<p>Financial support:</p> <ul style="list-style-type: none"> <li>Energy subsidy to the air-to-water heat pump, which utilises new technology and reduces CO2 emissions by 26,000 tons per year, granted by the Ministry of Economic Affairs and Employment. Overall annual reduction of CO2 emissions by the heating plant complex is 56,000 tons.</li> </ul> <p>Social impacts:</p> <ul style="list-style-type: none"> <li>The new heating plant, which uses the giant heat pump and two 50MW electric boilers, will provide enough heat for around 30,000 homes in Helsinki, saving roughly 26,000 tonnes of CO2 emissions each year.</li> <li>The new plant is expected to create price stability for customers, as its production is easily adjustable.</li> </ul>

 <p>Prague, Czech Republic</p>	<p><b><u>Replacement of coal boilers - Prague Climate Plan 2030</u></b>                  Published in 2021</p> 	<ul style="list-style-type: none"> <li>• Focuses on decarbonising the city, especially on clean heating, as it largely relies on coal.</li> <li>• It includes 69 proposed measures: 28 focusing on sustainable energy and buildings, with some focusing on heating:                         <ul style="list-style-type: none"> <li>○ N. 12 - "Reducing the carbon footprint of heat production - the city will entirely replace its heat production using coal with secondary renewable sources by 2030";</li> <li>○ N. 19 "Replacing coal-powered boilers with natural gas and heat pumps" supporting the modernisation of about 5,000 boilers.</li> </ul> </li> </ul>	<p>Stakeholder engagement: Prepared by the Committee on Sustainable Energy and Climate (advisory body to the Prague City Council). It is also a document acting as the SECAP, defined by the Covenant of Mayors for Climate and Energy.</p>
 <p>Budapest, Hungary</p>	<p><b><u>Refurbishment programmes - SECAP of Budapest</u></b>                  Published in 2021</p> 	<ul style="list-style-type: none"> <li>• Includes an Emission Reduction Action Plan.</li> <li>• Under this chapter, the refurbishment of residential buildings is a key action to reduce emissions.</li> <li>• The refurbishment programmes target, for example, suburban areas where the use of highly polluting fuels is still high and impacts air quality.</li> </ul>	<p>/</p>

 <p>Lisbon, Portugal</p>	<p><b><u>Decarbonisation of district heating and cooling</u></b> Installed in 1997</p> 	<ul style="list-style-type: none"> <li>• Lisbon's Parque das Nações is the only district heating system in the country.</li> <li>• The main objective of the project is to reduce energy consumption and emissions, but also to protect the city's unique architecture and set high standards for urban planning and design by eliminating unsightly air conditioning equipment.</li> <li>• Currently powered by natural gas but moving towards incorporating waste heat recovery.</li> <li>• Coupled with other comprehensive strategies, such as the Action Plan for Sustainable Energy and Climate targets, improving building energy efficiency, scaling up renewable energy access, and reducing emissions.</li> <li>• Lisbon's strategy, including district heating, is remarkable because district heating is rather uncommon in Southern European countries.</li> </ul>	<p>/</p>
 <p>Zagreb, Croatia</p>	<p><b><u>Replacement of old and inefficient heating systems - SECAP of Zagreb</u></b> Signed in 2019</p> 	<ul style="list-style-type: none"> <li>• Includes measures encouraging the replacement of old, inefficient residential heating systems with modern, energy-efficient, and low-emission technologies like heat pumps and certified biomass boilers.</li> <li>• Zagreb is one of the first EU capitals to join the Covenant of Mayors committed to climate action.</li> </ul>	<p>Financial support, including national funds, is available for households.</p>



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