Energy Saving

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Why Save Energy?!

- Climate crisis – we need to halve global emissions by 2030
- Cost of living crisis (40% in fuel poverty by autumn?)
- Why is the price of gas so high? – a lot of demand chasing limited supply.
- Reducing demand> reduces price> reduces fuel poverty
- Russia, Qatar…

Current Prices

Gas 8p/kWh
Elec 28p/kWh
Petrol 17.5p/kWh
(£1.68/litre)

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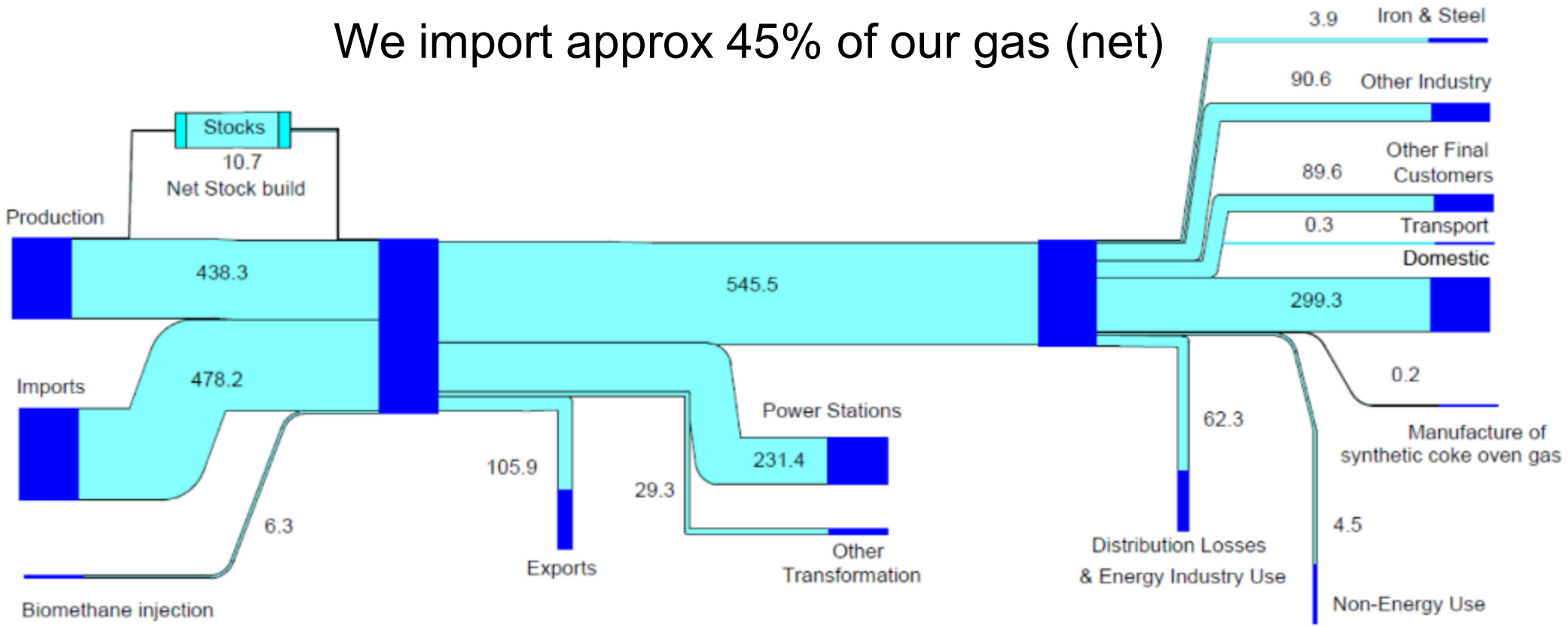
Natural Gas Flow Chart 2020 (TWh)

We import approx 45% of our gas (net)



>2/3rds of use is domestic heat & power generation

Note:

This flow chart is based on data that appear in Table 4.1, excluding colliery methane.

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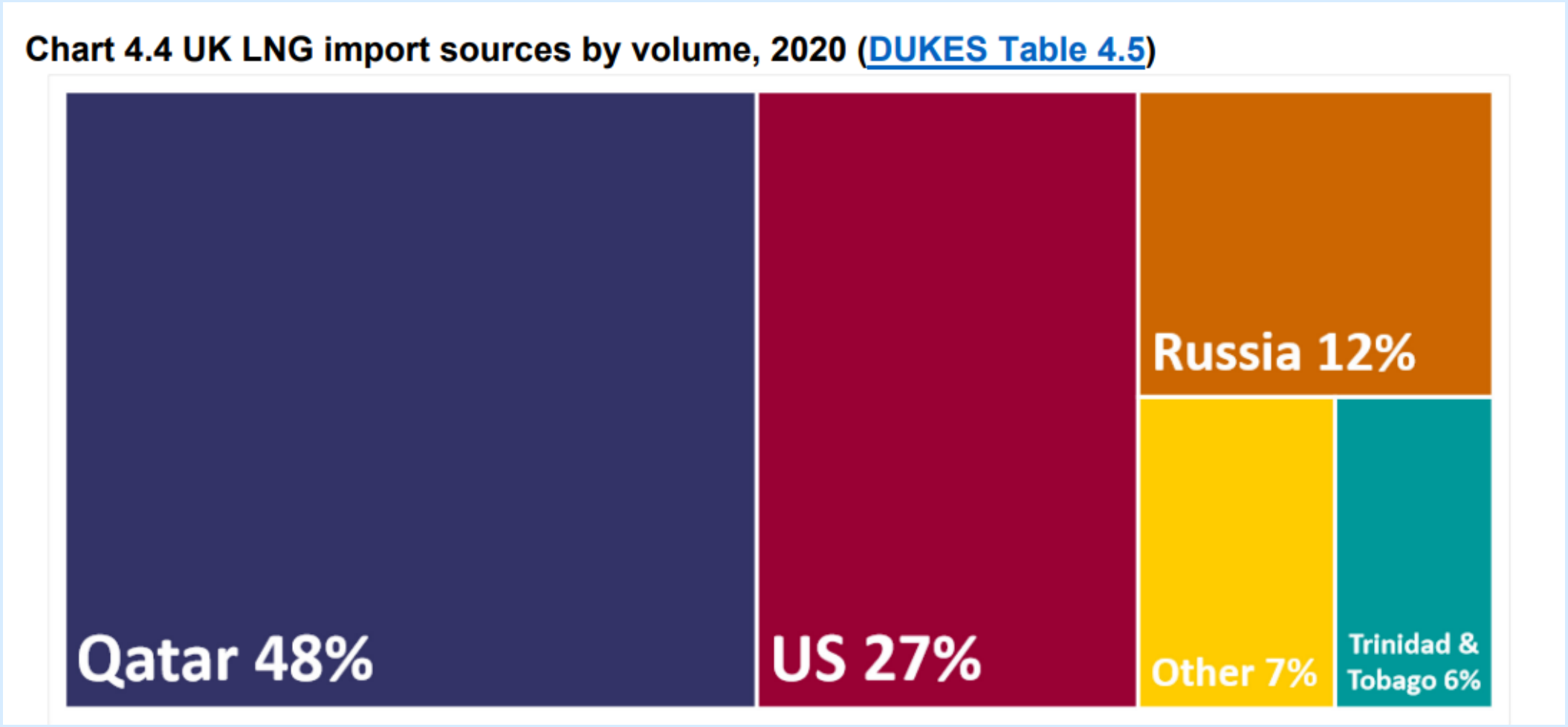
Where do our gas imports come from?



And LNG needs extra energy to liquefy and transport

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The Cheaper Stuff!

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Heating

- In most homes, the single biggest energy use
- Behavioural:
  - Turn it off when you don't need it
  - Is your heating still on? Switch it off completely - could come on unnecessarily on cold mornings
  - Turn down your room stat (£127/yr/degree)
  - Turn down your boiler stat…

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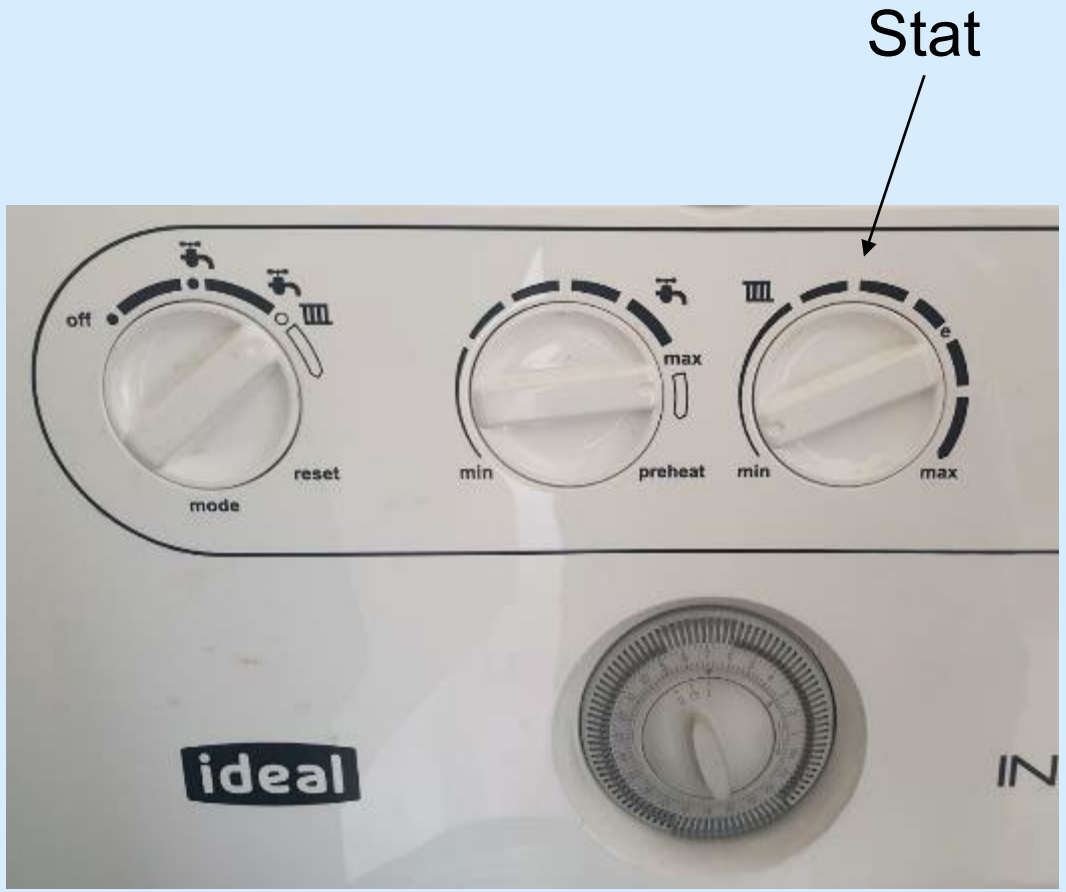
Turning Down Your Boiler Stat

- For instructions go here: theheatinghub.co.uk
- This stat changes the temperature of the water going to the radiators
  - if you have a combi boiler
  - if you have a system boiler (ie with a cylinder) care required - it also changes water temp going to cylinder
- Saving 6-8% = £85/yr
- Cost – nothing!



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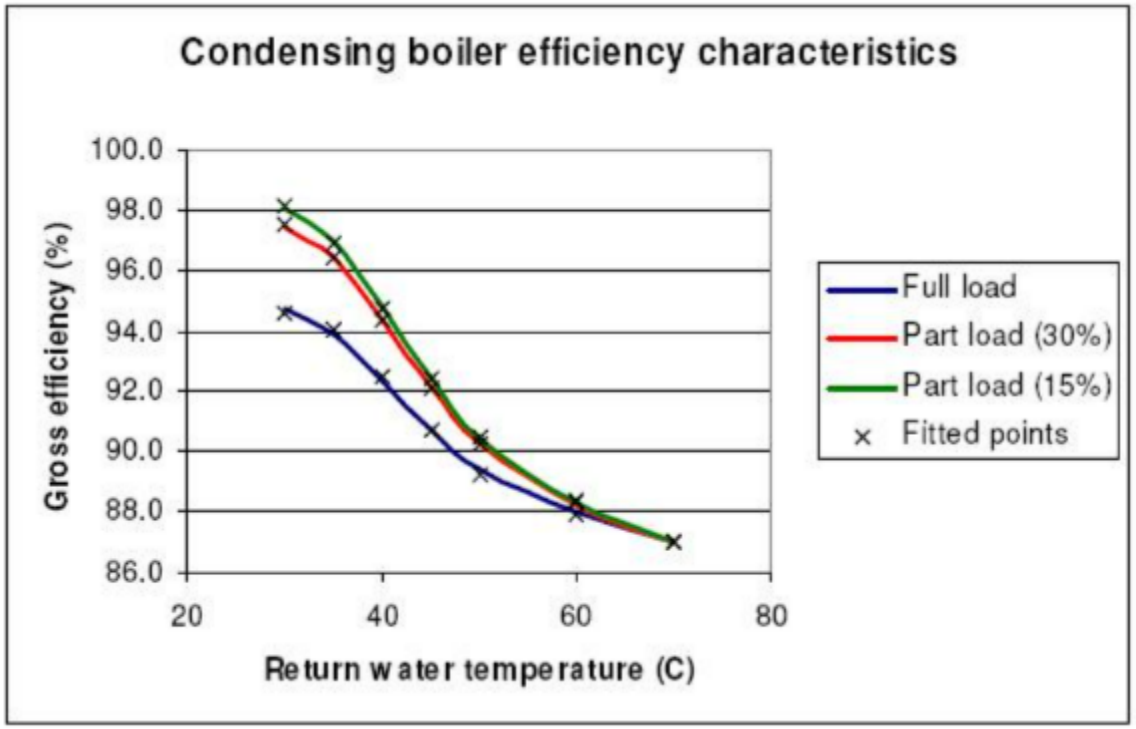
Turning Down Boiler Stat – How does it work?

- Modern “condensing boilers” extract latent heat of condensation
- They can only do this when flue gases drops below 54C
- So need water returning to boiler to be below 54C
- The lower this return temperature, the more heat is extracted
- Might need to adjust boiler stat
- Can be automated with weather compensation control



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Hot Water

- Cut your shower time
- Aerating shower heads
- Wastewater Heat Recovery
- Share a bath!

Energy Saving Trust study:

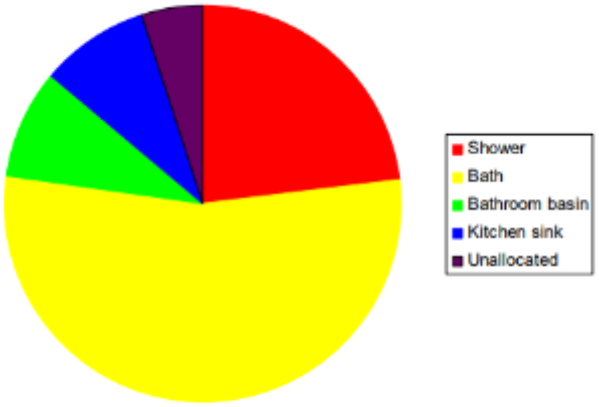

Figure 7.4: Relative run-off energy at each location in a single dwelling

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Hot Water Use

	Litres/ minute	Litres Per Shower/Bath	Litres/ Person/yr	Heat Required kWh/person/yr	Gas kWh/ person/yr	Elec kWh/ person/yr	Cost £/ person/yr	Cost £ 4 person family/yr
Power Shower	13	99	33,011	1,150	1,353	9	£ 108	£ 433
Mixer Shower	8	61	20,314	708	832		£ 67	£ 266
Electric Shower	5	38	12,697	442		442	£ 146	£ 583
Bath		80	26,800	934	1,098		£ 88	£ 351

Based on 7.58mins per shower (Energy Saving Trust)

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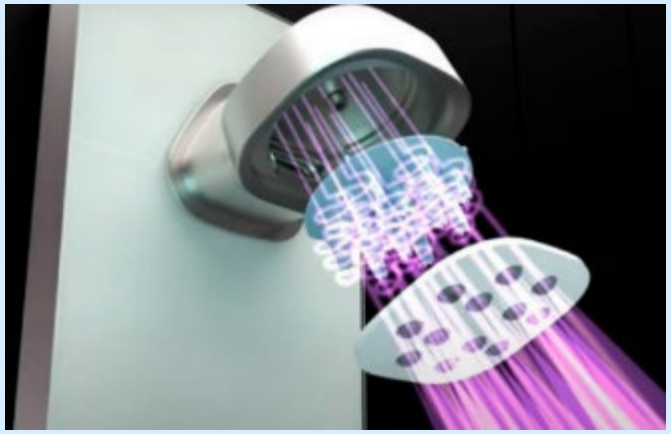
Aerating/Low Flow Shower Heads

- For a shower with sufficient pressure
- Mix air into droplets of water to give feeling of flow but with less water
- Fancy versions (Kelsa) use a fan
- Cut shower flow to as low as 5 litres/min
- C. £215/yr saving (assuming 50% flow reduction)
- £10-£1,500 cost
- Payback: 3weeks-7yrs



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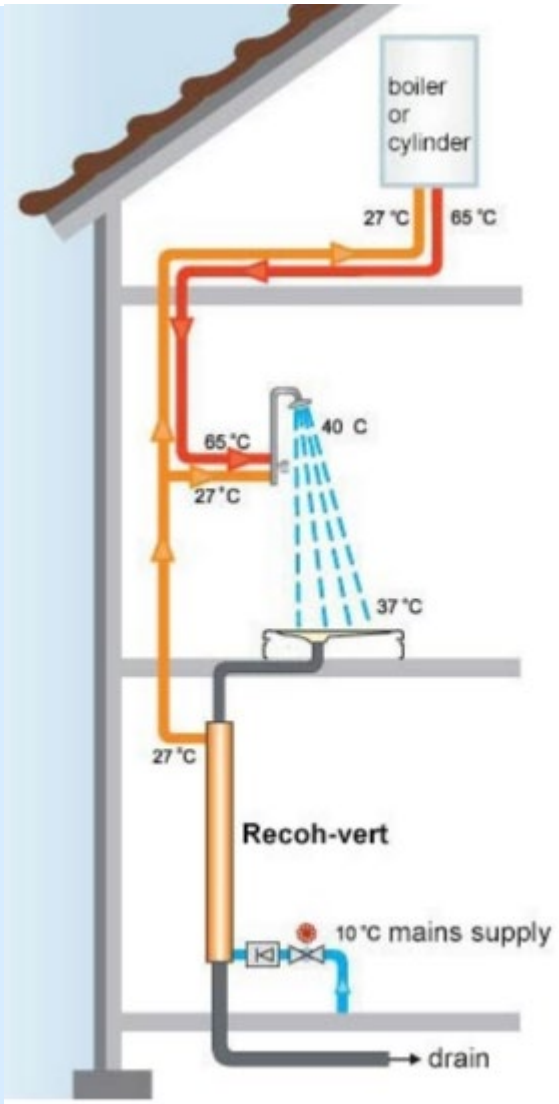
Shower Wastewater heat recovery (WWHR)

- Principle: outgoing warm water pre-heats incoming cold water
- Maybe hard to retrofit (needs to be below shower drain)
- Vertical systems more efficient than horizontal 60% vs 45%
- Gas saving approx 1500kWh a year = £120/yr
- Cost of unit = £500 plus installation = £1000?



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Electric Immersion vs Gas Boiler

- Do not… use your electric immersion instead of your gas boiler - except when renewable elec would have otherwise been wasted (wasted does not = exported to the grid)
- £840/yr with electric immersion
- £282/yr with gas

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Cooking

- Behavioural:
  - Lids on pans
  - Match pan to hob
  - Heat in microwave
- Induction hob
  - Installed cost = £410 including £60 on new pans
  - Gas hob = 328kWh/yr (£26) vs Induction hob 177kWh/yr (£50)
  - 54% energy saving, but increase in cost
  - No payback though the right thing to do over next 10years
  - Unless… the switch means you get rid of gas standing charge (£80/yr)
- Electric oven
  - Similar savings 55% by switching from gas to electric but no payback

Lighting

Halogen Lamp

50W at
4hrs/day
73kWh/yr
£20/yr

Energy
saving
95%

LED Lamp

5W at
4hrs/day
4kWh/yr
£1/yr

Fluorescent Lamp

50W at
4hrs/day
73kWh/yr
£20/yr

Energy
saving
55%

LED Lamp

23W at
4hrs/day
34kWh/yr
£9/yr

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Appliances

	A Rated or A*** kWh/yr	F/C Rated kWh/yr	Saving kWh/yr	£/yr Saving	Extra Purchase Cost £	Payback yrs
Fridge-freezer	110	245	135	38	110	2.9
Washing machine	47	77	30	8	150	17.9
Tumble dryer	194	520	326	91	295	3.2
Dishwasher	64	104	40	11	150	13.4

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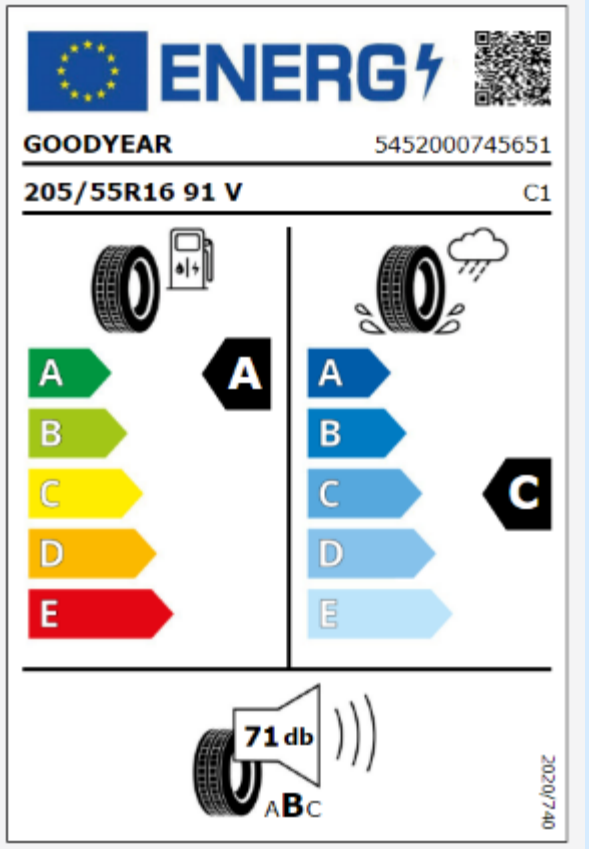
Mobility

At 70mph, our Focus 1.6 TDCi 115 5dr averaged 51.5mpg with our test equipment and two people on board. However, at 80mph the car could manage only 42.8mpg.

- Obey the speed limit!
  - Driving at 80mph (instead of 70mph) increases fuel consumption by 20-25%
- Tyre pressure
  - Every 1% decrease in tire pressure correlates to a 0.3% reduction in fuel economy
  - Tyres naturally lose 1 to 2 psi/month = 2mpg = £60/yr
- Efficient tyres 7.5% reduction in fuel use from G to A
  - Tyre lifetime saving = £315 (4 tyres) Extra cost £100.
- Modal shift
  - Replacing shorter journeys by cycling/walking



Tyre Fuel Efficiency Calculator (willis-owen.co.uk)

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The More Expensive Stuff

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Loft Insulation

- Loft Insulation (0mm to 270mm)
  - Cost: £500 for a semi
  - 3,260kWh a year gas saving
  - £260 a year saving
  - 50% / £300 grant from East Herts
- Topping Up Loft Insulation (120mm to 270mm)
  - Cost: £430 for a semi
  - 300kWh a year gas saving
  - £25 a year saving
  - 50% / £300 grant from East Herts
- Diminishing Returns!

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Wall Insulation

Cavity Wall Insulation

- Cost: £1,200 for a semi
- 3650kWh gas saving
- £290 a year saving
- £300 grant from East Herts

Solid Wall Insulation

- Cost: £14,000 for a semi
- 4950kWh gas saving
- £395 a year saving
- External requires planning permission (if current finish is brick)

Source: EST

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Existing East Herts Housing Stock

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Wall Insulation

Cavity wall insulation

Solid wall insulation

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East Herts Insulation Overview

- 63,759 households
- Data incomplete but factoring to stock…

Key East Herts Housing Stock Numbers	Homes
Single Glazed	871
No Loft insulation	4,066
Cavities to be filled	7,861
Solid Walls to be insulated	11,907

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Heat Pumps

Gas Boilers

Efficiency 85%

Electric Heat Pumps

Efficiency 300-400%

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Heat Pump Financial Saving...

- Capital cost £11,000, Govt grant £5,000, Net Cost = £,6000.
- Heating & hot water
  - 15,000kWh/yr gas use = £1,200
  - 12,750kWh/yr heat
  - 4,250kWh electricity @ 300% effy = £1,190
  - So the payback is…. 600yrs
  - @400% effy = 19.5yrs

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Solar PV

- 1kW from 4.4m2
- 4kW system = £4,000
- Generates 3,400kWh if unshaded…
- £890 if all used in-house
  - Payback = 5 years
- £605 if 50% used in-house
  - Payback = 6.5 years

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Electric Vehicles

- Petrol car 8000miles/yr @45mpg
  - £1,355 per year in petrol
  - 7,756 kWh/yr in petrol

- EV 8000miles @3.5miles/kWh
  - 2,285kWh/yr
  - £640 per year
  - Saving = £715 per year
  - Additional cost?

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