

— AFTER LIFE PLAN —

GreenStove

Gas Renewable
Eco Energy Nature Stove
[Project title]

LIFE GREEN-STOVE
[Project acronym]

LIFE20 ENV/IT/000190
[Project number]



The LIFE GREEN-STOVE - LIFE20 ENV/IT/000190 project has received funding from the LIFE programme of the European Union.



Project title:

Gas Renewable Eco Energy Nature Stove

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Coordinating beneficiary

PALAZZETTI

PALAZZETTI LELIO SPA

Associated beneficiary



ATECH ELEKTRONIKA D.O.O.



RVDISTRIBUTION SRL

Project budget and requested eu funding

Total project budget: 2,207,327 Euro

Total eligible project budget: 2,116,727 Euro

EU financial contribution requested: 1,164,199 Euro

(= 55.00% of total eligible budget)

Start date: 01/09/2021

End date: 29/02/2024

SUMMARY DESCRIPTION OF THE PROJECT

In Europe, 77% of thermal energy for heating is generated by boilers, primarily fueled by fossil fuels (95%), with only 5% powered by renewable energy. Other significant sources include district heating (12%), electric radiators (7%), and stoves (3%).

Biomass, mainly wood pellets, is the dominant renewable energy source, accounting for 96% of the renewable heat market. In 2019, EU member states produced about 17 million metric tons of wood pellets and consumed about 27 million metric tons, with 10 million tons imported. Pellets are seen as a versatile solution for EU decarbonization, aligning with the European Green Deal goals and Sustainable Development Goals.

Moreover, the proposed technology is fully in line with 6 out of the 17 objectives of the Sustainable Development Goals (SDG) i.e.: Affordable and Clean Energy (objective n°7), Sustainable Economic Growth (n°8), Industry, Innovation and Infrastructure (n°9), Sustainable Cities and Community (n°11), Responsible Consumption and Production (n°12), Climate Action (n°13).

ENVIRONMENTAL PROBLEM TARGETED

Households use energy for various purposes, with heating accounting for 63.6% of their final energy consumption. The project focuses on encouraging biomass use to enhance renewable energy share and promote sustainable heating.

Bioenergy is key in achieving the EU's goal of 20% renewable energy by 2020. According to plans set in 2010, the demand for biomass for electricity, heating, and transport is expected to hit 178 million tons of oil equivalent by 2020. Looking to the future, the EU has set a new goal for 32% renewable energy by 2030. The EU considers biomass as carbon neutral, believing that the carbon emitted when biomass is burned will be offset by the carbon absorbed during the growth of new trees.

The energy and climate legislative framework of the EU is pushing for an increased use of biomass for energy purposes, including domestic heating where solid biomass is and will remain a pivotal fuel.

Unfortunately, biomass burning in domestic appliances is known to release substantial quantities of air pollutants. Data from the Emissions Database for Global Atmospheric Research (EDGAR) show that in the EUSDR area, emissions of biomass related PM2.5 in the sector "Energy in buildings" have increased by more than 60% since 1990.

Nowadays, the Ecodesign Directive (EU 2015/1185) is the reference regulation at the European level for defining the emission limits and performance at the product's output that biomass heating appliances must comply with. In Italy, there is also a Legislative Decree (7/11/2017 No. 186) called "5 Stelle Aria Pulita" (5 Stars Clean Air), which is more stringent than the Ecodesign.

The chart reports the main reference parameters for the two legislations:

	ECODESIGN Commission Regulation (EU) 2015/1185	5 Stars Clean Air Legislative Decree (7/11/2017 No. 186)	Project Targets
Efficiency [%]	84	88	92
CO [mg/Nm³]	300	250	100
NOx [mg/Nm³]	200	100	60
OGC [mg/Nm³]	60	10	5
PM [mg/Nm³]	20	15	5

CO Carbon Monoxide / NOx Nitrogen Oxides / OGC Organic Gas Compound / PM Particulate Matter

From these values originates the **Life Green Stove project, which aims to reduce emissions in the field of biomass-burning home heating products.**

PROJECT OBJECTIVES

The main objective of LIFE GREEN-STOVE is to strongly reduce the pollutant emission of pellet stoves and optimize the use of biomass to replace fossil fuels in the production of thermal energy for residential heating, working on efficiency, clean combustion and control technologies. **LIFE GREEN-STOVE reduces the risks for health and environmental impacts, fully in line with EU Green Deal goals and the EU Clean Air Policy.**

The core of the project is the creation of a pellet stove with a completely new combustion process, with the main aim of reducing emissions. Thus, the **LIFE GREEN-STOVE** project combines for the first-time automation with the gasification process of pellet, generating a class of pellet stoves that combines the advantages of the two technologies in terms of control, efficiency and emissions.

The project involves demonstrating and validating a new biomass downdraft gasification system, which reduces pollutant emissions and decreases maintenance. This offers environmental and technical benefits, enhancing the product's usability. The system integrates with a smart home concept using IoT technologies, allowing it to connect to a network and exchange operating data with other devices or systems.



TECHNICAL OUTCOMES

The Life Green Stove project has impacts on health and the environment.

The individual emission classes have been greatly reduced both compared to the values of the Ecodesign directive and the "5 Stelle Aria Pulita" decree.

With reference to the total emissions at the product's exit, the product derived from the LIFE GREEN-STOVE project reduces the cumulative value by 80%, standing at a total of 116mg/Nm³ compared to the 580mg/Nm³ established by Ecodesign.

Comparing the value with the "5 Stelle Aria Pulita" decree, the reduction is 69%.

	ECODESIGN Commission Regulation (EU) 2015/1185	5 Stars Clean Air Legislative Decree (7/11/2017 No. 186)	Project Target Life20 ENV/IT/000190	Certification results - DIN EN 14785 Report No. K3420 20223
Efficiency [%]	84	88	92	90,7
CO [mg/Nm ³]	300	250	100	29
NOx [mg/Nm ³]	200	100	60	77
COV [mg/Nm ³]	60	10	5	1
PM [mg/Nm ³]	20	15	5	9
	580 [mg/Nm³]	375 [mg/Nm ³]	170 [mg/Nm ³]	116 [mg/Nm³]

-80%

The emission classes of greatest interest for these products are those that determine particulate matter such as PM and OGC. The focus on these two categories again highlights the results obtained with the **LIFE GREEN STOVE** project with a reduction of the total residual outputs, from 80mg/Nm³ established by Ecodesign to a value of 10mg/Nm³. The reduction of particulate classes is -87.5%.

	ECODESIGN Commission Regulation (EU) 2015/1185	5 Stars Clean Air Legislative Decree (7/11/2017 No. 186)	Project Target Life20 ENV/IT/000190	Certification results - DIN EN 14785 Report No. K3420 20223
Efficiency [%]	84	88	92	90,7
CO [mg/Nm ³]	300	250	100	29
NOx [mg/Nm ³]	200	100	60	77
COV [mg/Nm ³]	60	10	5	1
PM [mg/Nm ³]	20	15	5	9
	80 [mg/Nm³]	25 [mg/Nm ³]	10 [mg/Nm ³]	10 [mg/Nm³]

-87,5%

FURTHER IMPLEMENTATIONS

- The project website, available in both Italian and English, is structured into various sections. In the future, the landing page will be enhanced to integrate all current and upcoming activities related to the project. Within the Palazzetti webpage, users will be able to view products and stay updated on the continuous maintenance of the site. Once fully developed, the website will also feature sections dedicated to hosting gasification technology. This ensures that the platform will evolve to meet the project's needs and provide comprehensive information and resources to users.
- The activity of sharing news and updates about the project assessment, including its milestones, will be further developed in the future to reach a wider audience. We will continue to keep users informed about all the latest developments and progress related to the project's various activities. This ensures that everyone involved remains informed and engaged throughout the project's duration. By expanding our communication efforts, we aim to enhance transparency and foster a stronger connection with our audience.
- The activity of sharing project activities and results on our social media channels (Meta, Instagram, LinkedIn) will continue to be developed in the future. The social media presence related to the Life Green-Stove project will be maintained, alongside the ongoing communication campaign highlighting the benefits of the Green-Stove heater. Additionally, future events will be promoted through our social networks, ensuring that our audience remains informed and engaged with all aspects of the project. This strategy will help to broaden our reach and increase awareness of the project's impact.
- In the future, we will continue to attend trade fairs, engaging with industry stakeholders such as dealers, technicians, and end users. The primary trade fairs include Leipzig (Germany), Progetto Fuoco (Italy), Lyon (France), and Valladolid (Spain). The Green-Stove will be showcased at least at two of these major events. This ongoing participation will help to further promote the Green-Stove, facilitate networking, and foster relationships within the industry.
- In the future, we will continue to organize press conferences to raise awareness among key stakeholders about opportunities in the sector and to present new upcoming products featuring Green-Stove technology. These press conferences will serve as a platform to highlight innovations, discuss industry trends, and engage with the media and other influential figures. By maintaining this proactive approach, we aim to keep stakeholders informed, generate interest, and build excitement around the advancements and benefits of Green-Stove technology.

- In the future, Palazzetti will continue to produce and display institutional videos during various press conferences and major events. These videos will serve to highlight the company's mission, showcase the latest developments and achievements, and present new products and technologies, including those related to the Green-Stove project. By utilizing these videos, we aim to effectively communicate our vision, engage with our audience, and enhance the visibility and impact of our initiatives at key industry gatherings.
- In the future, we will continue to expand our product range with a variety of new designs. This ongoing development will include the introduction of innovative and aesthetically diverse products, catering to different customer preferences and market demands. By consistently enhancing our product offerings, we aim to meet the evolving needs of our customers and strengthen our position in the market.
- In the future, the innovative technology of Green-Stoves will be further refined to cover a variety of needs. This includes adapting to different power levels and developing scaled-down layouts for low-energy consumption requirements. Additionally, Palazzetti will integrate the PRO1, PRO2, and PRO3 hot air channeling technologies to enhance performance. Efforts will also be made to optimize the design for cost efficiency. These advancements will ensure that Green-Stoves remain versatile, energy-efficient, and cost-effective, meeting a broad spectrum of consumer demands and industry standards.
- In the future, gasification technology will be transferred to various layout types, including corridor (slim), built-in, and multifire models. This development aims to meet the needs of a broader customer base and enhance the versatility of Green-Stove's innovative technology. By offering different layout options, we will ensure that our products can be customized to fit specific customer requirements, thereby increasing the accessibility and appeal of Green-Stove technology. This approach will allow us to cater to diverse market segments and improve customer satisfaction.
- In the future, we will enhance the remote control capabilities of our products to include areas not reached by wired network connections. This will be achieved through the integration of a 4G gateway and a dedicated app. By using these technologies, users will be able to manage and monitor their Green-Stove devices remotely, regardless of their location. This advancement will ensure greater convenience and accessibility, allowing for seamless control and operation even in areas with limited connectivity.

TIMETABLE AND BUDGET OF THE AFTER-LIFE ACTIONS PER BENEFICIARY

ACTIVITY	ACTIVITY DESCRIPTION	TIME RANGE	FUNDING METHOD	BUDGET ASSESSMENT
Landing page	<p>Project website (available in Italian and English) structured in different sections.</p> <p>Landing page integration with any and further activities related to the project.</p> <p>Within the Palazzetti webpage it will be possible to view products and the progressive maintenance of the site. Once developed, they will host gasification technology.</p>	5 years	Internal	10.000 €
Newsletter	<p>Share the news and activities with a wider audience about the project assessment, e.g. project's milestones.</p> <p>We keep users updated with all the latest developments regarding the various activities and on the progress of the project, ensuring that everyone involved is informed and engaged.</p>	5 years	Internal	3.000 €
Social media posts LIFE	<p>Project activities and results will be shared on our social media channels (Meta, Instagram, LinkedIn, Twitter).</p> <p>The activity on social media related to the Life Green-Stove project will continue, along with the communication campaign on the benefits of the Green-Stove heater.</p> <p>Further events will be published via our social networks.</p>	5 years	Internal	5.000 €
Social media	<p>Posts on our main social media regarding the communication campaign on new to-be developed products with Green-Stove technology</p>	5 years	Internal	8.000 €

ACTIVITY	ACTIVITY DESCRIPTION	TIME RANGE	FUNDING METHOD	BUDGET ASSESSMENT
Fairs and events	<p>Trade fairs will be attended by industry stakeholders such as dealers, technicians and final users.</p> <p>The main ones are: Leipzig (Germany), Progetto Fuoco (Italy), Lyon (France) and Valladolid (Spain).</p> <p>The Green-Stove will be displayed at least during two of these trade fairs.</p>	5 years	Internal	500.000 €
Press conferences	<p>Organization of a press conference to raise awareness among key stakeholders about the opportunities in the sector and to present new upcoming products with Green-Stove technology.</p>	5 years	Internal	70.000 €
Video	<p>Palazzetti institutional videos to-be displayed during the various further Press Conferences and main events.</p>	5 years	Internal	20.000 €
Designs	<p>Expansion of product range with different designs.</p>	5 years	Internal	100.000 €
Technical range expansion	<p>Green-Stoves' innovative technology may be tuned in order to cover:</p> <ul style="list-style-type: none"> • different range of power levels; • scale down layout for low-energy consumption needs; • PRO1, PRO2, PRO3 hot air channeling technology by Palazzetti; • Design for cost optimization. 	5 years	Internal	€ 400.000
Technology transfer	<p>Transfer of the gasification technology to different layout types, for example:</p> <ul style="list-style-type: none"> • Corridor type (slim) • Built-in type • Multifire type <p>This will be assessed in order to satisfy a wider customer group and bring Green-Stove innovative technology to customer-specific exploitability.</p>	5 years	Internal or public funding on technical development	€ 650.000
IoT services	<p>Remote control also for areas not reached by wired network connection via 4G gateway and APP integration.</p>	5 years	Internal	€ 50.000



SKI
BUM



greenstove.eu

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