

ELWA

Power-to-Heat

P₂H systems – intelligent conversion of electrical Power-to-Heat



ELWA P₂H: More value.

Using excess energy multiplies its value.

Up to now, the efficiency of electrical power supply systems was a question of balance:

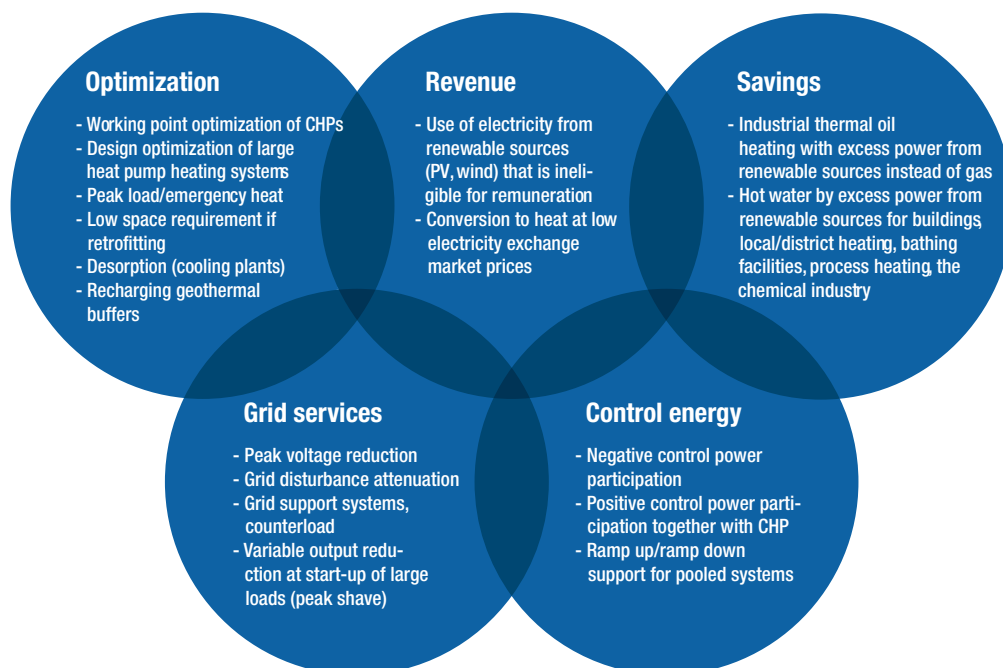
Differences between power generation and electrical energy consumption had to be balanced out by taking measures that are, to some extent, complex. ELWA has the solution – it can be easily installed used for retrofit in a space-saving manner, it lowers investment costs and pays back quickly: ELWA P₂H systems. With these systems, the excess power generated primarily from renewable energy can be utilized, which adds value with greater yield.

ELWA P₂H systems can convert excess electrical power into heat with precision down to the second, and in so doing, relieve the grid of the building and of the power supplier. Its variable control prevents the need for grid expansion at a small scale – in the building grid – and at a large scale, in European grid expansion.

Clever combinations for quicker amortization

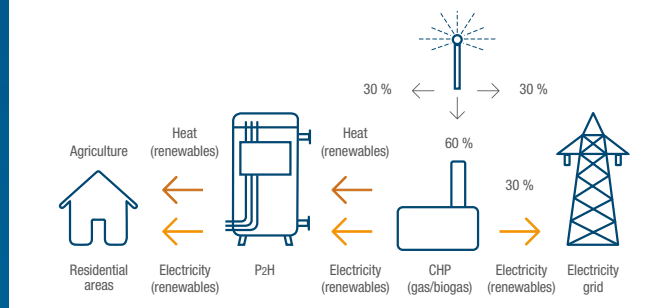
By combining several application benefits, the ecological and economic advantages are multiplied as well:

Considerable added value from investment – lower TCO, higher ROI/IRR and quicker amortization – is already occurring if two or more of the following application groups overlap.



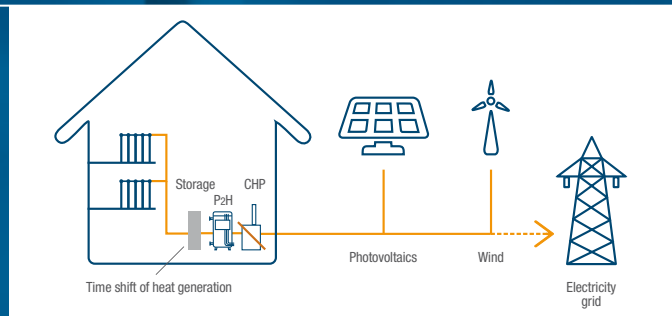
Other application advantages: ahead-of-schedule legionella treatment with excess electrical power, recharging of shallow geothermal energy buffers, reduction of primary energy factor Pf with district heating supply, return temperature increase at biomass heating, supporting variable power ability of biomass powerstations, counter-load for black start generators.

COMBINED POWER AND HEAT STATIONS (CHP)



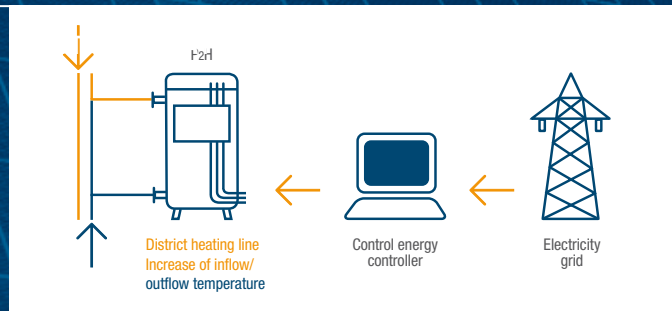
Meeting the grid operator's specification to reduce electrical supply to 30% of CHP nominal capacity due to grid overload: The CHP has to be reduced to only 60% of nominal capacity (less material stress); the P2H heater converts the excess electrical power to heat. Result: Both 90% of the heat supply and the requirement for 30% maximum grid supply are met.

USE OF EXCESS POWER



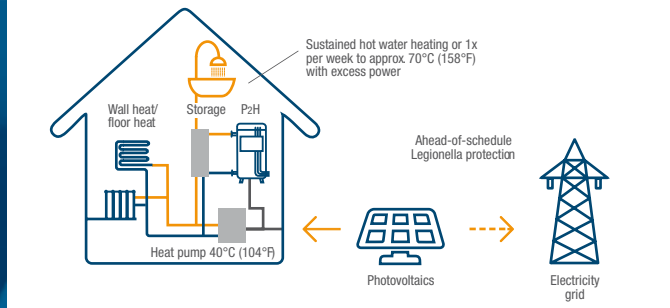
Some electrical power from renewable sources is not eligible for remuneration because otherwise, the power lines would be overloaded. The ELWA P2H system transfers the output that the grid cannot accept to the building/local/district heating system. This reduces the use of fossil energy sources. Additionally: supplemental revenue by using electricity from the grid when electricity exchange market prices are low, emergency/peak load heating.

ADDITIONAL REVENUE FROM CONTROL ENERGY



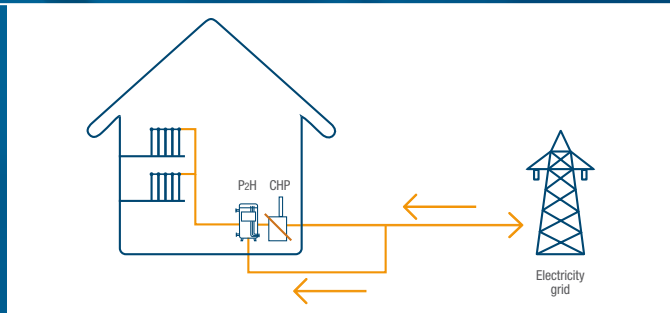
Intake of control energy (primary/secondary control power, minute reserve power as necessary) and reasonable energy use by transferring it to the heating grid. Grid relief, reduction of fossil-based power consumption, increase in maintenance interval length for the main heat source, support at pooled ramp-up and down. In addition, positive control power can be offered by switching off the ELWA P2H system on request during the offer period.

LEGIONELLA PROTECTION



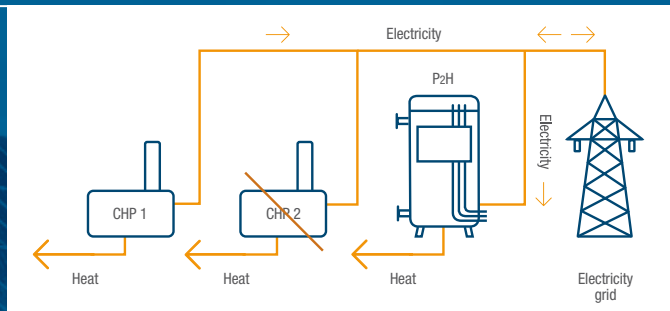
With heating systems that use heat pumps or low temperature furnaces, on appropriate days, excess electrical power that is not eligible for remuneration can be used at midday to provide ahead-of-schedule Legionella protection in the hot water tank with the ELWA P2H system (heating up to 70–75°C (158–167°F). This enables savings due to heating system design optimization with efficient, low water temperatures. In addition: emergency heating / peak load heating.

INCREASED SUPPLY SECURITY



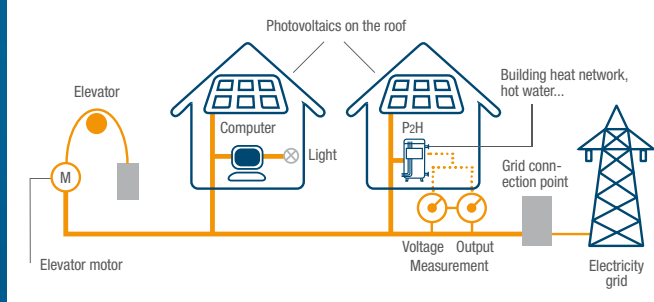
The ELWA P2H system can be used as a backup heating system to increase supply security, in particular with heating systems that have moving parts (due to malfunction, maintenance if pellets, oil or a heat pump is used) or in case of a district heating supply. Optimization of plant size and avoidance of a peak time gas heater (base fee, maintenance, chimney sweep). In addition: supplemental revenue from control energy or from not remunerated excess power.

OPERATING POINT OPTIMIZATION



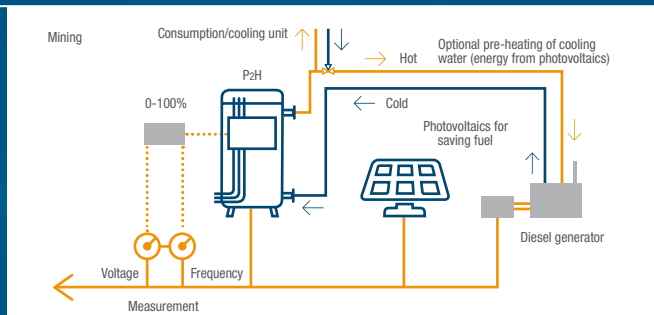
Avoidance of switching on another CHP (or another heat pump) in case of slight heat demand increase in a cascade array. This prevents inefficiency due to double partial-load operation, which also results in higher operating hours. Instead, the ELWA P2H system provides the required residual heat generation heat, if necessary using CHP power. In addition: peak time heating and emergency heating.

GRID OPTIMIZATION



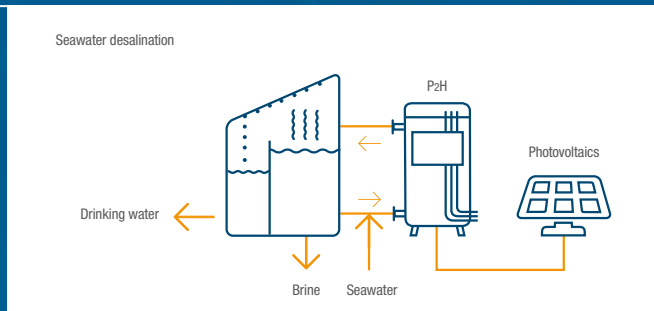
Short-term reduction of heating output when switching on large motors inrush current and avoidance of expanding the grid supply line (service charges, building cost subsidy) when installing renewable energy sources. In addition: excess voltage/wave filtering, balancing of asymmetric load, process heat supply based on available residual grid capacity (process heat for oil or water, for biomass heating return temperature increase).

VARIABLE COUNTER-LOAD WITH GRID SUPPORT OPERATION



Frequency and voltage stabilization of electrical grids in combination with emergency power generators (island solutions) by variable connection and disconnection of the ELWA P2H system. Adherence to the generator's minimum load (approx. 25%) and nominal capacity (100%), in particular in combination with wind and PV power. In addition: optional pre-heating of cooling water using renewable energy sources for quick start availability.

ADDITIONAL BENEFITS WITH RENEWABLE ENERGY SOURCES



Seawater desalination and simultaneous provision of hot water without a grid connection using renewable energy sources. For example, approx. 15 liters of drinking water per day per m^2 of PV in southern regions. In addition: drinking water treatment in general, thermal recharging of shallow geothermal storage units via PV in the summer.

A clear advantage with ELWA P₂H systems:

- > Additional revenue
- > Prevents need for electrical grid expansion
- > Lower maintenance costs
- > Quick amortization
- > Additional/emergency/post heating
- > Easy installation
- > Easy expansion of existing heating systems (only 1 m² area for heaters (approx.))
- > Grid-beneficial operation
- > Possible reduction of primary energy factor at of district heating



ELWA P₂H continuous flow heater with integrated or externally mounted control box – also for easy expansion of existing plants: The heater requires just 1 m² area (approx.). ELWA Power-to-Heat (P₂H) systems are maintenance free and have a long service life.



ELWA

ELWA is an owner-operated company with the third generation at the helm – and with its own manufacturing division right outside of Munich. With about 80 employees in production and distribution, water and oil heaters for industry, transportation and P₂H systems are manufactured here, according to high ISO quality standards, of course.

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