

**INFORMATION SHEET ON THE ECOLOGICALLY RELEVANT RESULTS OF THE
PRODUCTION OF WOOD PELLETS REALIZED AT SÄGEWERK SCHWAIGER,
HENGERSBERG**

Summary on the final report from 27/03/2008

By order of:
Sägewerk Schwaiger GmbH & Co. KG



Compiled by:

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In 2006 an integrated pellets production plant combined with a biomass-driven heating power station was put into operation at Sägewerk Schwaiger in Hengersberg.

The supply of wooden chips accumulated at the sawmill to the pellet production plant as well as the supply of bark to the heating power station is made at short distances by means of conveyors and omitting transportation by trucks. Beside the efficiently used drying heat of 50,000 MWh_{th} for the pellet production plant, warmth with a volume of 29,000 MWh_{th} for the sawmill as well as environmentally-friendly current with a volume of 11,228 MWh_{el} was generated at the heating power station in 2007 from which, however, the current used for meeting our business objectives is to be deducted so that round 8,950 MWh_{el} were fed into the public supply network. 88,706 t of wood pellets were produced at the pellets production plant.

In contrast to that, conventional pellets production plants are supplied by trucks and supplied by heating stations where electricity is not generated directly.

By means of a study prepared by the ZAE Bayern (Bayerisches Zentrum für Angewandte Energieforschung e. V. [Bavarian Centre for Applied Energy Research, registered association]) in March of 2008, the emissions of greenhouse gases and the consumption of non-renewable primary energy in 2007 were computed on the basis of the prevailing conventional conditions and compared with alternatives.

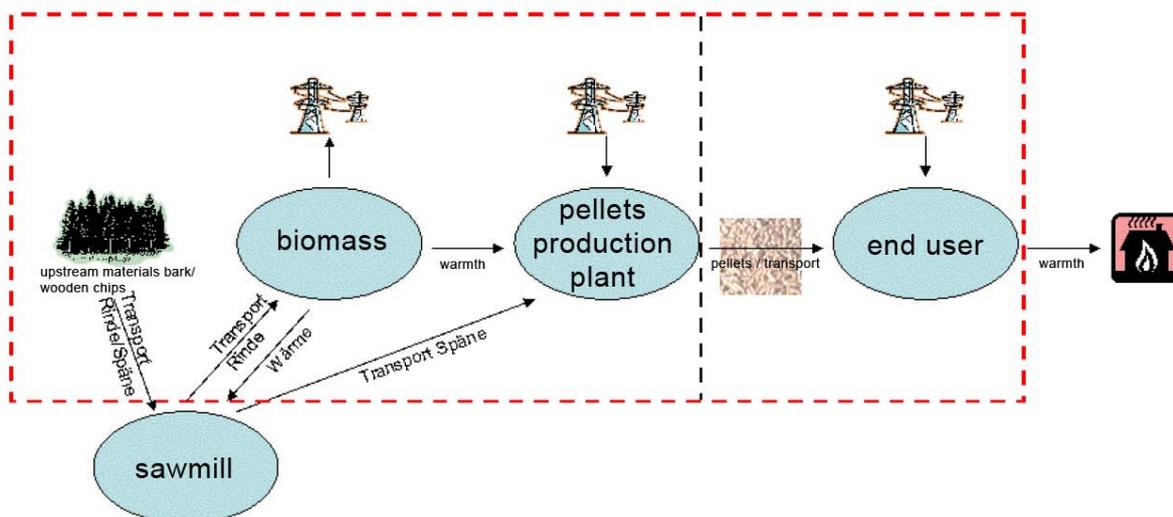


Diagram 1: Depiction of the essential material and energy flows regarding the production of pellets at Sägewerk Schwaiger, Hengersberg. Both the production of 88,706 t of wood pellets (ex pellet production plant) and the generated warmth of 335,000 MWh/a utilizable on the part of the end user (ex heating room) serve as a reference value.

The results can be summarized as follows:

Balance of the pellets production

Through that, the equivalent emissions of CO₂ and the requirements of non-renewable primary energy were balanced by showing the consumption on the way from timber industry to the pellets production plant.

Diagram 2 shows the emission of greenhouse gases resulting from the production of wood pellets in 2007 with 1,424 t of CO₂ emitted by Sägewerk Schwaiger. For producing the same amount of wood pellets the conventional way 10,900 t of CO₂ would have been emitted.

Accordingly pellets by Sägewerk Schwaiger are produced with an emission value that is sevenfold lower, cutting down round 9,500 t CO₂ per year alone in production. This is equivalent to emissions of round 79 m. of kilometres covered by motorcars (with reference to the threshold of 120 g CO₂/km set by the EU).

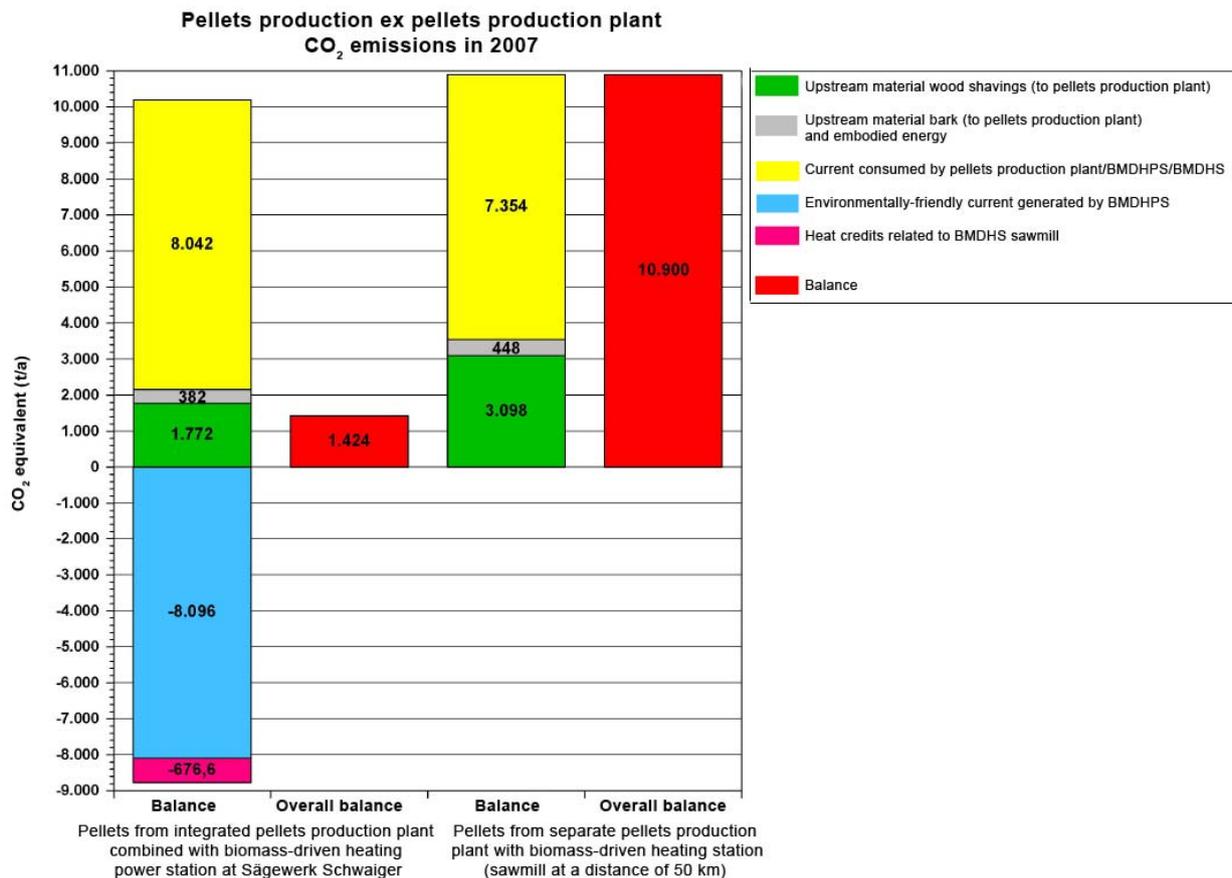


Diagram 2: Absolute equivalent CO₂ emissions resulting from the pellets production realized at Sägewerk Schwaiger (left) and emissions resulting from conventional production (right) in 2007. Compared with conventional pellets production, pellets by Sägewerk Schwaiger are produced with an emission value that is sevenfold lower.

The difference regarding the consumption of non-renewable resources is even more obvious. Diagram 3 shows the total energy consumption in conjunction with the production of 88,706 t of wood pellets in 2007. With an energy consumption of 39,119 MWh/a that is necessary for the conventional pellets production, ten times as much non-renewable primary energy is needed compared with the energy of 3,628 MWh/a consumed for the production at Sägewerk Schwaiger.

This energy efficiency is possible mainly because of the generated environmentally-friendly current based on the combination of power and heat generated at the biomass-driven heating power station, short haul distances and the supply of warmth to the sawmill.

Regarding combustible materials, for the calorific value that is equal to one kWh, primary energy of only 0.0085 kWh is consumed at Sägewerk Schwaiger whereas 0.0919 kWh_{primary energy}/kWh_{calorific value} is necessary in conjunction with conventional production. Regarding natural gas a reference value of 1.118 kWh_{primary energy}/kWh_{calorific value} was calculated.

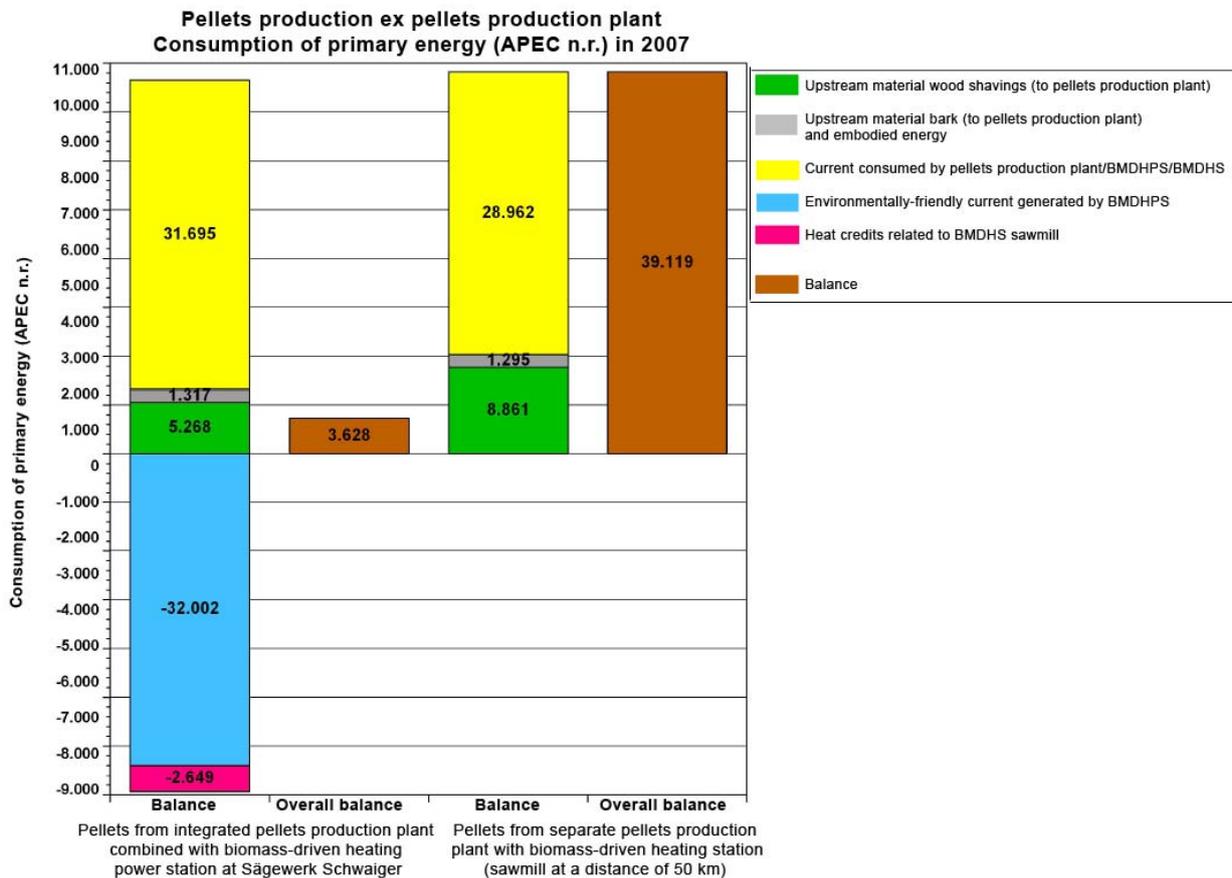


Diagram 3: Non-renewable accumulated consumption of primary energy (APEC n.r.) of Sägewerk Schwaiger (left) and in conjunction with conventional production (right) in 2007. Primary energy of more than 35,000 MWh/a was cut down by Sägewerk Schwaiger.

Balance of the generation of utilizable heat

With this balance regarding warmth ex heating room, transportation of combustible materials, conversion into warmth, as well as auxiliary current requirements were taken into consideration additionally.

Cutting down CO₂ emissions in conjunction with production leads to a reduction of CO₂ emissions by half with the end user (see diagram 4). Compared with state-of-the-art gas-condensing boiler technology, CO₂ emissions are reduced by a factor of 9. This is equivalent to 79,000 t of CO₂ cut down per year.

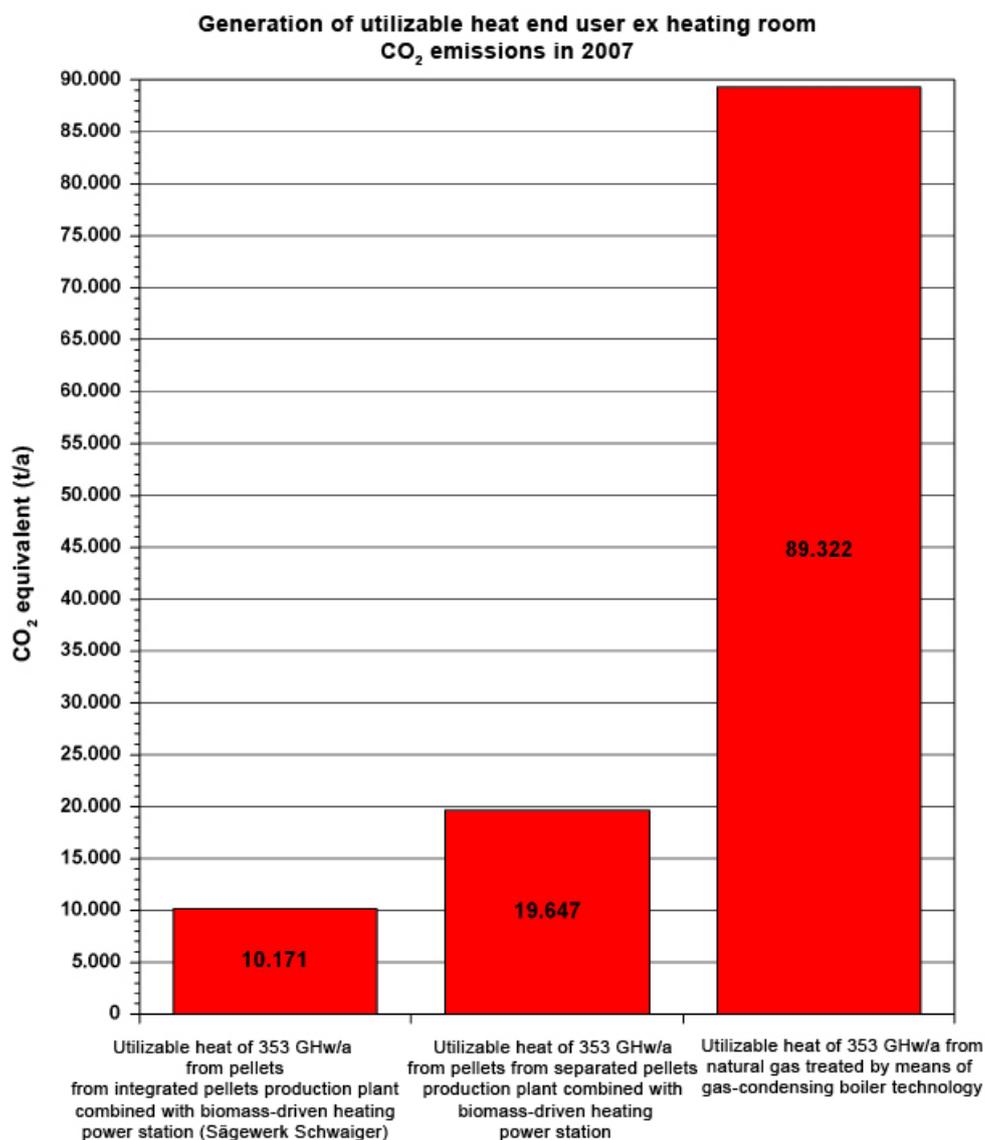


Diagram 4: CO₂-equivalent emissions resulting from the warmth generated by pellets by Sägewerk Schwaiger (left column), by conventional pellets (middle column) and by means of gas-condensing boiler technology (right column) in 2007.

Diagram 5 shows the non-renewable accumulated primary energy consumption in conjunction with the generation of 335,000 MWh of utilizable heat for which natural gas or 88,706 t of pellets are to be used.

If pellets by Sägewerk Schwaiger are used as combustible material, primary energy of 38,000 MWh/a is needed. This is equal to a reduction by half compared with an energy consumption of 81,000 MWh/a in conjunction with conventional pellets. When using gas-condensing boiler technology, an energy amount of 425,000 MWh/a is needed which corresponds to an increase by the factor of 11.

As a consequence, energy consumption was cut down by 43,000 MWh/a, compared with conventional pellets. This is equivalent to the conventional heating energy requirement of a small town with more than 6,000 inhabitants.

Regarding the warmth generated by pellets of Sägewerk Schwaiger, the specific value of non-renewable primary energy per one kWh of utilizable heat is 0.108 kWh whereas regarding conventional pellets the specific value of primary energy per one kWh of utilizable heat is 0.229 kWh; regarding the warmth generated by means of gas-condensing boiler technology this specific value of primary energy per one kWh of utilizable heat is 1.202 kWh.

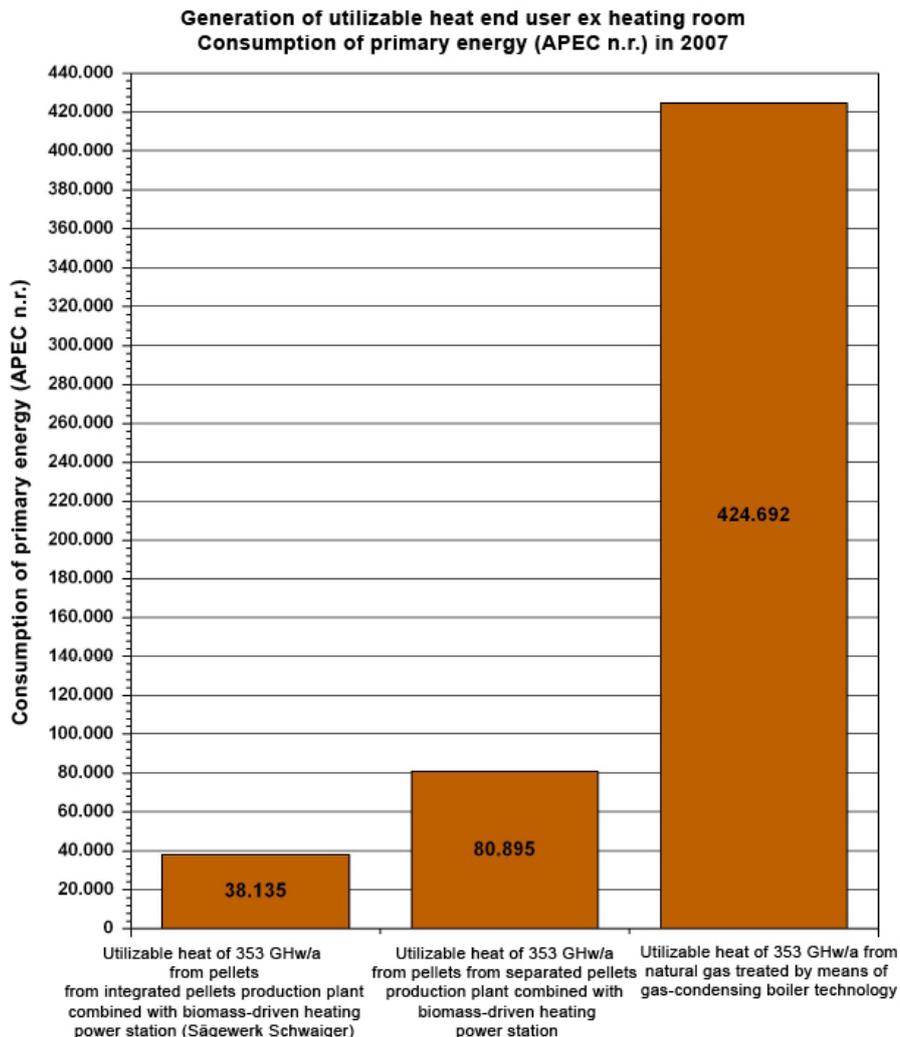


Diagram 5: Non-renewable accumulated primary energy consumption (APEC n.r.) regarding the warmth generated by pellets by Sägewerk Schwaiger (left column), by conventional pellets (middle column) and by means of gas-condensing boiler technology (right column). The utilizable heat (353,000 MWh/a) that results from the production of pellets (88,706 t) in 2007 serves as reference value.

Comparison of the sources of energy

The non-renewable primary energy consumption per one kWh of energy content (heat of combustion) was found out by comparing different sources of energy and combustible materials which normally are used for heating a building at the time of the handover of a house. According to this comparison, shown in diagram 6, the consumption of primary energy in conjunction with wood pellets by Sägewerk Schwaiger is extremely low.

Sources of energy ex handover house
Specific primary energy consumption (APEC n.r.) in 2007

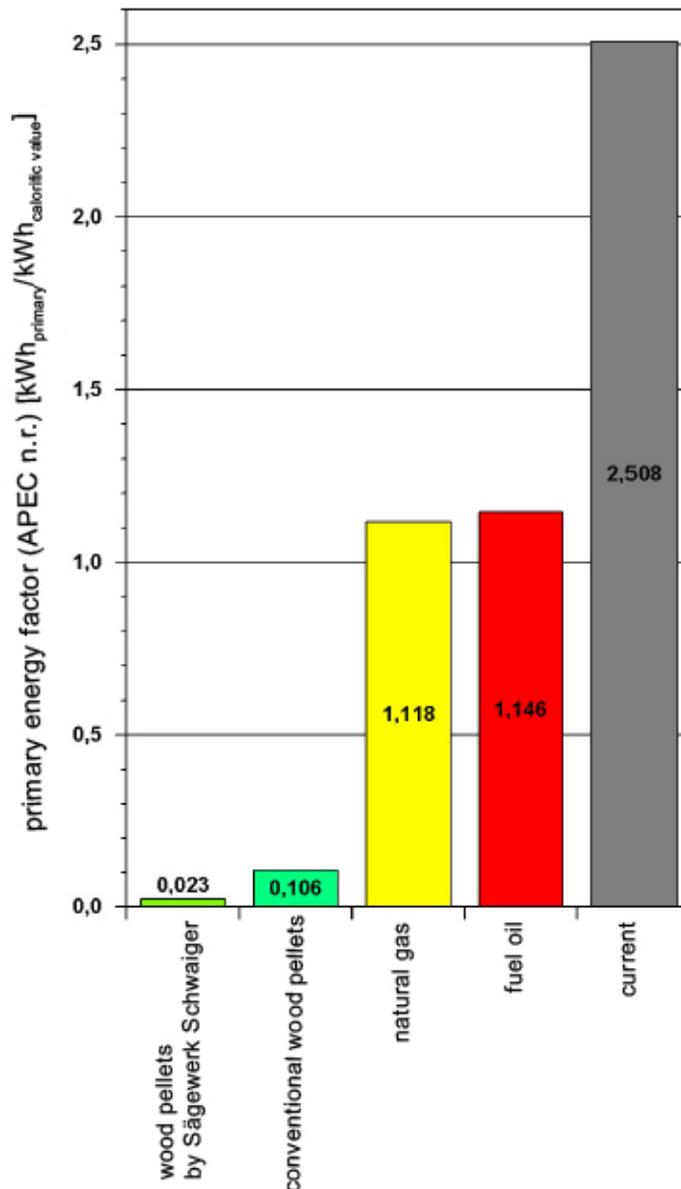


Diagram 6: Specific primary energy consumption (APEC n.r.) regarding the sources of energy ex handover house with end user. Beside pellets by Sägewerk Schwaiger (left) and pellets produced the conventional way, fuel oil and natural gas as combustible materials which are used for heating a building normally, as well as current (for electric heating systems), are shown. According to this comparison, wood pellets by Sägewerk Schwaiger are to be seen as a sensationally ecological combustible material.

Beside the consequences for ecology, the non-renewable primary energy consumption also serves as an important economic indicator regarding the dependence on the import of fossil fuels.

Conclusion

The installation consisting of a sawmill, a biomass-driven heating and power station and a pellets production plant, established at Sägewerk Schwaiger, corresponds to the capacity. The optimal result, which was noticed concerning carbon footprint and primary energy consumption, is based on the integral overall programme. This overall programme serves as a role model and should be an example for future projects.