Response to the Reviewers' Comments

Thank you for the comments provided and for the careful review of the manuscript. Below, we present our point-by-point responses based on the observations made.

Figures need more consistent labeling and clearer captions, and the text would benefit from language polishing and reduction of repetition.

The captions for Figures *1, 2, 3, 6, 7* and *8*, and Table *3* have been revised to enhance clarity. The previous versions are shown on the left, and the revised versions are shown on the right.

	Previous version	Revised version
Figure 1:	GHG emissions for energy sources (Based on Anthropogenic Emissions and Removals of Greenhouse Gases Inventory in the São Paulo Municipality 2010 – 2018). Source: SVMA (2022).	Greenhouse gas emissions for energy sources, based on data from Anthropogenic Emissions and Removals of Greenhouse Gases Inventory in the São Paulo Municipality (2010 – 2018). Source: SVMA (2022).
Figure 2:	Types of kitchen concepts. (a) Open concept kitchen design. (b) Closet concept kitchen design.	Kitchen layout concepts. (a) Open concept kitchen design. (b) Closed concept kitchen design.
Figure 3:	Map of the São Paulo state with highlights of the São Paulo (SP) city and the spatial distribution of residences. Source: Own author, map generated in QGIS 3.22 – QGIS Geographic Information System with shapefile São Paulo City from the Brazilian Institute of Geography and Statistics (IBGE).	Map of São Paulo state highlighting São Paulo city (SP_city in pink) and the spatial distribution of residences. Source: Map generated in QGIS 3.22 – QGIS Geographic Information System with shapefile São Paulo City from the Brazilian Institute of Geography and Statistics (IBGE) by the authors.

Figure 6:	Variability in gas concentrations across the different monitored households using Natural Gas (NG) and Liquefied Petroleum Gas (LPG): (a) For methane (CH4), with the lower explosive limit indicated at 50 ppm; and (b) For carbon dioxide (CO2), with the health effect threshold set by NIOSH at 2000 ppm.	Variability in gas concentrations across the monitored households using Natural Gas (NG) and Liquefied Petroleum Gas (LPG): (a) methane (CH4), with the lower explosive limit indicated at 50 ppm; and (b) carbon dioxide (CO2), with the NIOSH health effect threshold indicated at 2000 ppm.
Figure 7:	Variability in gas concentrations across the monitored households using Natural Gas (NG) and Liquefied Petroleum Gas (LPG): (a) For nitrogen oxide (NO); and (b) For nitrogen dioxide (NO2), with the health WHO recommendation for 1 hour at 106 ppb.	Variability in gas concentrations across the monitored households using Natural Gas (NG) and Liquefied Petroleum Gas (LPG): (a) nitrogen oxide (NO); and (b) nitrogen dioxide (NO2), with the WHO 1-hour exposure recommendation indicated at 106 ppb.
Figure 8:	Figure 8. Emission rate. (a) For carbon dioxide in grams per hour (g/h). (b) For methane in milligrams per hour (mg/h). (c) For nitrogen dioxide in milligrams per hour (mg/h).	Emission rates measured in the monitored households using natural gas (NG) and liquefied petroleum gas (LPG): (a) carbon dioxide (g/h). (b) methane (mg/h). (c) nitrogen dioxide (mg/h).
Table 3:	Table 3. Emission factor for CO_2, CH_4, and NO_2.	Emission factor for CO_2, CH_4, and NO_2 for NG and LPG with Median, First and Third quartile (Q1 and Q3), Brazil inventory and IPCC factor value.

Furthermore, Figures *2* and *5* were regenerated to standardize the identification font labels in (a) and (b).

Ethical aspects, such as consent for measurements in private homes, should also be explicitly stated.

The statement making it clear that participants gave consent for the research was added starting at *Line 103* in Section *2.2 Region of study and distribution of residence*:

“The volunteers gave their consent, authorizing the gas measurements, circulation within the monitored environment, and the sharing of the results obtained in this study, by signing a consent form.”

It was also included in the *Competing Interests* section:

“The authors confirm that free and unconditional consent was obtained from the residents of all private homes, authorizing gas measurements, circulation within the monitored environment, and the sharing of the results obtained in this study. From registration to the completion of the measurements, the personal data and information of each volunteer were kept anonymous. The procedures and rules were discussed in advance with the volunteers, and a consent form was duly signed.”

The analysis would benefit from basic statistical testing to support comparisons between natural gas and LPG homes [...].

We appreciate the suggestion of the reviewer. However, a more in-depth statistical comparison between natural gas and LPG homes was not the primary focus of this study. Our main objective was to develop and apply a detailed experimental protocol for in situ measurements of emissions under real-world conditions, identifying general trends and patterns.
We opted for robust descriptive analysis (medians, quartiles, and outlier identification) to realistically map domestic emissions in Brazil. While we acknowledge the value of deeper comparative analysis, future research with larger samples and experimental controls will allow for more robust statistical tests to explore differences between LPG and natural gas.

To address this point more clearly, we added a paragraph starting at *Line 327* in Section *4. Discussion and Conclusion*:

“A more comprehensive statistical analysis would be beneficial for comparing the advantages and disadvantages of using natural gas or LPG in residences. Future research with larger samples and more rigorous experimental controls will enable the execution of more robust statistical tests to better investigate the differences between LPG and natural gas.”

Some results, such as CO_2 emission factors far below IPCC values, require deeper explanation.

To address this point more clearly, we added a paragraph starting at *Line 331* in Section *4. Discussion and Conclusion*:

"The difference observed in CO_2 emission factors may be associated with the composition of fuels in Brazil, which tends to be cleaner and promotes more complete combustion, reducing CO_2 formation per unit of energy (ANP, 2010; ANP, 2020). However, these results should be interpreted with caution, as they may reflect not only specific fuel characteristics but also sample limitations, operational variability, and particular conditions of the analyzed households. This study aims to highlight these possibilities and reinforces the need for more in-depth comparative approaches between national and international specifications, as well as future investigations to consolidate these findings."

…the handling of outliers needs explicit, objective criteria.

To resolve the issues related with data handling, a new subsection (*2.6 Data Processing*), has been added to Section *2. Materials and Methods*.

This subsection describes the data treatments applied, including outlier detection, normalization, and negative emissions.
To explain the outlier handling, we have included in *Line 190* of the new version of the manuscript in subsection *2.6 Data Processing* the following text:

"To ensure consistency in calculations, outliers were identified using statistical analysis based on the Tukey method and the interquartile range (IQR) criterion. Values below the 1st quartile minus 1.5 times the IQR (Q1 - 1.5 × IQR) or above the 3rd quartile plus 1.5 times the IQR (Q3 + 1.5 × IQR) were classified as outliers and excluded from the main estimates. This procedure ensures objective and reproducible criteria in data analysis."

With the objective of improving the fluency and organization of the text, the explanatory text on normalization, previously located in Section *3* (*Line 185*), has been moved to the subsection *2.6 Data processing* (*Line 195*):

“The concentrations of the gases analyzed (CH_4, CO_2, and NO_x) were normalized, making it possible to evaluate the influence of each gas on the others and their behavior in relation to the conditions maintained at the time of measurement, as they had different magnitudes. This normalization was done through the standardization method (z-score), which transforms the data so it has a mean of zero and a standard deviation equal to one. The equation based on this method is described in the Section *3* of the *Supplementary Material*.”

Negative methane emissions point to problems with sealing or measurement conditions and should be treated as methodological artifacts rather than included in the dataset.

All negative methane values are explicitly treated as methodological artifacts and were excluded from the analysis shown in the boxplots. The text was reviewed to clearly indicate that these analyses were conducted according to the revised manuscript. Discussion of the origin of negative values has been included in the *Supplementary Material*.

It also has been added to subsection *2.6 Data Processing*, in *Line 199*:
“Negative emission values were occasionally observed under specific measurement conditions and reflect limitations of the experimental setup rather than physical emissions; therefore, these values have been replaced with zero in the data processing stage. A discussion of the origin of these values is provided in the *Supplementary Material*.”

The manuscript is scientifically valid, but the methodology needs clearer documentation, especially regarding how air-exchange rates were calculated and how much uncertainty they introduce.

The methodology section has been revised to provide a clearer description of how the air-exchange rates were estimated. The ACH was derived individually for each household from exponential fits to the decay of indoor CO_2 concentrations following the ST_ON. Although a tracer gas injection experiment was performed, it did not yield a sufficiently distinct signal for a robust decay analysis; therefore, naturally elevated CO_2 concentrations were used instead. An example graphic for one of the houses shown in the *Supplementary Material*.

To address this point more clearly, we added a paragraph starting at *Line 171* in Section *2. Materials and Methods*:

“The air-exchange rate (γ) was determined after ventilating the kitchen to achieve indoor concentrations similar to the outdoor environment. For each household, γ was estimated from an exponential fit to the decay of indoor CO_2 concentrations following stove operation. According to the experimental protocol, each cycle consisted of a stabilization period with the kitchen closed (St_OFF), followed by stove stabilization (St_ON) and a subsequent period with the stove turned off and the kitchen still closed. The best adjustment was chosen for each home, which was not necessarily in the same cycle. More details about this methodology is in Section *4* of the *Supplementary Materials*.”