

Workshop 3C: Understanding Climate Change and Household Energy





Energy Co-operatives Ireland
Building community energy networks
energyco-ops.ie



South West Mayo
DEVELOPMENT COMPANY LTD
Comhlacht Forbartha
Tuath/Theacht Ibhailte Fia-Tao



MAYO CLIMATE ACTION AWARENESS WORKSHOPS



Riailtas na hÉireann
Government of Ireland



Riailtas na hÉireann
Government of Ireland

Timerscail Éireann
Project Ireland
2040



Climate Action Awareness Group



- South West Mayo Development Company Ltd.
- CARO (Climate Action Regional Office)
- Mayo County Council
- Moy Valley Resources IRD
- Mayo North East Development Company Ltd.



Comhairle Contae Mhaigh Eo
Mayo County Council



Energy Co-Op



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OVERVIEW

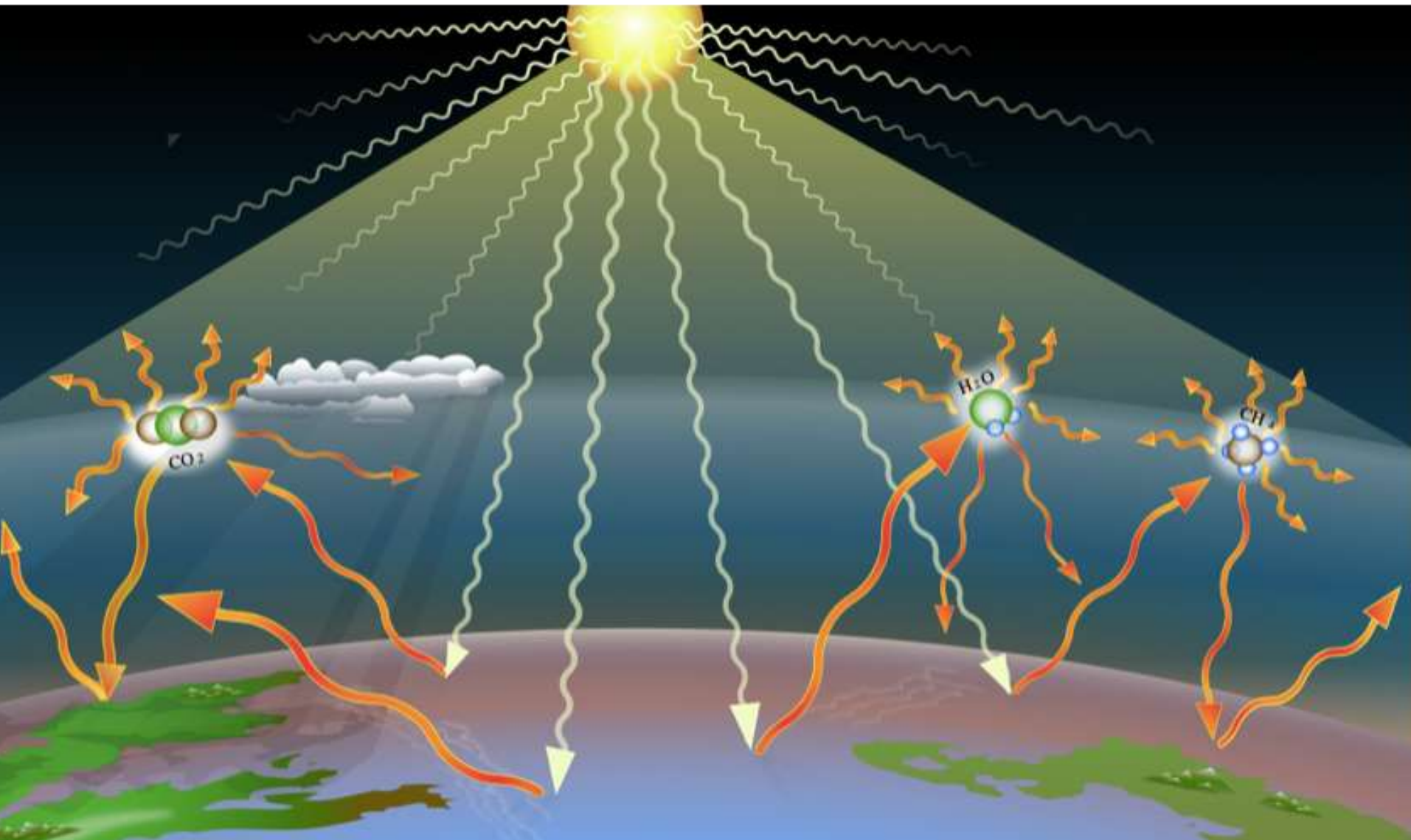
South West Mayo Development Company, as part of a Climate Action Awareness Group, are delivering a bespoke workshop programme 'Mayo Climate Action Awareness Workshops' in 5 Mayo Towns. These workshops will look at a number of topics related to climate change, the relative impacts and adaptation and mitigation actions that can be taken.

The format of these workshops will allow for educating and creating awareness of climate change issues and for interactive discussion around these issues and associated actions that can be taken individually or as a community. The training material will be a combination of both generic and specifically local information using local case studies directed at communities.

This programme will run over a period of 6 weeks, starting the 4th of February 2020 with 3 workshops running in 5 locations around the county. The first two workshops in each location will be common across all 5 locations, with the final workshop focusing on different themes in each location, but open to participants across the whole county.

Global Warming – Greenhouse

Greenhouse Gases collecting in the atmosphere trap heat



Global Climate Indicators

Indicators which show the changing conditions
which humans are causing

Surface
temperature

Atmospheric CO₂

Ocean
acidification

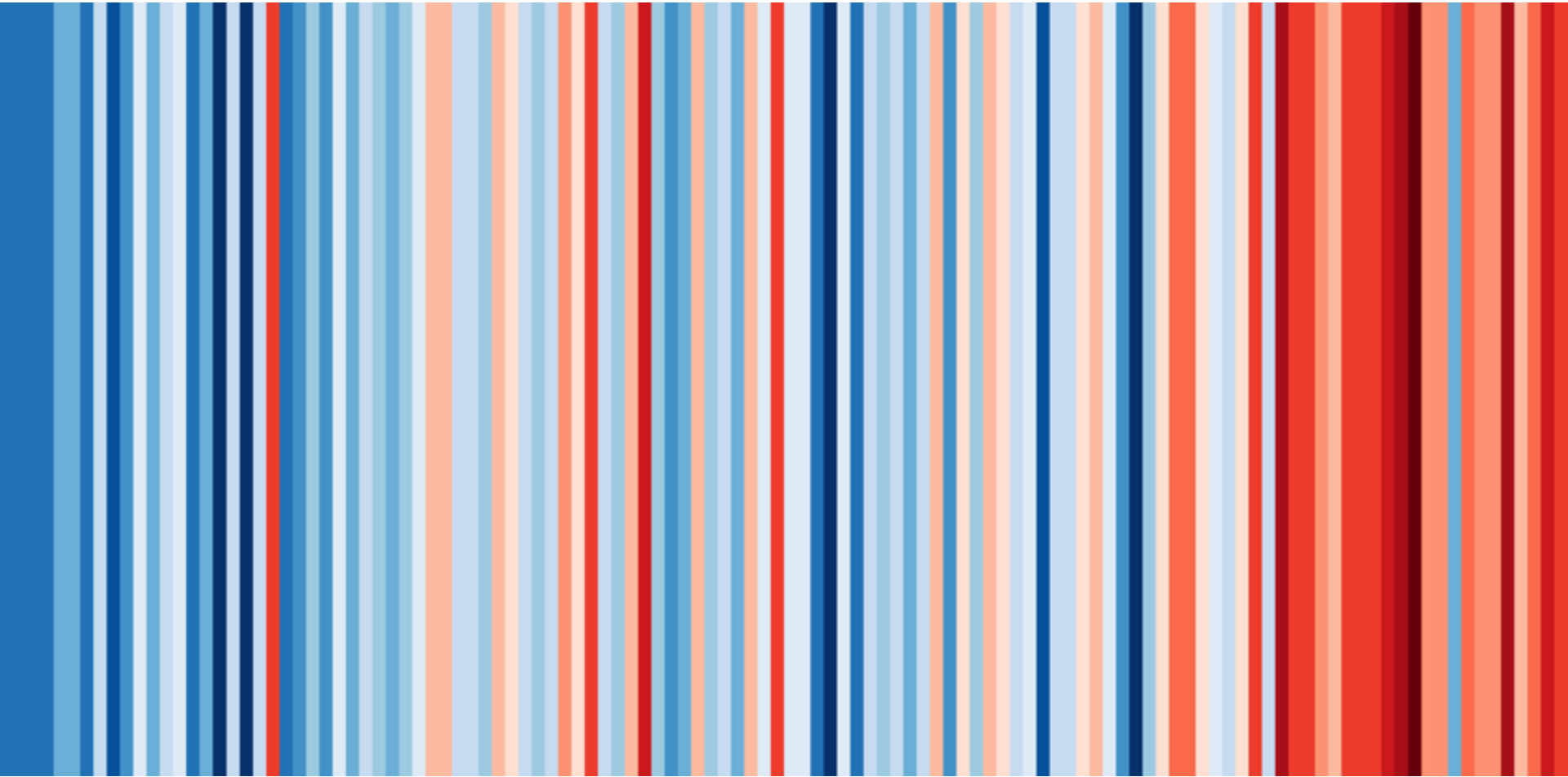
Glaciers

Ocean heat

Sea level

Arctic and
Antarctic
sea-ice extent

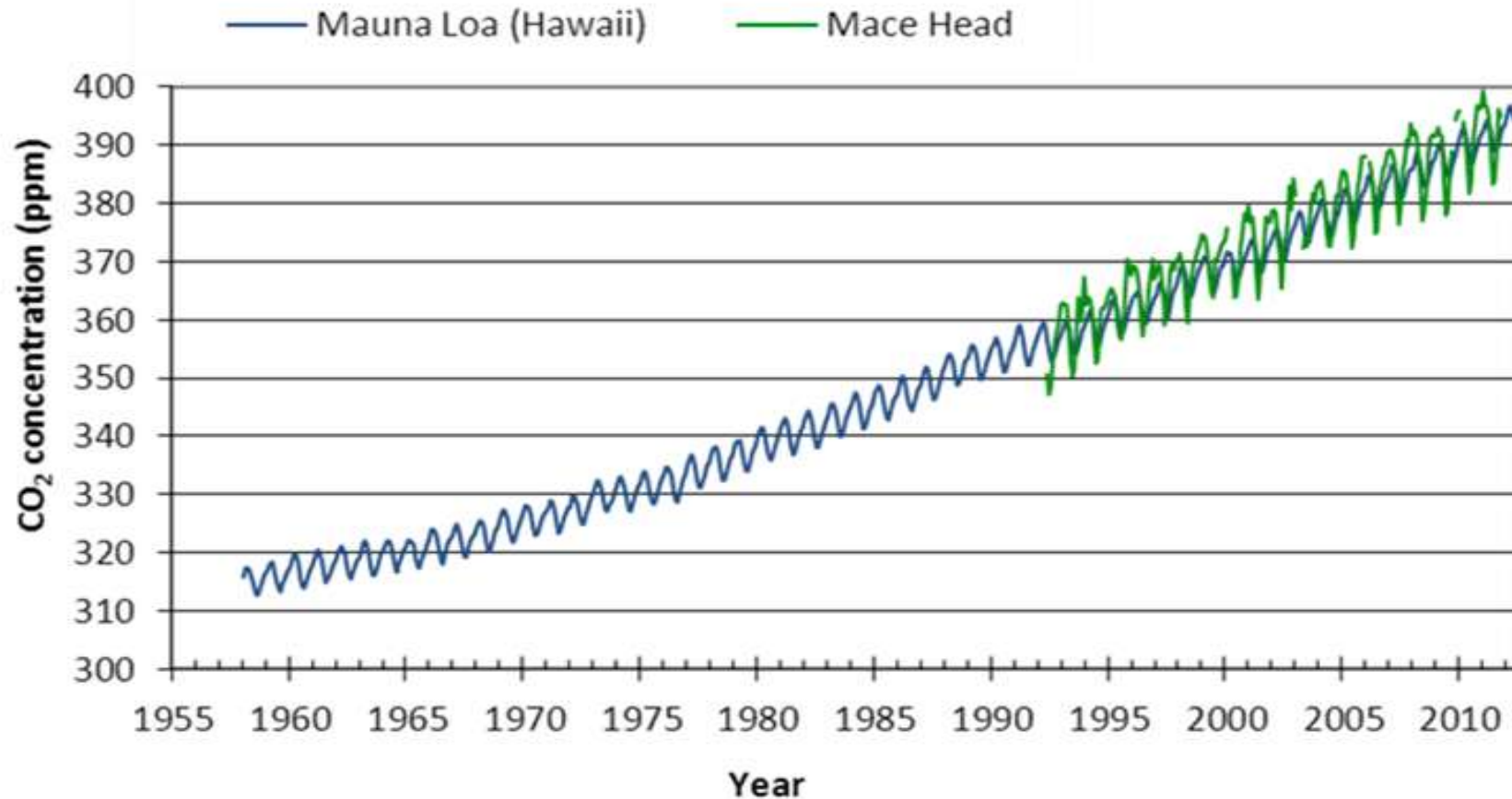
Annual Average Temperatures for Ireland



- The first line on the left is the temperature in 1801 and the temperatures increases as we move across to the 2018 temperature (far right)
- Berkeley Earth data <https://showyourstripes.info/strips/EUROPE-Ireland--1901-2018-BK>.

Atmosphere CO₂ Concentration in Mace Head

Carbon Dioxide (CO₂) (1958-2012)
monthly mean concentration



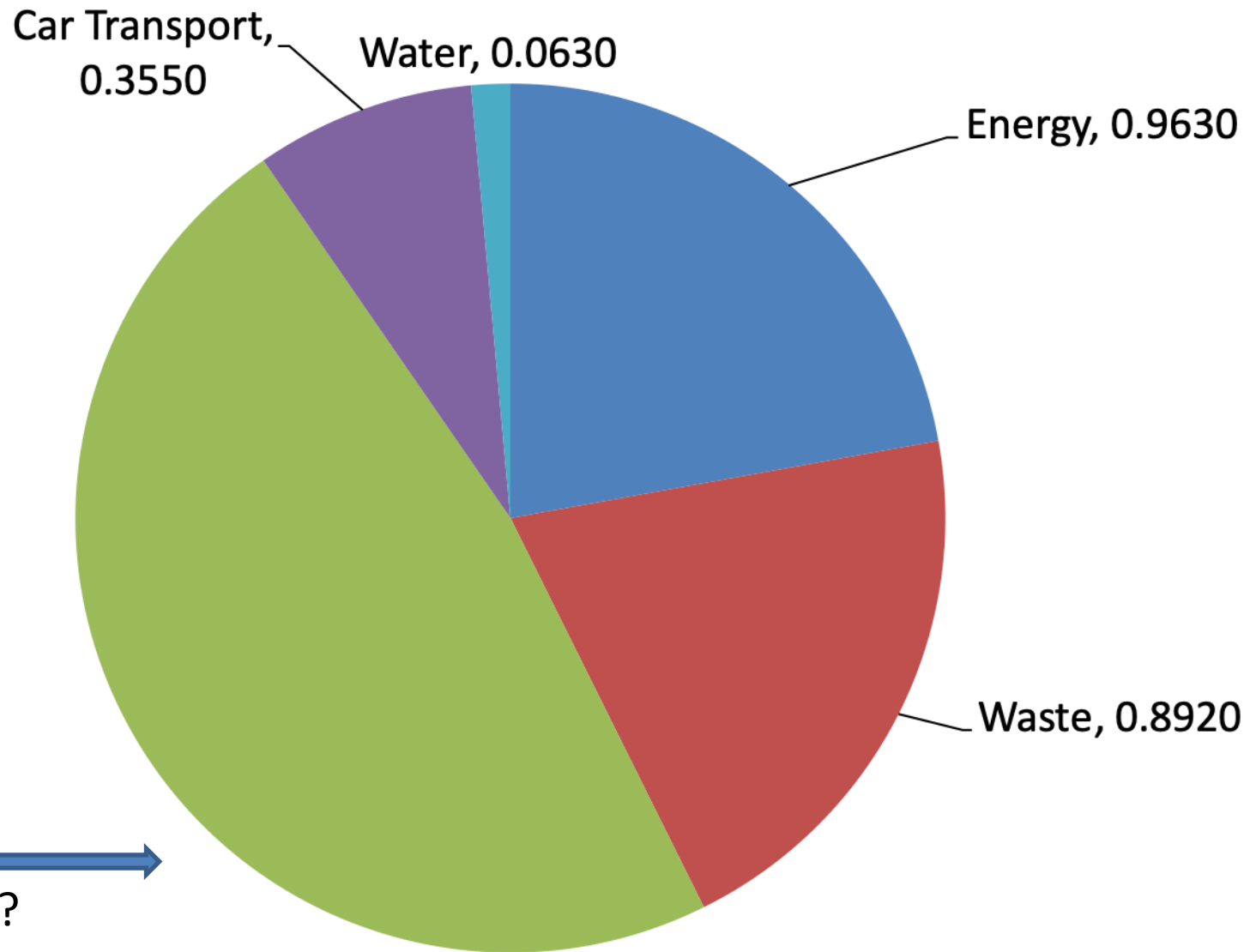
(Dwyer, 2013)

Global Warming



The evidence of human induced climate change is clear and 97% of scientists agree that recent climate warming trends are due to human activities.

Ecological Footprint (4.3 gHa) 79 Irish Communities



So what does energy
use of the average
house look like?

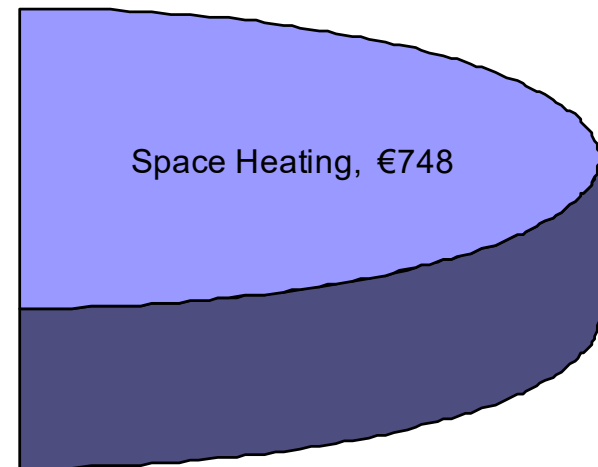
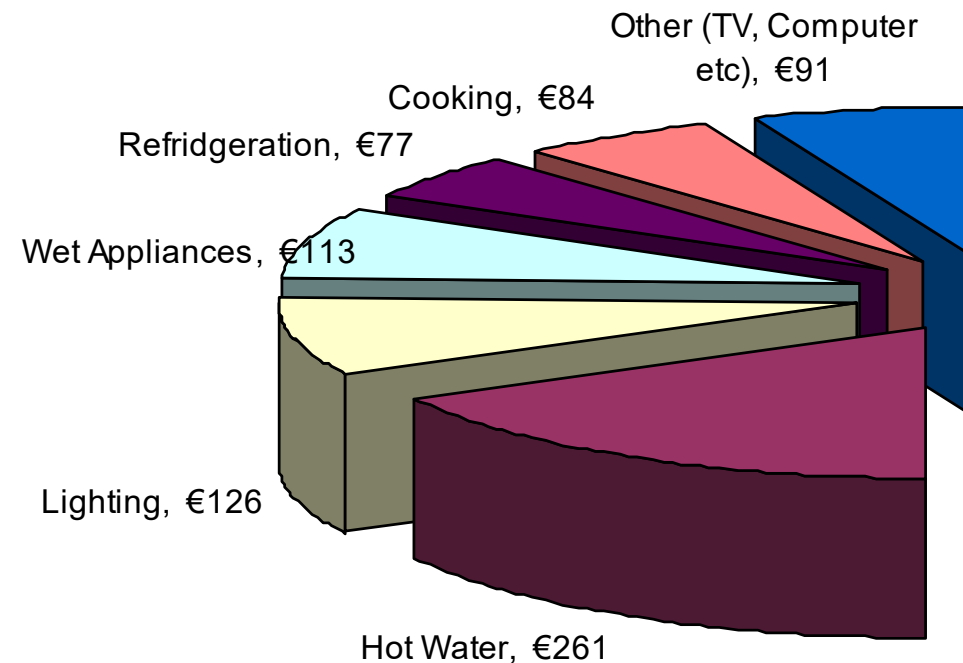


What is the biggest
energy user, cooking,
lighting, heating?

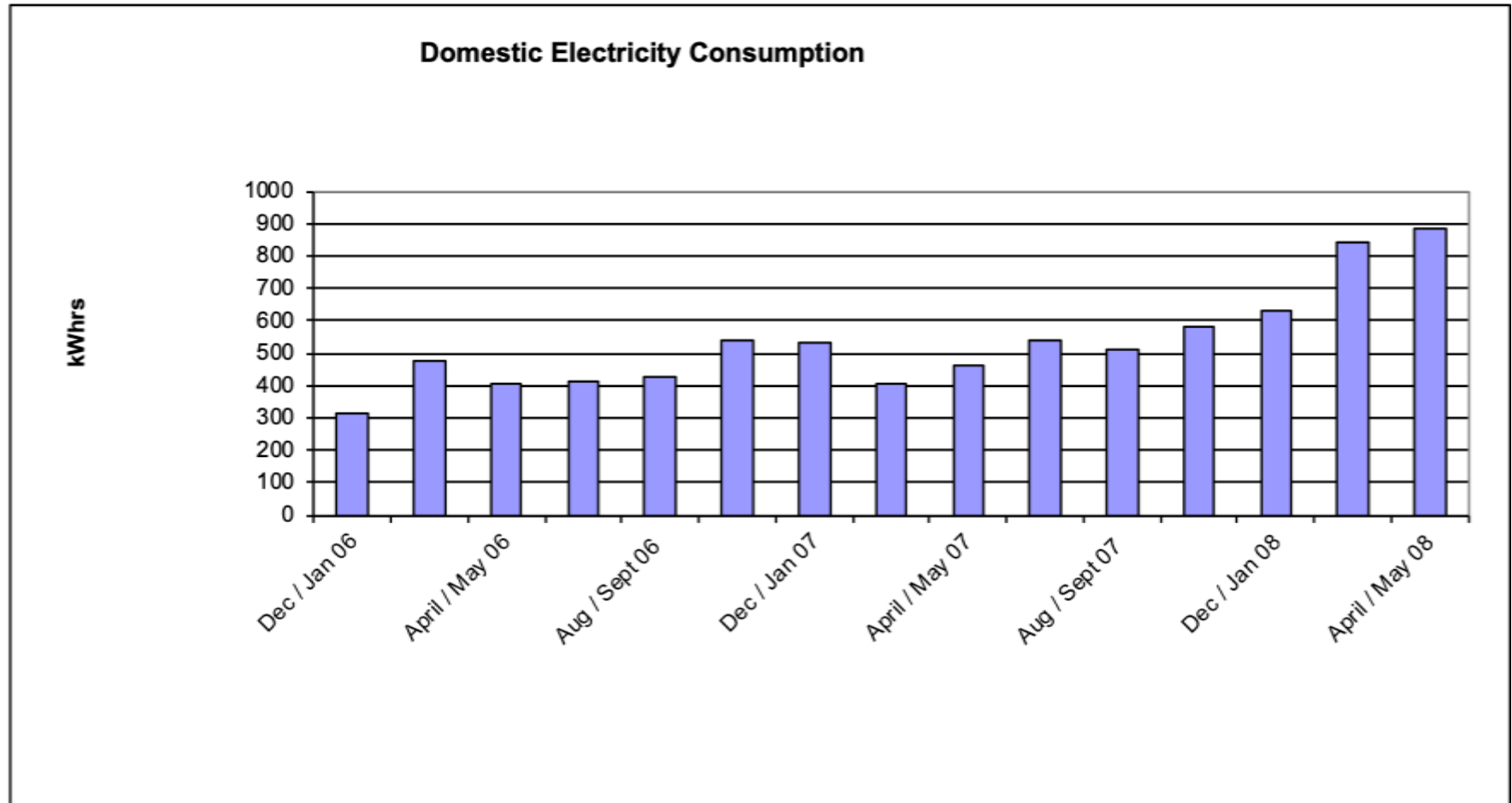


Annual Energy Use (2-3 person semidetached dwelling)

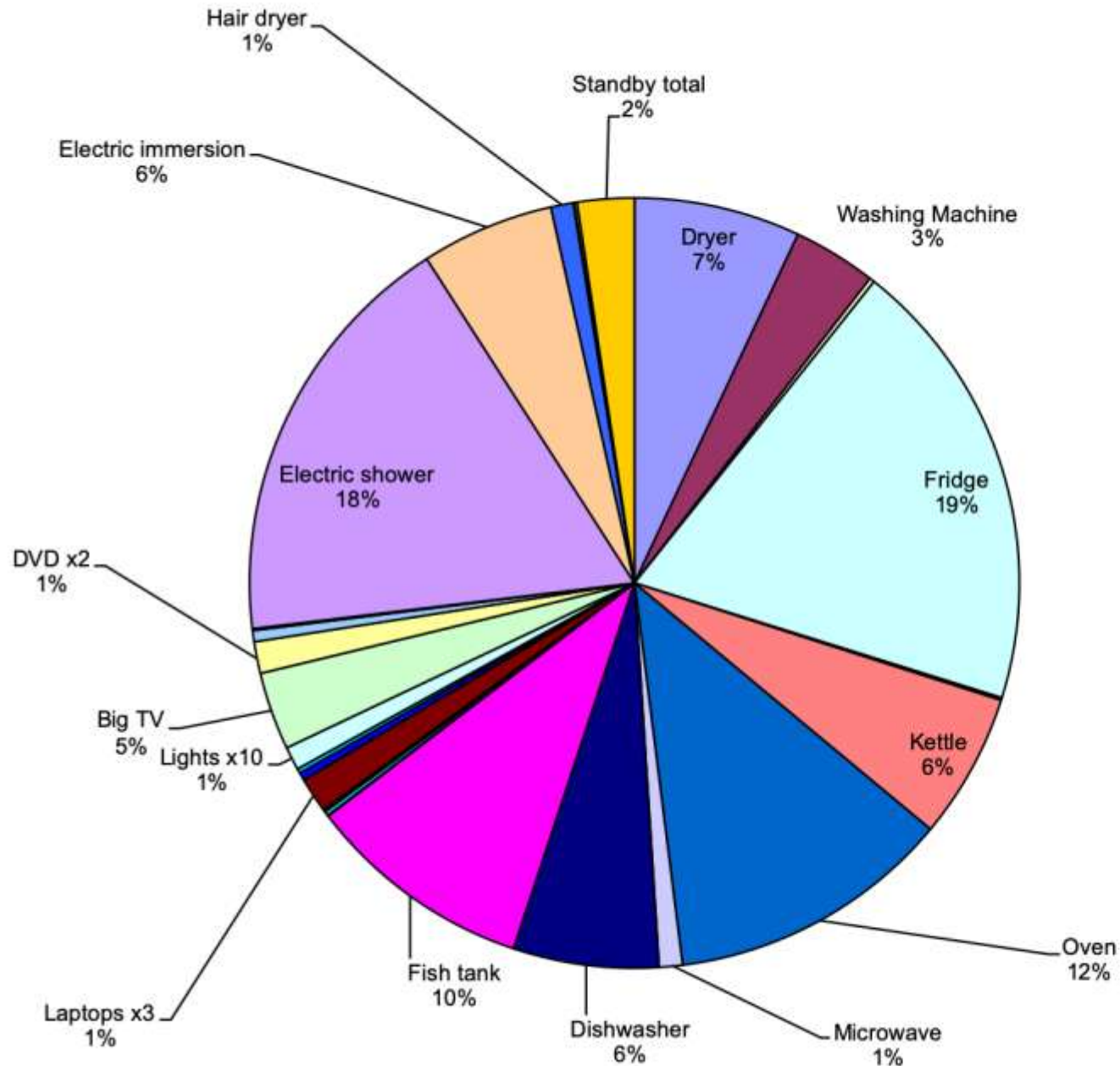
$$€1500 = €750 \text{ (space heat - gas)} + €750 \text{ (electric)}$$



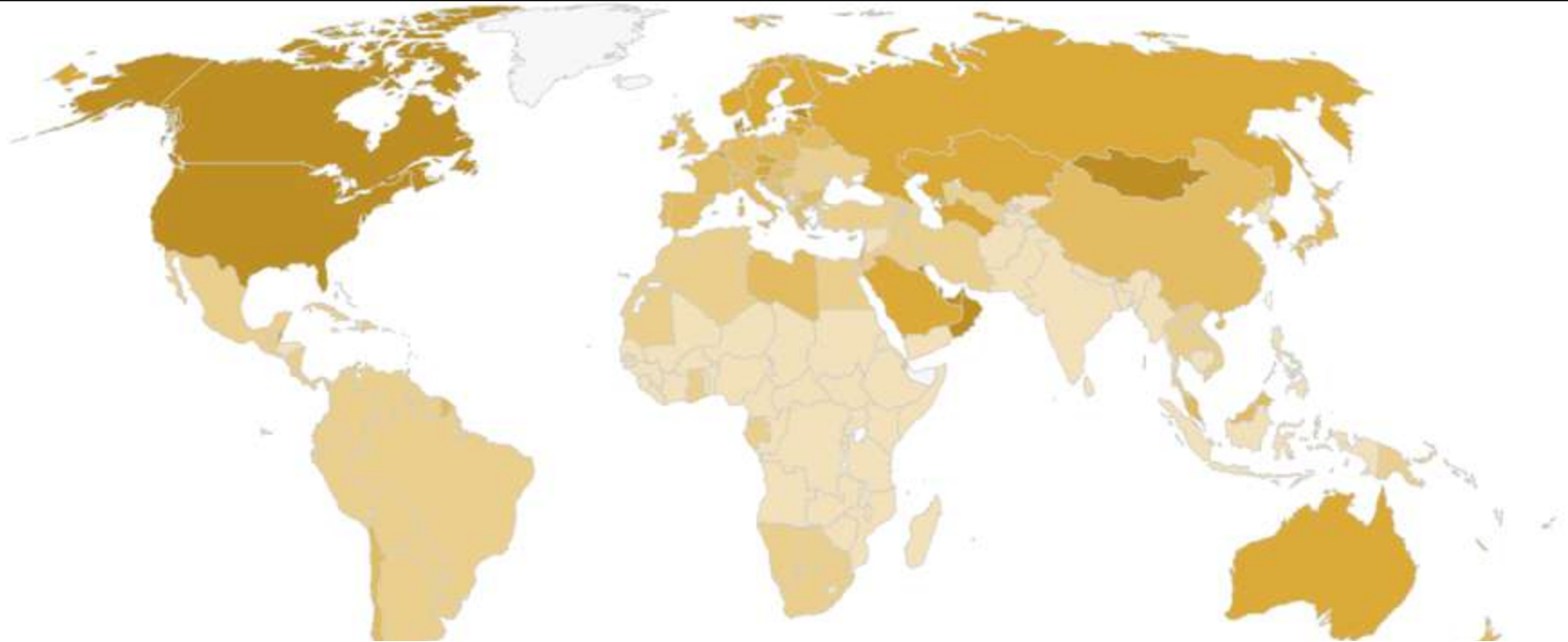
Annual Electricity Use (2-3 person dwelling)



Electricity Use (2-3 person semidetached dwelling)



Country Ecological Footprints – National Data



ECOLOGICAL FOOTPRINT PER PERSON

The Ecological Footprint per person is a nation's total Ecological Footprint divided by the total population of the nation. To live within the means of our planet's resources, the world's Ecological Footprint would have to equal the available biocapacity per person on our planet, which is currently 1.7 global hectares. So if a nation's Ecological Footprint per person is 6.8 global hectares, its citizens are demanding four times the resources and wastes that our planet can regenerate and absorb in the atmosphere.

ECOLOGICAL FOOTPRINT PER PERSON OF COUNTRY'S POPULATION (in global hectares)



> 6.7



5.1 - 6.7



3.4 - 5.1



1.7 - 3.4



< 1.7

<https://www.footprintnetwork.org/licenses/public-data-package-free/>

Personal Consumption, Making the Data Real

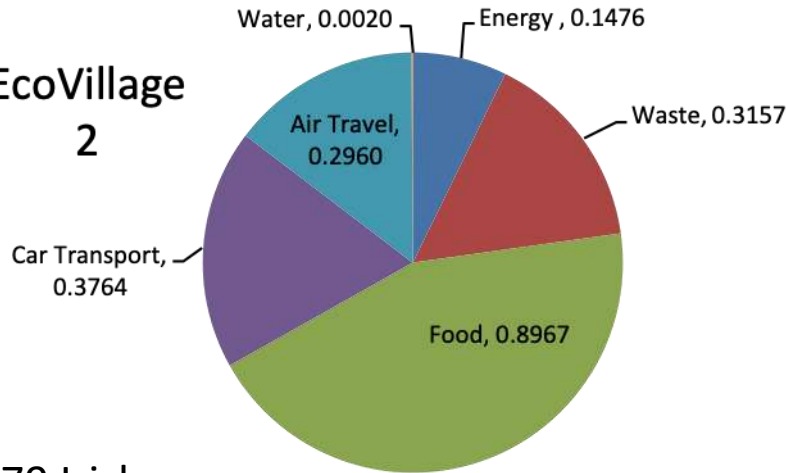


Bottom-Up Data – Capturing Our Emissions Impact

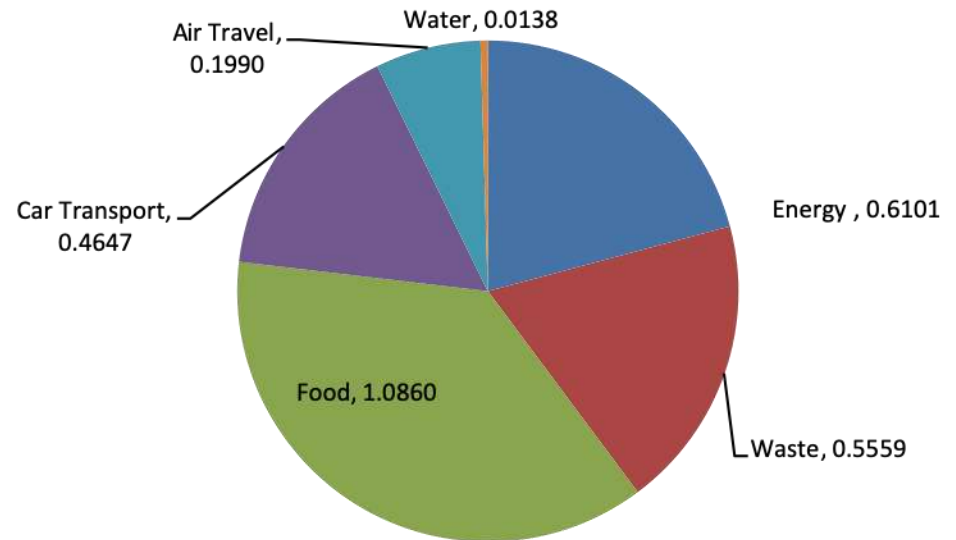


Ecological Footprint (gHa) 82 Irish Settlements

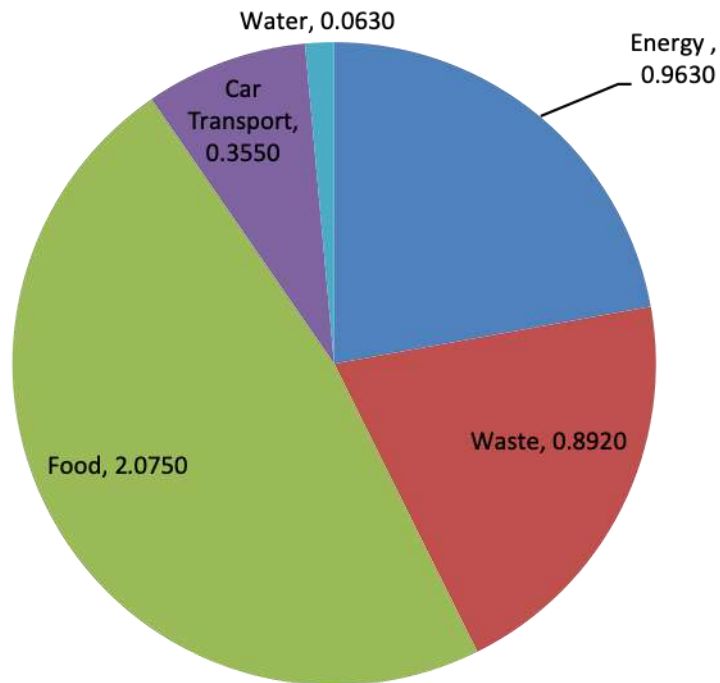
EcoVillage
2



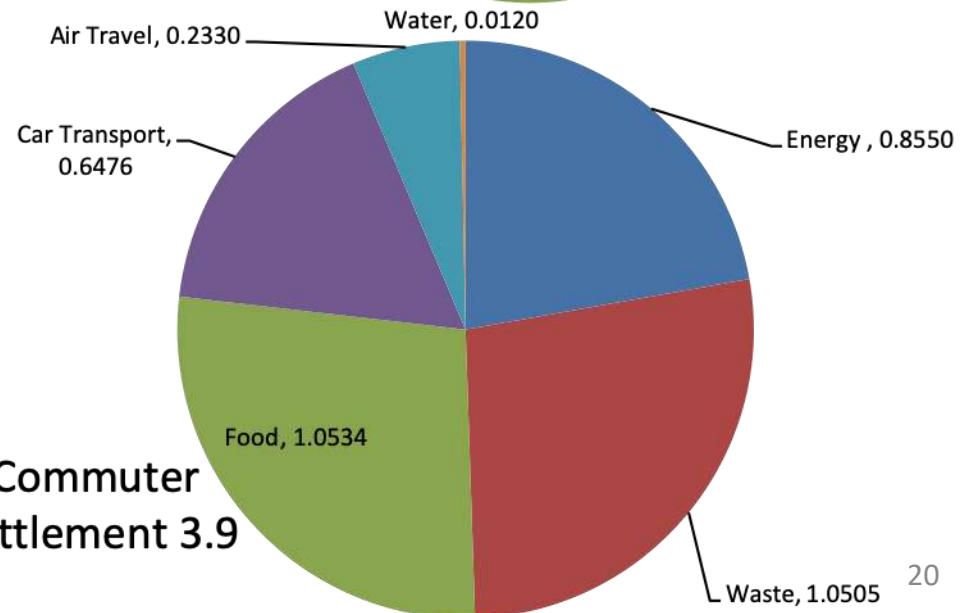
Ballina 2.9



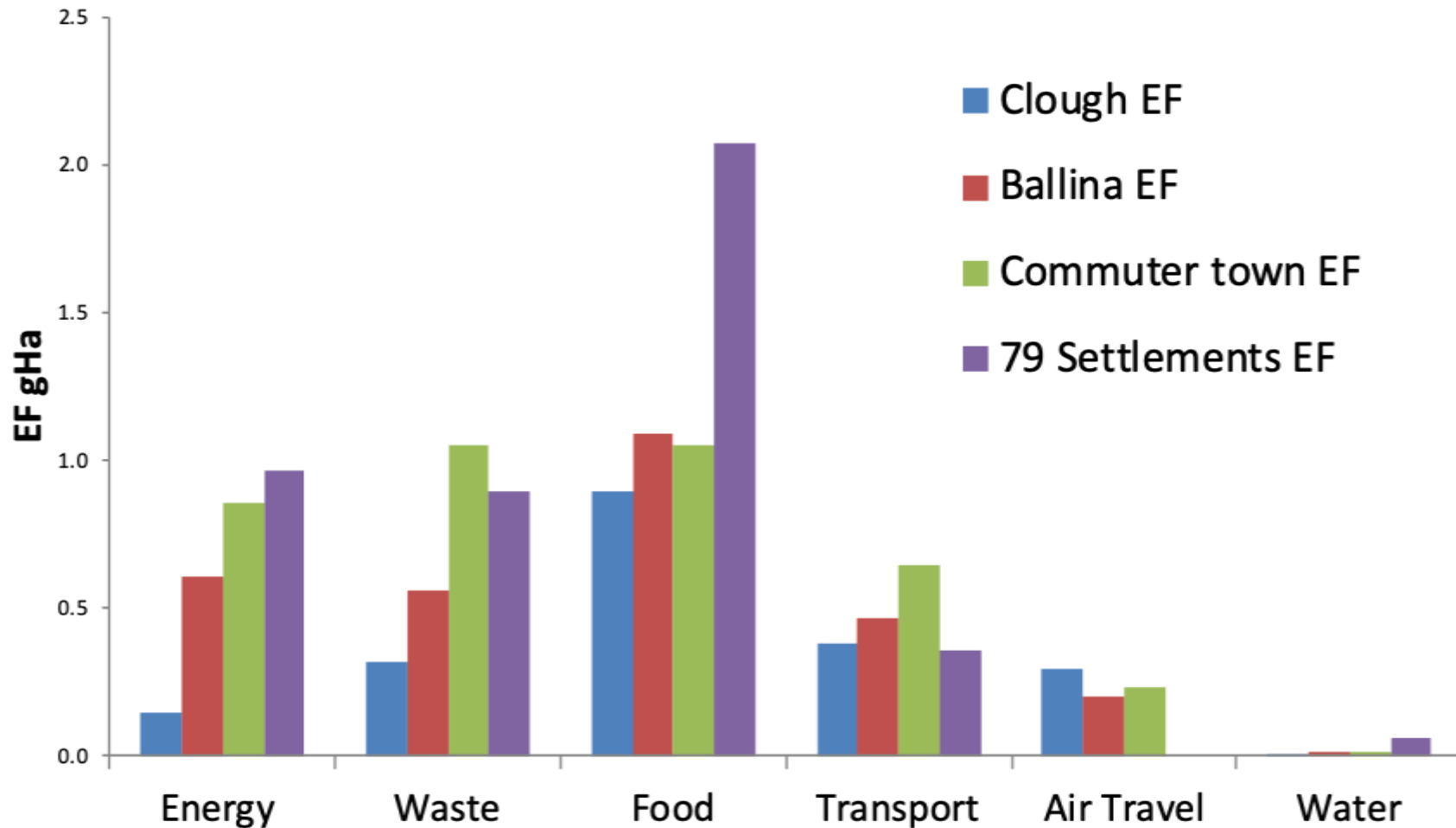
79 Irish
settlements 4.3



Commuter
Settlement 3.9



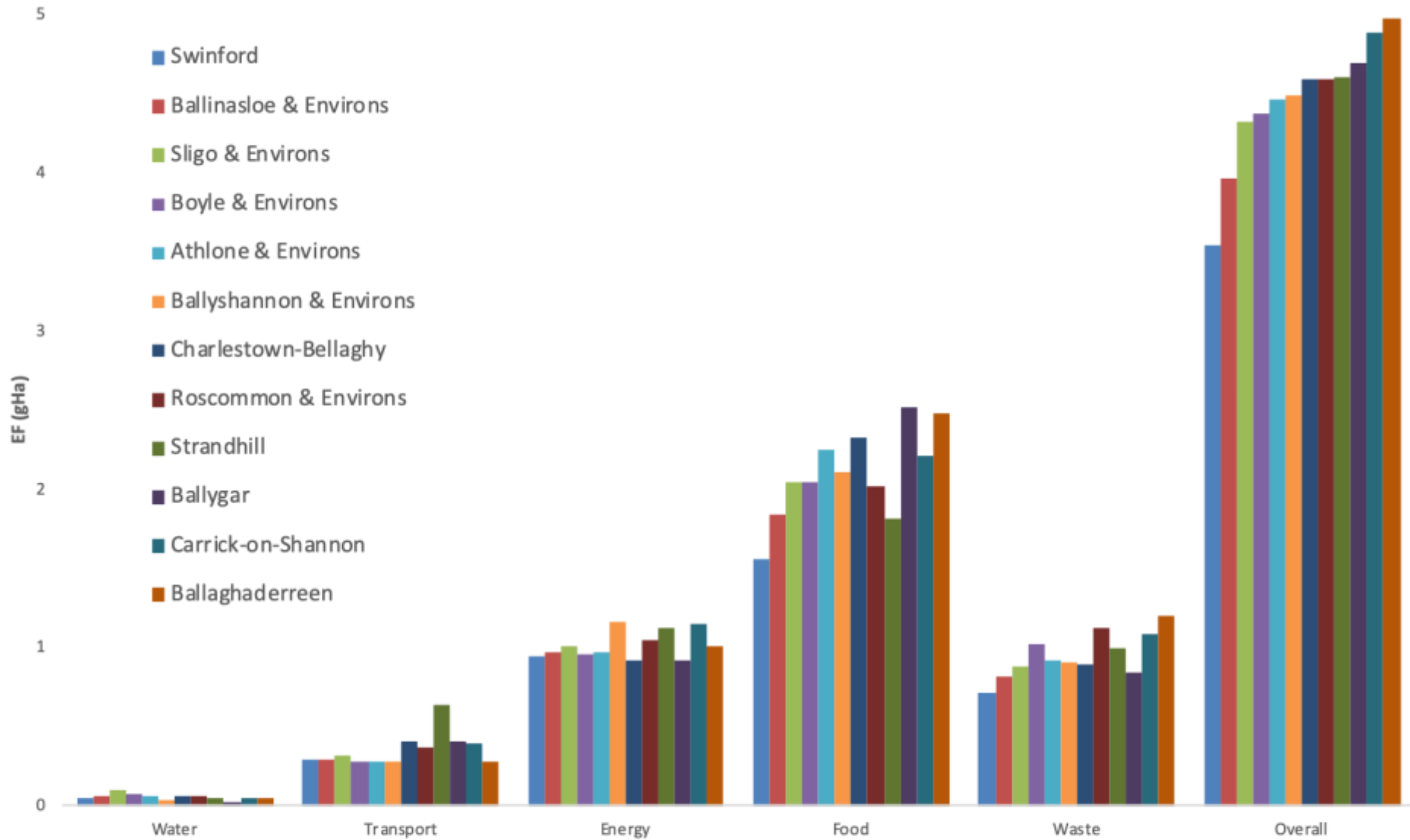
Ecological Footprint (gHa) 82 Irish Settlements



Local Ecological Footprints (Foley, Carragher, Peters)						
Settlement	Water	Transport	Energy	Food	Waste	Overall
Swinford	0.04	0.29	0.94	1.55	0.71	3.53
Ballinasloe & Environs	0.06	0.29	0.96	1.84	0.81	3.96
Sligo & Environs	0.09	0.31	1.01	2.04	0.87	4.32
Boyle & Environs	0.07	0.28	0.95	2.04	1.02	4.37
Athlone & Environs	0.06	0.28	0.96	2.24	0.92	4.46
Ballyshannon & Environs	0.03	0.28	1.16	2.11	0.9	4.48
Charlestown-Bellaghy	0.06	0.4	0.91	2.32	0.89	4.58
Roscommon & Environs	0.06	0.36	1.04	2.01	1.12	4.59
Strandhill	0.04	0.63	1.12	1.81	0.99	4.6
Ballygar	0.02	0.4	0.91	2.51	0.84	4.69
Carrick-on-Shannon	0.05	0.39	1.15	2.21	1.08	4.88
Ballaghaderreen	0.04	0.27	1	2.47	1.19	4.97
Average	0.05	0.35	1.01	2.10	0.95	4.45
Proximity to Hubs generally reduces car travel and waste dependency						

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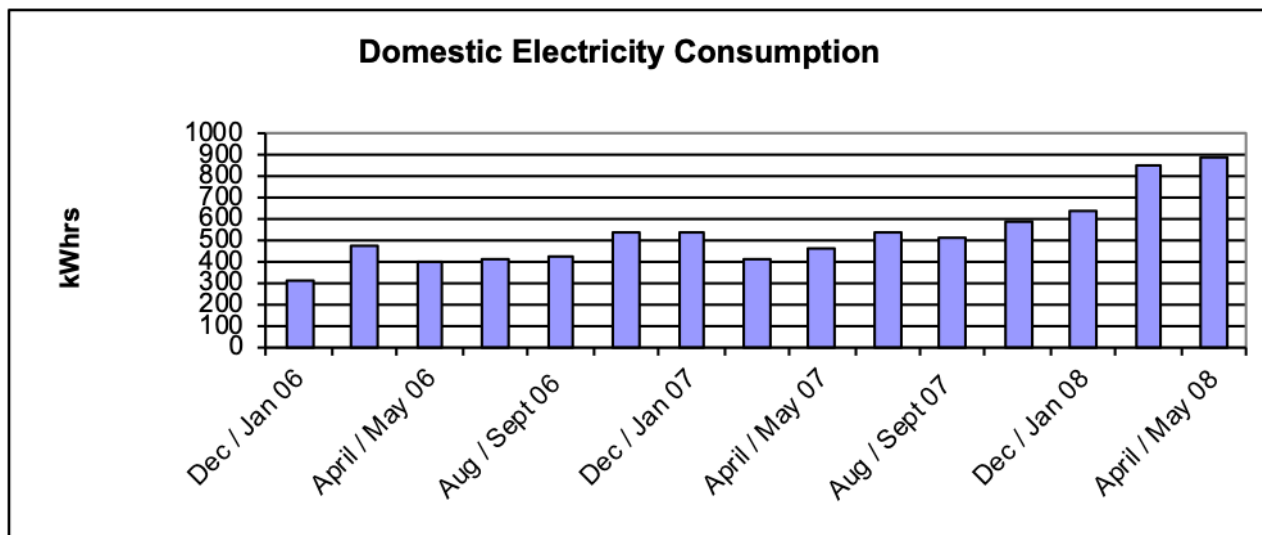
Local Ecological Footprints (Foley, Carragher & Peters)



Getting on top of your energy use?



Simple Home Energy Audit



Step 1: Collect energy bills and scrutinise them over a year or 2.

Step 2: Check windows, external doors, vents, interstitial floor spaces, fireplaces and stoves with a stick of incense: draughts.



Step 3: Check insulation levels in attic, basement, walls (meter box), interstitial floor spaces.

Step 4: Check boilers and stoves; what age, when last serviced.

Frost: which house would you buy?



Snow: which house would you buy?



Simple Home Energy Audit

Step 5: Check lighting; numbers of incandescent bulbs (retail ban), CFLs, LEDs.

Step 6: Efergy or Owl Energy Meter allows you to monitor appliances, find the energy guzzler, <https://efergy.com>.



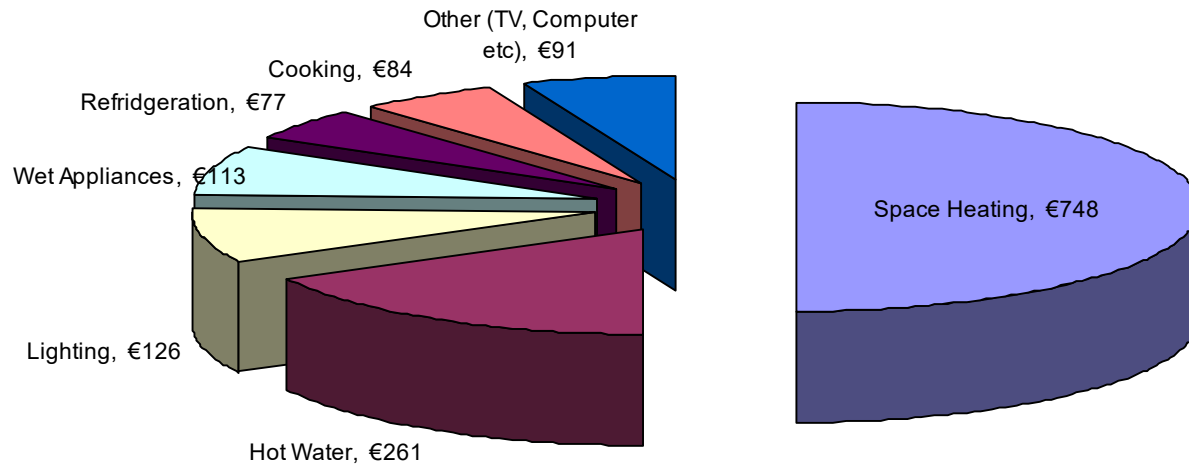
Step 7: Check individual appliances, find the energy guzzler with a simple meter. Increase fridge temperature to 5°C or freezer temperature to -10°C

Step 8: Identify how big standby is overall and for individual appliances, save up to €100 per year.

Step 9: Check boilers and stoves; what age, when last serviced.

Step 10: Professional audit; thermal imaging, pressure testing, BER.

Easy savings for 2-3 person semi-detached dwelling



Actions to save 36%, €342 per annum, 1 Tonne CO2

Turn everything off – no standby (2%)

Use a clothes line when possible - no tumble dryer (7%)

Wash clothes @ 30 dgrs

Invest in an Eco-Kettle

Turn light off in fish tank (1%)

Turn off lights when not in room, replace with CFLs.

Use oil to heat water – no electric immersion or electric shower (24%)

Easy Money and Energy Saving



- **Lighting accounts for 10-15%** of the electricity bill
- Compact Fluorescent Lamps (**CFL**) or **LEDs**
- They come in **standard fittings**: bayonet and screw fittings.
- They last up to **12** times longer
- CFL and LED can produce light using a fraction of the electricity needed and **save you up to €13 a year**. Costs are reducing.....
- Early brightness issues are solved though light can be different
- **CFL do not work with electronic sensors, timers or dimmer switches, LED can**
- Use them in places where you have lights on for the longest periods e.g porches, landings or outside lights that are left on all night
- **Use 4 CFL bulbs in busiest sockets and you will use 80% less electricity and save over a tonne of CO2** within 6 years.
- Always **turn off lights** when you leave a room – and **adjust your blinds** or curtains to let in as much light as possible during the day

Easy Money and Energy Saving

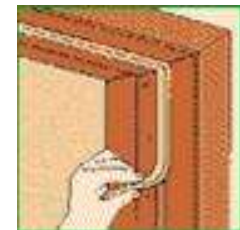
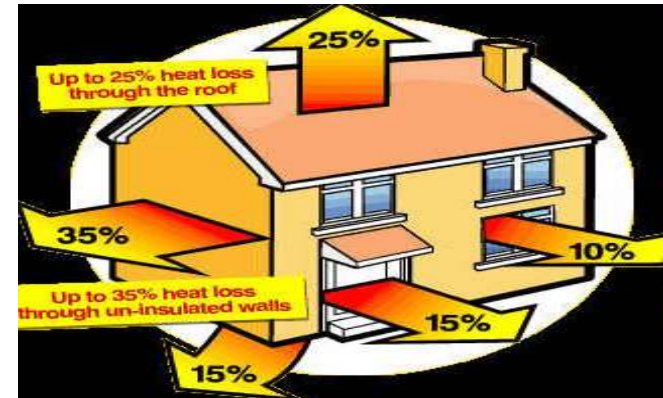
Draughts

Did you know that the when you add up the cracks and gaps in your home its the same amount as a **hole the size of a basketball** in your wall.

Draughtstrip and seal your home. Check windows carefully with a candle, when the flame quivers you have unnecessary cold air coming in.

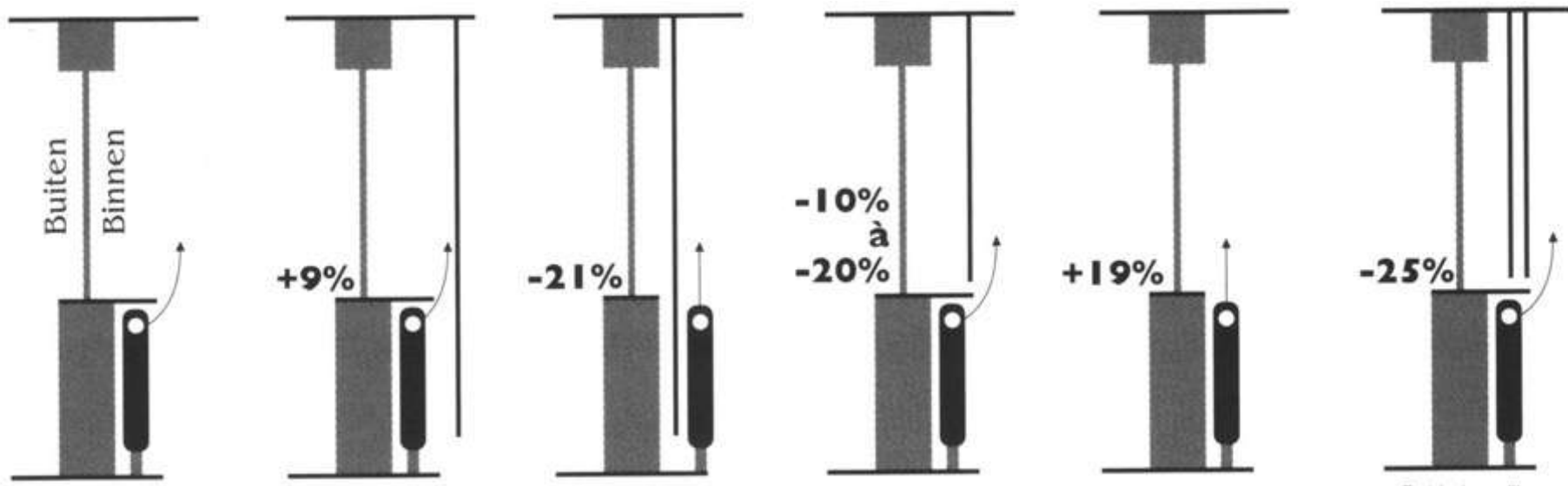
Silicone any gaps and cracks and fit large curtains to window openings.

Chimneys - excessive ventilation



Easy Money and Energy Saving

Use Curtains correctly



Close the curtains at dusk to keep heat in the room that would otherwise be lost through the cold windows. **If you close your curtains at night, you easily save up to 10% overall.**

Radiators – consider fitting **shelves above radiators** as they redirect the warm air that rises from them back into the room.

Easy Money and Energy Saving

Ventilation

- Ventilation/air is necessary in every house
- Controlled ventilation
- **Ventilate your house 3 to 5 minutes**, a couple of times a day instead of opening your windows a little bit all day. Shut off your heating, during ventilation. This saves up to 16%



Easy Money and Energy Saving

The Living Room

Room thermostat – automatically switches your heat off at a chosen temperature, and back on if it drops below your comfort level.



Fixed to the wall of most **frequently used room**.

Away from draughts, direct sunlight or other sources of heat.

Thermostatic Radiator Valves enable you to control the temperature of each room separately.



Work best in rooms that overheat and in rooms which are rarely used.

Reflective panels fitted behind radiators placed on outside walls helps to make the most of the heat they generate.

Boiler and Chimney yearly maintenance of boiler and chimney saves 10%.

Easy Money and Energy Saving

Save up to 17% by thinking about the way you control and use heat:

- 1. Room temperature 19°C (up to €350 every year/degree)**
- 2. The temperature of stored water 60°C**
- 3. Turn off the heating one hour before you go to bed.** Your home still has enough warmth.
- 4. Bleed your radiators on a regular base.** If there is air in your radiator your boiler burns longer. Always start with the lowest an end with the highest

Easy Money and Energy Saving

- Electric heating is **hard to regulate**, it uses a lot of energy and is often redundant.
- **Electric heating uses 2.5 times more energy than heating with gas or oil**
- **Accumulation devices charge up at night, even if you don't need them** the next day
- **Difficult to regulate**



Easy Money and Energy Saving

The Living Room

Leaving your **TV and video on stand-by** wastes energy.

If you are replacing your TV buy a **small liquid crystal display screen (19-20")**.



Plasma flat-screen TVs are drains on electricity.

Digital set-top boxes like **sky boxes use a lot of continuous power every hour on standby.**

Freeview set top box uses half this amount on standby.

If **hard disc DVD recorders are used two hours a day** they consume more electricity when on standby than when in use.

The **Panasonic range has low idle power consumption** and will use under half as much in standby.

Some appliances still use **up to 80% on stand by.**

Easy Money and Energy Saving

The Living Room & every room

A **Bye Bye Standby System** is a device to cut standby use of electrical appliances. ***When going to bed it is a simple matter of pressing one button which will turn off up to four appliances***

Save €60 a year with just one of these devices.



You can check this link on <http://www.maplin.co.uk> or this link www.naturalcollection.com. Or go to a reputable electric store

By turning everything off at the wall emissions from electricity can be reduced to below 0.6 tonnes per person saving hundreds of Euro with virtually no change in lifestyle.

Easy Money and Energy Saving

The Kitchen



- **Look for the energy rating when buying** new appliances - A is the highest, most efficient category. If your current **appliances are more than 10 years old**, you could save up to €65 on your electricity bills, simply by up-grading.
- www.sust-it.net is a very useful website which will allow you to **replace your main energy guzzlers**.
- The biggest users of electricity around the home are the **tumble dryer** (60cent per cycle x 148 times pa) then.....
- The **refrigerator** (30 cent per day)...
- And the **washing machine** (48 cent per day 274 cycles pa), **the dishwasher** (30 cent per cycle x 250 cycles pa).

The Best Energy Saving Devices

www.sust-it.net

[Discounts & Offers](#) » [Repair vs New](#) » [Newsletter](#) » [Blog](#) »



Appliances

Refridgeration
Washing & Drying
Dishwashers
Cookers
Small Appliances

Technology

Televisions
Entertainment
Computers & Monitors
Projectors
Printers & Copiers

Save Energy

Low Energy Lighting
Switch Energy
Heating & Cooling
Green Living
Greener Travel

Motoring

Running Costs
Electric Vehicles
Petrol Vehicles
Diesel Vehicles
Electric Car Journey

Calculators

Electricity Cost
Low Energy Lighting
Electric Heaters
Immersion Heaters
Kettles

Easy Money and Energy Saving

The Kitchen

- **Washing machines** – always wash a **full load**, and economy wash. The low temperature (**30 degrees**) programme is just as effective due to **modern washing powders**.
- **Tumble dryers** – **don't put really wet clothes** into a tumble dryer; wring them out or spin-dry them first. The best way is to **use a line or dedicate a room** in your home to drying clothes hung on clothes racks.
- **Dishwashers** – Try and use the **low temperature** programme and ensure you have a **full load**.
- **Pots and pans** – Choose the **correct** size pan and keep lids on when cooking. With gas, if the flames lick up the side then you are wasting energy.
- **Stack cookers and microwaves save energy.**

Easy Money and Energy Saving

The Kitchen

- **Kettles** – On average we boil twice the volume of water we need. Heat the amount of water you really need – and if you're using an electric kettle, make sure you cover the element - this could **save over €100 per year**.

Eco-kettles cost €30 - 45 at www.ethicalsuperstore.com and make a great present. Some can also dispense clean, cool filtered water so no need to buy bottled water either!



Easy Money and Energy Saving

Fridge and Fridge Freezers



- **Low use of electricity but continual.**
- When buying a new appliance select an **“A” rated** appliance.
- If door is left **open for 1 minute, it takes 3 minutes** to regain temp.
- **Defrost it regularly** to keep it running efficiently and cheaply.
- If it tends to **frost up quickly, check the door seal.** Damaged door seals let heat in
- **Condensation** forming on the outside suggests that its insulation has deteriorated and that it is using more power than it should
- **Site the appliance in a cool place,** out of direct sun and away from the cooker and boiler if possible.
- **Keep the cooling fins at the back of the appliance clean**
- Use the thermostat to keep the temperature right; **5°C for fridge and -10°C for freezer**
- Try to keep the appliance at least **three quarters** full, can use boxes for this.
- **Allow food to cool** before putting into fridge.

Easy Money and Energy Saving

- **Keep bedroom doors closed.** If the bedrooms aren't being used during the day, keep the doors closed until just a little while before you go to bed.
- **Floorboards and skirting boards** – stop draughts and heat escaping by filling gaps under skirting boards, with newspaper, beading or sealant.
- **Make sure your windows are draught proofed.**
- A low cost alternative to double glazing window frames can be to **insert a layer inside the window reveal.**
- Do not forget to **kill all standby use in the bedrooms and to knock the lights off when nobody is in the room.**

Easy Money and Energy Saving

The Bathroom

- In just one day, a dripping hot water tap can waste energy and enough water to fill a bath. **Make sure the taps are off!**
- **A bath uses 80 Litres of hot water.** Showers **5L/minute.** Power Showers **15L/min.** You could easily **save €100 and carbon dioxide emissions** on water heating every year by taking **shorter showers**, and not baths, and using slightly lower temperatures.
- Condensation – **reducing the amount of water vapour in the air will reduce the risk of condensation.** Keep bathroom and kitchen doors closed & open windows to let steam escape. Using an extractor fan can cost as little as 0.4c per hour, so use one to keep condensation at bay.
- **Water should be heated to 60°C/140°F** – any lower and bacteria may not be killed off, any higher and there is a risk of scolding. Or save by heating to 40 degrees for one to two weeks and then heat to 60 degrees once.

Easy Money and Energy Saving

- With water saving shower head you can easily reduce your warm water need by one third
- A saving showerhead can use 5 to 7 while a power shower uses 15 litre water/min,
- Saves up to € 25 per year



Easy Money and Energy Saving

The Airing Cupboard

Make sure your hot water tank is properly insulated. Solid, foam insulation or a jacket which is at least 75mm (3") thick. Jackets cost approx. **€15 save up to €20 per year!** Save **tonne of CO2** within 6 and a half years

Bare pipes waste energy – insulate them to keep the heat in the water



Use a clothes horse first. Make sure you warm and dry your clothes in the cupboard after they come off your clothes horse. **Tumble drying is expensive!**

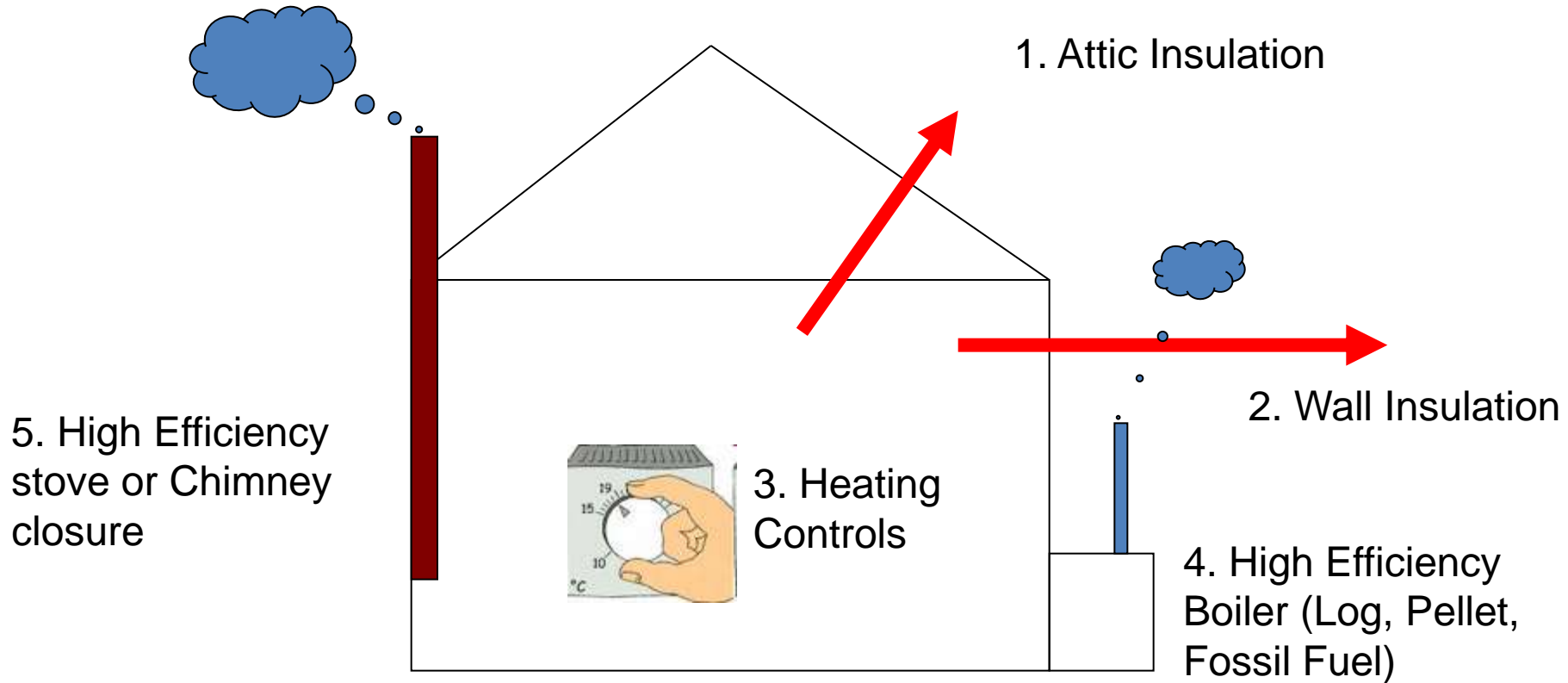
Easy Money and Energy Saving

Standby

Appliance	Average stand-by use (kWh/year)	Stand-by use (kWh/year)
Tv	105	9
Video	120	18
Fax	104	8
Hifi	96	---
amplifier	72	9
CD	50	---
Cassette recorder	50	---
PC	42	9
wireless telephone	42	---
motion detector	28	---

Structural Change: Save Money and Energy

Not with a Solar Panel, wood pellet heating or a wind turbine!!



6. Lighting and Appliances

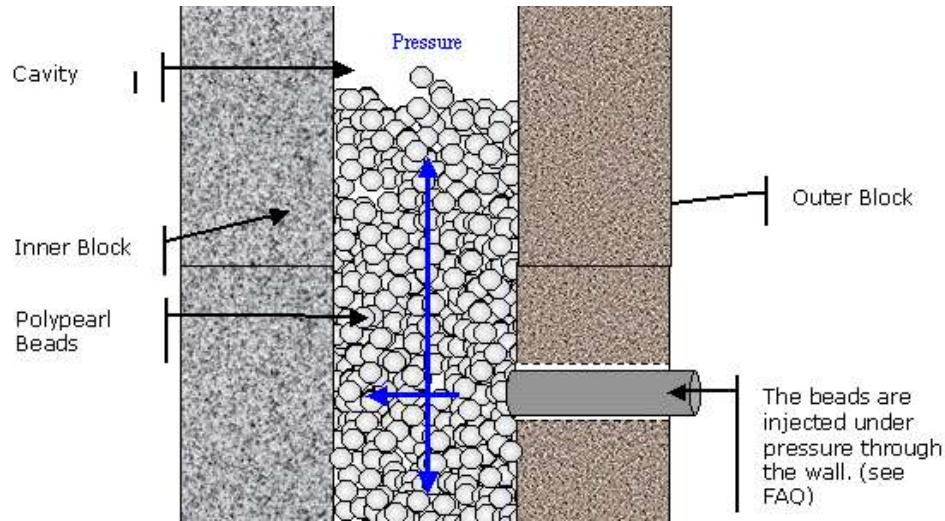
Structural Change: Save Money and Energy

- Recommended insulation **levels of 330mm (14 inch)** of fibreglass (yellow) or equivalent **counter layed**.
- Many different types:
 - Fiberglas or Rockwool (most common)
 - Sheep's wool or Hemp fibre (Natural)
 - Cellulose (recycled paper treated with flame retardant)
- Install storage area and walk way – **do not flatten**.
- Cheaper to install yourself (€150 – €500), nasty job, contractor will complete for (€900 – €1400).
- **Grants available**
- **Most Houses pre 2004 require urgent top up!**



Structural Change: Save Money and Energy

- **Pump cavity** if present.
- **Bonded grey polystyrene**
 - Suitable for most houses
 - Contractor install only
 - Several local companies
 - Most Houses prior to 2004 require some top up.
 - Cost €800 – €1500, more on grants later
- **No Cavity needs external** (Pre 1950's):
 - Dryline or externally insulate
 - External more expensive, cost falling dramatically, but far superior to dryline
 - €2500 for DL, more on grants later
 - Many companies launching new products



Structural Change: Save Money and Energy

- Compare with lighting controls
- Widely ignored in Ireland
- **Saves minimum of 20%**, much more if well used.
- Thermostat's, timers, cylinder thermostat, Zones.
- **Thermostats busy in Autumn and Spring**
- Cost €1000 - €2500
- **Grants available**



Structural Change: Save Money and Energy

- **Open fires** approx. 20% heat into house.
- **If you buy 5 bags of fuel – 4 of them are lost up your chimney.**
- Chimney “over ventilates” rooms when there is no fire.

What to do?

- **Stove** - 75-80% efficient (**if you buy 5 bags of fuel just one lost up your chimney.**)
 - Mainly for wood fuel, (Renewables) some multi-fuel.
 - **Decreases unwanted ventilation**
- **Chimney closure/ damper**
 - Seldom used chimneys
 - Closes hatch on top via chain

Renewables

- The Options
- **Free Renewable Energy**
 - Solar – **water heating** (space heating)
 - Wind – **electricity** (water heating, background, storage)
 - Solar – **PV electricity** (water heating, background, storage)
- Solid Renewable Energy
 - Wood Logs – **space and water heating**
 - Wood Pellets/Chips – space and water heating
 - It makes sense to target heating first for renewables
- Storage; battery prices are on the way down

Renewables – Solar Thermal

- Solar Thermal Panels
- Hot Water Cylinder
 - Larger than standard
- Controls
 - Pump, thermostats
- Connections to other heating
- Frost protection
- 80-100% DHW summer
- 60% overall

Renewables

- Typically on the roof
- South facing best
 - East or West will work but lower solar energy captured
- Should be done by trained installer
- Can install on ground if required
- In retrofit be careful of gaskets and seals if any fixing is through slates or tiles



Renewables

- Flat Plate
 - Cheaper but less efficient
 - Use where panels may be subject to damage
- Evacuated Tubes
 - More expensive but more efficient
 - Always on top of roof

Renewables

- A solar heating system used for domestic hot water heating **should be sized so that no excess heat is produced in summer.**
- **A typical rule of thumb is 1m² of collector and 75 litres water storage per person. Can cost €800-1300 per m².**
- Up to 40% of space heating can be supplied for a well insulated 120m² house by using 12m² of collector and 750 litres of hot water storage. Be sure and look at the paybacks, they can be large.

Renewables PV

- Solar PV panels **mounted on the roof** which generate electricity
- You can **spill the excess into the battery** and charge it for when the sun is not shining
- Can add a battery for systems over 2kW, batteries are €3,000-5000, grants are €1,000
- Costs are **€1700-2500 per kW_p** and falling
- 1kWp solar PV system has 3-4 panels and the electricity feeds the loads in your house, any excess gets exported, see next slide

Solar PV System

4 x 250 Wp PV panels, 1kWp in Galway City, no storage battery



Renewables

- **1kW_p system generates about 900kWh of electricity per year – and @ 17c per kWh that is €153 per year.**
- **Off the shelf systems** can be bought now and a competent electrician and roofer will install them. **Cost for 1kW_p approximately €1200-1300.**
- **At €2,500 – grant (€900) = $1600/153 = 10.5$ years**
- **At €1700 – grant (€900) = $800/153 = 5.2$ years**
- **Only work with referrals, shop around**
- **As electricity prices increase and PV cost reduces this gets better**

Wood Burning Heating Systems



RAIS stove - courtesy of Imperative Energy Ltd.

- **Log Stoves**
 - Check the efficiency,
 - With or without a back boiler
- **Log Gasifying Boilers**
 - Relatively new in Ireland
 - Automatic operation
 - **Fill 2/3 times per week**



Wood Pellets - Stoves

- Refined wood fuel
- **Room heating stoves**
 - No hot water
- **Space heating stoves**
 - **Space and water heating**
- **Fill using bagged pellets**



Wood Pellets – Boilers (auto feed)

- Use **auger or other device**
- Range in size from **15 kW to >50kW**
- **Space and water heating** for most houses.
- **Electrical ignition or manual**
- **Separate fuel store**



Approximate Costs and Payback

- Log Stove
 - €800 to €5,000
- Log Boiler
 - €15,000
- Pellet Stoves
 - €2,000 to €5,000
- Pellet Boilers
 - €10,000 to €20,000
- Payback
 - Stoves – 5-6 years
 - Boilers – 6-8 years



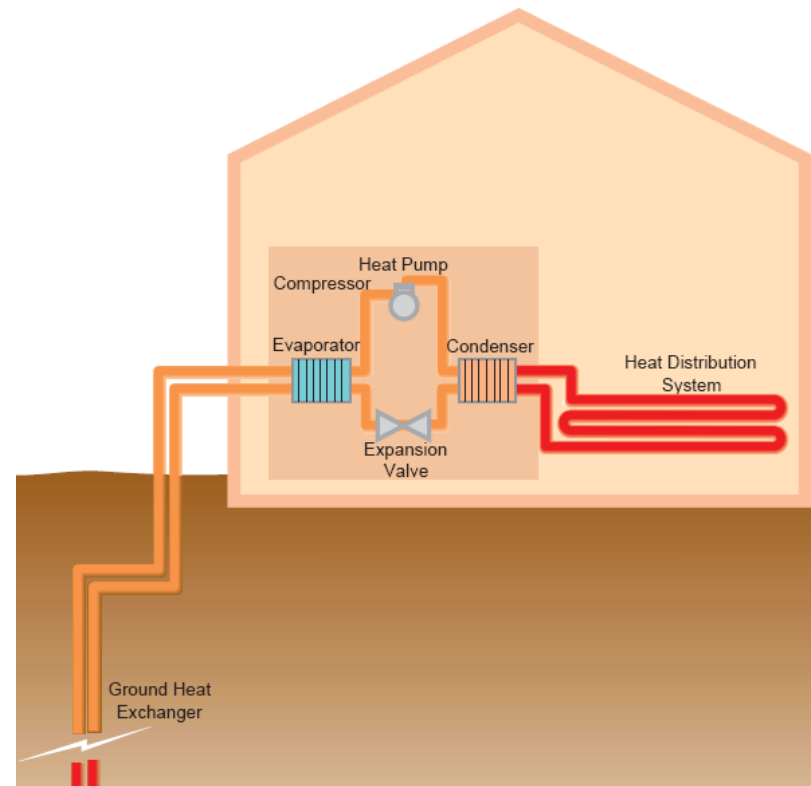
Heat Pumps – Basic Principles

- Similar to operation of a fridge
- Take energy from low temperature source
 - Ground, water or air
- Upgrade it using electricity – the heat pump
- Can provide heating and cooling

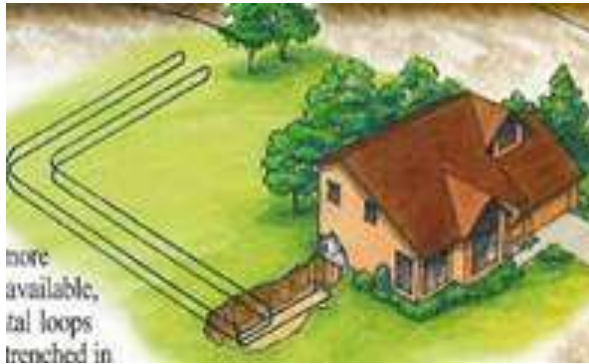


Heat Pump System Components

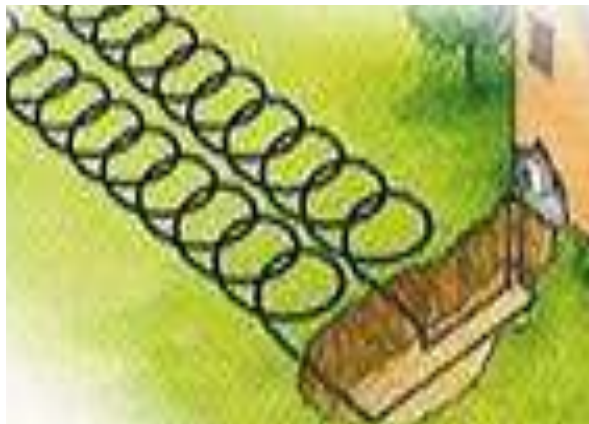
- Collector
 - Air
 - Horizontal Loop
 - Vertical Loop
 - Water
- Heat Pump
- Distribution system
- Controls



Heat Pump Collectors



Horizontal



Vertical



Air



Costs and Payback

- Horizontal Loop Heat Pump
 - €17 to 20,000+ installed cost
 - In new build common excavation costs reduce this to €11-15,000+
- Running Costs (depending on house design)
 - €700-1000 per annum (electricity)
 - Annual savings
 - Buyer beware (more on this later)
 - In new build installation of underfloor is more cost effective and reduces the running costs
- Payback
 - Depends on strategy: night rate, underfloor or rads etc
 - Payback 7-20+ years (Carragher (2006))

Renewables

Call Us Today! 067-56005 | info@communitypower.ie



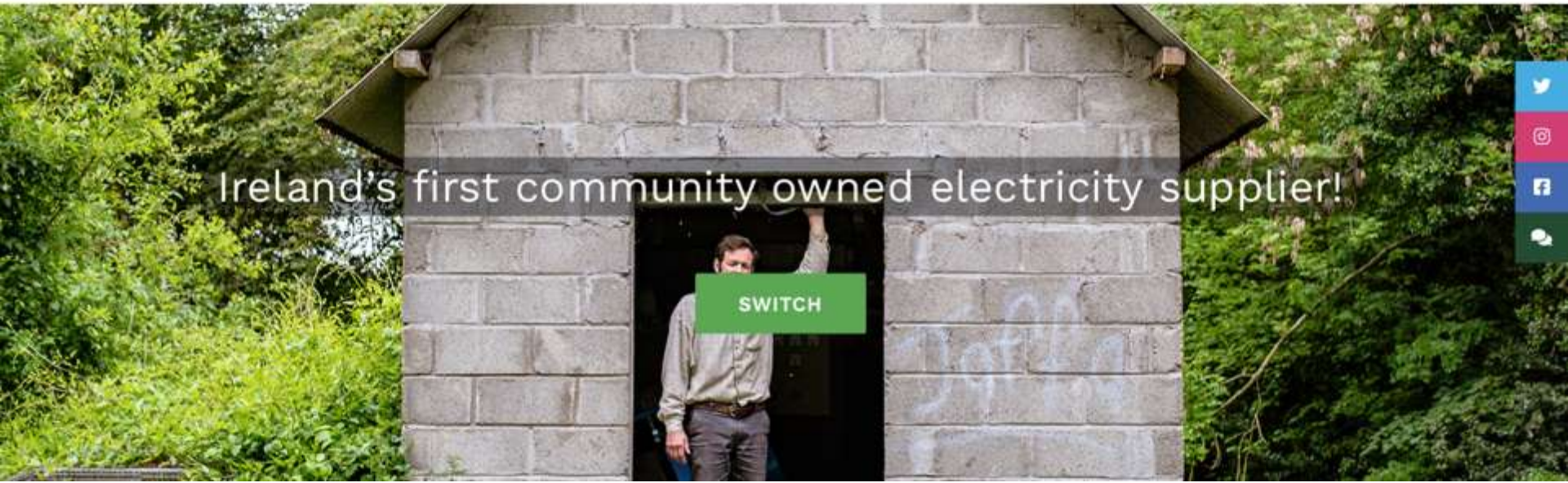
[Our Story](#)

[Our Communities](#)

[Our Generators](#)

[Our Customers](#)

[SWITCH NOW](#)



Ireland's first community owned electricity supplier!

Make the switch and buy green electricity now produced by Irish community renewable projects - <https://communitypower.ie>

Cheapest electricity, broadband, insurance, banking rates at <https://www.bonkers.ie>

Breakout Session – Your households energy footprint?



Tea Break – 15 minutes



Free Energy Upgrades

- For **homes built and occupied before 2006**
- For those in **receipt of social welfare payments**, you may be eligible - download an application from:
- <https://www.seai.ie/grants/home-energy-grants/free-upgrades-for-eligible-homes/>
- **Attic insulation** Fibreglass or mineral wool to a depth of about 300mm (12 inches). They insulate the water tank and pipework, and provide a walkway to access the tank and install ventilation.
- **Cavity wall insulation** To insulate a cavity wall, a contractor will pump insulation into the cavity. They will also install additional ventilation when installing this kind of insulation.
- **External wall insulation** A contractor will wrap a layer of insulation around the property, covering it in a render with a smooth finish to provide weather resistance. They also install ventilation.

Free Energy Upgrades

- **Internal wall insulation** A contractor fixes insulation boards to the inside of the external walls and covers them with a vapour barrier layer, plasterboard, skim and new paint. They will also install additional ventilation.
- Other **secondary measures**. Examples include lagging jackets, draught proofing and energy efficient lighting.
- Upgrades recommended occasionally Some qualify for **new boiler and radiators**.
- For **new windows**, a contractor will measure and fit the windows requiring replacement.
- <https://www.seai.ie/grants/home-energy-grants/free-upgrades-for-eligible-homes/>

Other Funding for Waged

Energy Upgrades		Grant Value
Insulation	Attic insulation	€400
	Cavity wall insulation	€400
	Internal Insulation (Dry Lining)	
	Apartment & Mid-terrace	€1,600
	Semi-detached & End of Terrace	€2,200
	Detached House	€2,400
	External Wall Insulation	
	Apartment & Mid-terrace	€2,750
	Semi-detached & End of Terrace	€4,500
	Detached House	€6,000

Other Funding		
Energy Upgrades		Grant Value
Heat Pumps		
	Air to Water	€3,500
	Ground Source to Water	€3,500
	Exhaust Air to Water	€3,500
	Water to Water	€3,500
	Air to Air	€600
Heating System	Heating Controls Upgrade	€700
Solar Water Heating	Solar Water Heating	€1,200
Building Envelope	Roof Insulation	€500

Other Funding

Do more, receive more	Number of Upgrades	Bonus Value
Bonus for multiple upgrades	For 3rd upgrade	€300
	For 4th upgrade	€100

- Above grants in general for pre 2006 houses, download an application from:
- <https://www.seai.ie/grants/home-energy-grants/insulation-grants/>
- [Heat Pump Grant pre-2011](#)
- <https://www.seai.ie/grants/home-energy-grants/heat-pump-systems/> also makes a €200 contribution towards technical assistance
- Deep Retrofit Grants (not currently open):
- <https://www.seai.ie/grants/home-energy-grants/deep-retrofit-grant/>
- Significant amounts concerned

Other Funding

- Solar Photovoltaic systems (PV)
- Pre 2011 homes
- Post installation the home must have a BER of C or better
- Download an application form here:
- <https://www.seai.ie/grants/home-energy-grants/solar-electricity-grant/>
- Costs are €1700-2500 per kW_p

Solar PV grant

€900 per kWp
Up to 2kWp

€300 for every additional kWp up to 4kWp if you get a battery.
Total grant available capped at €2400

Example

You will receive €1800 for 2kWp solar panels (up to 8 panels)

For 3kWp: You will receive €2100 for 3kWp solar panels plus €600 for the battery system.
For 4kWp: You will receive €2400 for 4kWp solar panels plus €600 for the battery system.

Solar PV

- **Always look for a referral.**
- **PV costs are on the way down & electricity prices are on the way up**
- **Utility companies like Electric Ireland are offering schemes.** Grants are available and payment can be in full or over 36 months with Electric Ireland, systems can include batteries.
<https://shop.electricireland.ie/products/install-detail/solar-pv>
- **This is worth a check as systems are guaranteed and installers are accomplished.**
- **First generate as much as you use @ 17c/kWh, a 1kWp system gives about 900 kWh per year, saving about €153 each year.**
- **Systems should be good for at least 20 years**
- **Where retrofitted to a roof make sure you check all gaskets and seals before installation** as the system is drilled through the slate in most cases

Community Fund

SEAI opened €20 million fund, if your community needs numerous homes and community buildings retrofitted then review this link:
<https://www.seai.ie/grants/community-grants/project-criteria-and-funding/>

2019 results:

SEAI supported **57 projects** giving €25.3million to community.
Energy efficiency upgrades in **698 homes and 570 non domestic buildings**. Total project costs **€65.8 million**.

Cumulatively the programme has supported:

Upgrades in **18,200 homes and 2,570 non-domestic buildings**.
34,676 tonnes CO2 emission reductions per year
122.5 GWh total energy credits saved (obligated energy suppliers)

Community Fund

Home type (residential)	Fuel type	Funding Level
Private	Fuel Poor	Up to 80%
Private	Non-Fuel Poor	Up to 35%
Local Authority		Up to 35%
Housing Association		Up to 50%
Type (non-residential)	Funding level	
Not-for-profit/community	Up to 50%	
Private and public sector	Up to 30%	
Public sector (exemplar)	> 30% ≤ 50%	

Warmth and Wellbeing Scheme Pilot

- **Currently a pilot in Dublin**, for those with **chronic respiratory ailments and below 12 or above 55 years old**. May come to Mayo.
- Grants page here: <https://www.seai.ie/grants/home-energy-grants/>
- Insulation Grants for homes built before 2006
- Application form
- <https://www.seai.ie/grants/home-energy-grants/how-to-apply/>
- **Generally everything is paid for**, evidence of this is shown to SEAI and then the grant is paid
- To receive grants the approved contractor must sign off and a post works BER must be submitted
- Timelines are adhered to, and **terms and conditions apply**.

Funding

- **EV and plug in hybrid grants** <https://www.seai.ie/grants/electric-vehicle-grants/> can be €2-5,000, depends on cost of EV
- **EV home charger grant** – up to €600
<https://www.seai.ie/grants/electric-vehicle-grants/electric-vehicle-home-charger-grant/>
- **Accelerated Capital Allowance**, allows a sole trader, farmer or company that pays corporation tax to deduct the full cost of the equipment from their profits in the year of purchase.
<https://www.seai.ie/business-and-public-sector/business-grants-and-supports/accelerated-capital-allowance/>
- **Exeed grant**, 50% grant for audit, 30% grant for implementation
<https://www.seai.ie/business-and-public-sector/business-grants-and-supports/exeed-certified-grant/>
- **Support Scheme for Renewable Heat** for commercial entities
<https://www.seai.ie/business-and-public-sector/business-grants-and-supports/support-scheme-renewable-heat/>

RESS Fund

Action 28 of Climate Action Plan

News promised in February 2020, grid connection may present issues

Community Projects

- Separate community category in auctions
- Enabling framework for community energy projects – range of supports

Rules

Maybe 5MW max

Min 150 participants

Must be an SEC and cooperative

Developer Projects

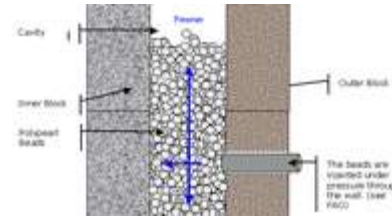
- Mandatory community benefit fund through a register
- Mandatory community investment offering
- Investment opportunity
- Rules

Climate Action Plan and Carbon Tax

- Climate Action Plan https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf
- €20 per tonne, €26 per tonne on petrol and diesel
- €80 per tonne by 2030

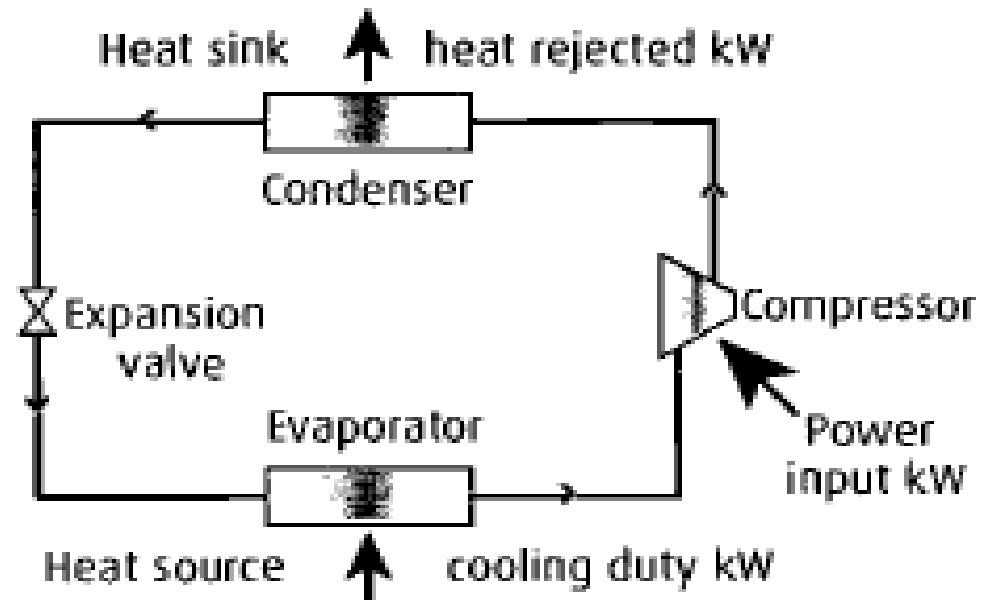
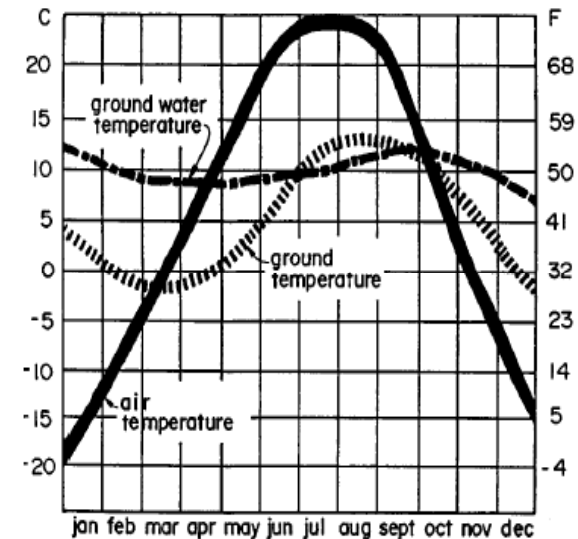
Range of Retrofit Technologies

- Previously discussed
- External insulation – various types
- Internal insulation – various types
- Seals, membranes and air tightness
- Chimney Closure devices
- Stoves (wood burning)
- Heat Pumps
- Heating Controls
- Underfloor heat distribution
- Larger radiators
- **Next up we take one technology the heat pump and discuss why you need to be very careful deploying new technologies like these, its key to get a referral as a minimum.**
- **Heat Pumps can if installed incorrectly ncrease your heating costs**



Heat Pumps

- Heat source ground, water (liquid) or air supply heat (solar) →
- Liquid in evaporator boiled and pressurised by compressor
- Temperature rises as $PV/T = \text{Constant}$
- Condenser extracts temperature heating water or air
- In short heat extracted from relatively low temperatures
- Carragher (2006)



Heat Distribution in your Home

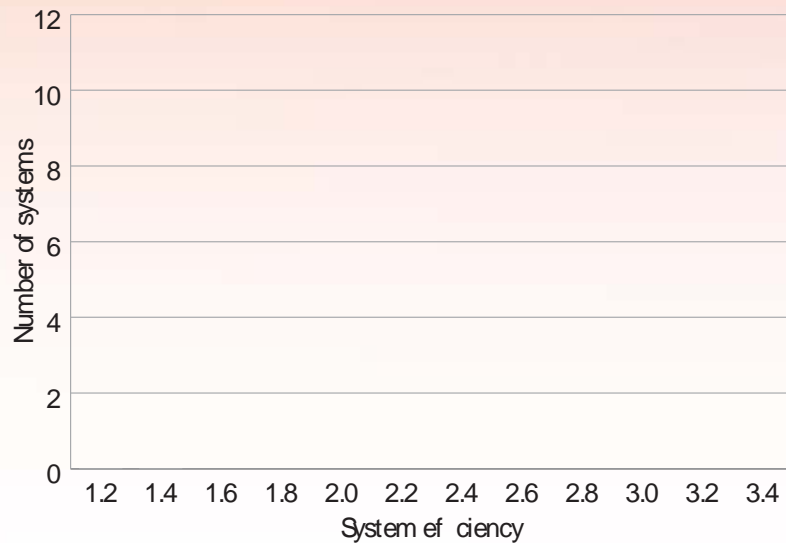
Distribution System	Delivery Temperature °C
Under-floor Heating	30-45
Low Temperature Radiators	35-55
Conventional Radiators	60-90
Air	30-50

System efficiency

The amount of heat the heat pump produces compared to the amount of electricity needed to run the **entire heating system** (including domestic hot water; supplementary heating; and pumps).

2008 field trial by Energy Saving Trust

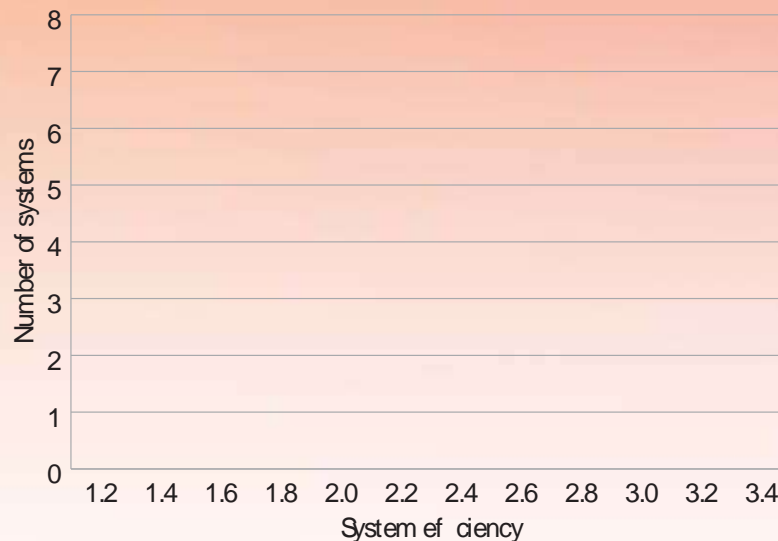
EST Heat Pump Trial



- 54 ground source heat pumps
- 29 air source heat pumps



A total of 83 heat pumps were monitored in the Energy Saving Trust heat pump field trial, distributed across the UK



System efficiency	ASHP	GSHP
Median	1.83	2.31
Range	1.2-2.2	1.55-3.47
Number	22	49

How to make it work efficiently

- It is clear the **EST trial throws up many questions**
- **COP or seasonal efficiency needs to be very good**
- **Monitored heat pumps in the field COPs as high as 5**
- **Heat Pumps need a strategy, and good design and commissioning**
- **Bad idea to expect these to work with your current radiators**
- **Preferably purchase a tested heat pump – EU standard 14511**
- **If its not tested, ask why?** The reason would want to be very good
- **Significant retrofit first – insulation, airtightness etc**
- **Reduce heat demand so smaller heat pump will suit, use night rate**

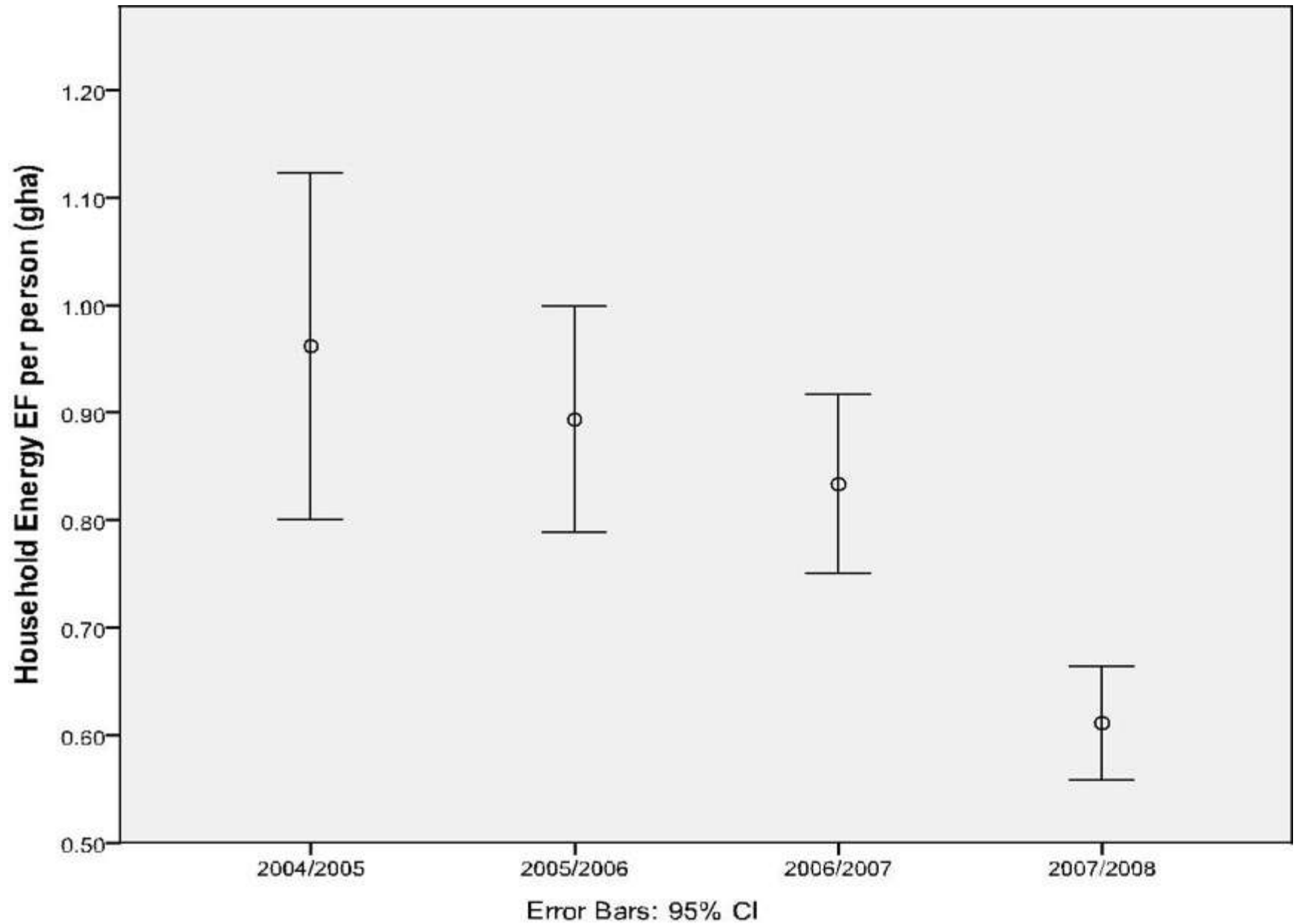
How to make it work efficiently

- Heat distribution system – **underfloor needs only 30°C**
- Customers need good understanding of what causes inefficiency or electricity bills can be very high, **controls need to be well explained**
- **Installers need to commit to substantial handover, with one committing to overall responsibility, referral is important, agree a 3 year maintenance contract before installation**
- **Non-continuous control can be very efficient:** Regularly heat water for a short fixed period, heat space similarly but for a long period on night rate and boost infrequently but when required
- Air source systems are improving now
- **Paybacks can be a little over 6 years**

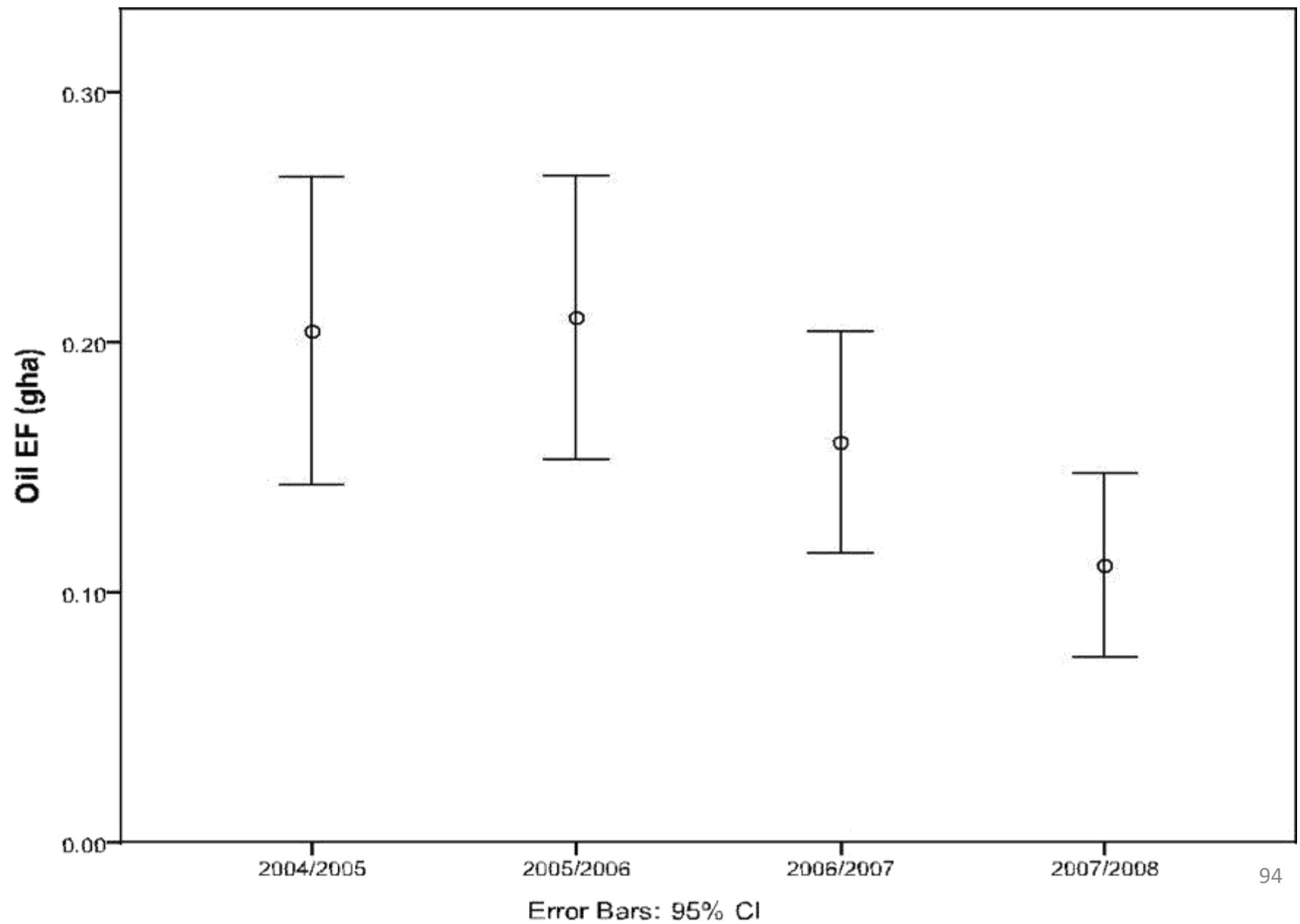
Four Year Ecological Footprint Campaign



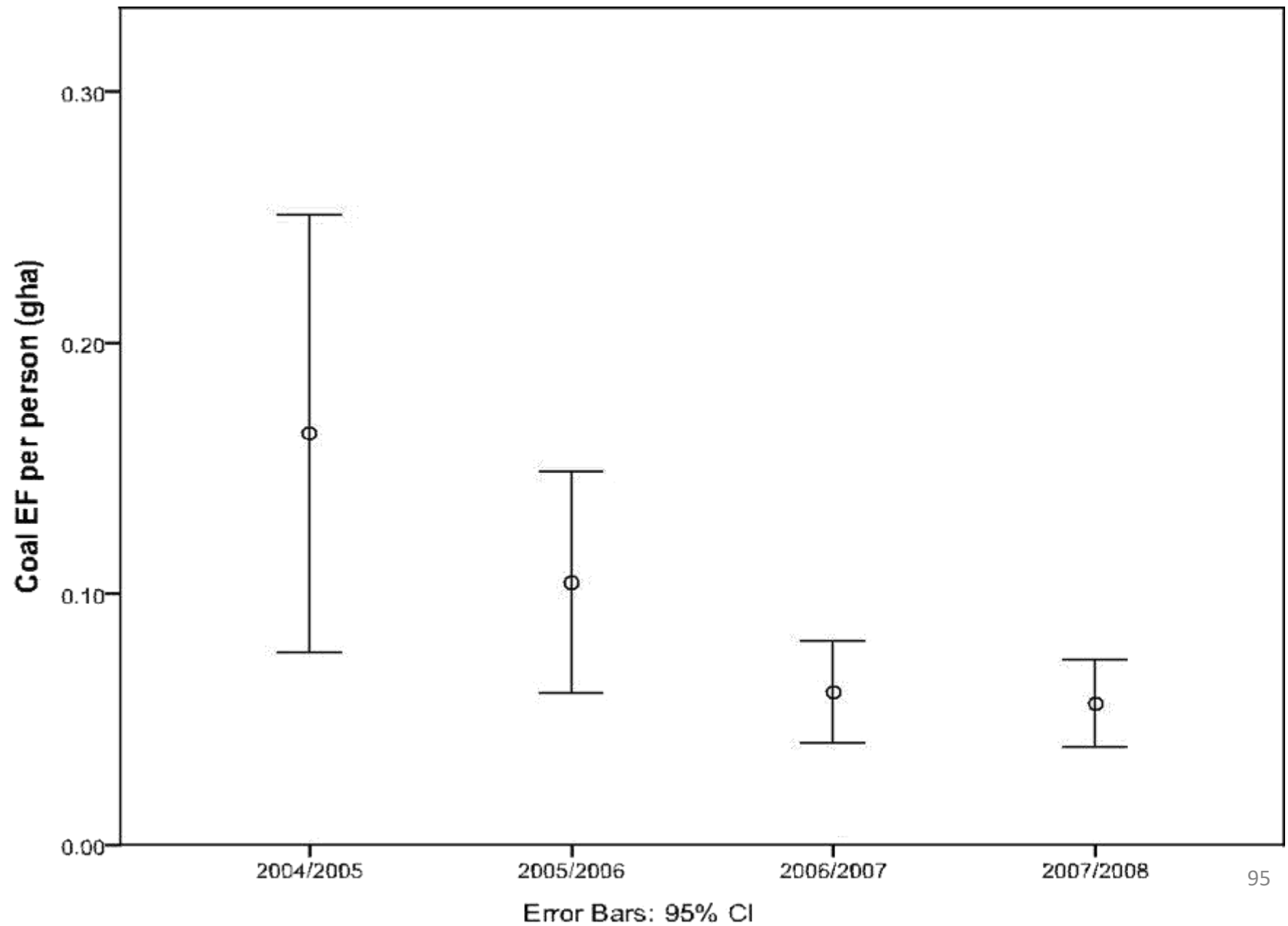
Ballina EF Energy Data Over Four Years



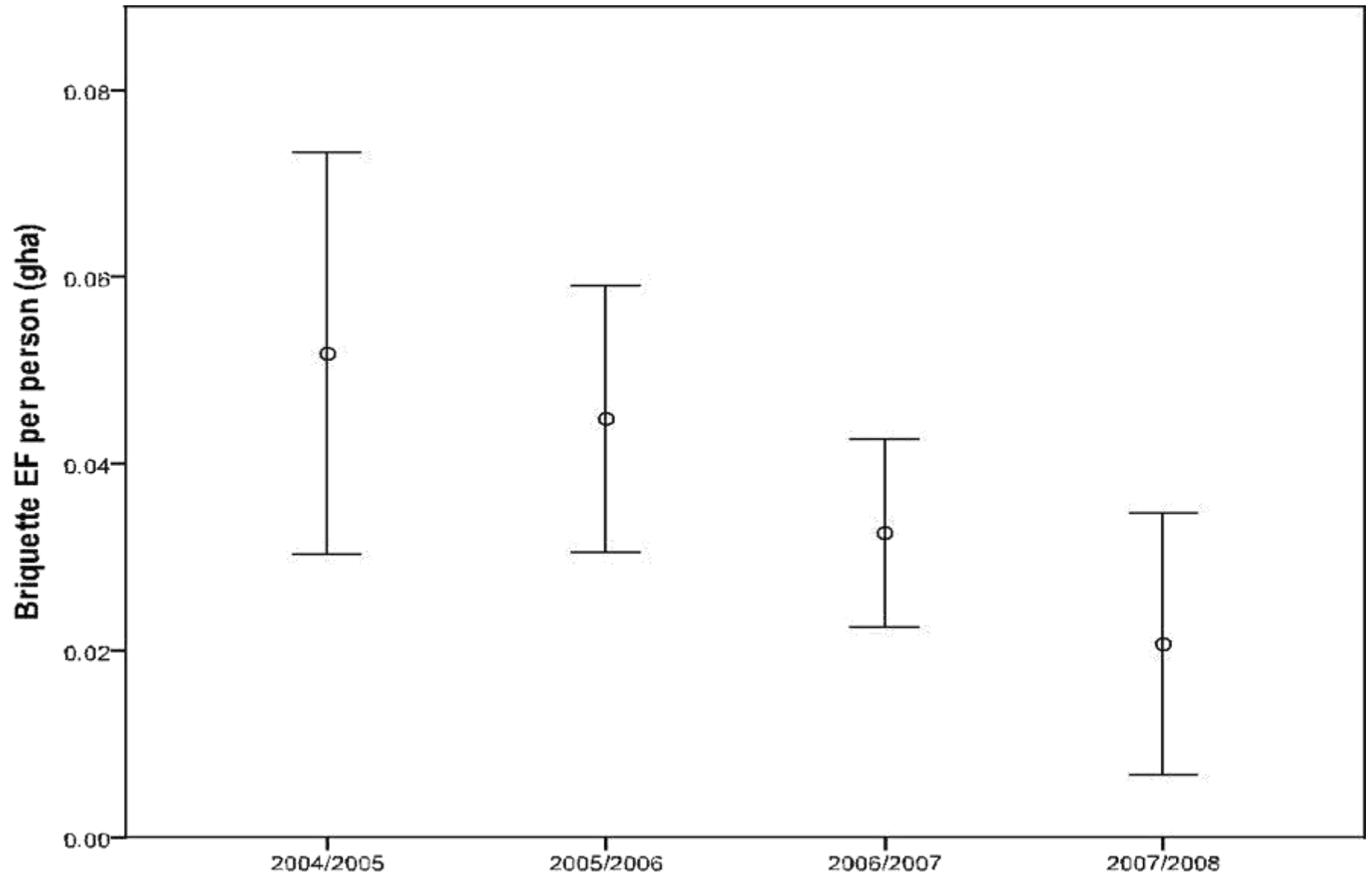
Ballina EF Oil Data Over Four Years



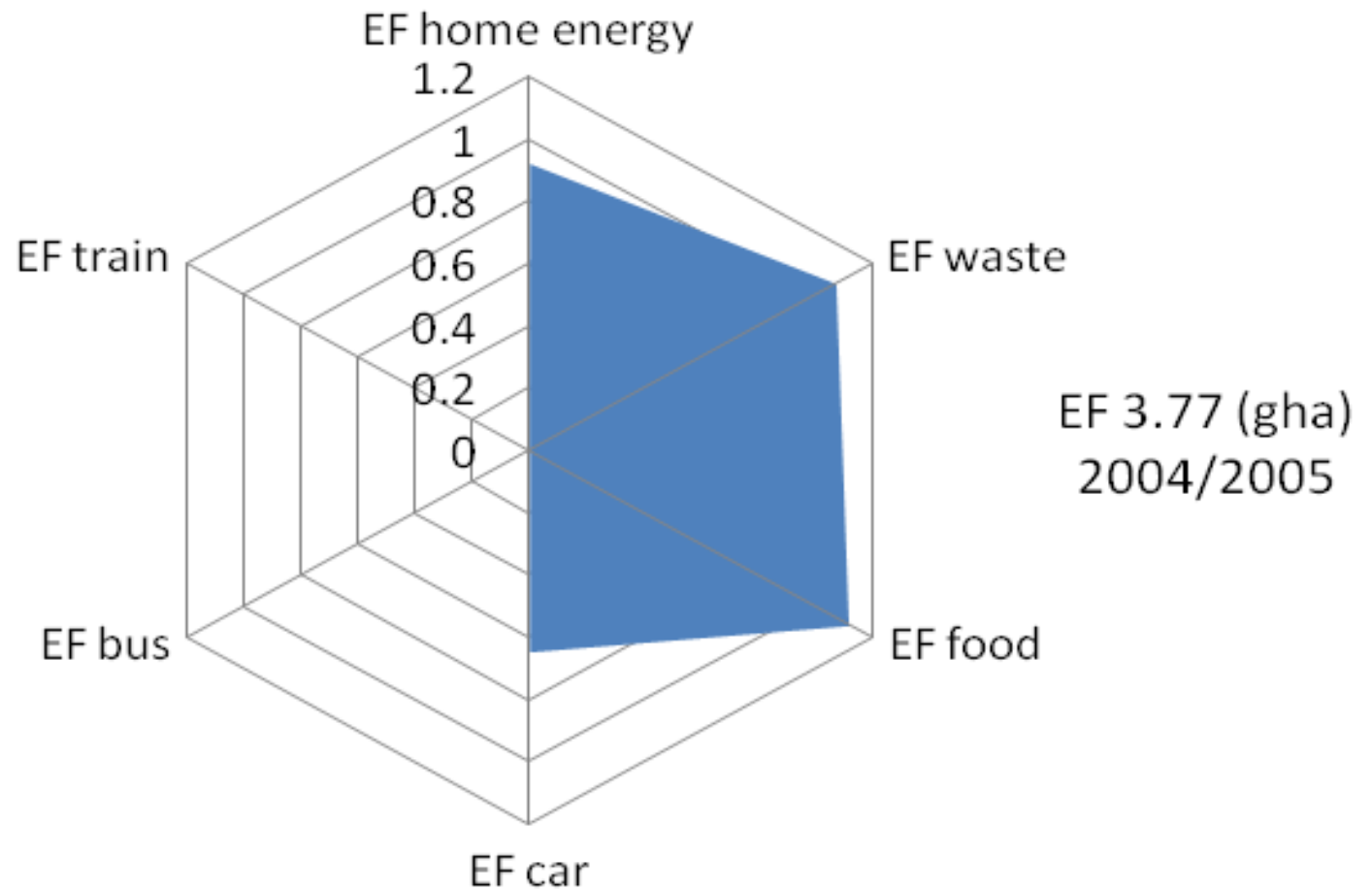
Ballina EF Coal Data Over Four Years



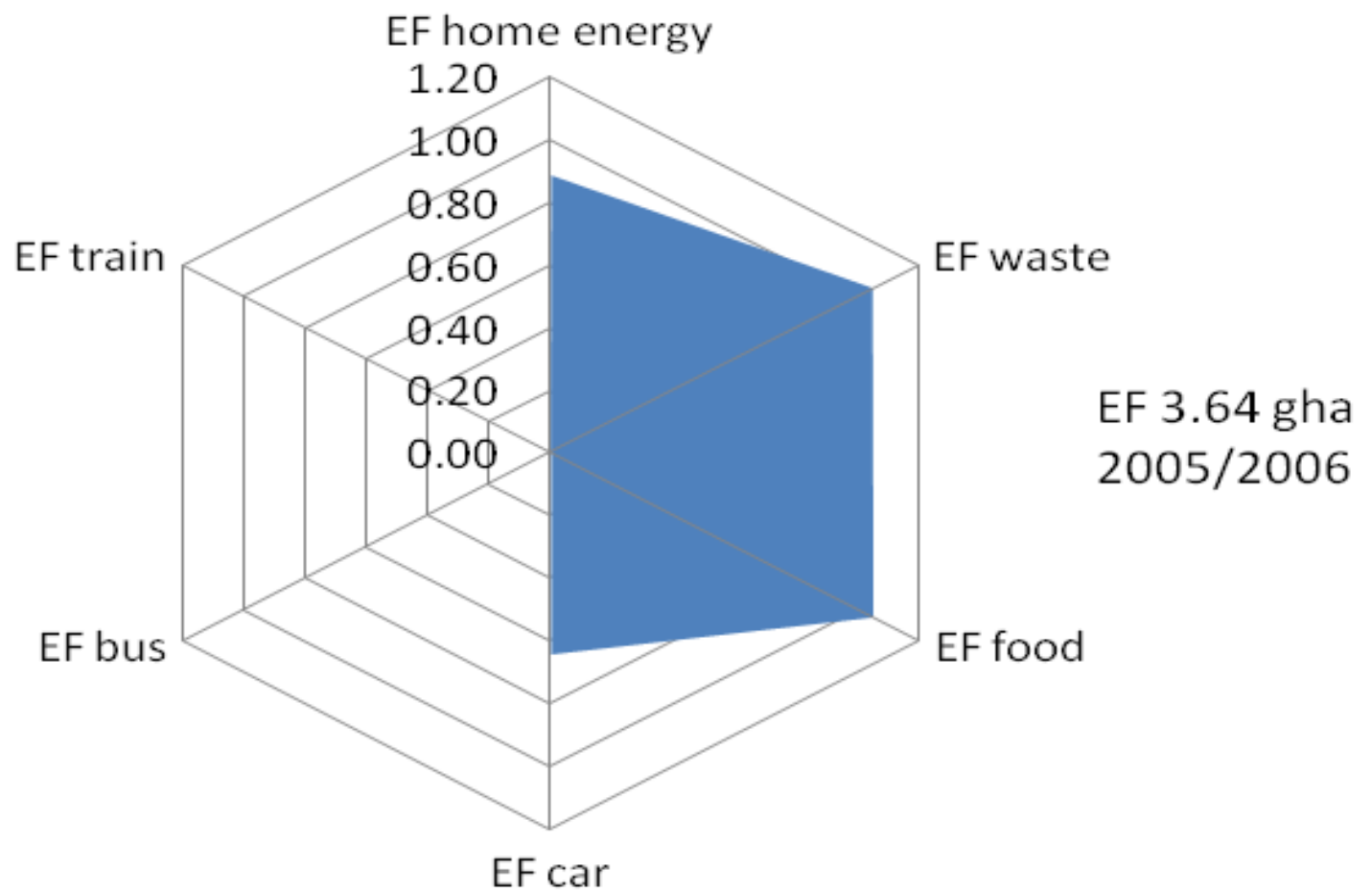
Ballina EF Briquettes Data Over Four Years



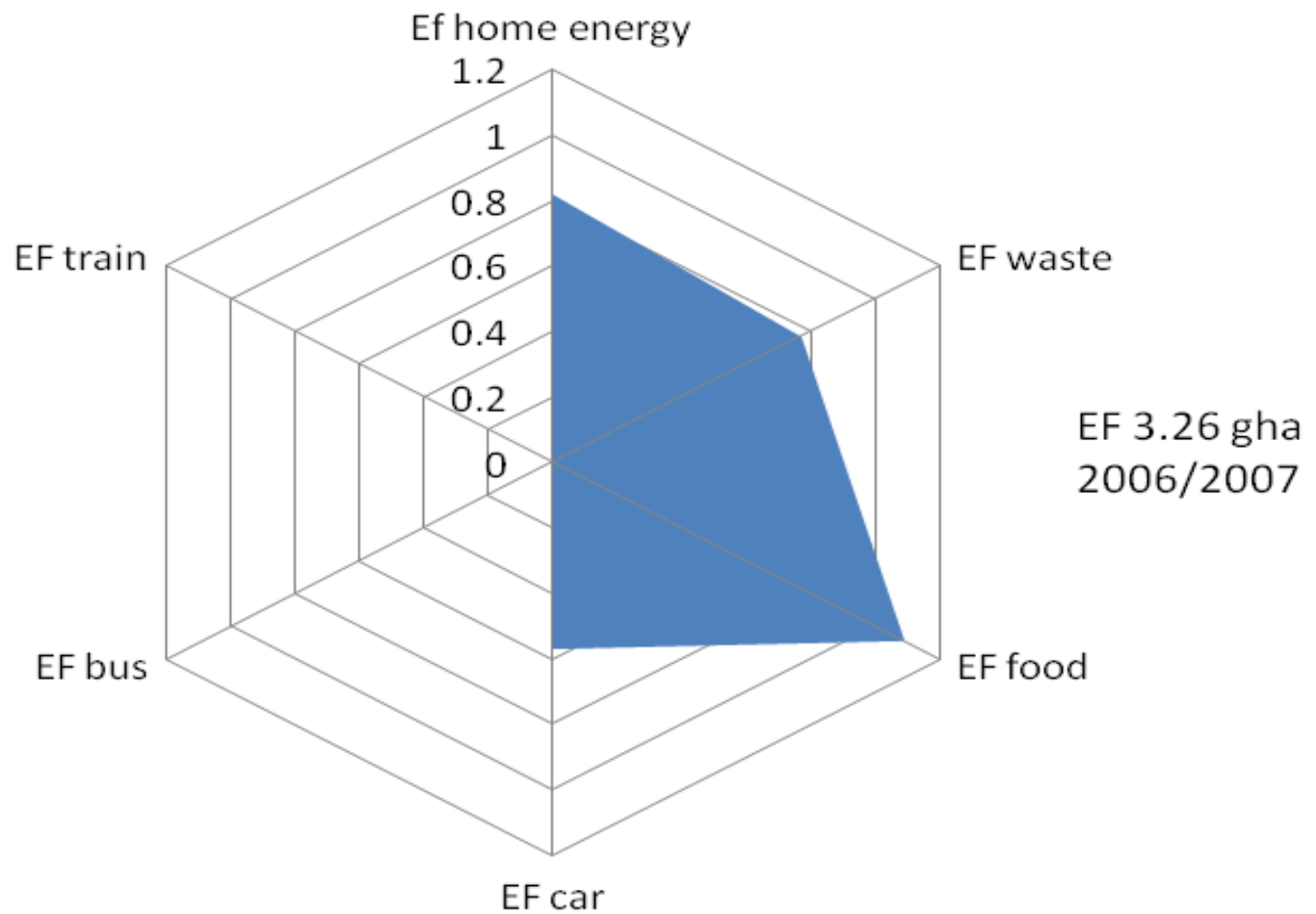
EF Data Year 1



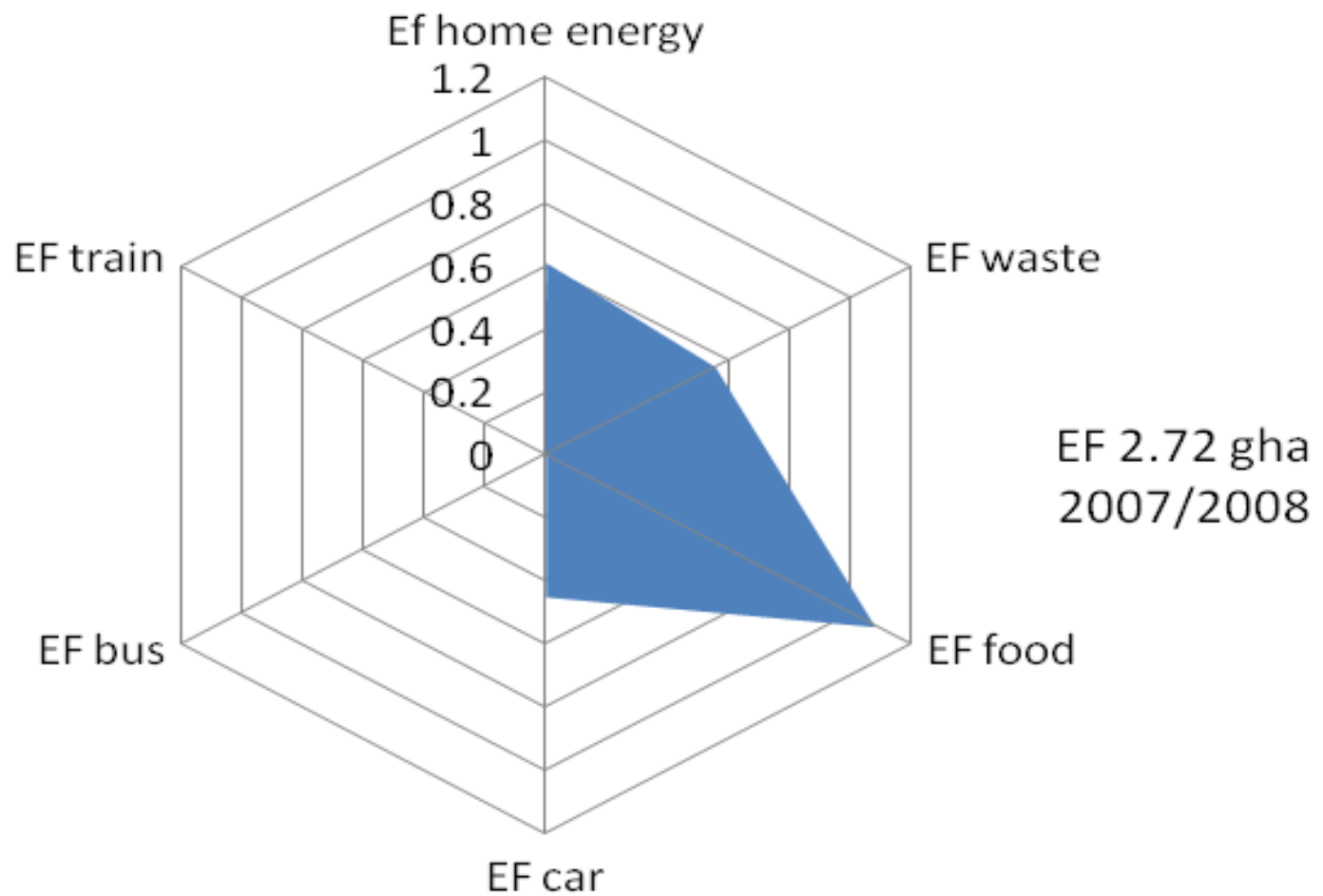
EF Data Year 2



EF Data Year 3



EF Data Year 4



International Blueprint

Developed an EF method for Irish communities. 95 community EFs now.

Presented results of 5 year intervention.

- 1800 residents.
- Reduced its emissions by 28%.
- Equates to 4,900t CO₂.
- Validated by ISO 14064.
- PDD issued for verification.
- Started the trading of energy savings Nationwide.

So do you think 4,900 tCO₂ would fill Croke Park?



It would fill it 5 times!



International Blueprint

This is recognised as a blueprint for community sustainability by SEI, Swedish and Japanese governments and by IGES. Japan and Sweden are recognised as leading countries in relation to decarbonization. Presented in New York at the High Level Political Forum, 2018. Involves a community, CBOs, a skilled facilitator and our research team. Householders are facilitated to measure their ecological footprint and then to reflect on their learning and share their low carbon solutions as stories. They interact, craft new knowledge and advance the development of their understanding within a co-learning experience. Trusted messages.

Link:

https://iges.or.jp/en/pub/sustainablelifestylespolicyandpractice/en?fbclid=IwAR1XTxe3z1G2nomIL5alfzqvTf5BzelccLOnfUzBvTl2XPQqwBBGsVq_H70

International Blueprint

<https://www.tandfonline.com/doi/abs/10.1080/13549839.2018.1434493>

<https://www.tandfonline.com/doi/full/10.1080/13549839.2018.1481021>

http://www.epa.ie/pubs/reports/research/econ/Research_Report_238.pdf

<https://www.sparkchange.ie>

Drombane Upperchurch



Drombane Upperchurch

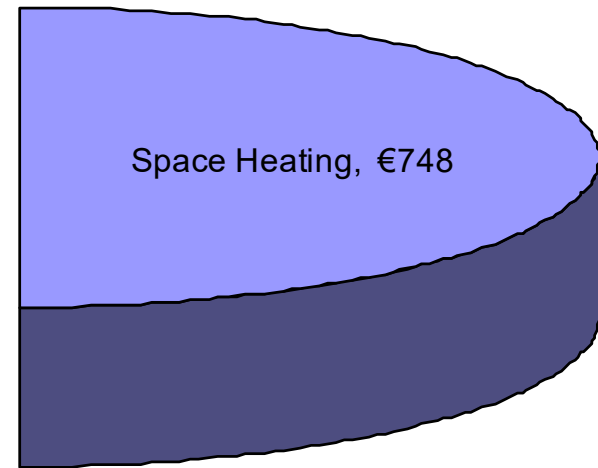
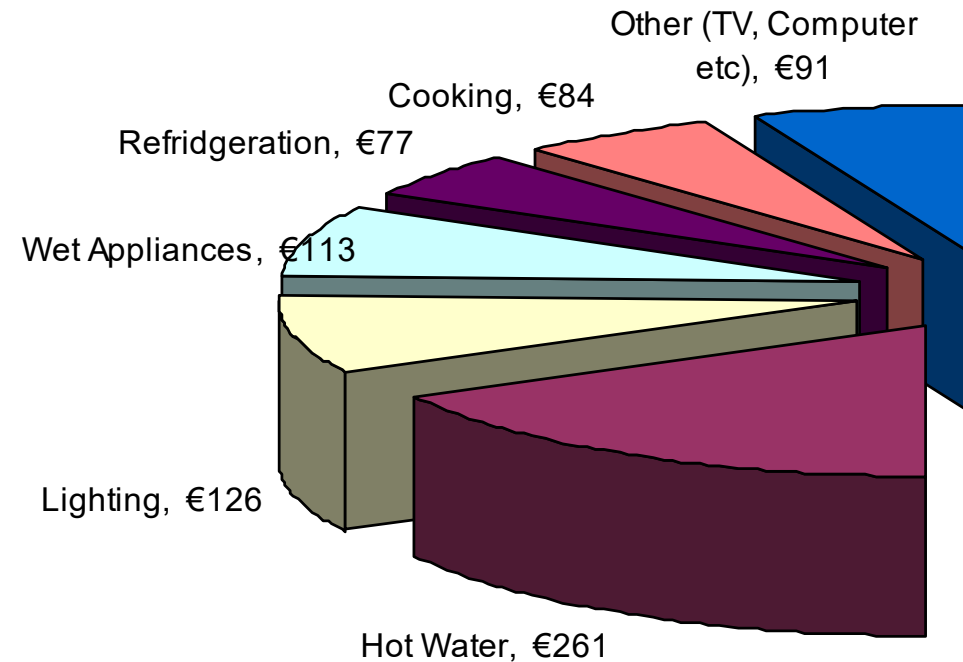
- Retrofitted over 100 homes, there is an economy in scales
- <https://www.sparkchange.ie/success-stories/>
- **Community Fund can give up to 80% towards a retrofit**
- **€1,000,000 per year** spent on energy within the parish before retrofit projects.
- €1000 per person on average.
- €2,500 per household per year on average.
- **A 25% reduction in energy usage could save the parish €250,000**

Drombane Upperchurch

- **60% (200 out of 349) cited financial savings as their most important reason for investing in energy efficiency.**
- Drombane Upperchurch has **evolved from one community project into 12 communities** across Co. Tipperary, known as Energy Communities Tipperary Co-operative.
- Co-op has completed a number of projects, one of which was in the region of €3.8 million, €3.2 million was a grant from SEAI, across Co Tipperary.
- They have **bought back young people they had lost to Canada, trained them** and they now retrofit in Drombane Upperchurch and across Ireland.

SERVE: 2-3 person semidetached dwelling

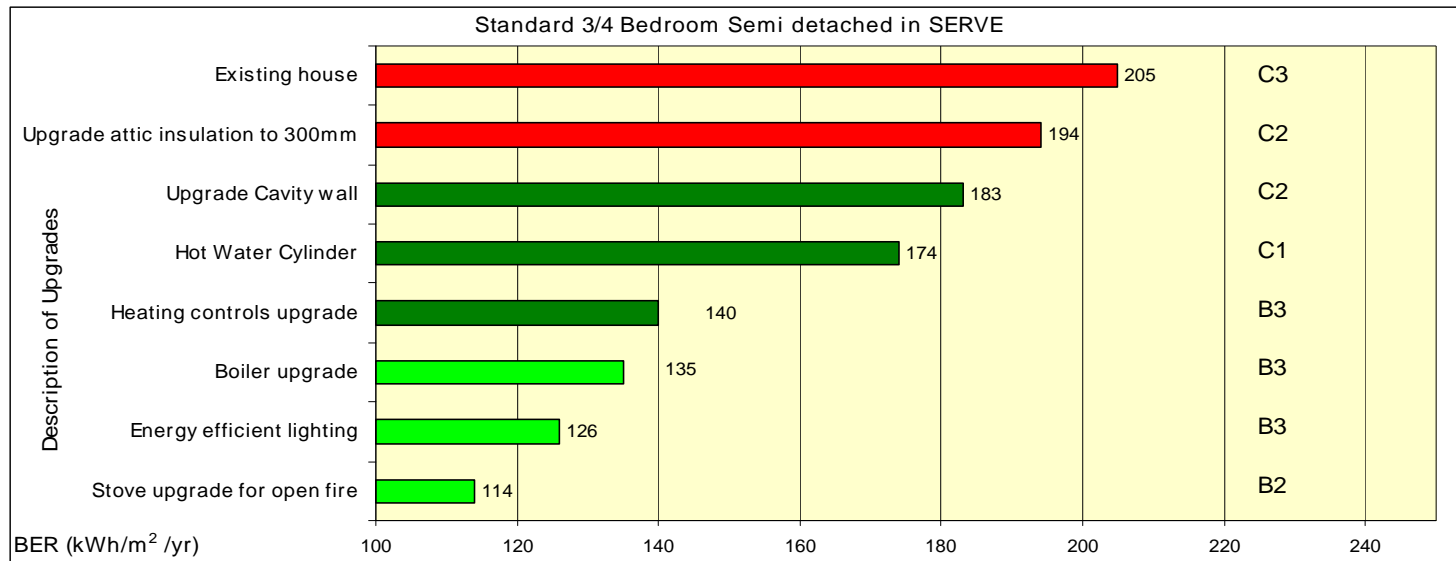
€1500 = €750 (space heat - oil) + €750 (electric)



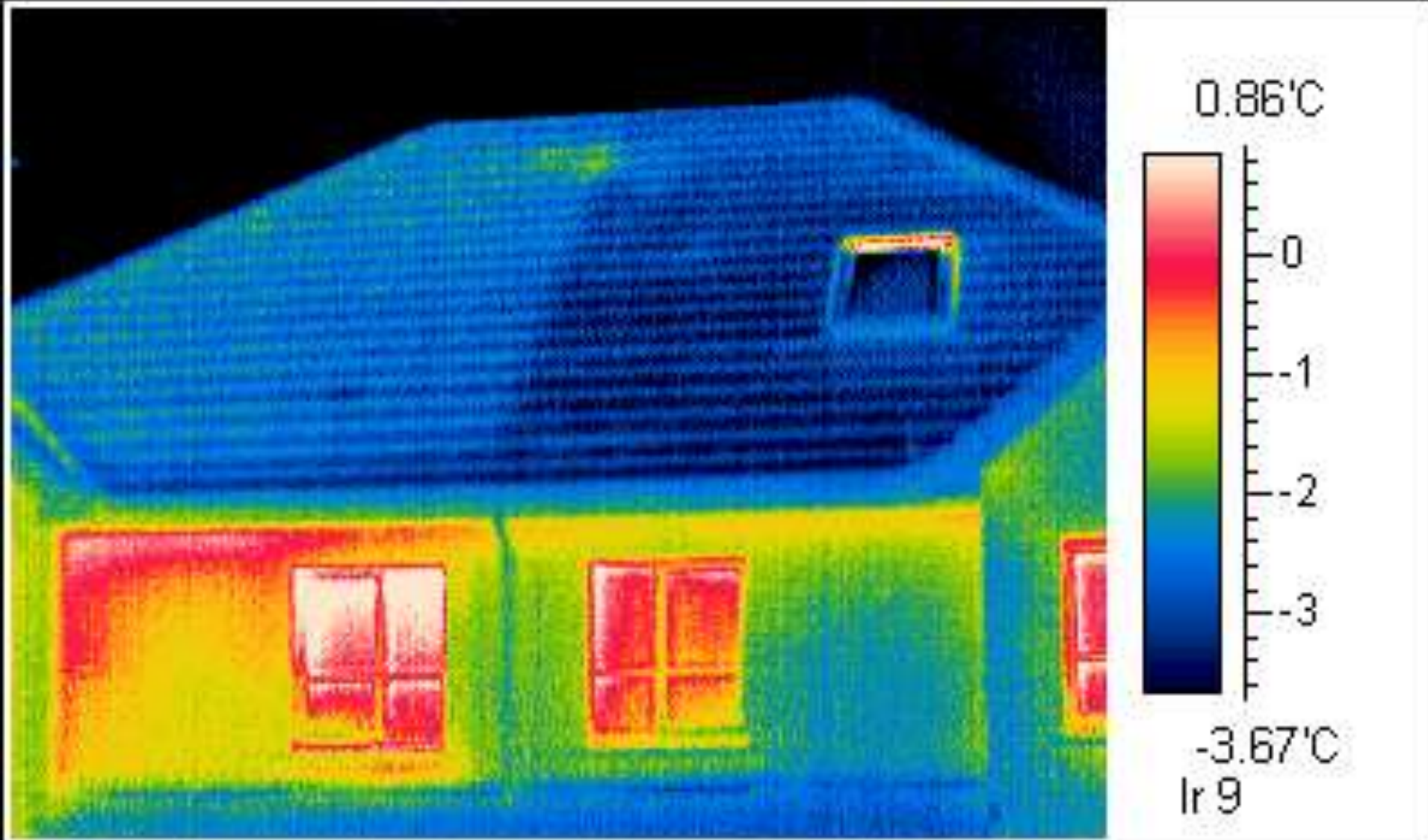
SERVE Semidetached dwelling C3 to B2



1990-2005
Retrofit
€5,350 cost
€660 saved pa
125m²

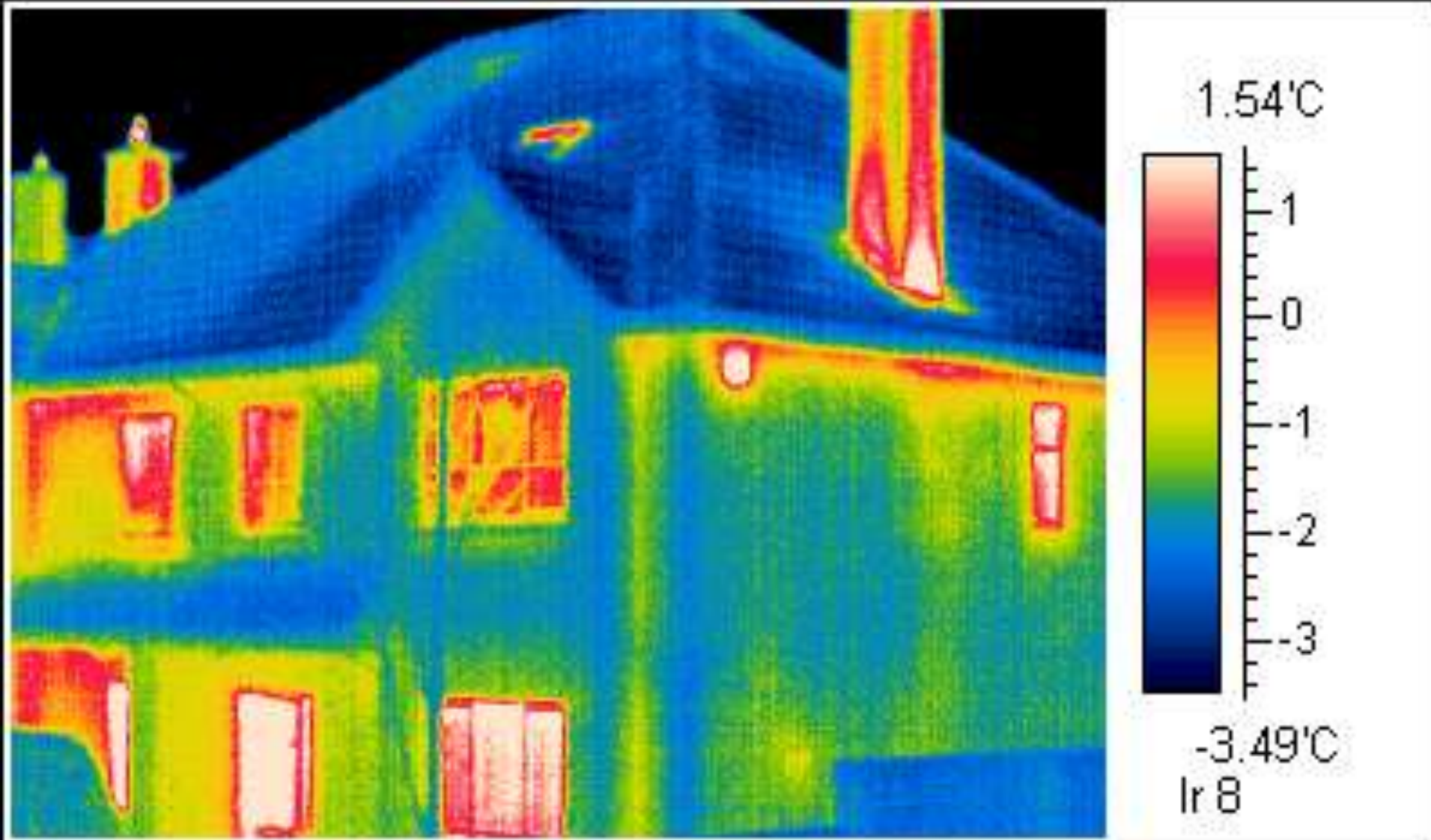


Professional Diagnostics – Thermal Imaging postwork



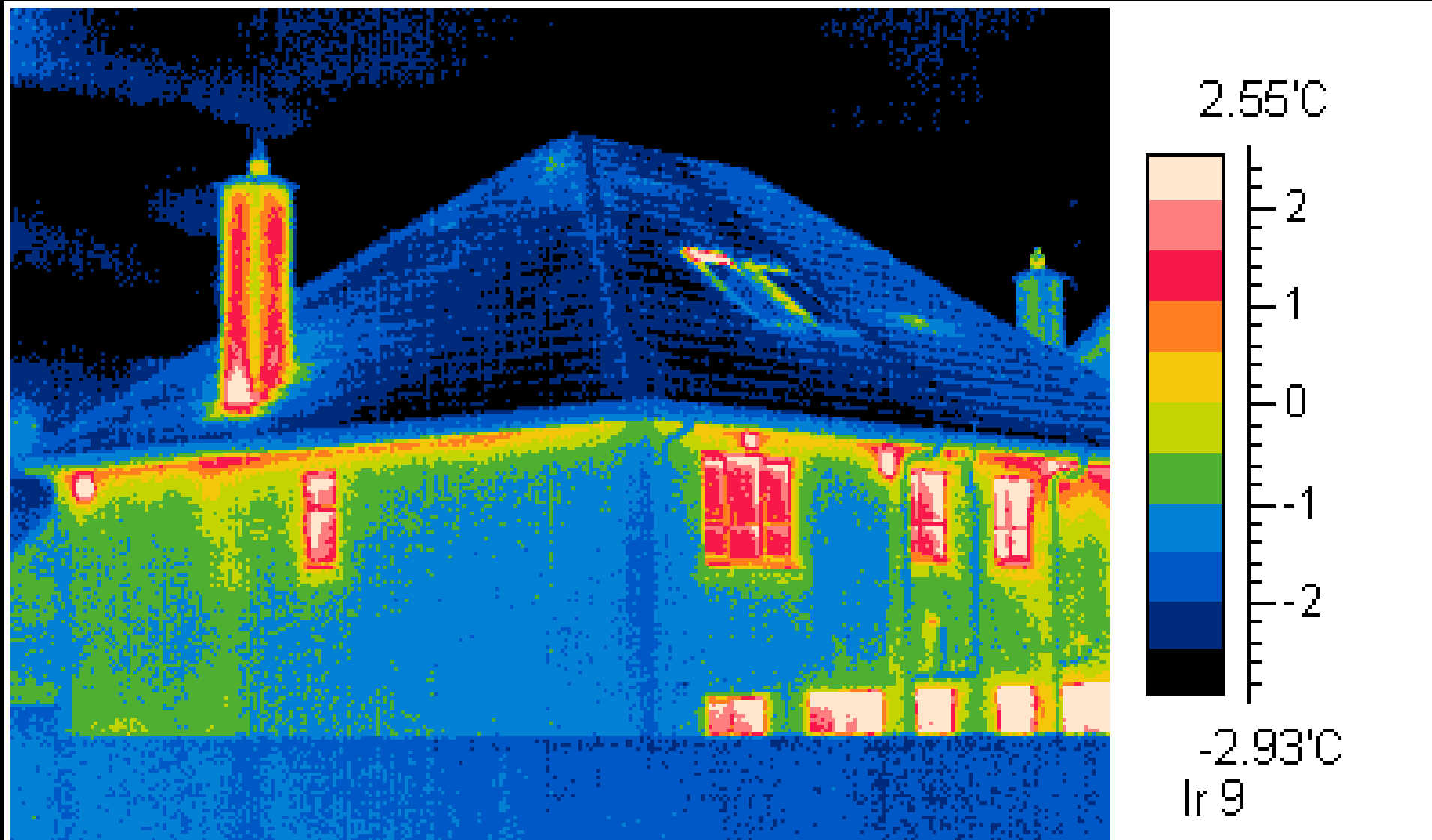
Money in which householders pocket?

Professional Diagnostics – Thermal Imaging postwork



Money in which householders pocket?

Professional Diagnostics – Thermal Imaging postwork



Money in which householders pocket?

SERVE Bungalow D2 to B3

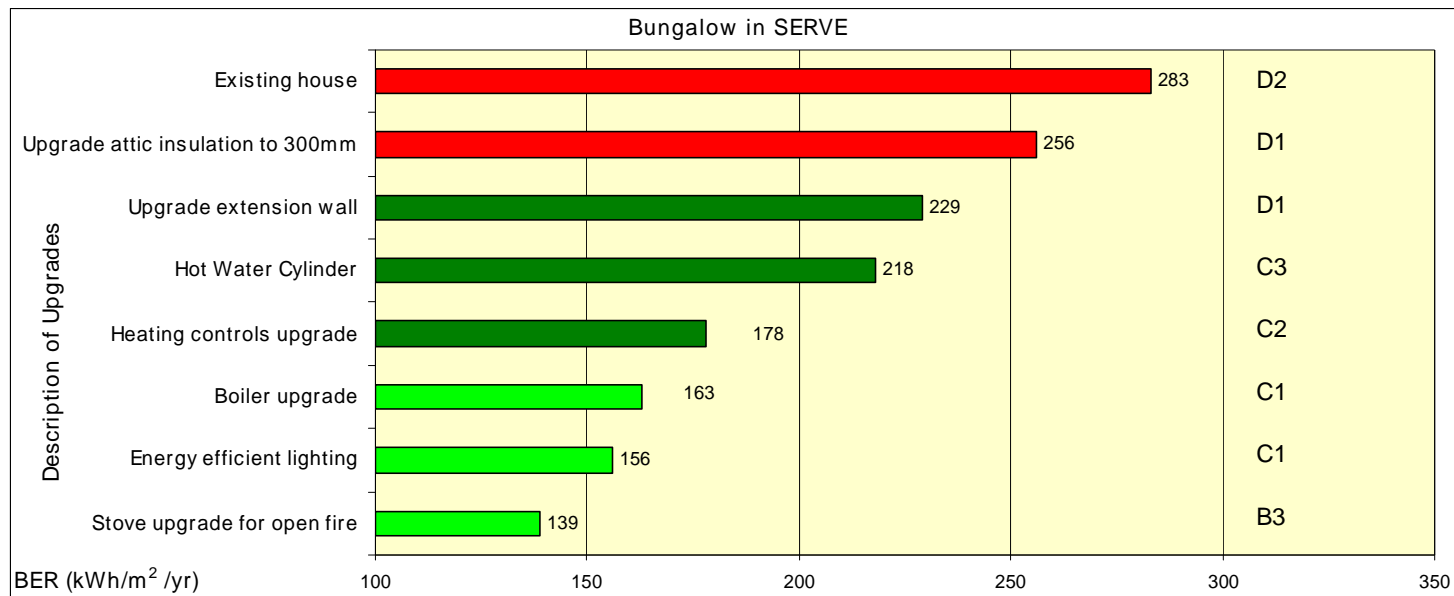
1960-1990

Retrofit

€5,650 cost

€1,000 saved pa

140 m²



SERVE Farmhouse F to B3

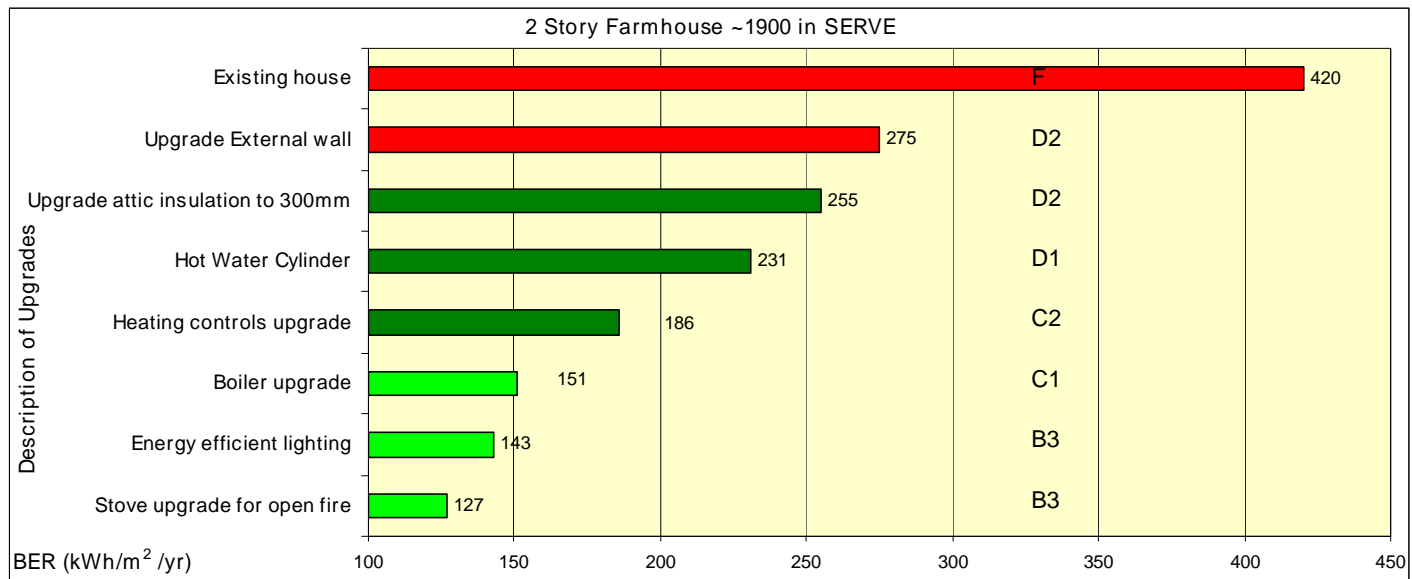
1950s

Retrofit

€17,350 cost

€1,900 saved pa

Large



A2 Cottage Galway City

New Build

€160k

120m²

Does not need
to cost a
fortune



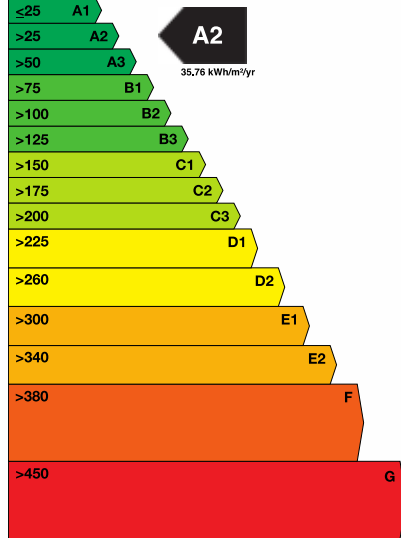
Menlo, Galway - one of the air tightest houses (block-built) in the West. 0.49 AC/hour @ 50 Pascals or 0.0245 AC/hour at normal pressure. New build, designed for air tightness, trade cooperation.

Left alone it changes its complete air contents approximately once **every 2 days**. **There are houses in Ireland which change there complete air contents once an hour** – now that is leaky!

Internal air quality being monitored for the next 18 months

A2 Cottage Galway City

Building Energy Rating
kWh/m²/yr
MOST EFFICIENT



- Defining what you do (design) the way its done (trades need to cooperate)
- LED lights
- High passive solar gain
- High levels insulation
- Thermal bridging designed out
- Heated using exhaust air source heat pump (300W)
- Wood burning stove (dedicated air supply)
- 1kW solar PV (to be increased) = EV
- Monitored 4,000kWh/year (house, heat, light cooking and EV)

Some Reading

We are developing a website which shows the reader across **11 houses of typical Irish construction** in the West what can be done, its not ready yet but its url will be worth checking and is:

<https://www.energyco-ops.ie/resources/BERsandCommunityAudits>

Other Links:

[https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate Action Plan 2019.pdf](https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf)

<https://passivehouseplus.ie>

<http://servecommunity.ie/i-am-a/home-owner/energy-information-for-your-home/>

www.sust-it.net

<https://communitypower.ie>

<https://www.footprintnetwork.org/licenses/public-data-package-free/>

<https://www.tandfonline.com/doi/abs/10.1080/13549839.2018.1434493>

<https://www.tandfonline.com/doi/full/10.1080/13549839.2018.1481021>

http://www.epa.ie/pubs/reports/research/econ/Research_Report_238.pdf

<https://www.sparkchange.ie>

https://iges.or.jp/en/pub/sustainablelifestylespolicyandpractice/en?fbclid=IwAR1XTxe3z1G2nomIL5alfzqvTf5BzelccLOnfUzBvTI2XPQqwBBGsVq_H70

Breakout Session – What are your energy saving ideas?



Breakout Session – What can we do?

What can individuals and communities do to reduce the energy footprint?

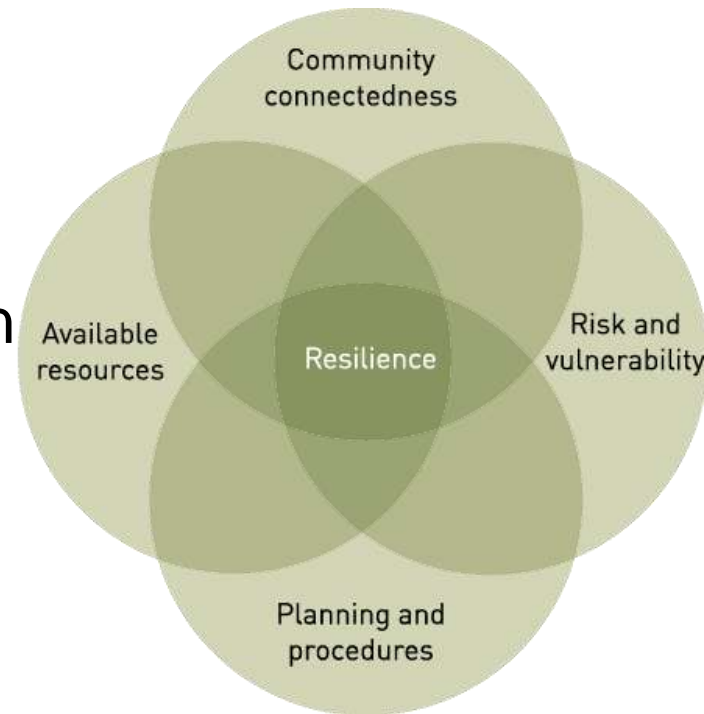


Your ideas?

Breakout Session – What can we do?

Resilience is strengthened when you work with your Local Authority and generate and submit to plans, local, regional and national:

1. Community Futures Plans
2. Climate Mitigation Strategy Plan
3. Neighbourhood Climate Action Plan
4. Business Continuity Plan
5. County Development Plans
6. Local Economic and Community Plan
7. Biodiversity Management Plan
8. Peatland Management Plan
9. Conservation Action Plan (CANN)
10. Surface Water Management Plan
11. Community Resilience Plan
12. Invasive Species Management Plan



Workshops

FOCUSED WORKSHOPS

DATES AND LOCATIONS



WORKSHOP 3A: UNDERSTANDING CLIMATE CHANGE AND COASTAL IMPACTS

- ✓ [Belmullet](#) - Aras Inis Gluaire
27th February 2020
7pm - 10pm



WORKSHOP 3C: UNDERSTANDING CLIMATE CHANGE AND HOUSEHOLD ENERGY

- ✓ [Castlebar](#) - Leisure Complex Lough Lannagh
3rd March 2020
7pm - 10pm



WORKSHOP 3B: UNDERSTANDING CLIMATE CHANGE AND COMMUNITY ENERGY

- ✓ [Ballina](#) - Family Resource Centre
29th February 2020
10am - 1pm



WORKSHOP 3D: UNDERSTANDING HOW PERSONAL CONSUMPTION AFFECTS CLIMATE CHANGE

- ✓ [Claremorris](#) - Town Hall
5th March 2020
7pm - 10pm



WORKSHOP 3E: UNDERSTANDING HOW TRANSPORT AFFECTS CLIMATE CHANGE

- ✓ [Westport](#) - Leeson Enterprise Centre
7th March 2020
10am - 1pm



Email: vincentcarragher@gmail.com

[Email: ofeeney@mayococo.ie](mailto:ofeeney@mayococo.ie)

Email: nclesham@southmayo.com

Email: rethinkgalway@gmail.com

Email: vincent.carragher@tcd.ie

