

ICaXTM ltd

Interseasonal Heat Transfer:

**Heat Capture in Summer
Heat Storage over the Autumn
Heat Delivery in Winter**

Edward Thompson

ICaXTM ltd

A critical aspect is:

Heat storage in the ground between seasons.

Other names for this are:

ThermalBanks

Underground Thermal Energy Storage

UTES

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The EU's
Renewable Energy Directive
understands renewable energy very well.

“the promotion of the use of energy from renewable sources”

“energy from renewable sources’ means energy from renewable non-fossil sources”

“geothermal energy’ means energy stored in the form of heat beneath the surface of solid earth”

It hardly mentions **Renewable Heat** without mentioning
Renewable Cooling in the same sentence.

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Interseasonal Heat Transfer

provides
Heating in winter
and
Cooling in summer

using the same mechanism.

ICaXTM Ltd

The EU's RED understands renewable energy.

DECC needs to focus its limited funds on effective well-proven technology like

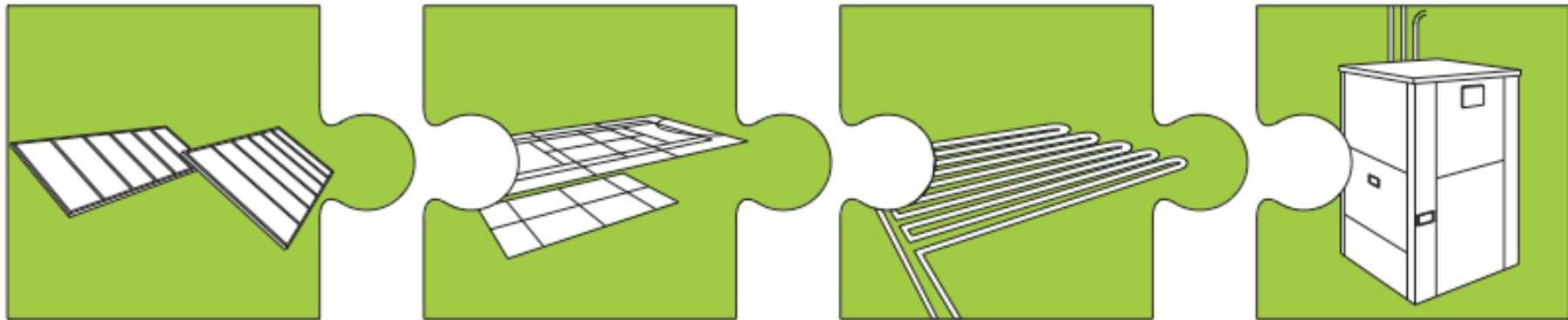
Interseasonal Heat Transfer

and

Underground Thermal Energy Storage.

Interseasonal Heat Transfer™

Collects heat in summer
Stores heat in ThermalBanks
Releases heat in winter
To heat building
Without burning fossil fuels



Solar Thermal + Asphalt Solar + ThermalBank + Heat Pump

= Successful Integration

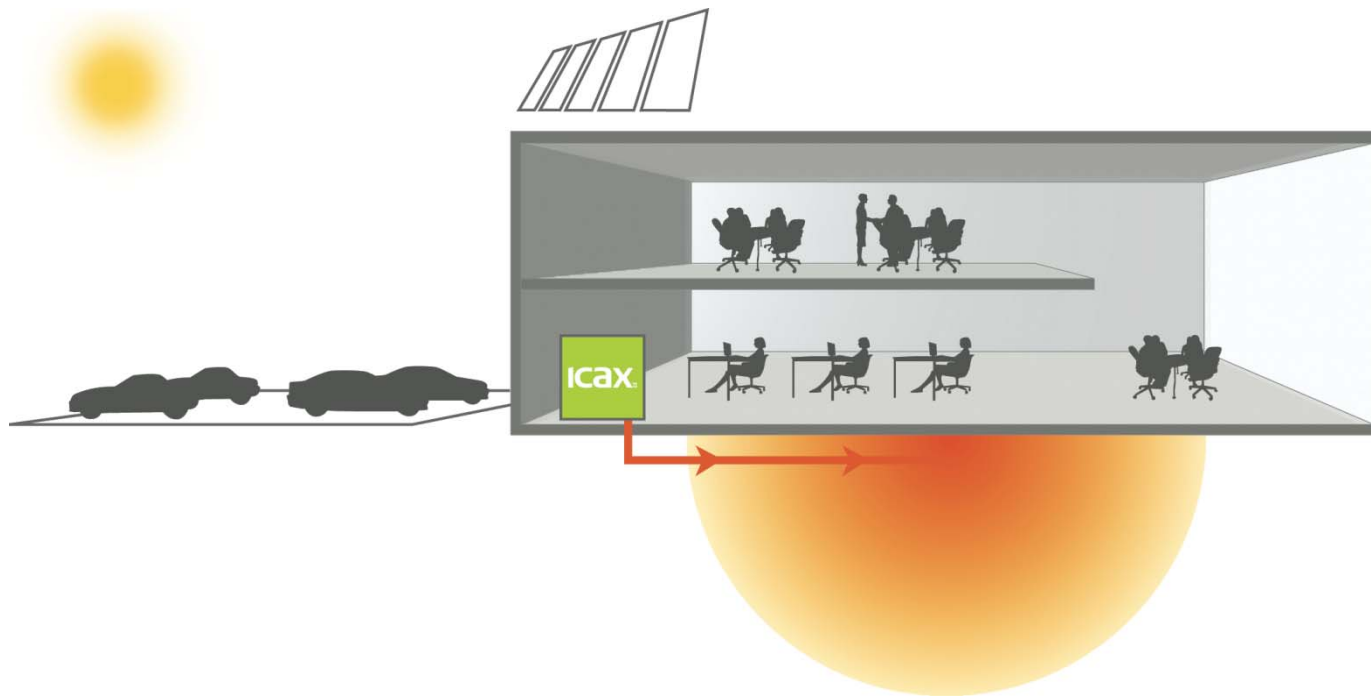
Interseasonal Heat Transfer

Collects solar heat in summer



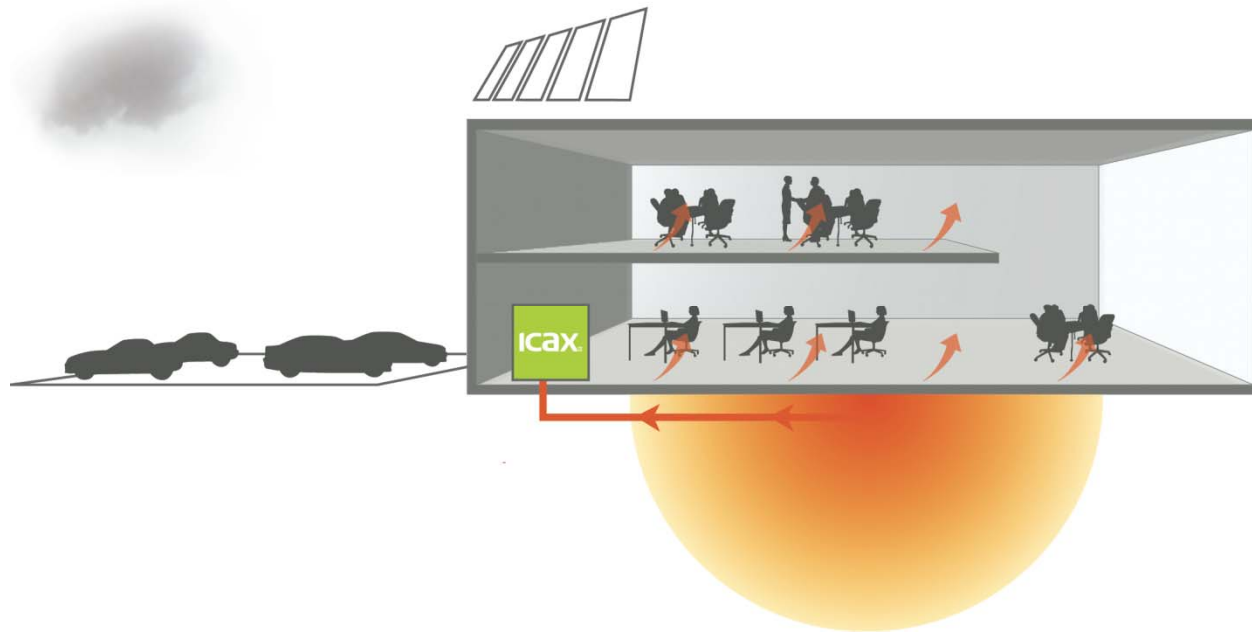
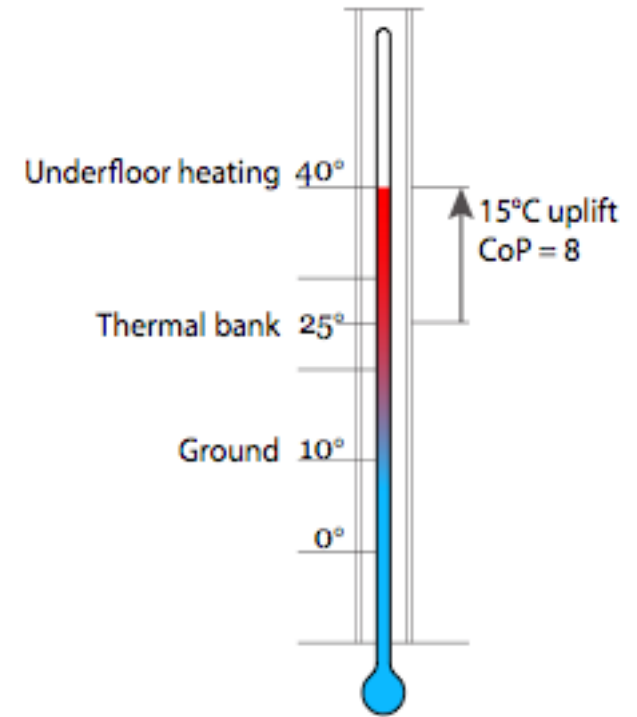
Interseasonal Heat Transfer

Stores heat in a ThermalBank
raising ground from 10° C to 25° C



Interseasonal Heat Transfer

Doubles the performance of heat pumps
By starting with warmth
from Thermal Banks



Interseasonal Heat Transfer

Case studies:

- Toddington – Under Road Heating
- Howe Dell School
- Garth Prison
- Hiroshima
- Merton Intergenerational Centre
- Suffolk One
- Tesco Greenfield Supermarket
- Wellington Civic Centre

Case Studies – Toddington Demonstration

Highways Agency
Under Road Heating



Case Studies – Toddington Demonstration

Highways Agency
Under Road Heating



For two winters this road did not freeze – by day or by night

Howe Dell School

Increases the performance of heat pumps by starting with warmth from Thermal Banks



Garth Prison

Exercise yard doubles as solar collector



Hiroshima

Misawa tests IHT in Japan under licence from ICAX



Merton Intergenerational Centre

Over 44% on site renewable energy



Merton Intergenerational Centre

Merton Rule

Modular building

Low thermal mass

Heating load

Cooling load

Budget blown

Interseasonal Heat Transfer

Intrabuilding Heat Transfer

Over 44% on-site renewable energy

Merton Intergenerational Centre

ICAX Skid, controls system energy flows

Interseasonal Heat Transfer

Intrabuilding Heat Transfer



Suffolk One - £65m Sixth Form College

Doubles the performance of heat pumps
by starting with warmth from Thermal Banks



Suffolk One

Solar Collector Array in construction – bus turning area



Incorporates 13 kilometres of REHAU piping

Case Studies

Suffolk One - £65m Sixth Form College

Solar Collector Array – bus turning area



Case Studies

Suffolk One - £65m Sixth Form College

Solar Collector Array – melts snow – February 2012



Tesco Greenfield Supermarket

Renewable Cooling – heat transfer to ThermalBank in summer

Renewable Heat – heat transfer from ThermalBank in winter



Every little helps

TESCO

Case Studies

Wellington Civic Centre - £8.5m Redevelopment

Solar Roof Collector – Integral Solar Collector



Interseasonal Heat Transfer

Integrates renewable technologies:

Solar Thermal Collection
Seasonal Heat Storage in Thermalbanks
Heat pump delivery

Economic Renewable Energy

ICaXTM Ltd



INTERSEASONAL HEAT TRANSFER

ThermalBanks

Renewable Heat

Renewable Cooling

www.icax.co.uk