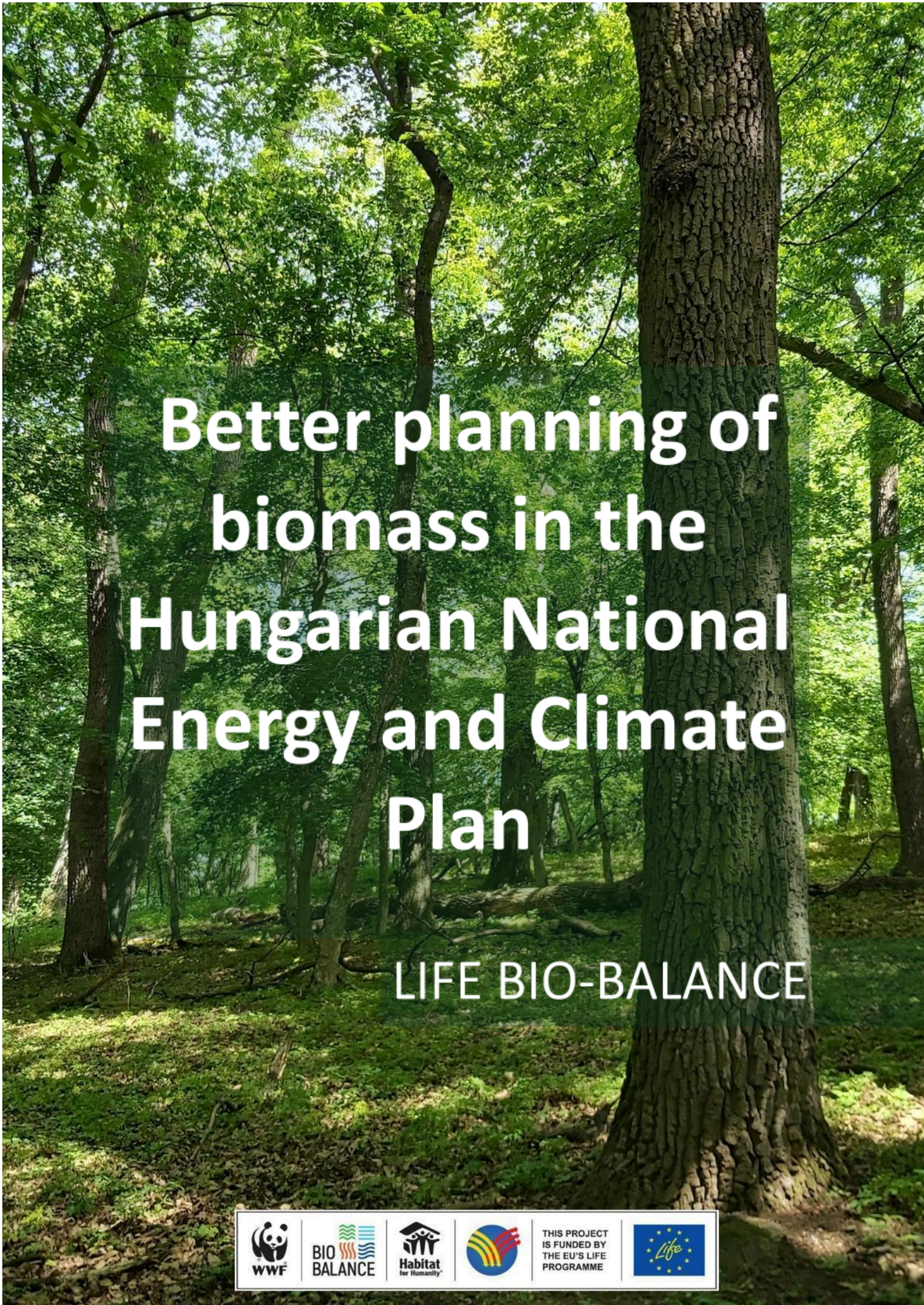

Better planning of biomass in the Hungarian National Energy and Climate Plan

LIFE BIO-BALANCE

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Introduction

Forestry biomass is a scarce resource and the emerging conflict between biodiversity loss and the need for maintaining/increasing carbon stock on one hand, and the use of biomass as renewable energy on the other hand makes the National Energy and Climate Plans a key policy tool in finding the right balance for biomass use in the fight against climate change and biodiversity loss.

The Governance Regulation, (EU 2018/1999), the revised Renewable Energy Directive (EU 2023/2413) (RED III) and the Guidance to Member States for the update of NECP, prepared by the European Commission contain a number of requirements on biomass sustainability. Together with the Regional Centre for Energy Policy Research (REKK) we have developed a detailed assessment of the biomass market and current state of biomass sustainability in Hungary, then, in the frame of the EU LIFE-funded „Balancing solid biomass for climate neutrality in CEE countries" (LIFE BIO-BALANCE) project we also prepared a guidance document on the RED III revised sustainability criteria itself, and how Member States can improve it further.

The aim of this document is to support the Hungarian government in the revision process of the 2030 National Energy and Climate Plan (NECP) in light of the regulatory requirements, but this document also incorporates our recommendations on the different sectors and aspects of biomass supply and demand, in order to shift from current, inefficient biomass use sourced mostly by primary forestry biomass to a future where biomass energy use is relying on secondary biomass and residues, and produced in efficient and just way, in harmony with nature and climate protection.

Key messages

1. Comprehensive supply analysis of biomass feedstock, comparison with future planned biomass demand is needed.
2. Ensure that the future planned biomass use is in line with the 2030 and 2050 LULUCF targets.
3. Integration of the revised sustainability criteria in the final version is inevitable, especially in light of the cascading principle of biomass use.
4. Bioelectricity should be phased-out in the long term, and in the short term should only be generated when the surplus heat is used.
5. Biomass-based district heating should be limited to peak demand.
6. The use of biomass in industrial sectors with limited alternatives to fossil fuels should be prioritized over electricity and heat production.
7. Predictable household energy efficiency programme, which promotes deep renovation, is inevitable to reach our energy efficiency and climate objectives.
8. Policy planning has to be introduced for alleviating energy poverty: definition, objectives, monitoring indicators are needed.

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Sustainability of biomass feedstock

Assessment of biomass supply availability

According to the Governance Regulation, the main aim of the supply analyses under 2.1.2 iv) chapter is to ensure that there will be sufficient amount of sustainably sourced biomass compared to the planned solid biomass energy use.

In the draft revised Hungarian NECP, The planned use is indicated on a yearly basis, disaggregated between heat, electricity and transport, as it is required by the Regulation. However, Art. 20 on the Integrated reporting on renewable energy also requires the share of electricity produced from biomass without the utilization of heat, as the effectiveness of burning is an important proxy of the sustainable biomass use (i.e. the RED III introduced new criteria for the electricity-only installations). Also, assessments of non-energy demand for the different feedstock are also needed, in order to avoid any future demand conflicts.

However, on the supply side, besides a general description of the current forest management regime, only three tables provide information on the planned biomass supply:

- Perspective annual development of afforestation by type of tree stand (table 9, in ha):as the planned yearly increase in the WAM scenario only equal to 2 per mil of the area of managed forests, its contribution is negligible, especially in terms of the next decades. (And the numbers are not in line with the 2030 afforestation policy, published in the Climate and Environmental protection Action Plan, whose target is to reach 27% of land covered by forest.)
- Perspective evolution of cylindrical wood plantations for industrial purposes (table 11): again, the planned new energy plantation could only contribute to a fraction of the biomass supply. Moreover, the WAM scenario is not backed-up by any PAM.
- Projection of the future net carbon balance of existing forests (table 10): as the majority of the solid biomass energy use is primary forestry biomass, this table would have high relevance. Nevertheless, from the three scenarios (FRL, increased-, and low level logging), it is not stated which one would be needed to satisfy the future planned biomass use.

Currently, the planned use as a unit of energy, and on the demand side, the sources in area and volume are not comparable, therefore this chapter cannot provide evidence on the supply-demand balance.

Also, there are important categories on the demand side which are missing right now, like the net import-export balance, sources on non-primary woody biomass (like residues from wood-processing industries, agricultural residues), or waste wood materials for energy purposes)

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Comprehensive supply analysis, comparison with future planned biomass demand is needed

In order to ensure that there will be enough solid biomass for energy purposes, the supply analyses should sufficiently granular analyses on future planned primary forestry biomass use, and need to include other feedstocks, like non-primary woody biomass (e.g. industrial by-products, agricultural residues). Besides the carbon sink and sustainability limitations, described below in detail, assessment of non-energy demand for these feedstocks are also needed, in order to avoid any future demand conflicts. The different units of feedstocks should be converted to primary heating value, in order to be comparable with the future planned energy use.

It is a well-known issue that currently the reported biomass energy use is around two times higher than the available biomass supply by the different statistics. The BioScreen CEE project developed a detailed analysis of this gap, and also developed specific policy recommendations which could contribute to eliminating the gap between the two sides.

Carbon sink and biomass use

Art. 29 (7b) of the revised Renewable energy directive requests Member States to assess the compatibility of the projected use of forest biomass for the production of energy with the Member States' targets and budgets for 2026 to 2030 laid down in Article 4 of Regulation (EU) 2018/841 (LULUCF Regulation).

In the revised Hungarian draft NECP there is no target for carbon sequestration. However, the HU-TIMES model, which was used for the modeling, included a new important sub-model, the FOX (Forest Carbon SINK Optimization), which set up primary energy use limits for primary solid biomass, also in light of the LULUCF targets. However, this model is not identical to the one which was used for the Hungarian Forestry Accounting Plan, developed by the Forest Research Institute, and which is also the source of the previously described projection of the future net carbon balance of existing forests. The cross-checking of the two models have not been done by the time of the publication of the document. But first the assessment of the compatibility should resolve inconsistencies between the HU-TIMES modeling number and the biomass projects already under development (explained in more detailed below).

Also, there is no existing or planned national measure and policies ensuring compatibility with the biomass and LULUCF target. This is especially important in light of the aging forest stands in Hungary. As experts from Forest Research Institute, Hungary and the National Land Centre pointed out in a recent article, based on their modeling, applying the current forest management regime, significantly more wood will be available for logging compared to the current logging level. However, on the other hand, as the European Scientific Advisory Board on Climate Change highlighted in their report, reducing harvesting is one of the rare options to maintain or increase forest carbon sinks in the short to medium term.

Ensure that the future planned biomass use is in line with the 2030 and 2050 LULUCF target.

The new LULUCF modeling and targets has to ensure that the planned biomass use is in line with the 2030 and 2050 carbon sink targets. The final version of the revised NECP should establish sound compliance with the planned biomass used and the carbon sink targets. For this, inconsistencies with the planned targets and current trends (explained below) has to be addressed. Also, national measures should be introduced to ensure compatibility between the planned biomass use and the carbon sink targets.

Also, the LULUCF modeling needs to be in line with the Nature Restoration Law, including the requirements on restoration of ecosystems and the enhancement of organic carbon stored in forests.

Integration of the revised sustainability criteria

Art. 29 (7b) of the revised Renewable energy directive also requests Member States to address the effect of the new sustainability criteria. The draft NECP has not included this aspect, although this can be reasoned with the different timelines, as its publication was way before the RED III has been officially adopted and published.

However, the limitation on the different feedstock (stumps and roots), or the prevention of old growth forest degradation, and most importantly, the introduction of the biomass cascading principle can have notable impact on the planned biomass use.

Integration of the revised sustainability criteria in the final version is inevitable, especially in light of the cascading principle of biomass use.

The limitation of future accountable feedstock as renewable energy in the Hungarian circumstances mostly relevant for the stumps and roots, and also the possible limitation of harvesting in old-growth forest in order to prevent its degradation. These aspects should be part of the supply assessment.

But the most important new element of the criteria is the introduction of the biomass cascading principle. Even though the directive is very generous in terms of possible derogation, for nature protection and climate purposes the adaptation of the directive should not undermine its main objective, i.e. to decrease the share of primary forestry biomass in the energy use. This is especially important for Hungary, as installations that fall within the scope of the directive are mostly (~56% of total weight[1]) using primary forest biomass.

[1] Average of 2020-2022, based on data requested from the Institute of Agricultural Economics Nonprofit Kft.

Sustainability of biomass energy production and use

Electricity

Currently the total capacity of the biomass power plants is ~382 MW (including partial capacity of the Mátra Power Plant, which uses biomass as co-firing), producing around 1600 GWh of electricity annually. From the five producing biomass power plants, two are electricity-only (Mátra and Szakoly), and three are co-generation plants (Ajka, Pécs, Tatabánya).

The draft document envisages practically an elimination of biomass-based electricity, decreasing the capacity to 91 MW by 2030, and assuming there will be no electricity production. However, this assumption is totally against the current trend. Based on the result of the METÁR feed-in-premium call on November 2021, 130 MW biomass capacity, from which 100 MW is additional, will receive state aid for 20 years, and also, except for the Mátra Power Plant, there is no communication about the possible decommission of the four other ones. The revised sustainability criteria banned providing financial support or renewed support to electricity-only plants. In the case of Hungarian power plants, it only might affect the Szakoly power plant.

However, according to the HU-TIMES modeling results, after 2040 the electricity capacity would drastically increase, reaching 1880 MW of capacity and more then 10 TWh produced electricity by 2050, but as bioenergy with carbon capture and storage (BECCS).

Bioelectricity should be phased-out in the long term, and in the short term should only be generated when the surplus heat is used.

As our recently published article pointed out, biomass power plants use around ⅓ of the total feedstock of primary woody biomass for energy purposes. However, they could only cover ~3% of the total consumed electricity, operating with very low seasonal efficiency, in case of electricity-only plants 28%, and in case of co-generation plants 50%. Nevertheless they received so far more state support than other renewables together, and based on the result of the 2021 November call of the METÁR feed-in-premium system, this privileged role will maintain this status quo in the future as well..

Without neglecting the advantages that biomass can balance the intermittent renewable energy sources, and could support the local economy while relying on domestic feedstock, with the current very low efficiency, they significantly contribute to the carbon and biodiversity loss of forests. Also, the large power plants are not flexible for balancing. Therefore, the projected decrease of electricity would be beneficial, however, currently it is not realistic. Therefore, we suggest that no state support should be guaranteed in the future, and measures should be introduced which puts the biomass electricity only plants as

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back-ups, and optimize the production of co-generation plants based on the local heat demand, when the efficiency is high. The limitation on eligible feedstock for renewable electricity can also contribute to a decrease of bio-based electricity and contributes to the implementation of the cascading use principle. In 2011, the governmental party submitted a proposal to amend the Electricity Act (T/1941/6) to exclude logs with diameter above 8 cm from the definition of biomass accountable as renewable energy source. Given the nature conservation and climate protection objectives that have emerged since then, we believe that such a restriction is certainly timely, even if there may have been opponents in 2011, which is why the proposal was not adopted.

Regarding the post 2040 targets, we suggest also to revise the future reliance on BECCS, taking in mind the immaturity of the technology and possible pressure on forests. Also, if it will be used by primary forest biomass after 2040, it would not make any climate benefit by 2050, as it will lead to an increased emission in the LULUCF sector. We therefore suggest to rely more on the mitigation efforts.

District heating

The WAM scenario lays out a hectic role for biomass in the district heating sector: while its use would be increased to 12 PJ by 2030, and then 18 PJ by 2040, providing 45% of the total generated heat, by 2050 it would be phased-out. Similarly to electricity production, this scenario is also unrealistic. The two largest biomass heating plants in Kaposvár and Kecskemét just started operating, and even though it can be expalined that the life expectancy of these plants are only 25 years, it is unrealistic that new plants will be decommissioned by 2050 at latest.

Biomass-based district heating should be limited to peak demand.

In the frame of the Green District Heating measure, we suggest to include limits for the biomass heating plants capacity. The reason for this is that the implementation of the cascading use principle suggests that there will be only limited biomass feedstock available in the future. Therefore, we recommend that new measures should support diverse supply of district heating, where the baseload is provided by low-carbon renewable energy sources as geothermal and heat pumps, and only the peak demand is supplied by biomass. Practically, such big, only biomass-powered heating plants should be avoided which were built in Kaposvár and Kecskemét. On the other hand, Tamási city can be a good example, where the small biomass heating plant only operates during peak time.

Industrial heat

Industrial energy use is projected to be increased from 186 PJ to 269 PJ by 2030 according to the WAM scenario. The renewable use would be doubled, but the renewable energy is not disaggregated, therefore there is no information about the planned biomass-based energy use. Currently, around 4% of the final industrial energy consumption, 11,7 PJ is covered by biomass.

Almost 50% of it is used in the wood processing and paper industries, where biomass is generally available as a by-product. 30% is used by the food industry, and 17% for non-metallic mineral products. The document does not evaluate the different sub-sectors and its planned energy consumption by different feedstocks.

The use of biomass in industrial sectors with limited alternatives to fossil fuels should be prioritized over electricity and heat production.

The planned industrial energy use should be more detailed, with sub-sectoral assessments and targets, including the planned energy use by different energy carriers.

Biomass should be used in sub-sectors with 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. The use of biomass in these sectors should be prioritized over electricity and heat production, therefore, measures should be introduced to initiate the fuel shift.

Household energy efficiency

The document has conflicting information about the planned decrease of firewood use by the domestic sector. While figure 97 envisages around 20% decrease by 2030 (from 53 to 43 PJ), and it suggests that the firewood use would be totally eliminated by 2050, while on page 47 it is stated that the consumption will decrease by 30% until 2030.

While in overall, it is expected that the energy consumption of the household sector will have the highest drop, reaching more than 75% of energy saving compared to 2019 figures, there are no policy measures which would effectively support this drastic transition. There are references in the text about what would be desired to achieve this goal, like predictable financial incentives and technical assistance, and it also states that investment should be directed towards complex energy upgrades. However, only one planned policy measure can directly contribute to this target, the promotion of heat pumps (PAM no. 119). However, applying the energy efficiency first principle, heat pumps should be promoted as part of deep energy renovation or in case of households where the heat demand is already decreased due to previously implemented energy efficiency measures. Other listed measures, like the Family Home Creation Allowance (CSOK) (PAM no. 87) or the Hungarian Village Programme (PAM no. 86) have no criteria for energy saving.

Predictable household energy efficiency programme, which promotes deep renovation, is inevitable to reach our energy efficiency and climate objectives.

Annually, around 130 thousand deep renovations should be implemented in order to reach

the climate-neutral building stock by 2050. To achieve this, a predictable household energy efficiency programme is needed, with an annual budget. Technical assistance, in the frame of a one-stop shop model should support the households with such investments.

Also, focusing on biomass, according to the latest census, 15% of the households are using solely firewood, and further 13% using firewood with natural gas for heating. In order to truly phase-out biomass and fossil fuel, an action plan for the dissemination of clean technology is needed.

In order to support the planning of the deep renovation programme, we have collected best practices from existing NECPs and from EU-funded projects from all over Europe.

Energy poverty

Addressing energy poverty, including affordability and accessibility, is a priority of the European Union and should be reflected in the updated national energy and climate plans. The Commission recommends that Member States should set clear, concrete, achievable, measurable and time-bound targets for reducing energy poverty, none of which are included in the draft document.

The term 'energy poverty' does not even appear in the document; instead, the term 'vulnerable consumer' is used, with the following short definition: "Vulnerable customers/households are those who have difficulties in securing the basic energy needs of their homes. For the purpose of determining membership of vulnerable consumers, detailed definitions with indicators are defined for each supporting policy measure." The first sentence does not even minimally reflect the definition in the new Energy Efficiency Directive. This wording is totally unacceptable, as it does not specify the criteria used to determine who has difficulties in meeting their basic energy needs. And the description of the policies in the second sentence is nowhere to be found in the document.

According to the Governance regulation, Member States should assess the number of households in energy poverty, taking into account the necessary domestic energy services needed to guarantee basic standards of living in the relevant national context, existing social policy and other relevant policies, as well as Commission indicative guidance on relevant indicators, including geographical dispersion, that are based on a common approach for energy poverty. In the event that a Member State finds that it has a significant number of households in energy poverty, it should include in its plan a national indicative objective to reduce energy poverty. However, none of these requirements are fulfilled in the updated draft NECP.

Policy planning has to be set up for alleviating energy poverty: definition, objectives, monitoring indicators are needed.

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We recommend that in line with the requirements, a methodology for measuring energy poverty should be defined, which requires a formal definition of the phenomenon and on the basis of which national energy poverty alleviation targets can be defined and monitored. In addition to mapping and monitoring the problem, well-defined metrics and indicators will allow for the appropriate targeting of energy efficiency and cost support to households.

Also, specific targets and objectives are needed to define energy poverty alleviation ambitions, in line with the energy poverty definition and indicator framework. Examples of short/medium term targets could be reducing the number of households without access to basic infrastructure to zero, or providing energy cost subsidies to households living below the subsistence level, or reducing the number of households with accumulated utility debts by 50%. A long-term target could be to reduce the number of households living in low-income, worst-performing properties by 80%. The targets can serve as a basis for the development of measures related to the Social Climate Plan to be completed by June 2025.

In order to support the planning of energy poverty measures, we have collected best practices from existing NECPs and from EU-funded projects from all over Europe.

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