GHG emissions reductions in kg of $\rm CO_{_{2eq}}$ when using 1 MWh* of renewable electricity to substitute fossil fuels in different applications

Fossil gas boiler → Heat pump 602 → Hybrid heat pump (30% H, heat) Fossil gas boiler 322 Fossil gas boiler \rightarrow H₂ boiler Hard coal plant \rightarrow 100% wind and solar 867 Fossil gas OCGT \rightarrow 100% wind and solar 512 Fossil gas CCGT \rightarrow 100% wind and solar 340 Hard coal plant \rightarrow H₂ CCGT 328 Hard coal plant → H₂ OCGT 218 \rightarrow H₂ CCGT Fossil gas CCGT 140 Fossil gas OCGT → H₂ OCGT 128 Coal blast furnace \rightarrow H₂ DRI/EAF steelmaking 580 Fossil gas boiler → Heat pump Fossil gas boiler \rightarrow H₂ boiler 146 Diesel car → Battery electric vehicle 833 → H, fuel cell vehicle Diesel car → E-fuels vehicle Diesel car 116

Technology switch

GHG savings [in kg CO_{2 eq}/MWh]

Efficiency assumptions

Buildings	Energy sector	Industry	Transport
Hybrid heat pump: 145% (HP 450%, Boiler: 90%) Heat pump: 300% Boiler: 90%	Hard coal plant: 39% OCGT: 39% CCGT: 59%	BF: 2t CO _{zeq} /t steel DRI/EAF: 3.4 MWh _e /t steel Heat pump: 300% Boiler: 95%	BEV: 18 KWh/100 km Fuel cell: 0.89 kg/100 km Diesel & E-fuels: 6 l/100km

* 1 MWh represents roughly the annual electricity production of 1 kWp solar PV

Emissions intensities (in g $CO_2/kWhPE$) = Hard coal (338.2), Fossil gas (200.8), Diesel (266.5) HP = Heat pump, H₂ = Hydrogen, OCGT = Open cycle gas turbine, CCGT = Closed cycle gas turbine, BF = Blast furnace, DRI = Directly reduced iron, EAF = Electric Arc Furnace, BEV = Battery electric vehicle