PCM ENERGY STORAGE for LOAD FLEXIBILITY in HVAC-R

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PCM Battery vs Electrochemical Battery

➢ PCMES is meaningful where a cooling process is involved:

  ➢ Process cooling: Winery, Abattoir, Food and beverage production

  ➢ Cold storage

  ➢ Building air conditioning

  ➢ Supermarkets

➢ PCMES costs 2 - 3 times less than Electric batteries

➢ Longer useful life of more than 20 years with recyclability

➢ Smaller footprint

Interaction with Power network

➢Peak Demand Reduction (Load shaving)

➢Load Shedding

➢Load Shifting

  ➢ price arbitrage in wholesale

  ➢ leveraging free cooling produced from heat pumps delivering earlier heating demands

➢Load Shaping

➢Frequency management

How does PCMES work?

➢Freeze and melt @ -6℃ for Medium Temp. application

How will the customer benefit?

➢Generate income during negative power price events as well as high price events

➢Cut peak demand by load shifting (Peak Demand Reduction)

➢Maximise utilisation of rooftop solar (Load Shaping)

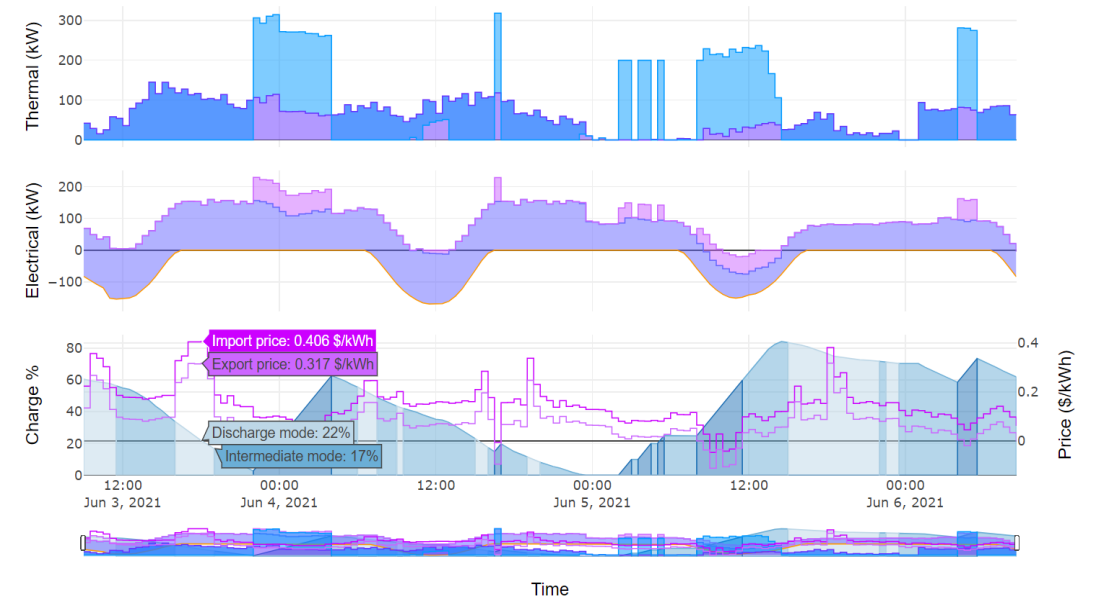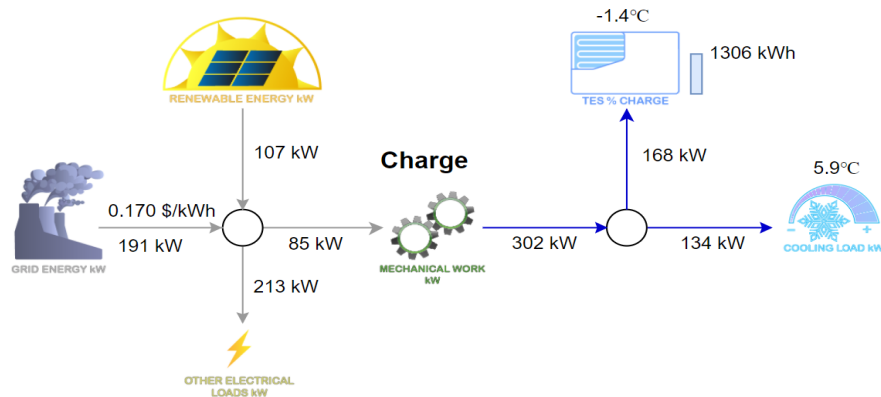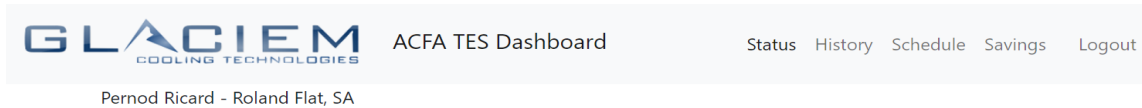➢Maximise benefits of PPA (Load Shedding and Load Shaping)

➢**Supplementary cooling**

How will customers benefit?

➢ **Supplementary cooling:** in conjunction with heat pumps

Hourly Heating and Cooling Load (26-12-2020)
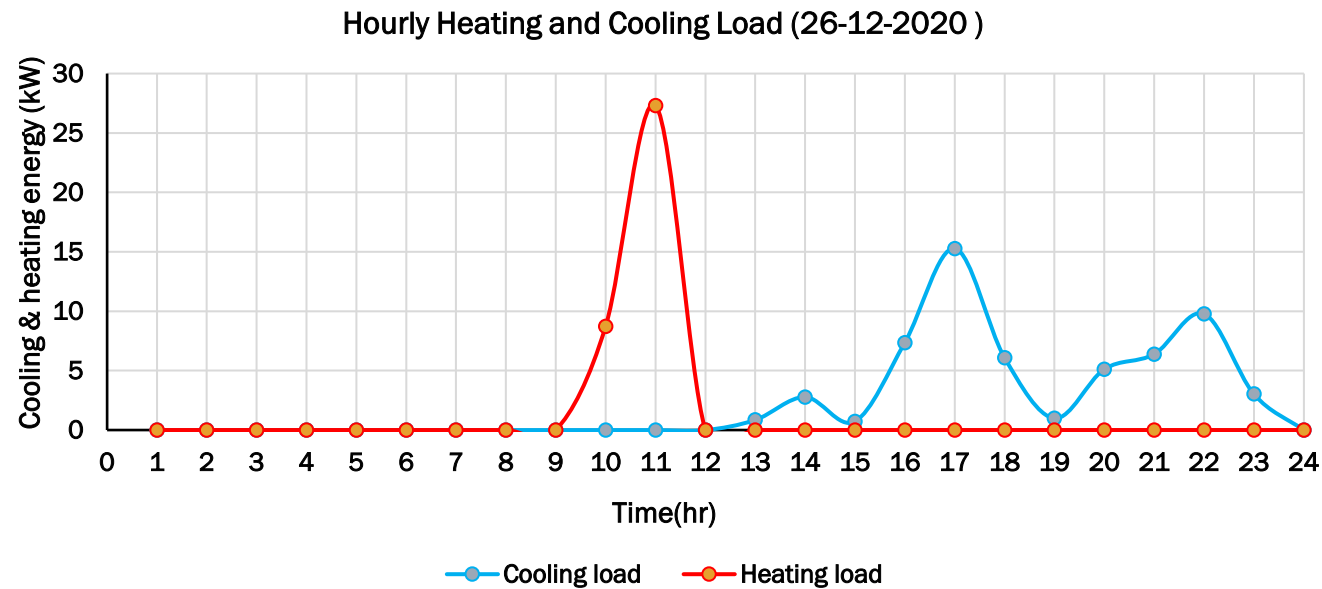
Breakthrough

Distributed energy resources need a smart energy management system

Breakthrough

Improving on the efficiency of integration

Use of CO_2 as the heat transfer fluid instead of a glycol for integration

➢Higher charging rate with same power consumption

➢Lower discharge power consumption

➢**Deploy across a wider range of applications such as supermarkets**

What the Future Holds

➢ Prototype of pumped CO_2 PCMES

➢ Integration with district heating / cooling

➢ Potential for massive scale applications

➢ We are looking for collaborators / applications

   ➢ Viability of implementation and payback period in other industries

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