Retrofitting and Sustainability

Topics

1. When should we retrofit?
2. Example – 200 year old cottage
3. Energiesprong and other offsite approaches
4. Energy agencies and their roles in retrofits - TEA
5. Mechanical heating and ventilation issues
6. SEAI grants
7. Energy efficiency in traditional buildings (EETB)- Draft consultation document
8. Value

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1. When <u>should</u> we retrofit?

- Reuse or recycle
- Keep it simple

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1. When <u>should</u> we retrofit?

- Reuse or recycle
- Keep it simple
- Occupational comfort levels
- Whats the residual value

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1. When <u>should</u> we retrofit?

- Renew or replace

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1. When <u>should</u> we retrofit?

<u>Considerations</u>

- Neighbours & collaboration

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1. When <u>should</u> we retrofit?

<u>Considerations</u>

- Neighbours & collaboration
- Access to rear

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1. When <u>should</u> we retrofit?

<u>Considerations</u>

- Neighbours & collaboration
- Access
- Cold bridges – porch?

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1. When should we retrofit?

Considerations

- Neighbours & collaboration
- Access
- Cold bridges – porch?
- Windows & doors
- Attic space
- Services
- Sustainable materials?

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2. An example

<u>200 year old cottage</u>

- Family house inherited
- Uninhabitable
- Historic poor interventions
- Conservatory
- Cold and Dampness
- High heating costs
- Sentimental attachments

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2. An example

Condition

- BER – F
- Zero insulation
- “you can see the stars”!
- Damp walls – cement render
- Open fires
- Oil central heating – “never really worked”
- Damp floors
- Timber infestation
- Chimneys & hygroscopic salts
- “Over 3K a year on fuel”!

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2. An example

Work ongoing

- Warm roof,
  - insulation over rafter
  - No eaves gap
  - Chimneys
- New 3G windows and doors
- EWIS ongoing
- Cement plaster maintained
- Wufi analysis
- Increase thermal bridge
  - Perimeter insulation
  - Ground temperature

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2. An example

Work ongoing

- New insulated floor slab
- Some new timberwork
- Hydraulic lime plaster
- Ducting routes

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2. An example

Work ongoing

- Heating and ventilation system
  - Nilan Compact P
  - Double duct extract air heat pump
  - In full control of internal environment
  - Extract from wet spaces

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2. An example

Completed

- Home brought to modern standards
- 120M2 with extension
- A2 BER rating
  - Energy bill 400 in first year
- Total cost 120,000
  - 1,000/m2
  - Inc 25 SqM extension

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3. Energiesprong

Dutch initiative

- Bringing homes to NZEB standards
- Now in many countries
- Setting cost standards through innovation - lidar scan & BIM
- Use of offsite methods
- Financed by future energy cost savings
- 40 year min lifespan
- Rapid installation
- Minimum disruption
- Best suited to replication
- Link: https://energiesprong.org/

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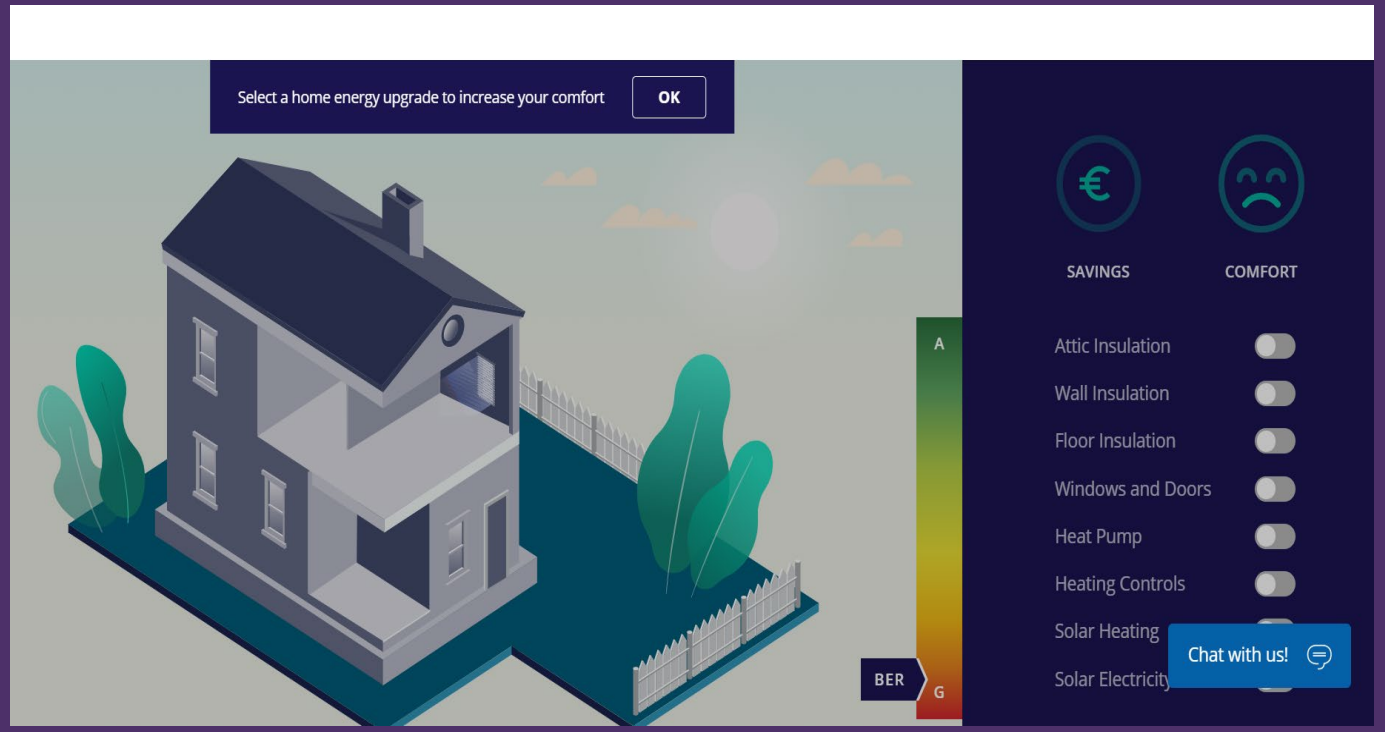
4. Energy agencies and their roles in retrofits - TEA

SEAI

- “Our role is to help all of society to be more energy efficient. We also support the development of clean energy technologies”
- Provides grants and advise for home improvements.
- Homeowner responsible for economics and results
- Approved contractors required
- Link: https://www.seai.ie/home-energy/home-upgrades/



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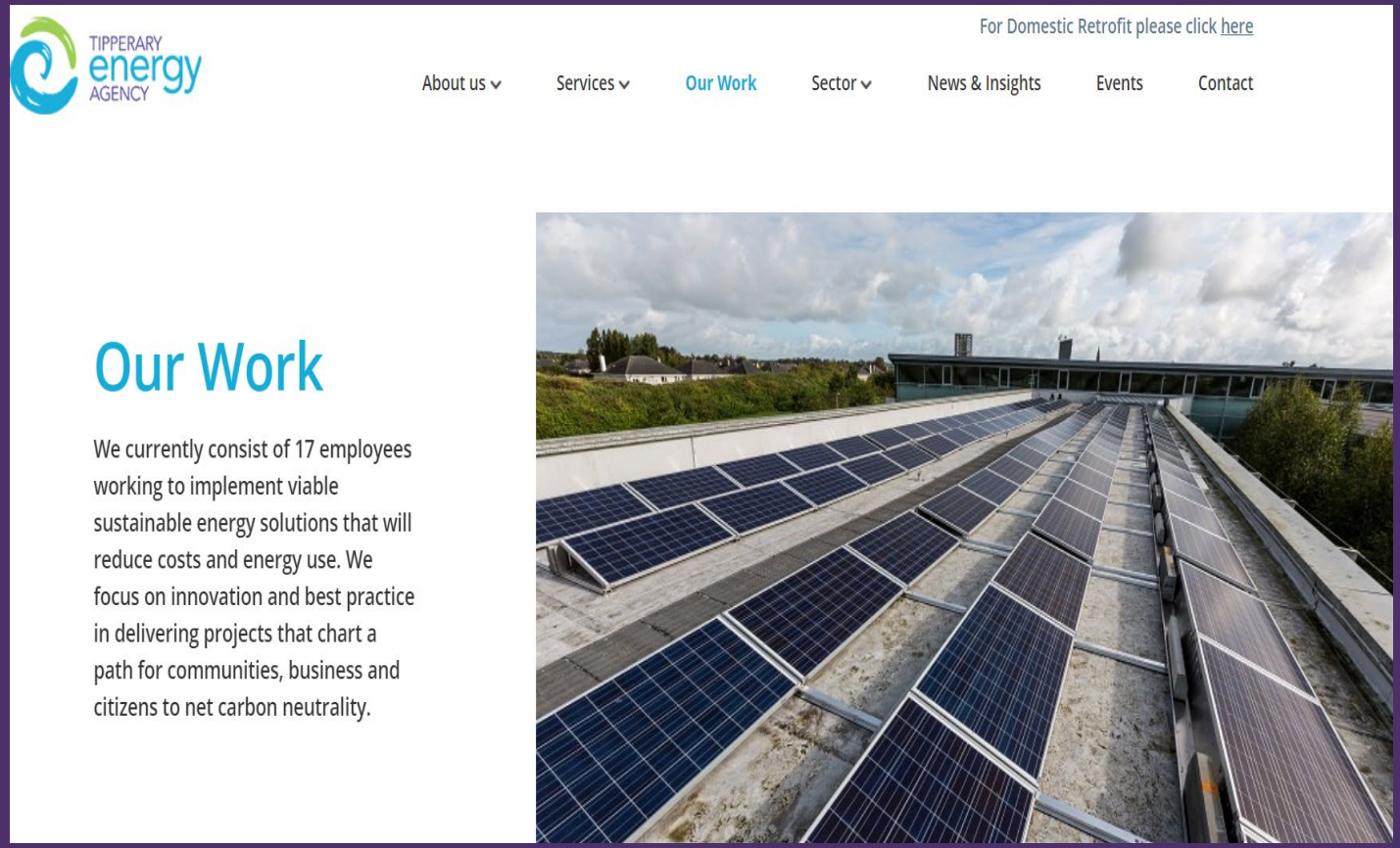
- When <u>should</u> we retrofit?

4. Energy agencies and their roles in retrofits - TEA

<u>Tipperary energy agency</u>

- "Our mission is to lead the delivery of sustainable energy solutions in Tipperary and beyond, by advocating, educating and innovating on climate action."
- not-for-profit company limited by guarantee (CLG)
- Superhomes scheme
- Approved contractors required
- Link:https://superhomes.ie/about-us/



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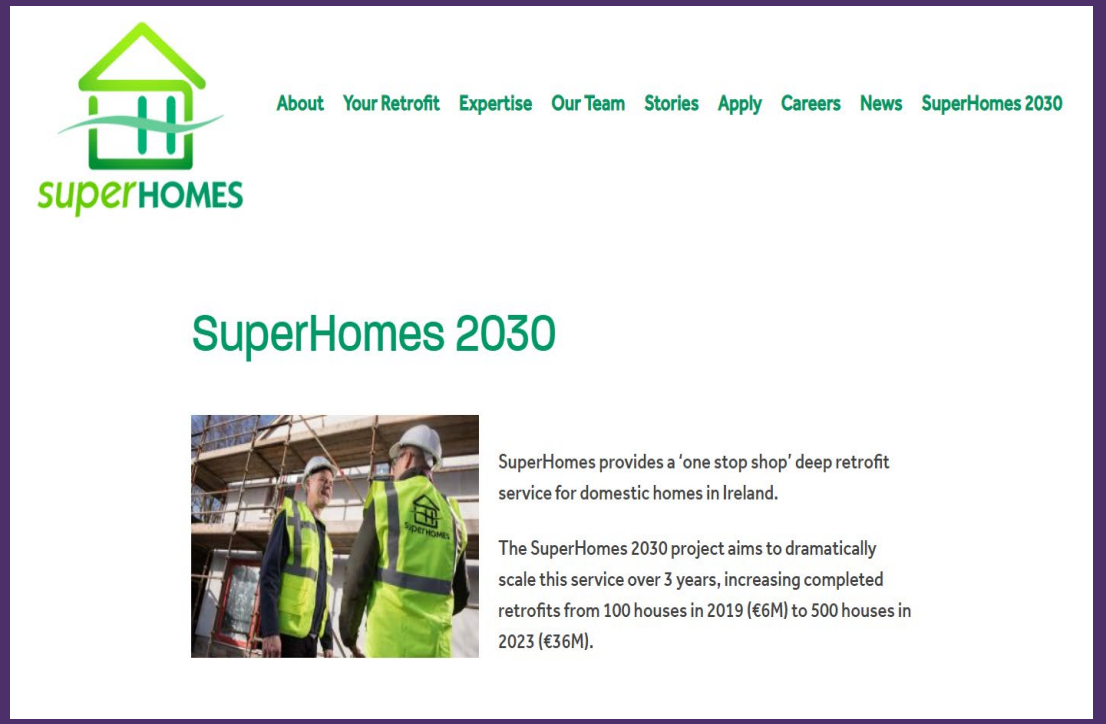
4. Energy agencies and their roles in retrofits - TEA

Superhomes

4 prescriptive measures
- Air to water heat pump
- Advanced ventilation *(heat recovery or demand controlled ventilation)*
- Airtightness improvement (reducing draughts and heat loss)
- Insulation to a high standard

Other Measures:
- Cavity wall, attic, flat roof and external wall insulation
- Windows
- External Doors
- Wood burning Stove
- Solar photovoltaic *(PV) panels to generate electricity*
- Low Energy Lighting



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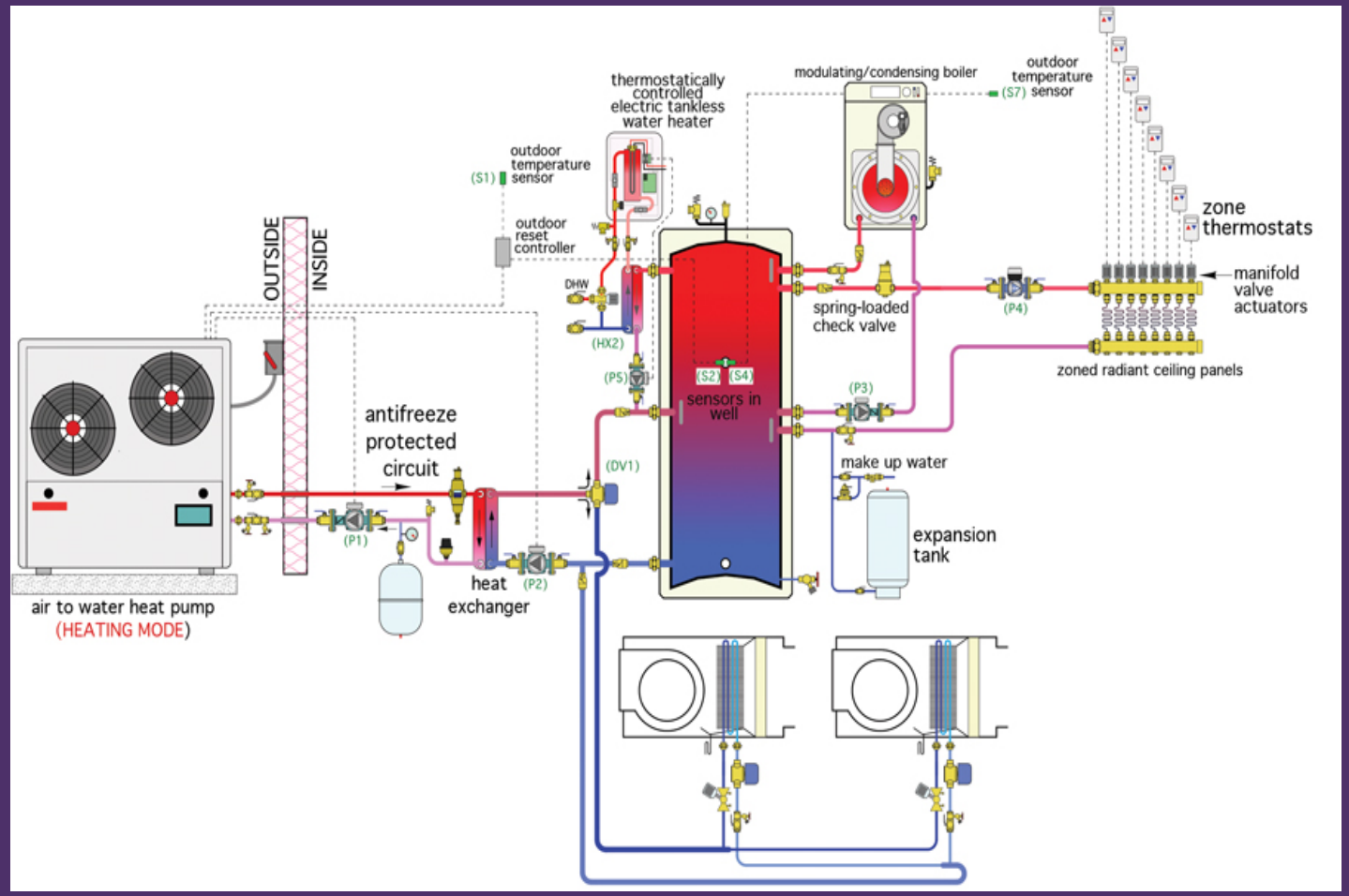
5. Mechanical heating and ventilation issues

<u>Accepted cost centres</u>

- External Air to water heat pump
- Heat distribution
  - Underfloor / wet system
- Domestic hot water & hydraulics
- Controls system
- Ventilation system
  - Heat recovery



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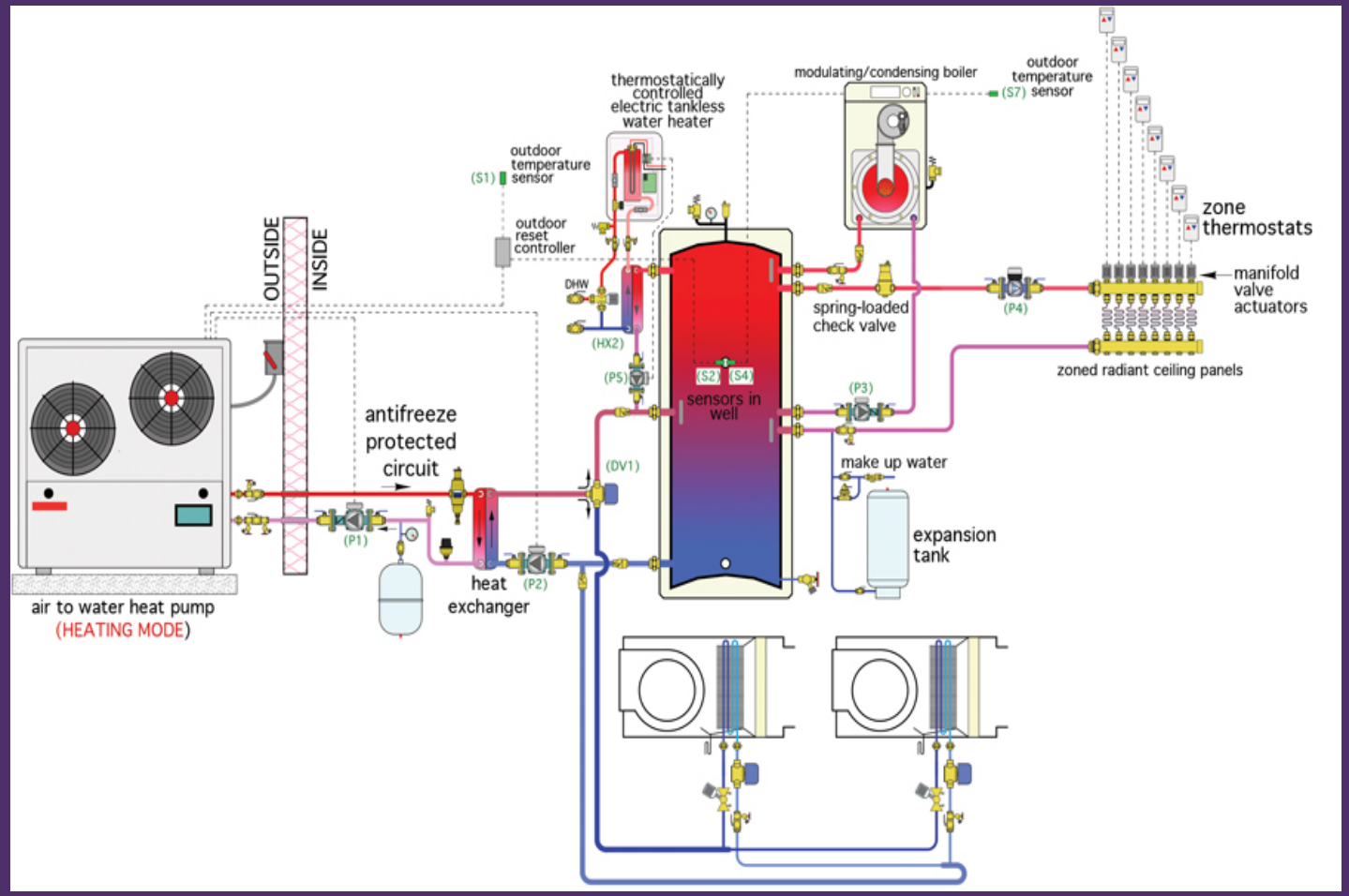
5. Mechanical heating and ventilation issues

<u>Accepted cost centres</u>

Based on traditional perceptions -

- External Air to water heat pump
- Heat distribution
  - Underfloor / wet system
- Domestic hot water & hydraulics
- Controls system
- Ventilation system
  - Heat recovery?
  - Demand controlled?

- Complications!



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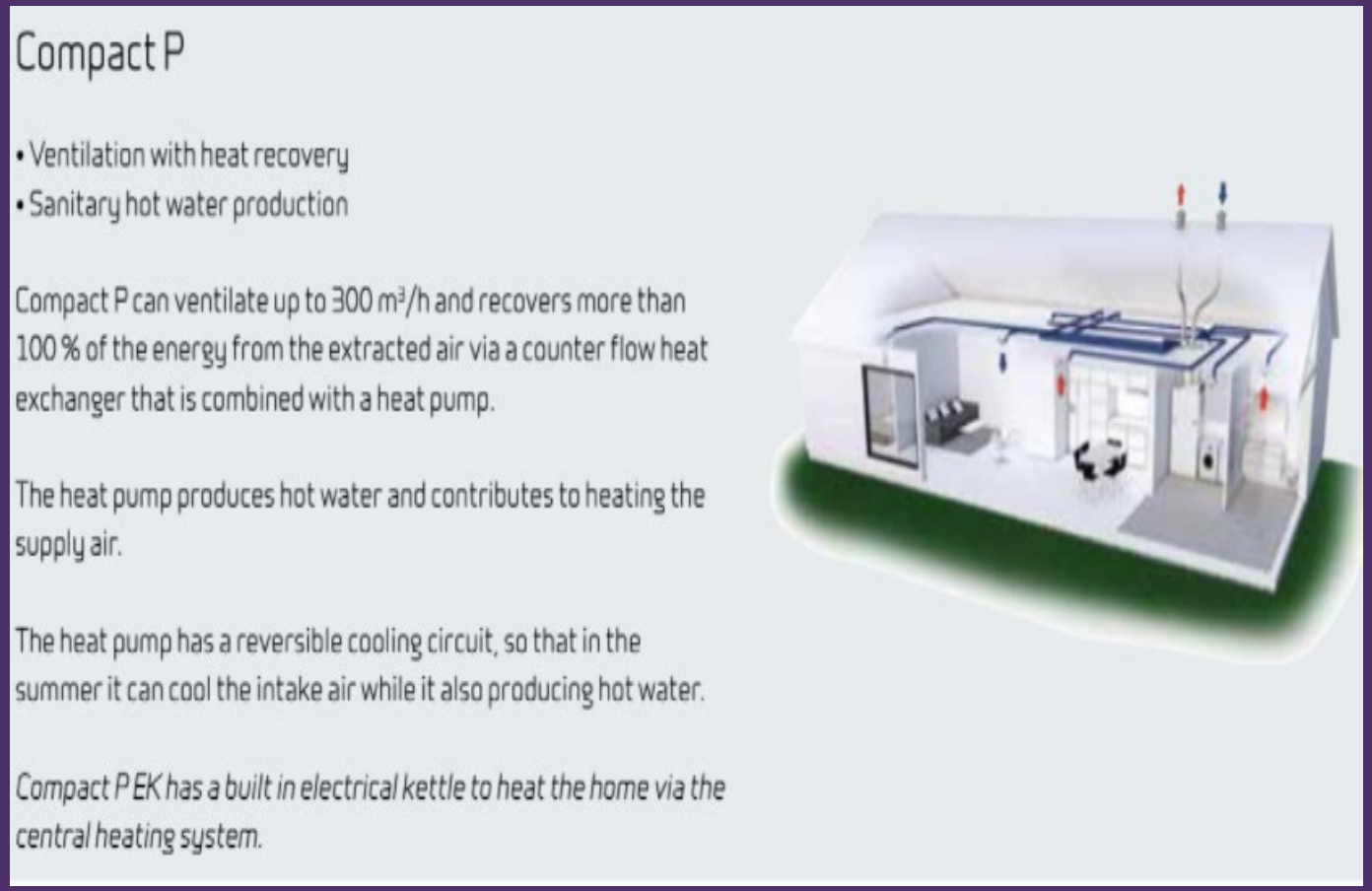
5. Mechanical heating and ventilation issues

<u>European norms</u>

Based on simplicity-

- Fabric first approach
- Control energy movements
- Double duct – flow and return
- <u>Exhaust air</u> heat pump
- Domestic hot water & hydraulics
- Controls system
- Ventilation system
  - Heat recovery
  - Demand controlled
- Single unit, minimum disruption
- Cost effective low consumption
- Fast RoI
- Very applicable to many Irish homes



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6. SEAI Grants

Home heating grants

Based on allowances

- Any one or combination
- Limited funds
  - First come first served
- Prescriptive approach

Overview of SEAI domestic grants	
Measure	Max grant
Attic insulation	400
Cavity Wall insulation	400
Wall insulation (internal lining)	1,600 to 2,400
Wall insulation (External EWIS)	2,750 to 6,000
Heat pump systems	3,500
Heating controls upgrade	700
Solar water heating	1,200
Solar PV	900 to 2,400

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6. SEAI Grants

Upgrade options

Free Energy Upgrade

Free home energy upgrade service for qualifying homeowners
Fully funded by SEAI
All home upgrade costs covered
Managed by SEAI and includes:

- home survey
- contractor selection
- contractor works
- follow up BER

Who this is for?

•qualifying homeowners in receipt of certain welfare benefits

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6. SEAI Grants

Upgrade options

One Stop Shop Service

Complete home energy upgrade solution
Part funded with SEAI grants
Approximately a third of the cost for a typical family home
Managed by a One Stop Shop including:

- home energy assessment
- grant application
- project management
- Contractor works
- follow up BER

Who this is for?

•homeowners and landlords

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7. Energy efficiency in traditional buildings (EETB)

Draft consultation document

Consultation closed 10th September.

Draft document no longer available.

Very comprehensive advise applicable to a wide range of buildings

Quote:
“There’s a widely held belief that our older, traditional buildings are not energy-efficient, and that they need radical upgrading to improve their performance. In fact, the reality is more complicated.
Assumptions about the poor performance of these buildings are not always justified.
That being said, the energy performance of most of our historic and traditional buildings can be improved. This will help them continue to be viable and useful, both now and into the future.”

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7. Energy efficiency in traditional buildings (EETB)

Draft consultation document

Detailed considerations for many building types

Poses real questions about cavities -

Where does damp really come from?

If there is no insulation, there is no thermal bridge!

Includes a number of case to show what energy-efficiency options are appropriate

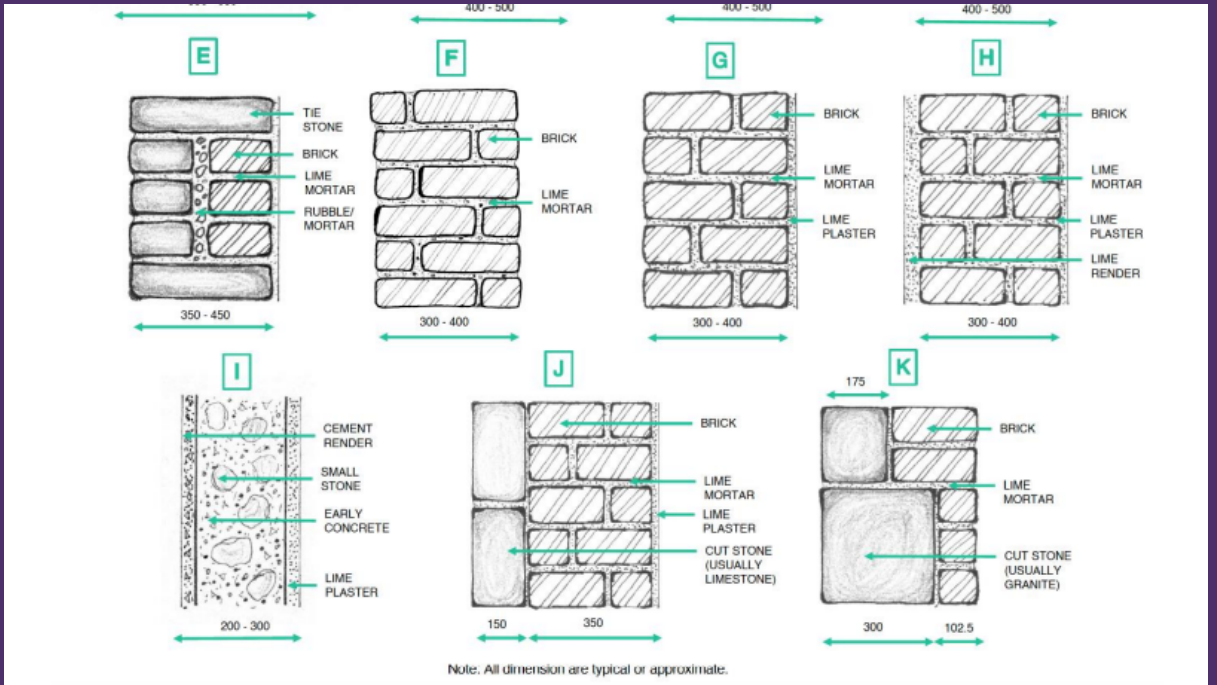

Figure 1 Different types of traditional masonry walls and their typical build up.

Modern construction is largely distinguished by the development and widespread use of twin-leafed construction, commonly called a cavity wall, which is based on a fundamentally different approach to keeping the interior of a building dry than that of a traditional solid masonry wall. The cavity wall consists of an outer leaf which is presumed always to be wet, and an inner leaf which it is intended should always be dry, with the air-filled cavity acting as a water barrier. In the earliest cavity wall constructions, the cavity was left empty but

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8. Value

Costs versus sustainability

MaREI institute

Research into the processes towards decisions on retrofits.

Questions sustainability

Complicated strategies beyond homeowners abilities.

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8. Value

Costs versus sustainability

The MaREI Turnkey Retrofit project aims to develop a homeowner-centric renovation service, transforming the complex and fragmented renovation process into a simple, straightforward, and attractive process.

A burden-free experience for the customer, this holistic service allows them to manage and upgrade their homes in a simpler and cost-effective way.

It will match end-users with the right building professionals and financial options while assembling the local capacity for deep energy renovations.

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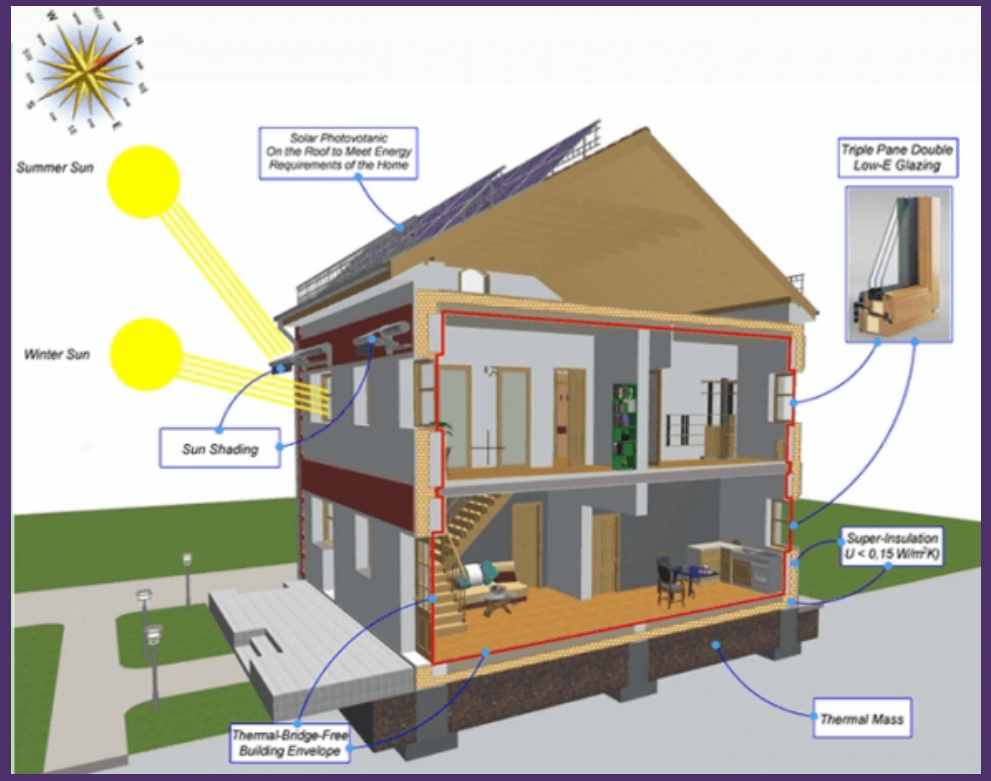
8. Value

Sustainable?

- Costs versus outcomes?
- Disposable incomes
- Energy poverty
- Materials choices
- Recycle or reuse?
- Training and workforce
- The challenge ahead
- Climate change

Conclusion-

- There is no planet ‘B’



1. Space Heating Demand should not exceed 15kWh annually or 10W (peak demand) per square meter of usable living space.
2. Primary Energy Demand should not exceed 60kWh annually for all domestic applications (heating, cooling, ventilation, hot water and domestic
3. Airtightness with a maximum of 0.6 air changes per hour at 50 Pascals pressure.
4. Thermal Comfort must be met for all living areas year-round with not more than 10% of the hours in any given year over 25°C (without the use of active cooling).

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