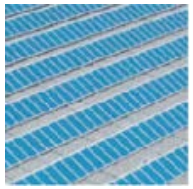
About the

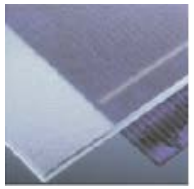
# ‘good old days’

when we had …

Summer Study
25th of February 2015
Dr Andreas Luzzi, CEO LAROS

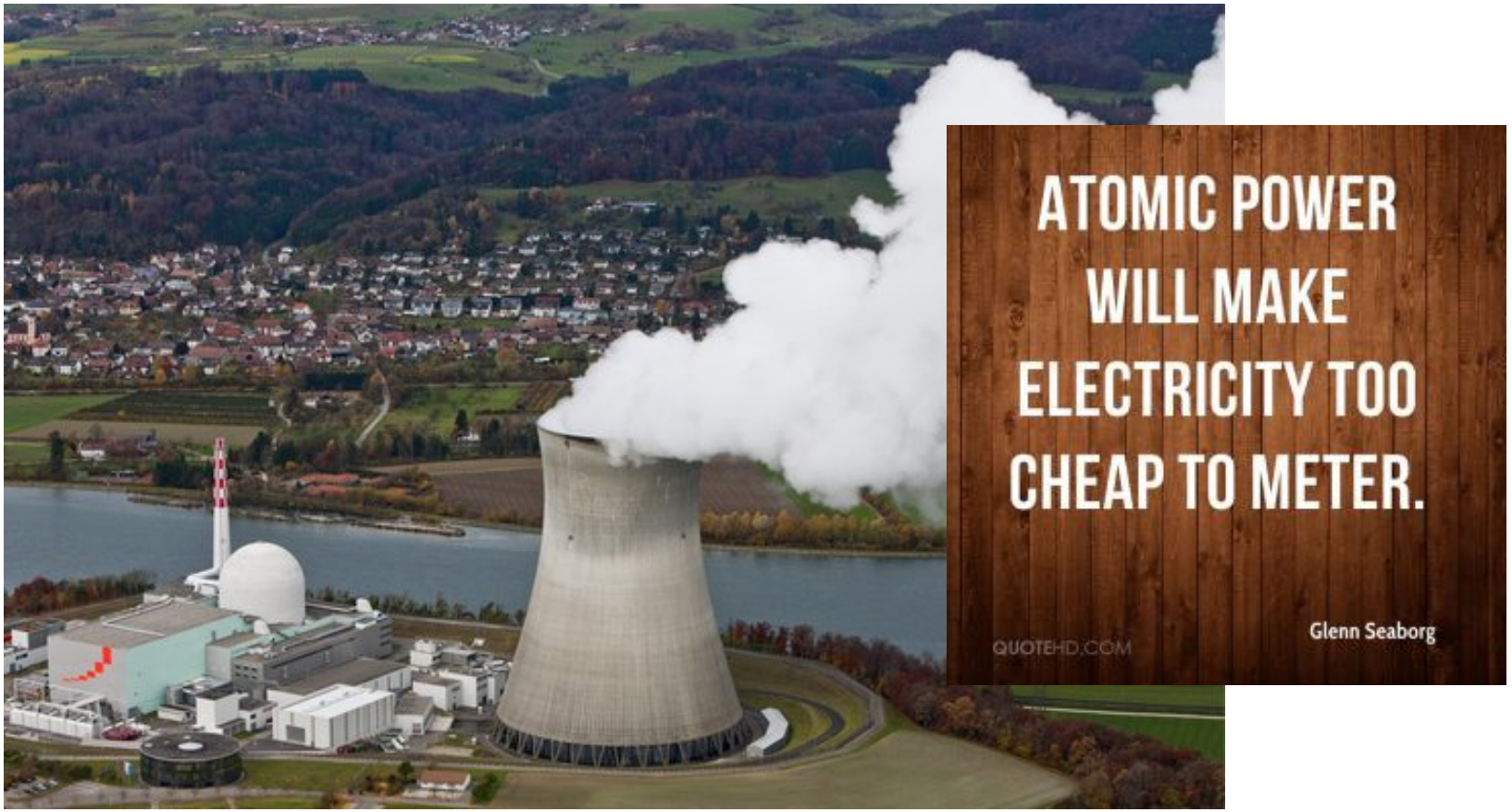
LAROS TECHNOLOGIES
solar & low-E building solutions www.laros.com.au



# Healthy Buildings (1960ies) ...

# … and Cheap Energy .



# Oil Crises (1973 & 1979) ...

# ... Better (but unhealthy) Buildings .

# Passivhaus

**… the voluntary code for**

# 2000-Watt Society Buildings

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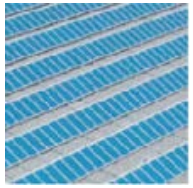
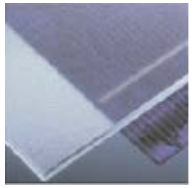


# Observations …

One outstanding building in a row of real estate …

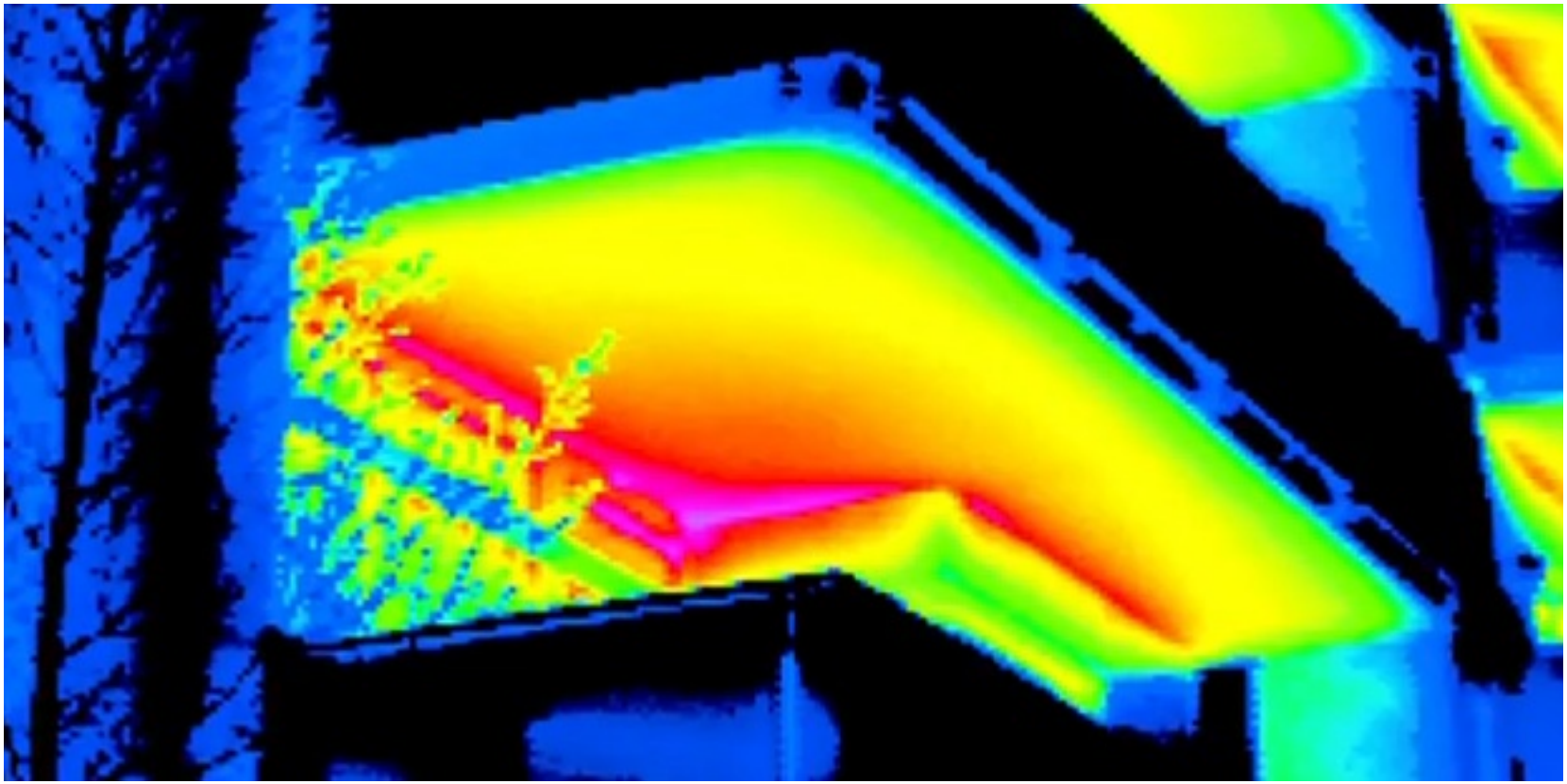

… retrofitted to perform like an ‘architectural esky’

# Typical Facade Designs ... Australia

Sydney (2013)

Melbourne (2014)

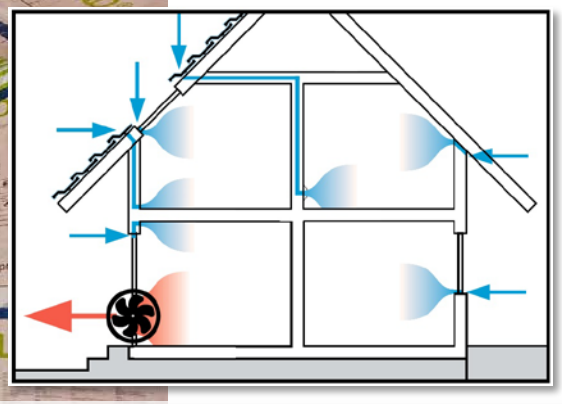
# BCA-Compliance … no worries, but …



# … A (building performance) & Health Issue

# Novel Toolbox for Architects

# 1) … Seriously Airtight

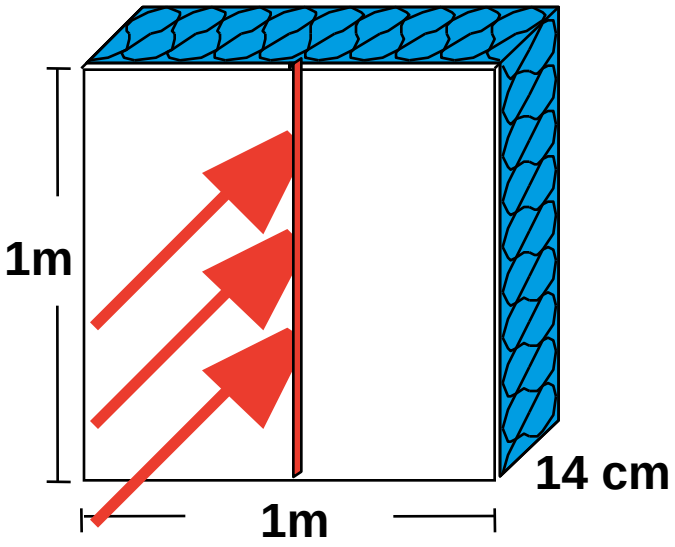



Dynamic moisture management using smart building membrane

Solution : Membranes & tapes

Challenge : Airsealing to $n_{50}$

# Importance of Airtightness




without gap: R-Value 3.3 W/m²K

with 1mm gap: R-Value 0.7 W/m²K

**Performance down by 4.8 !**

## Insulation Performance (thermal)

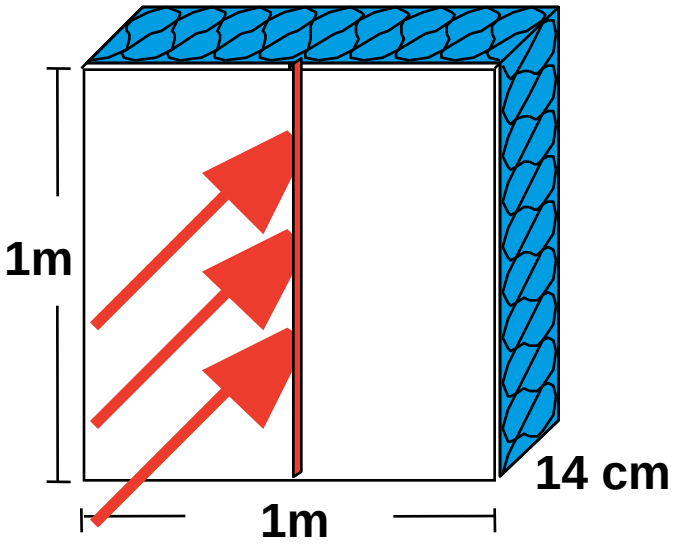
**experimental conditions**

inside temperature +20° C
outside temperature -10° C

Pressure difference
20 Pa = wind force 2-3

Measurement:
Institute of building physics, Stuttgart
Source: DBZ Dec-**1989**, page 1639ff

# Importance of Airtightness




without gap: 0.5 g-water / $m^2$ x 24h

with 1mm gap: 800 g-water / $m^2$ x 24h

**Moisture escape up 1'600 fold !**

## Insulation Performance (moisture)

**experimental conditions**

inside temperature +20° C
outside temperature -10° C

Pressure difference
20 Pa = wind force 2-3

Measurement:
Institute of building physics, Stuttgart
Source: DBZ Dec-**1989**, page 1639ff

# 2) … Seamless Insulation

# 3) … External Shading

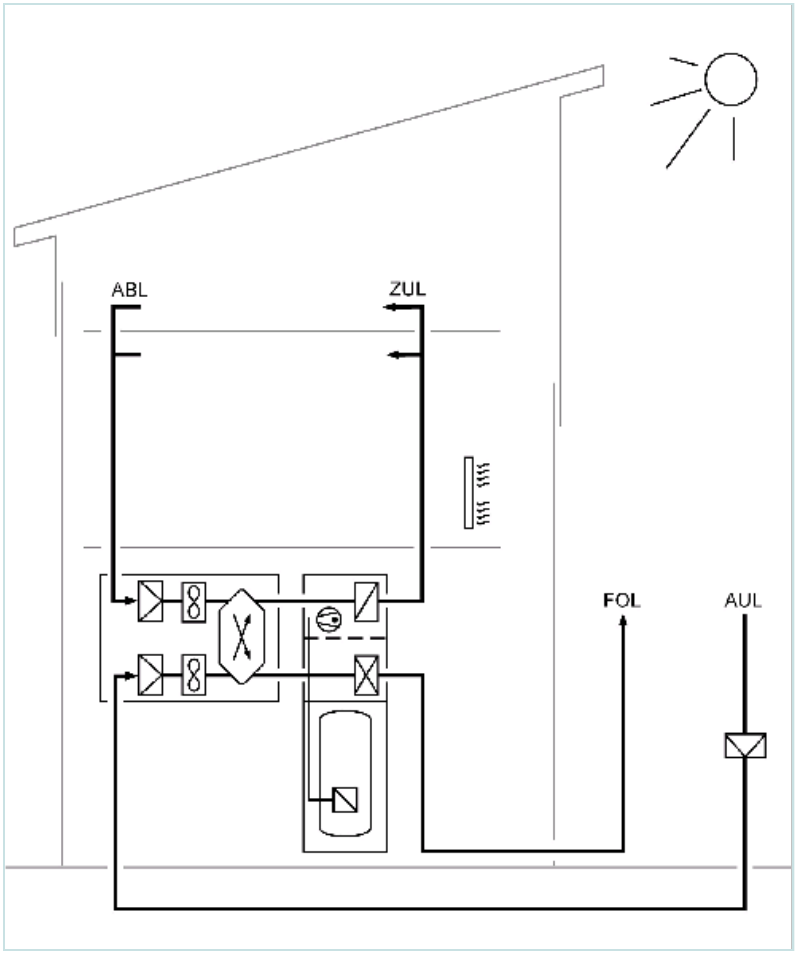
Challenge :
Solar (heat) gain (control)

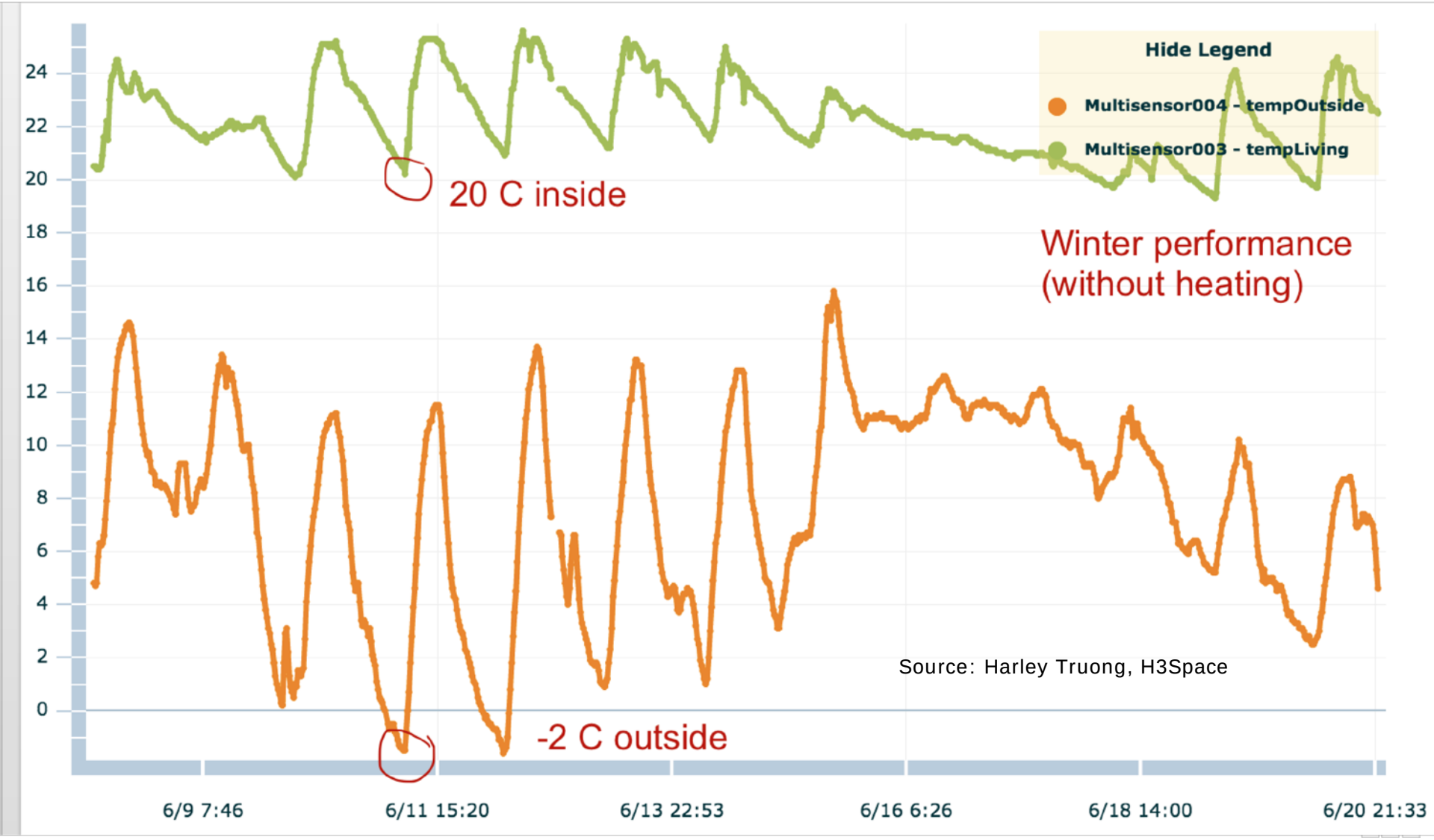

Solutions :
Awnings & blinds

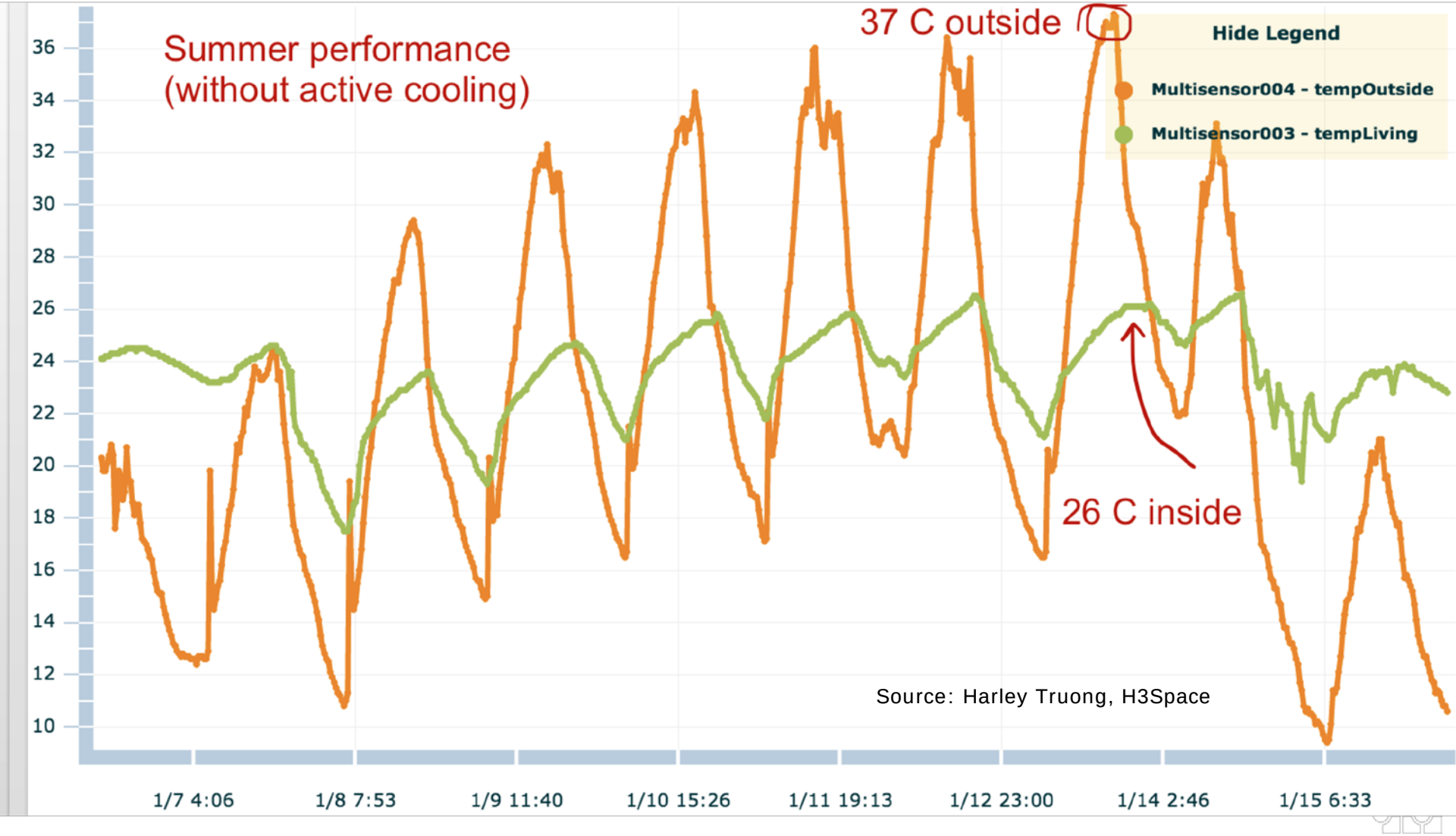
# 4) … Comfort Ventilation

Challenges :
Fresh-air supply, $CO_2$, temp. & rel. humidity man‘g‘t

Solution : Air2air energy recovery ventilation with integrated HVAC




Hide Legend
Multisensor004 - tempOutside
Multisensor003 - tempLiving
20 C inside
Winter performance
(without heating)
Source: Harley Truong, H3Space
-2 C outside
24
22
20
18
16
14
12
10
8
6
4
2
0
6/9 7:46
6/11 15:20
6/13 22:53
6/16 6:26
6/18 14:00
6/20 21:33




Source: Harley Truong, H3Space


Typical all-electric Passivhaus
running on a 2-kWp solar PV system


COMPASS HOUSE
COMPASS HOUSE
LAROS
Mt Larose Vale
Cellars


MAX. SAFE WORKING LOAD 2040 Kg (2 TON)


Research Way
32-42
1-28
30

# Building with Wood – Smartly


INTELLO®
SOLITEX EXTASANA


FRANDS

f-prefab timber
carbon-neutral
autark (e & w)
„eco“ - for life