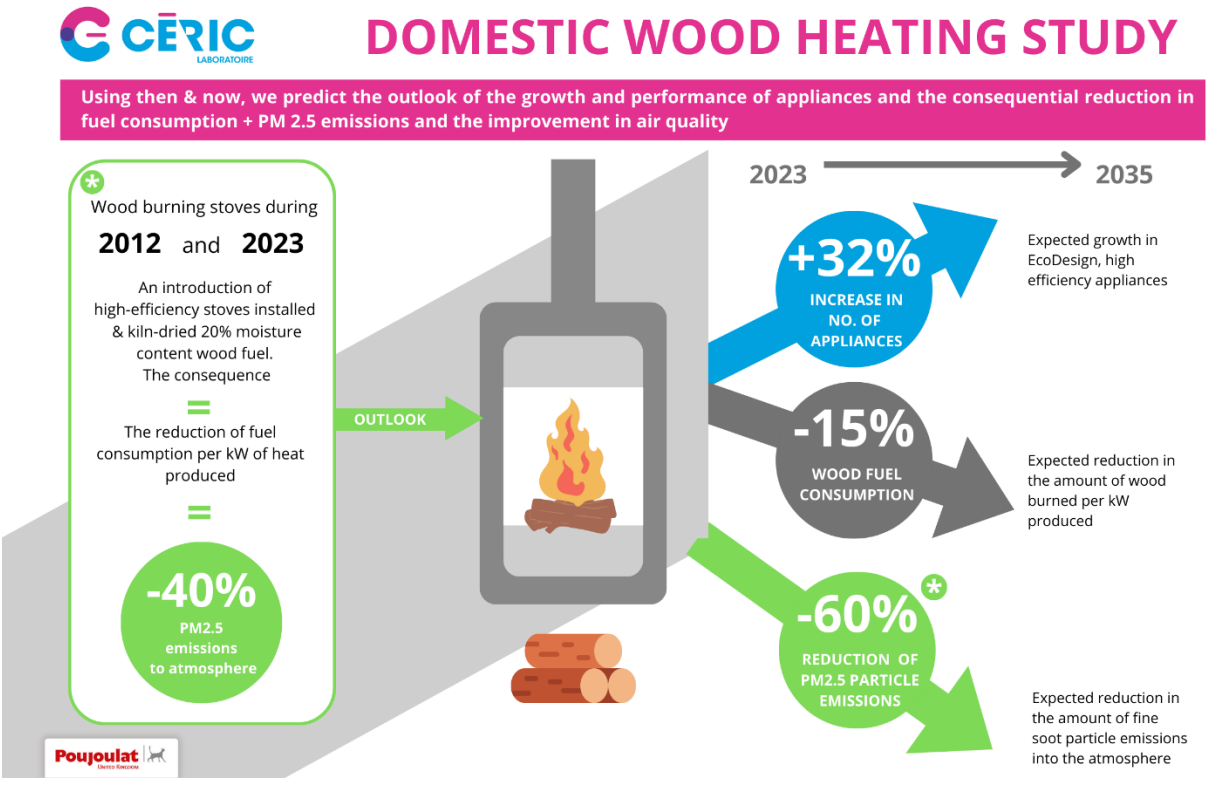
Poujoulat
UNITED KINGDOM

Opportunities for Domestic Wood Heating Growth

Introduction

We are pleased to share insights from a recent study by CÉRIC, a COFRAC[1]- accredited laboratory specialising in energy and environmental studies. This leading research organisation has focused on the impact of wood energy as a renewable resource, with particular attention to its sustainability and effects on air quality.

Key Findings from the Report



The above infographic summarises the findings and highlights the significant potential of wood energy to drive sustainable growth of wood burning stoves and at the same time improve air quality.

This report demonstrates that we can reduce PM's emissions into the air, improving air quality and do so while using more wood-burning appliances not less.

[1] The French accreditation committee

1. **Adoption of Modern Appliances**
   Despite a projected 32% increase in the number of wood-burning appliances in France by 2035, advancements in stove efficiency and improved fuel quality will lead to a 15% reduction in overall wood consumption. These findings are relevant to the UK market, where similar trends can be expected.

2. **Energy Efficiency and Air Quality Improvements**
   Modern EcoDesign wood-burning stoves using wood with 20% moisture content significantly reduce wood consumption per kW of heat produced. This also leads to lower PM2.5 emissions, contributing to better air quality.

3. **Potential for Emissions Reduction**
   Upgrading older stoves and replacing open fires with EcoDesign appliances could reduce PM2.5 emissions by at least 60% by 2035. These improvements align with government clean air strategies.

4. **Economic and Environmental Benefits**
   Wood is a renewable, sustainable fuel source. Its use supports managed forestry, creates jobs, and contributes to the circular economy. Whether left to rot in the forest or burned in a stove, wood releases the same amount of carbon and other pollutants. The emissions are equal, regardless of whether the tree decays naturally or its wood is burned.

5. **Energy Security**
   On an average winter day, the UK's estimated 1.6 million stoves and 1-2 million open fires generate energy equivalent to a power station. This contribution is critical as the UK faces increasing energy demands.

A Balanced Approach to Wood Burning and Air Quality

The “all-or-nothing” approach to banning wood-burning stoves is unrealistic and counterproductive, creating negative publicity and doubt among potential customers. While wood-burning appliances emit some pollutants, the majority comes from open fires, outdated stoves, barbecues, and bonfires. Simply banning modern, efficient, low-emission stoves will not eliminate these emissions; in fact, it could increase them as people rely more on open fires or second-hand stoves.

Modern EcoDesign stoves provide a viable solution. They allow users to enjoy the benefits of wood heating while using less fuel and producing fewer emissions—a true "win-win" for consumers and the environment. Encouraging users to transition from open fires to these efficient appliances can significantly reduce emissions without sacrificing comfort or utility.

Wood-burning stoves are also vital to the UK's energy resilience. With approximately 1.6 million operating stoves and 1–2 million open fires, they collectively produce an estimated 16,000 MW of heat on a typical winter day—equivalent to the output of a power station. As the UK already imports 19.1 million MW of power annually and faces growing energy demands, banning stoves would strain the energy grid further, as acknowledged in the government's Clean Air Strategy.

Additionally, wood contributes nearly half of the UK's renewable energy mix and is essential for meeting sustainability goals. Sourced from sustainable forestry that replants more trees than it harvests, wood is a renewable fuel with a closed carbon cycle. If left to decay, wood emits the same greenhouse gases as when burned. Ceasing its use would disrupt forestry management, increase emissions, and result in job losses.

Research confirms that replacing outdated appliances and open fires with EcoDesign stoves, paired with wood fuel at 20% moisture content or less, could reduce PM2.5 emissions by at least 60%. This represents a substantial improvement for air quality and public health.

By embracing modern, efficient wood-burning solutions and promoting sustainable practices, the industry can play a crucial role in balancing environmental goals with practical energy needs.

Why This Matters

As key stakeholders—manufacturers, retailers, installers, and users—we play a vital role in:

- Promoting high-performance, efficient wood-burning appliances.
- Encouraging the use of high-quality fuels with moisture content below 20%.
- Educating the public on best practices for wood heating and its environmental benefits.

By fostering adoption of modern EcoDesign appliances, we can improve energy efficiency, reduce emissions, and support renewable heating solutions. This aligns with the UK's transition to cleaner energy and air quality improvement goals.

Call to Action

We invite you to share this report and its insights with your colleagues and customers. Raising awareness about the benefits of modern wood heating is essential for driving sustainable growth in our industry.

The full report and a detailed presentation are attached for your review. These findings, while based on the French market, are equally relevant to the UK and other European contexts, providing valuable insights for all stakeholders.

Conclusion

Wood energy is a renewable, local, and versatile heat source that offers significant potential for economic and environmental progress. Together, we can enhance energy performance, support sustainable practices, and secure the future of wood heating as a key component of the UK's energy mix.

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Poujoulat - 2024

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DOMESTIC WOOD HEATING

Outlook 2023 > 2035

Growth and **performance** of appliances, **reduction** in fuel consumption and **improved** air quality

2023 → 2035

+32% INCREASE IN NO. OF APPLIANCES

-15% BIOMASS CONSUMPTION

-60%* REDUCTION OF PM2.5 PARTICLE EMISSIONS

* Between 2012 and 2023 — More efficient appliances + Reduction in fuel consumption = **-40%** PM2.5 EMISSIONS

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OUTLOOK FOR INDIVIDUAL WOOD-BURNING APPLIANCES: A EUROPEAN MARKET EXAMPLE

GROWTH IN THE QUANTITY & PERFORMANCE OF WOOD BURNING STOVES BEING USED IN A EUROPEAN COUNTRY.

THE CONSEQUENTIAL REDUCTION IN FUEL CONSUMPTION.

THE CONSEQUENTIAL IMPROVEMENTS IN AIR QUALITY.

https://www.laboratoire-ceric.com/en/the-ceric-laboratory/

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DOMESTIC WOOD HEATING REPORT

Using then & now we predict the Outlook of the Growth and performance of appliances and the consequential reduction in fuel consumption + PM2.5 emissions and the improvement in air quality.

Wood burning stoves During 2012 to 2023

An introduction of high efficiency stoves installed & Kiln dry 20% moisture content wood fuel
The Consequence

=

A reduction in fuel consumption per Kw of heat produced

=

– 40% in PM2.5 emissions to atmosphere

OUTLOOK =

2023 → 2035

+32% INCREASE IN NO. OF APPLIANCES

Expected Growth in Eco design high efficiency appliances

-15% BIOMASS CONSUMPTION

Expected Reduction in the amount of wood burned per Kw produced

-60%* REDUCTION OF PM2.5 PARTICLE EMISSIONS

Expected Reduction in the amount of fine soot particle emissions into the atmosphere.

CONTEXT

The number of individual wood-burning appliances has been rising since 1992.
Most of this growth has taken place over the last 10 years [1]. In 2021 and 2022, almost 550 000 units have been sold [1].

At the same time, the existing stock of old (pre-2000) wood heating systems is being replaced with incentives from the French government (renovation bonus, energy saving certificate, etc.) and local government (wood fund).

These measures, combined with the introduction of better dried quality fuel, have led to a significant reduction in average consumption per appliance, resulting in more rational use of the resource by the domestic wood energy sector.

In addition, between 1990 and 2022, individual wood heating contributed to the reduction in emissions of fine particles (PM2.5) in the residential and tertiary sector (-59% [2]).

For example, between 2012 and 2023, emissions from domestic wood heating fell by around 40%, largely due to technical developments in wood-burning appliances and also as a result of the renewal of the old stock and burning of quality fuel.

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CONTEXT

Since 2020, the appliances installed have met the highest performance standards, with the Flamme Verte 7* label and the Eco-design standard.

The aim of this Expert study is to project current trends in the number of domestic wood-burning appliances up to 2035 and to analyse the consequences for wood energy consumption and air quality.

This work therefore takes account of the latest studies and knowledge on the subject.

In particular it is based on the latest publication by ADEME (French environment agency) [1], which takes stock of the park (quantity of operating appliances in the market) and unit consumption.

It complements the previous analysis by CÉRIC Laboratory published in 2017 [3] and updated in 2022 [4] .

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A Reminder of previous CÉRIC studies completed in France

Air quality

- In France, CÉRIC accurately estimated that domestic wood-fired heating accounts for less than 22.4% of national $PM_{2.5}$ concentrations. This is below the incorrectly reported emission estimate of 64%.
- The number of appliances in a sample studied location area has little impact on concentrations.
- The air quality in large cities does not change dramatically from summer to winter, which would be expected in winter when considering the impact of specific winter activities e.g. wood-fired heating.
- Topography and winds are seen to have an impact on PM concentrations indicating impacts from external to locations sources or greater use of other sources of PM concentrations.

Wood energy can develop and grow in a positive health context

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A Reminder of previous CÉRIC studies completed in France

Efficiency

- Wood energy used in France for an estimated 7 million households; reduces the demand for electricity by 10 GW (that's 10 million KW) on winter evenings providing a substantial impact on energy use.
- The quality and moisture content of wood also plays an important role in the performance of wood burning appliances and the improvement of air quality by increasing efficiency and reducing emissions.

Wood energy can develop and grow in a positive health context

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First results of other studies in France

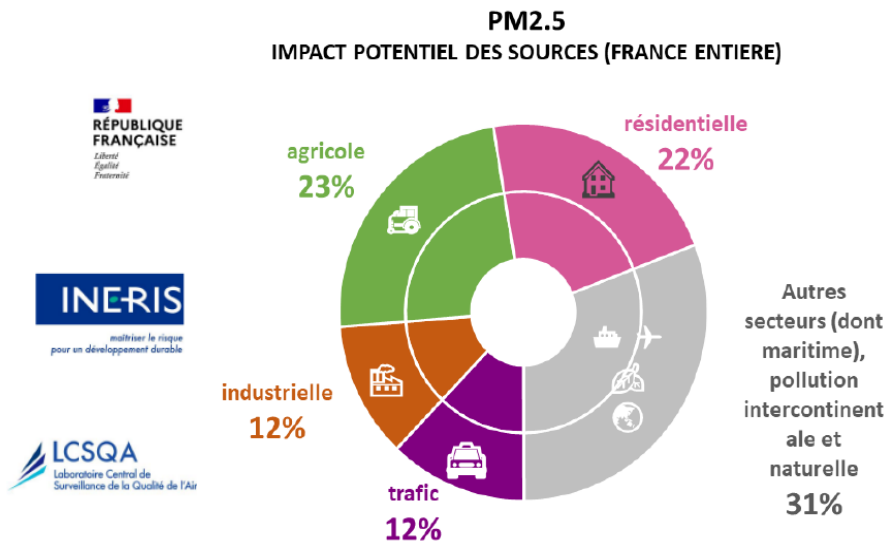
- **An additional study by the Renewable Energy Union on air quality improvement**

  Domestic wood-fired heating now accounts for less than 15% of national $PM_{2.5}$ concentrations.

- **Study by the Environment Agency on air quality and the share of residential activities**

  ❖Residential activities represent 22% of $PM_{2.5}$ concentrations. In conclusion, domestic wood-fired heating cannot account for more than 22%.

Results for the annual amount of PM2.5 in France :-



Outlook for individual wood-burning appliances: A French market example

The number of operating wood-burning appliances, stoves in France is growing.

With the advent of Eco Design and better-quality fuels; the growth consequence are:

That we now see lower fuel consumption, whist still achieving the same heat output, with an improved ‘air quality’ resulting in a very significant reduction in PM’s and other emissions."

French context

Since 1992, the number of individual appliances has increased.

At the same time :

Overall particle emissions linked to domestic wood heating is decreasing

(-59% since 1990 and -40% since 2012)

Overall consumption of wood as heat energy is decreasing (-27% since 1990),without decreasing heat output.

Regulation of the use of wood heating has becoming a major health talking point

In April 2021, French Health organization estimates that fine particle pollution causes **40,000 deaths per year** and around 8 months of lost life expectancy.

64% of $PM_{2.5}$ emissions come from wood heating (CITEPA)

We wanted to see if this number was correct?

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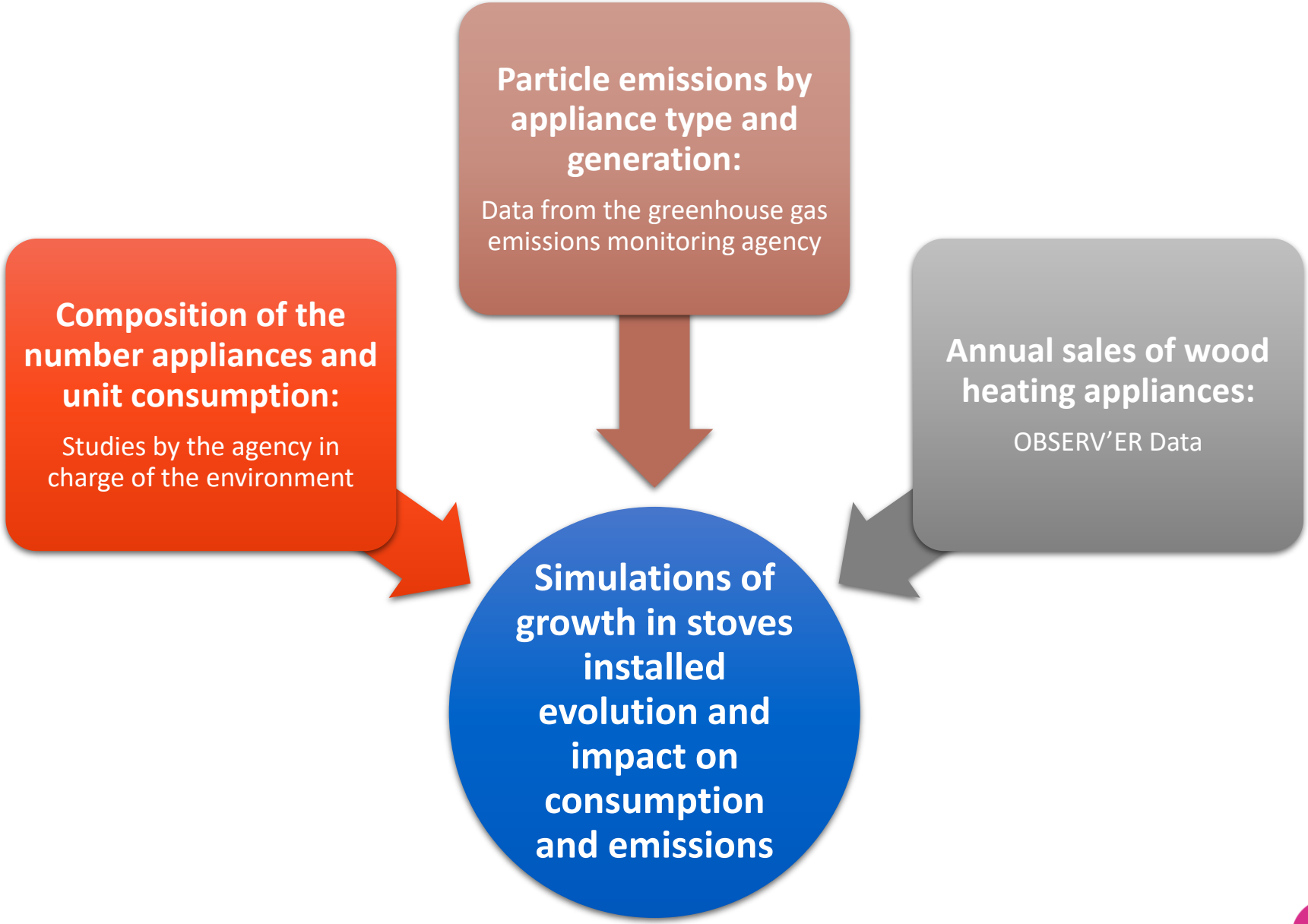
Study methodology



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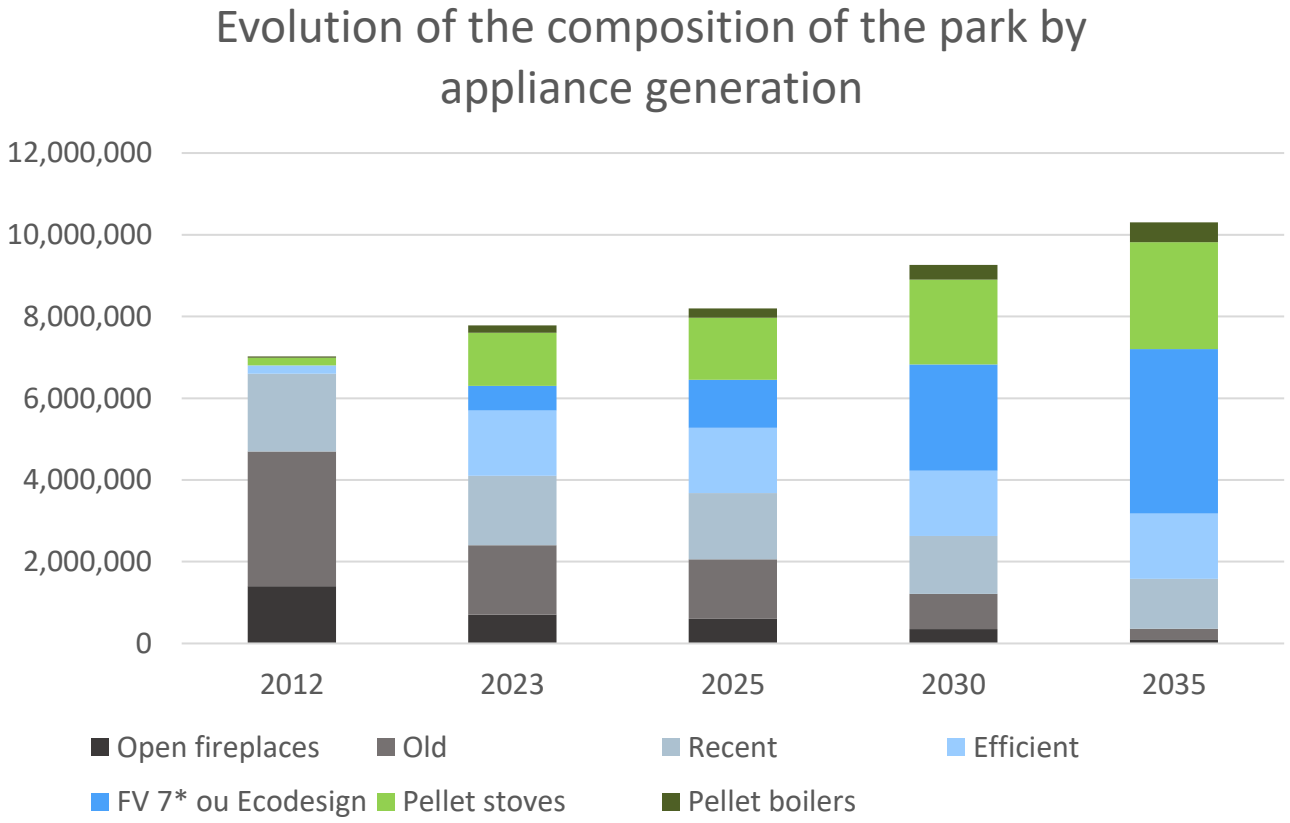
Park evolution simulations- The quantity of appliances in use now and the future



- Continued conversion of old appliances to more efficient and more economical appliances
- Continued growth of the quantity of operating appliances

On the current projection of market trends
The quantity of installed appliances could reach 10 million appliances in 2035,
An increase of 32% in Quantity of operating appliances compared to 2023.

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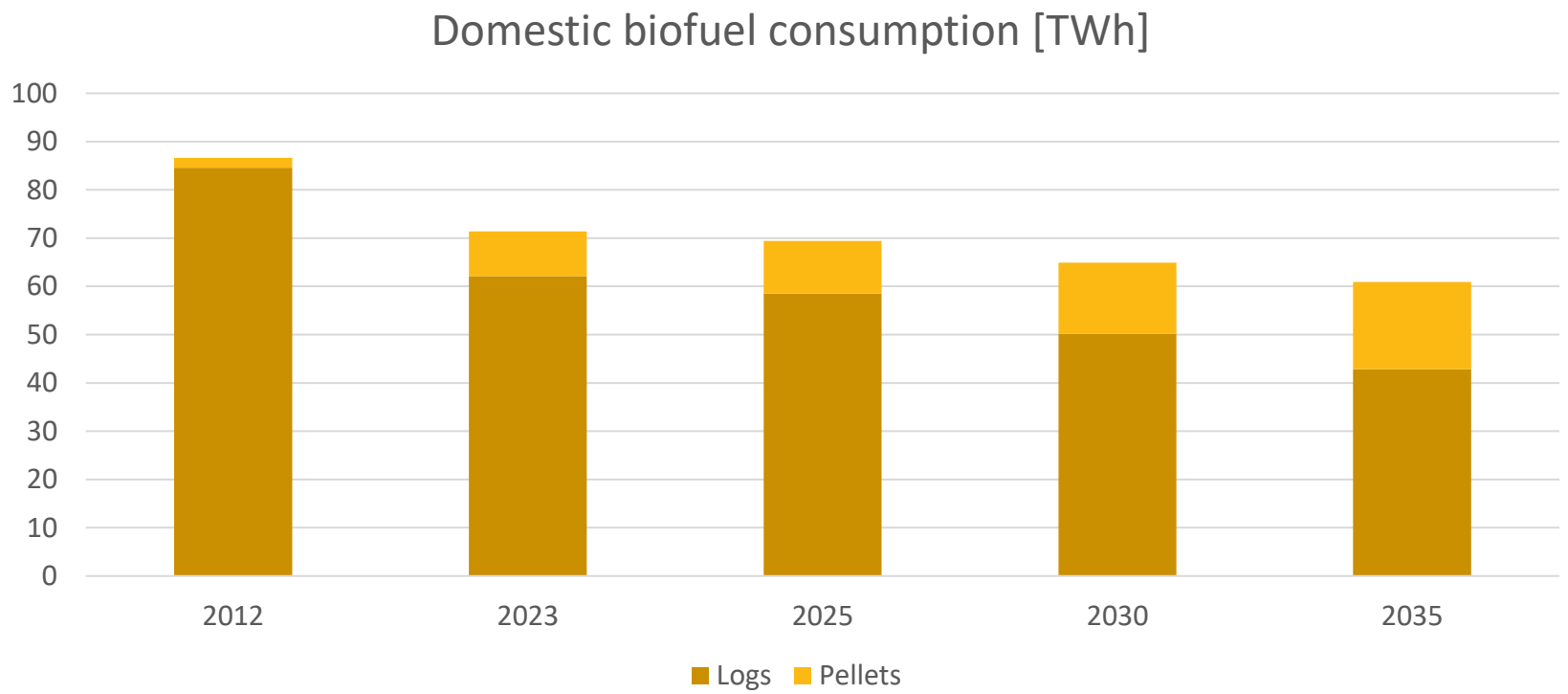
Impact on the evolution of consumption



Finding 1: The modernization (Eco design & better fuel quality) improvements combined with the replacement of and increase in the number of domestic wood-burning appliances operating has resulted in reduced biomass consumption by around 15%.

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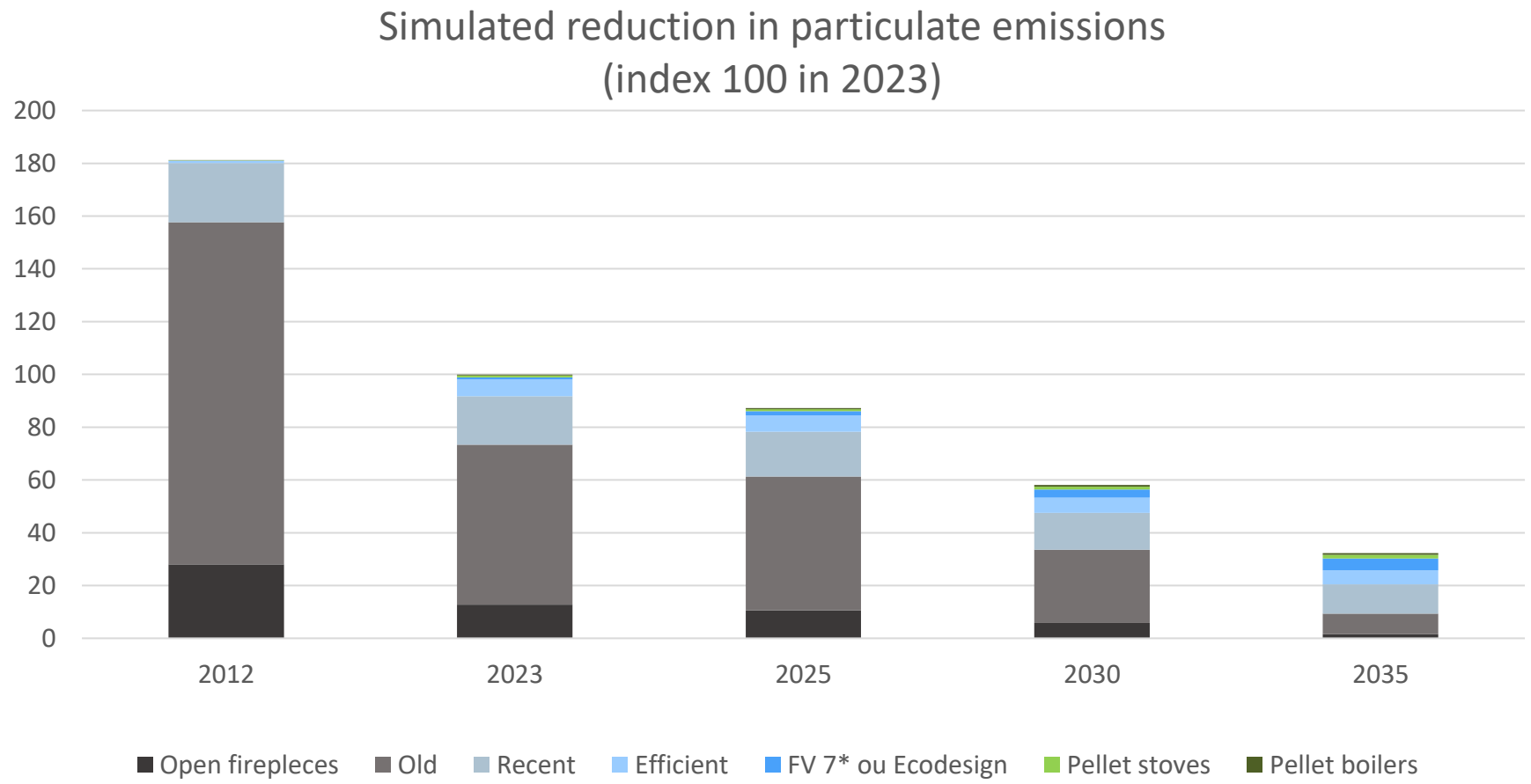
Impact on the evolution of particle emissions



Finding 2: Particulate emissions cut by a factor 3 as appliances fleet grows and is replaced The appliances installed can grow and do not result in a growth of emission instead there is a reduction in emissions.

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Air quality: French recommendations

- Continue to provide support for the acquisition of high-performance appliances and replace old less efficient appliances
- Implement a public policy to increase the supply of quality biofuels
- Continue and strengthen quality approaches in terms of installation and maintenance
- Scaling up communication actions on good practices

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SUMMARY

The ADEME studies, published in 2013, 2018 and 2024, confirm the conversion of the heating stock to more efficient appliances, adapted to the lower energy requirements of buildings.
For example, there has been a significant drop in the use of open fireplaces (by 50%) and a massive installation of new-generation stoves, inserts and boilers that are more efficient.
Given the new developments and technical requirements for wood and pellet heating equipment (Flamme Verte Label / Eco-design), the trend towards lower particulate emissions should naturally accelerate in the coming years.

With the rapid replacement of the least efficient appliances (open fireplaces and appliances built before 2000) and the fuel quality requirements imposed by the regulations and the technical constraints of the appliances, it would even be possible to divide by 3 the particulate emissions linked to individual wood heating by 2035.
Another finding is that the increase in the number of homes is compatible with a drive to reduce particulate emissions.
It also means that renewable heat can be developed in a greater number of homes, in line with renewable energy targets for 2035, which aim to double the production of low-carbon heat compared with 2021 [5].

At the end of these analyses, a strategy is proposed to achieve this objective.

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OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES

HYPOTHESES

The aim of this simulation is to assess the evolution of the fleet and its future impact on fuel consumption, and to demonstrate that fine particle emissions from domestic wood-burning appliances will continue to fall sharply in the years to come, and to measure the impact of quality fuel.
The assumptions used to establish this simulation come from the following official sources:

- CITEPA (based on tests carried out by INERIS in 2013): emissions by type of appliance and generation
- OBSERV'ER: study of annual sales of wood-burning appliances [6].
- ADEME 2013: STUDY ON DOMESTIC WOOD FIREPLACES: MARKETS AND SUPPLY [7]: composition of the fleet and fuel consumption in 2012 (quantity and drying time).
- ADEME 2018: STUDY ON WOOD-BASED HOME HEATING: MARKETS AND SUPPLY [8]: composition of the fleet and fuel consumption in 2017 (quantity and drying time).

This study shows that 49% of the wood consumed in France can be considered dry (i.e. 2 years of drying).

- ADEME 2024: SITUATION OF DOMESTIC WOOD HEATING IN 2022-2023 [1]: Inventory of the stock, consumption and supply.

This new study shows that 45% of the log wood consumed in France is stored in good conditions so that it can be recognized as dry, and that 47% of log wood from professional channels is dry.

- CÉRIC laboratory: Work and research carried out by CÉRIC laboratory for over 30 years on wood-burning appliances, flues and fuels.

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OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - HYPOTHESES

In addition to this public data, assumptions for reducing unit consumption per appliance (improved fuel quality, home insulation, improved appliances, maintenance, climate change, etc.) and emission factors have been used.

We have also taken into account an annual assumption for renewals and growth in the installed base by type of appliance.

This is based on average sales over the last 3 years and the assumption that a similar rate will be maintained, as well as a differentiated and higher replacement rate for older equipment.

The data was then compiled to determine a scenario for 2035 and simulate changes in fuel consumption and fine particle emissions associated with the replacement of old appliances and the use of quality fuel.

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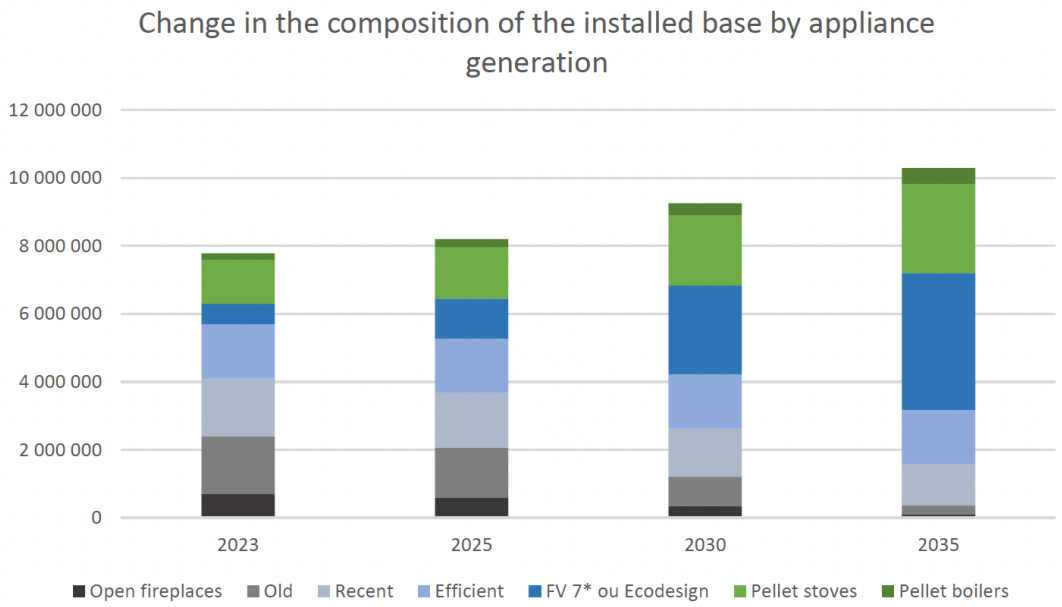
OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - RESULTS

RESULTS OF THE SIMULATION

Changes in the composition of the stock of appliances in operation in terms of performance



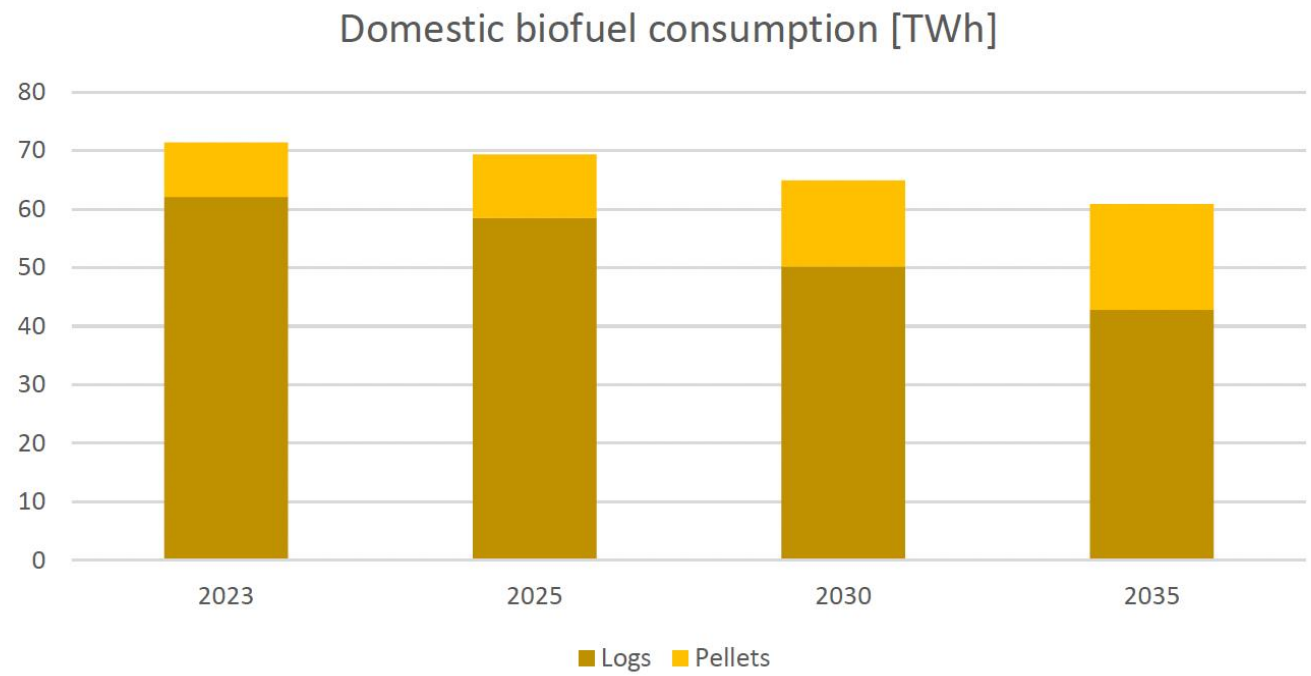
Definitions of appliance performance:

- Open fireplaces
- Older log-burning appliances (before 2000)
- Recent log-burning appliances (between 2000 and 2011)
- Efficient appliances (between 2012 and 2020)
- Flamme Verte 7* or Eco-design equivalent appliances (from 2020)
- Pellet stoves
- Pellet boilers

OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - RESULTS

RESULTS OF THE SIMULATION

Evolution of the park's energy consumption



Finding 1: The modernization and increase in the number of domestic wood-burning appliances has reduced biomass consumption by around 15%.

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OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES- RESULTS

RESULTS OF THE SIMULATION

Finding 1: The modernization and increase in the number of domestic wood-burning appliances & increase in use of quality fuel has reduced biomass consumption by around 15%.

By 2035, the number of logs/pellets heaters could reach more than 10 million, an increase of 32% compared with 2023.
This increase, if it materializes, could make it possible to replace other types of fossil heat production (oil, gas, etc.) and to support electric heating appliances (heat pumps, radiators, etc.) to relieve the electricity grid and strengthen our energy independence.

At the same time, given the improved performance of new appliances, the quality of fuels and the insulation of homes, a significant reduction in energy consumption is expected (-15%). This reduction in overall consumption is in line with the fall in unit consumption of equipment that has already been measured for almost 40 years in France (halved between 1984 and 2022) [1].

Final energy production from domestic wood combustion will remain relatively constant at around 49 TWh. Wood energy will therefore continue to make a significant contribution in the future and will play a greater part in making the energy mix greener.

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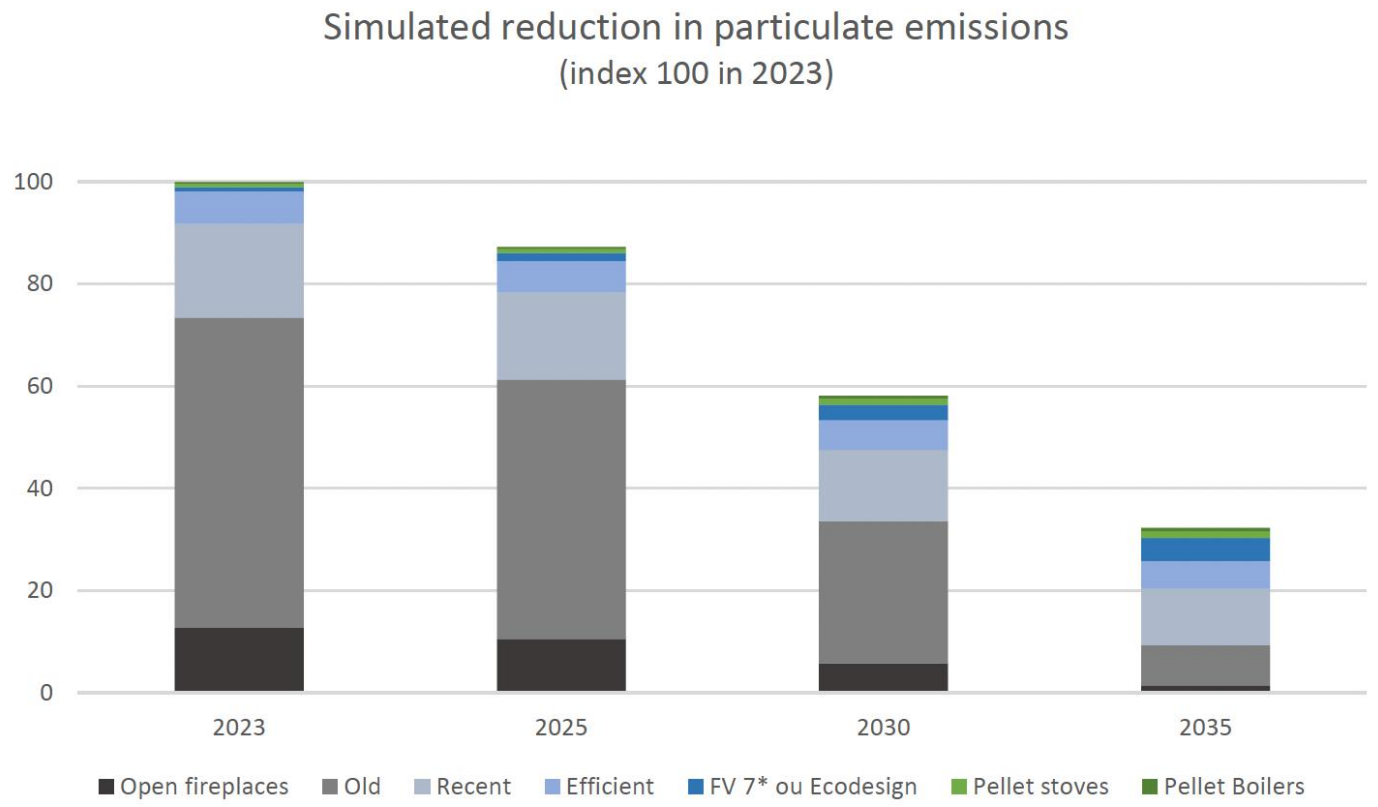
OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - RESULTS

RESULTS OF THE SIMULATION

Simulated reduction in particulate emissions (based on index 100 in 2023)

This simulation takes into account changes in the installed base, as well as increased use of higher-quality wood fuels, particularly as a result of the implementation of the French decree [9] and order [10] of 31 March 2022.



OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - RESULTS

RESULTS OF THE SIMULATION

Finding 2: Particulate emissions cut by a factor 3 as appliances fleet grows and is replaced

31% of the installed base is currently made up of open fires and old appliances, which are the least efficient and emit the most particles. They account for 73% of particulate emissions.

With the replacement of these appliances, and despite the planned increase in the number of appliances by more than 2 million, **fine particle emissions should automatically continue to fall significantly.** Replacing older appliances with more efficient ones will play a major role in this reduction.

The greater the replacement rate, the faster the fall in emissions. This replacement and first-time installation will also lead to an increase in fuel quality.
To work properly, Flamme Verte 7* and eco-design appliances need to be fuelled by dry, calibrated wood. The implementation of the decree [9] and order [10] of 31 March 2022 should encourage the use of quality wood fuels.
It is estimated that particulate emissions could be cut by a factor of 3 between 2023 and 2035, following an initial reduction of around 40% between 2012 and 2023.

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OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - CONCLUSIONS

Simulations have shown that the increase in the number of homes with woodburning equipment is combined with a fall in wood energy consumption, as new, efficient appliances, improved fuels and home insulation mean that each appliance consumes less to deliver the same amount of heat.
It's also important to remember that wood energy has a number of advantages that make it the leading source of renewable heat:

- Availability: France has a growing, sustainably managed forest that provides a local resource.
- Storable: wood energy can be used to supplement or replace other sources of heating, whether fossil fuels (gas, fuel oil), electricity or intermittent renewable sources (solar, wind).
- Efficient and competitive: quality wood energy, which has a higher calorific value and guarantees better appliance performance, remains the most competitive source of energy for French consumers.

These simulations have also shown that renewing the existing fleet of domestic wood-burning appliances with Eco design and improving fuel quality will have a significant impact on air quality. Between 2012 and 2023, particulate emissions from domestic wood heating have already been reduced by around 40%.

By 2035, emissions could still be cut by a factor of 3 by continuing to replace open fires and the least efficient appliances and developing the market for quality wood, while increasing the number of installed appliances to more than 10 million.

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OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - CONCLUSIONS

Good combustion in domestic wood-energy systems depends on enabling conditions:

- ✓ **The quality of the appliances and flues**
- ✓ **The quality of the fuels used**
- ✓ **Correct sizing and Selection**
- ✓ **Optimized operation and use**
- ✓ **Regular maintenance and cleaning**

This study shows that when these key factors are enabling;
the growth in the number of new efficient domestic wood-burning appliances enables a reduction in particulate emissions and overall biomass consumption and improvement in Air Quality.

At the same time, these effects are also enabling a reduction in the consumption of fossil fuels and electricity used in domestic dwellings during the winter period reducing green house gases and benefiting local power grid production.

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OUTLOOK FOR DOMESTIC WOOD-BURNING APPLIANCES - CONCLUSIONS

Useful actions for the development of efficient wood heating could be:

- ✓ **The continuation of targeted support for the purchase of efficient appliances with a bonus granted when an old appliance is replaced (wood fund), particularly in polluted areas;**

- ✓ **The implementation of a public policy aimed at increasing the supply of quality biofuels. A first stage in stimulating demand has been launched with the publication of two regulatory texts in March 2022 [9] [10]. Support for supply and the industrialization of production could complete the system to speed up the production and marketing of these products to the highest standards;**

- ✓ **Continuing and strengthening the quality approach to installation and maintenance, with the aim of deploying high-performance equipment under the best possible conditions in terms of installation and sizing;**

- ✓ **The development of communication campaigns for the general public on good practices and good habits.**

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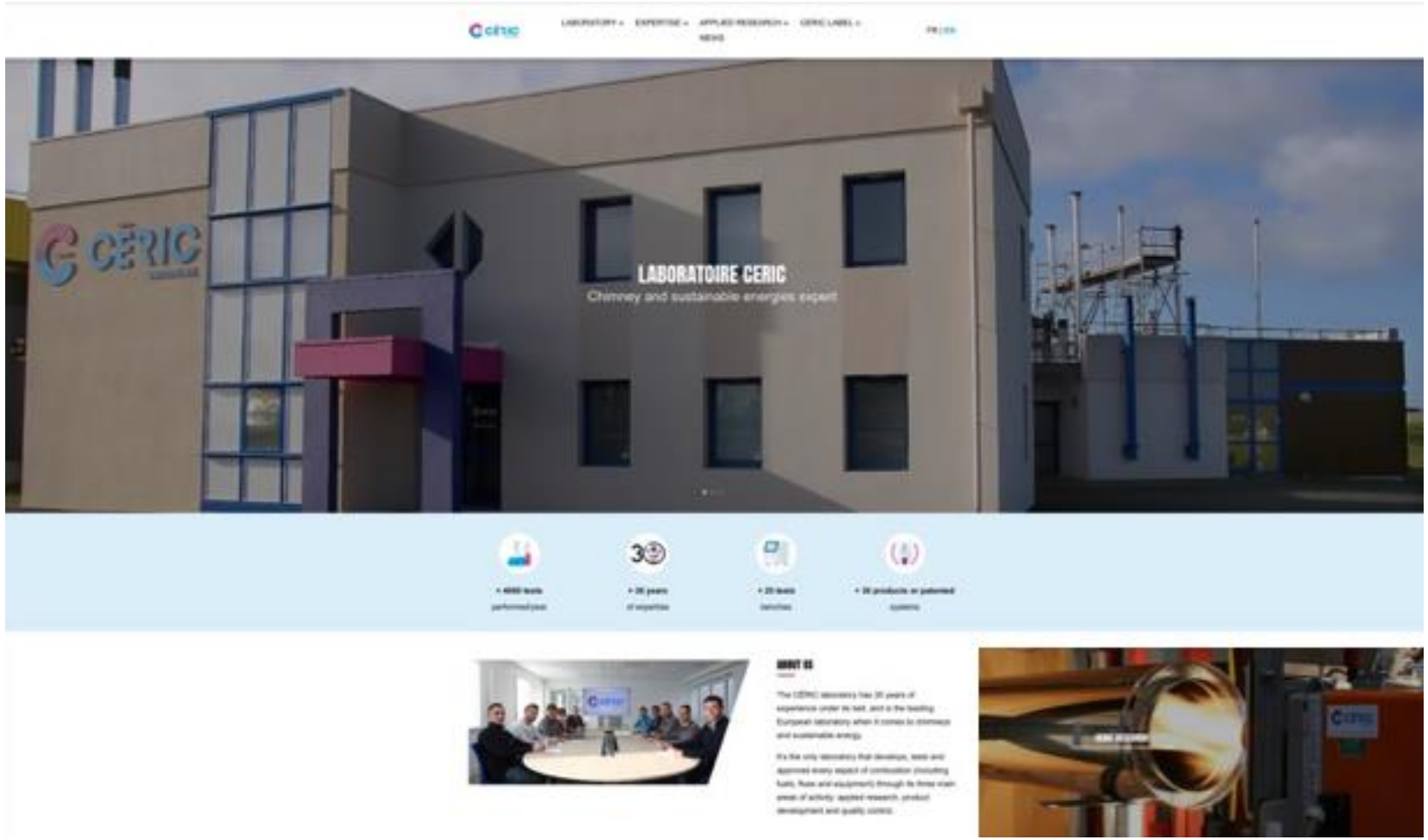
Communication

The CÉRIC Expert study will be published on the CÉRIC website
https://www.laboratoire-ceric.com/en/the-ceric-laboratory/



CÉRIC STUDY

Air quality: how does wood-fired heating contribute to the French PM2.5 emissions?

Download the summary

Download the study

January 2024

Outlook for individual wood-burning appliances : The French market example

Download the summary

Download the study

September 2024

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CÉRIC LABORATOIRE

Bibliography

[1] ADEME, «Situation du chauffage domestique au bois en 2022-2023,» Juin 2024.

[2] CITEPA, «Rapport SECTEN 2024,» 2024.

[3] Laboratoire CERIC, «Impact de la qualité du combustible bois bûche et de l'évolution du parc d'appareils à bois sur la qualité de l'air,» 2017.

[4] Laboratoire CERIC, «Impact de la qualité du combustible bois et de l'évolution du parc d'appareils sur la qualité de l'air,» 2022.

[5] Ministère de la Transition Energétique, «Stratégie française pour l'énergie et le climat,» 2023.

[6] Observ'ER, «Marché 2023 des appareils domestiques de chauffage au bois en France,» 2024.

[7] ADEME, SOLAGRO, Biomasse Normandie et BVA, «Etude sur le chauffage domestique au bois : Marchés et approvisionnement,» 2013.

[8] ADEME, SOLAGRO, Biomasse Normandie et BVA, «Etude sur le chauffage domestique au bois : Marchés et approvisionnement,» 2018.

[9] Legifrance.gouv.fr, «Décret n°2022-446 du 30 mars 2022 relatif aux informations générales données par les distributeurs de combustibles solides destinés au chauffage auprès des utilisateurs non professionnels, concernant les conditions appropriées de stockage et d'utilisation,» 2022.

[10] Legifrance.gouv.fr, «Arrêté du 30 mars 2022 relatif aux critères techniques auxquels doivent répondre certaines catégories de combustibles solides mis sur le marché et destinés au chauffage, afin de limiter l'impact de leur combustion sur la qualité de l'air,» 2022.

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Thank you

CÉRIC laboratory: An expert in heating appliances, flue system, wood and sustainable energy for over 30 years, CÉRIC laboratory is a benchmark in Europe. It develops, tests and validates all elements of combustion (fuels, flues and appliances) through applied research, product development and quality monitoring. The CÉRIC laboratory is the first part of Poujoulat SA (Tests / accreditation 1-1033 - Scope available on www.cofrac.fr). In figures: 550m² surface area, 6 test halls, 1 Celsius boiler room, 6 engineers and 4 technicians and +5 000 tests per year.

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