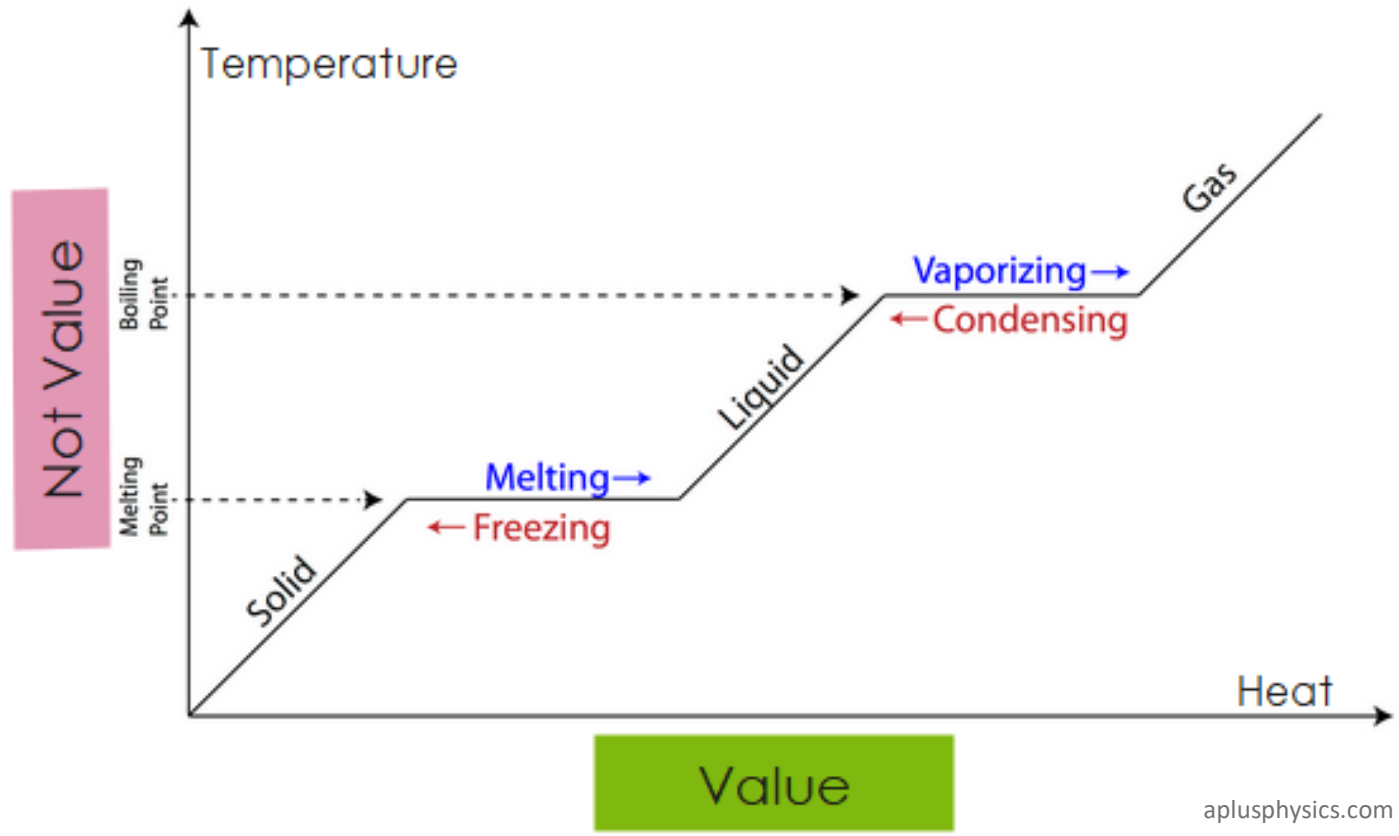




**Thermal Storage with Phase
Change Materials
Jeff Ihnen, P.E.**



aplusphysics.com

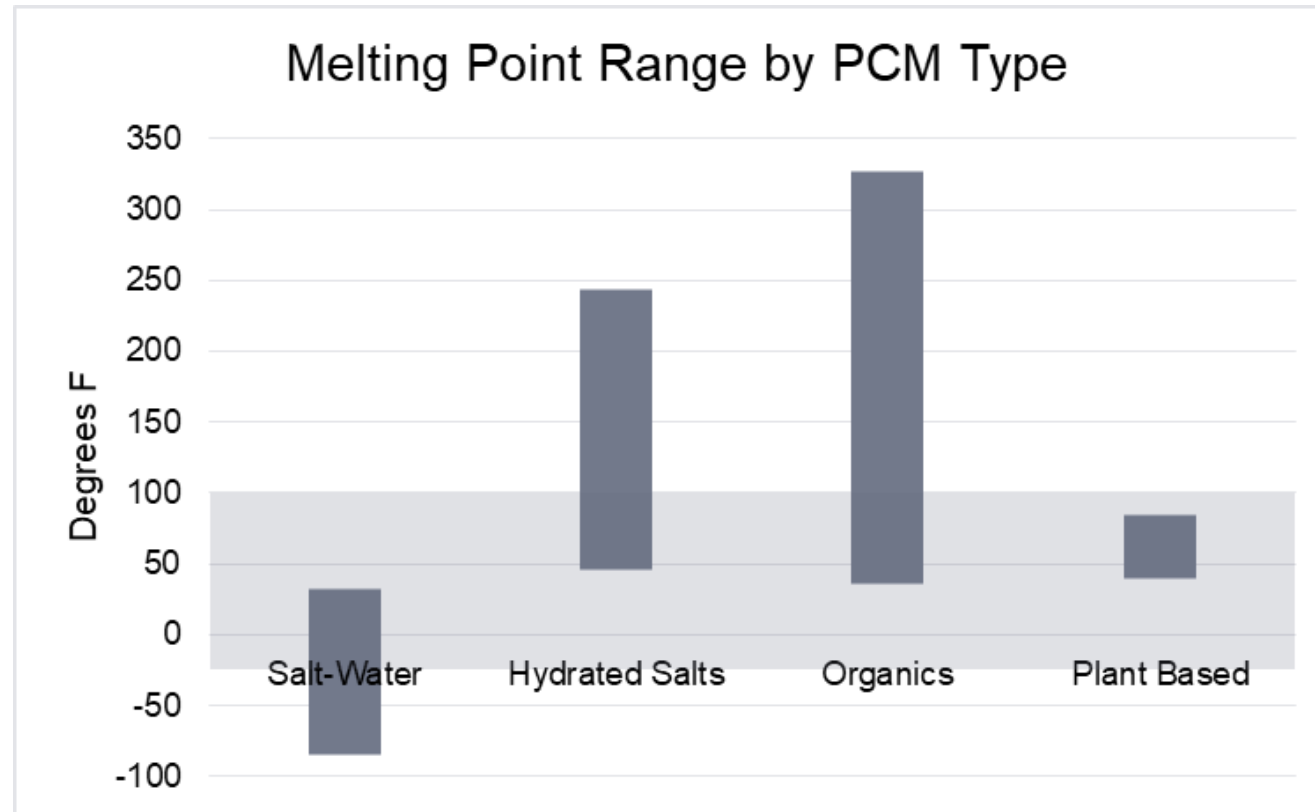
Outline

- Phase change material (PCM) characteristics
- Types of PCMs
- Applications, considerations, results
- Conclusions

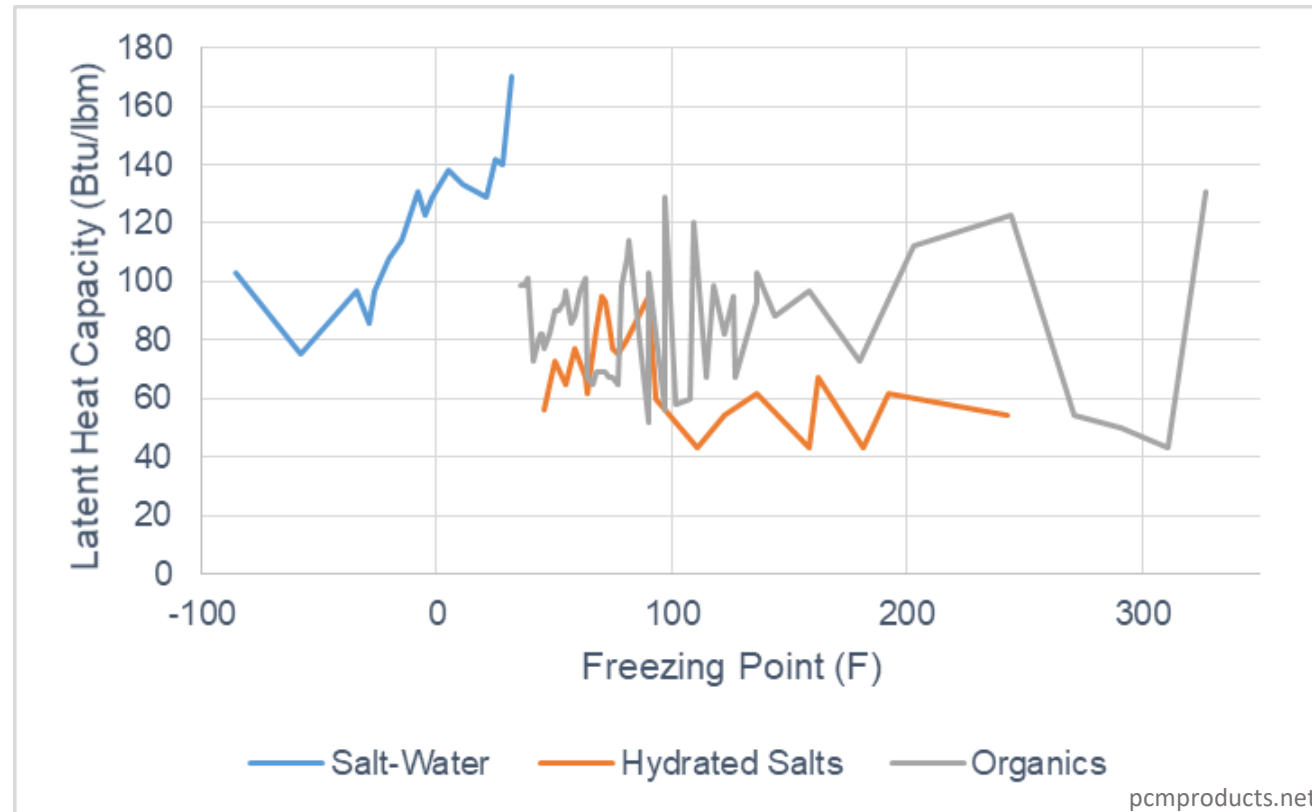
PCM Characteristics

- Latent heat of fusion – the whole point
- Sharpness of latent heat
- Melting and freezing proximity
- Stability
- Containment systems

PCM Families

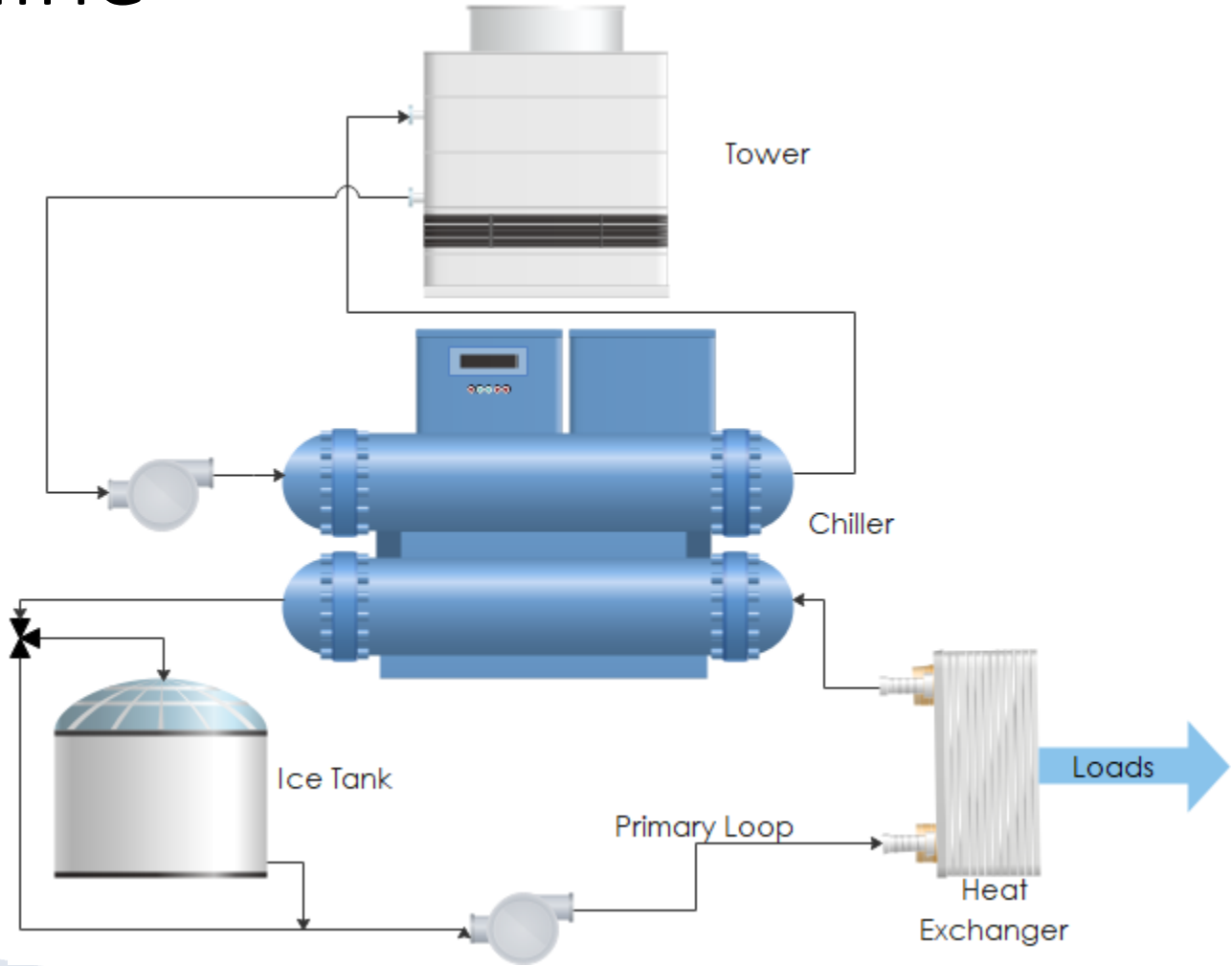


Latent Heat v Freezing Point



Applications

The Baseline



Salt-Water PCMs



vikingcold.com

Salt-Water, Frozen Food Results

- 25-40% energy savings*
- 5-10% demand reduction**

Bio PCM in a Telecommunications App



Bio PCM Telecom Results

- 15-20% energy savings
- No mention of demand savings*

PCMs for Commercial Spaces

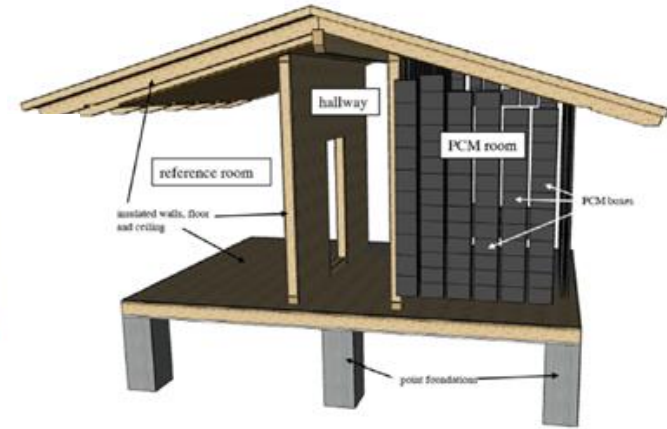
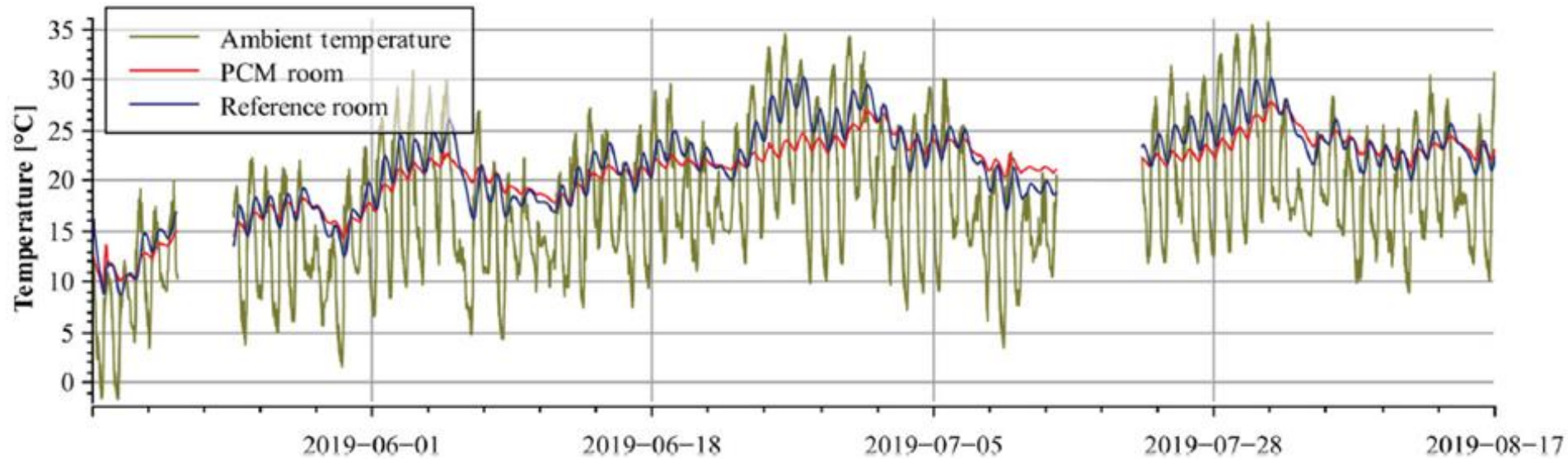
Options

- Bio PCM blankets in walls
- Bio PCM blankets in panels ON walls
- Hydrated salts in walls
- Encapsulated paraffin in cellulose insulation

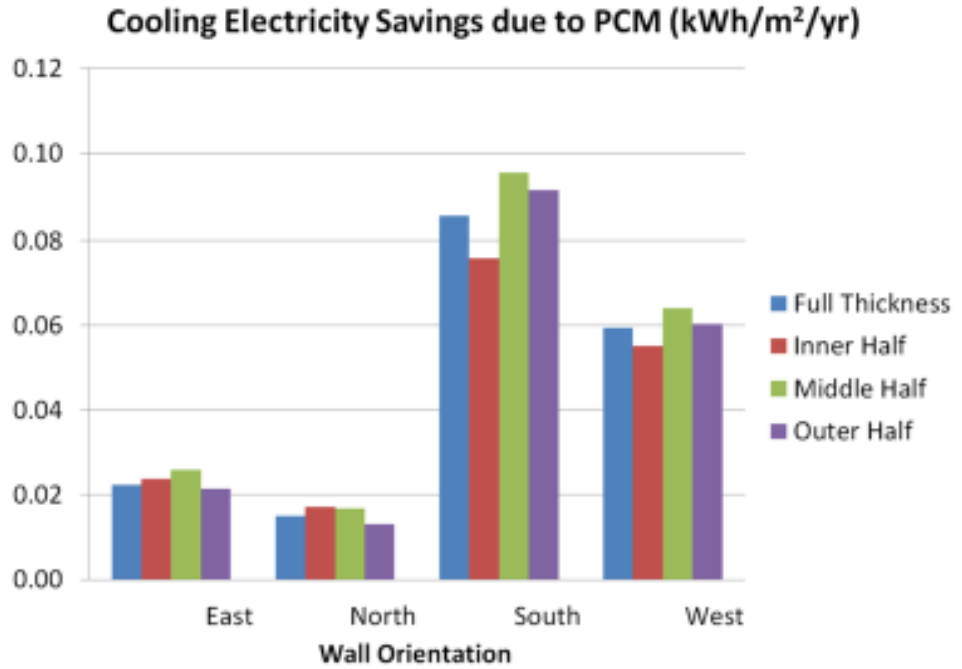
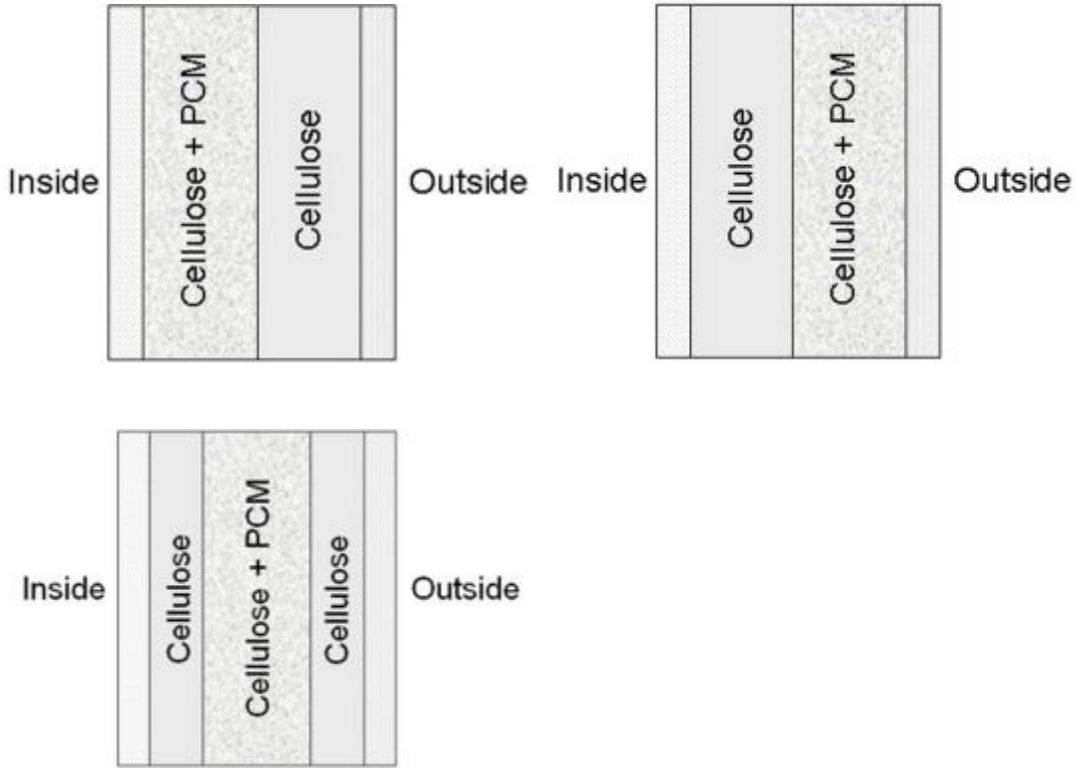
PCM Blanket in Walls



Hydrated Salt in Wall Cavity



Bonus: Encapsulated Paraffin in Walls



My Conclusions

PCMs are great for direct conditioned space contact where several degrees of temperature change is ok.

PCMs may have challenges with conditioning occupied spaces, like offices and institutional facilities.

PCMs in wall structures require substantial testing to get it right.



Thank you
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