



Buro Happold Specialist Consulting
& Brunel University Mechanical Engineering

Energy Storage in the Built Environment

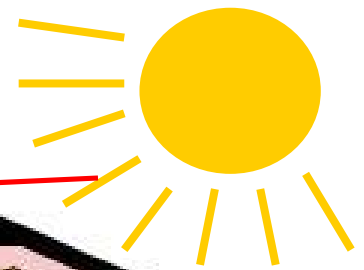
Introduction

- The Engineering Doctorate (EngD) in Environmental Technology: Similar to a PhD but the student is based at a sponsor company for four years and must focus their research on a topic that is of benefit to the company and the environment.
- Buro Happold Engineers is an international engineering firm that provides expertise in all aspects of the built environment.
- My research into energy storage is intended to reduce carbon emissions from buildings by managing energy through storage.





Wind (Kinetic Energy)



Solar Radiation

Computer (Electricity)



Shower (Heat)

Refrigerator (Electricity)

Mains Electricity

Gas-Fired Boiler

Constant Ground Temperature

(<http://www.getafreelancer.com/projects/Graphic-Design/Creative-Graphics-Designer-house-cross.html>)



Night Sky (Heat Sink)



Night Air
(Heat Sink)

(<http://www.getafreelancer.com/projects/Graphic-Design/Creative-Graphics-Designer-house-cross.html>)



- In order to reject excess daytime heat to the night time sky or air, we need a storage medium.
- Phase change materials (PCMs) could be appropriate for this for two reasons:
 - High storage capacity (through high latent heat capacity.)
 - Melt temperature or transition zone that can maintain thermal comfort.
- One example is paraffin wax which melts at 22°C.
- PCMs can be integrated in various ways into the walls, floors or ceilings of a building.



My Research

- Over the next three and a half years I will be researching one of many ways to increase the use of PCMs in buildings. Examples are:
 - Performing studies on buildings that use PCMs to demonstrate their efficacy.
 - Optimising PCM-based systems that could supplement or replace conventional heating or cooling systems in buildings.
 - Research into ways of increasing the internal heat transfer in PCMs to aid their response to temperature change.



Any Questions ?

