



Main biomass fuels for heating comprise raw materials from forestry and wood processing industries

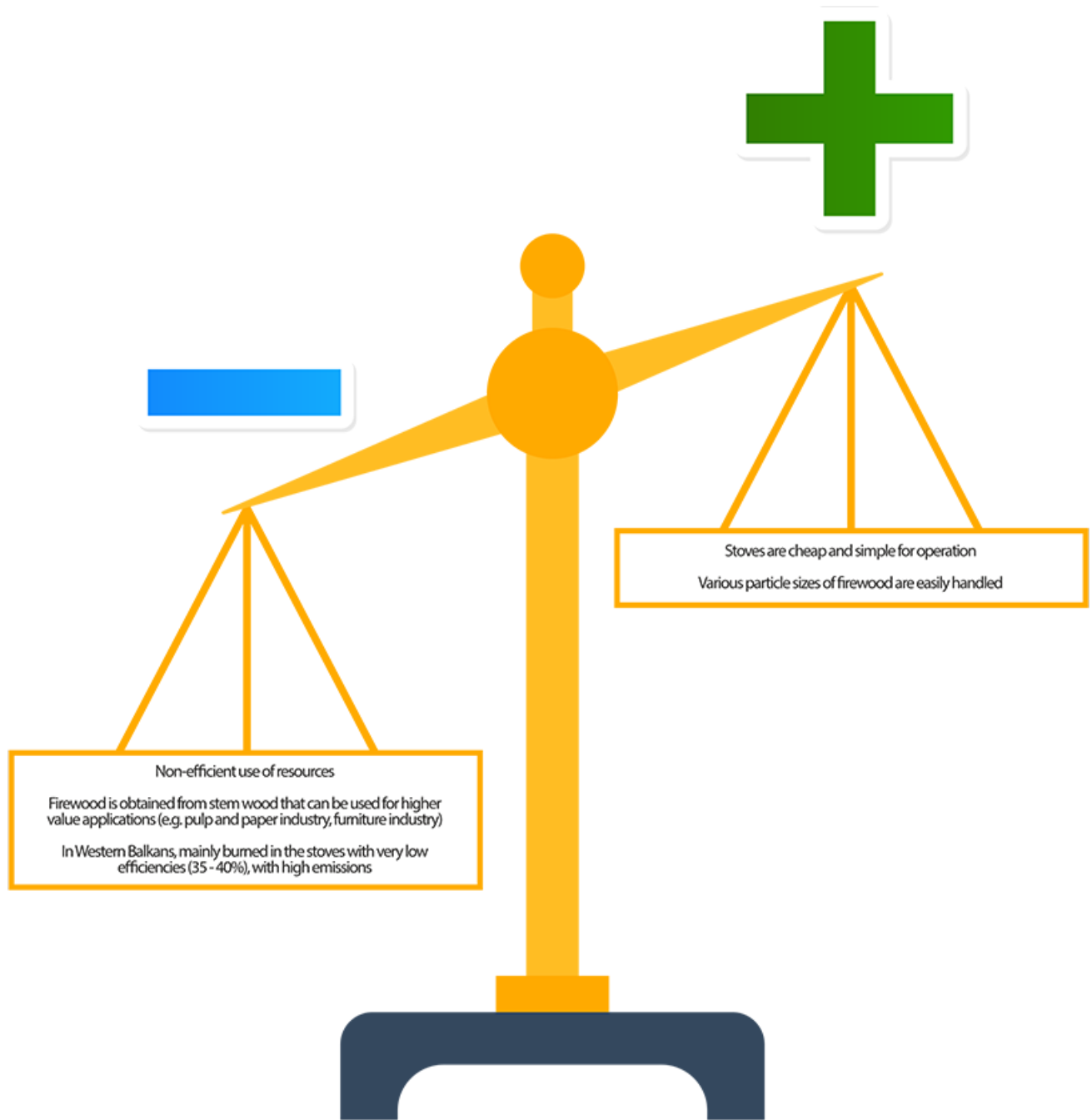
FIREWOOD (FUEL WOOD, WOOD LOGS)

Firewood is most used fuel for heating in the Western Balkans and covers 42% of annual heat demand. However, there is a need to improve the efficiency of the firewood use. Cut and split oven-ready firewood is used in wood-burning appliances like stoves, fireplaces and central heating systems. Firewood usually has a uniform length, typically in the range between 150 mm to 1000 mm. Log wood is cut wood in which most of the material has a length of 200 mm and above.

Pros and Cons of the use of firewood for heating (*Figure 1*)

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WOOD CHIPS

Despite being the cheapest wood fuel in the Western Balkans - consumption of wood chips for heating is negligible, while more than 60% of wood chips production is exported. Wood chips are generally available with moisture contents between 20–55% (heating value is in the range of 2.35 - 4.18 kWh/kg).

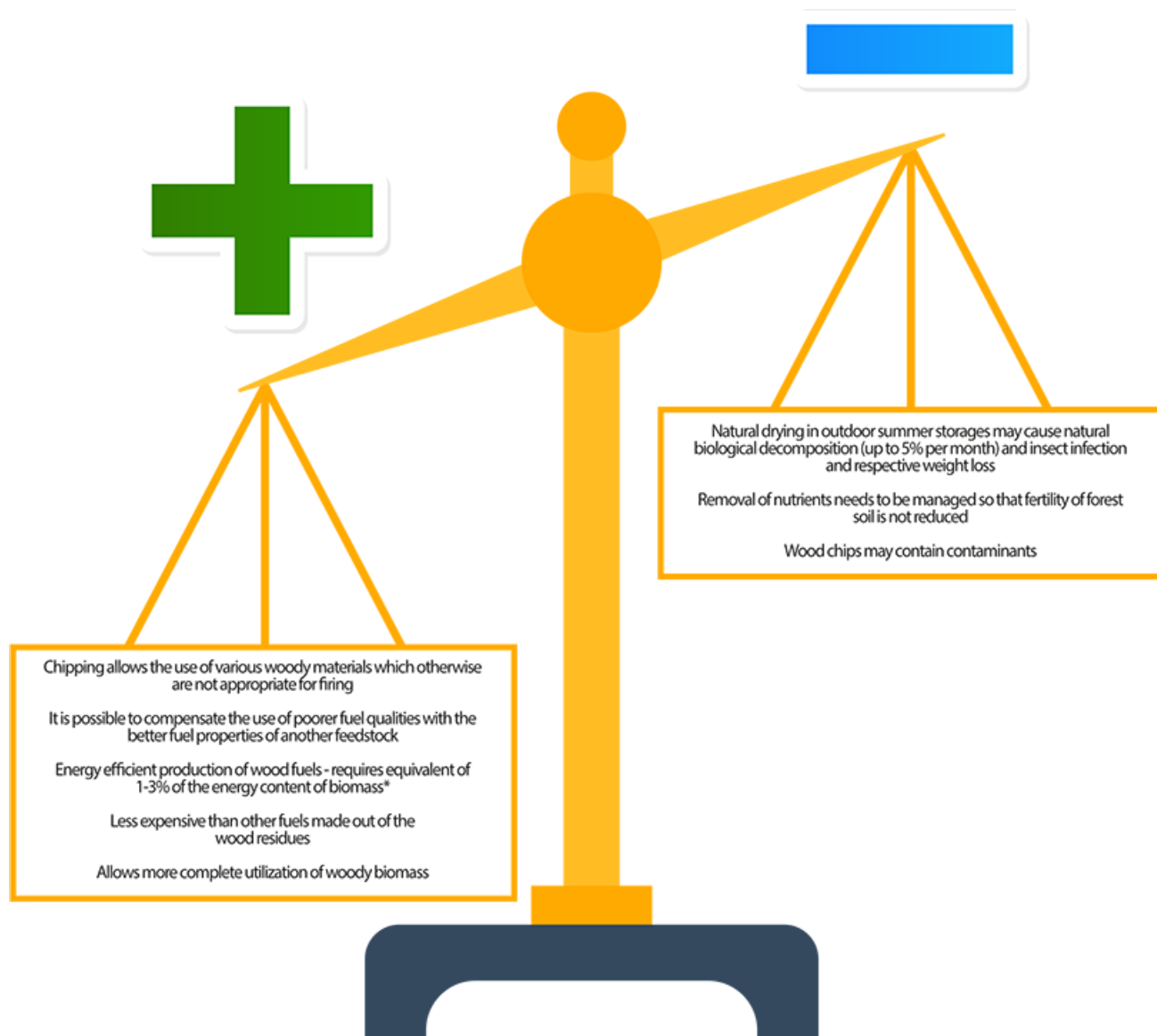
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Chips derived from wood stems have a higher quality and contain fewer impurities, compared to the chips from the residual woody material, but they are also more expensive. Larger and less uniform chips from residual wood are more suitable for large-scale utilization, while smaller and more refined chips are more appropriate for the small-scale application.

Use of wood chips with high moisture content leads to higher use of wood to produce the required heat and also contributes to higher particle emissions, that have a negative public health impact, especially in urban areas.

Pros and Cons of the use of wood chips for heating (Figure 2)



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WOOD PELLETS AND BRIQUETTES

Wood pellets, manufactured in accordance with the technical standard ISO 17225-2 have a maximum moisture content of 10%, and the lower heating value of 4.68 kWh/kg. They are manufactured from the heart wood, excluding the bark, small branches, and sawmill residues, without the use of adhesives, in diameters of 6, 8 and approximately 10 mm.

Agricultural pellets are made from grinded or milled biomass, as cylinders of diameter <25mm, with random length. Specification of properties of agricultural pellets produced from cereal straw and miscanthus, according to EN ISO 17225-6:2014.

Technical standard ISO 17225-6:2014 determines the fuel quality classes of agricultural pellets produced from herbaceous or fruit biomass, or biomass blends and mixtures, for heating of residential, small commercial and public buildings, as well as industrial applications. Agricultural pellets have high ash, chlorine, nitrogen and sulfur content and major element contents, and may result in fouling, slagging and corrosion inside boilers. Therefore, they should be used in specially designed or adjusted appliances – pellet burners tested according to EN 15270 or pellet boilers tested according to EN 303-5.

The mechanical durability of pellets is a measure of the degree to which pellets remain intact during fuel delivery, storage and handling. Good quality pellets should have a mechanical durability of at least 97.5%, meaning that less than 2.5% of the pellets will be broken down after handling, and have no more than 1% of fines.

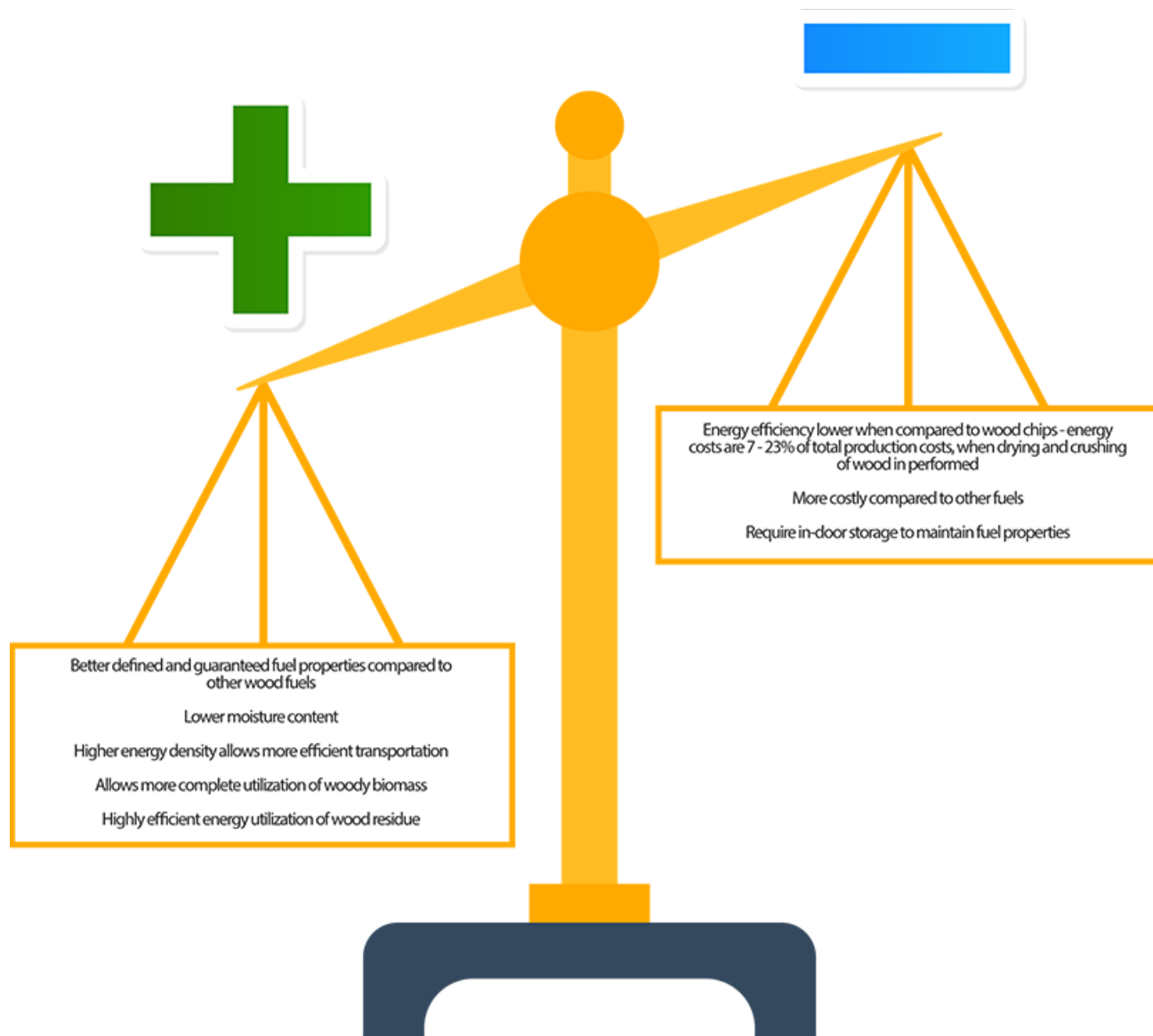
The briquette form of biomass fuels facilitates easy transportation and enables better handling and storage. Briquettes have typical diameter of 30-100 mm. The main advantages of the briquettes are:

- easy to handle, transport, and store;
- uniform in size and quality;
- reasonably good substitute for coal, lignite, and firewood;
- there is no fly ash when burning briquettes;
- have a consistent quality, high burning efficiency, and are ideally sized for complete combustion; combustion is more uniform than coal combustion;
- easy to ignite, burns continuously, and has a long burning duration.

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Pros and Cons of the use of wood pellets and briquettes for heating (Figure 3)



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