Scrapping and creating awareness, Aiel's suggestions to the world of politics and institutions to build a ten-year plan together

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If all of the biomass-fuelled heating systems older than 10 years were, by axiom, replaced right now with appliances that at the state of the art guaranteed the best performance, for the same amount of produced energy, it would be possible to **obtain a reduction in emissions of the residential segment of wood biomasses of 74%**, going from just over 87,000 tonnes of particulate to just less than 23,000 tonnes (Aiel 2020). Nevertheless, to be able to quantify the real benefits in terms of particulate emission reduction through the gradual phasing out of technologically outdated heating systems and their replacement with technologies that guarantee the best performance, it is necessary to imagine an annual replacement rate which, for simplicity, we have assumed to be constant for the next 10 years. We therefore observe that replacing **350,000 appliances a year,** in 10 years (2029) would lead to a **reduction in particulate emissions of 36%**, if **450,000 appliances were replaced the reduction in emissions would be 46% and for 650,000 replaced appliances the reduction in emissions would be around 66%** (Figure 10).

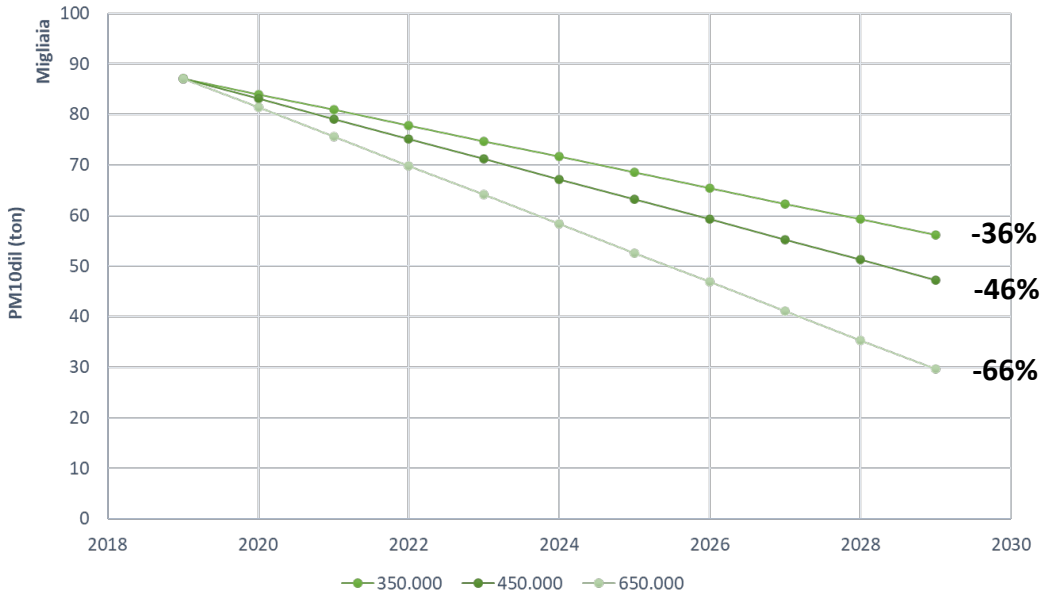
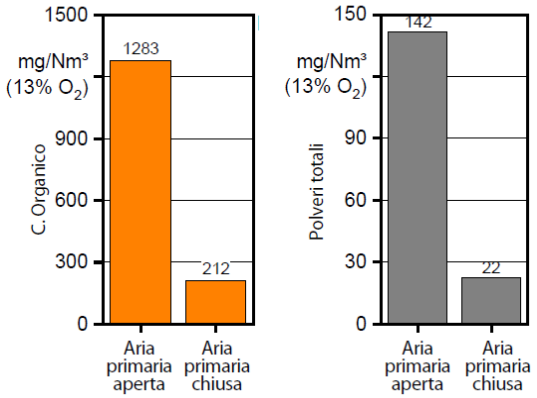


Figure 1 Simulation of the reduction of particulate emissions with three different annual replacement rates (Aiel 2020)

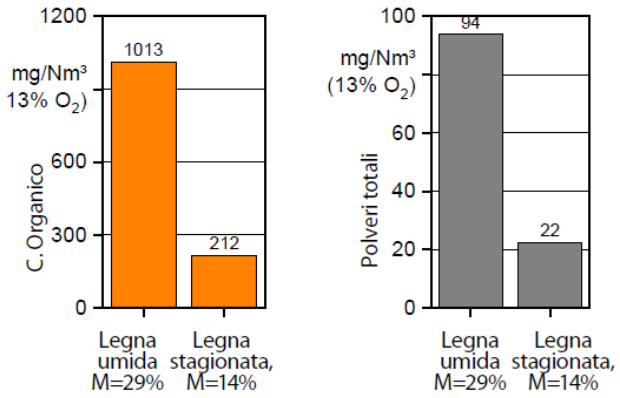
An ambitious yet realistically attainable objective is that of phasing out 350,000 appliances a year, so that over the course of 10 years it is possible to **requalify half (55%) of the currently installed appliances, leading to a 36% reduction in emissions.**

Nevertheless, solely replacing technologically outdated generators is not enough to guarantee appreciable results and a significant leap in improving air quality. In fact it will be crucial to start a broad **"awareness creating" action on end users**, especially those who burn wood which, if the appliance is not used correctly, can cause an increase in PM_{10} emissions and organic carbon, which is responsible for the formation of organic and secondary particulate in the atmosphere, as much as **10 times** more in comparison to optimal use.

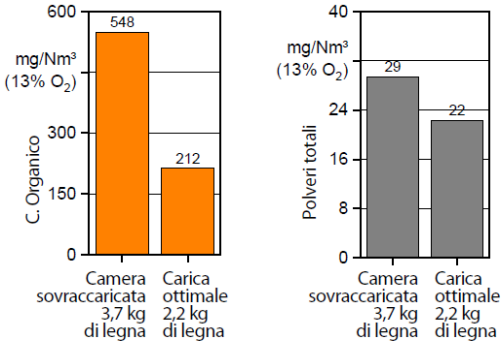
The tangible effect in terms of achievable air quality through the correct approach and correct management of domestic appliances is not broadly known and is underestimated but has the great advantage of being immediately measurable. The main conditions of incorrect use of stoves are due to **excessive or low draught of the flue**, **inadequate technical conditions of the appliance** (even as simple as an unsealed door) and **oversized appliances**, which subsequently permanently operate at reduced power. Also, the most common and simple operating errors are: the use of **poor quality bio-fuels** (wood that is too wet, logs that are too large, using waste wood), inadequate **wood ignition and loading methods** and incorrect use of **combustion air intake** (Figure 11). These errors are generally caused by imprecise and unclear use and maintenance manuals and, very often, completely unexpected by the consumer (Hartmann, Mack 2020).



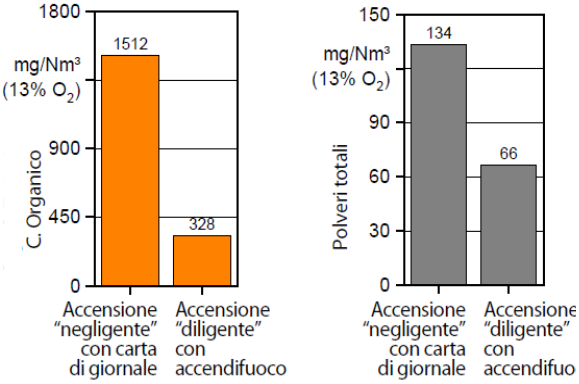
The correct combustion air intake makes it possible to reduce the total particulate emissions by up to 85%



The use of seasoned wood makes it possible to reduce the total particulate emissions by up to 77%



The optimal loading of the brazier makes it possible to reduce total particulate emissions by up to 24%



Correct ignition of the fire makes it possible to reduce total particulate emissions by up to 51%

Figure 2 Effects stemming from the correct management of biomass appliances in terms of total particulate reduction (Hartmann, Mack 2020)

What results can we achieve?

The two founding pillars of Aiel's 10-year strategy to improve air quality are:

- replacing at least 350,000 appliances a year[1]
- teaching the end consumer how to correctly run their biomass heat generator.

The combined effect of these two actions will make it possible to **reduce particulate emissions by 70% in 10 years; 36% of which would be thanks to the overall replacement of 3,5 million appliances and 30-40% thanks to correct user operation of the appliances.**

The main objective, however, **entails reaching certain important secondary objectives, i.e.:**

[1] The current level of sales of biomass heating systems in the residential sector in Italy is 236,000 units (Aiel 2020)

1. guaranteeing the achievement of the European 2030 targets in terms of renewable energy sources used in heating;
2. obtaining social-economic benefits along the entire supply chain, in terms of turnover and new employment;
3. contributing to the national GPD, strengthening the concept of *Made in Italy*.

The indirect effects that can be obtained are numerous. Firstly, considering the current level of sales of biomass heating systems in the Italian residential sector of approximately 236,000 units (Aiel 2020), **it will be possible to obtain an increase in sales on the national market of more than 40%**. All of this will lead to a potential increase in turnover in keeping with the growth rate of sales and that can be reasonably translated into a rise in employment.

What are we asking of the institutions?

The biomass heating sector therefore refers to the world of institutions without requiring new investments, specific subsidies or grants, rather asking them to **politically support a ten-year programme** that can be implemented by improving, specialising and guaranteeing the already existing incentivising systems in support of technological *turnover*. Without a strong and consolidated partnership with the main competent Ministries, the regions will not indeed be able to transform the strategy described here into a **long-term plan of action**, that we demand be implemented in order to place the sector in the conditions to tangibly contribute to improving air quality.

The incentivising tool in support of technological *turnover* that the sector policies must be directed towards, that brings together various benefits with significant relapses, already exists and as we said previously, is the Conto Termico. For this reason, we are addressing the world of politics, asking for a position to be firmly taken, to strengthen it, so that the tool is:

- **confirmed**, also for the private residential sector[2] **and guaranteed for the next 10 years**
- **increased**, not so much in terms of budget as **in terms of the public's capacity to use it**[3]
- **streamline** the incentives application mechanism.

In particular we ask the Italian regions subject to air quality violation procedures to, within the scope of the joint conference, reiterate the critical need to maintain and further strengthen this incentivising tool, also thanks to the implementation of local measures that strengthen it.

Lastly, we are aware that to achieve the objectives set by Pniec for 2030, the sole replacement of technologically outdated domestic appliances will not be enough and the installation of new modern biomass systems will be necessary. It therefore becomes essential that the incentives that allow the brand new installation of systems include strict performance-related criteria for access, as required by the inter-ministerial Agreement signed on June 2019 at the *Clean Air Dialogue* and confirmed by the Decree on "technical requisites" for access to the 110% Superbonus.

Accordingly, as an association we will work to promote project-related solutions included in the Ecobonus and Superbonus so that biomass can replace fuel oil and LPG as much as possible (e.g. in mountainous areas) and we will support engineers so that, with the Superbonus, even in the driven interventions, biomass will become the preferential option (e.g. in combination with work on building envelopes and the installation of other renewable energy sources).

[2] Article 6 of the Scheme of the legislative decree implementing directive (EU) 2018/2002 which amends directive 2012/27/EU on energy efficiency, includes the proposal to apply the Conto Termico to the civil non-residential sector only, both public and private. The Pniec document also contains the statement according to which it is the intention to specialise the Conto Termico in energy requalification and building recovery in the non-residential sector

[3] No more than 30% of annually available resources will be used

Conclusions and proposals

PM10 is a complex pollutant, and its evolution, due to the considerable weight of the secondary component, is affected by multiple factors (Ispra 2020). **Accordingly, reduction policies must use an integrated and non-sectorial approach.** All sectors play an objective responsibility: traffic, farming, biomasses and industry, and each one must play its part without denying its responsibility (Francescato, 2020).

With this said, the intention of the biomass heating sector, as the first party to take action, is to actively work towards improving air quality. In order for this to be possible it is necessary to implement, in partnership with the competent ministers and local reference bodies, an organic framework of planned actions that make it possible to turn the strategic objective described herein into tangible results, i.e. a plan of action.

Aware of its role, the sector industry is therefore ready to place at the disposal of the institutions, all of its elements of strength and quality. In fact, to guarantee **the best possible results it will be necessary to make an extra effort in terms of research and development to identify even more advanced technological solutions, confirming the leadership of Italian companies**. It will also be necessary to **further strengthen the voluntary ariaPulita® (*clean air*) certification scheme** created by Aiel and based on the classification implemented with Lgs. D. 186/2017. For this reason **market surveillance** will be implemented with the aim of testing the performance of randomly selected appliances, checking whether they provide what is stated in the test report, and the requirement to provide a "Quick guide" that allows the consumer to manage the appliance correctly.

It is crucial to continue **professionally qualifying installation-maintenance technicians** of biomass systems, with the method that Aiel developed through the AIEL*plus* training standard. Only through the correct installation and maintenance of biomass heating systems is it possible to guarantee the performance levels of the appliances and safety of the systems.

We are also compelled to **recall the importance of using certified wood fuels.** In addition to the EN*plus*® certification for wood pellets, which is a consolidated procedure, another procedure will also be implemented to further spread the use of wood and woodchip quality certification, Biomass*plus*®, also as set forth in the Superbonus "technical requirements" decree. We will also endeavour to have the requirement to use seasoned wood with a water content of less than 20% implemented in the Po Plain Agreement, on top of the requirement to use certified class A1 pellets.

Lastly, several sources have observed the awareness that **communication is a key factor in the sector for biomass heating** (Lanzani 2020). For this reason we are placing our association at the disposal of the major bodies and institutions to plan communication actions to work closer with end consumers and offer fundamental knowledge: the impact of combustion, the correct way of using generators, installation standards, mandatory checks, requirements that must be fulfilled and incentivising systems that make it possible to accelerate technological *turnover*. The ultimate goal is to "persuade" the end consumer to use appliances correctly, kicking incorrect habits and behaviour and replacing old systems that can no longer be used. All of this is possible and to do so Aiel, with the support of the sector businesses that it represents, is seeking the collaboration of the competent institutions and politics. Only together can we implement a concrete and effective plan of action to reduce the PM10 produced by domestic wood combustion by 70% in 10 years.

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