

THE SITUATION OF DENDROMASS AND SHORT ROTATION COPPICE IN HUNGARY

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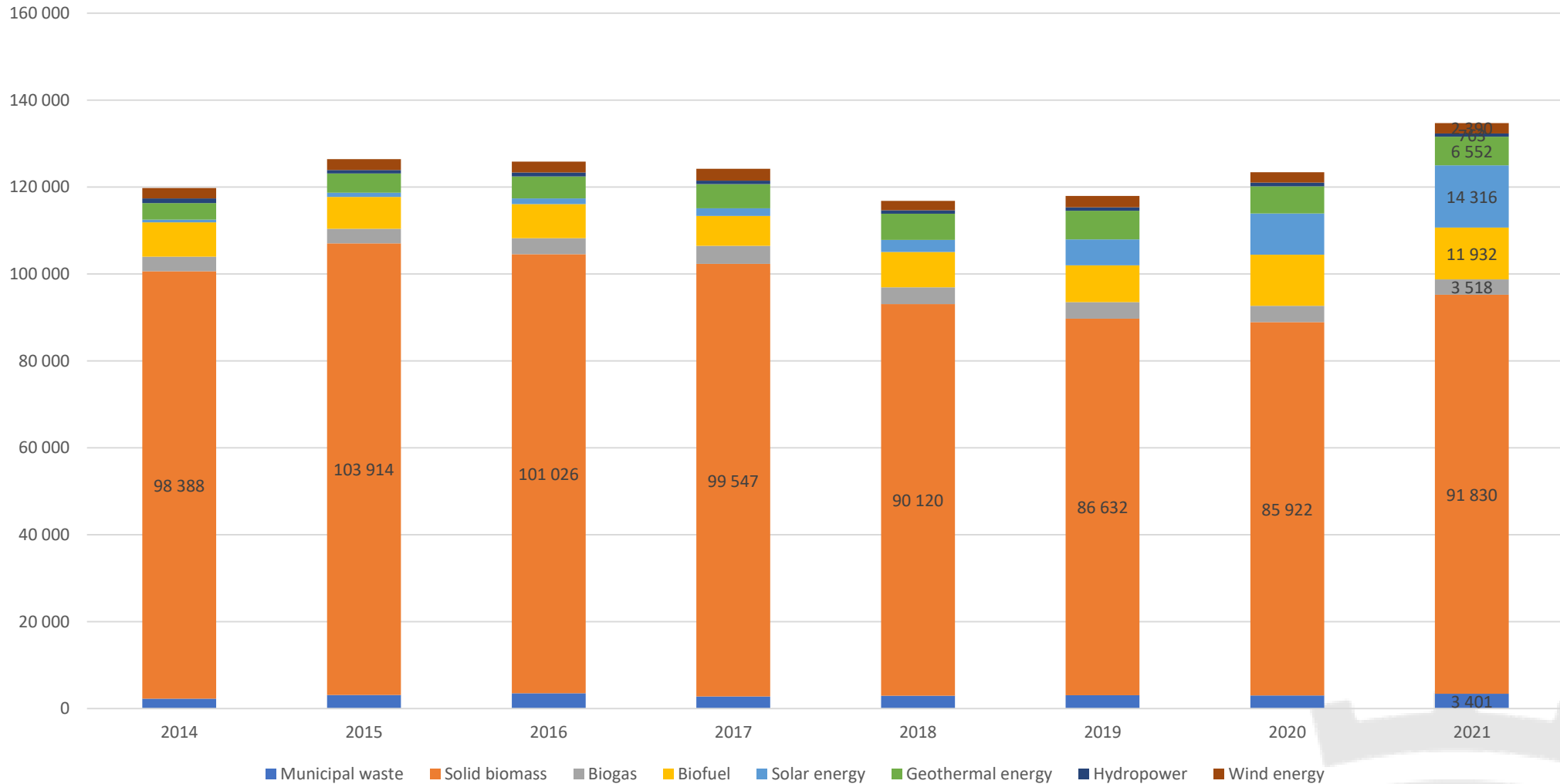
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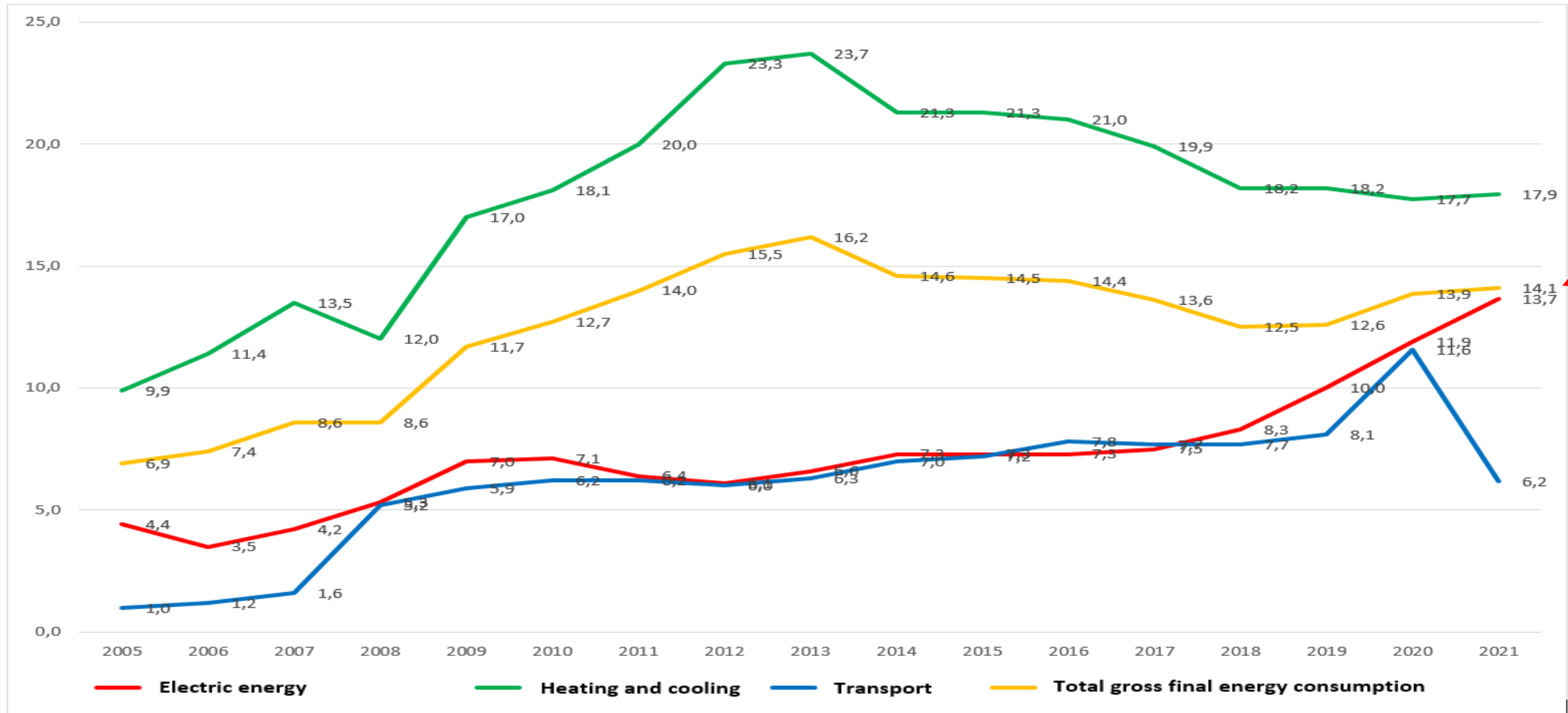


Use of primary renewable energy sources [TJ]

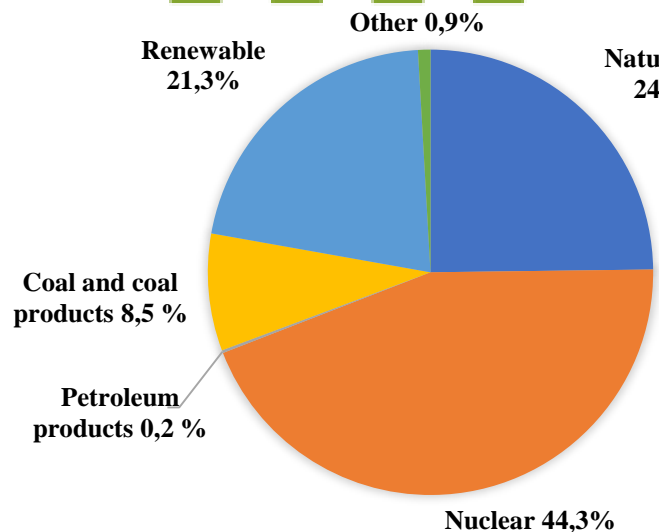
Primary energy consumption in
2021: 1133 PJ = $1,133 \times 10^6$ TJ (Source:
ksh.hu)



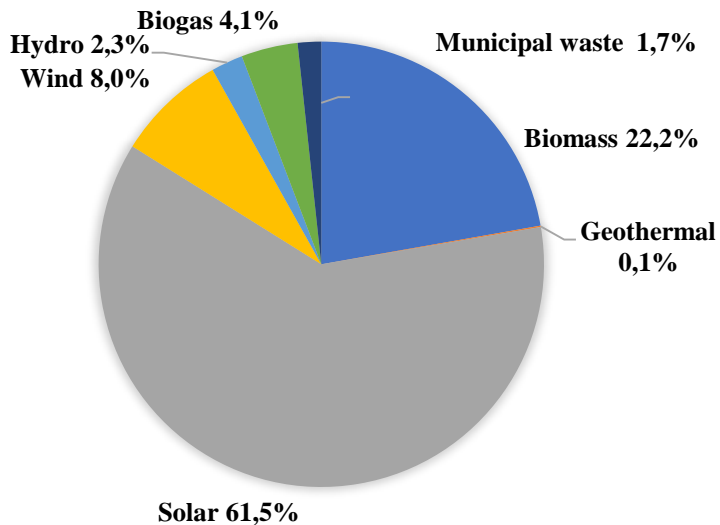
Share of the use of renewable energy sources within gross final energy consumption and in Hungary [%]



(Source: Magyar Energetikai és Közmű-szabályozási Hivatal
2021 tárgyevi adatok számítása az Európai Parlament és a Tanács 2018/2001 irányelve alapján történt. A 2021 előtti évek adatainak a számítási módszertana az Európai Parlament és Tanács 2009/28/EK irányelvén alapul, ezáltal az adatok közvetlenül nem összevethetőek.)

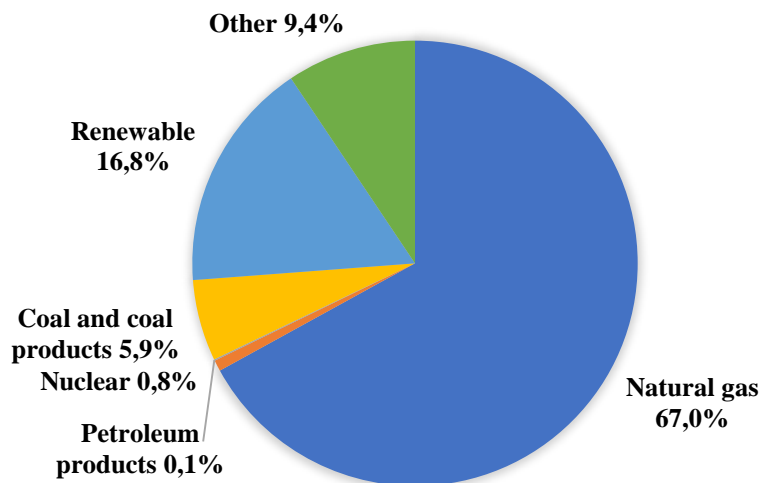


Renewable energy

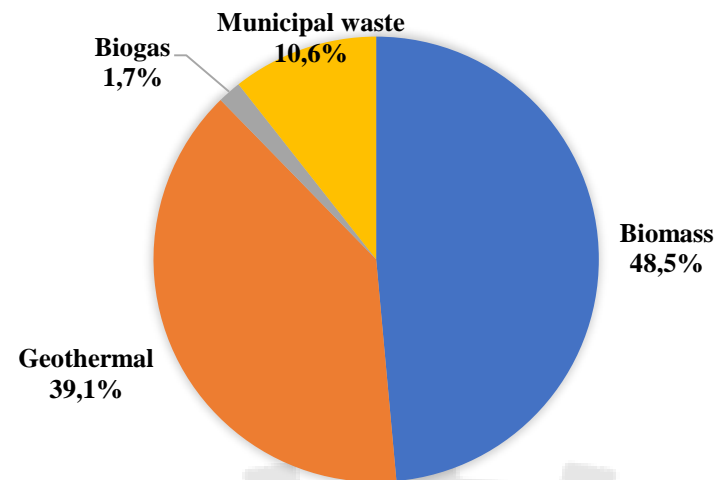


Distribution of gross electricity production by energy carrier, 2022 [%]

The proportion of biomass in electricity and heating energy production (2022)



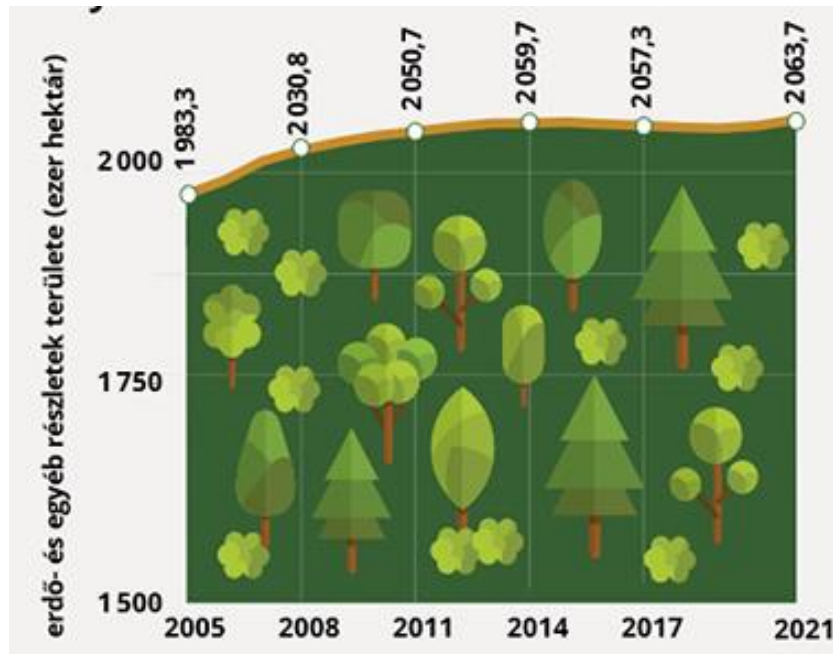
Renewable energy



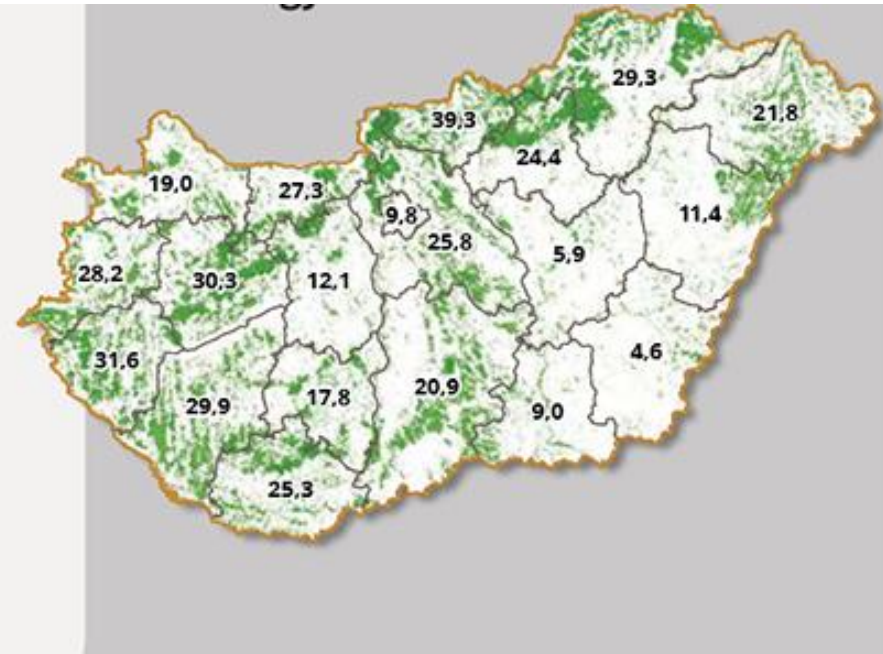
Distribution of heating energy production by energy carrier, 2022 [%]

Forest area, forest cover

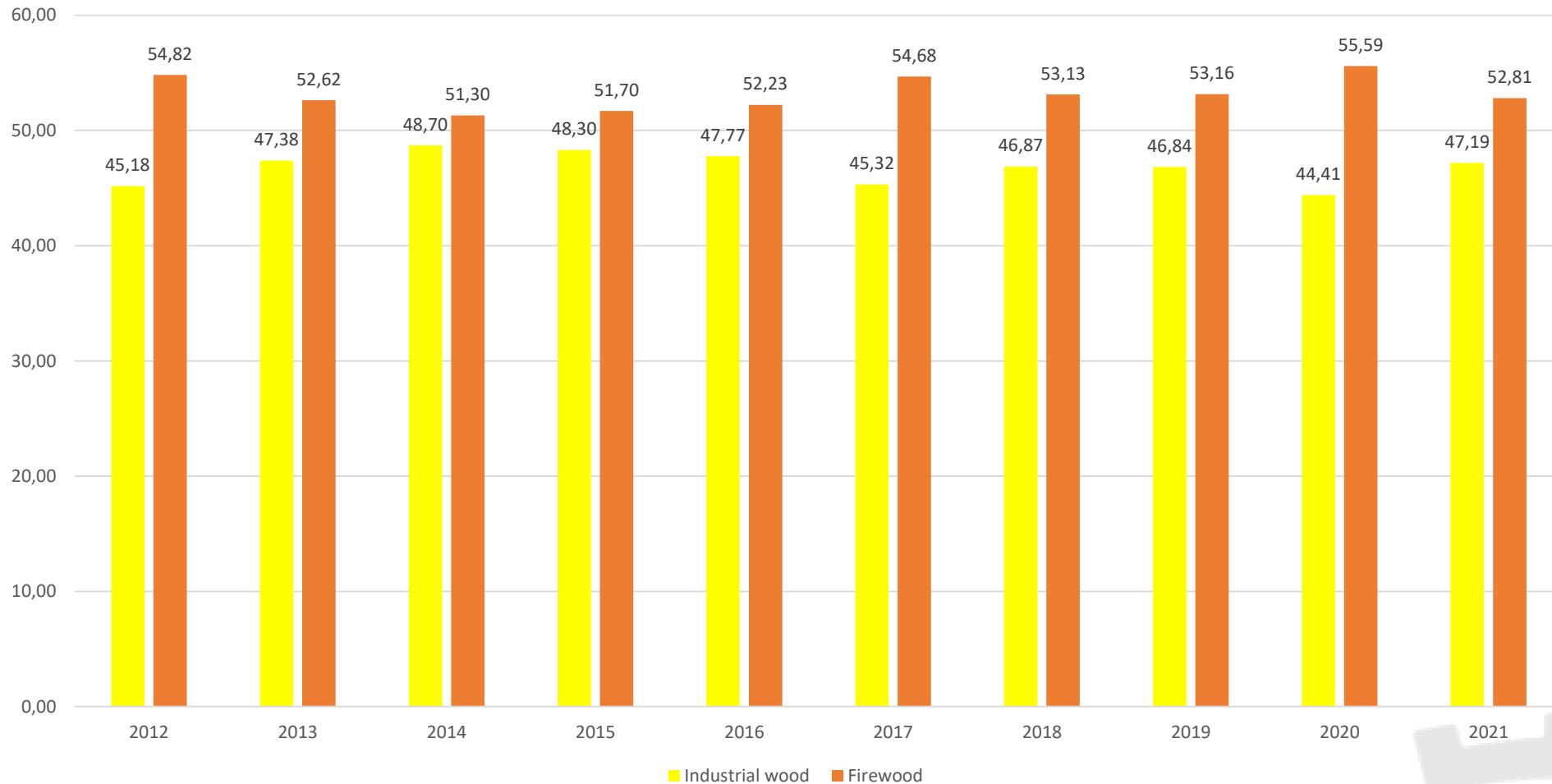
Forest area



Forest cover in Hungary
by county



Ratio of firewood and industrial wood in the last 10 years [%]

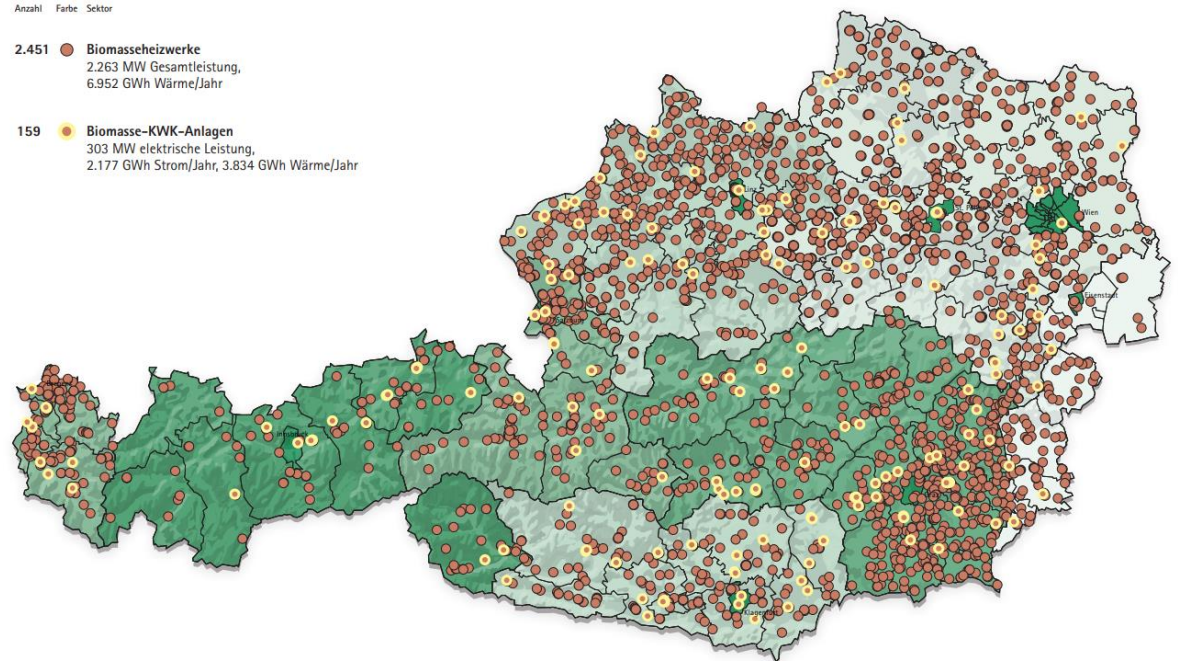


Biomass use for energy purposes in Hungary (power plants, heating plants, biomass boilers)

- In 2022, 133 operating power, heating plants and biomass boilers were in Hungary, where biomass was utilized for energy purposes. Of the biogas plants (excluding sewage plant biogas and landfill gas), 34 were operating and 5 were not operating.
- In 2022, domestic biomass consumption for energy purposes was 3.93 million tons (+7.7 percent increase compared to 2021), of which 143,000 tons were imported.
- Nearly one third of the total biomass feedstock used in 2022 came from Central Transdanubia and 23.3 % from South Transdanubia.

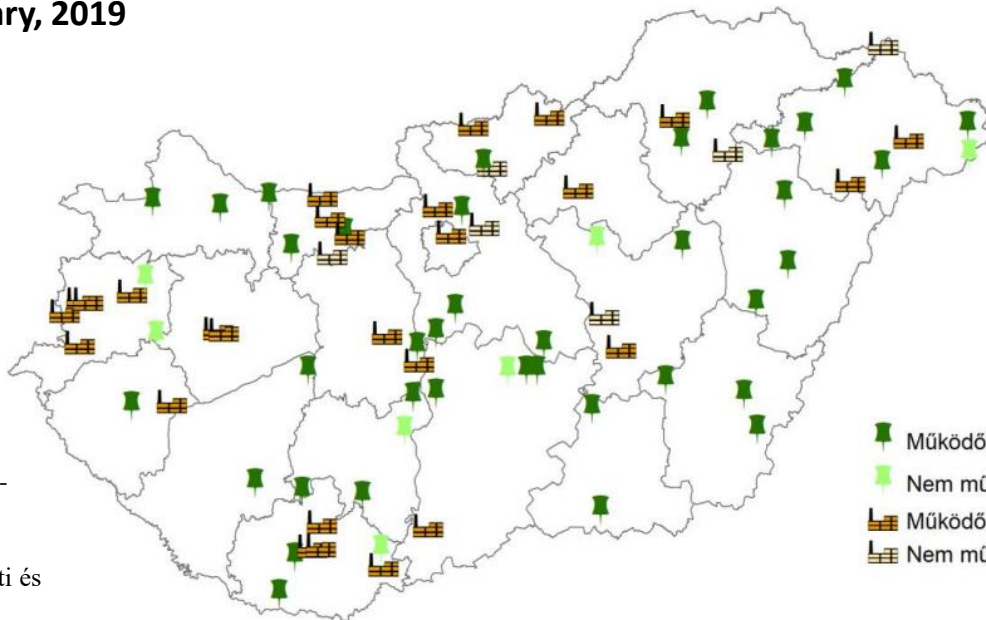


Anzahl Farbe Sektor
 2.451 ● Biomasseheizwerke
 2.263 MW Gesamtleistung,
 6.952 GWh Wärme/Jahr
 159 ● Biomasse-KWK-Anlagen
 303 MW elektrische Leistung,
 2.177 GWh Strom/Jahr, 3.834 GWh Wärme/Jahr



In 2022, around 31,000 modern central heating systems based on pellets, firewood and wood chips were installed in Austria

Biomass utilization facilities in Hungary, 2019



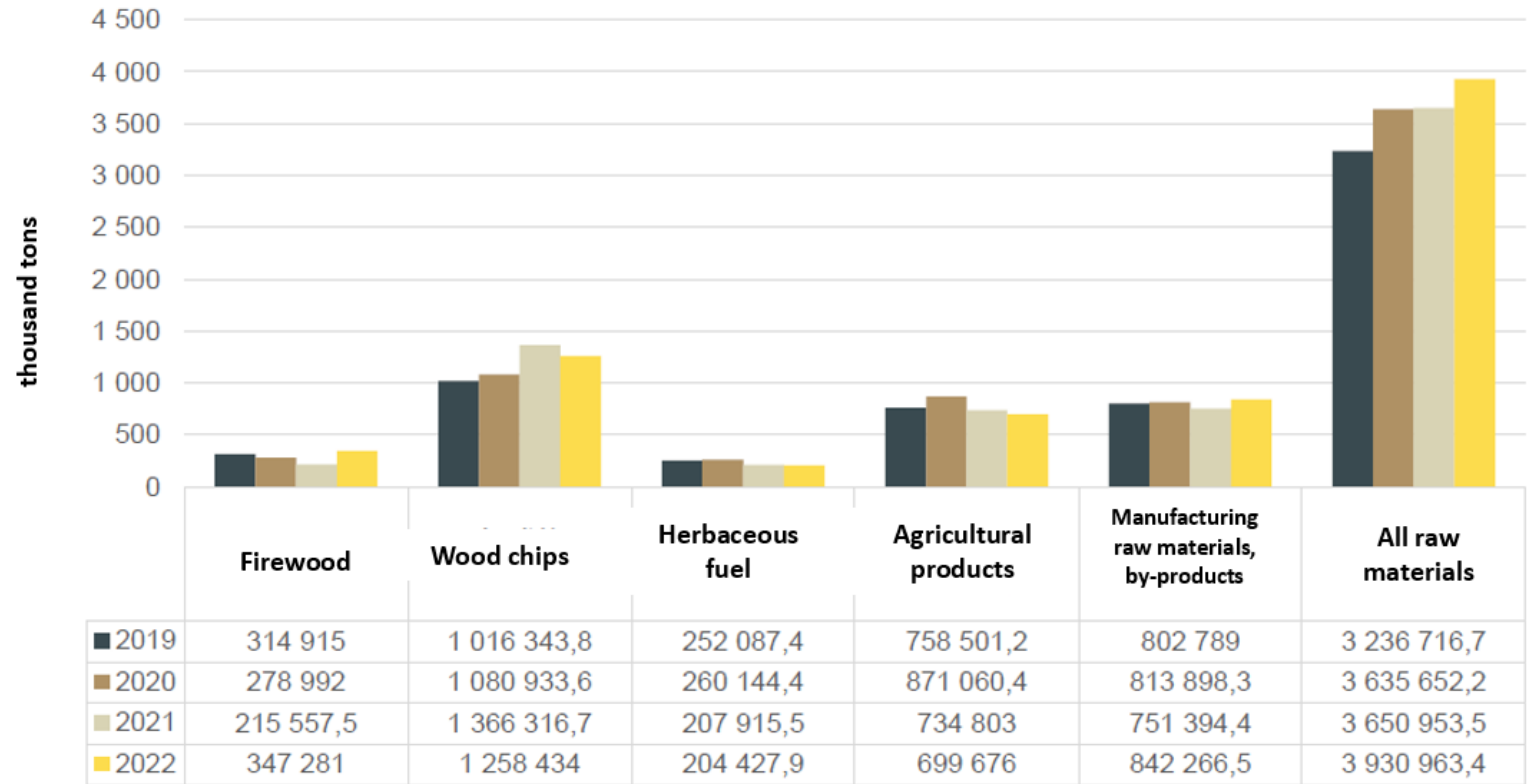
■ Működő biogázüzem
■ Nem működő biogázüzem
■ Működő erőmű, fűtőmű
■ Nem működő erőmű, fűtőmű

Power plants, heating plants and biogas plants using biomass in Hungary, 2021

(Source : Agrárközgazdasági Intézet (AKI) (2022): Biomassza-felhasználás energetikai célra. III. évf. (1);
 Bódis et al. (2021): Van-e elég fenntartható biomassza Magyarországon? - Országjelentés a szilárd biomassza keresleti és kínálati oldaláról; Bioenergie-Atlas Österreich, 2023)

Development of the composition of biomass used for energy purposes between 2019-2022

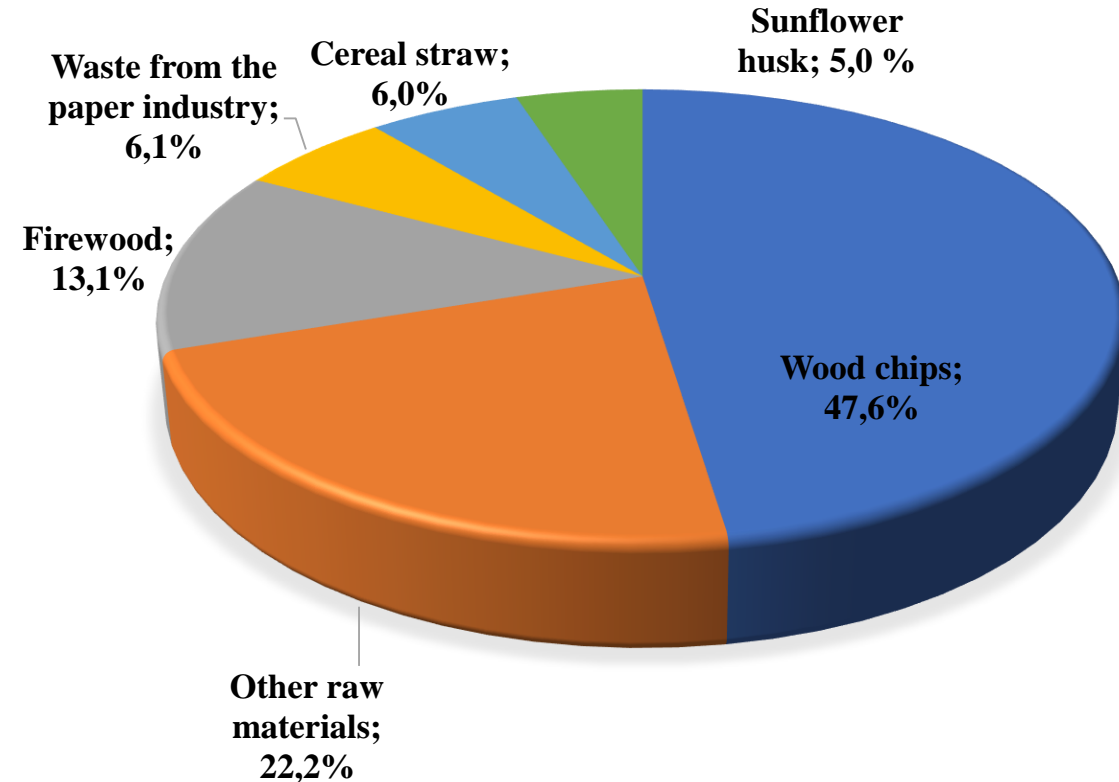
- The domestic biomass consumption for energy purposes was 3.93 million tons in 2022.
- Using wood chips is dominant.
- Compared to 2019, 23.8%, nearly 250,000 tons more was burned in the power and heating plants.
- There was also an increase in firewood and raw materials for the processing industry (by 10.3 and 4.9 %), while there was a decrease in the other main categories. The use of herbaceous fuel fell by the greatest extent, which was nearly 20 percent less in 2022 compared to the 2019 value.



Forrás: AKI ASIR

Development of the main raw material categories of biomass used for energy purposes and their total use between 2019-2022

Biomass raw materials of power plants and heating plants

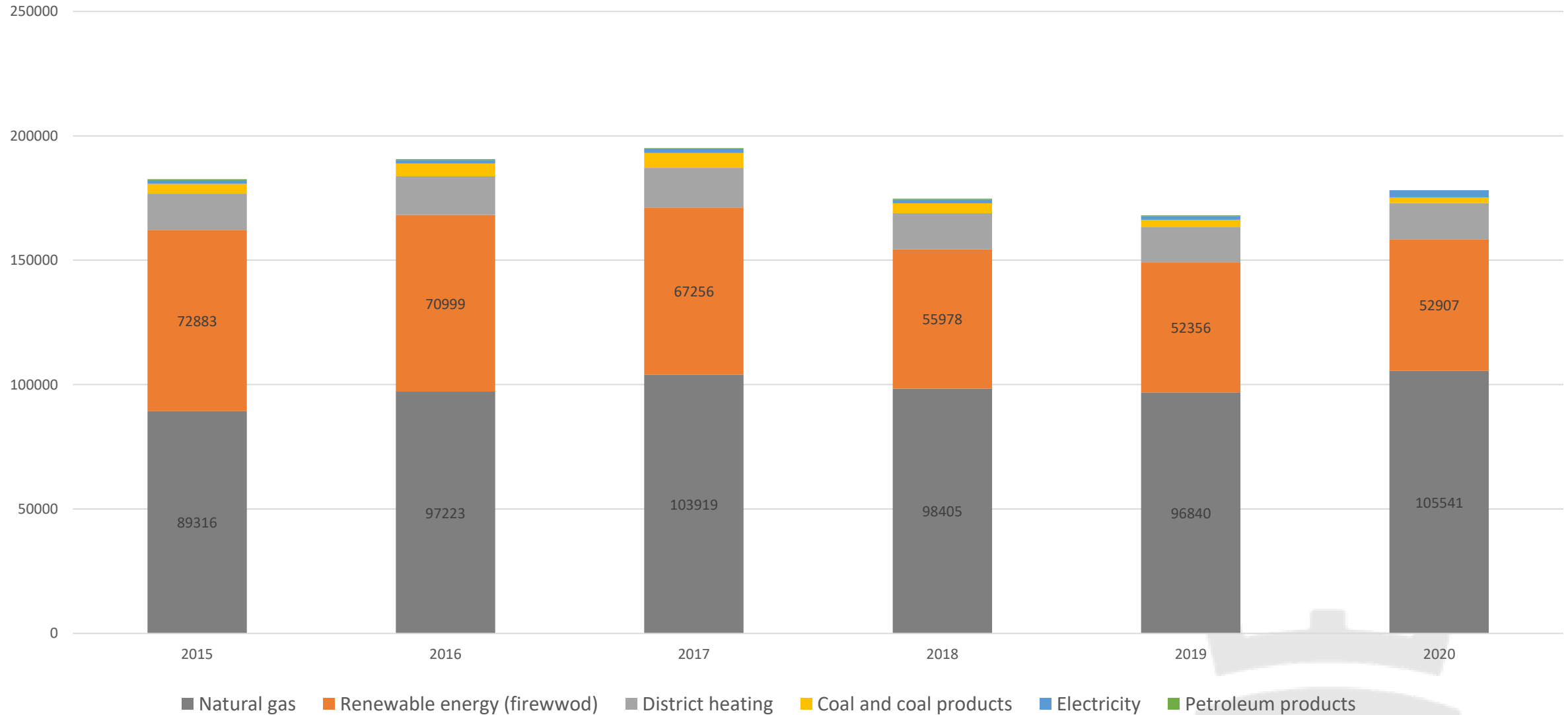


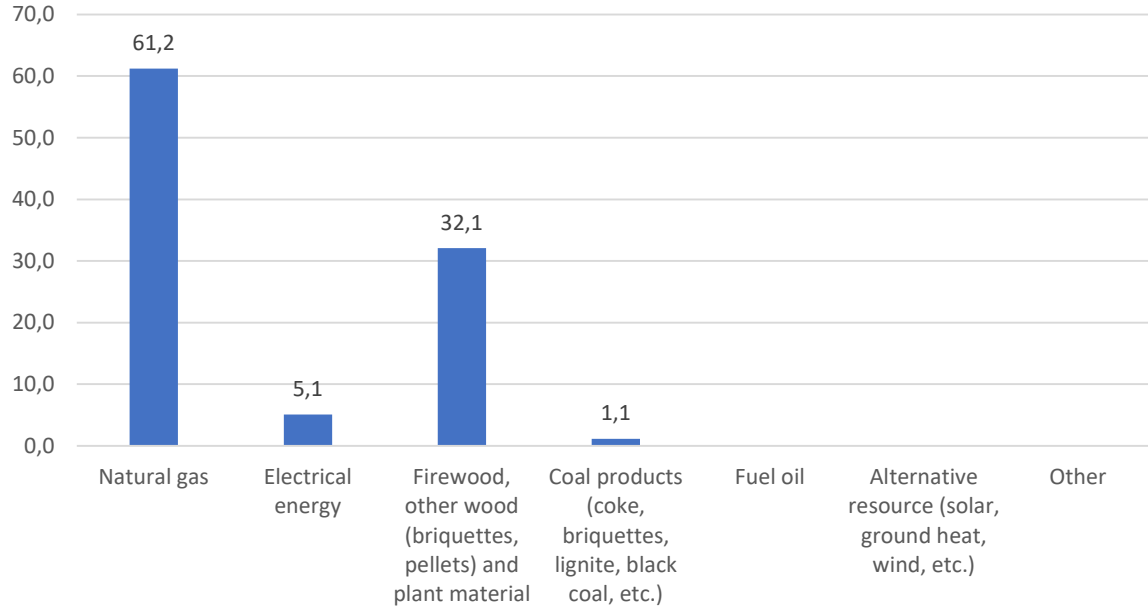
- In 2022, power plants and heating plants used wood chips in 47.6% (1258 thousand tons) for their energy production.
- Firewood (rolled, balled, logs) 13.1%, sunflower husk 5%, cereal straw and paper industry waste are 6.0 and 6.1%.
- Other raw materials are 22.2%.
- Others → municipal waste more than 5.2% and timber by-products 3,6% share in biomass-based energy production in 2022.

Biomass use of power plants and heating plants in proportion to the main raw materials, 2022



Households energy consumption (heating) [TJ]

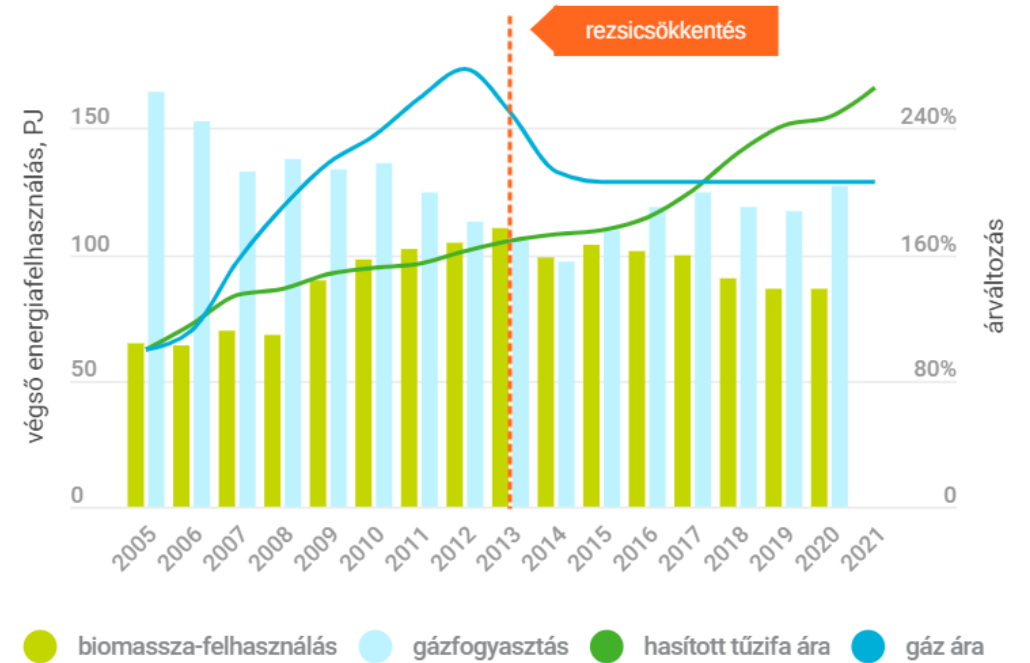




Distribution of apartments by energy source used for heating in 2021 [%]

Fuel oil, solar ground heat, wind other - the data is not known; without district heating

Estimate: 1.5 million households have equipment suitable for burning firewood a significant part would use official price firewood → 10-15 million m³ demand/year, for this 20-30 million m³ extraction



Development of residential biomass and natural gas consumption (left) and the price of natural gas and chopped firewood (right)

The amount of wood that can be used for energy purposes in the following years

Wood energy sources can be classified into four groups:

- firewood;
- harvesting losses (cutting site waste, cleaning and thinning materials, bark, stumps, branches);
- energy tree plantations;
- timber processing waste (secondary raw materials), old wood products ("altholz").

The amount of standard **firewood** in 2021 was 3.4 million m³, and this corresponds to 52.8% of the net wood production, so at least half of the wood extracted from the forests can be used for energy purposes in the longer term.

A significant amount of **harvesting losses** could be collected for energy purposes.

According to estimates, 10% of the gross wood production could be collected, chopped, and used. About 1.2 million m³ of harvesting losses remains in the forests (Németh et al. 2013).

10-20 m³/ha/year of wood can be obtained with dendromass produced on **energy plantations**, but Molnár et al. (2013) study (in the case of adequate funding and support), not even half of the 50,000 ha plantation area projected for 20 years was reached in 15 years, there are only a few thousand hectares of energetic tree plantations in our country.

During the production of wood products, by-product is also produced (**timber processing waste**), a part of which can be used for energy purposes.

Overall, it can be said that a significant amount of dendromass raw material and wood processing by-products is available for energy use.

Forest plantation - The Decree 135/2017 (VI.9.)

- The Decree 135/2017 (VI.9.) provides that woody plantations can only be established in areas of at least 5,000 square meters.
- The woody plantation are classified:
 - rolling energy plantation: there are kept up to 20 years, intended for energy recovery;
 - copping energy plantation: there are at most 5 years of rotation, intended for energy recovery;
 - woody industrial plantation: for the production of wood raw material.

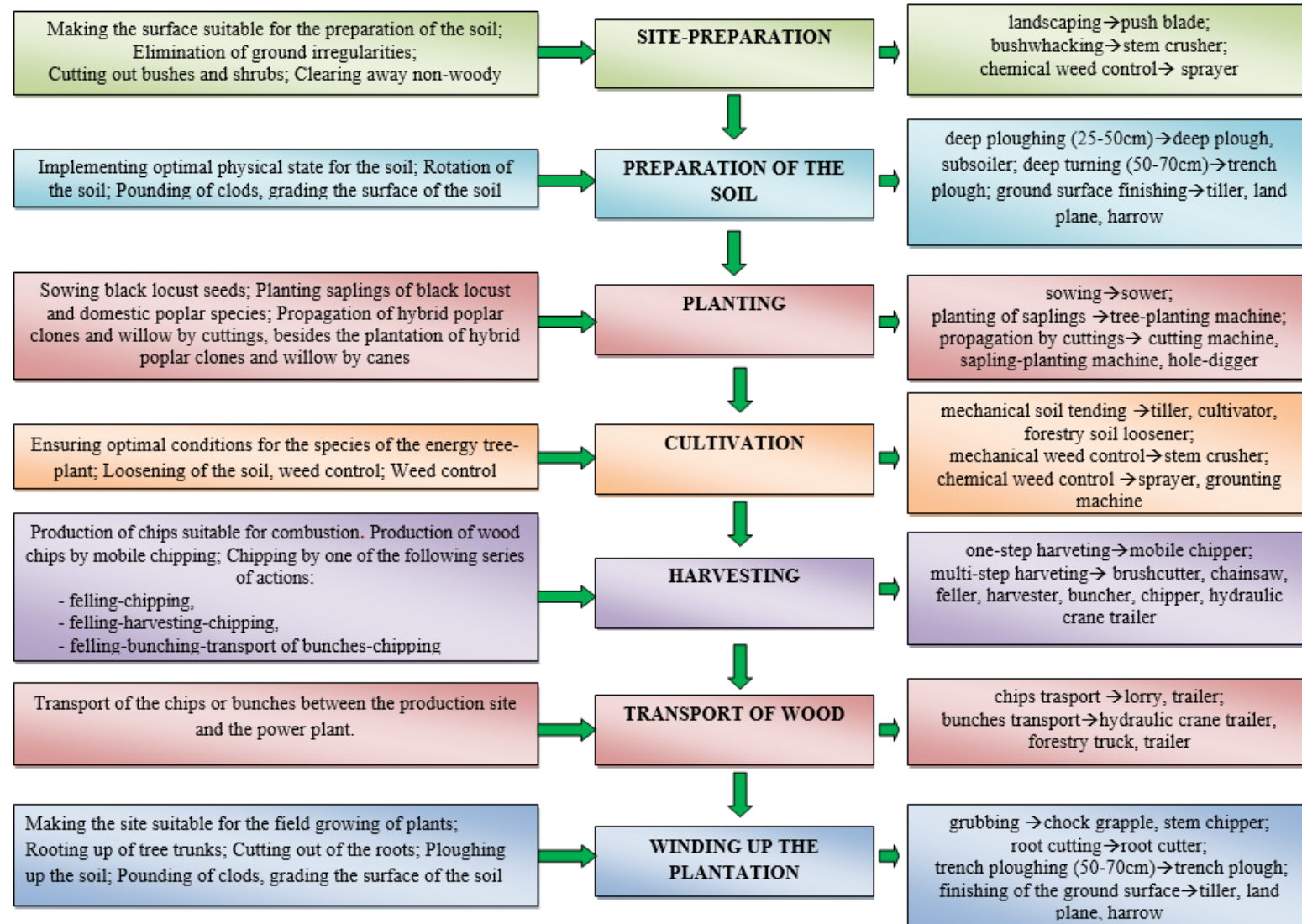


Characteristics of a woody plantation

- the area stays in the ARABLE cultivation branch, does not need to be reclassified as FOREST;
- production of wood for energetic and industrial purposes;
- care and maintenance can also be done with agricultural machines;
- slurry, sewage sludge, sewage sludge compost can be placed;
- sales: wood processing plants, export possibility.



The actions and the corresponding machinery required in the cultivation technology of energy tree-planting





(Source: Dr. Bálint Heil)

Two-year-old poplar plantation Sárosd



Mechanical single harvesting



By mechanical single harvesting the base cutting and chopping happens at once. The used machines do the felling, the chopping and deliver it to a storage unit (container, trailer).

(Source: Dr. Bálint Heil)



Mechanical multiple harvesting

In case of mechanical multiple harvesting the harvest and chopping of timber in different time – in some cases on different places – comes true.



**Tomorrow it will be continued
on the field day in Gógánfa.....**



The University of Sopron wants to contribute to the increase of decentralized energy production and the enhancement of supply security, therefore...

1. Main Campus → Efficiency: 1700 kW
2. Benedek Elek Faculty of Pedagogy: 850 kW
3. Dormitories of University in Baross street: 700 kW

And the building has started....



Thank you for your attention!

