PRESS RELEASE

Estudio realizado por Centro Mario Molina Chile

ENEL X DELIVERS CONCLUSIONS OF STUDY THAT MEASURES TOXICITY OF HEATING EQUIPMENT EMISSIONS FOR THE CREATION OF LABELING SYSTEM

- *The purpose of the study is to propose a methodology for labeling artefacts based on emissions and toxicity in view of the need to measure the impact on people´s health of household pollution produced by combustion heating emissions (kerosene, firewood, gas, and pellets) as compared to electricity.*
- *Statistically significant differences were found in kerosene, gas, firewood, and pellets, and their impact on the toxicity of emissions as compared to electricity, which - despite being the best result, was exposed to infiltrations coming from external sources of pollution from the surroundings of the dwellings measured.*

Santiago, September 24, 2018 - In order to contribute to the Santiago Decontamination Plan promoted by the Government, which includes analyzing the feasibility of creating a system for labeling emissions and energy efficiency for heating equipment, Enel X commissioned the Mario Molina Chile Center to do a study on emissions and toxicity of heating equipment, which showed that electricity is the cleanest option to avoid indoor pollution and thus generate less impact on people's health.

The study will be delivered by Nicola Cotugno, Enel Chile's CEO, to the Ministry of the Environment. The Mexican professor Mario Molina, the 1995 Nobel Prize in Chemistry, participated in the activity and was in charge of the development of the analysis accompanied by a team of scientists from the research center that bears his name.

Due to the need to investigate the impact of emissions from open combustion technologies for heating such as kerosene, pellets, firewood, gas, among others, the study focused on the most- used appliances in Chile, according to their annual sales. The focus was to evaluate before and after changing combustion equipment to 100% electric equipment.

Effects of intramural pollution

The most recent estimates indicate that intramural air pollution causes about 4 million premature deaths globally.

Among the pollutants most relevant to public health are high-irritant gases, such as sulfur dioxide, nitrogen oxides and ozone, as well as particles in suspension, collectively referred to as Particulate Material (PM).

According to international organizations such as the World Health Organization, in more than five decades of epidemiological research it has been shown that breathing contaminated air increases the likelihood of suffering from various respiratory diseases, among which lung cancer is included. It has also been shown that there is a significant association between PM exposure and the development of cardiovascular accidents. Conceptually, PM refers to solid particles that are dispersed in the air. The particles that generate a more noxious effect are those that have a size smaller than 2.5 micrometers (μm), also known as $MP_{2.5}$. These particles are easily inhaled into deep areas of the respiratory system, where they can pass through into the bloodstream and be deposited in different organs of the human body.

Research Method

The research considered the development of a methodology known as an "intervention" study, which consists in evaluating indicators of a baseline scenario known technically as "ex ante" and subsequently intervening the baseline scenario with new conditions called "ex post".

For this purpose, a pilot study was carried out in 2 homes in Maipú. One of them with all electrical appliances and the other called "experimental" that contemplated the change of different types of heaters (pellets, kerosene, LPG, and electrical) during the study.

For the sampling, a housing characterization questionnaire was carried out that considered that both houses had similar characteristics such as size, number of inhabitants, construction material and that in both cases they would lead a normal daily life, to represent the exposure of the habitants to pollution.

The sampling that took place during the winter of 2017 (July - September), simultaneously included measuring atmospheric and variable pollutants such as temperature and relative humidity in indoor environments corresponding to the two pilot homes, and measuring the same variables in the exterior to estimate their impact inside the homes.

Complementary to the measurements of air quality, in each dwelling a heating activities report was completed indicating the hours of use of the heaters, plus other subjects relevant to the study such as the hours in which they cook, among others.

Measurements of pollutants were also carried out inside and outside the homes, this is because what happens outside affects the interior of the home directly, either by air leaks or due to the amount of time the house is ventilated.

Main conclusions

Differences were found between the impact of intra-household emissions resulting from the energy change (use of the different heaters).

Energy sources such as firewood, kerosene, pellets, and gas had a statistically significant impact on the pollutants analyzed.

Electricity did not present a statistically significant impact.

The scenario with electricity turned out to be the best indoor environment and the external/internal filtration processes are the ones that most influence the concentration inside the dwellings.

It was detected that the maximum concentration of pollutants are generated during the morning, at the beginning of the day (breakfast, lighting of heaters, showers, application of cleaning products, among others.), And that at noon the concentrations decrease due to several factors such as ventilation of dwellings, meteorological (ventilation in the watershed), and by the cessation of activities.