



The Future of Cooking in Europe

*Transitioning to Healthier, Cleaner and
More Efficient Kitchens*

Report for: ECOS – Environmental Coalition on Standards

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Acronyms and Abbreviations

ADHD	Attention Deficit Hyperactivity Disorder
°C	degrees Celsius
CAGR	Compound Annual Growth Rate
CH ₄	Methane
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
ECB	European Central Bank
EU	European Union
°F	degrees Fahrenheit
GAR	Gas Appliances Regulation (EU 2016/426)
GWP	Global Warming Potential
H ₂	Hydrogen
IEA	International Energy Agency
NO ₂	Nitrogen Dioxide
OH	Hydroxyl radical
PR	Press Release
WHO	World Health Organisation
UK	United Kingdom
USA	United States of America

Summary

Change is a fact of life. As businesses develop new and better ways of doing things, our old approaches change. The last century has borne witness to many examples of disruptive technologies entering and changing an established market, for example ball-point pens replacing fountain pens¹; flat screen televisions replacing cathode ray tubes²; electric and diesel trains replacing steam³; and light-emitting diodes replacing tungsten filament lightbulbs⁴. New, better technologies were offered in these markets, and end-users embraced the better service they provided.⁵

Today, in the midst of a global automobile market transition from fossil fuel propulsion to electric motors⁶, there is a similar transition away from fossil fuels taking place in European kitchens; more and more households are choosing electric cooking over gas^a.

Figure 1 presents the national domestic cooker percentage sales for the Netherlands over a 16-year period. This histogram shows a gradual growth in electric cooker sales, starting in 2006 and surpassing gas in 2016. By 2020, electric cookers in the Netherlands were outselling gas by 4 to 1.⁷ Acting in support of this trend and in the interests of protecting the health and welfare of their customers, the international retailer IKEA took the decision to stop selling gas cookers in the Netherlands from January 2024.⁸

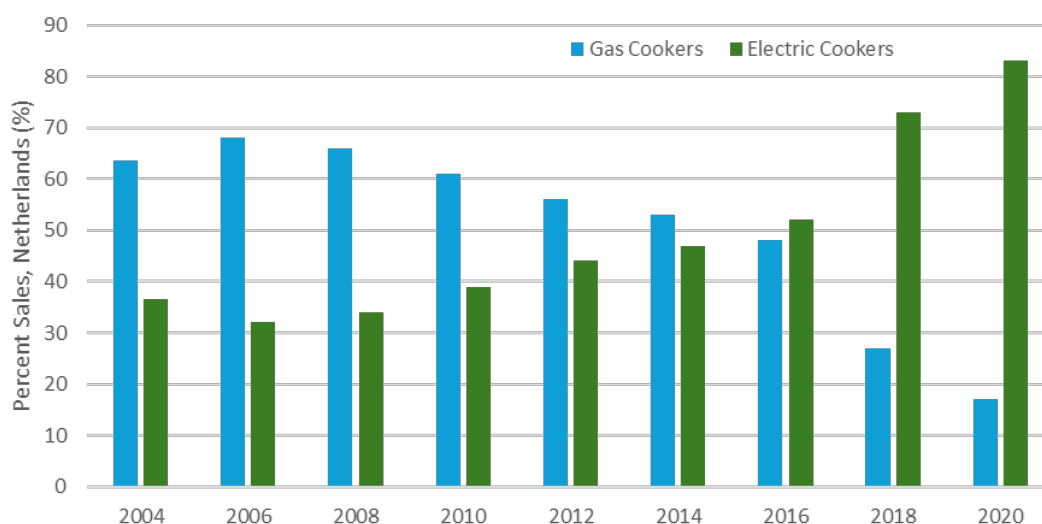


Figure 1. National Domestic Cooker Sales by Fuel Type, The Netherlands (2004-2020)

While the installed stock of gas cookers remains high in The Netherlands (just over 65% of households, or about 5.4 million households), new sales are the bellwether of change, indicating that the future of cooking for Dutch households is electric. There are, no doubt, many factors which contributed to this market shift in the Netherlands. This report examines some of these contributing factors, highlighting recent and compelling evidence on cost-effectiveness, health, safety, efficiency, convenience and climate.

Ultimately, the future of cooking in Europe is electric, offering consumers a healthier, more efficient and cleaner alternative to gas. The key question is, “how can this transition be accelerated, improving the lives of European citizens?”

Electric Cooking is More Cost Effective

One of the pivotal drivers of any market transition is cost. Consumers will naturally gravitate towards the least expensive option. We analysed the energy prices for domestic electricity and gas and found that in most countries across Europe, the existing trends favour switching to electric, as shown in Figure 2.⁹ In

^a In this paper, the term “gas” is used to refer broadly to gaseous fuels, including natural gas (also called fossil gas), propane, butane, biogas and hydrogen.

this diagram, there are 24 EU countries plotted with their three-letter abbreviations. Seventeen countries are on the right of the “cooking fuel price line” because the projected 2026 price of gas vs. electricity in these countries favours switching to less expensive electric cooking. Seven countries are plotted to the left of the line where the energy price ratio favours cooking on gas. For these seven countries, however, it should be noted that they are very close to the cooking fuel price line. The further away from the line, the stronger the incentive to choose one cooking fuel over the other. For example, the Netherlands (NLD) is very far from the line on the side favouring electricity, meaning it is far more cost effective in the Netherlands to cook with electricity than with gas. These seven countries on the left of the cooking fuel price line are only marginally favouring gas and with gas prices projected to escalate faster than electricity, they are expected to transition to favour electric cooking soon.

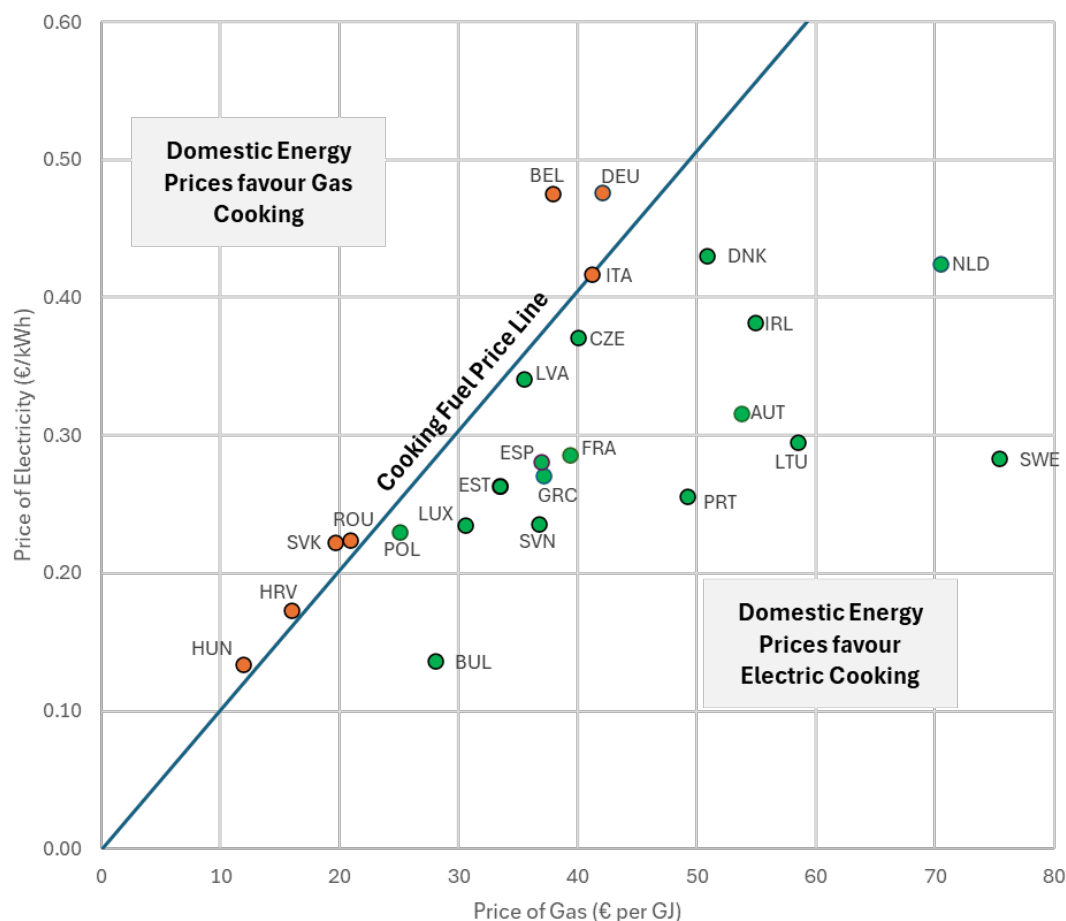


Figure 2. Scatter Plot of Gas and Electric Prices in 24 EU Countries (projected 2026 prices)

In addition to electric cooking becoming more attractive from a running cost point of view, the purchase prices of electric cooking appliances are becoming more competitive. In April 2024, we gathered prices of 963 gas and electric four-hob cooktops from across the EU and found that the market now offers affordable induction cooktops at price points that overlap prices of gas cooktops. For example, online retailers in Austria and Germany offer a four-hob induction cooktop at €149.99. Romania has a retailer selling a four-hob induction cooktop for €168, and Italy has a model at €169.99. Portugal and Spain both have models offered at €179.99. Infact, across the 21 EU countries where price data was collected, 14 of them offered induction cooktop models that were less expensive than the average price of a gas cooktop.

Figure 3 shows the significant overlap between gas and two of the electric cooking technologies, infrared and induction. The bars represent the average price with +/- one standard deviation, and the whiskers represent the minimum and maximum prices in the database.

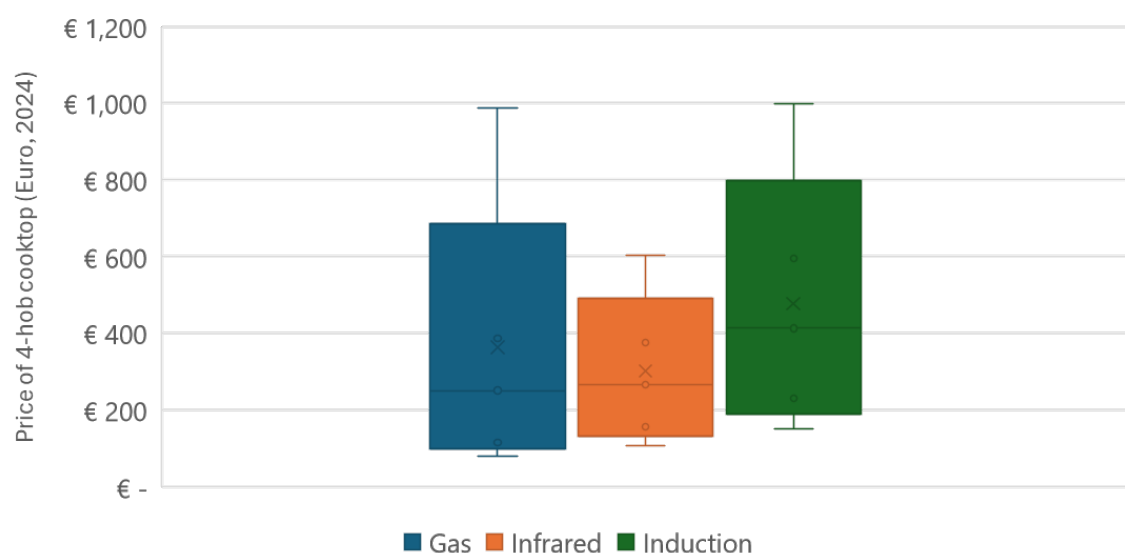


Figure 3. Online Retailer Prices for Four Hob Cooktops from Across Europe (n=963 models)

The global electric induction cooking market is forecast to grow by an annual growth rate of 5.6% through to 2032, taking the global market from US\$12.1 billion (2022) to US\$20.9 billion (2032).¹⁰ Europe represented 39% of the global market for induction cooktops in 2022, and as the global and European induction markets continue to grow, economies of scale will help to keep prices affordable.¹¹

Combining the new price data, forecasted energy prices, and JRC's estimated costs of installation and maintenance¹², we developed a 'cost of cooking' model for households across the EU. Inflation is accounted for and energy prices are projected on the basis of the last 6 year trend. The 'cost of cooking' model calculates the net present value (NPV) of all current and future costs (using a 4% discount rate) for gas, infrared and induction cooktops. We then divide that NPV of the total cost of cooking by the number of years in the analysis period to calculate an annualised cost of cooking. Detail on this calculation can be found in Chapter 2, however the figure below shows the comparison for the Netherlands as it clearly shows the economic driver for their national market shifting to electric cooking. In this example we show that in the Netherlands, owning an induction cooktop is 37% less expensive than gas.

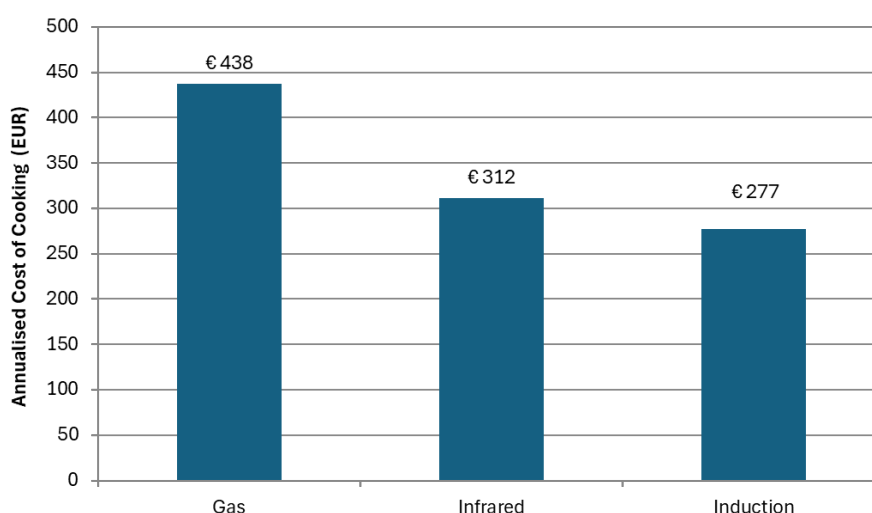


Figure 4. Annualised Cost of Cooking for the Netherlands, Net Present Value, 2026.

Electric Cooking Avoids Health and Safety Risks of Gas

Gas cooking appliances can affect our health because the combustion of gas produces indoor air pollution. Gas hobs and ovens emit nitrogen dioxide (NO₂) and carbon monoxide (CO) directly into our homes, negatively impacting indoor air quality and putting the health of our families at risk. According to researchers, 12% of the current paediatric asthma cases in the EU (over 700,000 children) could be avoided if all gas cookers were removed.¹³ Electric cooking appliances do not have an open flame, and therefore do not produce those same emissions when cooking.

Safety can also be a concern for households because gas cookers have an open flame that can ignite cooktop fires, especially when cooking with oil or alcohol. Furthermore, in many countries, gas is supplied in old pipe networks that can leak and have dangerous outcomes. In the UK where gas pipes for domestic cooking and heating is quite old, the government's national statistics over a seven-year period (2015-2022) found that there is a gas-related fire or explosion incident nearly every day.¹⁴ Over that seven year time period, this study also found that the UK experienced 669 gas fires and explosions that resulted in a casualty and/or a fatality.¹⁵

Finally, there is another risk associated with cooking with gas, since the open flame radiates heat all around the cooking zone and onto the user. There is a risk that the heat plumes coming up the sides of pots and pans could affect the user's hands and arms, particularly if they need to reach for a pot or pan on the back burners or need to regularly stir the dish. In a commercial kitchen, this phenomenon is particularly pronounced and a professional chef who described this problem as "almost suffocating". He found his body was exposed to a sustained temperature of 57°C while working in his kitchen at a gas stove.¹⁶

Electric Cooking is more Efficient

Measuring the energy required to boil a volume of water in normal cookware, a group of researchers found that gas burners were only 31% efficient at delivering the heat content of the fuel to the water.¹⁷ These same researchers found that commercially available induction hobs were 86% efficient – nearly three times better at delivering heat to the water. Induction hobs are the most efficient technology because they induce an electric current that produces heat directly in the cook pot placed on them, delivering heat right at the point where it's needed.

In the future, to achieve sustainability, our electricity will be derived from renewable sources. In a recent publication, a comparison was made between the cooking efficiency of "green" hydrogen derived from renewables with induction cooking. This comparison found that on a system basis, using renewable electricity directly to cook with induction – even taking into account the battery storage losses – was 3 to 4 times *more efficient* than producing green hydrogen and burning the hydrogen.¹⁸ The comparison found that when one compares the two systems, the solar-powered, battery-backed-up induction cooktop solution was 3 to 4 times more efficient at delivering useful heat for cooking than a hydrogen-burner system that uses hydrogen derived from renewables.¹⁹

Electric Cooking is more Convenient

Electric cooking has many advantages which make it attractive and easy to use for in domestic as well as professional kitchens. Induction and infrared cooktops are easier to control, are more comfortable to use and are far easier to clean.

Electric induction and infrared hobs are highly responsive to temperature adjustments, and induction hobs can boil water faster than gas because they deliver nearly all their input energy to the pot/pan. At the other end of the scale – when very little heat is required – induction hobs offer a super-low setting, enabling chefs to melt chocolate without a double-pot or leaving stock to simmer overnight.²⁰

Electric cookers are also much easier to clean. The radiant and induction electric cooktops typically have smooth glass tops which are simple and time-efficient to clean – just wipe them down and its done. In

Australia, professional chef Luke Burgess estimates that he saves \$30,000 per year in cleaning time, with the cooktop cleaning time being reduced “from 24 minutes to 21 seconds” when he switched from gas to induction at his restaurant.²¹

Electric Cooking is Better for the Climate

In Europe, the climate impact of gas cooking compared to electric is significant. We calculated the lifetime CO₂ emissions of a gas hob compared to electric for a typical European household that cooks three times a week. For this household, we estimated that for each of the three days per week, they cook for 45 minutes with a 2kW burner, 30 minutes with a second 2kW burner and 15 minutes with a 1.2kW burner. Over a 15-year time period, a family following this frequency of usage with a gas cooktop will produce 4.12 metric tonnes of CO₂ emissions from the combustion of gas. In Europe, the CO₂ emissions per kilowatt hour are low and are projected to continue to decline through 2050, thus a family cooking for the same time period (15 years) on an electric-infrared cooktop will produce 1.11 metric tonnes, and electric-induction will produce 0.91 metric tonnes. Thus, on the basis of CO₂ emissions associated with cooking, gas results in 3.5 times *more* CO₂ emissions than cooking on induction in Europe (i.e., induction cooktops release 78% less CO₂ over their lifetime compared to gas). See Chapter 5 for information on this calculation.

In addition to the CO₂ emissions from the combustion of gas when cooking, methane also leaks from the appliance and network of pipes as well as incomplete combustion at the burner. Methane is an extremely potent greenhouse gas, having a heat trapping capacity 85.5 times greater per molecule compared to CO₂ during its first 20 years in the atmosphere.²² A recent study took measurements in 53 kitchens across California and found that leaking and unburned methane from gas stoves and cookers amounted to 0.8-1.3% of the methane they consume.²³ This included methane leakage from the appliance, pipes in the house, incomplete combustion, and ignition/extinguishing of the flame. The researchers extrapolated the measured rate of leakage to 40 million households in the US that cook with gas and determined that this was equivalent to the average annual CO₂ emissions of 500 thousand passenger automobiles.²⁴

If that same average leakage rate of methane found in California (0.8-1.3%) were applied to all the EU households cooking on gas²⁵, it would equate to 42.3 to 68.8 million cubic metres of methane, which has a global warming potential (20 year) equivalent of 2.6 to 4.2 million metric tonnes of CO₂ annually. The average passenger car in the EU emits 1.7 metric tonnes of CO₂ annually²⁶, thus if this rate of leakage were to apply in Europe, it would equate to the annual emissions of 1.5 to 2.4 million automobiles.

Achieving Clean Cooking Across Europe

Europe is a world-leader in policy measures that inform and protect consumers. For cooking appliances, this includes measures contained in the Ecodesign Directive 2009/125/EC, the European Energy Label (EU) 2017/1369 and the Gas Appliances Regulation (EU) 2016/426. Complementing these three policy instruments are the Energy Efficiency Directive (EU) 2023/1791, the Energy Performance of Buildings Directive (EU) 2018/844 and the Ambient Air Quality Directive 2008/50/EC, all of which contain provisions aimed at transitioning European buildings and equipment away from fossil fuel and its detrimental pollution affecting air quality and the environment. These policies are slowly working to demonstrate the health and environmental impacts of cooking with gas, supporting Europe’s transition towards cleaner, more convenient and environmentally sustainable practices.

The European market is already in transition to electric cooking, reflecting the fact that more and more households are becoming aware of the health, safety, environment and economic benefits of making the switch. There are, however, eight policy interventions which could be deployed to help accelerate this process, enabling more people to benefit sooner from making the switch.

- 1) **Retailer Leadership** – work with retailers to develop promotions and marketing campaigns to raise awareness of the benefits of induction cooktops.

- 2) **Manufacturer Leadership** – appliance manufacturers follow the Tesla model and shake-up the fossil-fuel gas market by announcing a phase-out date for gas and working build more public awareness around the benefits of cooking with electricity.
- 3) **Public Health-Funded Incentive Schemes** – recognising the direct public-health benefit of replacing gas cooktops from kitchens across Europe, establish a subsidy scheme that covers any first-cost differential to facilitate the switch away from gas and its detrimental impact on indoor air quality.
- 4) **Regulatory Policies** – continue to work through the ecodesign an energy labelling regulations, the gas appliances regulation and Energy Performance of Buildings Directive and the Ambient Air Quality Directive.
- 5) **Distribution Network Upgrades** – work across the EU to improve the strength and interconnectedness of the national electricity transmission and distribution networks, to handle the new demand.
- 6) **‘Positive-About-Induction’ communications campaign** – Member State governments, including health authorities, should work with health experts and other organisations in their countries to design and manage national programmes to raise awareness across the generations.
- 7) **Cooking Golden Carrots** – working with electric utilities or other relevant stakeholders, design and introduce a national programme to incentivise innovation and win a bulk procurement contract worth >€10 million.
- 8) **Consumer-focused legal action** – emulating the path followed by thousands of households across the US, develop class-action lawsuits in Europe to bring pressure on manufacturers to disclose the health and safety risk of gas cooking appliances.

Europe has an opportunity to lead the world in the cooking sector with not only its renowned cuisine, but also with new policy measures and market interventions that accelerate the transition from gas to electric across domestic and commercial cooking. The sooner Europe takes this step, the sooner all its citizens will be able to enjoy the health, economic and environmental benefits of clean, electric cooking.

1. Introduction

1.1 The Backstory

Eighty years ago, the fossil fuel industry appropriated the expression “Now you’re cooking with gas” from radio comedians in the United States²⁷. The gas industry designed a public relations campaign around this phrase, using it to promote gas cooking and imply superiority over electric cooking. It even went so far as to insert the phrase into popular culture such that it is used as an expression for things going well or running smoothly²⁸. More recently, researchers have found on-going efforts to promote gas cooking amongst Gen-Z millennials through online influencers such as the “Natural Gas Genius” campaign²⁹. This campaign pays influencers to post positive messages about cooking on gas to their followers while omitting any mention of any health risks, including for example the emissions of nitrogen dioxide, carbon monoxide, ultra fine particles and other indoor air pollutants.³⁰

While the scientific community has been aware of the public health risk associated with cooking on gas, publishing papers that span more than five decades³¹, the general public has remained largely unaware of the risks of cooking with gas. Recent research has found that this was no accident, concluding that since the early 1970’s, the gas industry applied the same strategies followed by the tobacco industry to create controversy around research linking gas stove emissions with poor respiratory health.³² This study found that the gas industry had employed Hill & Knowlton, a public relations (PR) firm hired by the tobacco industry to design their PR strategy. According to researchers, executives from Hill & Knowlton instructed the gas industry to launch a “massive, consistent, long-range public relations programs” to get ahead of critics and diffuse the impact of any negative studies published by independent researchers.³³ That strategic guidance led to the gas industry applying tactics similar to tobacco and climate-denial campaigns, funding its own “research”, hiring consultants to criticise published literature, and actively advocating an lobbying against regulatory action.³⁴

Even though we spend 90% of our time indoors, government agencies in Europe and the United States have yet to set any indoor health and safety standards that limit nitrogen dioxide (NO₂) pollution from gas appliances. In the United States, consumers are generally unaware of the health risks associated with gas appliance emissions in their home. As a result of this issue, three class action lawsuits were filed against popular appliance brands like Samsung³⁵, General Electric (Haier)³⁶ and Whirlpool³⁷. All three of these pending class action lawsuits share the common complaint that manufacturers knew about the harmful emissions from their gas appliances, but chose not inform the consumers of the health risks.

In the Samsung case, for example, the plaintiffs claim that Samsung is aware that the gas stoves it sells emit harmful pollutants and that cooking with these appliances can “increase the rates of respiratory illness in adults and children,” yet Samsung has failed to develop a safer design for its product or disclose the pollutant risk to consumers. The plaintiffs continue, “Like other makers of gas stoves, Defendant monitors and keeps track of research on the health effects of its products. This is diligence that large companies like Defendant routinely do when selling a consumer product. Defendant is aware of the fact that its Products emit harmful pollutants.”³⁸

1.2 European Context

In Europe the situation is largely the same as the US. There are no defined limits on ambient NO₂ concentrations indoors, and so recent studies that evaluated indoor air pollution and gas cookers compared those modelled³⁹ and measured⁴⁰ indoor levels of pollution to outdoor ambient pollution limits. Unlike the United States however, Europe enjoys the protection of a Gas Appliances Regulation (GAR) that was adopted in 2016 and which states the following requirements about the products of combustion from gas appliances (EU 2016/426)⁴¹:

“3.4.1. Appliances shall be so designed and constructed that, when normally used, the combustion process is stable and combustion products do not contain unacceptable concentrations of substances harmful to health.”

“3.4.4. Appliances shall be so designed and constructed that, when normally used, they do not cause a concentration of carbon monoxide or other substances harmful to health, such as they would be likely to present a danger to the health of persons and domestic animals exposed.”

There is some ambiguity in Europe as to what these clauses mean, for example NO₂ is clearly a “substance harmful to health”, but it is not named and manufacturers do not report on those emissions for this appliance.^b Furthermore, the GAR fails to establish any numerical thresholds, instead opting for the subjective phrase “unacceptable concentrations”. Recent research has found that in kitchens using gas cookers, indoor air pollution regularly exceeded outdoor limits in a study of 250 kitchens across seven European countries.⁴²

Fortunately, new collaborations that promote clean cooking with electricity are emerging between experts in the health and energy communities. These collaborations are enhanced by growing support and actions by professional chefs and suppliers. The research is now achieving a critical mass where efforts to raise awareness and to inform the public of the risks of gas are breaking through. The celebrity-sparkle effect of professional chefs – are showing its possible to cook delicious, healthy meals without putting your family’s health at risk. Fossil-fuel-funded campaigns like “Natural Gas Genius” are falling flat at millennials wisely view gas-industry funded propaganda with a critical eye, and the strategies of Hill & Knowlton that propped up tobacco and climate-deniers for years are over-ridden by peer-reviewed science, people’s personal stories of indoor air quality impacts of gas, and culinary leaders showing the public there is a cleaner, healthier alternative. With the transition to electric cooking underway, the question is ‘how quickly will society enable that transition to take place?’

1.3 European Households Cooking with Gas

Table 1 estimates the number of households in Europe that use gas for cooking.⁴³ The estimates are ranked by percentage of households, and are provided to enable readers to assess the importance and urgency of supporting a transition to cooking with electricity in their country.

Table 1. Percentages and Number of European Households Cooking with Gas

European Households Cooking with Gas (ranked by percentage of homes)					
Country	Percent	Number	Country	Percent	Number
Romania	69.9	5,207,700	Slovenia	10.0	83,500
Italy	68.2	17,580,500	Portugal	9.7	369,700
Netherlands	65.0	5,406,300	Austria	5.5	220,800
Hungary	61.3	2,510,700	Germany	3.1	1,283,600
Poland	50.0	7,053,600	Bulgaria	2.7	78,400
Slovakia	49.8	922,600	Denmark	2.6	78,000
Czechia	49.2	2,386,100	Sweden	1.4	76,500
Luxembourg	47.2	125,500	Finland	0.6	16,600
Lithuania	44.4	620,000	Latvia	0.4	3,400
Spain	34.5	6,506,700	Greece	0.2	8,900
France	33.3	10,332,800	Malta	0.0	-
Belgium	27.6	1,396,000	Cyprus	-	-
Croatia	24.0	351,300	Norway	-	-
Ireland	21.2	413,000	EU	32.5	63,928,200
Estonia	17.7	120,300	United Kingdom	53.9	15,199,800

^b However, it should be noted that NO_x emissions are perceived as harmful and already regulated (i.e., limited, have to be reported) under the Ecodesign Directive for solid fuel local space heaters ([EU 2015/1185](#)) and for water heaters and hot water storage tanks ([EU 814/2013](#)).

Table 1 shows that Italy has the largest number of households cooking on gas – accounting for just over one-quarter of all EU households who cook with gas. In France, approximately one-third of households cook with gas, constituting just over 10 million homes and apartments. In Poland, half the population cooks with gas, constituting about 11% of the EU total of households. In these priority countries, raising awareness about the risks of gas and the advantages of electric cooking will be important to support a transition to a clean cooking future.

2. What's the True Cost of Cooking?

Cost is one of the most important factors households consider when making a decision, such as whether to choose a gas or an electric cooktop. In this chapter, we set out our methodology and findings behind our calculation of an annualised cost of cooking comparison which shows that for over two thirds of the EU, electric cooking is more cost-effective than gas. This calculation involves several inputs, including the efficiency of the cooking technologies, the purchase price of the cooktops, the cost of fuel (gas vs. electric) and other important economic parameters such as the discount rate.

2.1 Efficiency of Cooking Technologies

Cooking with electricity is more efficient, safer, more climate-friendly and cleaner. Electric cooktops are supplied in three forms: hot plates, infrared and electromagnetic induction. Of these, induction cooktops are the most efficient because they produce heat directly in the cook pot being used by inducing an electric current in the metal of the pot - delivering heat right at the point where it is needed.

A comparison was conducted of different cooking technologies using normal household cookware and water. In this test, researchers evaluated commercially available residential cooktops including induction and gas.⁴⁴ It was found that gas burners are only 31 to 32% efficient while induction is 83 to 87% – nearly 3 times more efficient at delivering heat to the water (see Table 2). Induction cooktops are also significantly faster at boiling water, for the medium-heat burner the induction cooktops were all more than twice as fast as gas – with the Frigidaire model being nearly three times as fast. On the high hob heat, the induction cooktops were about twice as fast although it should be noted that the high heat gas burner had about 50% more heat capacity compared to the induction cooktops.⁴⁵

Table 2. Residential Cooktop Comparison Heating Water in Normal Cookware

Cooktop	Induction (Frigidaire)	Induction (GE)	Induction (Samsung)	Infrared (Whirlpool)	Gas (Samsung)
Medium Heat Hob Comparison					
Medium Hob Heat Rate (kW)	2.8	2.5	2.3	1.2	2.8
2.27 litre water heat-up time (minutes)	5.3	5.8	6.4	18.8	14.1
Efficiency	86.2%	86.8%	85.3%	70.3%	30.6%
High Heat Hob Comparison					
High Hob Heat Rate (kW)	3.6	3.7	3.3	2.5	5.0
5.44 litre water heat-up time (minutes)	9.8	9.3	11.6	17.8	18.6
Efficiency	85.2%	86.1%	83.0%	75.5%	31.9%

Based on these findings, when making the cost of cooking comparison, we will use 31% efficiency for gas, 70% for infrared and 86% for induction.

2.2 Purchase Price of Cooktops

In addition to electric cooking becoming more attractive from a running cost point of view, the first cost of electric cooking is also becoming more competitive. In April 2024, we gathered nearly 1000 prices of four-hob cooktops from across the EU and found that the market now offers very affordable induction cooktops at price points that are right in line with the prices of gas cooktops. In several EU countries, four-hob induction cooktops are available at prices less than €180 per unit, including: Austria and Germany €149.99; Romania €168; Italy €169.99; Portugal and Spain €179.99. These price points are all very close to those of equivalent four hob gas cooktops in those same markets.

Figure 5 shows the full database of 985 four-hob cooktop models that were assembled for this study. The bars presented show the average price plus and minus one standard deviation, and the whiskers above

and below the bars represent the minimum and maximum prices recorded. What is immediately apparent about this comparison is the high degree of overlap between the three technologies – gas, electric-infrared and electric-induction. A household going to market to purchase a cooktop could choose any of the technologies.

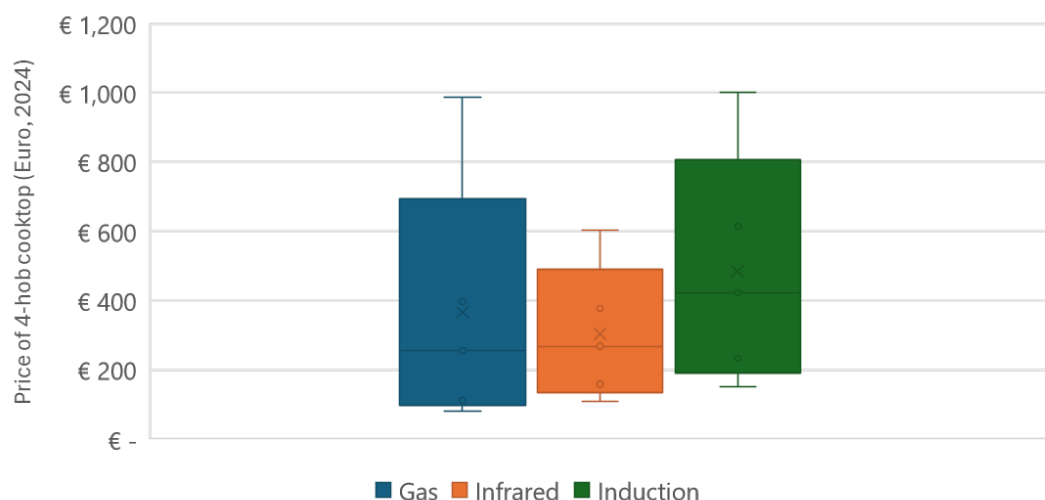


Figure 5. Online Retailer Prices for Four Hob Cooktops from Across Europe (n=985 models)

Looking across the whole database, the average price of a four-hob gas cooktop was €251. The average price of an electric-infrared was slightly higher at €266; and the average price of electric-induction was higher still at €413. However, the standard deviations are an indicator of price, and as discussed earlier, there are many low-cost induction hobs being offered on the EU market, giving consumers choice about the cooking technology they install in their kitchens.

The expectation is that the price of induction cooktops will continue to become more affordable relative to gas. The global electric induction cooking market is forecast to grow by an annual growth rate of 5.6% through to 2032, taking the global market from US\$12.1 billion (2022) to US\$20.9 billion (2032).⁴⁶ Europe represented 39% of the global market for induction cooktops in 2022, and as the global and European induction markets continue to grow, economies of scale will help to keep prices affordable.⁴⁷

Based on the data collected, Table 3 presents the average (April 2024) prices of the four hob cooktops for each of the EU countries. These 2024 prices were then multiplied by the European Central Bank's anticipate rate of inflation for 2025 and 2026, in order to estimate what the prices would be in 2026. This step is necessary because 2026 is the first year that the Ecodesign regulation on domestic cooking appliances could take effect. We applied the inflation estimates for the EU-27 from the ECB⁴⁸, which are:

- 2024-2025 2.0% inflation
- 2025-2026 1.9% inflation

The actual prices used can be seen in Annex A, where the country-by-country cost comparison sheets are provided.

Table 3. Average 2024 Prices for Four-Hob Gas, Electric-Infrared and Electric-Induction Cooktops

Country	ISO-3	Gas	Infrared	Induction
Austria	AUT	€ 244	€ 206	€ 346
Belgium	BEL	€ 382	€ 353	€ 504
Bulgaria	BUL	€ 205	€ 283	€ 405
Croatia	HRV	€ 337	€ 257	€ 428
Czechia	CZE	€ 191	€ 197	€ 312
Denmark	DNK	€ 677	€ 328	€ 698
France	FRA	€ 398	€ 315	€ 588
Germany	DEU	€ 225	€ 238	€ 336
Greece	GRC	€ 475	€ 422	€ 539
Hungary	HUN	€ 211	€ 219	€ 401
Ireland	IRL	€ 259	€ 224	€ 393
Italy	ITA	€ 157	€ 146	€ 257
Lithuania	LTU	€ 181	€ 219	€ 380
Netherlands	NLD	€ 260	€ 389	€ 447
Poland	POL	€ 251	€ 246	€ 382
Portugal	PRT	€ 194	€ 287	€ 274
Romania	ROU	€ 170	€ 245	€ 302
Slovakia	SVK	€ 190	€ 216	€ 354
Slovenia	SVN	€ 270	€ 274	€ 550
Spain	ESP	€ 194	€ 238	€ 274
Sweden	SWE	€ 649	€ 381	€ 494
EU-27 Average		€ 251	€ 266	€ 413

2.3 The Cost of Fuel – Gas vs. Electric

We analysed the energy prices published by Eurostat for domestic gas⁴⁹ and electricity⁵⁰ and found that in most countries across Europe, the existing ratio of gas to electric, and the trends in the respective prices of those fuels, favours a switch to electric, as shown in Figure 6.⁵¹

Figure 6 presents the forecasted relationship between gas and electric prices in 2026^c, only taking into consideration fuel costs (i.e., €/GJ of gas and €/kWh of electricity for cooking a meal). In this diagram, there are 17 EU countries depicted to the right of the “Cooking Fuel Price Line”, with their dots shaded green. For these countries, based on fuel costs alone, it is preferable to cook on electricity because its less expensive per meal cooked. There are 7 EU countries to the left of the “Cooking Fuel Price Line” where the price ratio favours cooking on gas. For these countries that show a preference for cooking on gas, it should be noted that they are very close to the cooking fuel price line, meaning the fuel cost comparison only slightly favours gas. The further away from the line, the stronger the incentive to use one cooking fuel over another. For example, the Netherlands (NLD) is very far from the line on the side favouring electricity, and it is far more cost effective in the Netherlands to cook with electricity than with gas. Those seven countries which favour gas cooking are only marginally over the line – and indeed, Italy is directly on the line – and with gas prices projected to escalate faster than electricity in the future, those countries are expected to transition to the right of the line, where they would favour electric cooking.

^c 2026 was chosen because this is the earliest date an Ecodesign measure could take effect on domestic cooking products.

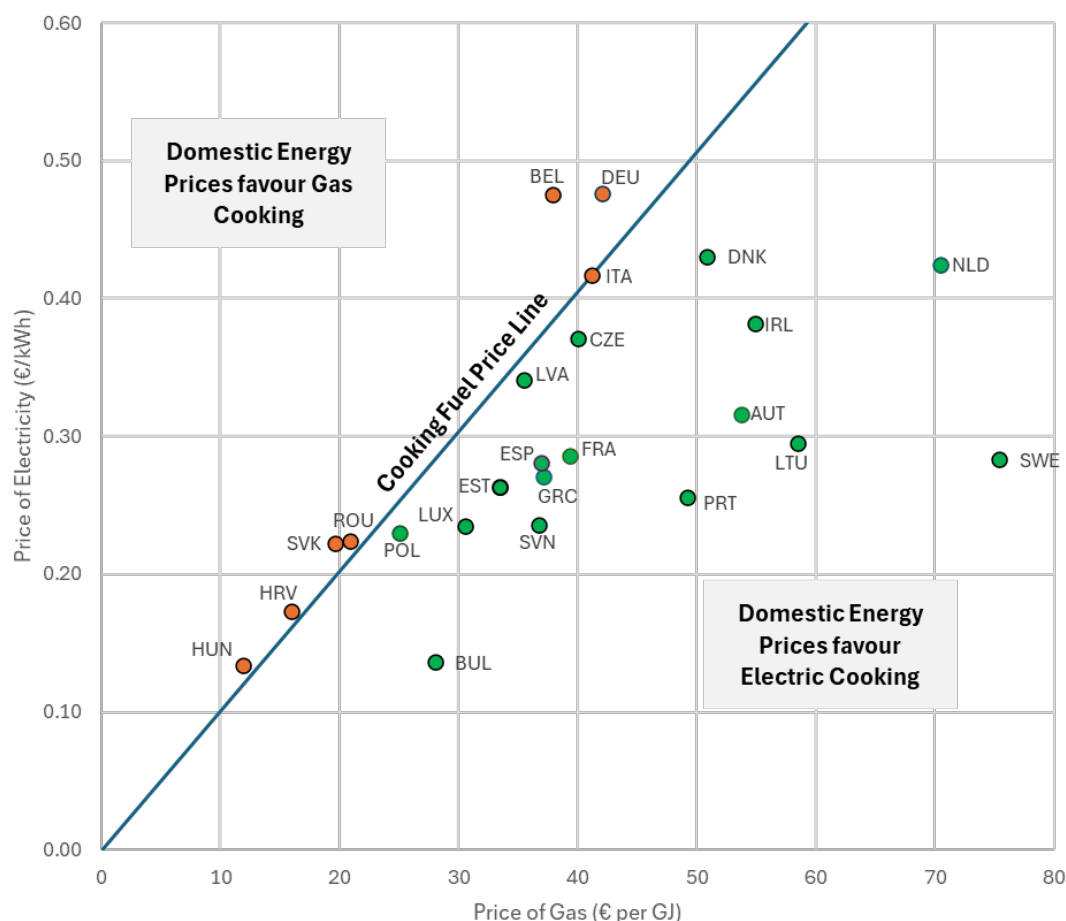


Figure 6. Scatter Plot of Gas and Electric Prices in EU Countries With Dividing Line (projected 2026 prices)

In order to develop a forward-looking cost comparison for gas cooking vs. the two types of electric cooking, we developed a forecast of energy prices based on the trend of the last six years published by Eurostat. We used the six-year historic energy price trend at the EU-27 level as the index, and then projected all the countries forward at the same rate of change calculated for the EU-27. These two projections, including inflation, equated to an annual increase in gas prices of 5.3%⁵² and an annual increase in electricity prices of 3.9%⁵³.

2.4 Calculating the Annualised Cost of Cooking

Combining the new price data, forecasted energy prices, and JRC's estimated costs of installation and maintenance, we developed a 'cost of cooking' model for households for each of the EU countries. Inflation is accounted for, energy prices are forecasted as described above on the basis of the last 6 years, and a 4% discount rate applies to all future costs. The model calculates the net present value (NPV) of all costs associated with gas, infrared and induction cooktops, and then divides that NPV by the number of years in the analysis period – 15 years – thus creating a comparable annualised cost of cooking.

The individual calculation pages and graphs for each of the countries analysed are presented in Annex A of this report, however Table 4 summarises the key findings. As shown in this table, for the majority of EU-27 countries analysed, induction cooktops are less expensive than gas. In some countries like Sweden, Portugal, Bulgaria, Ireland, Lithuania and the Netherlands, there is a large household cost savings associated with cooking with induction over gas. For a handful of countries where gas prices are lower than electricity per unit of heat delivered to the cooking pot, induction is more expensive, with Hungary being the least economically attractive for induction. In these countries where it isn't immediately cost-effective to switch to induction, market policy interventions may be considered which are justified on the basis of future healthcare savings from removing gas cooking.

Table 4. Annualised* Total Cost of Owning a Four-Hob Cooktop for 21 EU Countries (2026 Euros)

Country	Gas	Infrared	Induction	Comments
	(Euro, 2026)	(Euro, 2026)	(Euro, 2026)	
Austria	€ 341	€ 231	€ 215	Induction is 37% less expensive than gas
Belgium	€ 259	€ 341	€ 307	Induction is 19% more expensive than gas
Bulgaria	€ 190	€ 124	€ 127	Induction is 33% less expensive than gas
Croatia	€ 130	€ 145	€ 148	Induction is 14% more expensive than gas
Czechia	€ 258	€ 265	€ 240	Induction is 7% less expensive than gas
Denmark	€ 354	€ 311	€ 298	Induction is 16% less expensive than gas
France	€ 269	€ 220	€ 216	Induction is 20% less expensive than gas
Germany	€ 272	€ 333	€ 296	Induction is 9% more expensive than gas
Greece	€ 261	€ 218	€ 205	Induction is 21% less expensive than gas
Hungary	€ 98	€ 118	€ 126	Induction is 28% more expensive than gas
Ireland	€ 348	€ 273	€ 252	Induction is 28% less expensive than gas
Italy	€ 263	€ 290	€ 260	Induction is 1% less expensive than gas
Lithuania	€ 363	€ 219	€ 206	Induction is 43% less expensive than gas
Netherlands	€ 438	€ 312	€ 277	Induction is 37% less expensive than gas
Poland	€ 176	€ 180	€ 173	Induction is 2% less expensive than gas
Portugal	€ 311	€ 199	€ 179	Induction is 42% less expensive than gas
Romania	€ 139	€ 175	€ 164	Induction is 18% more expensive than gas
Slovakia	€ 148	€ 174	€ 169	Induction is 14% more expensive than gas
Slovenia	€ 245	€ 185	€ 188	Induction is 23% less expensive than gas
Spain	€ 241	€ 211	€ 192	Induction is 20% less expensive than gas
Sweden	€ 493	€ 223	€ 208	Induction is 58% less expensive than gas

*Annualised cost is the net present value of all future costs (i.e., purchase, installation, maintenance and energy), discounted to the base year (2026) and divided by the analysis period of 15 years. Annualised cost provides an equivalent annual lifetime total cost of ownership of a product, discounted to 2026, the earliest effective date of the Ecodesign regulation.

3. Are there Health and Safety Risks Associated with Gas Cooking?

Although the scientific community has been aware of the health risks associated with cooking on gas for over 50 years^{54,55}, the general public has remained largely unaware of those risks. Gas burning hobs and ovens release a number of dangerous pollutants, including nitrogen dioxide (NO₂) and carbon monoxide while they are cooking our food. The use of gas cooking appliances has been associated with an increased risk of childhood asthma and the severity of asthma⁵⁶, as well as reduced lung function in children⁵⁷. The air pollution produced by gas cooking appliances has also been associated with adverse impacts on cognitive function of children, and a higher risk of developing attention deficit hyperactivity disorder (ADHD) symptoms⁵⁸.

Researchers have found that children are particularly vulnerable to the negative health impacts caused by air pollution due to their higher breathing rates compared to adults, and their developing immune and respiratory systems⁵⁹. According to recent research conducted by TNO in the Netherlands, 12% of the current paediatric asthma cases (i.e., 700,000 children) in the EU-27 could be avoided if gas cookers were removed from households across the EU⁶⁰. Globally, researchers have found that children living in households with gas cookers are 32% more likely to have current and lifetime asthma⁶¹.

Exposure to air pollution from gas cookers is also a matter of social equity. Lower income and marginalised groups are more likely to live in houses with smaller and poorly ventilated kitchens, which increases the concentration and duration of the exposure. Furthermore, people with chronic conditions are more likely to spend more time indoors, putting them at greater risk of breathing higher concentrations of pollutants from indoor sources. Brief exposures to high levels of nitrogen dioxide caused by, for example gas cooking, is dangerous for people with respiratory disease as it can lead to respiratory problems such as coughing, wheezing or difficulty breathing⁶².

Nitrogen Dioxide (NO₂)

One of the main pollutants of concern from the burning of gas (or indeed, hydrogen or hydrogen blends) is nitrogen dioxide (NO₂). NO₂ is formed in the flame of the gas cooking appliance when it is in use. Nitrogen gas is approximately 78% of the air we breathe, and in the presence of heat from a gas flame, NO₂ molecules are formed primarily through the oxidation of NO with the HO₂ radical in the flame, producing NO₂ and OH.⁶³

The reason NO₂ is a concern is that it is closely associated with negative health outcomes at ambient concentrations lower than previously thought. In 2021, the World Health Organisation (WHO) completed a major review of its Global Air Quality Guidelines⁶⁴, and lowered the recommended NO₂ limit by a factor of 4⁶⁵ – the largest adjustment for any of the pollutants under review in the Guidelines. The WHO has specifically mentioned gas appliances as one of the major factors resulting in people being exposed to NO₂⁶⁶. In a study across nearly 250 kitchens in 7 countries in Europe, researchers found levels of NO₂ that exceeded the EU and World Health Organisation 1-hour outdoor limit of 200 µg/m³ in the kitchens of seven countries where households were cooking on gas⁶⁷.

Carbon Monoxide (CO)

Another pollutant released from gas cookers when they are in use is carbon monoxide (CO). CO is an odourless, colourless, dangerous air pollutant. Breathing low concentrations of CO has been found to cause headaches, nausea, dizziness and confusion.⁶⁸ Gas cooking appliances create long-term, low concentration exposures which have negative health effects, particularly for people with coronary heart disease⁶⁹.

A literature review in 2013 found that in homes without gas cooking appliances, the average CO levels are generally between 0.5 and 5 parts per million (ppm). In homes with gas cooking appliances, the CO levels were found to be between 5 and 15 ppm, and in some homes where the stoves are poorly adjusted, the levels of CO can double to 30 ppm or higher.⁷⁰ At high levels, CO poisoning can cause nausea, anxiety or

depression, vomiting, unconsciousness, and death. Experts looking at long-term exposure to low concentrations of CO may cause permanent mental or physical problems, and can increase chances of dementia, and possibly, Parkinsonism.⁷¹

Benzene

In addition to nitrogen dioxide and carbon monoxide, researchers recently identified an additional potential public health risk from fossil gas. Research in California found that there is also a risk of exposure to benzene at levels that exceed state regulatory levels due to the gas cooking appliances found in the home. Fossil gas was analysed for its chemical composition in people's homes (185 samples) and found that benzene molecules were present in 99% of the samples⁷². When they combined the not-in-use leakage rate of the gas stoves and ovens with this new data on benzene, they found concentrations of benzene in indoor ambient air can exceed the California Office of Environmental Health Hazard Assessment 8-hour reference exposure level of 0.94 parts per billion (3 µg/m³)⁷³.

This study found that having a single burner on a gas hob running on high or having a gas oven set to 350°F (177°C) can raise indoor benzene concentrations to levels that are the same as second-hand tobacco smoke⁷⁴. The researchers noted that they found benzene from the gas and propane stoves travelled in the home, and in some cases found benzene concentrations in the bedrooms above health benchmarks for hours after the stove had been turned off.

In Europe, measurements conducted in 2013 found that gas extracted from the North Sea contained benzene concentrations up to 0.35% by mass⁷⁵. Researchers in the Netherlands calculated that in a typical kitchen with a gas stove, following the national ventilation rate of 75 m³/hr, the equilibrium concentration of benzene from gas would be 2.6 µg/m³ which is higher than the WHO guideline of 1.7 µg/m³^{76, 77}. The WHO limit is set based on a lifetime risk of leukaemia above 1 in 100,000 people. The calculated level of 2.6 µg/m³ is also close to the outdoor limit of 5 µg/m³ in the EU Ambient Air Quality Directive of (EU 2008/50/EC).⁷⁸

Heat exposure

The flames from the burning fossil gas on a hob emit infrared radiant heat in all directions, including at the user. In a commercial kitchen, the chefs and cooks working with them will have multiple burners running concurrently and thus will essentially have multiple radiant heaters directed at them. This can have a compounding effect, with the heat exposure in commercial kitchens becoming a significant staff health and safety issue, particularly when it is a repeated exposure, night after night.

One professional chef, Christopher Galarza, described this phenomenon as “almost suffocating”. He experienced this problem first hand, and one night he put a meat thermometer in his front pocket to record the temperatures he was experiencing. The thermometer reported that his body was being exposed to temperatures of 57°C while he was performing the normal duties of his job.⁷⁹

After 10 years, Galarza moved to work in a kitchen with induction cookers, and he has never looked back. Galarza now calls for induction stoves to be the norm in restaurants and commercial kitchens, for the physical and mental well-being of the people who work in these kitchens.

Electric is Safer than Gas

The safety experts have done their best for over 100 years to try and make fossil gas safe, but setting leaks from pipes, valves and appliances, fundamentally this method of cooking is designed around an open flame in your home and therefore carries an element of risk. When in use cooking, spills especially those involving cooking oils or alcohol can ignite from the flame. Furthermore, pots and pans are placed on elevated metal platforms to allow air for combustion to reach the burner, making this cookware more

susceptible to spillage compared to one simply resting on a smooth cooktop. Additionally, a common mistake that can happen to anyone is forgetting to turn off the gas hob after cooking, leaving that open flame burning in the kitchen, posing a fire risk. Electric cooking technologies do not carry these same flame-based fire risks, in fact many induction cooktop simply turn themselves off if they do not detect a pot on their surface for a short period of time.

Beyond accidents and fires that can occur at the cooking appliances, there is also a safety risk associated with the infrastructure that supplies that gaseous fuel to the kitchen. The old pipes, joints, connections and valves can develop leaks over the decades they are in use, which – if not detected and remedied – can result in catastrophic explosions. Taking the UK as an example, the Home Office tracks “fire and rescue incident statistics” associated with gas-related explosions. Table 5 provides the number of incidents over a seven-year period, illustrating the on-going risk and safety problems associated with gas appliances.⁸⁰

Table 5. Fires, Explosions, Casualties and Fatalities from Domestic Gas Explosions in the UK, 2015-22

Home Office Fiscal Year	Number of fires involving gas and an explosion	Number of fires involving gas and an explosion with a casualty and/or fatality	Fire-related Fatalities
2015/16	334	88	9
2016/17	326	103	6
2017/18	323	101	7
2018/19	361	105	7
2019/20	352	98	12
2020/21	321	96	4
2021/22	270	78	4
Total (7 years)	2287	669	49

The UK Home Office reports there were 2287 fires over 7 years involving gas-related fire and explosions, that’s an average of 327 incidents per year, or nearly one incident per day. Injuries and fatalities occurred in 669 of those incidents, and 49 people lost their lives over this time period.⁸¹

4. What is the market saying about electric cooking?

Gas cookers have been used in our kitchens for over 100 years. Over that time period, industry has invested in gas cookers, offering new products to the market. Combustion science is well understood and design improvements around air flow, nozzles and controls have been developed and introduced to market. The simple fact of the matter is that there simply isn't much potential for improving the performance of gas cooking, which when tested normal cookware was found to only deliver 31% of the primary energy of the gas to the water.⁸²

Manufacturers and retailers are recognising that the days of selling gas stoves are coming to an end. The only question is how soon do they take that critical decision to exit the market? In March 2023, Pelgrim – a Dutch kitchen appliance manufacturer – became the first company in the industry to announce that it was ceasing production and sale of gas cookers and would focus entirely on electric stoves⁸³. Pelgrim had been producing gas stoves for over 70 years when it took this decision.

IKEA Netherlands decided to do the same, announcing on 5 September 2023 that they would no longer sell gas hobs in The Netherlands from 1 January 2024⁸⁴. IKEA's announcement is in support of the government's national environmental objective to eliminate gas cooking from 1.5 million homes by 2030. IKEA will now only offer induction hobs, encouraging customers to switch to electric cooking.

These trends cut across to the professional sector as well, with award-winning chef Luke Burgess who stated clearly: "It's a no brainer for me; induction outperforms gas and is without a doubt the future of cooking. Cooking on a toxic fossil fuel stove doesn't give me any sense of nostalgia or pleasure anymore."⁸⁵

One of the solutions that is often touted by industry is that extraction fans and ventilation should be used, essentially putting the responsibility on the end user rather than the product manufacturer. According to TNO's research however, "households that cooked with gas and had indicated before the study that they regularly or always use an extractor hood had kitchen NO₂ concentrations that were no lower than households that said they did not use an extractor hood."⁸⁶

TNO also noted that published studies indicate that people do not always use the extractor hood while cooking, or do so too late – i.e., after pollution concentrations are already elevated in the room from cooking. This new research shows that the risks of indoor gas cooking cannot be eliminated at a societal level, and policies are needed that accelerate the transition to clean alternatives, including electric cooking appliances.

The maturity and flexibility of induction cooking technology is also evident by the fact that some professional chefs are switching their kitchens to electric cooking, after working for years on gas. The default cooking technology in professional kitchens in the past was gas, but that default is changing with some professionals refitting their kitchens with induction cookers.

A top chef and author based at the Cristal Room Baccarat in Paris describes induction as: "Powerful, immediate, precise, effective, practical – here in a few words are the qualities of induction,"⁸⁷. Another author and co-proprietor of the Michelin-starred restaurant Pidgin in London said "I love our big induction range – I'd never go back to gas"⁸⁸.

Professional chefs have noted that they find them extremely fast heating, with precise heat control. Plus, induction cookers only warm the pan and not the surface or surrounding area, so very little heat escapes to the room, making the kitchen and working environment far more comfortable. Award-winning Chef Ming Tsai commented, "It's so much safer. I have kids, right, and you can literally touch everything around it [the cooking area on the induction cooktop]."⁸⁹

In addition to the above-mentioned benefits regarding health and environmental risks, other advantages can be found relating to cleaning the cooktop after cooking a meal. Compared to gas cookers, induction electric cookers are much easier to clean because they do not have removable grates and burners that you need to scrub around – especially when there has been a spill and food is scorched or burned onto the metal surface. Instead, induction cookers have smooth ceramic glass surfaces that can be easily wiped

clean, without corners and crevasses for the food to stick. Plus, since the glass does not get as hot when it is in use, food that does spill is less likely to get burnt onto the surface of the cooktop⁹⁰. Renowned Australian Chef, Neil Perry commented about induction cookers: “They’re far easier to clean down after use, which is one of the main reasons we chose induction over gas”⁹¹.

At his restaurant in Australia, professional chef Luke Burgess estimated his annual financial savings in terms of staff time. He determined that cleaning a gas cooktop – including removing and cleaning the grid and the food burnt onto the cooker surface took approximately 24 minutes each night. He contrasted this with the ability to “wipe down an induction cooktop” which he estimated took 21 seconds, and concluded that he’s saving over \$30,000 in wages for cleaning each year. When recounting this calculation, Chef Burgess clarified that the switch to induction was not motivated by money, it was made due to the quality of output and the improved working environment for his staff.⁹²

Electric cooktops offer accuracy, consistency and speed. On temperature control, due to their digital scale on induction cooktops, over time the user learns exactly which cooking number is correct for a given dish, and then they can consistently select that heat setting every time the dish is prepared. On gas cooking, with knobs that allow for a flow-rate of gas, it is less precise. And, an additional performance benefit, induction cooktops are faster at bringing water to a boil, tests carried out found water heat-up times were 2 to 3 times faster with induction.⁹³

Another performance advantage of induction is that it is able to distribute heat evenly across the bottom of the pan, avoiding the hot-spot problem associated with gas. The advantage there is that you can melt chocolate in a pot directly on an induction cooktop, but you would need a water-filled double-boiler to do it on gas.⁹⁴ At the Fat Mao Noodles restaurant in Vancouver, Chef Angus An highlighted the excellent control and sustained low heat with induction, commenting: “It’s much more precise. I can put this pot of soup on medium, set it for five to eight hours and know it’s getting the same amount of power every single time. And, you don’t have to worry about the flame if you want to make stock overnight. It’s safe.”⁹⁵

5. Protecting our Climate

The climate impact of gas cooking is significant, but switching to electric cooking can eliminate three quarters of the lifetime CO₂ emissions associated with cooking. Furthermore, in addition to the combustion emissions in the home, methane gas – an extremely potent greenhouse gas - leaks from the appliance and the network of supply pipes, further exacerbating the problem.

5.1 Combustion of Gas

We calculated the lifetime CO₂ emissions of a gas hob compared to an electric-infrared and an electric-induction hob for a typical household. In this comparison, we assumed that the household cooks three times per week, and that the daily cooking times on those occasions is given in Table 6.

Table 6. Assumed Average Cooking Times for CO₂ Comparison Calculation

Burner	Duration (min/day)	Power (kilowatts)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

In addition, our forward-looking calculation of carbon footprint from cooking takes into consideration the fact that electricity in Europe is increasingly being derived from carbon-free renewable sources. As households transition to cooking with electricity that is increasingly derived from renewables, it will help to address the climate-related problems associated with the supply of gas. The EU has cut the carbon intensity of its electricity (CO_{2e}/kWh) in half between 1990 and 2020, and is now forecasting that it will accelerate this trend of decarbonising electricity, and cut its carbon intensity per kilowatt-hour in half again by 2030 – see Figure 7.⁹⁶

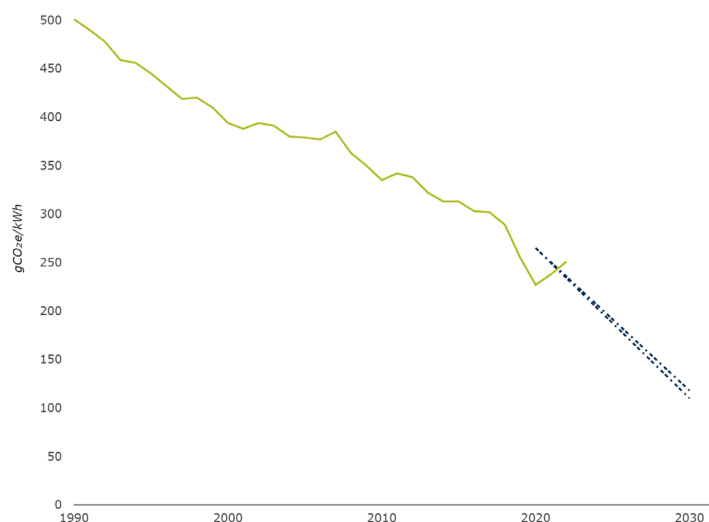


Figure 7. Carbon intensity of electricity in EU-27 1990 to 2022, and forecast to 2030 (g CO_{2e}/kWh)

Making a comparison for a family that follows the frequency of cooking three times a week as shown in Table 6, we calculate that over a fifteen-year time period, the gas cooktop will produce 4.12 metric tonnes of CO₂ emissions from the combustion of gas. Over that same analysis period (15 years) an electric-infrared cooktop will require electricity that causes 1.11 metric tonnes of CO₂ emissions at the power plant. The more energy-efficient electric-induction cooktop has the lowest lifetime CO₂ emissions, causing the release of 0.91 metric tonnes of CO₂ over those 15 years. Thus, on the basis of CO₂ emissions

associated with cooking, gas results in 3.5 times *more* CO₂ emissions than cooking on induction in Europe (i.e., induction cooktops release 78% less CO₂ over their lifetime compared to gas).

In the future, to achieve sustainability, our electricity will be derived from renewable sources. In a recent publication, a comparison was made between the cooking efficiency of “green” hydrogen derived from renewables with induction cooking. This comparison found that on a system basis, using renewable electricity directly to cook with induction – even taking into account the battery storage losses – was 3 to 4 times *more efficient* than producing green hydrogen and burning the hydrogen.⁹⁷ The comparison found that when one compares the two systems, the solar-powered, battery-backed-up induction cooktop solution was 3 to 4 times more efficient at delivering useful heat for cooking than a hydrogen-burner system that uses hydrogen derived from renewables.⁹⁸

5.2 Leakage of Methane

Methane is an extremely potent greenhouse gas, having a heat trapping capacity 85.5 times greater per molecule compared to CO₂ during its first 20 years in the atmosphere⁹⁹. A recent study took measurements in 53 kitchens across California and found that leaking and unburned methane from gas stoves and cookers amounted to 0.8-1.3% of the methane they consume. Extrapolated to the whole United States, with more than 40 million households cooking with gas, the methane leaks are equivalent to the annual CO₂ emissions of 500 thousand cars¹⁰⁰.

Applying the same average rate of leakage / emission of methane that was measured in 53 US kitchens to the EU, we find that the impact is even greater since there are more households cooking with gas. Household kitchens in the EU-27 consumed 5.3 billion cubic metres of gas in 2021 for cooking¹⁰¹. Assuming 0.8 to 1.3% of that end use was released as methane equates to 42.3 to 68.8 million cubic metres, which has a global warming potential (20 year) equivalent of 2.6 to 4.2 million metric tonnes of CO₂ annually, or 1.5 to 2.4 million average sized EU passenger cars.¹⁰²

From a global perspective, the International Energy Agency (IEA) reports that methane concentrations in the atmosphere are 2.5 times greater than pre-industrial levels and they estimate that this methane released into the atmosphere is responsible for about 30% of the increase in global temperatures¹⁰³. In their report, the IEA estimates that the global energy sector (including coal, oil and gas) were responsible for approximately 135 million tonnes of methane emissions in 2022, which given that methane over a 100 year time period (GWP₁₀₀) is 29.8 times greater than CO₂, equates to 4.023 gigatonnes of CO₂ in annual emissions – that’s more than six times the total annual CO₂ emissions of Germany.

While these methane emissions are large, the IEA goes on to note that the technical challenges and cost-effectiveness of mitigation measures are a “huge opportunity” to cut methane emissions. The IEA estimates that 70-75% of methane emissions could be reduced with existing technology across the sector from proven measures (e.g., leak detection, repair programmes, and leaky equipment upgrades)¹⁰⁴. Their methane report concludes:

“Based on the record gas prices seen around the world in 2022, we estimate that about 80% of the options to reduce emissions from oil and gas operations worldwide could be implemented at no net cost. Around USD 100 billion in investment is required to 2030 to deploy all methane abatement measures in the oil and gas sector. This is less than 3% of the net income received by the oil and gas industry in 2022.”

5.3 Policy Mechanisms to Protect the Climate and Consumers

Looking ahead to achieving a sustainable energy pathway for the planet, the International Energy Agency informed world leaders that to achieve net zero by 2050 and limit warming to 1.5°C, all new gas, coal and oil developments have to stop¹⁰⁵. Transitioning to electric cooking is part of that pathway.

- Ecodesign Directive (2009/125/EC) – established a regulatory framework under which manufacturers of products are required to reduce the energy consumption and other negative

environmental impacts that occur throughout the product life cycle to launch new appliances in the EU single market.

- Energy Labelling (Regulation (EU) 2017/1369) – established a regulatory framework that requires certain products to visibly present an energy label that informs consumers of the relative energy performance of a product they are considering purchasing, ranked by classes, enabling them to choose products that save energy.
- Gas Appliances Regulation (Regulation (EU) 2016/426) – established a legal framework that addresses the safety of gas appliances and fittings, to protect consumers and other end-users from unsafe products.

The Ecodesign and Energy Labelling policy measures present an opportunity for the Commission to establish a regulatory framework that informs consumers at the time of purchase about the harmful emissions released when cooking with gas. This can be done via the information requirements (*i.e.*, product fiche) in Ecodesign and/or as supplementary product performance information at the bottom of the energy label. While gas cooking hobs do not have an energy label and therefore could only rely on the product fiche option, gas ovens do have a label and therefore this metric could be added to the gas oven label as well as the product fiche. If either policy measure required the reporting of specific combustion compounds then gaseous fuel burning appliances would be required to conduct laboratory-testing of the products in use, and report the measured emissions of pollutants such as NO₂ and CO. Electric appliances, on the other hand, would be exempt from the emissions testing because they do not emit those pollutants while they are operating.

As noted earlier, the Gas Appliances Regulation (GAR) requires that appliances are designed that when normally used do not emit “concentrations of substances harmful to health”, specifically mentioning carbon monoxide or other substances harmful to health. There is scope within this policy measure to establish limits on the rate of emissions associated with the gas appliances while in use. However, researchers have already found that emissions levels from gas cooking appliances while in use exceed levels that are considered “safe” for outdoor ambient air¹⁰⁶. Empirical findings such those in the TNO study provide evidence that substances harmful to health regulated by the GAR may already be violated, and remedial action is necessary. In the light of these findings, the lack of information provided to consumers about the health risks of cooking on gas makes the underlying rationale for the three class action lawsuits in the United States understandable.

6. How do we achieve clean cooking across Europe?

The market is transitioning to electric cooking as more and more people and stakeholders in the market recognise the many benefits – health, safety, environment and economic. The transition to clean cooking in Europe could, however, be accelerated through market interventions, enabling more people to benefit sooner from making the switch.

The list below gives a high-level overview of some possible actions that could be undertaken by governments, manufacturers, retailers, health organisations, non-profit organisations and other stakeholders with an interest in facilitating the transition to electric cooking.

- 1) **Retailer Leadership** – work jointly with retailers of kitchen appliances to develop promotions and marketing campaigns to raise awareness of the benefits of induction cooktops. To engage retailers, these promotions would highlight the corporate social responsibility (CSR) and social equity benefits as well as the health, safety, environmental and economic benefits for their customers. Ambitious retailers could go further and voluntarily adopt phase-out dates for the sale of gas cooktops. This concept follows the pioneering initiative announced by IKEA Netherlands in September 2023 that they would no longer sell gas cookers from 1 January 2024.^d IKEA Netherlands will now focus their considerable purchasing power and market influence on procuring more affordable induction cooktops for their customers.
- 2) **Manufacturer Leadership** – all the major suppliers of gas cooktops also manufacture induction cooktops. At the time of this writing, sales of induction cooktops are growing each year. In much the same way that Tesla entered the automobile market and accelerated the global transition to electric vehicles, appliance manufacturers could shake-up the domestic cooking appliances market by announcing a phase-out date for gas and instead offering the market new, less expensive, induction cooktops that are specially designed to appeal to gas cooktop users. This could include, for example, incorporating physical control knobs rather than touch-screen glass and incorporating induction for woks and round-bottom dishes. By focusing exclusively on this market, the manufacturer could accelerate the transition and help build public awareness around the benefits of cooking with electricity.
- 3) **Public Health-Funded Incentive Schemes** – in recognition of the direct health-related benefits derived from phasing out flame-based cooking in the home, health ministries could develop national programmes that incentivise citizens to transition from gas to electric. These programmes could include a direct financial payment to households taking action, tax breaks, coupon schemes or other fiscal mechanism, and would include a set of products that had been tested and found to meet quality and performance requirements. The appropriate level of the subsidy would be determined nationally on the basis of the cost differential in the market between gas and electric (varying from country to country) and the determined national health system lifetime savings associated with avoided cases of asthma and other health impacts.
- 4) **Regulatory Policies** – work to adopt national and regional (EU-wide) policy measures that will gradually shift the market away from flame-based cooking. This can include, for example, measures in the on-going review of the ecodesign and energy labelling requirements for domestic cooking appliances, covering issues like measurement and limits on harmful combustion emissions and leakage rates of valves when off, as well as performance measurements of efficiency that are more reflective of real-life usage. They could also leverage the [Energy Performance of Buildings Directive](#) and the [Ambient Air Quality Directives](#). At the national level, individual member states could go further and adopt laws that required all new construction and renovations to be all-electric (i.e., no gas connection), ensuring these properties are supplied with adequate capacity for heat pumps, induction cooking and, if appropriate, electric vehicle charging. These regulatory policy measures could be justified not only on the

^d IKEA Netherlands' announcement is captured in this press release from the Global Cooksafe Coalition: https://cooksafecoalition.org/wp-content/uploads/2023/09/IKEA-announcement_EU-MR.pdf

basis of public health improvements, but also on the basis of climate emissions and overall national decarbonisation goals.

- 5) **Distribution Network Upgrades** – one of the issues that could delay the transition from gas to electric in certain areas is the electrical connection capacity of the households. Bearing in mind that cooking, heating and transportation will all ultimately shift to electric power, powered in the future by a decarbonised renewably-supplied electricity grid, households will require more electrical connection capacity. The EU is already responding with many measures that will support the strengthening and rollout of upgraded electricity grids, including the [revised TEN-E regulation](#), the [revised Renewable Energy Directive](#) and proposals for a [Net-Zero Industry Act](#) and a [reformed electricity market design](#). These efforts and others should continue to be supported to ensure households have the capacity they need to make the switch when they are ready.
- 6) **‘Positive-About-Induction’ communications campaigns** – EU member state governments (e.g., Ministries of Health and/or Energy) work with stakeholders within their respective countries to develop tailored communications campaigns highlighting the benefits of induction cooking. Highlighting the health and environmental benefits, as well as the fact that induction is easier to control, more comfortable to use, easier to clean and more efficient, these national campaigns could be aligned with regional initiatives like the Global Cooksafe Coalition^e, incorporating nationally-recognised celebrity chefs and positive messaging. Key messages of the communications campaign would be disseminated through both traditional media and social media outlets, to facilitate message delivery across the generations.
- 7) **Cooking Golden Carrots** – a bulk-procurement campaign for induction cooktops modelled after a successful US Environmental Protection Agency programme involving electric utilities and other stakeholders in the early 1990’s.^f Parties would work together to establish national or multi-national bulk procurement contracts for induction cooktops through their electricity suppliers. If 25,000 customers (or more) are willing to sign up to participate in a Cooking Golden Carrot scheme, the successful supplier bidding would secure induction cooktop sales of around €10 million. This guaranteed sales contract, in combination with the positive publicity surrounding the Golden Carrot, would further incentivise innovation and cost reduction, lowering costs for all consumers shifting to induction – not only those in the programme – achieving a pool procurement benefit across the market.
- 8) **Consumer-focused legal action** – in the United States, law firms and citizens have come together to file three separate class-action lawsuits against major manufacturers (i.e., General Electric/Haier, Samsung and Whirlpool). One aspect common to all three lawsuits is the fact that consumers were not informed by the manufacturers of the health risks associated with cooking on gas. If consumer rights, health groups and environmental law firms were to combine forces and follow a similar track here in Europe, the publicity surrounding such cases would significantly raise public awareness about the risks of gas.

Europe is a world leader in establishing principles of resource efficiency and sustainability into consumer products and commercial equipment. European regulations – and the evidence underpinning them – are published for governments around the world and these are followed in jurisdictions where governments are seeking the same economic, environmental and social benefits. Europe has an opportunity to lead the world in the cooking sector with not only its renowned cuisine, but also with new policy measures and market interventions that accelerate the transition from gas to electric across the sector.

^e For information on the Global Cooksafe Coalition, visit: <https://cooksafecoalition.org/>

^f For information on the Golden Carrot scheme, visit: https://www.aceee.org/files/proceedings/1994/data/papers/SS94_Panel3_Paper08.pdf

Fundamentally, the question is not ‘Will Europe transition to electric cooking?’, but rather ‘When will Europe make the transition?’. Essentially, all the evidence is showing that keeping gas cookers in our homes is unhealthy, dangerous, expensive and completely unnecessary. The largest roadblock to gas-free cooking in our homes and businesses is the installed stock of tens of millions of gas cookers across Europe, given that the health, technical and economic case for replacement have already been made.

Electric cooking is more climate-friendly – potentially 100% carbon free – as well as being safer, healthier, easier to use and maintain, and more efficient. With the climate crisis bearing down on us, this decade is perhaps the most important in the history of humankind, and action is needed across our economies – from fossil-fuel suppliers and gas appliance manufacturers right through to end-users in homes and commercial kitchens. All stakeholders in the value chain, and indeed wider society, would benefit from setting aside old, dirty, polluting technologies like gas cookers when much better alternatives exist.

Annex A. EU Country Profiles – Annualised Cost of Cooking

A.1 Austria

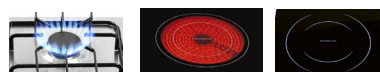
Austria

AUT	Country:	Austria
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

* Livchak et al, 2019, Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.

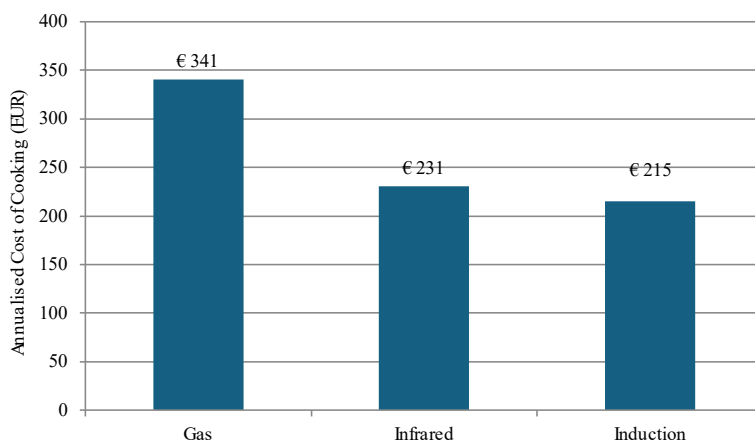
Customise the average cooking duration

Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 253	€ 214	€ 360
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 276.19	€ 196.32	€ 160.29
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 79.87	€ 115.90
Simple Payback period from choosing electricity over gas, in years:	---	instant	0.9
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 5,110	€ 3,463	€ 3,221
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 341	€ 231	€ 215
Percentage savings of annualised cost of cooking compared to gas:	---	32%	37%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019, Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.2 Belgium

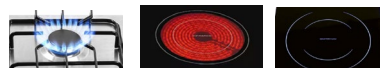
Belgium

BEL	Country:	Belgium
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

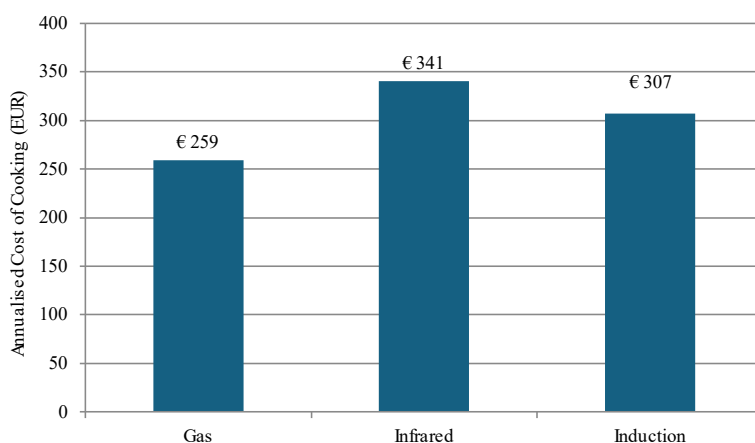
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 397	€ 367	€ 524
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 194.56	€ 295.44	€ 241.22
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	n/a
Simple Payback period from choosing electricity over gas, in years:	---	instant	n/a
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 3,885	€ 5,110	€ 4,605
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 259	€ 341	€ 307
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	n/a
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energypriees are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

A.3 Bulgaria

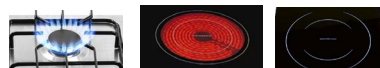
Bulgaria

BUL	Country:	Bulgaria
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

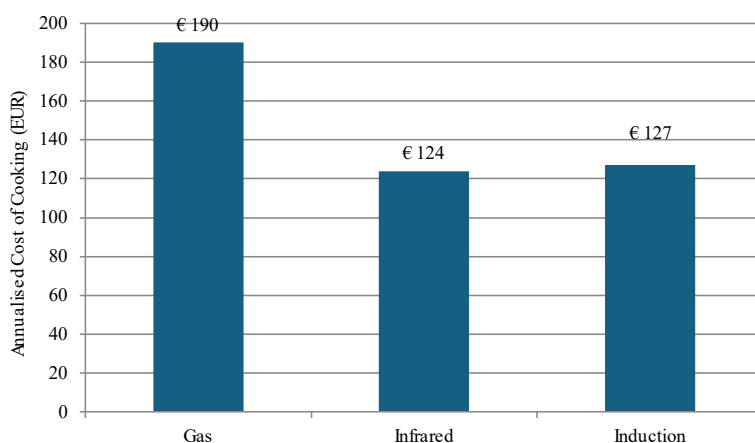
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 213	€ 294	€ 421
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 143.84	€ 84.69	€ 69.15
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 59.15	€ 74.69
Simple Payback period from choosing electricity over gas, in years:	---	1.4	2.8
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 2,851	€ 1,859	€ 1,908
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 190	€ 124	€ 127
Percentage savings of annualised cost of cooking compared to gas:	---	35%	33%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energypriees are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

A.4 Croatia

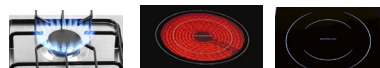
Croatia

HRV	Country:	Croatia
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

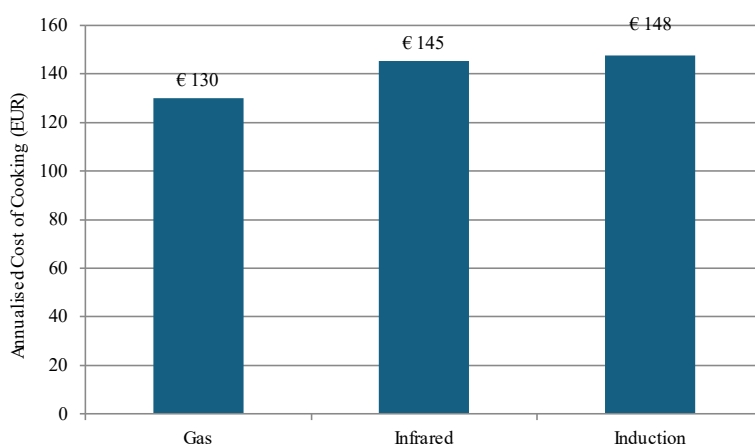
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	8.4	8.4	8.4
Energy input to the cooktop each week, accounting for hob efficiency:	31%	70%	86%
Annual maintenance cost of cooktop (JRC, 2022):	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Rated lifetime of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Average price of four-hob cooktop, Euros in 2026:	19	17	15
	€ 350	€ 267	€ 445
			kWh per week
			percent
			per week
			Euros/yr
			years
			Euro
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 81.87	€ 107.59	€ 87.85
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	n/a
Simple Payback period from choosing electricity over gas, in years:	---	instant	n/a
			per year
			Euros/yr
			Euros/yr
			years
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 1,949	€ 2,178	€ 2,214
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 130	€ 145	€ 148
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	n/a
			years
			Euro, NPV2026
			Euro, NPV2026
			percent
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5
			kg CO ₂
			percent
			times less CO ₂

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.5 Czechia

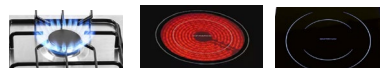
Czechia

CZE	Country:	Czechia
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

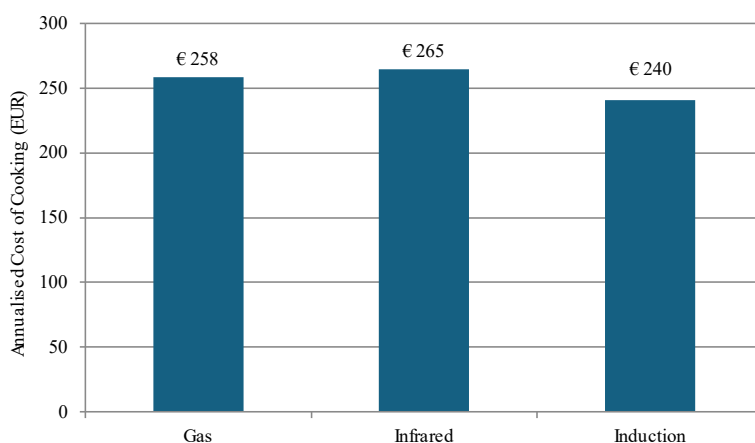
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 199	€ 204	€ 325
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 205.86	€ 230.48	€ 188.19
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	€ 17.68
Simple Payback period from choosing electricity over gas, in years:	---	n/a	7.1
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 3,876	€ 3,968	€ 3,607
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 258	€ 265	€ 240
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	7%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energypriees are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

A.6 Denmark

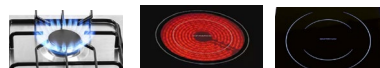
Denmark

DNK	Country:	Denmark
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

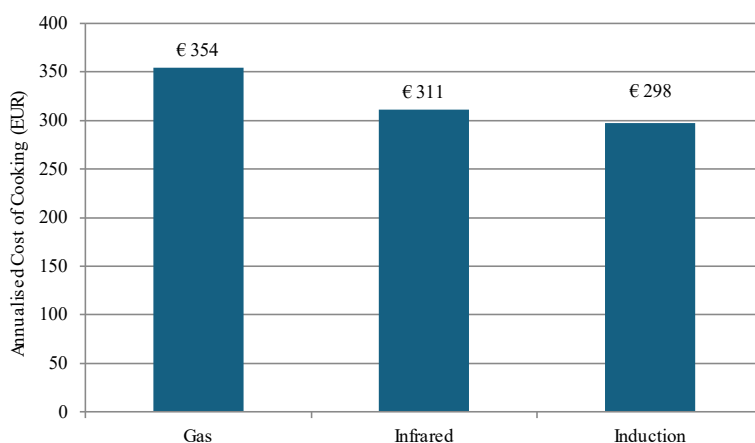
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	8.4	8.4	8.4
Energy input to the cooktop each week, accounting for hob efficiency:	31%	70%	86%
Annual maintenance cost of cooktop (JRC, 2022):	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Rated lifetime of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Average price of four-hob cooktop, Euros in 2026:	19	17	15
	€ 703	€ 341	€ 726
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 261.50	€ 267.70	€ 218.58
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	€ 42.93
Simple Payback period from choosing electricity over gas, in years:	---	instant	0.5
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 5,314	€ 4,666	€ 4,466
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 354	€ 311	€ 298
Percentage savings of annualised cost of cooking compared to gas:	---	12%	16%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.7 France

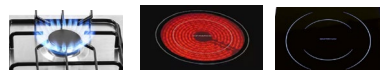
France

FRA	Country:	France
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

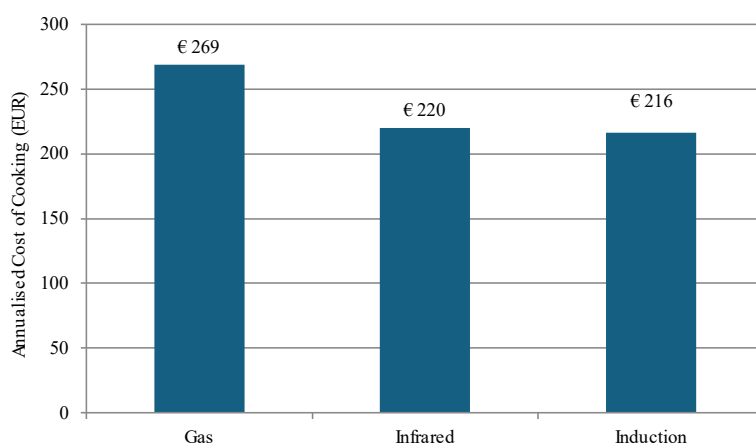
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



Four-Hob Cooktop Comparison				
	Gas	Infrared	Induction	
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4	kWh per week
Hob efficiency during normal use in a kitchen*:	31%	70%	86%	percent
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk	per week
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60	Euros/yr
Rated lifetime of cooktop (JRC, 2022):	19	17	15	years
Average price of four-hob cooktop, Euros in 2026:	€ 413	€ 327	€ 611	Euro
Annual Energy Consumption and Cost				
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh	per year
Annual energy bill (projected 2026 fuel prices):	€ 202.34	€ 177.78	€ 145.15	Euros/yr
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 24.56	€ 57.19	Euros/yr
Simple Payback period from choosing electricity over gas, in years:	---	instant	3.5	years
Life-Cycle Cost (LCC) over analysis period shown				
LCC analytical time period:	15.0	15.0	15.0	years
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 4,032	€ 3,296	€ 3,244	Euro, NPV2026
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 269	€ 220	€ 216	Euro, NPV2026
Percentage savings of annualised cost of cooking compared to gas:	---	18%	20%	percent
CO2 emissions calculations				
CO2 emissions from selected cooking duration during LCC analysis period:	4118	1112	908	kg CO2
Percentage CO2 savings of electric compared with a gas cooktop:	---	73%	78%	percent
Times less CO2 compared with a gas cooktop:	---	3.7	4.5	times less CO2

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.8 Germany

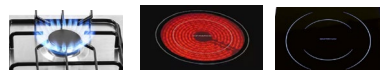
Germany

DEU	Country:	Germany
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

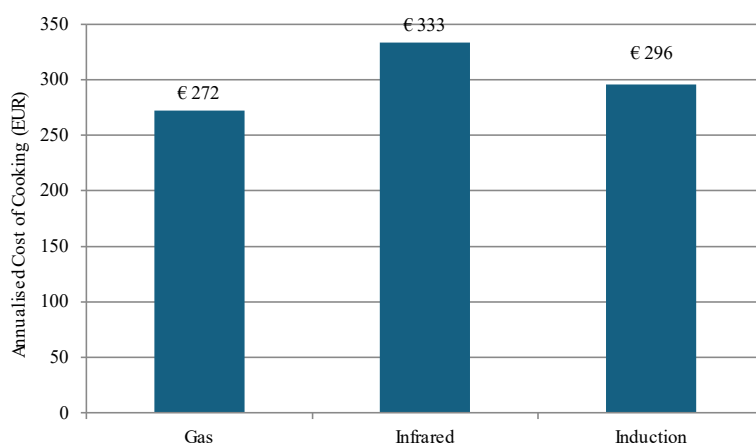
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



Four-Hob Cooktop Comparison				
	Gas	Infrared	Induction	
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4	kWh per week
Hob efficiency during normal use in a kitchen*:	31%	70%	86%	percent
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk	per week
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60	Euros/yr
Rated lifetime of cooktop (JRC, 2022):	19	17	15	years
Average price of four-hob cooktop, Euros in 2026:	€ 234	€ 247	€ 349	Euro
Annual Energy Consumption and Cost				
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh	per year
Annual energy bill (projected 2026 fuel prices):	€ 215.94	€ 296.05	€ 241.73	Euros/yr
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	n/a	Euros/yr
Simple Payback period from choosing electricity over gas, in years:	---	n/a	n/a	years
Life-Cycle Cost (LCC) over analysis period shown				
LCC analytical time period:	15.0	15.0	15.0	years
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 4,081	€ 4,999	€ 4,438	Euro, NPV2026
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 272	€ 333	€ 296	Euro, NPV2026
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	n/a	percent
CO2 emissions calculations				
CO2 emissions from selected cooking duration during LCC analysis period:	4118	1112	908	kg CO2
Percentage CO2 savings of electric compared with a gas cooktop:	---	73%	78%	percent
Times less CO2 compared with a gas cooktop:	---	3.7	4.5	times less CO2

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.9 Greece

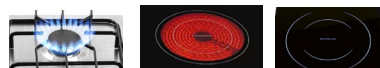
Greece

GRC	Country:	Greece
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

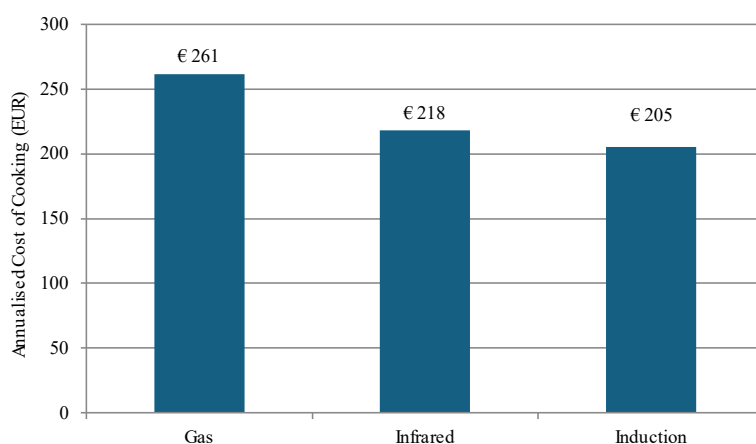
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



Four-Hob Cooktop Comparison				
	Gas	Infrared	Induction	
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4	kWh per week
Hob efficiency during normal use in a kitchen*:	31%	70%	86%	percent
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk	per week
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60	Euros/yr
Rated lifetime of cooktop (JRC, 2022):	19	17	15	years
Average price of four-hob cooktop, Euros in 2026:	€ 494	€ 438	€ 560	Euro
Annual Energy Consumption and Cost				
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh	per year
Annual energy bill (projected 2026 fuel prices):	€ 190.74	€ 168.51	€ 137.59	Euros/yr
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 22.23	€ 53.15	Euros/yr
Simple Payback period from choosing electricity over gas, in years:	---	instant	1.2	years
Life-Cycle Cost (LCC) over analysis period shown				
LCC analytical time period:	15.0	15.0	15.0	years
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 3,918	€ 3,268	€ 3,079	Euro, NPV2026
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 261	€ 218	€ 205	Euro, NPV2026
Percentage savings of annualised cost of cooking compared to gas:	---	17%	21%	percent
CO2 emissions calculations				
CO2 emissions from selected cooking duration during LCC analysis period:	4118	1112	908	kg CO2
Percentage CO2 savings of electric compared with a gas cooktop:	---	73%	78%	percent
Times less CO2 compared with a gas cooktop:	---	3.7	4.5	times less CO2

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.10 Hungary

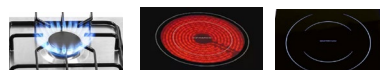
Hungary

HUN	Country:	Hungary
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

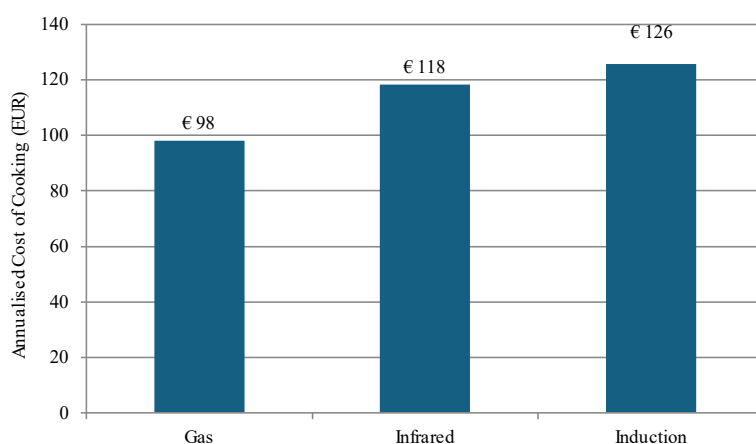
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



Four-Hob Cooktop Comparison		Gas	Infrared	Induction	
Total power delivered to the cookware each week, based on cooking duration:		8.4	8.4	8.4	kWh per week
Hob efficiency during normal use in a kitchen*:		31%	70%	86%	percent
Energy input to the cooktop each week, accounting for hob efficiency:		0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk	per week
Annual maintenance cost of cooktop (JRC, 2022):		€ 11.00	€ 15.75	€ 27.60	Euros/yr
Rated lifetime of cooktop (JRC, 2022):		19	17	15	years
Average price of four-hob cooktop, Euros in 2026:		€ 219	€ 228	€ 417	Euro
Annual Energy Consumption and Cost					
Annual energy consumption, based on weekly consumption above:		5.14 GJ	621.3 kWh	507.3 kWh	per year
Annual energy bill (projected 2026 fuel prices):		€ 61.05	€ 83.35	€ 68.05	Euros/yr
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:		---	n/a	n/a	Euros/yr
Simple Payback period from choosing electricity over gas, in years:		---	n/a	n/a	years
Life-Cycle Cost (LCC) over analysis period shown					
LCC analytical time period:		15.0	15.0	15.0	years
Total discounted LCC of purchase, installation, maintenance and use (2026):		€ 1,469	€ 1,773	€ 1,888	Euro, NPV2026
Annualised cost of cooking (discounted LCC / 15 year analysis period):		€ 98	€ 118	€ 126	Euro, NPV2026
Percentage savings of annualised cost of cooking compared to gas:		---	n/a	n/a	percent
CO2 emissions calculations					
CO2 emissions from selected cooking duration during LCC analysis period:		4118	1112	908	kg CO2
Percentage CO2 savings of electric compared with a gas cooktop:		---	73%	78%	percent
Times less CO2 compared with a gas cooktop:		---	3.7	4.5	times less CO2

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.11 Ireland

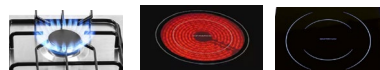
Ireland

IRL	Country:	Ireland
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

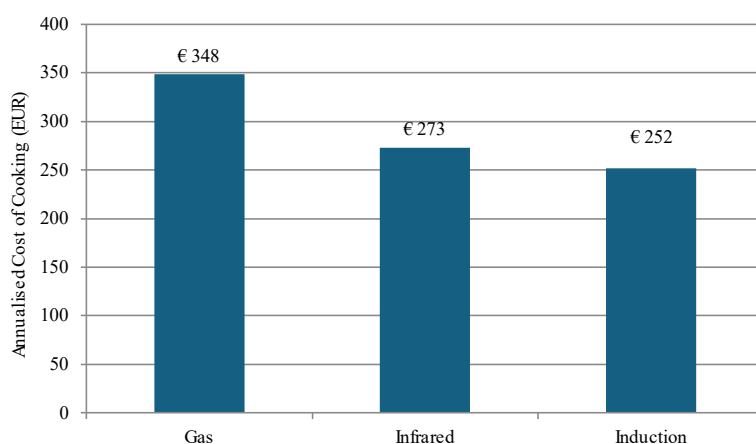
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



Four-Hob Cooktop Comparison				
	Gas	Infrared	Induction	
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4	kWh per week
Hob efficiency during normal use in a kitchen*:	31%	70%	86%	percent
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk	per week
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60	Euros/yr
Rated lifetime of cooktop (JRC, 2022):	19	17	15	years
Average price of four-hob cooktop, Euros in 2026:	€ 269	€ 233	€ 409	Euro
Annual Energy Consumption and Cost				
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh	per year
Annual energy bill (projected 2026 fuel prices):	€ 282.20	€ 237.32	€ 193.77	Euros/yr
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 44.89	€ 88.44	Euros/yr
Simple Payback period from choosing electricity over gas, in years:	---	instant	1.6	years
Life-Cycle Cost (LCC) over analysis period shown				
LCC analytical time period:	15.0	15.0	15.0	years
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 5,227	€ 4,099	€ 3,775	Euro, NPV2026
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 348	€ 273	€ 252	Euro, NPV2026
Percentage savings of annualised cost of cooking compared to gas:	---	22%	28%	percent
CO2 emissions calculations				
CO2 emissions from selected cooking duration during LCC analysis period:	4118	1112	908	kg CO2
Percentage CO2 savings of electric compared with a gas cooktop:	---	73%	78%	percent
Times less CO2 compared with a gas cooktop:	---	3.7	4.5	times less CO2

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.12 Italy

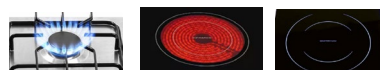
Italy

ITA	Country:	Italy
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

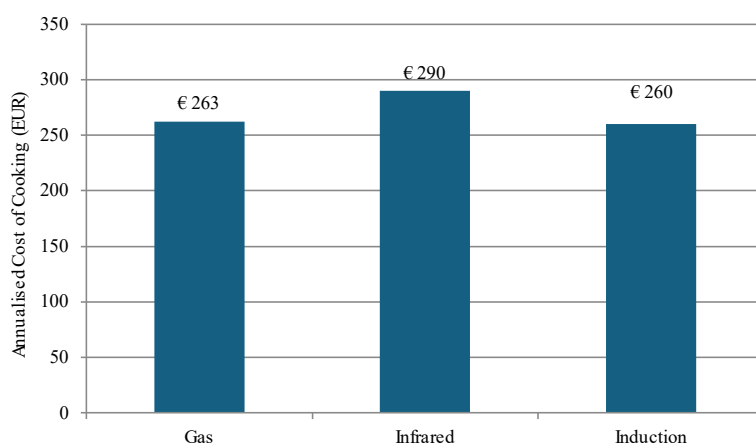
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



Four-Hob Cooktop Comparison				
	Gas	Infrared	Induction	
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4	kWh per week
Hob efficiency during normal use in a kitchen*:	31%	70%	86%	percent
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk	per week
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60	Euros/yr
Rated lifetime of cooktop (JRC, 2022):	19	17	15	years
Average price of four-hob cooktop, Euros in 2026:	€ 163	€ 152	€ 267	Euro
Annual Energy Consumption and Cost				
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh	per year
Annual energy bill (projected 2026 fuel prices):	€ 211.68	€ 259.12	€ 211.57	Euros/yr
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	€ 0.11	Euros/yr
Simple Payback period from choosing electricity over gas, in years:	---	instant	953.2	years
Life-Cycle Cost (LCC) over analysis period shown				
LCC analytical time period:	15.0	15.0	15.0	years
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 3,939	€ 4,347	€ 3,901	Euro, NPV2026
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 263	€ 290	€ 260	Euro, NPV2026
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	1%	percent
CO2 emissions calculations				
CO2 emissions from selected cooking duration during LCC analysis period:	4118	1112	908	kg CO2
Percentage CO2 savings of electric compared with a gas cooktop:	---	73%	78%	percent
Times less CO2 compared with a gas cooktop:	---	3.7	4.5	times less CO2

* Livchak et al. 2019. Residential Cooktop Performance and Energy Comparison Study. Frontier Energy. July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.13 Lithuania

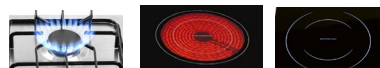
Lithuania

LTU	Country:	Lithuania
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

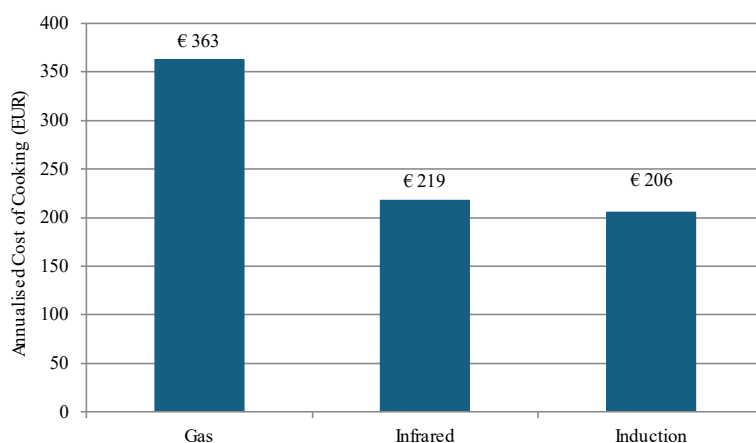
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 188	€ 227	€ 395
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 300.30	€ 183.30	€ 149.67
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 117.00	€ 150.63
Simple Payback period from choosing electricity over gas, in years:	---	0.3	1.4
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 5,449	€ 3,280	€ 3,096
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 363	€ 219	€ 206
Percentage savings of annualised cost of cooking compared to gas:	---	40%	43%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.14 Netherlands

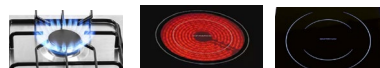
Netherlands

NLD	Country:	Netherlands
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

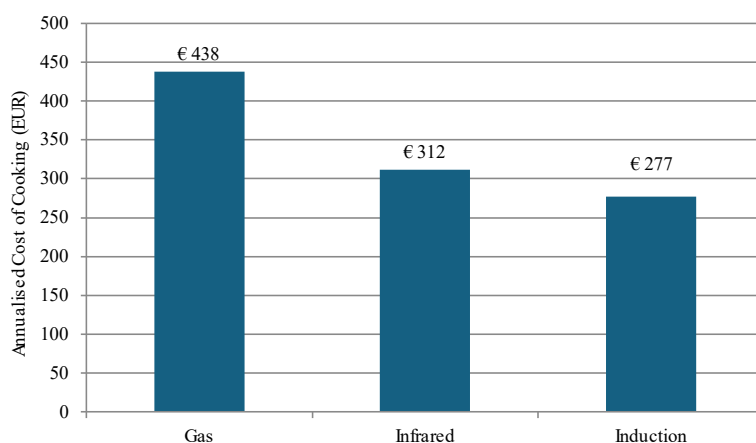
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 270	€ 404	€ 465
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 362.03	€ 264.07	€ 215.61
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 97.96	€ 146.42
Simple Payback period from choosing electricity over gas, in years:	---	1.4	1.3
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 6,566	€ 4,674	€ 4,160
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 438	€ 312	€ 277
Percentage savings of annualised cost of cooking compared to gas:	---	29%	37%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

A.15 Poland

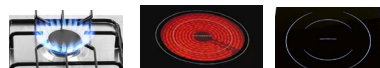
Poland

POL	Country:	Poland
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

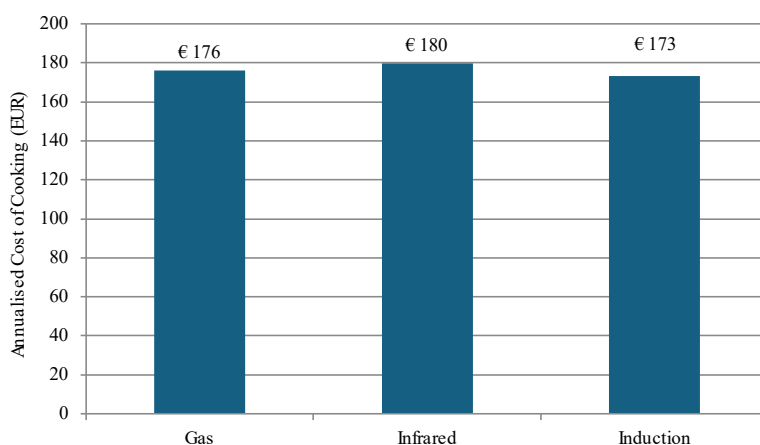
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	8.4	8.4	8.4
Energy input to the cooktop each week, accounting for hob efficiency:	31%	70%	86%
Annual maintenance cost of cooktop (JRC, 2022):	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Rated lifetime of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Average price of four-hob cooktop, Euros in 2026:	19	17	15
	€ 261	€ 255	€ 397
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 128.48	€ 142.88	€ 116.66
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	€ 11.81
Simple Payback period from choosing electricity over gas, in years:	---	instant	11.6
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 2,641	€ 2,698	€ 2,601
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 176	€ 180	€ 173
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	2%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.16 Portugal

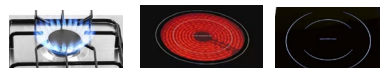
Portugal

PRT	Country:	Portugal
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

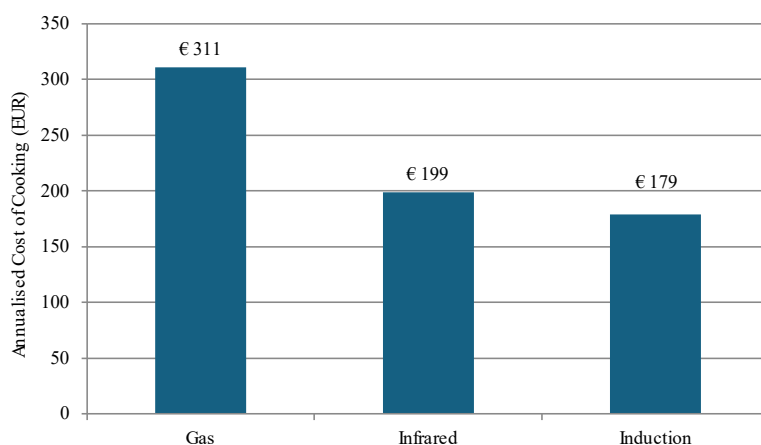
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	8.4	8.4	8.4
Energy input to the cooktop each week, accounting for hob efficiency:	31%	70%	86%
Annual maintenance cost of cooktop (JRC, 2022):	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Rated lifetime of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Average price of four-hob cooktop, Euros in 2026:	19	17	15
	€ 201	€ 299	€ 285
			kWh per week
			percent
			per week
			Euros/yr
			years
			Euro
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 252.85	€ 158.84	€ 129.69
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 94.01	€ 123.15
Simple Payback period from choosing electricity over gas, in years:	---	1.0	0.7
			per year
			Euros/yr
			Euros/yr
			years
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 4,667	€ 2,982	€ 2,685
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 311	€ 199	€ 179
Percentage savings of annualised cost of cooking compared to gas:	---	36%	42%
			years
			Euro, NPV2026
			Euro, NPV2026
			percent
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5
			kg CO ₂
			percent
			times less CO ₂

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.17 Romania

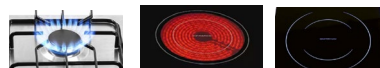
Romania

ROU	Country:	Romania
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

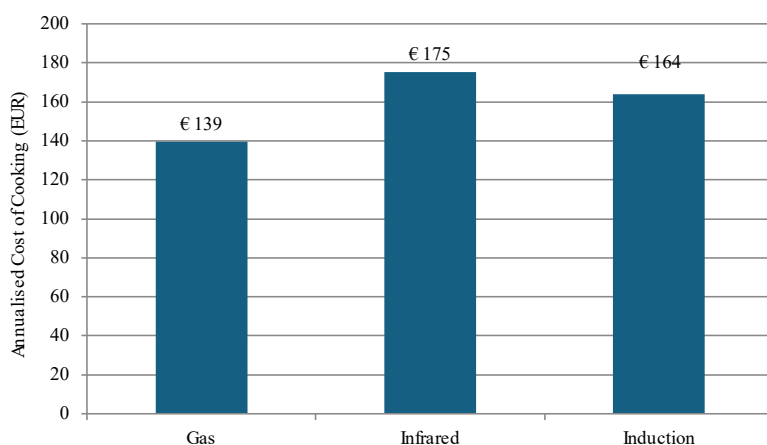
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019, Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 176	€ 254	€ 314
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 100.66	€ 138.20	€ 112.84
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	n/a
Simple Payback period from choosing electricity over gas, in years:	---	n/a	n/a
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 2,090	€ 2,627	€ 2,460
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 139	€ 175	€ 164
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	n/a
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019, Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energypriees are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

A.18 Slovakia

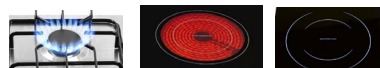
Slovakia

SVK	Country:	Slovakia
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

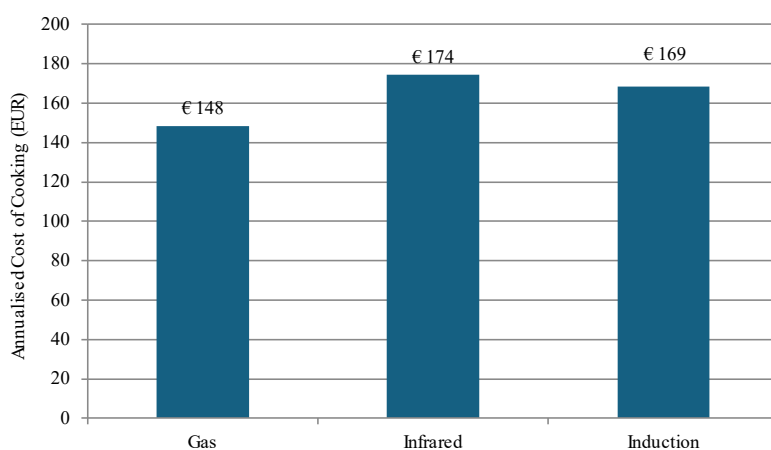
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	8.4	8.4	8.4
Hob efficiency during normal use in a kitchen*:	31%	70%	86%
Energy input to the cooktop each week, accounting for hob efficiency:	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Annual maintenance cost of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Rated lifetime of cooktop (JRC, 2022):	19	17	15
Average price of four-hob cooktop, Euros in 2026:	€ 197	€ 225	€ 368
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 107.42	€ 139.39	€ 113.81
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	n/a	n/a
Simple Payback period from choosing electricity over gas, in years:	---	n/a	n/a
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 2,225	€ 2,615	€ 2,529
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 148	€ 174	€ 169
Percentage savings of annualised cost of cooking compared to gas:	---	n/a	n/a
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energy costs. Inflation is accounted for, energy prices are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energy calculation for each hob.

A.19 Slovenia

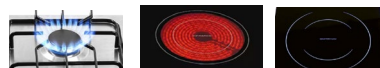
Slovenia

SVN	Country:	Slovenia
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

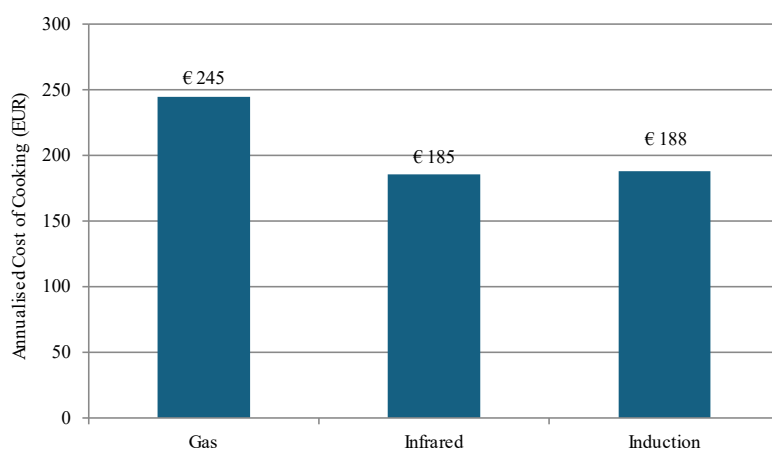
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	8.4	8.4	8.4
Energy input to the cooktop each week, accounting for hob efficiency:	31%	70%	86%
Annual maintenance cost of cooktop (JRC, 2022):	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Rated lifetime of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Average price of four-hob cooktop, Euros in 2026:	19	17	15
	€ 281	€ 285	€ 572
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 188.95	€ 146.48	€ 119.60
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 42.47	€ 69.35
Simple Payback period from choosing electricity over gas, in years:	---	0.1	4.2
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 3,675	€ 2,782	€ 2,820
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 245	€ 185	€ 188
Percentage savings of annualised cost of cooking compared to gas:	---	24%	23%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energypriees are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

A.20 Spain

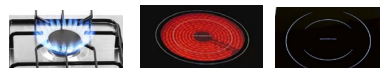
Spain

ESP	Country:	Spain
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

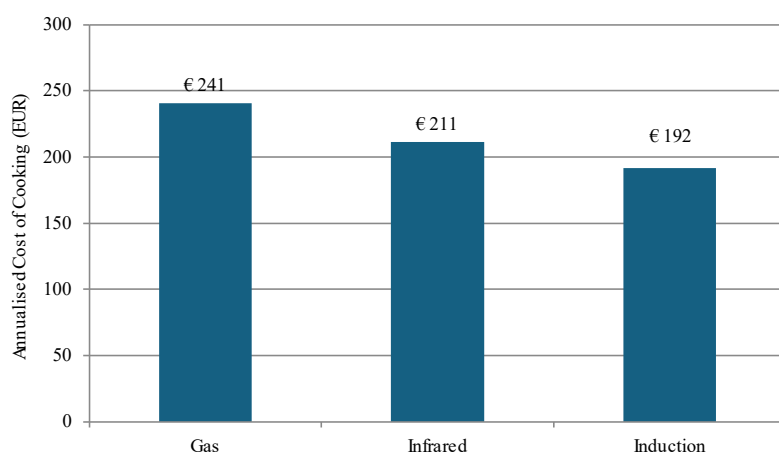
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	8.4	8.4	8.4
Energy input to the cooktop each week, accounting for hob efficiency:	31%	70%	86%
Annual maintenance cost of cooktop (JRC, 2022):	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Rated lifetime of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Average price of four-hob cooktop, Euros in 2026:	19	17	15
	€ 201	€ 247	€ 285
			kWh per week
			percent
			per week
			Euros/yr
			years
			Euro
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 189.79	€ 174.51	€ 142.48
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 15.29	€ 47.31
Simple Payback period from choosing electricity over gas, in years:	---	3.0	1.8
			per year
			Euros/yr
			Euros/yr
			years
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 3,610	€ 3,167	€ 2,878
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 241	€ 211	€ 192
Percentage savings of annualised cost of cooking compared to gas:	---	12%	20%
			years
			Euro, NPV2026
			Euro, NPV2026
			percent
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5
			kg CO ₂
			percent
			times less CO ₂

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energypriees are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

A.21 Sweden

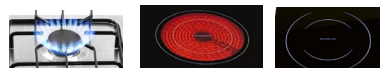
Sweden

SWE	Country:	Sweden
Number of days cooking per week:	3	days
Installation Cost:	€ 82.00	Euros
Efficiency*, Normal Use, Gas hob:	31%	Euros/yr
Efficiency*, Normal Use, Infrared hob:	70%	Euros/yr
Efficiency*, Normal Use, Induction hob:	86%	Euros/yr
Discount Rate	4.0%	percent

Customise the average cooking duration

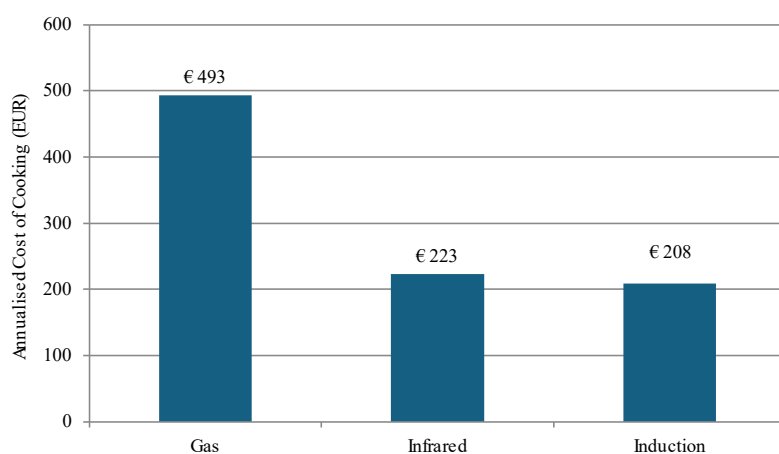
Avg. Cooktop use per day	Duration (min/day)	Power (kW)
Hob 1:	45	2.0
Hob 2:	30	2.0
Hob 3:	15	1.2
Hob 4:	0	3.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



Four-Hob Cooktop Comparison			
Total power delivered to the cookware each week, based on cooking duration:	Gas	Infrared	Induction
Hob efficiency during normal use in a kitchen*:	8.4	8.4	8.4
Energy input to the cooktop each week, accounting for hob efficiency:	31%	70%	86%
Annual maintenance cost of cooktop (JRC, 2022):	0.099 GJ/wk	11.95 kWh/wk	9.76 kWh/wk
Rated lifetime of cooktop (JRC, 2022):	€ 11.00	€ 15.75	€ 27.60
Average price of four-hob cooktop, Euros in 2026:	19	17	15
	€ 675	€ 396	€ 514
Annual Energy Consumption and Cost			
Annual energy consumption, based on weekly consumption above:	5.14 GJ	621.3 kWh	507.3 kWh
Annual energy bill (projected 2026 fuel prices):	€ 387.34	€ 176.03	€ 143.73
Annual energy bill savings (2026 Euros) from cooking on electric instead of gas:	---	€ 211.30	€ 243.61
Simple Payback period from choosing electricity over gas, in years:	---	instant	instant
Life-Cycle Cost (LCC) over analysis period shown			
LCC analytical time period:	15.0	15.0	15.0
Total discounted LCC of purchase, installation, maintenance and use (2026):	€ 7,395	€ 3,338	€ 3,125
Annualised cost of cooking (discounted LCC / 15 year analysis period):	€ 493	€ 223	€ 208
Percentage savings of annualised cost of cooking compared to gas:	---	55%	58%
CO ₂ emissions calculations			
CO ₂ emissions from selected cooking duration during LCC analysis period:	4118	1112	908
Percentage CO ₂ savings of electric compared with a gas cooktop:	---	73%	78%
Times less CO ₂ compared with a gas cooktop:	---	3.7	4.5

* Livchak et al, 2019. Residential Cooktop Performance and Energy Comparison Study, Frontier Energy, July 2019.



This comparison provides the annualised net present value (NPV in 2026 Euro) of the total life-cycle cost of cooking for the analysis period shown, and including purchase, installation, maintenance and energycosts. Inflation is accounted for, energypriees are projected on the basis of the last 6 years, and a 4% discount rate is applied to all future costs to calculate NPV.

Note that no normalisation of cooking service is required here as the hobs are providing the same delivered heat to the pan. The efficiency of the hob technologies is incorporated into the energycalculation for each hob.

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