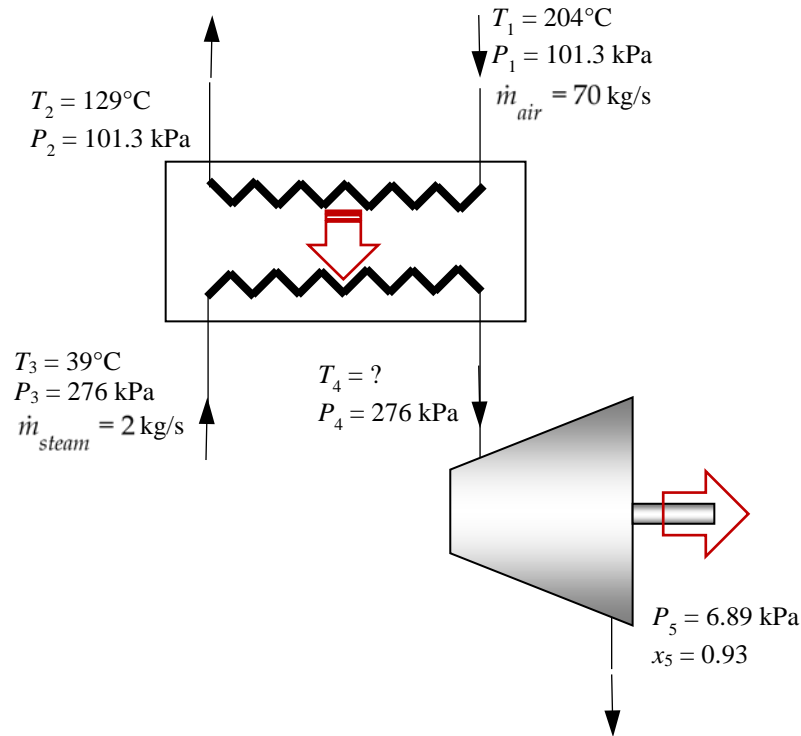

EXAMPLE: Oh where does the exergy go?

Consider a heat exchanger and a steam turbine used as a waste heat recovery system. The heat exchanger takes hot combustion gases and uses them to heat steam, which in turn passes through a turbine. The gases can be modeled as air treated as an ideal gas with variable specific heats. The surroundings are at $T_0 = 25^\circ\text{C}$ and $P_0 = 101\text{ kPa}$.



- Find the power (in kW) delivered by the turbine.
- Find the isentropic (adiabatic efficiency) of the turbine.
- For the heat recovery system (heat exchanger and turbine combined) identify
 - where inflows of exergy occur

_____ / _____

- outflows of exergy occur

_____ / _____ / _____

- destruction of exergy occur

_____ / _____

(d) Using an exergy accounting approach, calculate the necessary information to fill in the following **exergy balance sheet**

<i>Net rate of exergy in:</i>		(100%)
<i>Disposition of exergy:</i>		
• Rate of exergy out		
Power developed		(%)
Water stream		(%)
• Rate of exergy destruction		
Heat exchanger		(%)
Turbine		(%)
		(100%)