



Efficient Appliances for People & the Planet

## PRESS RELEASE

# Gas stoves cause regular pollution breaches in homes across Europe

### Pollution twice as strong as homes using electric stoves, largest-ever European study shows

Cooking with gas regularly fills European kitchens with air pollution above recommended levels, the largest-ever home monitoring [study](#) in Europe has found.

The World Health Organization (WHO) daily limit value for nitrogen dioxide (NO<sub>2</sub>) exposure was broken in most (57.3%) of the homes using gas stoves and/or gas ovens that were tested under normal living conditions by leading scientific researchers.

NO<sub>2</sub> levels were found to be almost twice as high in kitchens, living rooms, and bedrooms in homes cooking with gas compared to those using electric appliances, on average. Breaches in 15.9% of homes using electric appliances were caused mainly by outside air pollution blowing in, the researchers say.

The research, commissioned by Washington, DC–based nonprofit energy efficiency group [CLASP](#), was conducted by the Netherlands Organisation for Applied Scientific Research ([TNO](#)). Sensors were placed in more than 250 homes [1] across seven countries: the Netherlands, Italy, Spain, France, Slovakia, Romania, and the United Kingdom. These countries were chosen because they have large populations that cook with [gas](#), as well as significant numbers of childhood asthma cases [linked](#) to gas stoves.

Breaching NO<sub>2</sub> limit values increases health risks. NO<sub>2</sub> can cause inflammation of human airways, coughing, wheezing, reduced lung function, and increased asthma attacks, especially in children. Children in homes with a gas cooking appliance have a 20% increased risk of suffering a lower respiratory illness, the WHO [estimates](#).

Pollution spikes in homes that cook with gas can last several hours and intensify with longer cooking times, the researchers found. During the 13-day testing period in each home, the WHO daily limit was breached for a total of 3.25 days on average.

Extrapolating to a year, the data show that a quarter of homes (25%) cooking on gas breached EU and UK hourly legal NO<sub>2</sub> limits for outside air quality. Authorities across Europe have been forced to [respond](#) to breaches of these limits in outdoor settings, yet EU regulators have not set limits for indoor air pollution.



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The presence of range hoods in kitchens was found to make little difference in pollution levels, even if the hoods were vented outside. This is because of improper use as well as inefficient pollutant capture technology, the researchers believe.

Little has been done to prevent NO<sub>2</sub> pollution from gas cooking appliances in Europe, CLASP wrote in its report summarizing the research. Various regulations could limit air pollution from appliances, but fail to, it said. The problem could be corrected at EU level next year when new [design](#) and [labeling](#) rules are expected to be adopted.

Mirroring the ongoing push by consumer and health advocates to introduce regulations making cooking appliances safer in the United States, CLASP will call for a new EU energy [label](#) comparing gas and electric stove efficiency and highlighting pollution levels during a November 30 meeting with EU officials.

Nearly a third ([32.5%](#)) of homes in the EU cook with gas. But few are aware of the risks due to the invisible nature of the pollution, according to a recent opinion [poll](#) commissioned by CLASP and carried out by Opinium. If made aware, up to three quarters of respondents (74%) said they would consider getting rid of their gas appliances.

**TNO senior scientist Piet Jacobs said:** *“Based on our field study data, we estimate that in about 25% of the European kitchens cooking on gas, the EU NO<sub>2</sub> limit value for 1-hour exposure is exceeded, where outside levels were below these values. Changing to electric cooking, preferably combined with use of well-designed ventilation hoods to reduce exposure to high levels of particulate matter from cooking, can bring these values down to below recommended levels.”*

**CLASP Europe Director Nicole Kearney said:** *“Our research reveals the severity of air pollution caused by gas cooking appliances in homes across Europe. Cooking up a change starts with awareness. Empowering people with knowledge on the health risks of these products is essential, and they need resources to upgrade to cleaner and healthier hobs and ovens. In turn, governments must protect public health, tackling air pollution at the source and supporting the transition to cleaner cooking.”*

**Imperial College London Professor [Frank Kelly](#) said:** *“Gas hobs and ovens are a major source of indoor air pollution, including NO<sub>2</sub>, which can both exacerbate existing health conditions and potentially lead to new respiratory illnesses. For children with asthma, the presence of gas cooking appliances can intensify their symptoms. Removing these appliances from our homes will improve indoor air quality and mitigate potential risks to public health.”*

The scientists also measured for fine particulate matter (PM<sub>2.5</sub>). In kitchens, this is caused by outdoor pollution blowing in and food cooking rather than the appliance fuel source. The scientists found no significant difference in emissions between homes cooking with gas and electric.



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## Ends

CLASP's report is available: [www.clasp.ngo/research/all/cooking-with-gas-findings-from-a-pan-european-indoor-air-quality-field-study](http://www.clasp.ngo/research/all/cooking-with-gas-findings-from-a-pan-european-indoor-air-quality-field-study)

The TNO report is available here: <https://publications.tno.nl/publication/34641471/zD0Xiz/TNO-2023-R11809.pdf>

## Notes

[1] Market research firm [Opinium](#) selected 40 homes each in France, Spain, UK, Italy, Slovakia, the Netherlands, and Romania where residents cook at least 3 days a week, are non-smokers, and are not near busy main roads or industrial plants. More than 40% of homes include children. One in 5 cook purely with electric appliances, while 4 in 5 cook purely on gas appliances, either ovens, stoves, or both. In all homes, sensors were placed in the kitchen, living room, and a bedroom to measure NO<sub>2</sub>, PM<sub>2.5</sub>, and carbon monoxide. Outdoor sensors detected NO<sub>2</sub>. Participants were told to cook and behave normally. Each was paid €100. Only data from 247 homes that successfully followed instructions over a 13-day period in 2023 were included. The previous largest EU [study](#) of NO<sub>2</sub> exposure was based on continuous sensor data took readings from 16 homes.

## Contacts

CLASP Europe director [Nicole Kearney](#) (EN) +44 75 4486 5924

CLASP Europe senior communications associate [Païline Caroni](#) (EN, FR) +32 473 127 674.

ICL professor [Frank Kelly](#) (EN) +44 (0)20 7594 8098

CLASP communications consultant [Jack Hunter](#) (EN) +33 751 051 805

TNO press officer [Maarten Lörtzer](#) (EN, NL) +31 620420732.

## About CLASP:

CLASP is an international nonprofit leading the research and promotion of appliance efficiency and energy access to improve the lives of people and the planet. CLASP works to combat climate change and drive the transition to a more energy-efficient and just future where no one is left behind. Headquartered in Washington DC, and based in Beijing, Brussels, Dehli, Jakarta and Nairobi, CLASP works with governments, appliance manufacturers and partners to advance positive change on a global scale.