

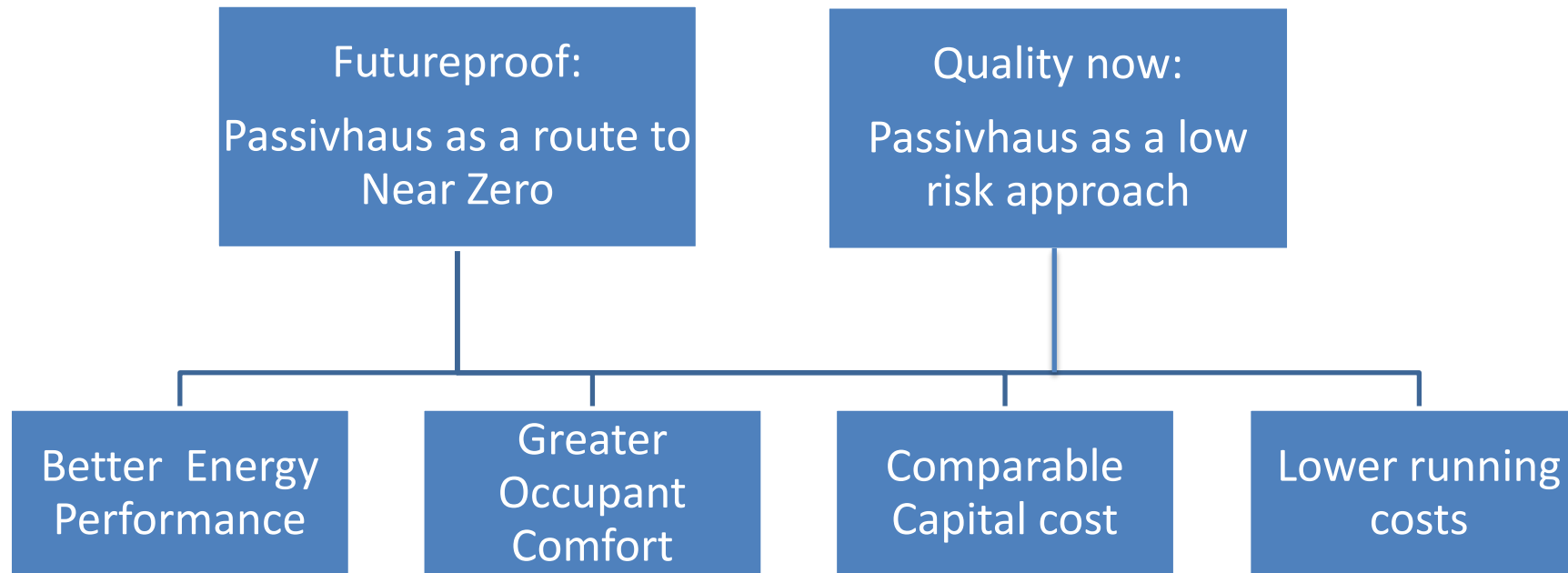
# Passivhaus and policy



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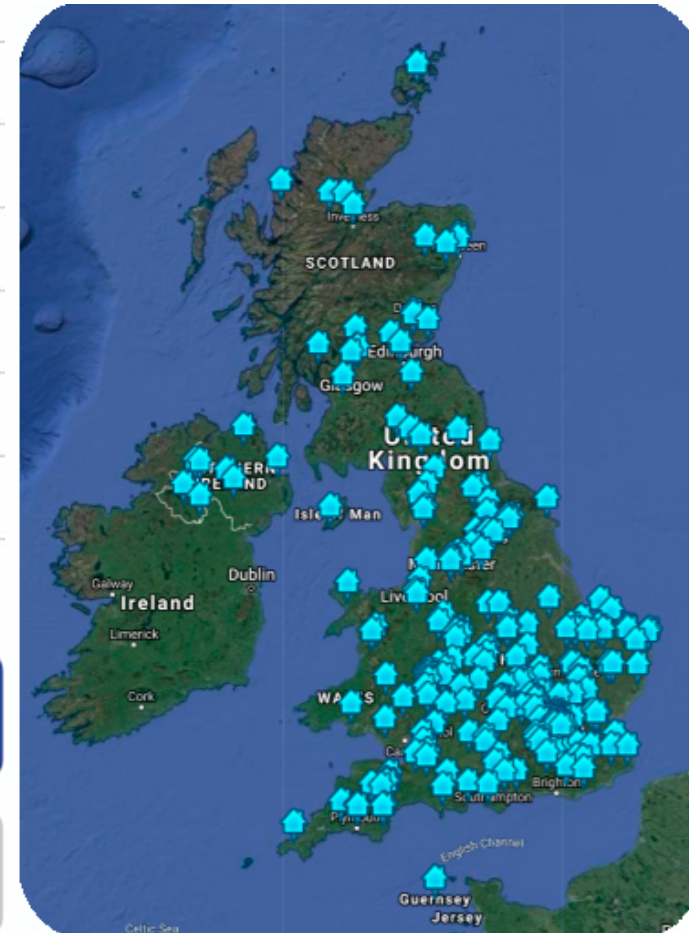
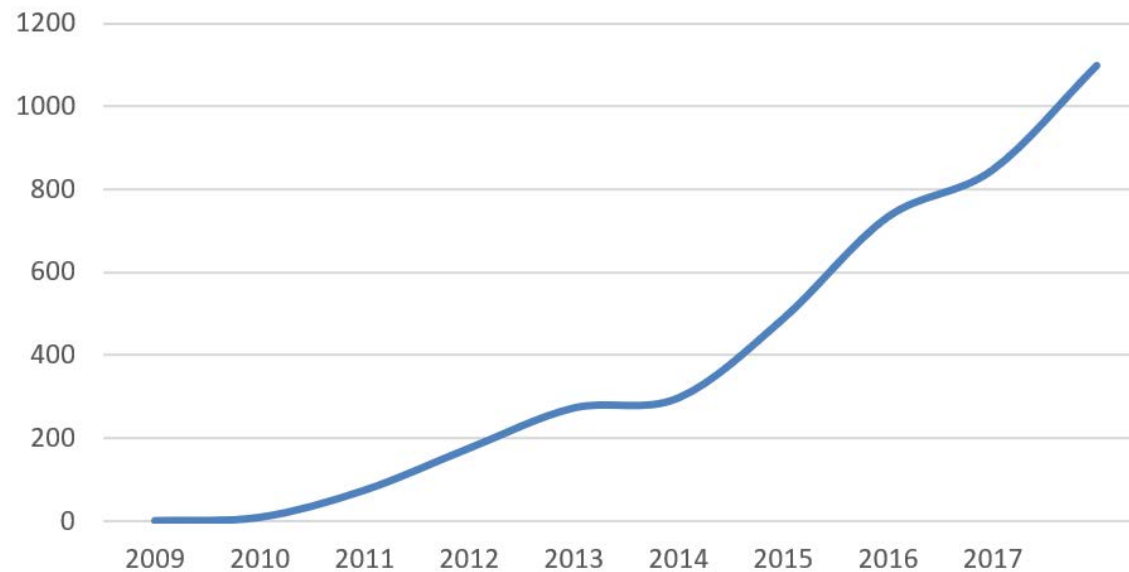
Erneley Close, Manchester : 2E Architects

# Why choose Passivhaus?



# UK Passivhaus 2019

>1100 complete, >1240 underway



**1100+**

CERTIFIED  
UNITS

**250+**

CERTIFIED  
PROJECTS

MORE THAN  
**1240**

UNITS  
UNDER  
DEVELOPMENT

**125+**

PROJECTS  
UNDER  
DEVELOPMENT

# Two recent developments



- 1. The Building Mission Challenge**
2. The Zero Carbon Challenge

# The Building Mission Challenge



Department for  
Business, Energy  
& Industrial Strategy

Policy paper

## The Grand Challenges

Updated 21 May 2018

### **Mission: At least halve the energy use of new buildings by 2030**

Heating and powering buildings accounts for 40% of our total energy usage in the UK. By making our buildings more energy efficient and embracing smart technologies, we can cut household energy bills, reduce demand for energy, and boost economic growth while meeting our targets for carbon reduction.

For homes this will mean halving the total use of energy compared to today's standards for new build. This will include a building's use of energy for heating and cooling and appliances, but not transport.





# The Challenge – in summary ...



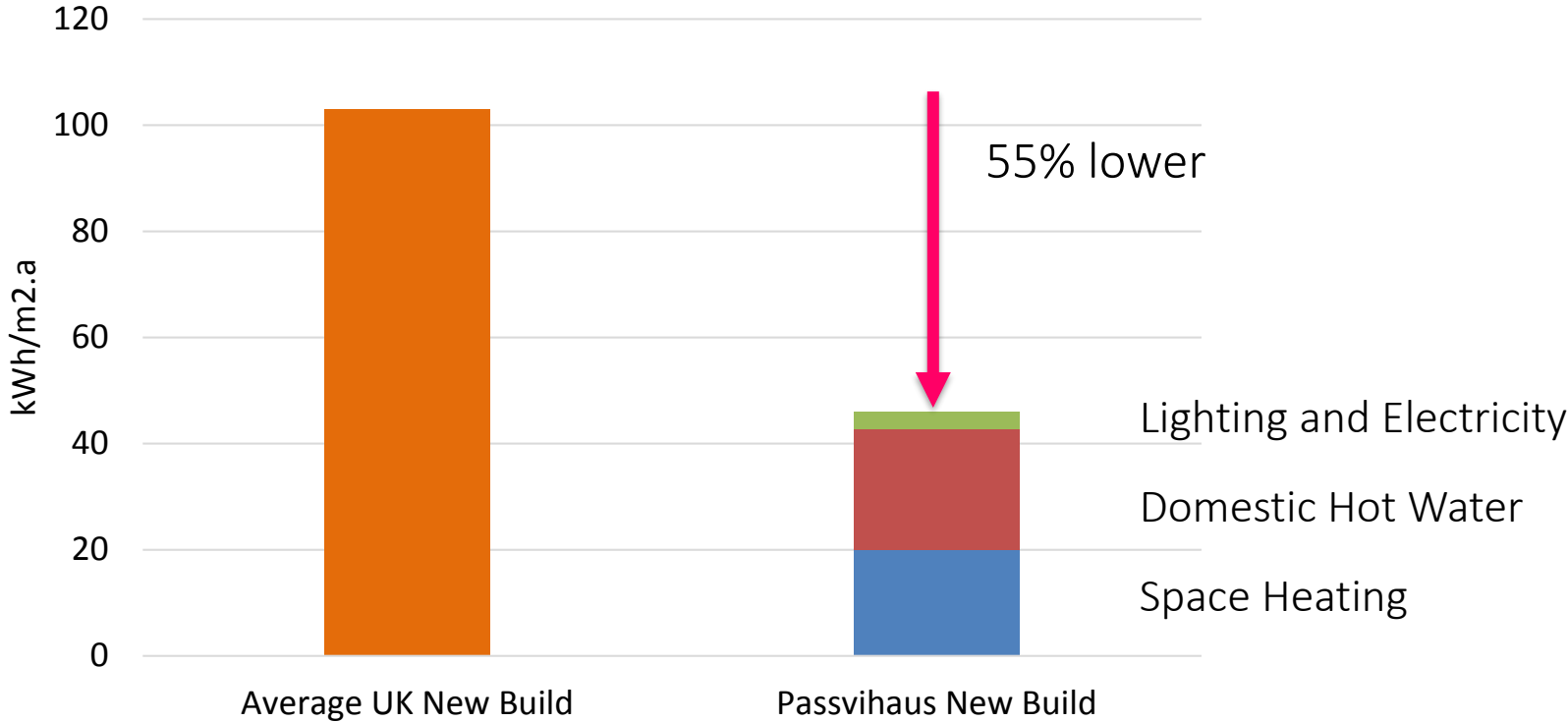
New Build – at least halve the energy use of new buildings by 2030



Retrofit – need new policies to dramatically reduce current emissions to meet 2032 and 2050 carbon targets – i.e. reductions of at least 50%.

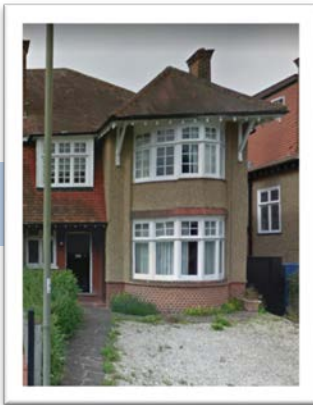
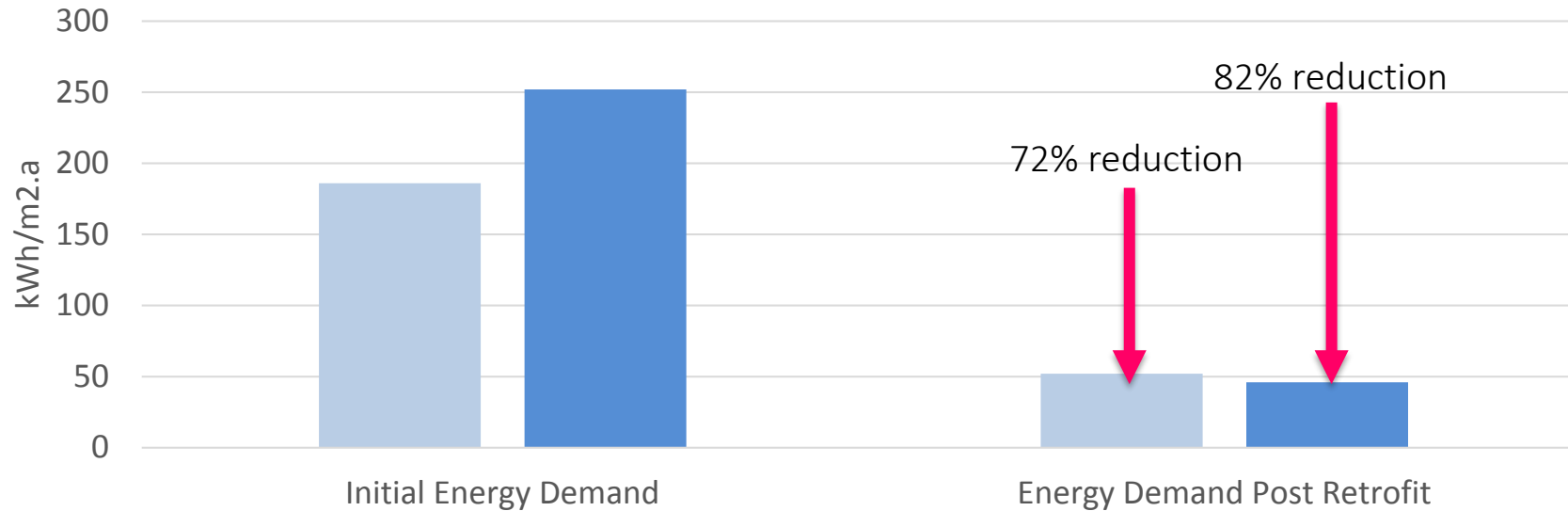
# Passivhaus Energy Use

Predicted Total Energy Use for New Build Dwellings



# Passivhaus Retrofit

## Small Retrofit Examples – Primary Energy



### Example 1

Early 1900s solid wall semi detached 3-bed retrofitted to EnerPHit standard



### Example 2

Detached 4 bed solid wall property to EnerPHit standard

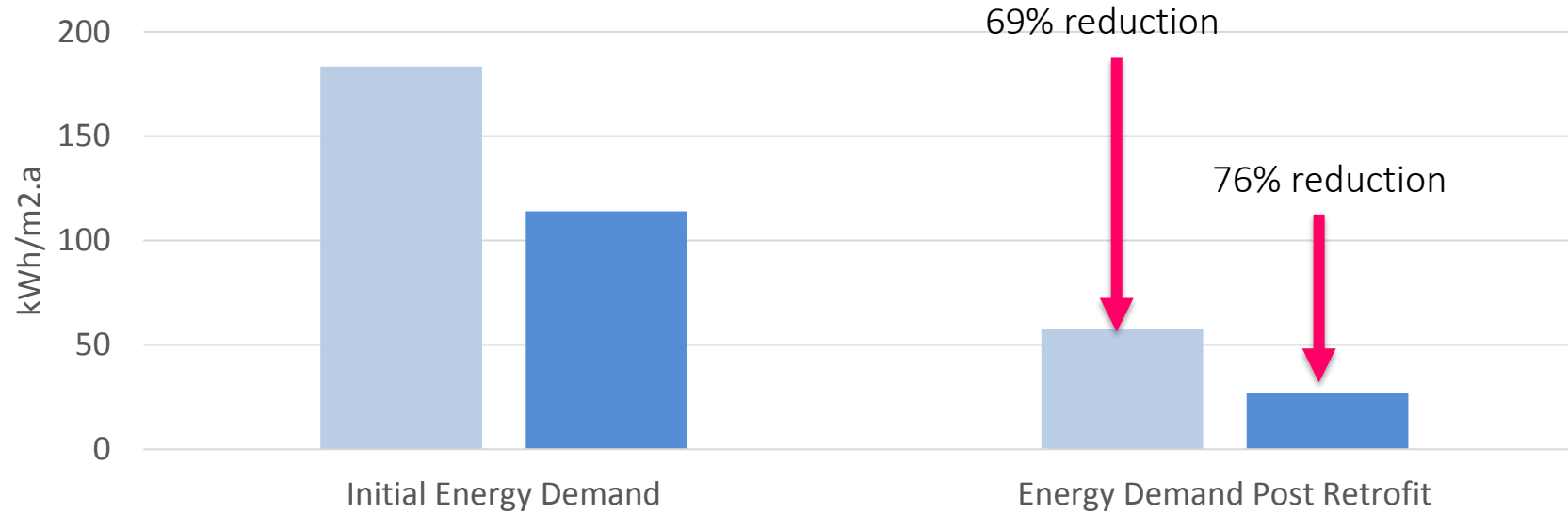




# Passivhaus Retrofit



Large Retrofit Examples – Primary Energy



## Example 1

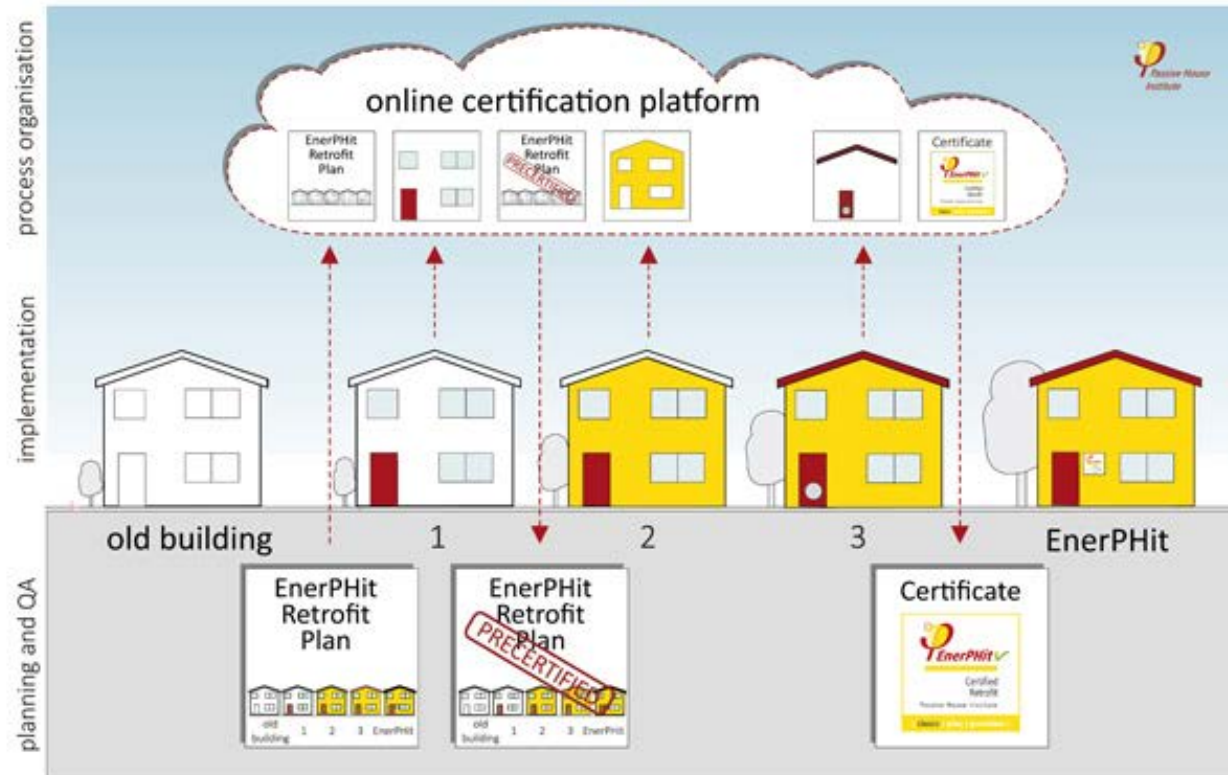
Cedar Court, Glasgow – complete refurbishment of an 8000m2 tower block



## Example 2

Erneley Close, Manchester - Regeneration of two blocks of flats in one of the poorest parts of Manchester

# Staged Retrofit ...



- Allows for phased budgeting
- Allows components to be replaced as they reach end of life
- Removes the risk of Carbon Lock-in
- Enables forecasting of future potential reductions



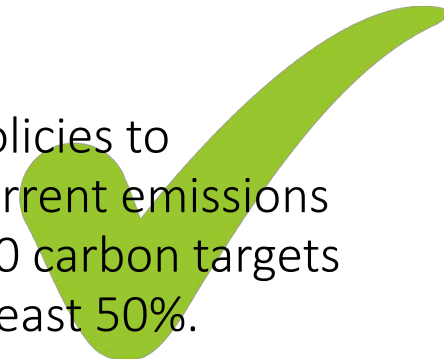
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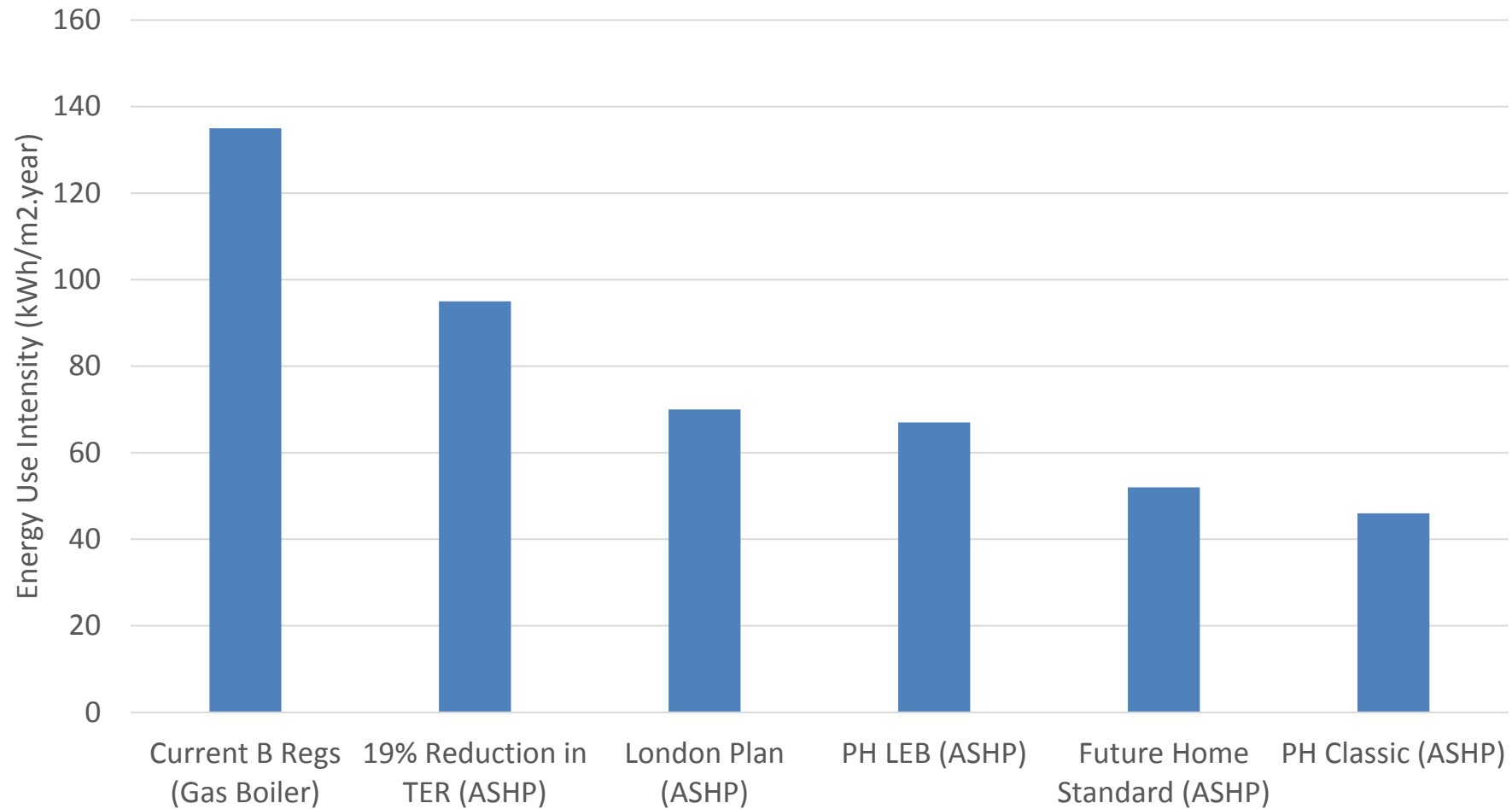
New Build – at least halve the energy use of new buildings by 2030



Retrofit – need new policies to dramatically reduce current emissions to meet 2032 and 2050 carbon targets – i.e. reductions of at least 50%.



# What might the FutureHomes standard be?



# What does that look like?



	Baseline	19% TER	London Plan	PH LEB	Future Home Standard?	Certified Passivhaus Classic
<b>Airtightness (ACH@50Pa)</b>	5	1.5	1	1	0.64	0.64
<b>Fabric Performance Gap (%)</b>	60	60	60	20	60	0
<b>Average u-value</b>	0.17	0.14	0.15	0.18	0.14	0.14
<b>Glazing</b>	Double	Double	Av quality triple	Triple	Triple	Triple
<b>Ventilation Strategy</b>	Natural	Natural	MVHR	MVHR	MVHR	MVHR
<b>Thermal Bridges</b>	Typical	Typical	Improved	Good	Good	Good
<b>Form Factor</b>	Typical	Typical	Typical	Improved	Improved	Improved
<b>Glazing Proportion</b>	Typical	Typical	Typical	Optimised	Optimised	Optimised
<b>Domestic Hot Water Design</b>	Typical	Typical	Improved	Good	Good	Good



# Why choose Passivhaus?



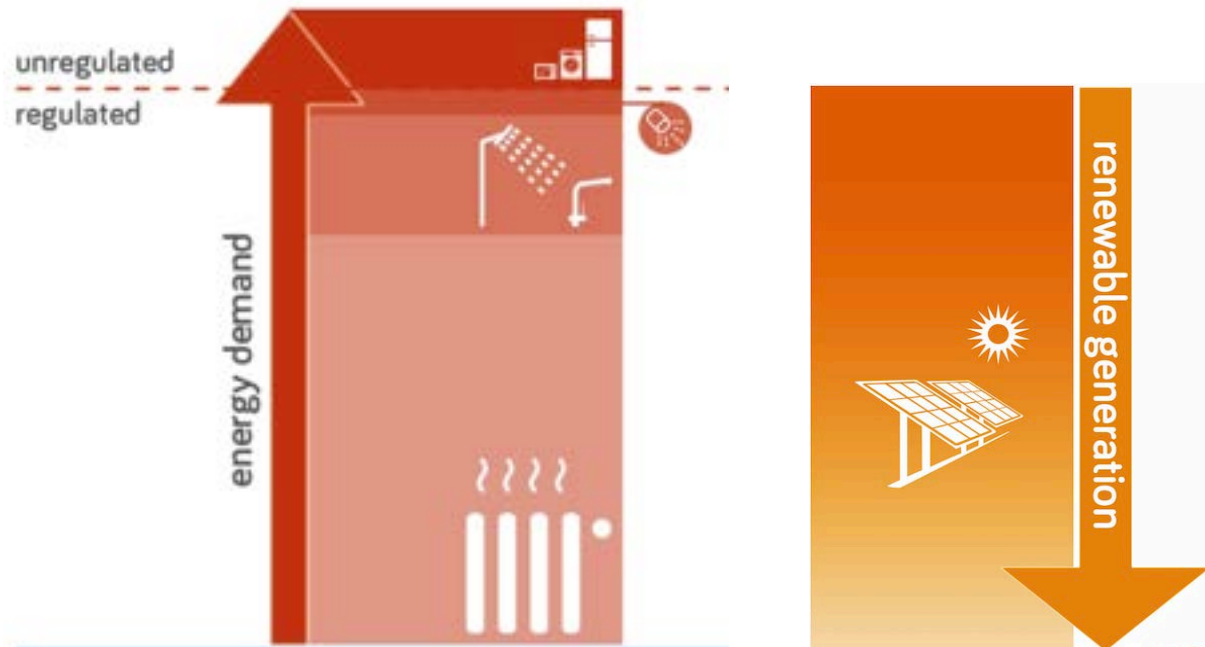
Futureproof:

Passivhaus as a  
route to Near Zero

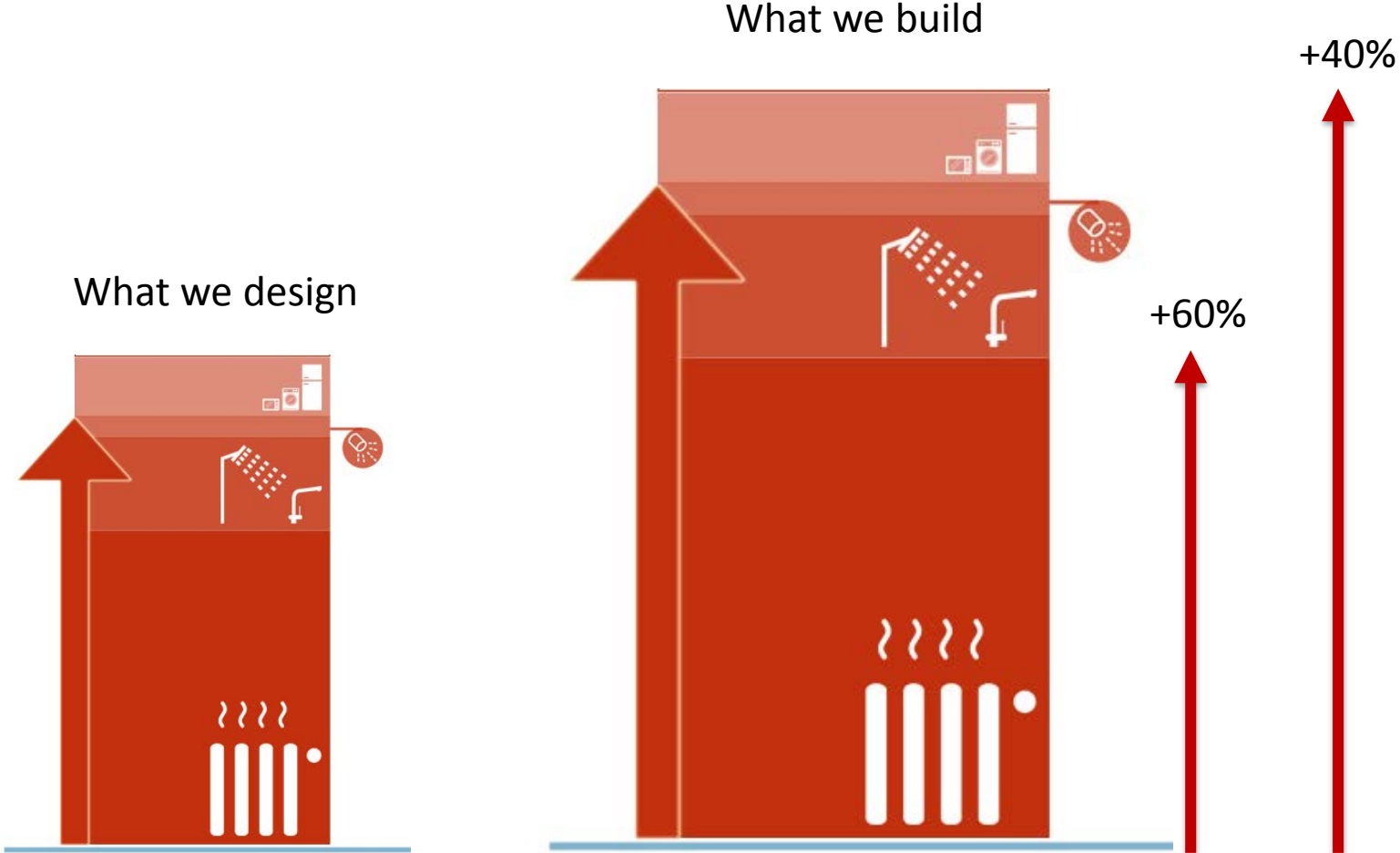
Quality now:

Passivhaus as a low  
risk approach

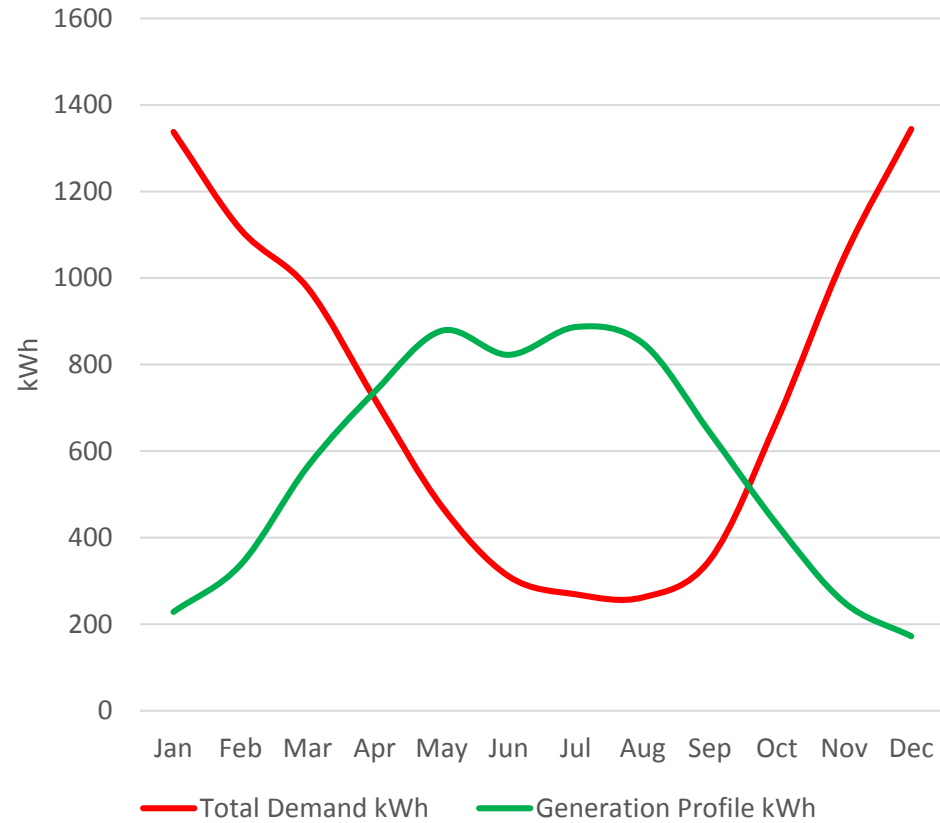
# What is a Zero Carbon building?



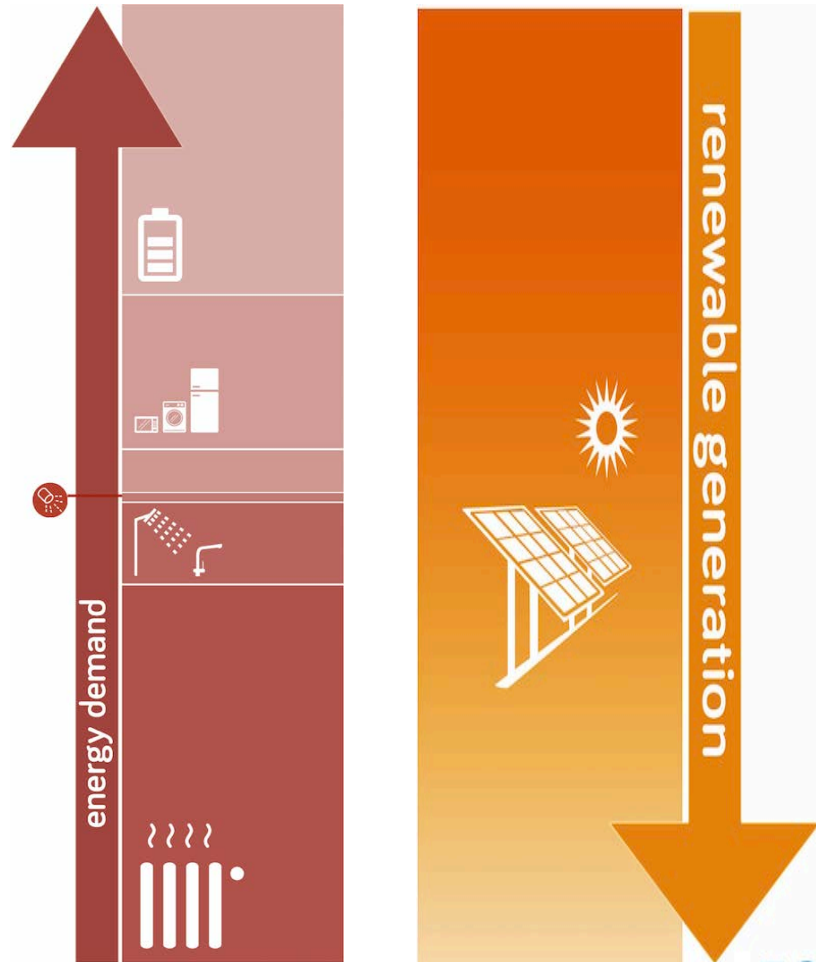
# What about the Performance Gap?



# The renewables performance gap...



# What is a Zero Carbon building?

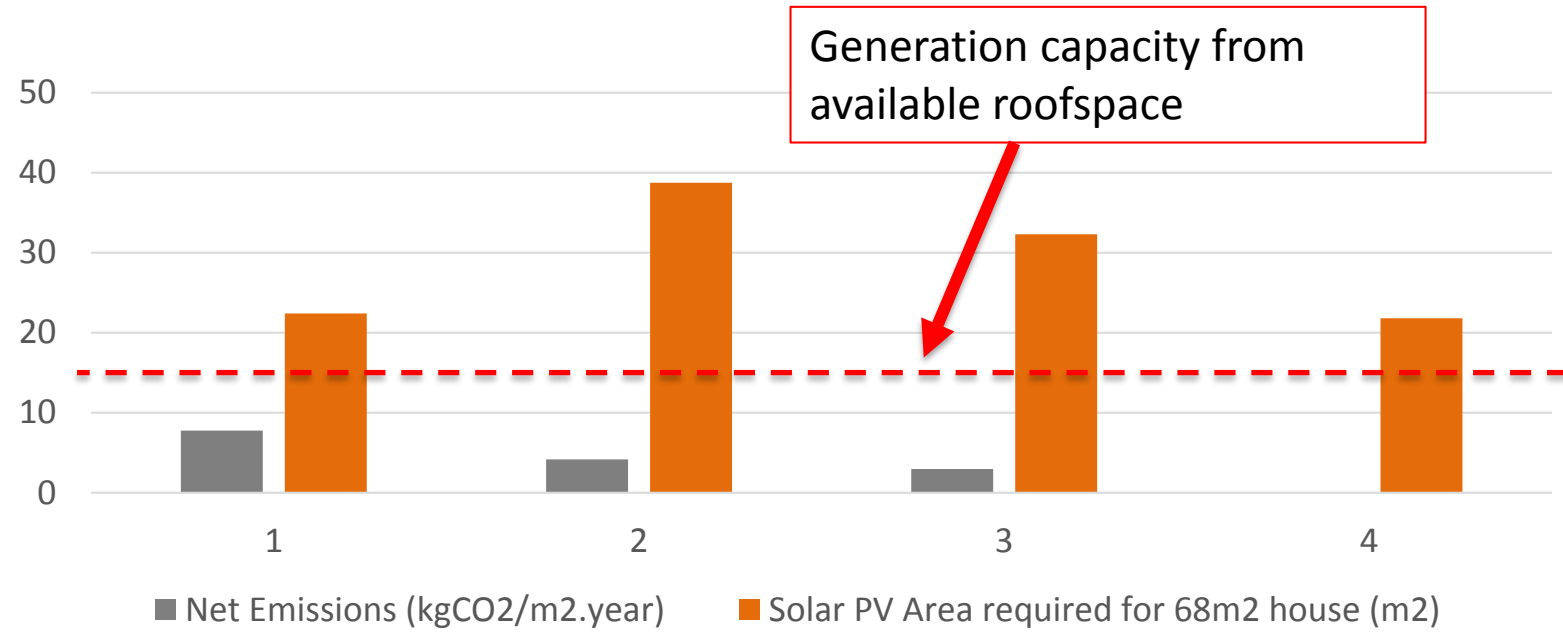


How much renewable energy?

Achievable?

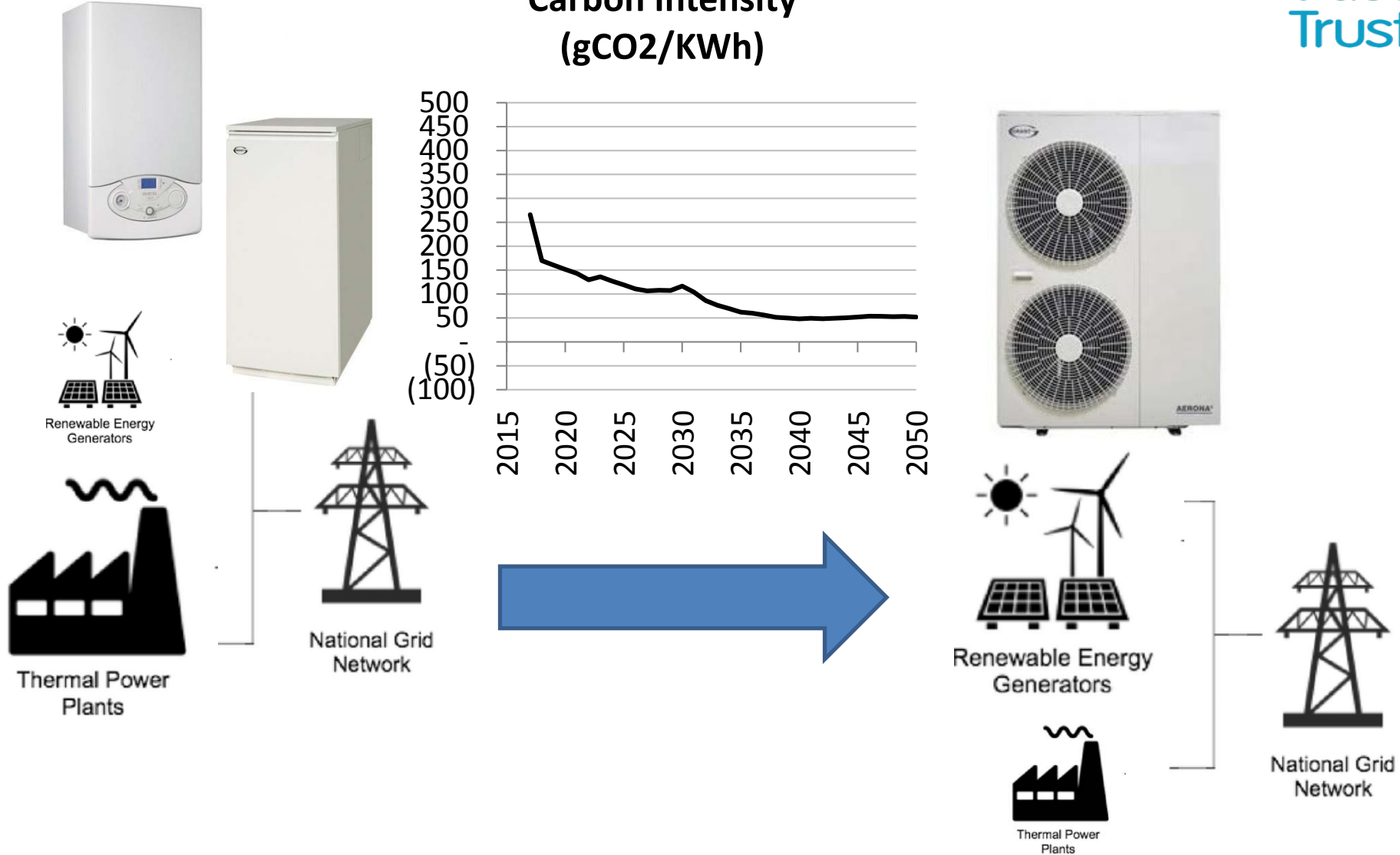


# So let's use lots of renewables then

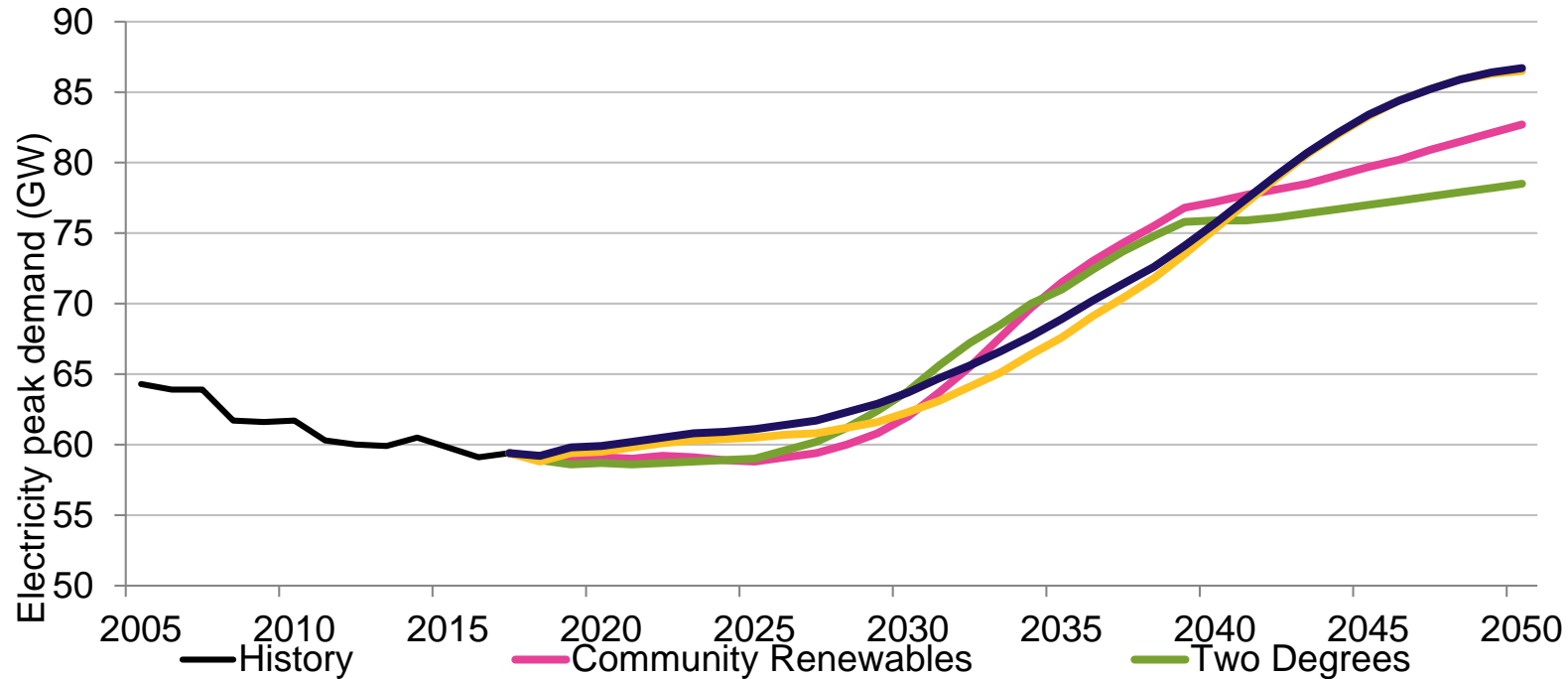


<b>Scenario 1</b>	Current situation – existing carbon factors, assuming a gas boiler and including the performance gap. Renewable energy sufficient to offset all energy.
<b>Scenario 2</b>	2020 Carbon Factors with an ASHP and renewable energy sufficient to offset all energy including storage losses.
<b>Scenario 3</b>	2020 Carbon Factors with an ASHP, but with Part L requiring a further 19% reduction in TER. Renewable energy sufficient to offset all energy including storage losses.
<b>Scenario 4</b>	Passivhaus with ASHP and sufficient generation to offset all energy including storage losses.

# So just decarbonise the grid ...



# ... but it's not that easy

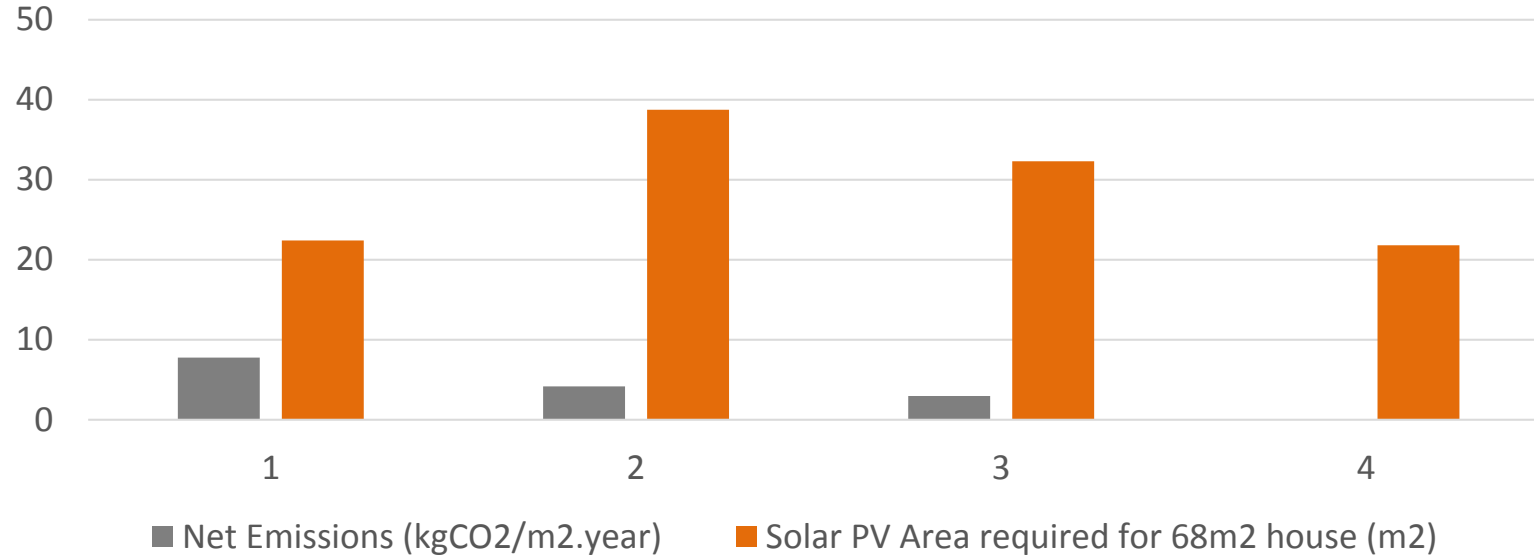


... just relying on grid decarbonization would mean increasing grid peak load capacity by four times what it is now – just to cope with domestic demand!



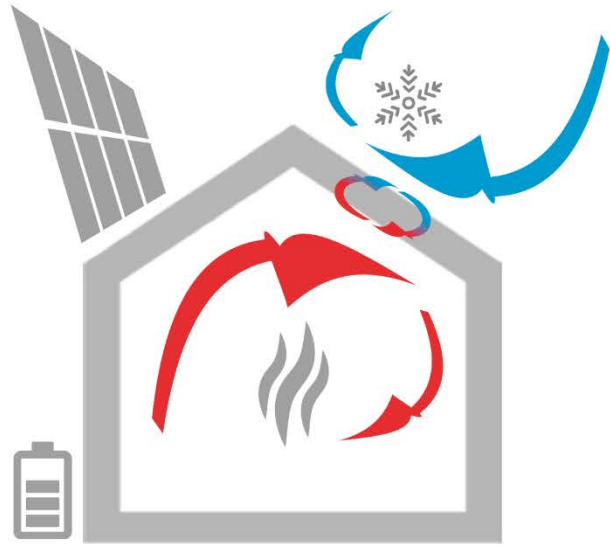
# So, Zero isn't really Zero ...

## ... except with Passivhaus and renewables



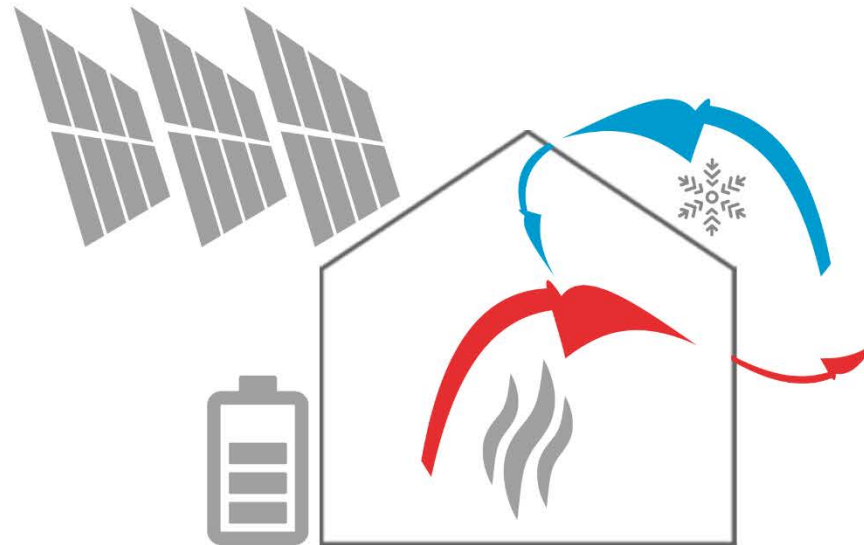
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# Conclusion: Passivhaus is the route to zero carbon



Passivhaus Classic + renewables

**= NET zero carbon**



Notional Building Regs zero carbon

**= NOT zero carbon**

To reach zero carbon, a sample Passivhaus building of 68m<sup>2</sup> needs only 14 solar PV panels with storage, while a comparable Building Regulations dwelling needs 28, with more than twice the amount of storage.