#UKPHC19

The Erne Campus – The UK's 1st Passive House Premium

Barry Mc Carron

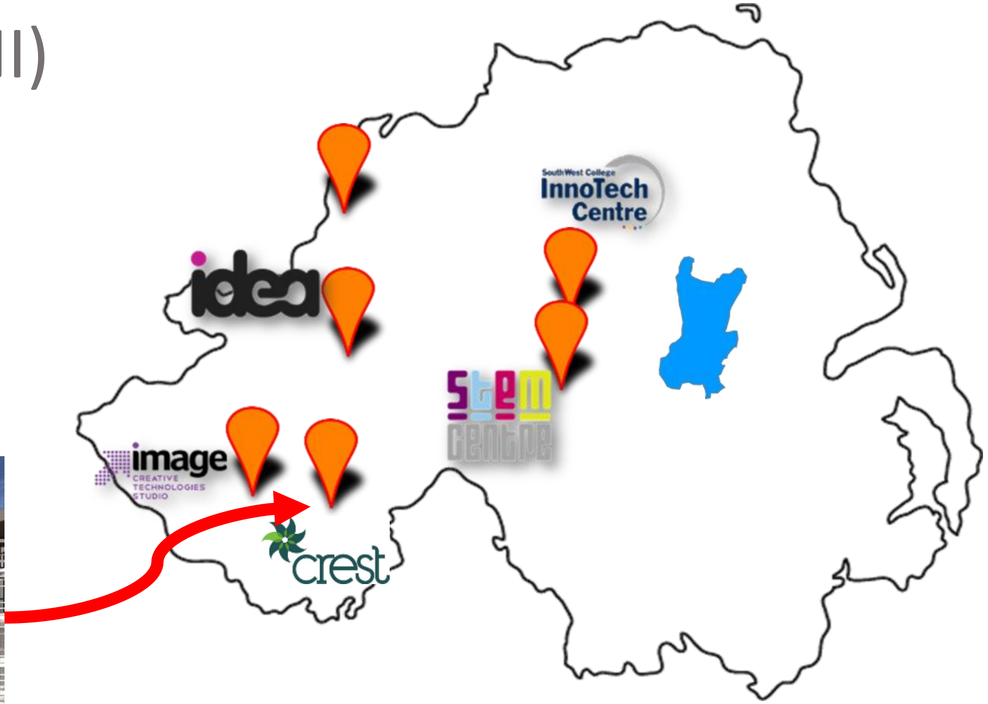
Introduction – Barry Mc Carron

- In South West College since 2013
- Passive House Designer since 2014
- Board Member of the Passive House Association of Ireland
- Expert Advisor to the Ministerial Advisory Group on Architecture
- Passive House RADON PhD Research due for Completion in 2020

South West College

South West College

- Largest Further Education College in Northern Ireland
- Tyrone & Fermanagh (West NI)
- £41 million Annual budget
- 18,000 enrolments
- 900 staff

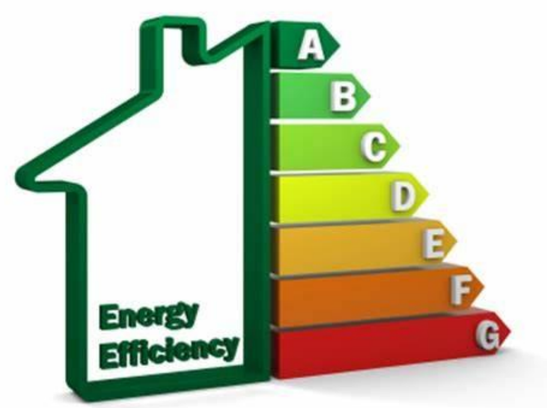


South West College – Passive House

- Passive House Certified CREST Centre opened in 2015
- Passive House Training Commenced in 2016
- 150 Designers and Tradespersons since opening + 4 Direct Projects

South West College – Enniskillen Campus

- This Campus Building is 48 years old (1978) D-Rating
- The Campus requires 152 Kwh/m2/year for heating alone.
- The building is heated with Oil and uses ~100,000 liters a year
- Costing ~£51,000.00 a year.



Erne Campus – Overview

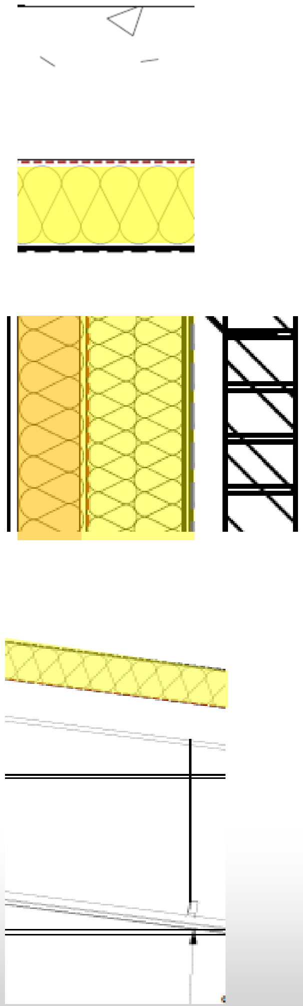
- Site of Old Hospital & Work commenced in late 2016
- The brief is to achieve world class teaching and learning facilities
- Passive House Premium and BREEAM Outstanding Standards

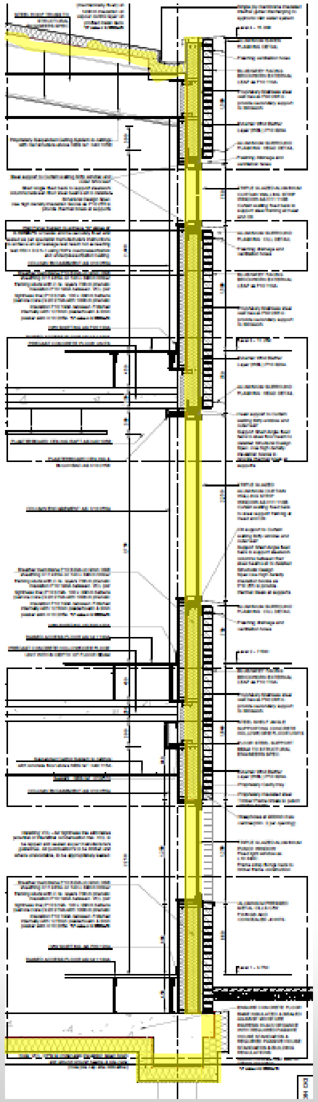
Certified Passivhaus
Passivhaus Institut
| classic | plus | premium |

BREEAM®
Outstanding

Erne Campus – Thermal Envelope

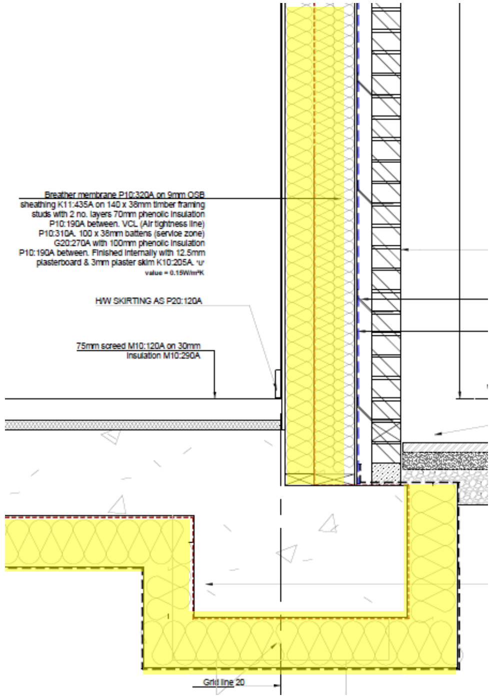
- Floor U-Value 0.11 W/m²K
  175mm Insulation
  27.8%
- Wall U-Value 0.15 W/m²K
  240mm Insulation
  17.6%
- Roof U Value 0.15 W/m²K
  140mm Insulation
  27.8%

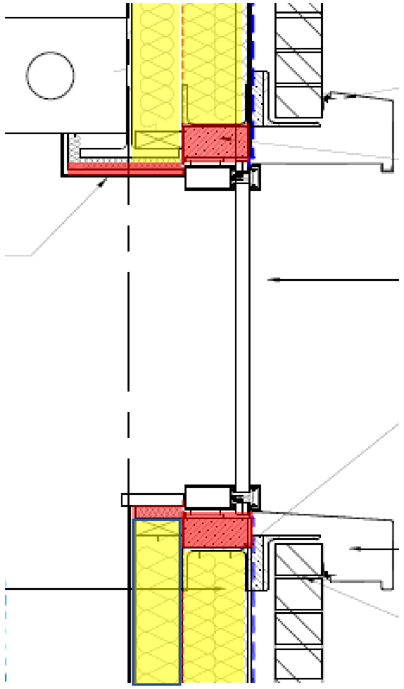


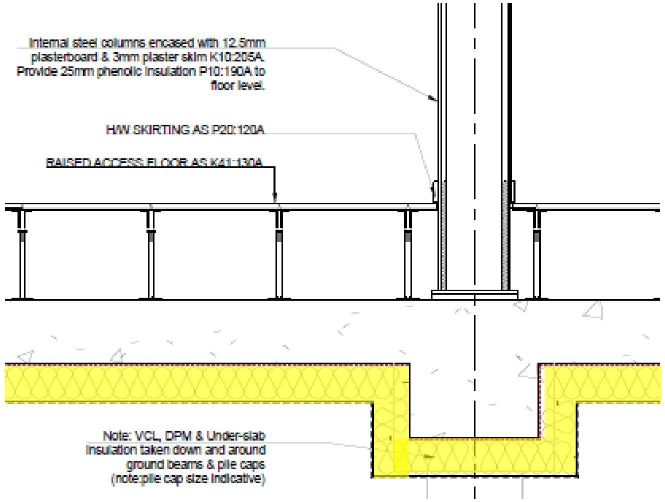


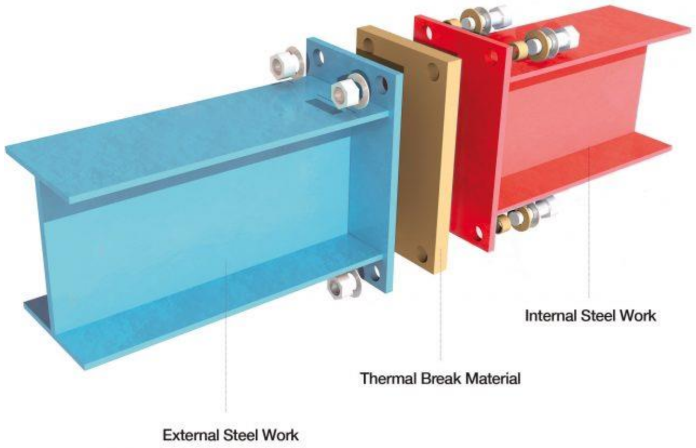
Erne Campus – Thermal Bridging

- All details have been Thermal Bridge mitigated

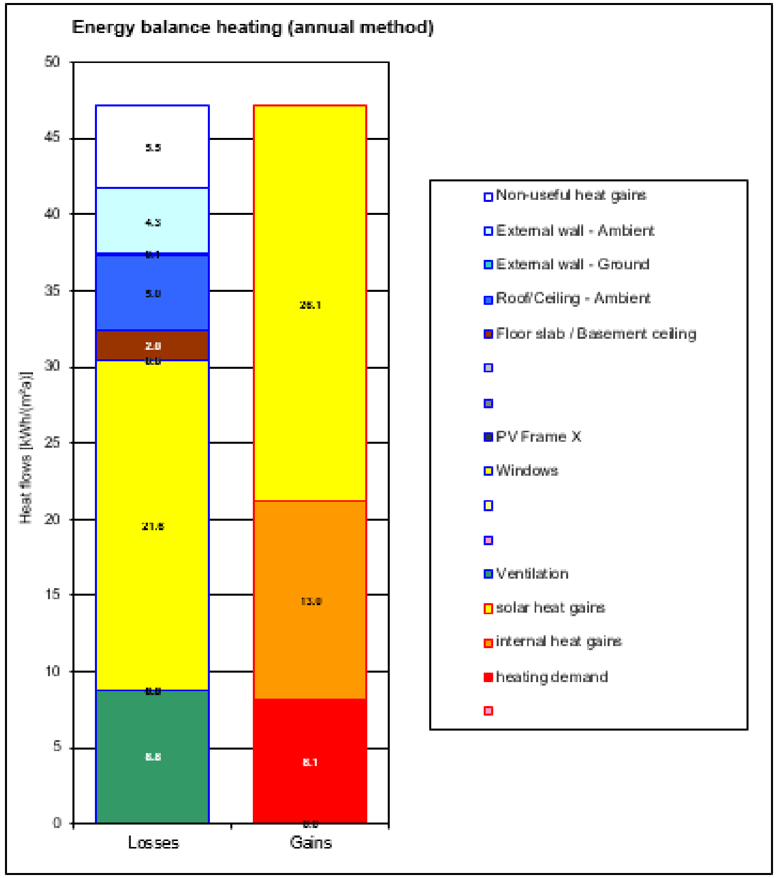




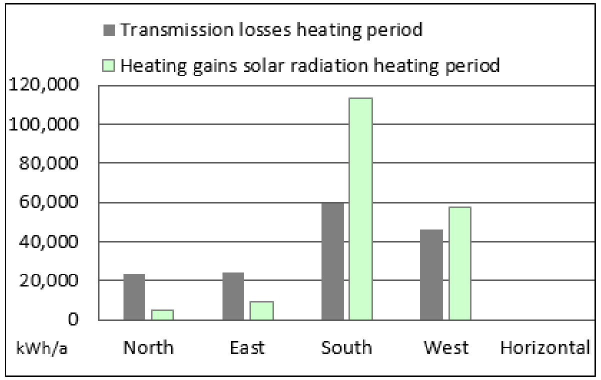


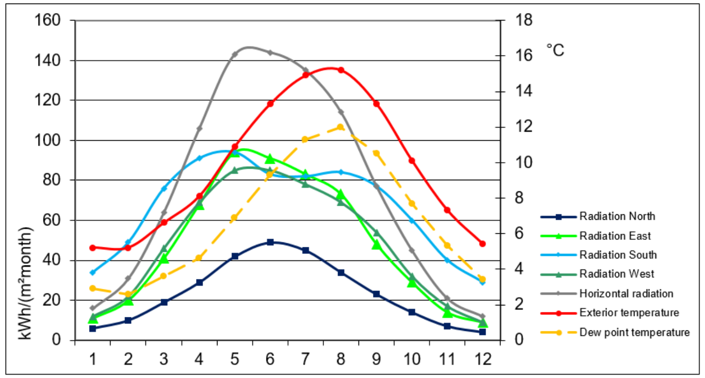


Erne Campus – Window Glazing



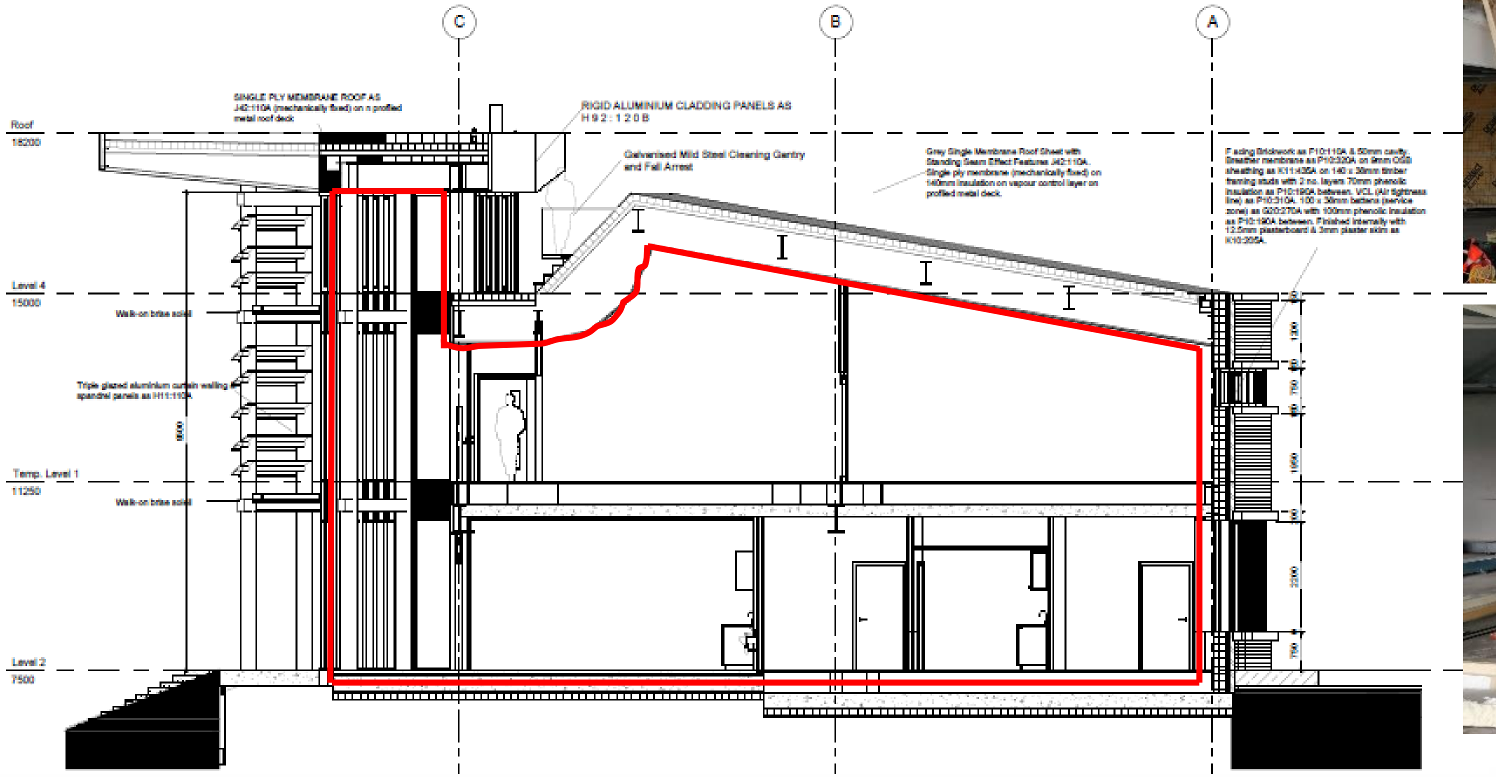
- g Value 0.41
- U Value Glazing 0.53 W/m^{2}K
- U Value Frame 0.96 W/m^{2}K
- U Value Installed 0.85 W/m^{2}K
- Belfast Aldergrove Climate Data





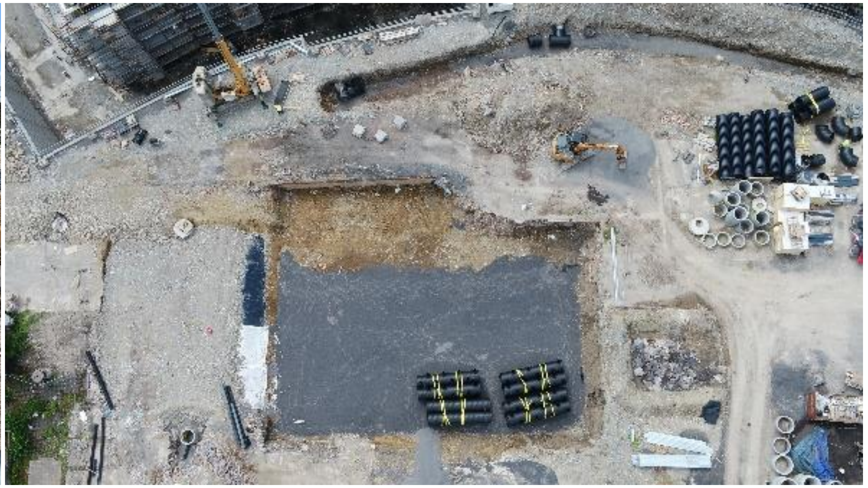
Erne Campus – Airtightness

- Airtightness Target of 0.3 ACH @ 50 PA



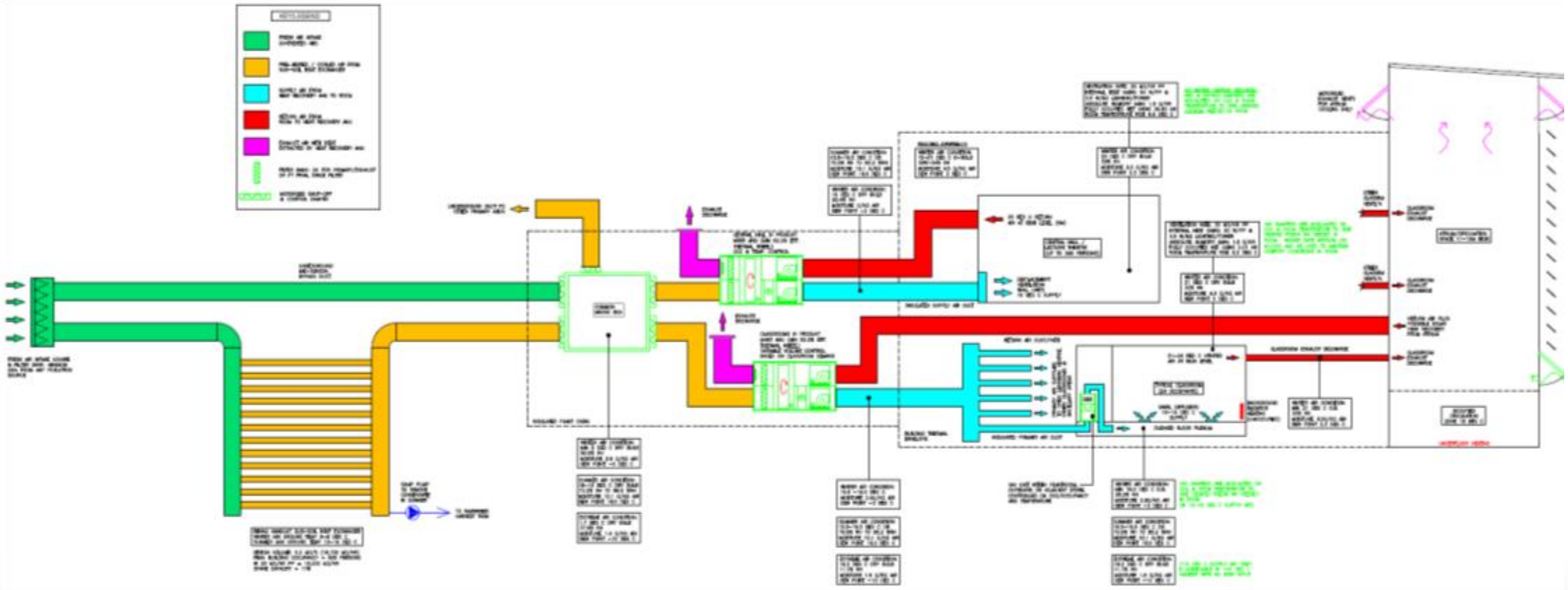
Erne Campus – Sub Soil Heat Exchange

- The ventilation strategy is mixed mode, employing both mechanical and natural ventilation systems.

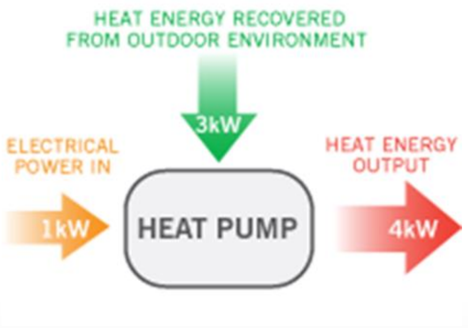

Erne Campus – MVHR

- The ventilation strategy is mixed mode, employing both mechanical and natural ventilation systems.



Erne Campus – Heating

- The heating system is a combination of a bio-oil micro CHP unit producing 80% of the space heating demand as well as 100% of the DHW Demand and finally an air to water heat pump technology providing the remaining 20% of the space heating demand. Both these systems will use a mix of underfloor heating sections and responsive low water content radiators as the heat emitters.

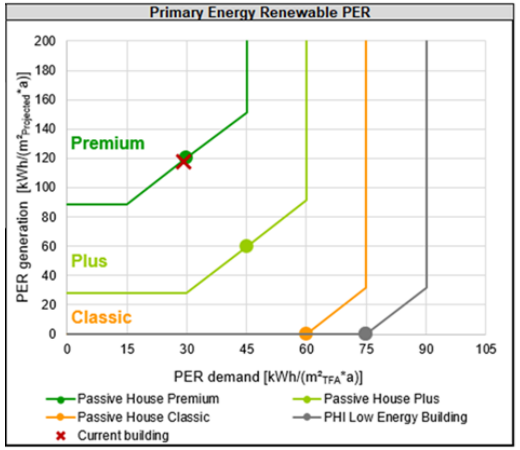


Erne Campus – Renewable Energy

- On site generation and consumption at the Erne campus was significantly increased for the high demand of power consumption in the campus. The roof has significant capacity 3400m2 to allow a solar photovoltaic system (520kwp) which will provide a renewable energy generation figure of 120 Kwh/m2/year.

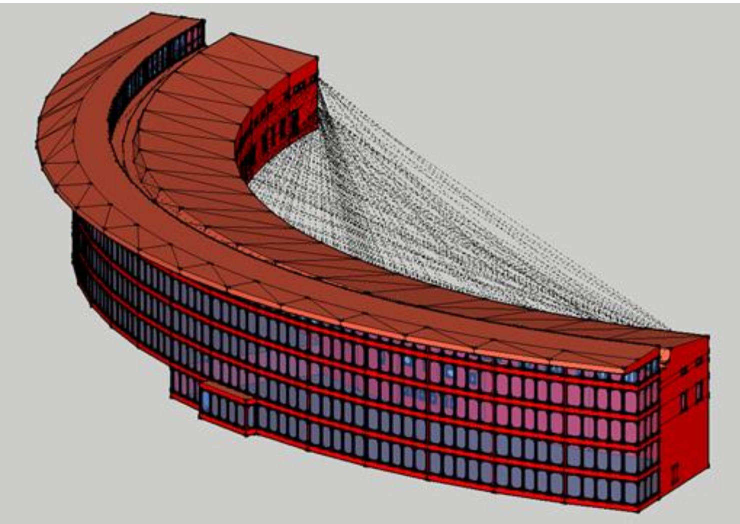
Erne Campus – Energy Storage

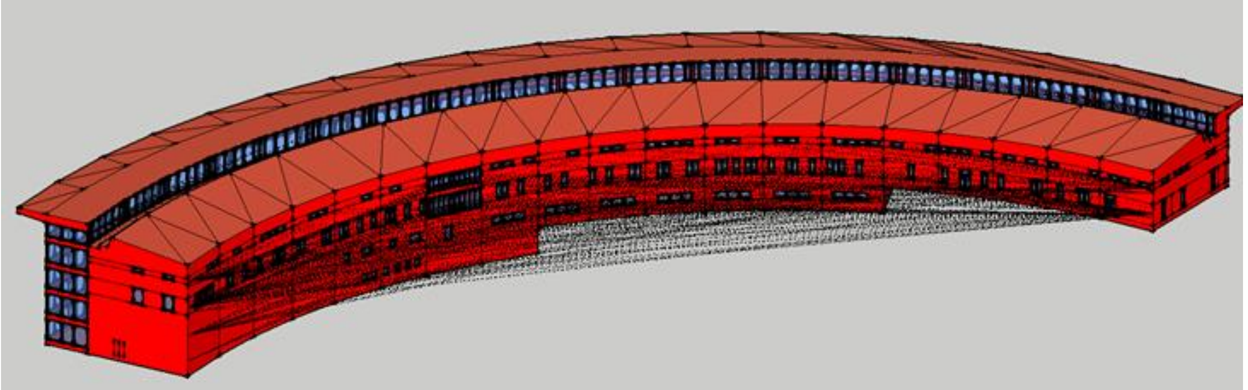
- There is 480Kwh of battery storage in the design that will allow for reasonable amount of short-term storage.
- There is 480kWHr/180kWpk of Lithium battery storage in the design that will allow for a reasonable amount of short-term storage.



Erne Campus – PHPP Metrics

Airtightness (<0.6 ACH@50pascals)	0.3 ACH@50pascals
Thermal Energy Demand (<15kWh/m^2/y)	6.82 kWh/m^2/y
Thermal Energy load (<10 W/m^2)	8.75 kWh/m^2/y
Primary Energy Demand (<120kWh/m^2/y)	52.8 kWh/m^2/y
Primary Energy Renewable PER (<30kWh/m^2/y)	30 kWh/m^2/y
Primary Energy Renewable Generation(<120kWh/m^2/y)	120 kWh/m^2/y





Erne Campus – Project Costs

- The total construction budget for the Erne campus is £29,128,000.00 which is the equivalent to £3,552.19 per m^2 of floor area

Erne Campus – Predicted Performance

- The existing campus at South West College (Fairview 8,898m2)
- In 2018 used 118 kWh/m2/year burning over 100,000L of heating oil which cost approx. £49,000 pounds or £5.50 per m2.
- If we then apply the PHPP projected costs of the heat demand of the erne campus which is 6.82 kWh/m2/year and assume a price of £0.10 per/kWh
- Then the total cost to heat the erne campus will be £4,864.70. This would then represent an annual saving of £44,135.29 or a 90% saving for the college.

Erne Campus – Conclusion

- This building in Northern Ireland is extremely significant to the region.
- It will be the first Passive House Premium project in the UK.
- The application of the passive house standard is still quite new in the UK and in particular Northern Ireland.
- South West College and CREST offer passive house training services in Northern Ireland which will help to break down the barriers.
- The near Zero Energy Building (nZEB) standard coming into force for public sector bodies in the near future.
- This new campus building from South West College represents an excellent international demonstration of how to successfully implement energy efficient and cost effective nZEB through the use of passive house and renewables.
- The Project is on time and is due for opening in August 2020.

#UKPHC19

Thank you…