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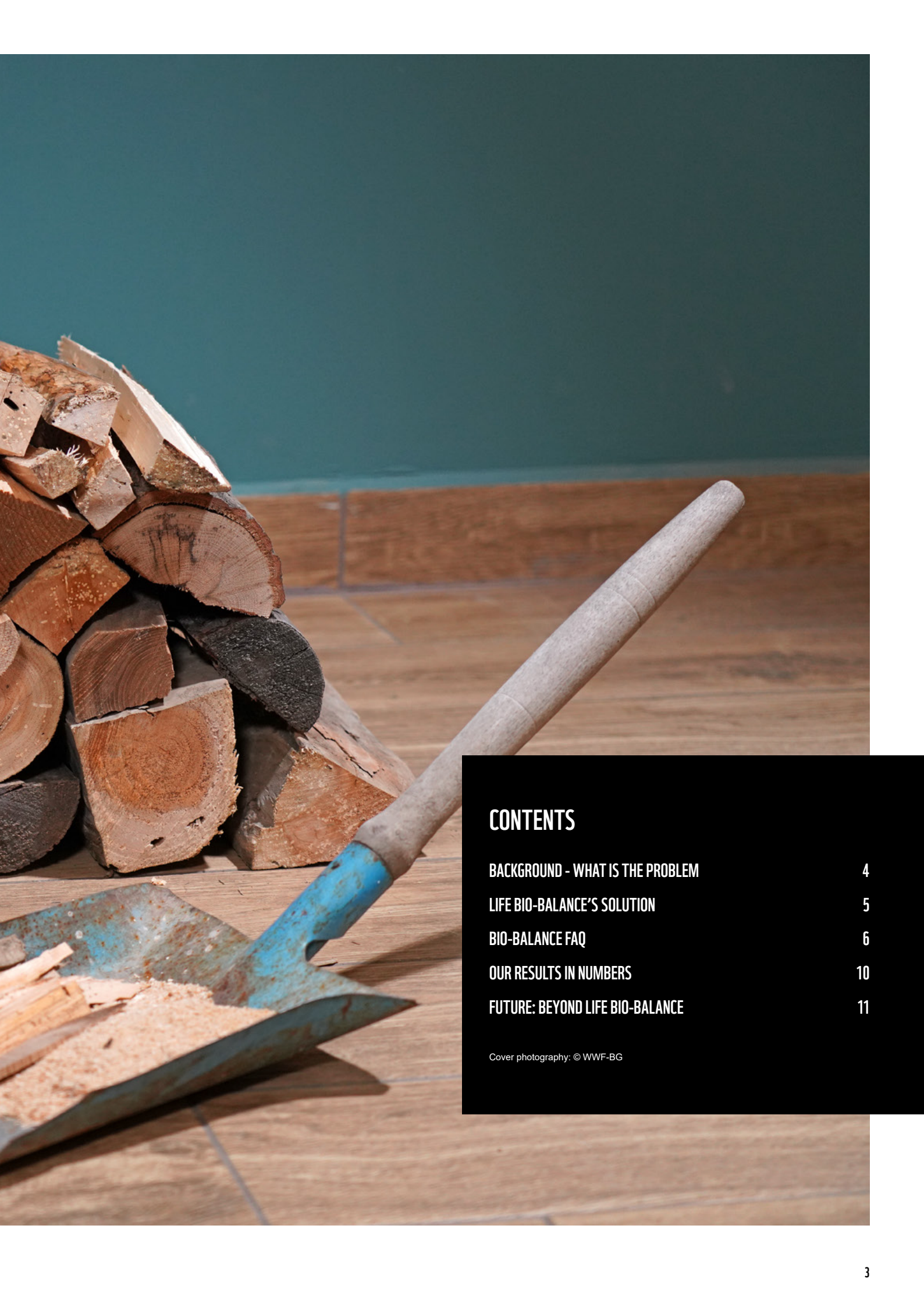


LIFE BIO-BALANCE PROJECT (2021-2024): THE RESULTS

Layman's Report



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BACKGROUND - WHAT IS THE PROBLEM

The share of renewable energy within the European Union was 22% in 2022. The Fit for 55 package raised the ambition for 2030, aiming to almost double the current share, to 42,5%. Even though there is much attention on wind and solar, 60% of renewable energy is still biomass. It is expected that its share will decrease, but its actual use will increase. Most of them, 70% of the total biomass-use is from solid biomass. Solid biomass is any plant matter used directly as fuel or converted into other forms before combustion. This practically means wood-based fuel, like firewood and pellets, to a larger extent, but also agricultural residues, like straw.

Even though bioenergy is considered a renewable energy, its environmental impact ranges widely. While using biodegradable waste which has no other alternative use, is a way better energy than fossil fuels, on the other hand, burning tree trunks which are not suitable for wood products, likely have negative impact on biodiversity, but also on climate change.

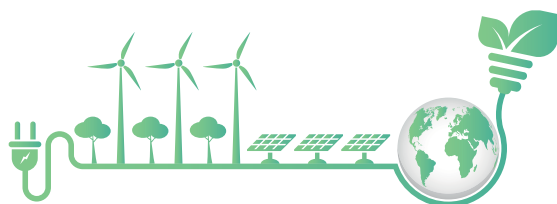
Talking about a renewable energy source, which when burned, emits the same amount of carbon dioxide that the plant captured during its growth, can be confusing. However, its emission factor, i.e. the emitted carbon dioxide per generated energy unit, is worse than lignite, the lowest quality of coal. Instead of reporting this emission at the point of combustion, as it is in the case of fossil fuels, the emission is reported in the land use sector (in the so-called LULUCF sector), when the harvesting is carried out.

This impact on carbon sink has an increasing recognition in climate change mitigation, as natural ecosystems, especially forests, play an important role in sequestering and storing carbon, which in the climate neutrality concept can counterbalance those emissions which is hard to abate. Therefore, the European Union also set a goal for carbon sequestration, aiming to sequester at least 310 million t CO₂ annually by 2030. However, in light of the current trend, the EU is not on track to reach this target. Between 2005 and 2022, the yearly sequestration dropped by 33%, to 244 million t CO₂. In the same period, the amount of fuelwood almost doubled. The two are interlinked, as reducing forest

harvest and minimizing deforestation are the two possibilities with immediate results to change the shrinking carbon balance of forests.

Ideally, the two should be in balance: biomass use should be planned in the light of the carbon sink target, but there are other factors that affect biomass use in different ways. The energy crises and the increased need to shift from fossil fuels made biomass more appealing, and the aging forest, under the current forest management regime, will make more wood available for harvest. On the other hand, the EU Biodiversity Strategy and the Nature Restoration Law should protect forests more. Moreover, when it comes to how we use biomass, there is a huge potential to reduce our demand with the rapid decrease of wind and solar energy prices, putting more effort on household energy efficiency, and tackling energy poverty.

There is a role for bioenergy in the energy transition, but we have to find the right balance in order not to threaten other environmental and climate objectives. The aim of LIFE BIO-BALANCE is to support Member States, especially Bulgaria, Hungary and Romania in this process.



LIFE BIO-BALANCE'S SOLUTION

In order to mitigate the conflicting interests and issues around biomass use, LIFE BIO-BALANCE has three main pillars:

1. We have enabled national governments in the target countries to ensure biomass sustainability, by developing recommendations on how they can strengthen the sustainability criteria on a national level, and on how the biomass sustainability issue should be addressed in the revision of the 2030 climate plans (National Energy and Climate Plans), and 2050 long-term strategies. We engaged and consulted experts to finalise our recommendations. We also developed and applied a biomass sustainability assessment tool for our recommendations. When it was possible, we discussed our messages with key policymakers.
2. Our second pillar focused on residential firewood users. We have directly supported more than 7 thousand households to use firewood in a more efficient and clean way and to invest in energy efficiency. For energy poor communities we have tested tailor-made solutions to decrease firewood dependency, applying hands-on practical interventions.
3. In order to enable replication and upscaling of our results in other Member States and firewood-dependent communities, we developed guidelines, organized webinars and conferences.

If you are keen to learn more about our solutions, scroll down for more details.

ADMINISTRATIVE INFORMATION

- **Target countries:** Bulgaria, Hungary and Romania.
- **Project partnership:** WWF Hungary (coordinator), Energy Agency of Plovdiv (EAP), Habitat for Humanity (HfH) Bulgaria, HfH Hungary, HfH Romania, WWF Bulgaria, WWF Romania.
- **Project duration:** June 2021 – July 2024 (36 months).
- **Total budget:** 1,518,819 €, from which EU contribution is 835,350 € (55%). The project received support under the LIFE Climate Governance and Information call.

Pillar 1



Pillar 2



Pillar 3



BIO-BALANCE FAQ

The project steps in more detail

WHAT SUSTAINABILITY CRITERIA DO WE NEED?

WWF partners and EAP assessed the solid biomass energy market and current sustainability safeguards in the three target countries during a previous project, and our partner, REKK compiled a regional synthesis, which is accessible [here](#). The report provided the basis to develop the sustainability criteria recommendations for the three countries and beyond.

[This guideline](#) itself is a reaction to the sustainability criteria regulation in the Renewable Energy Directive. In theory, the directive should rule

out those biomass feedstocks whose utilisation on industrial level for energy brings no advantage compared to fossil fuel counterparts, and which have disproportionately large negative impacts on biodiversity. However, it received much criticism, including a letter signed by more than 800 scientists, stating that the criteria fails to deliver its main objective. Even though the criteria was revised in the frame of the Fit for 55 package in 2023, its revision did not address the gaps in the existing safeguarding of solid biomass. As Member States are allowed to introduce stronger sustainability criteria, we developed a guide with recommended additional criteria that countries can adopt

during the transposition process of the revised directive. The most important recommendations are the following:

- Member States should not grant financial support for any primary (i.e. directly coming from the forest) wood-to-energy biomass. This recommendation is a prerequisite for implementing the cascading use principle.
- The cascading use principle aims to increase biomass use efficiency by prioritising biomass material use over energy use wherever possible. If implemented well, biomass is first used as a product. If its service life can not be extended further, then it should be re-used, and as a next possibility, recycled. If recycling is not possible anymore, and only if it otherwise would be disposed of, it should be used for energy production. Even though the cascading use principle was introduced in the 2023 revision of the directive, it allows many exemptions, including when the wood has defects which make it unsuitable for local processing facilities. However, from a climate or biodiversity perspective, the wood characteristics are irrelevant (e.g. if it is twisted or not), therefore we recommended Member States to apply the principle without any derogation option.
- As it was explained in the introduction, when the emission of biomass at the point of combustion is reported as zero, an effective way to counterbalance is a strong target for carbon sinks and developing corresponding policies and instruments for their implementation. Therefore, we recommended Member



States to set up ambitious targets beyond the 2030 LULUCF national target and to set limits of biomass use accordingly, by creating a strong link between the sink target and the planned demand of forest biomass for energy.

- However, the first criteria Member States should deliver is to improve their forestry legislation and enforcement practices in order to minimise illegal logging and trading, and to protect and increase the naturalness of forests.

WHAT ARE THE IMPACTS OF IMPLEMENTING THE SUSTAINABILITY CRITERIA?

If our recommendations are well implemented, besides many positive impacts on forests, like more deadwood, increased biodiversity and more diverse and resilient forests, another evident impact we have to consider is less available biomass for energy on the market.

Firstly, we need to assess the level of impacts. These can be on many levels, such as national, regional, local (municipality) or even at a level of a power-plant. In order to be able to assess these different impacts, EAP developed the SustainEnBio tool which can be downloaded [here](#). With the built-in user manual of the tool, one can build a series of datasets of the available feedstocks, grouped by the level of associated climate and biodiversity impacts.

Secondly, the compliance with current RED III rules and the overall effectiveness of the different feedstock use can be assessed either on industrial site level, or by adding multiple sites on regional or even national level. Even though the sustainability criteria does not cover residential use, the tool is able to assist municipalities to calculate the different emission values of the residential sector and build scenarios when energy efficiency or increased user awareness occurs.

WHAT WOULD WE LIKE TO SEE IN NATIONAL BIOMASS POLICIES?

Once the impact of stronger sustainability criteria is assessed, the next step is to replace the biomass use which was ruled out by applying the improved safeguards.

One easy option can be to use more non-forestry biomass, which is the most sensitive feedstock when it comes to impact on climate and biodiversity. In order to see the potential of this option we assessed the energy potential of non-forestry feedstocks in [Bulgaria](#), [Hungary](#) and [Romania](#), for low-conflicting feedstocks like biodegradable wastes from industrial processes, post-consumer woods, and higher-conflicts as agricultural residues and energy plantations. In general, due to data gaps and lack of information, only the magnitude of the potentials could have been assessed, however, in general a significant part of low-impact feedstocks is already used for energy production or other purposes.

However, there are other alternatives as well, which can be well-addressed in the climate policy documents where Member States describe how they would like to reach their climate mitigation, renewable energy or energy efficiency targets. For the shorter term, by 2030 this instrument which is obligatory for each Member State is the so-called National Energy and Climate Plan, and for the longer term, by 2050, the long-term climate strategies. In these strategic documents Member States describe how they envisage the energy use of different sectors, and how it will be supplied by the different energy sources and technologies. We developed recommendations for the revision of these documents in the three countries - [Bulgaria](#), [Hungary](#) and [Romania](#), and also a [general one](#) for all Member States. Our key recommendations:

- The prerequisite for any kind of biomass sustainability assessment is the availability of high quality, reliable and detailed data. Therefore, we recommend that Member States ensure that they have comprehensive, reliable statistical data on the supply and use of biomass for energy by feedstock and by sector, and its impact on the LULUCF sink, and that this information is made available in a timely, accessible and transparent manner.
- The elimination of public subsidies for primary woody biomass and power plants which only generate electricity from biomass (and not heat) should result in a decrease of solid biomass-based electricity. Better alternatives are wind and solar, with flexible electricity grids. Heat pumps can already provide a good alternative for distinct heating and cooling.
- As the available feedstock should be limited to biogenic wastes and residues, this scarce resource should be prioritised for niche sectors or purposes where it will add the highest value and/or deliver the greatest climate benefit. These are typically those sectors where there are limited alternatives to fossil fuels, like the production of non-ferrous, steel materials, or in the (petro)chemical and steel industry, where the required heat temperature is high.
- Improvement of energy efficiency in firewood-user households can decrease the use of firewood significantly. Targeted and predictable household energy efficiency programmes and subsidies are needed, which promote deep energy renovation, which means that the energy demand of buildings can be at least halved (across the entire lifecycle, including the manufacture of materials used in construction and the energy used by the households). Support is especially crucial for firewood users, as they generally have lower income and live in buildings with low energy efficiency.
- When tackling residential firewood use, it can not be separated from mitigating energy poverty, which is also obligatory to be addressed in the National Energy and Climate Plans. For this, a clear definition of energy poverty is needed, and also SMART objectives with monitoring indicators.

WHAT CAN HOUSEHOLDS DO TO INCREASE BIOMASS SUSTAINABILITY?

The sustainability criteria is applicable only on industrial scale (above 7.5 MW of installed capacity), however, across the EU half of the primary wood biomass is consumed by households. As it was highlighted above, households are the main consumers of forestry biomass in the target countries. Therefore, their support is fundamental in addressing biomass sustainability.

REPRESENTATIVE HOUSEHOLD SURVEYS

Even though households are an important consumer of firewood, we lack adequate data which should guide any related policies, such as the energy performance of their homes, their plans for energy efficiency investments, their willingness to shift to other ways of heating, or for how long they season the firewood before using it. To fill this gap, the project conducted telephone surveys in 2022 and 2024 in households that partly or solely use firewood for heating. The results of altogether 2400 household questionnaires show that in total 45% of the buildings are at least 50 years old, around half of the households have insulation on the walls and also half replaced their old windows, and only close to 15% are certainly planning to invest in energy saving measures. On average, they dry their firewood for around 4 months, but they believe that 5 months is sufficient to dry firewood. For more insight, you can visit our factsheets from [2022](#) and [2024](#).

Besides policy-level recommendations, we directly reached out to households through multiple communication channels. We are very proud of the Facebook groups we have created in the three countries where besides more conventional forms of communication (website, studies, events) of the project activities and results, we have encouraged members to share best practices from their homes, and interact with each other on how they can improve their household heating. From the collected best practices we compiled a [report](#), which brings real-life examples directly linked to the firewood use, as well as topics such as choosing the optimal orientation of a building during the planning process, thermal insulation techniques or various energy saving practices.

When it comes to firewood use, we also created a poster on the basic rules of efficient firewood use, which is available

[here](#) for further use and dissemination.

Our key messages:

- Use well-seasoned (dry) firewood, which has been stored in a shed or other structure which protects the wood from rain and is well-ventilated
- In a wood stove start the fire from the top, instead of the bottom
- Always provide a sufficient amount of oxygen for the combustion
- Do not use synthetic waste materials as fuel, including treated wood and plastics
- Regularly maintain the heat appliance and the chimney

We have also developed factsheets for those topics which had a high interest in the Facebook groups, such as [pellets](#) and [heat pumps](#).

WHAT ARE THE SOLUTIONS WHICH CAN HELP FIREWOOD DEPENDENT ENERGY POOR COMMUNITIES?

Even though there is some support available for energy efficiency improvements for households, often low-income households are excluded as they cannot meet the eligibility criteria. Therefore, tailor-made policies, and specifically targeted subsidies and services are needed to reach these households.

First, in order to assess the issue of energy poverty, we published a study, where we identified the drivers of firewood use, made some preliminary assessments based on available statistical information, and formulated policy recommendations. The **Fuel of the Poor** report is available [here](#) and the summarising factsheet [here](#).

Besides households, we also surveyed municipalities, as they are an important target group of the project; they can effectively facilitate and support local initiatives on household heating. More than 1500 municipalities answered our questionnaire, which was carried out in 2023, following the first winter of the energy crises. The results showed that on average, the energy crisis resulted in some increase of firewood use, but in many cases, firewood was already the most used fuel. This increase caused supply shortages in many municipalities. On average air quality associated with local solid fuel

consumption was indicated as a medium severity, and energy poverty as a noticeable problem, with various severity among the three countries. Results in detail are available [here](#).

In order to demonstrate and test pilot solutions that can effectively support firewood-dependent local communities, the project provided support for four selected municipalities (1-1 in Bulgaria and Romania, 2 in Hungary), with a grant of cca. EUR 16,000 per grantee. The aim was to identify approaches and solutions which can be replicated in other similar municipalities with relatively low investment costs. Altogether we demonstrated and identified 8 such interventions under three different topics:

- Increasing access to dry firewood: In Botevgrad, Bulgaria storage units were built for storing wood for individual vulnerable households who live in multi-apartment buildings and heat only with wood. While in Varga, Hungary a community-level storage facility was built where the social firewood (a state in-kind subsidy) can be stored and dried. Within the project, the local communities also bought as much wood as the yearly government funded social firewood subsidy provides. As a result, the “project firewood” allows the “subsidy firewood” to be stored and dried for an extra season before distribution and thus becomes a rotating fund for years to follow.
- Energy efficiency to decrease solid fuel dependency: In the two Hungarian pilot sites, in Varga and Ág we replaced wood stoves in 10 households. Habitat for Humanity Hungary developed a low-cost efficient stove

in collaboration with experts based on designs available in Northern European countries. The so-called ‘Heat Column’ could replace the old, outdated, and highly inefficient metal heaters that were in use previously. Also in Ág, in the case of 12 households the families themselves or with the help of each other replaced old windows and doors with mostly second-hand, but better insulated, good quality ones. In Comanesti, Romania 30 families received attic insulation. The process of installing mineral wool in the attic of the house is relatively easy and quick, but the positive effect is immediate and significant.

- Awareness raising: In each pilot project these ‘hard measures’ were accompanied by ‘soft measures’ (i.e. community/social work). This involved residential forums and workshops to raise awareness and motivate behavioural change. These sessions focused on energy efficiency in general and the sustainable use of biomass: ways to reduce the amount of firewood used during the heating season; how to dry and store the wood properly, how to use the dryer storage, and how to light the firewood correctly. Also, in Ág, the members of the local association and local coordinators of the interventions used an additional community-building element during the project: they reestablished a local savings group and community treasury that had already been in operation previously.

For municipalities facing similar challenges, we have developed two guidelines. In our [Local pilot project guidebook](#) all interventions are described in detail with lessons learned. The other [Guideline on local capacity building and multi-stakeholder planning](#) shares the experiences and gives recommendations on how to involve the local community when such interventions are designed and how to mobilise them and increase their capacity.



OUR RESULTS IN NUMBERS



21

Expert meetings



90+

Experts participated
in our events



9

National-level policy
recommendation papers



3

International guidelines
for policy recommendations



5

Conferences
Watch our Biojust and Just
Transition conference [here](#)



3

International webinars
Watch our Bioenergy in the
EU: responsible planning and
policy making webinar [here](#)



2

Guidelines
for municipalities



94

Households received
support through direct local
interventions



7400

Members of Facebook
groups



2400+

Surveyed households



1500+

Surveyed municipalities



8

Pilot interventions to tackle
heating energy poverty

FUTURE: BEYOND LIFE BIO-BALANCE

As the revision processes of the national climate policy documents are ongoing (the National Energy and Climate Plans) and will also happen after the project ends (for the long-term climate strategies), project partners will continue to call for the adaptation of the recommendations we formulated. We will also continue our local-level work: the WWF offices together with Habitat for Humanity Bulgaria and Hungary, launched the “BioJust – Just Transition for Solid-Fuel-Dependent Households” project, funded by EUKI. Within this project, we will continue to demonstrate model solutions in four other pilot municipalities, and use the experiences to develop a guidebook for municipalities for local heating action plans, and also provide capacity building (e.g. trainings). The project also supports national policymakers to create financial instruments to facilitate local energy transition measures, especially through the Social Climate Fund. You can learn more about the project [here](#).



**SUPPORT EU MEMBER STATES
TO SHIFT TO A LOW-CARBON
AND RESILIENT ECONOMY BY
ENSURING THAT
SOLID BIOMASS IS PRODUCED
AND USED SUSTAINABLY
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