

We heat Co2 neutral - for the sake of the climate!

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**EIGER COLLECTION®**  
HOTELS GRINDELWALD



**KIRCHBÜHL**  
HOTEL★★★★ GRINDELWALD



# Holzenergie is carbon neutral

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The consequences of climate warming are especially noticeable in Grindelwald, since Glaciers and permafrost areas are dwindling in the region. This is precisely why we decided to make an active contribution to the protection of the local climate by adopting CO<sub>2</sub>-neutral heating systems.

District heating for most of our local Hotels, public buildings and private households now comes mostly from local wood chips. We rely on modern equipment that delivers 100% of our energy needs for heating and hot water via the transmission line.



This initiative originated from a group of Grindelwalder hoteliers, who worked together in 2006 to plan and develop a comprehensive and carbon-neutral heating network.

The ambitious local project for a wood heating plant took an investment volume of CHF 17.8 million and construction would only be completed and fully operational around September 2010. It allowed for yearly cuts of around 1.6 million litres of heating oil and 4300 tonnes of Co<sub>2</sub>.

The Hotel Kirchbühl has been using this system ever since, and its superior performance and environmental value speak for themselves.

# All around climate friendly with a natural CO<sub>2</sub> cycle

When wood is burnt, the released CO<sub>2</sub> volume is exactly the amount that same tree absorbed during its growth process. The same levels of carbon dioxide gas would be released gradually if the tree were to be left alone in the forest until its decay.

## Unused wood gradually releases CO<sub>2</sub>

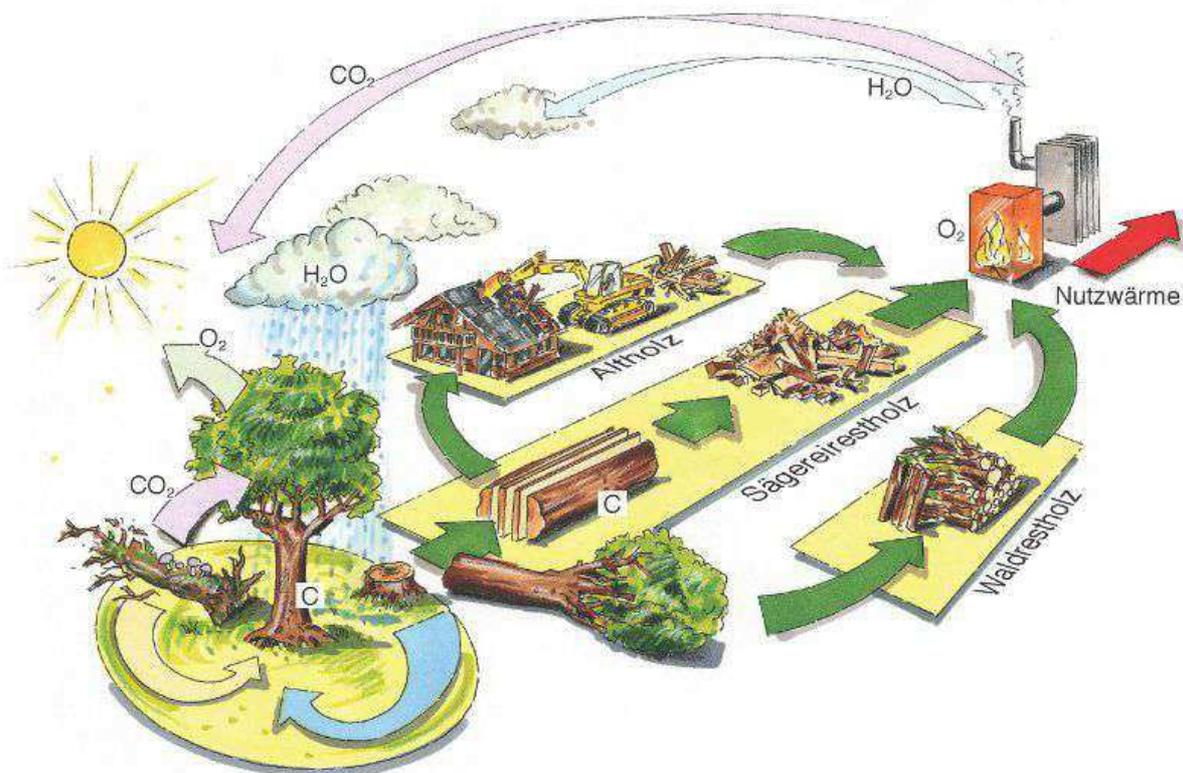
In the course of their lives, trees absorb large quantities of carbon dioxide (CO<sub>2</sub>) from the atmosphere which is processed into the carbon (C) they require for growth and oxygen (O<sub>2</sub>) they release back into the environment.

A 25 m high beech thus releases the amount of oxygen daily that three people must breathe to stay alive. If a tree is not cut down, it eventually dies and the bound carbon (C) again turns into CO<sub>2</sub> and is released back into the atmosphere – thus completing a cycle.

## CO<sub>2</sub> circulation with wood use

If the tree is used and processed into wood products (buildings, furniture, etc.), its carbon (C) is bound therein. When these wood products are no longer needed, they can be used for energy production.

In this case, or even when used directly as firewood, the released CO<sub>2</sub> exactly matches the amount which the tree originally absorbed from the ambient air during its lifespan. In this way, the CO<sub>2</sub> cycle of wood is closed, meaning there are no additional emissions into the atmosphere as it happens with fossil fuels.



# WOOD HEATING PLANT GRINDELWALD

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The Grindelwald wood-fire heating plant is the first heating plant in Switzerland that was conceived to be fully comprehensive, covering all steps from combustion to air conditioning and heat recovery.

It is equipped with two wood boilers with a capacity of 3200 kW and 1200 kW, working together with an exhaust gas condensation heat exchanger with a capacity of 700 kW and a backup oil boiler (5000 kW) that's only used for covering the coverage of energy consumption peaks.

Besides relying on the most modern Electro filters for cleaning, the exhaust gases are separated by a special dehumidifier. This way, the formation of the typical steam trap at the exit of the fireplace is prevented.

Intricately woven remote lines connect all heaters, and can thus supply all needed energy for heating and hot water, solely from the burning of woodchips, sawmill wood and old wood from the region. This is the tried and true formula to create CO<sub>2</sub>-neutral heat energy.



## TECHNICAL SPECIFICATIONS

Type of installation:	Woodchip heating with dewatering
Special feature:	First wood-fire heating plant in Switzerland Full swathing including heat recovery, combustion and air conditioning
Fuel requirement	21'600 Srm (shaking volume) in the final version Consists of wood chips, wood, Landscaping, Sawmilling, Oldwood etc.
Heat output:	3.2 MW wood boiler 1 incl. ECO Heat exchanger (about 200 kW) 1.2 MW wood boiler 2 incl. ECO heat exchanger (about 75 kW) 0.7 MW Exhaust gas condensation heat exchanger 5.0 MW peak load and emergency boiler oil
Heat production:	approx. 13'500 MWh / a This represents savings of 1.6 million litres of fuel oil per year as well as 4300 tonnes of CO <sub>2</sub> .
Investment costs:	approx. 17.8 million CHF
Commissioning::	September 2010

# Specification

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## Heat production

approximately 13'500 MWh / a

This means that around 1.6 million litres of fuel oil and 4300 tonnes of CO<sub>2</sub> are saved each year, which corresponds to the yearly CO<sub>2</sub> emissions of approximately 1'140 cars!

## Heat Output

3.2 MW wood boiler 1 incl. ECO heat exchanger (approx. 200 kW)

1.2 MW wood boiler 2 incl. ECO heat exchanger (approx. 75 kW)

0.7 MW Exhaust gas condensation heat exchanger

5.0 MW peak load and emergency boiler oil

## Fuel Demand

21'600 cubic metres in final construction consisting of wood chips, wood Landscaping, Sawmilling, Old wood etc.

## Fuel Bearing Wood

Filling volume approx. 1'700 m<sup>3</sup>

## Fuel storage petroleum extra light

Net Volume approx. 40'000 litres of oil extra-light

## Emissions

De-waxing prevents the formation of steam on the chimney

Fine dust	< 20 mg / Nm <sup>3</sup>
Nitrogen oxides NO <sub>x</sub>	< 250 mg / Nm <sup>3</sup>
Carbon monoxide CO	< 250 mg / Nm <sup>3</sup>

## Heating Memory

Heating accumulator 2 pcs with 26'000 litres each

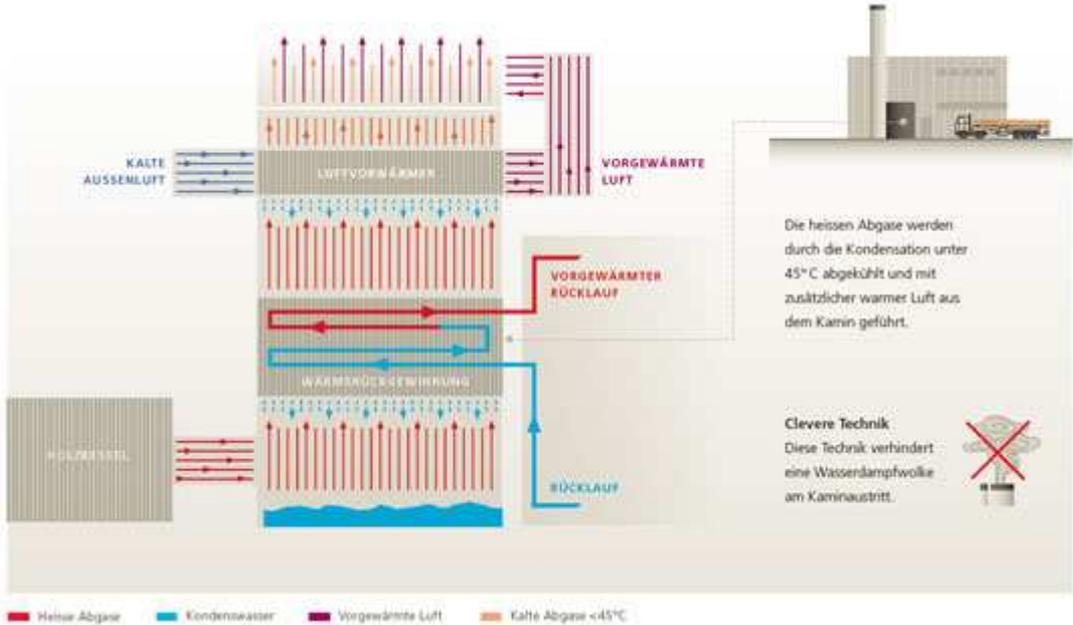
## Long-Distance Line

Development End of July 2010	Total 3'340 track meters
Development end of December 2010	Total 894 track metres
Development End of July 2011	Total 256 track metres
<b>TOTAL</b>	<b>Total 4'490 track meters</b>

# FLUE GAS CONDENSATION and DISCHARGE

Through the use of wood chips as a fuel, the flue gases contain after the combustion plenty of water in the form of steam. This steam is recovered and condensed to generate further energy; an additional heat output of 700 kilowatts can be obtained with this highly efficient method. However, part of the air humidity remains in the flue gas. This water vapor can easily cause unwanted ice deposits at the exit from the chimney as it hits the cold ambient air.

To prevent this phenomenon, special treatment is given to the leftover flue gas before being released. Pre-heated dry ambient air is supplied to the escaping flue gas to reduce its relative humidity and avoid unwanted condensation upon the chimney exit. Thanks to this modern technology, the Mountain View in Grindelwald remains undisturbed by the heating facilities.



# DISTRIBUTION NETWORK



## Heat Consumers

Over 50 customers, including numerous hotels, public buildings and individual single and multi - family houses.

## Technical information

Total length of the trenches for all stages: approx. 4.5 km

Trench size: approx. 3 m wide / approx. 2 m deep

System temperatures: 90 ° C

System pressure: 16 bar

## Plan of the conduit wiring

