

Energy Systems Transition At Princeton University

IDEA Microgrid Workshop

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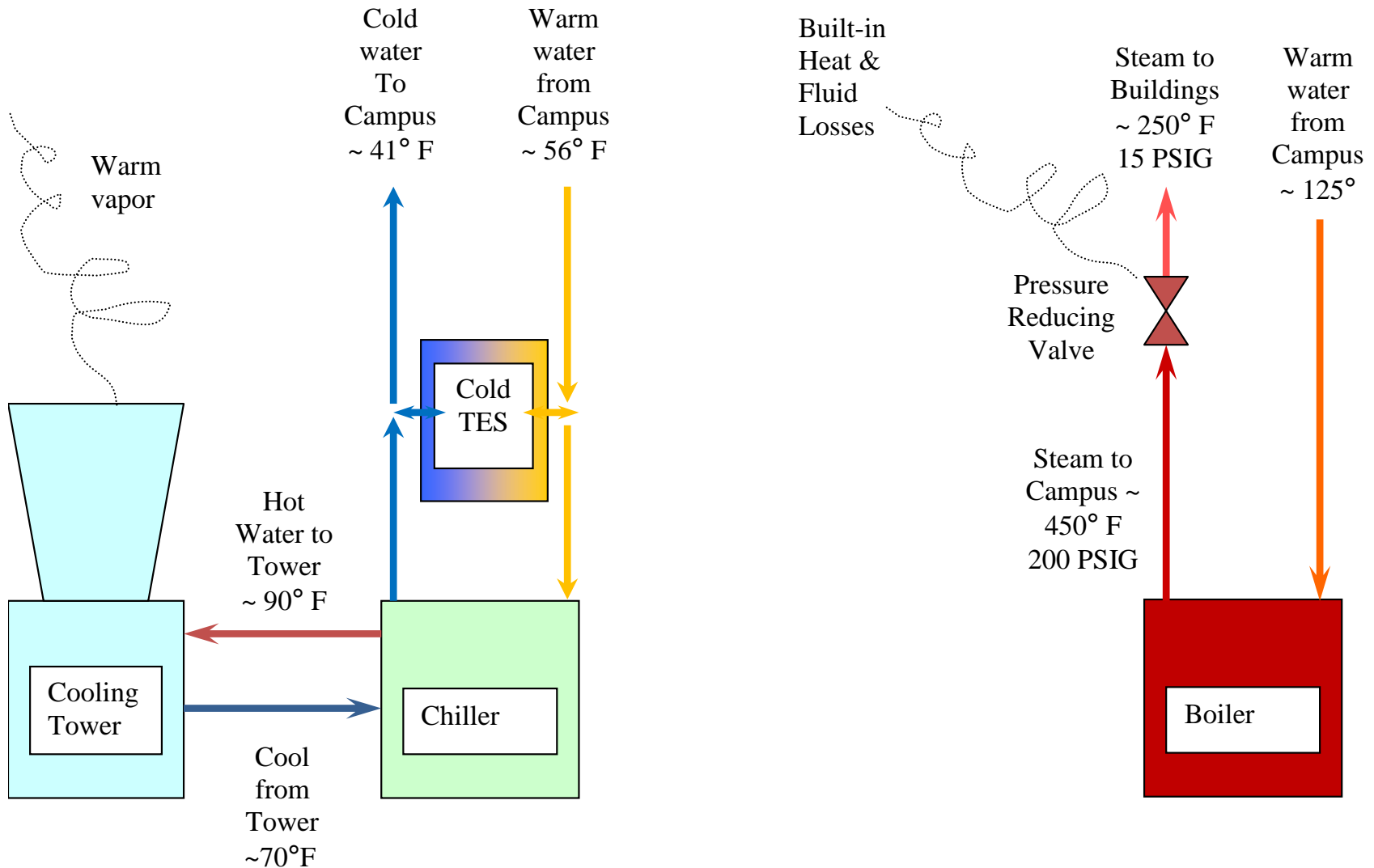
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The Problem

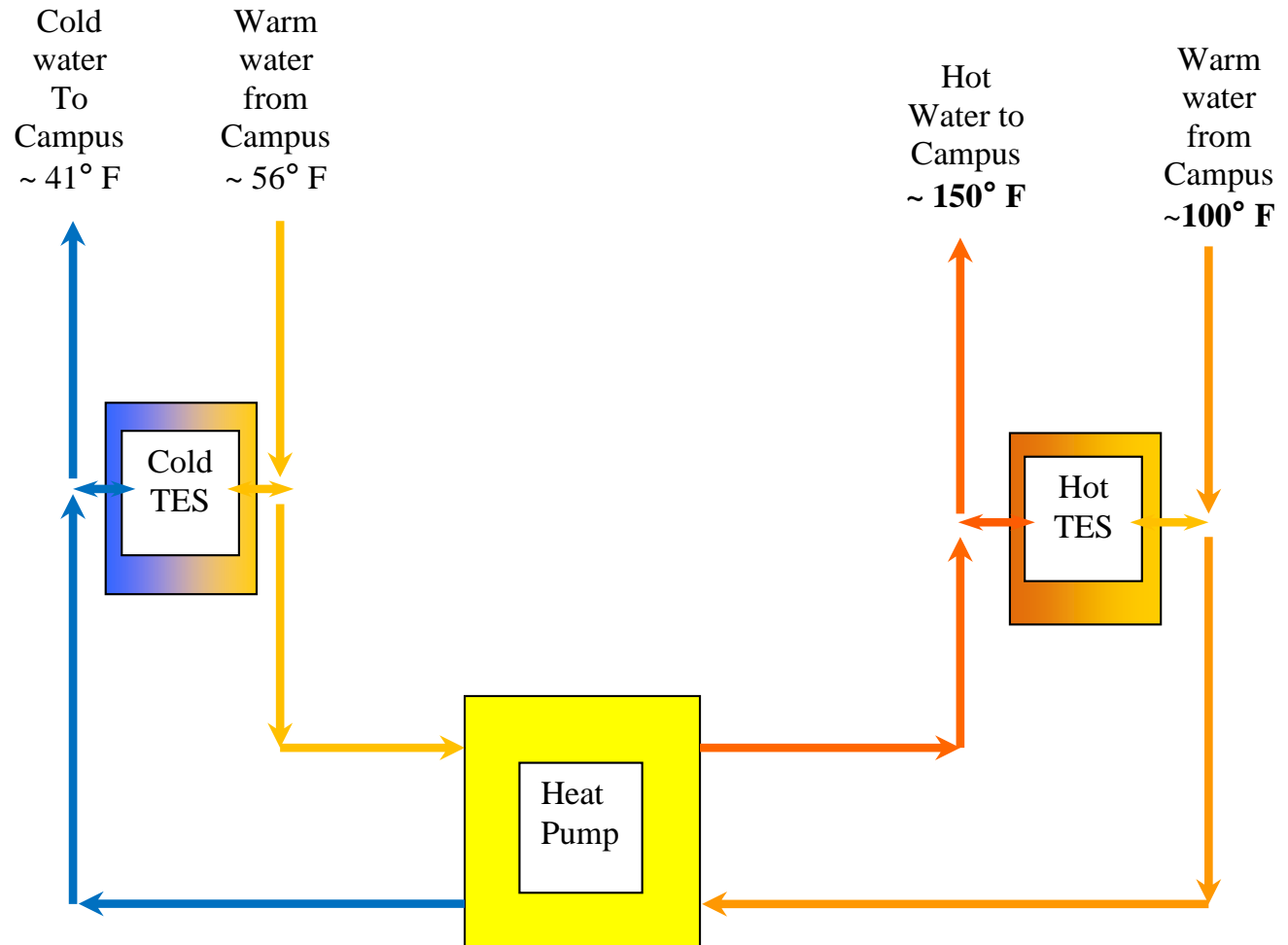
Reduce CO₂ footprint & other negative environmental impact with:

- Good financial stewardship
- Existing buildings & campus aesthetics
- Space limitations
- Existing technologies
- Existing codes, tariffs
- No interruption of education and research
- Additionality
- Replicability
- No discomfort
- Reliability

Separate Heat Removal (CHW) & Addition (Steam)

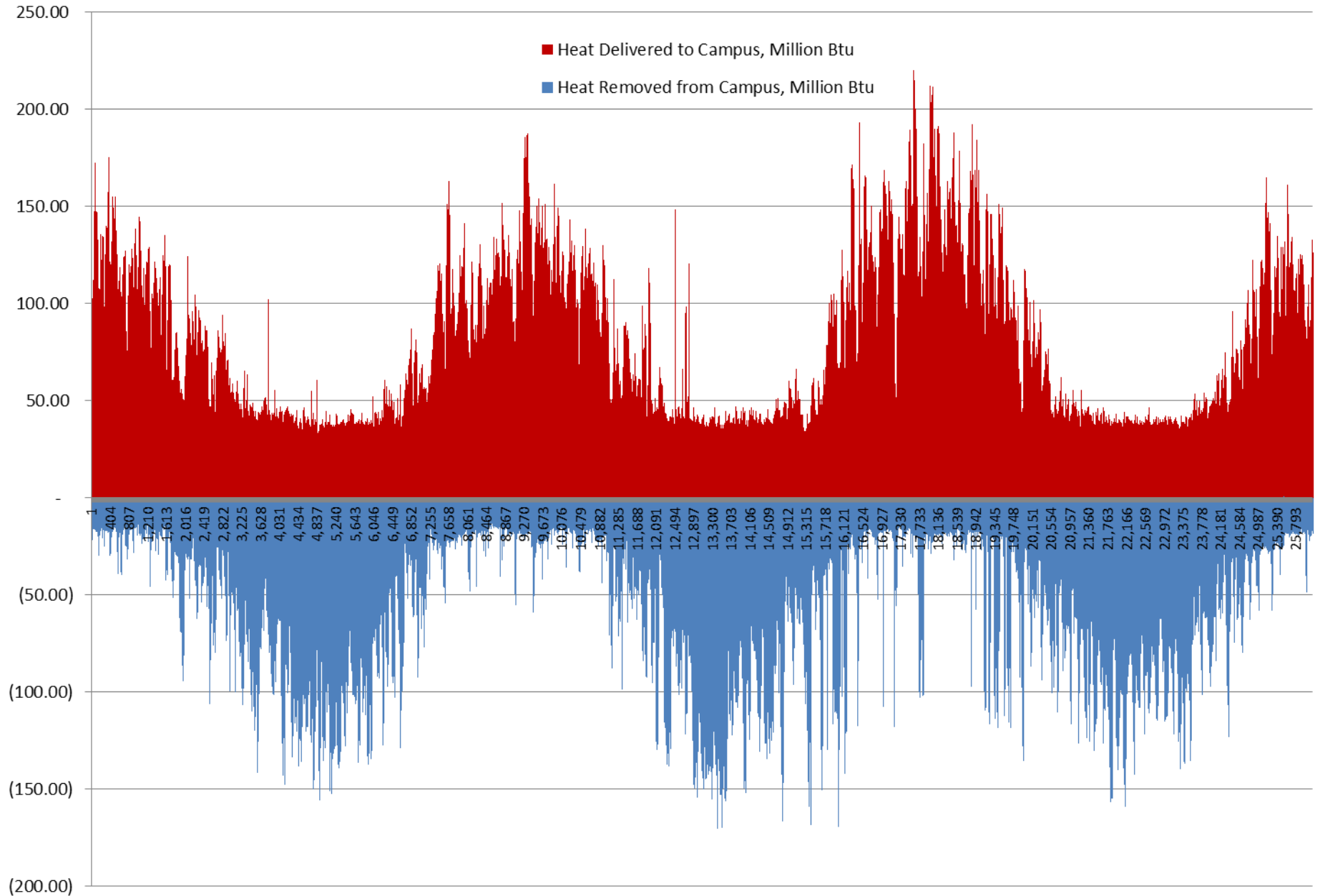


Combined Heat Removal (CHW) & Addition (HTW)



Hourly Heat Addition to campus and heat removal from campus

3-year period, Jan 2012 - Dec 2014



The Big Energy Projects

- 2 new heat pump based thermal energy plants
- Hot and cold thermal storage at each plant
- ~ 1000 geoexchange wells
- 13 miles of hot water distribution pipe
- 180 building conversions
- Interconnect existing plant
 - Steam to HHW conversion
- 8 new solar arrays ~ 13 MW