A New Approach for Designing Industrial Thermal Systems with Heat Pumps

Industrial heat pump suppliers and engineers have begun advocating for a new thermal system approach that reduces energy waste and costs compared to the traditional, steam-system approach.

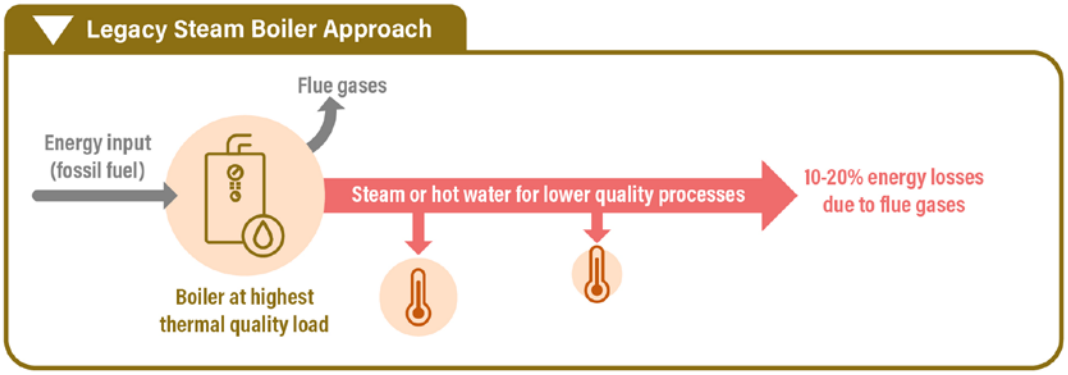
A different thermal system design approach for IHPs turns the legacy approach on its head

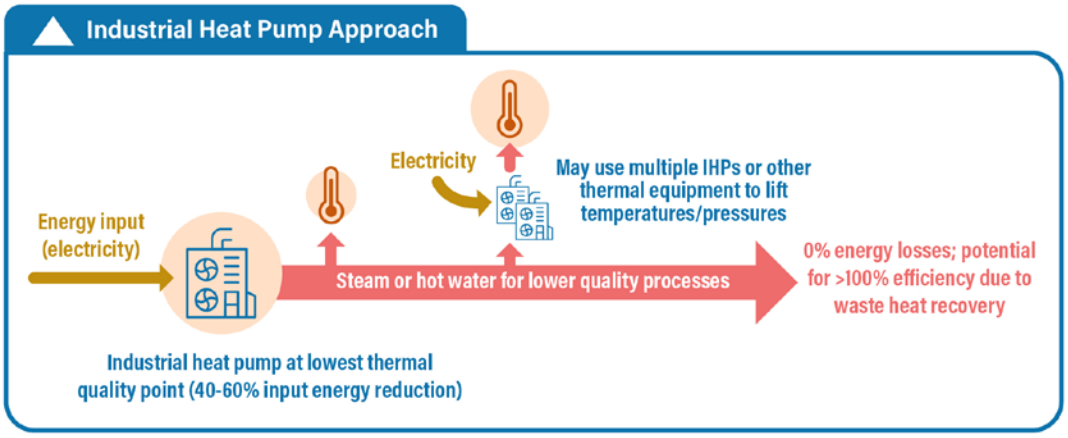
Legacy Steam Boiler Approach

1. Identify the **highest thermal quality** (i.e., temperature and pressure) load in the facility/plant.
2. Sum all maximum thermal loads throughout the plant.
3. Select a boiler and steam distribution system to deliver that thermal output (plus margin of safety) at the highest quality required in the plant.

Industrial Heat Pump Approach

1. Identify the **lowest thermal quality** load in the facility/plant.
2. Identify higher thermal loads for individual processes throughout the plant.
3. Select thermal quality boosting technologies, including higher-temperature IHPs or electric boilers for each higher-quality load, to upgrade the thermal quality from the lowest plant level.
4. Size a baseload IHP system to deliver the lower thermal quality, usually in the form of pressurized water, to meet the balance of plant requirements.





Orange circles show "size" or level of thermal quality of thermal load (large = high thermal quality load, small = low thermal quality load)

For more information, please see our topic brief or contact Hellen Chen at hchen@aceee.org