



CampusEnergy2021

BRIDGE TO THE FUTURE

Feb. 16-18 | CONNECTING VIRTUALLY

WORKSHOPS | Thermal Distribution: March 2 | Microgrid: March 16



Distribution Piping Systems

Capital Efficiency, Planning and Future Proofing

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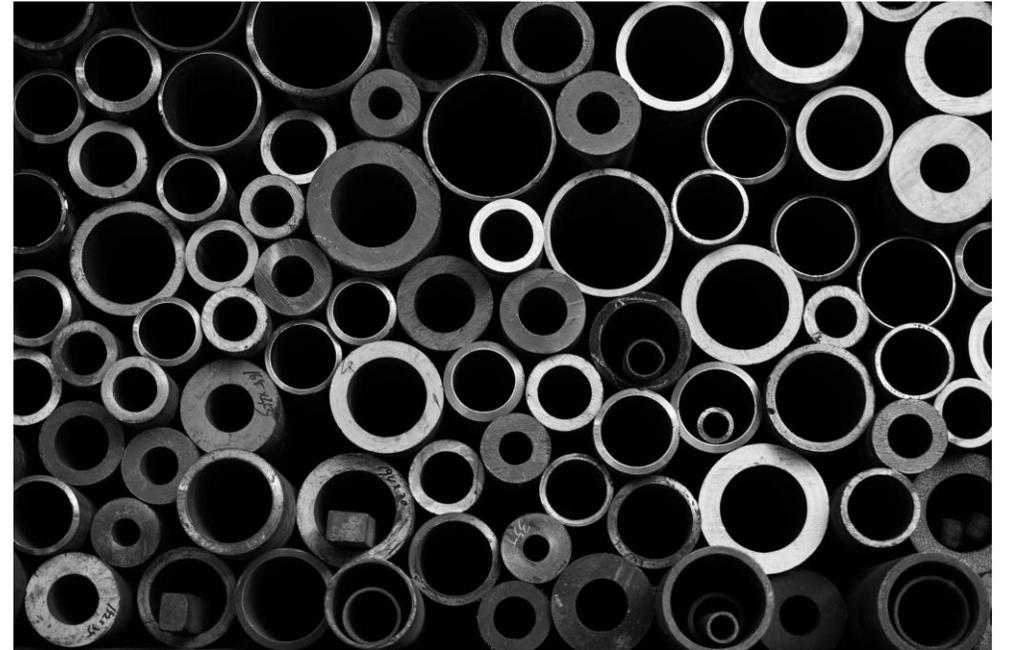
Q&A Will Not Be Answered Live

**Please submit questions in the Q&A box.
The presenters will respond to questions off-line.**

Distribution Piping Systems (DPS)

The longest lifespan asset in a district energy system

- Steam and Condensate
- Hot Water
- Chilled Water
- Ambient Loops



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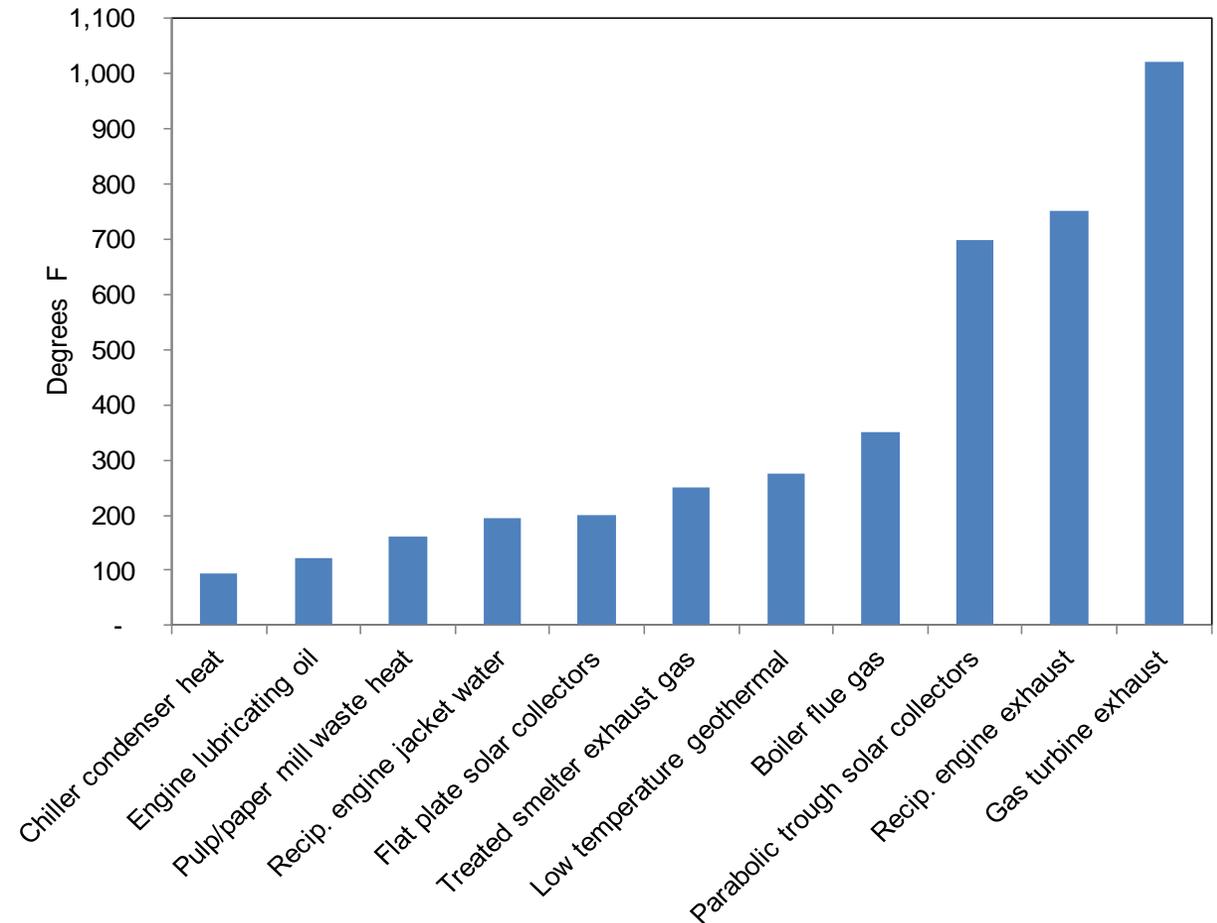


Future Proofing?

“Generations” of district heating

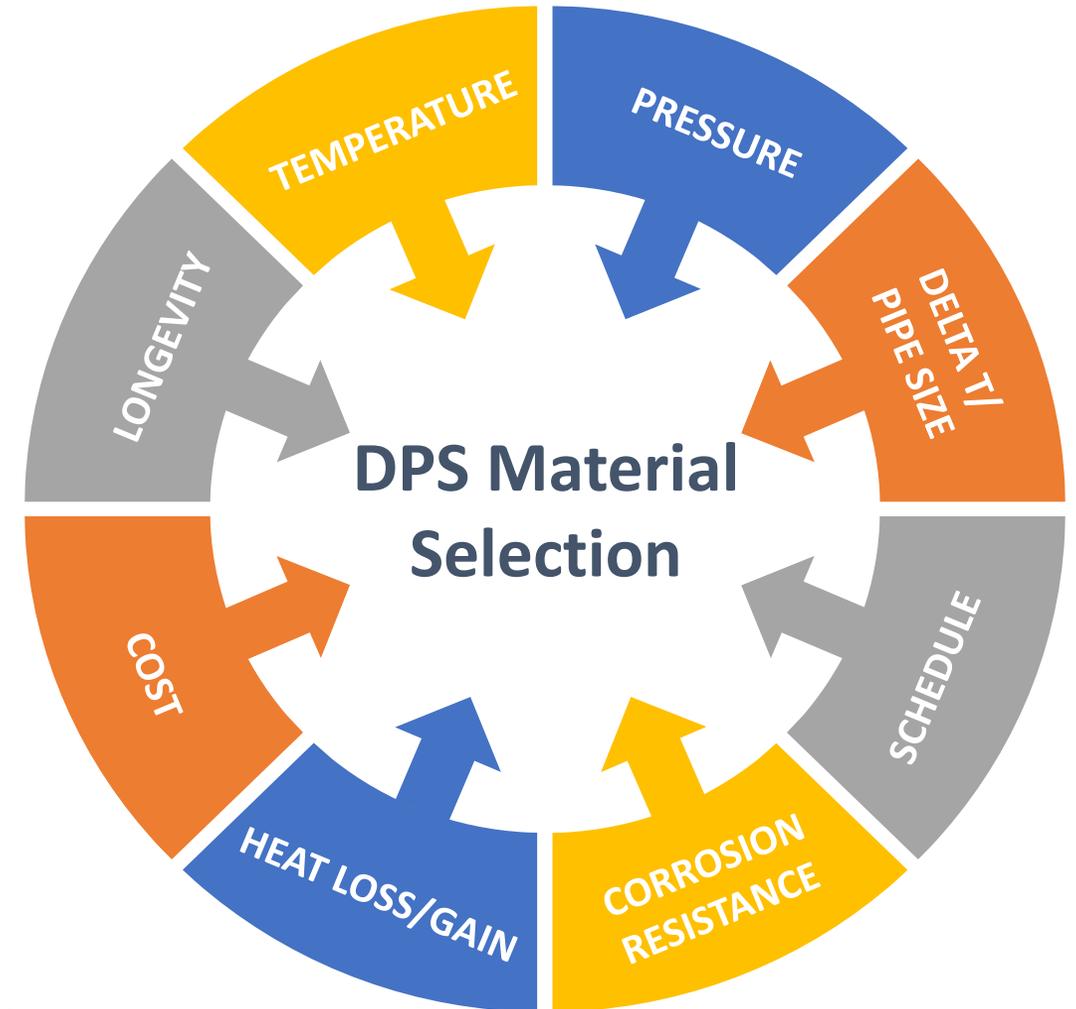
1. Steam
2. Hot water $>212^{\circ}\text{F}$
3. Hot water ($176\text{-}212^{\circ}\text{F}$)
4. Hot water $<(149\text{-}167^{\circ}\text{F})$

- Future loads
- Utility corridors
- Delta T and pipe sizing



Factors affecting pipe materials' selection

- Temperature
- Pressure
- Size/Delta T
- Corrosion resistance
- Acceptable heat loss/gain
- Cost
- Longevity
- Project Schedule



Steam DPS

- Mostly legacy, few new systems
- In tunnels, or directly buried (cost)
- Condensate return
- Low ability to use renewable heat sources
- Relatively high heat losses
- Slope/profile limitations
- Safety



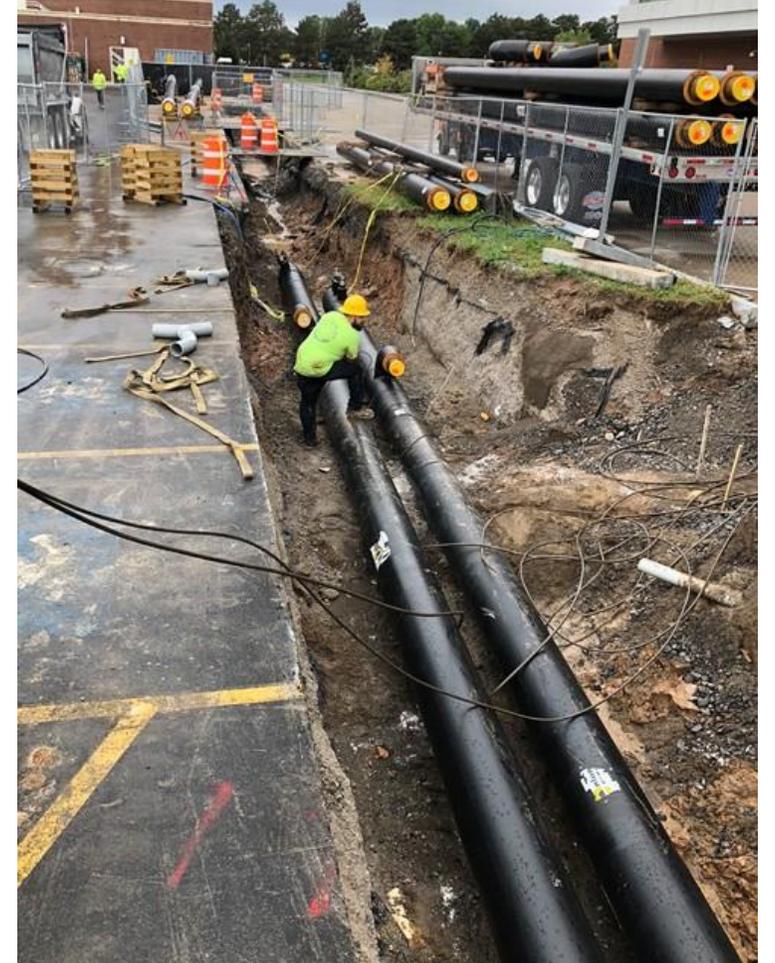
Chilled Water and Ambient Loop DPS

- Narrower range of design temperatures
- Wide selection of materials
- Mostly directly buried
- Insulated or not?



Hot Water DPS

- High ability to use renewable heat sources (4th Gen systems)
- Wide selection of materials depending on pressure and temperature
- Mostly directly buried
- Relatively low heat losses
- Safety



Carbon Steel Piping

- Most versatile
- Directly buried?
- Insulated?
- EN-253?
- Cost
- Availability

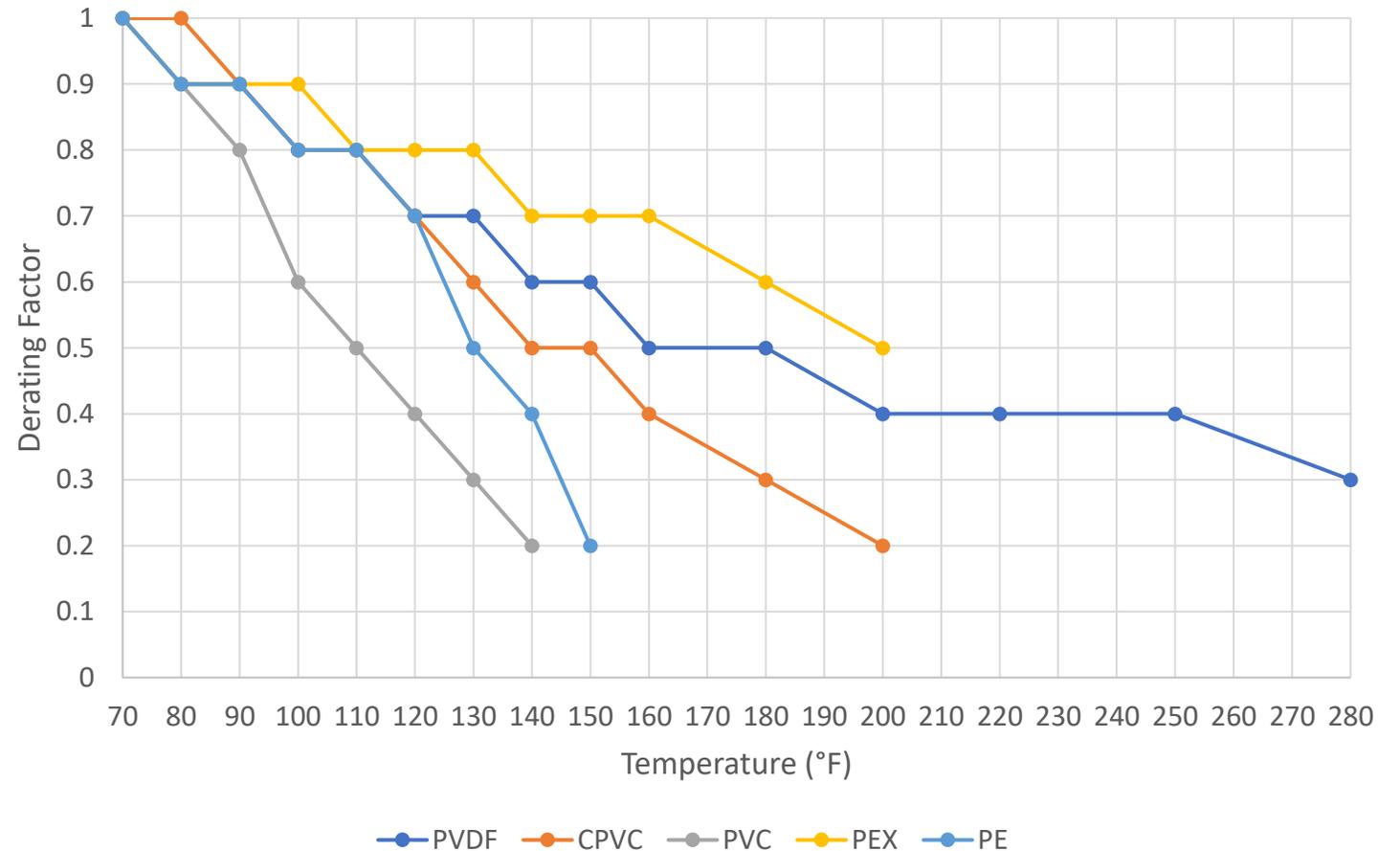


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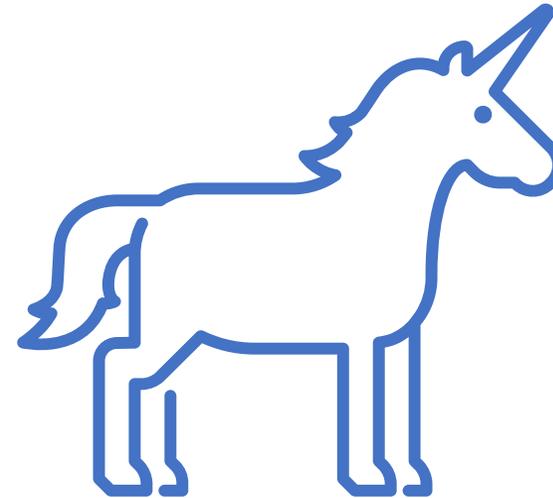
Plastic Piping

- Temperature and pressure limitations
- PP-RCT/PE-RT?
- Fusion Welded?
- Insulated?
- Flexible?
- Cost
- Availability



The perfect DPS?

- Lives **Forever**
- Caters to **Unlimited loads**
- Cheap to **Build**
- Cheap to **Operate**
- Absolutely **Future Proof**
- *Does not Exist!*



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Planning DPS Projects

- System design conditions
- Future proofing
- Project schedule
- Materials and installation costs
- Lifecycle analysis
- Phasing
- Reuse of existing assets (if possible)
- Minimizing Disruption
- Coordination with existing and planned utilities



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Questions?

Thank you for your attention

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