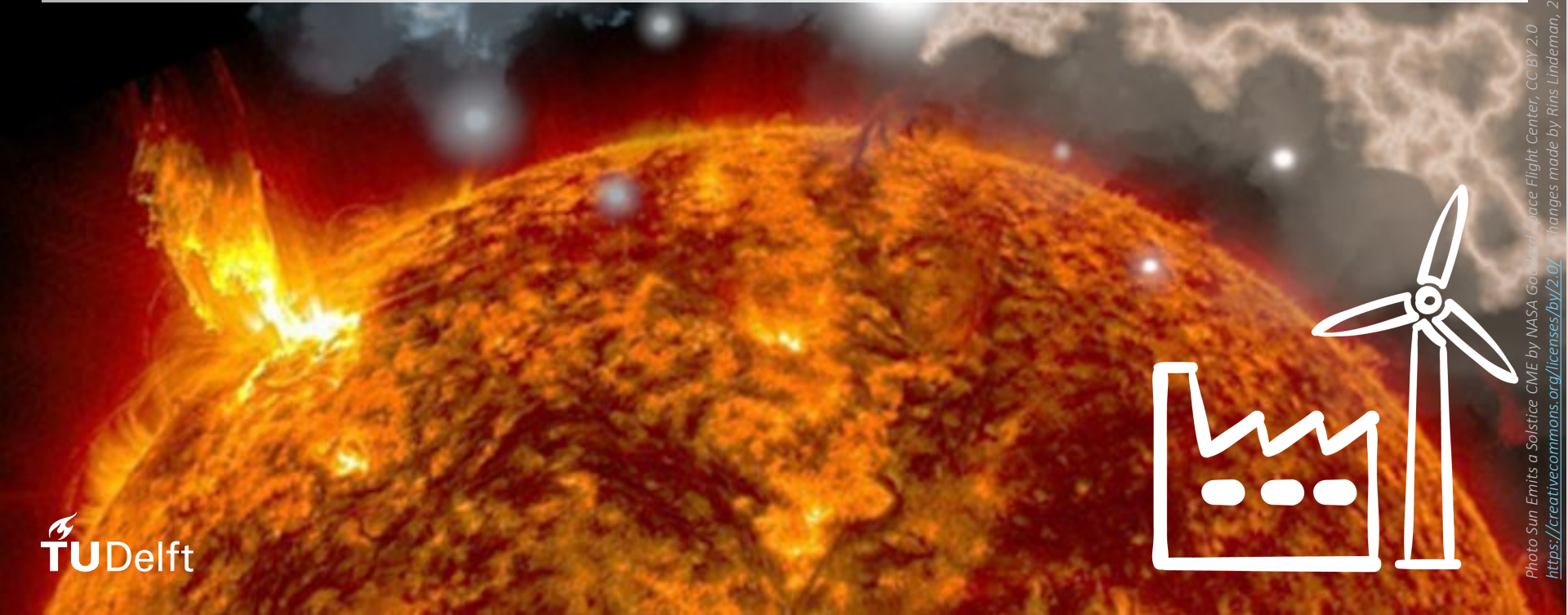
Performance comparison: guided example

Prof. Dr. L.C.M. Itard



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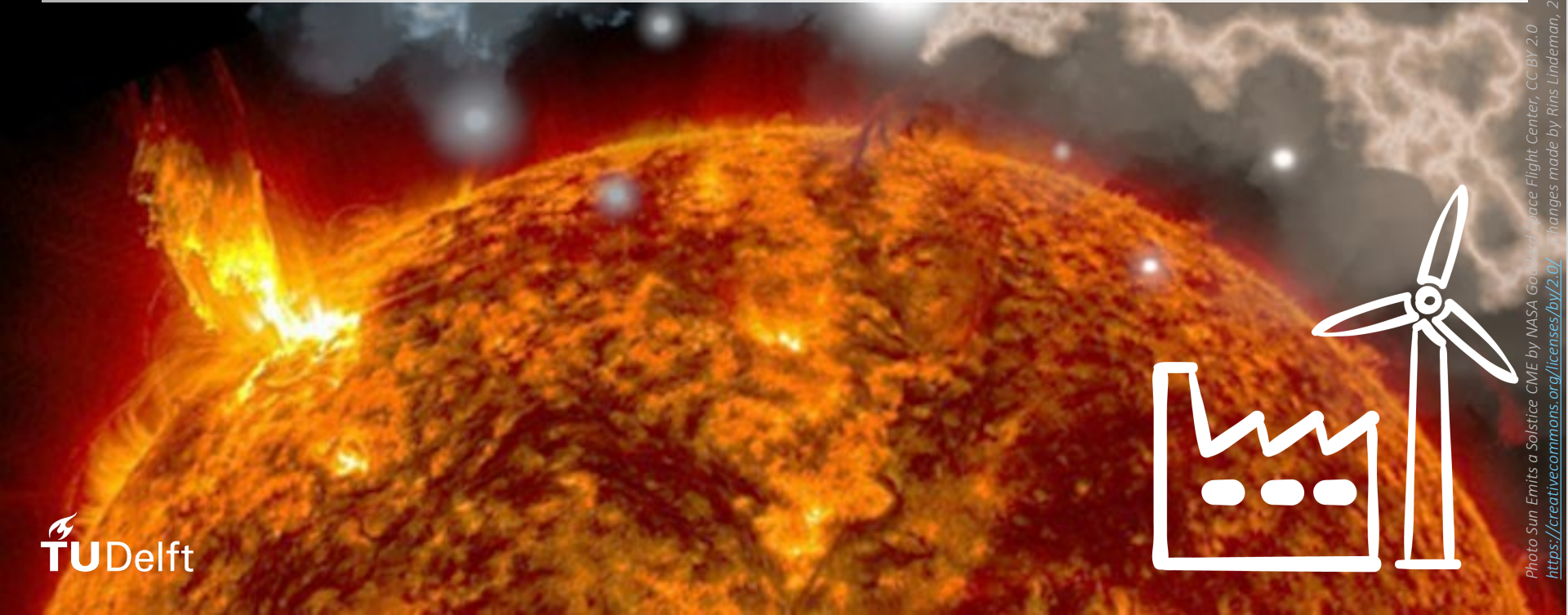

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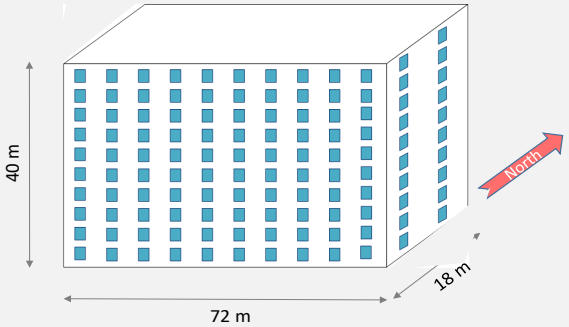
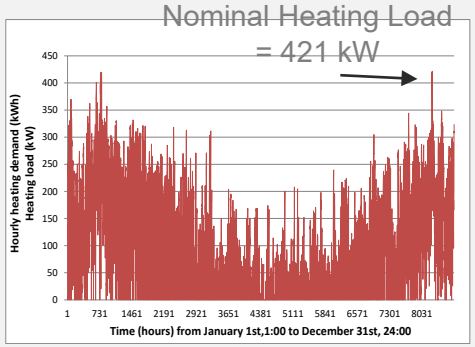
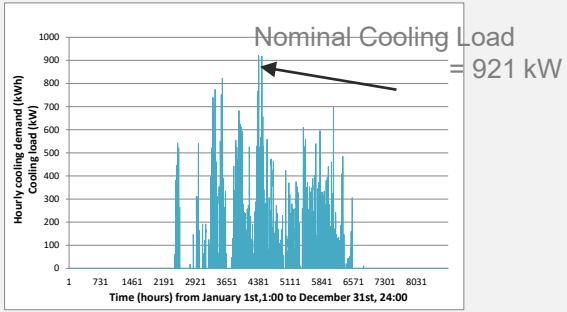
Choice of the energy supply of a building

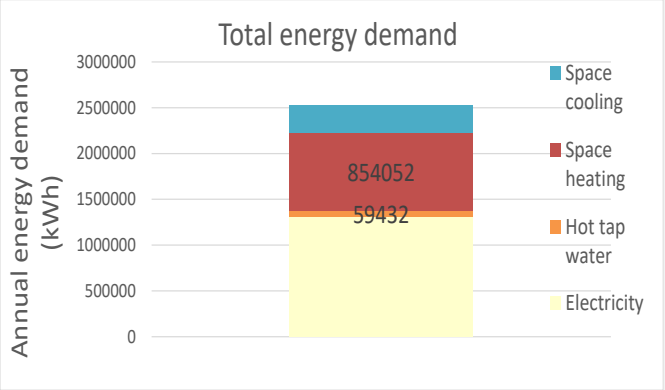
Case 1: Office building in the Netherlands





Space heating demand (kWh) per hour during a typical year





Annual Space heating: 854052 kWh
Nominal power space heating: 421 kW
Cooling demand: 297 505 kWh.
Nominal power space cooling: 921 kW

Options

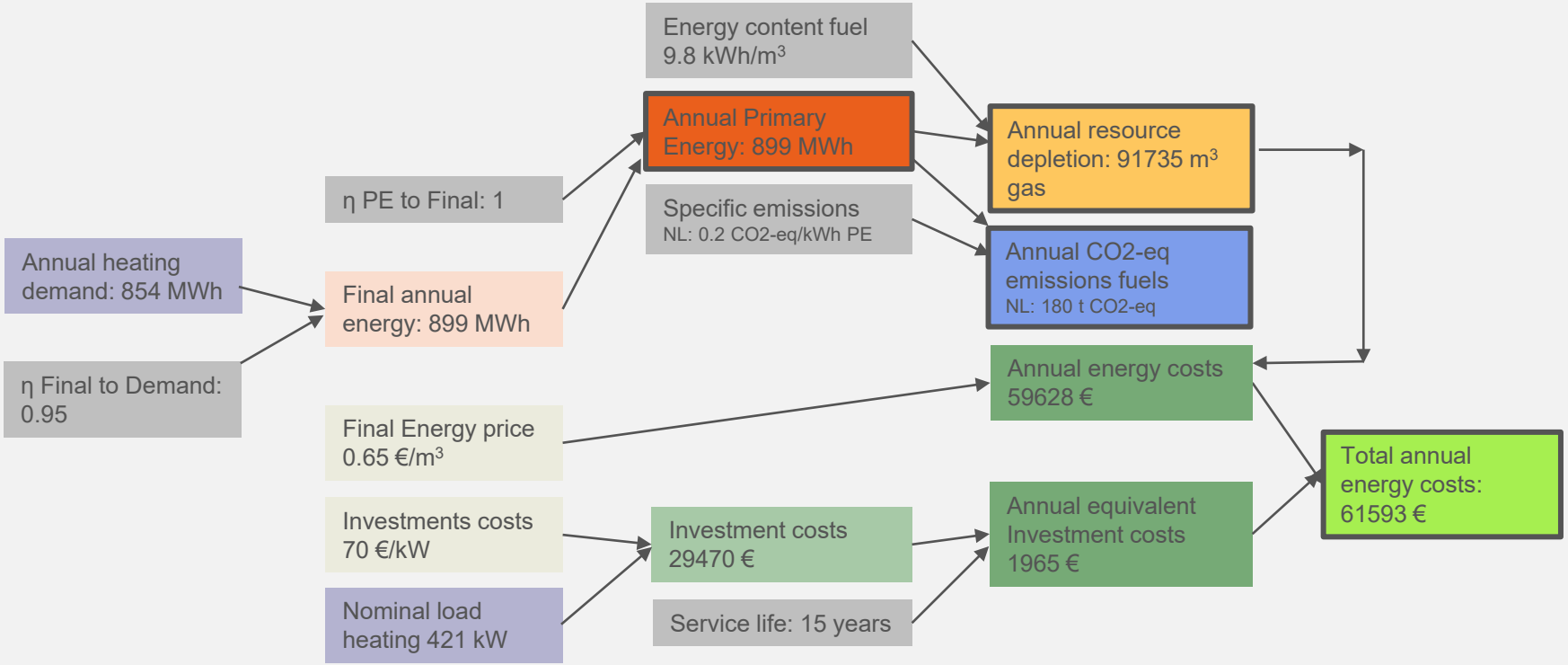
1. Condensing gas boiler (η=0.95) + air chiller with SEER 2
2. Reversible ground source Heat pump with SCOP 5 for space heating and SEER 4

Cost data example NL:

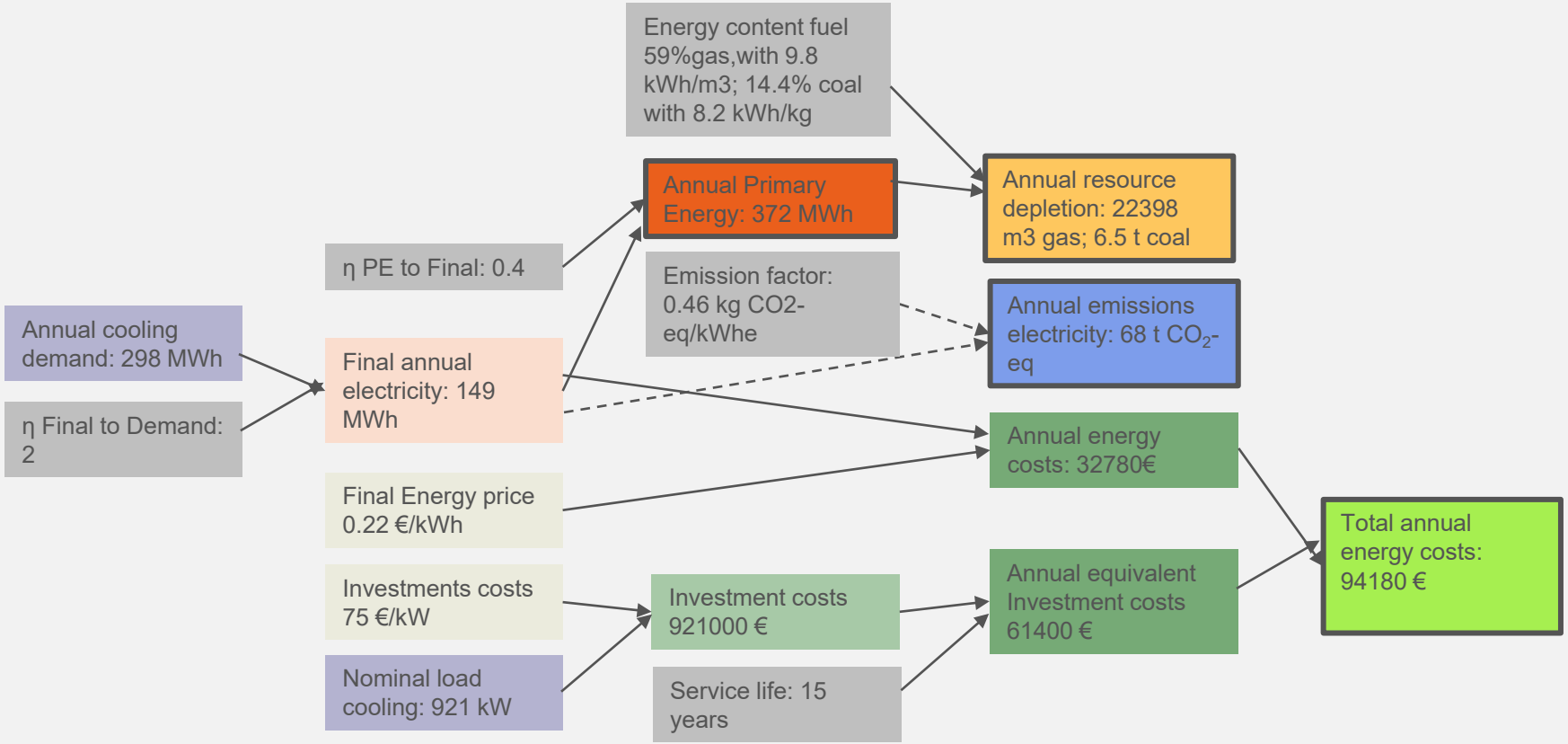
	€/kW	€/kWh	€/m³	€/kg
Gas boiler	70			
Reversible Heat pump	1500			
Chiller	1000			
Grid electricity		0.22		
Gas			0.65	

Option 1: Gas boiler & Chiller

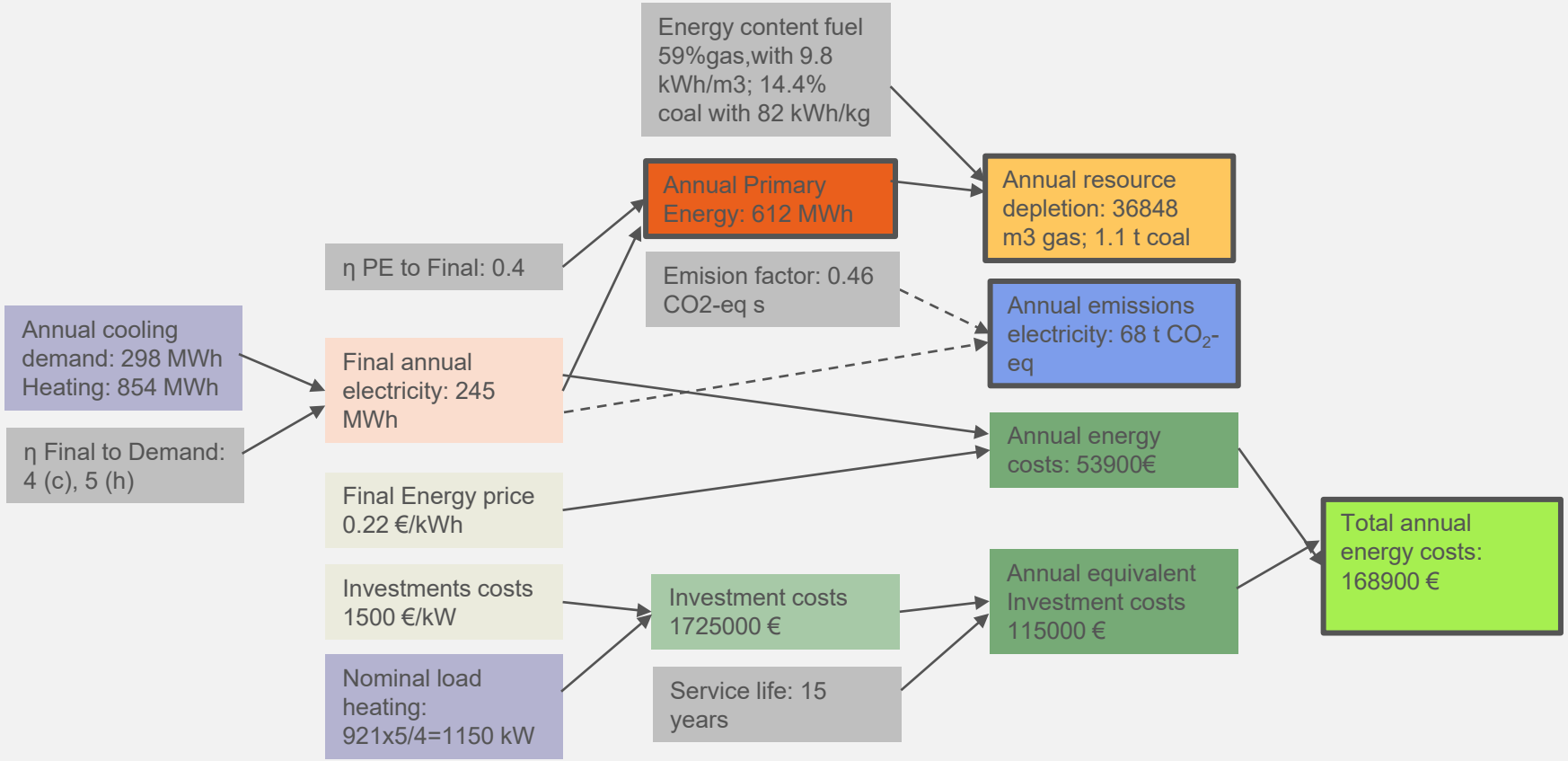
1a: gas boiler



Option 1: Gas boiler & Chiller
1b: Chiller

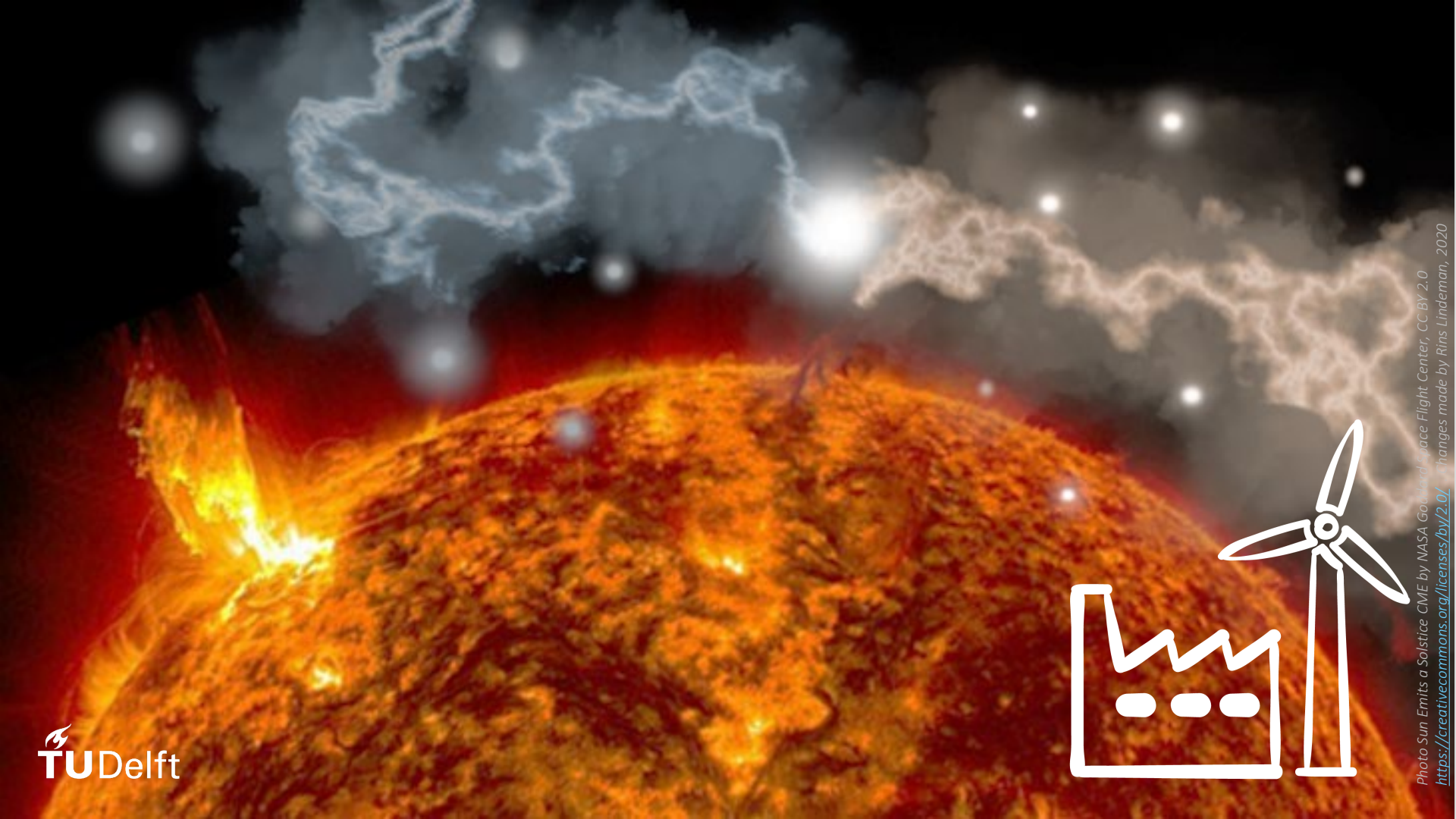


Option 2: Reversible heat pump



Summary of performances

	Annual Primary Energy (MWh)	Annual Res. depletion	Annual CO2 – eq emissions	Annual energy costs
Combi gas boiler + chiller	899+372=1271	114133 m^3 gas+ 0.6 t coal	248 t	155733 € (61593 (h)+94180(c))
Reversible heat pump	612	36648 m^3 gas +1.1 t coal	68 t (-85%)	168900 € (+ 8%)



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