

Plenary 3:

Housing stock assessment: at what point do you dispose of a property?

Speakers: Peter Rickaby (Rickaby Thompson Associates), Russell Smith (Parity Projects), Emyr Poole (HCA), Luke Smith (National Energy Foundation)

Chaired by: Shaun Aldis

Room: Queens Room



Successful places
with homes and jobs



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A NATIONAL AGENCY

WORKING LOCALLY



Stock Assessment : with a View to Disposal

NHMF Maintenance Conference
Hilton Birmingham Metropole

Emyr Poole
26th January 2016

Contents



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1. Policy, delivery and market context
2. HCA context
3. Stock Assessment: disposal
4. Low Carbon Infrastructure Fund
5. Achievements and lessons learnt





Complex delivery landscape

- Continued limits on public funding but long term certainty and commitment
- Emphasis on housing supply across all tenures and on economic growth
- Localism, innovation and tailored solutions
- Risk, diversification and complexity
- Bedding in of key policy changes





Continued support for housing

- Housing positioned alongside infrastructure as driver of economic growth
- Continued political focus on housing
- Reflects government confidence in the sector and in the HCA
- New programmes and extra funding:
 - £3.3bn for affordable housing up to 2018
 - Additional £1.915bn announced in AS 2014
 - Extra £6bn for Help to Buy to 2020
 - £525m Builders Finance Fund
 - LIF Large Sites extended to 2020
 - Increased focus on public land
 - Housing Zones, Locally Led Garden Cities, Estate Regeneration, Custom Build, direct commissioning...





HCA purpose and vision

- Throughout a period of change, the HCA's core purpose and vision remains

To help create successful places with homes and jobs

- Working with **people and places** to help deliver homes, economic growth and jobs
- Delivering programmes of **investment** and **market interventions**, making significant contribution to overall supply of homes
- Making best use of public **land** and developing **economic assets**
- Undertaking effective and proportionate **regulation** of social housing providers





HCA statutory requirements

- Contribute to the achievement of sustainable development and good design
- Other HCA projects include Greenwich Peninsula, 'zero' carbon homes projects, EU Concerto projects





Business planning and strategy

- Business plans and interests in the stock:-
 - Social goals
 - corporate strategy
 - financial pressures
 - clawing back income
 - tenant management

- Disposing of end of line property, with or without improvement
 - Will investment in advance of disposal increase value



Retention and regeneration

- Retention and reinvestment potential
 - Do you actually need to dispose?
- Regeneration and redevelopment potential
 - A longer term strategy – values and timelines
- Some case studies looking at the Low Carbon Infrastructure Fund

Low Carbon Infrastructure Fund



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- Part of Budget '09 Housing Stimulus Package in April 2009
- £25m fund to support low carbon community heating schemes. To be spent by March 2011
- HCA partnership with DECC: expert sounding board
- 13 projects allocated funding covering new build and retrofit schemes
- lessons learned in 2010 fed into subsequent CSR expenditure round, and dissemination continues though now a legacy programme



Tower block refurbishment and
and heat network Newcastle (£1.7m)

Low Carbon Infrastructure

CHP Pioneers: different drivers, local responses



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**Bloom Street CHP, Manchester, 1911:
powered trams, sold excess heat to local
businesses**



**Aberdeen Heat and Power Co
1999: decrease fuel poverty**

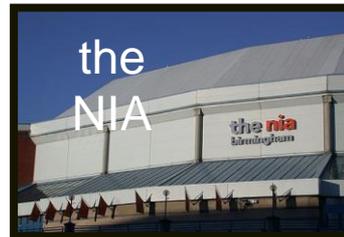
Low Carbon Infrastructure Fund

Cambridge and Crescent Towers, Birmingham



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Wider Heat Network



New Link



Energy
Centre

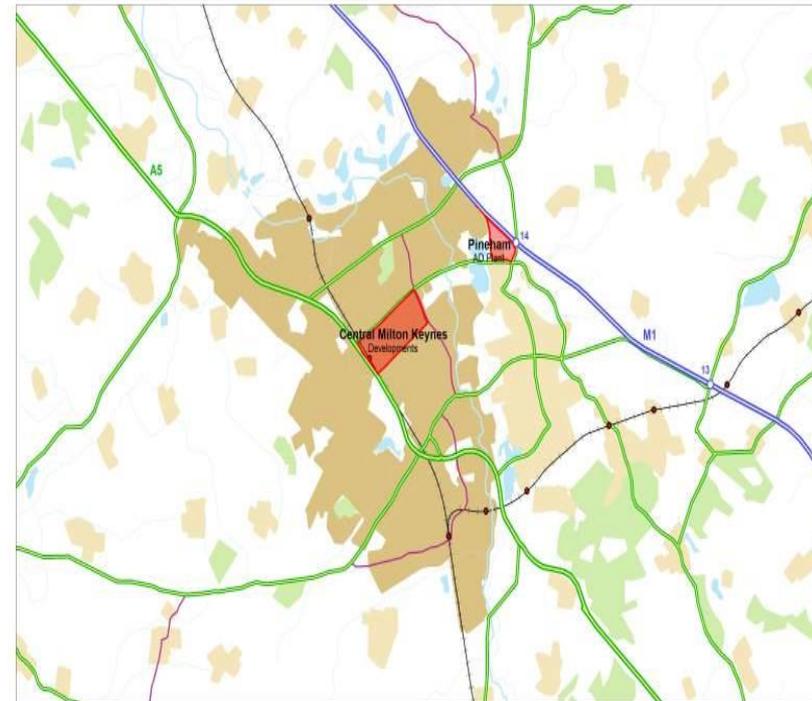




Low Carbon Infrastructure Fund

Anaerobic Digestion Plant, Milton Keynes

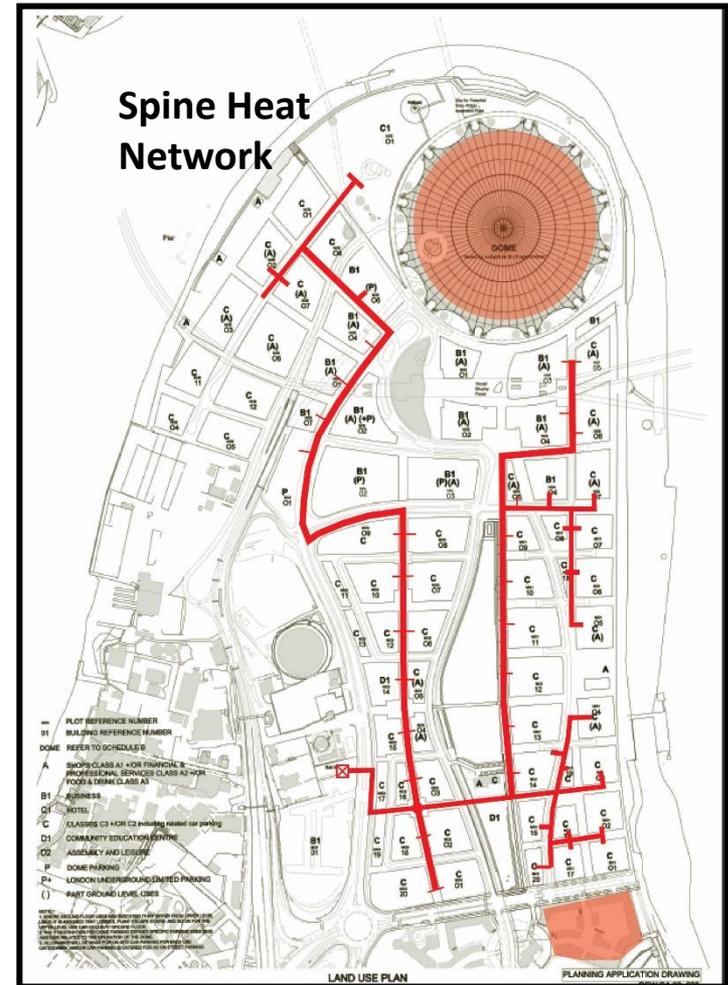
- **New biomethane plant at Milton Keynes Council's planned Anaerobic Digestion (AD) plant 5km from the city centre and its injection into the regional gas network.**
- **Connection to an existing good quality CHP/private-wire system in Central Milton Keynes**
- **The combined technologies will displace approximately 70% CO² emissions in the area; total potential saving of CO² in MK is 3,400 tonnes.**
- **Serves existing, high density, mixed used developments with the possibility of further extension**



Low Carbon Infrastructure Fund Greenwich, London: London heat network



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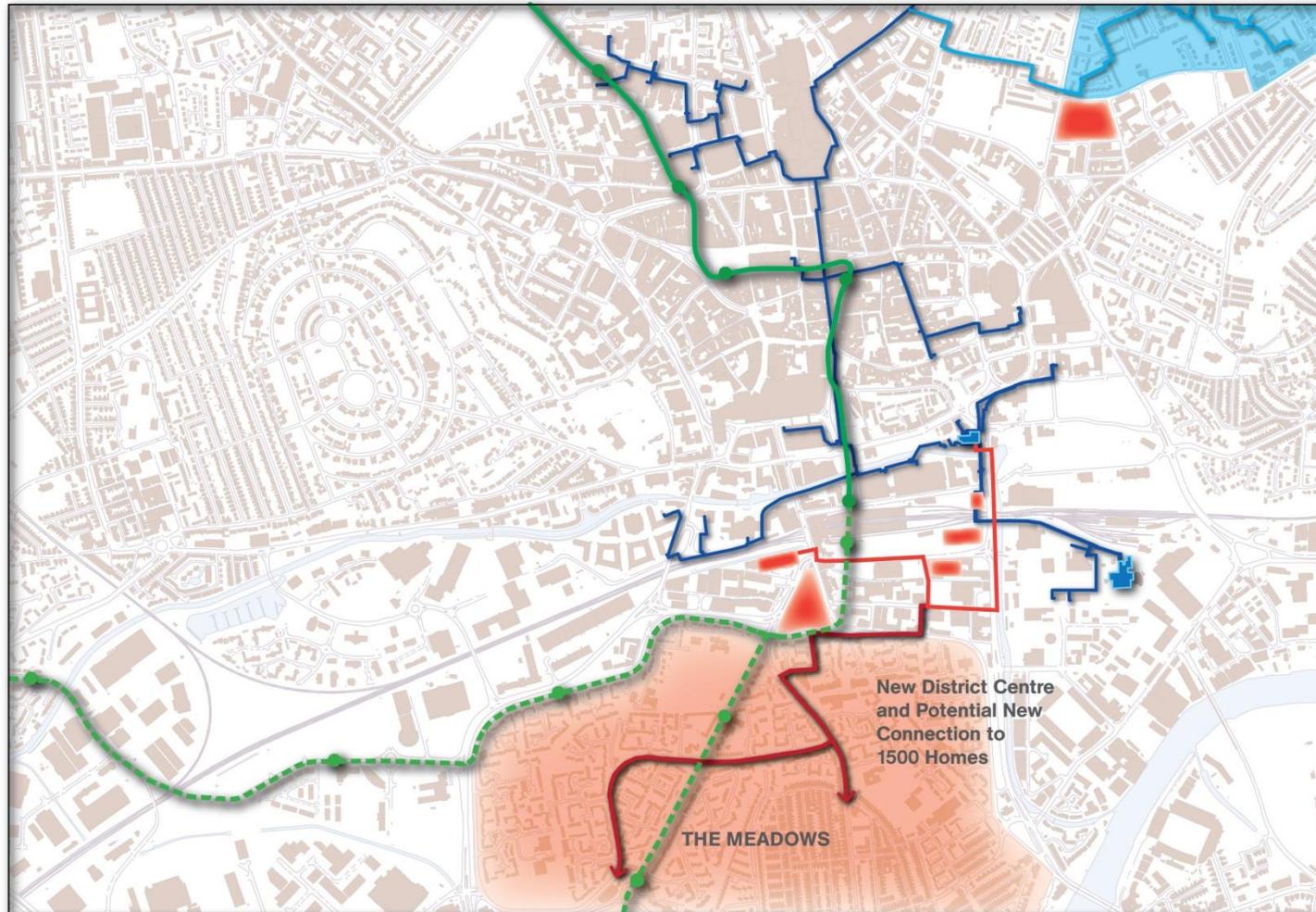
London Thames Gateway Heat Network:
www.ltgheat.net

HCA Low Carbon Infrastructure Fund

Hub & Southside, Nottingham: linking projects



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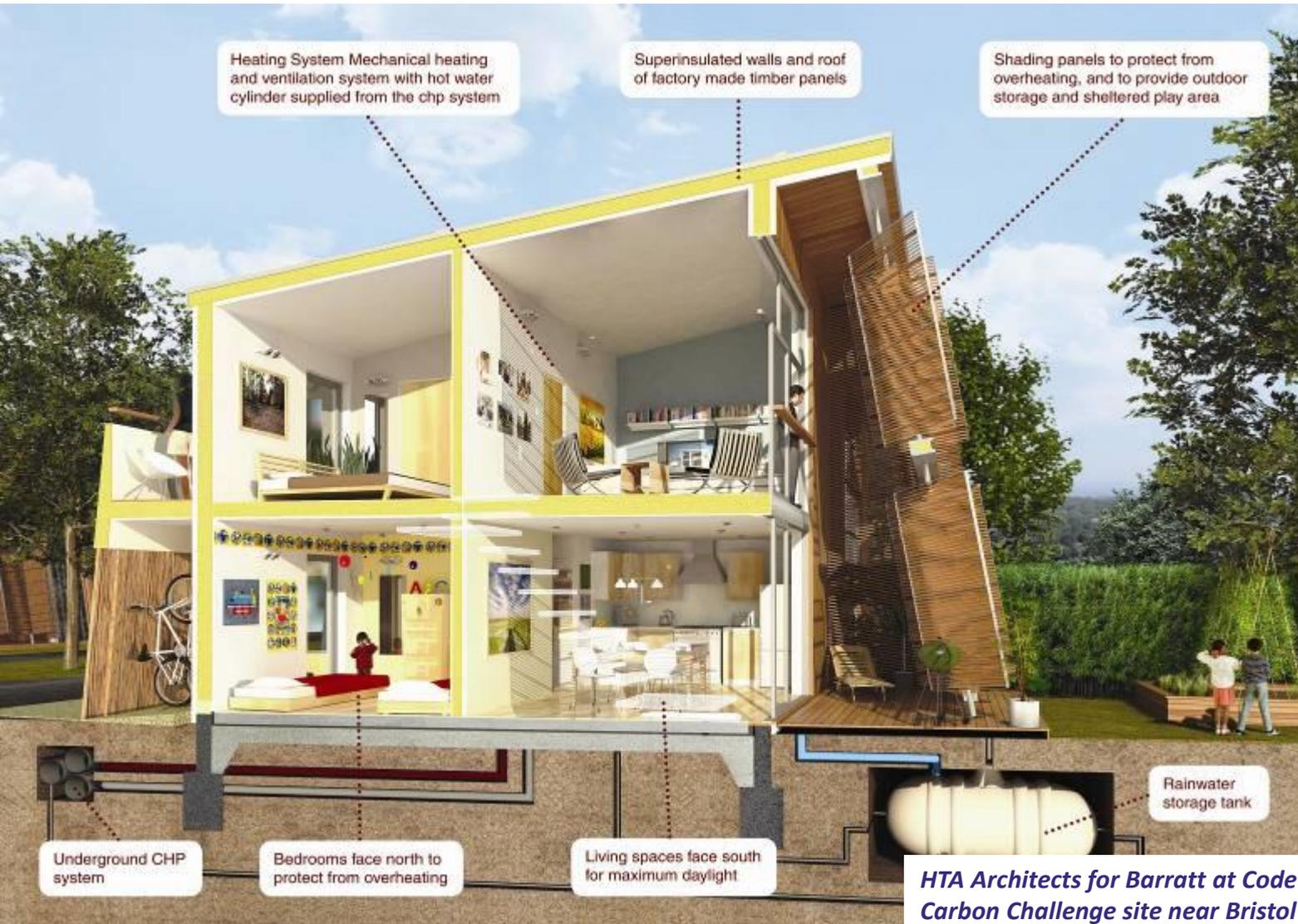


Barratt Hanham Hall scheme Bristol

'passive' houses and CHP supply



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Newcastle: Riverside Dene former Cruddas Park estate cladding and heating scheme



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Low Carbon Infrastructure Fund



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Achievements

- Creating better links between civic, commercial and housing heat loads and demand
- A proving ground - for private investment in the UK's growing market
- Better Information - dissemination and good practice, leading to greater efficiency
- Route to low carbon – testing efficiency and technology
- Financial and technical feasibility - critical



LCIF Lessons Learnt

- Estate renewal schemes – involve architects and contractors as part of the project team early on, and regularly review during build out and maintenance.
- Tackle interface issues, don't regenerate estate and then retrofit heat and power, if possible develop in tandem.
- Where there are existing buildings, integration with building fabric improvement works is important:-
 - critical to avoid problems such as overheating.
 - insulation of risers, location of HIU's etc

Understanding People

existing communities *and* future communities



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Northstowe community engagement process



LCIF Lessons Learnt

- Early sign up local authorities/partners all levels and engage community
- Identify and support project champions, work with other a range of partners
- Plan for future growth. e.g. space in energy centres for new engines and design in future flue exits, consideration of likely new urban designs
- Lessons learned document available on archive



Keeping in touch



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homesandcommunities.co.uk

[gov.uk/government/organisations/homes-and-communities-agency](https://www.gov.uk/government/organisations/homes-and-communities-agency)



HCA_UK



homes-&-communities-agency

NHMF Conference 2016, Plenary 3

Housing Stock Energy Assessment Why and How?

Peter Rickaby

Rickaby Thompson Associates Ltd

www.rickabythompson.com

Drivers

- Affordable warmth
 - How can we alleviate fuel poverty and secure affordable warmth for our residents, in an era of rising fuel prices?
- Reducing carbon dioxide emissions
 - How much pollution does our housing stock emit, and how can we reduce it significantly?
- Integrating energy work into asset management
 - How does the scope and cost of necessary energy work relate to broader asset management activity?
- Securing funding
 - When external funding opportunities arise, do we know what we need and can we demonstrate eligibility?

Questions

- What are the implications of energy standards that we might adopt (or which might be imposed on us)?
 - SAP 80 (the affordable warmth standard for 2030)
 - 50%-60% reduction in carbon dioxide emissions (by 2050)
- Questions to be investigated:
 - What would we have to do to meet these standards?
 - What would be the capital cost over 25-30 years?
 - By how much will residents' fuel costs be reduced?
 - By how much will emissions be reduced?
 - How much external funding might be available?

Data

- Cloned, low-precision ('Level 0') SAP data from sample stock condition surveys is not good enough!
- The minimum data standard is Reduced Data SAP (RDSAP) as collected for EPCs
 - For every dwelling type
 - Converted to Full SAP or equivalent
- Aim to have RDSAP data for every dwelling
 - Or equivalent data if another model is used
 - Most organisations have $\geq 20\%$ RDSAP data
 - A few organisations already have $> 80\%$ RDSAP data

Assessments

- Full SAP is OK
 - BREDEM 12 (NHER) is better
 - Includes heating, hot water, cooking, lighting and appliances
 - Good for costs and CO₂
- SAP standard occupancy is a good average
 - Some underestimation
 - Some overestimation
 - Actual occupancy is variable
- Estimate:
 - Fuel use
 - Fuel costs
 - CO₂ emissions
 - Broken down by end use



Summary of Archetypal Dwelling Energy Efficiency Assessments to Achieve SAP 80 and 50% CO₂ Emissions Reduction

Dwelling: 13 Perry Spring, Harlow, CM17 9DG
Dwelling type: House, Semi-det/End-terrace, 1930-75, gas heating system



UNIMPROVED DWELLING

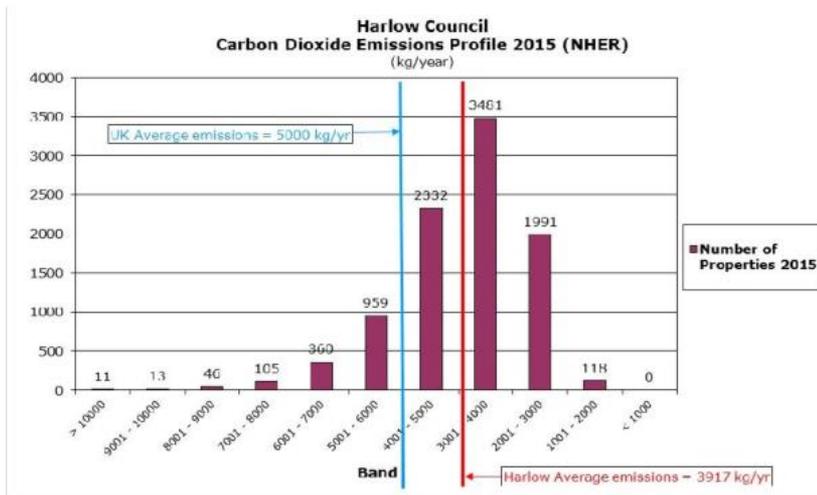
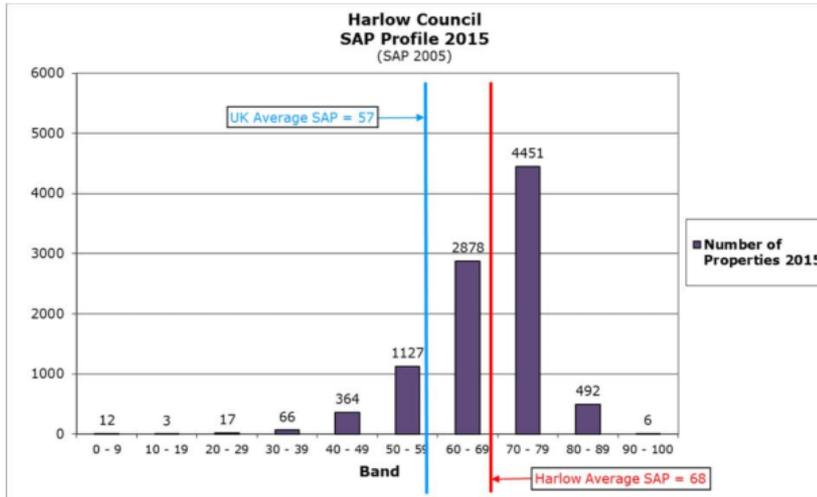
Energy Ratings:

SAP Energy Rating: 63 SAP CO₂ emissions (kg/yr): 3156
EPC Band: D 50% CO₂ Reduction (kg/yr): 1578

Estimated annual fuel use, fuel costs and CO₂ emissions

End Use	Energy (kWh/yr)	Fuel Cost (£/yr)	CO ₂ (kg/yr)
Space Heating - Main	8419	293	1819
Space Heating - Secondary	0	0	0
Water heating	4811	167	1039
Pumps and fans	120	17	62
Lighting	454	65	236
Standing Charges	-	120	-
Totals	13804	663	3156

Stock Profiles



- Energy performance distribution (SAP, fuel costs, CO₂ emissions)
- Identification of worst-performing stock
- Number of improvements required to meet proposed standards
- Year-on-year tracking of overall performance
- Stock level KPIs

KPIs

- Energy ratings
 - Average and minimum SAP
 - Numbers of dwellings in each band
- Fuel costs
 - Average £/yr and range
 - Numbers of dwellings in each band
- Carbon dioxide emissions
 - Average and maximum emissions
 - Numbers of dwellings in each band
- Numbers of dwellings to improve
 - To meet any proposed SAP or CO₂ standard

Dwelling Types

- Define by repeat filtering of energy data
 - Age, built form, construction, heating, ...
- Add types to reflect stock characteristics and flat positions
 - Ground | Mid | Top
- Typically 25-35 types
 - Must be one dwelling of each type with RDSAP (EPC) data

Summary of Archetypal Dwelling Energy Efficiency Assessments to Achieve SAP 80 and 50% CO₂ Emissions Reduction

Dwelling: 35, Edmunds Tower, Harlow, CM19 4AD
Dwelling type: High Rise: Ground Floor Flat, 1930-75, gas (indiv) heating



UNIMPROVED DWELLING

Energy Ratings:

SAP Energy Rating: 64 SAP CO₂ emissions (kg/yr): 2890
EPC Band: D 50% CO₂ Reduction (kg/yr): 1445

Estimated annual fuel use, fuel costs and CO₂ emissions

End Use	Energy (kWh/yr)	Fuel Cost (£/yr)	CO ₂ (kg/yr)
Space Heating - Main	7383	257	1595
Space Heating - Secondary	0	0	0
Water heating	4671	163	1009
Pumps and fans	165	22	86
Lighting	386	51	201
Standing Charges	-	120	-
Totals	12606	612	2890

Cost data

- A rate for every improvement measure
 - Based on recent contracts, consultants' data or the NHMF Schedules of Rates
- Include access costs
 - Scaffolding, etc.
- Ensure clarity about
 - Preliminaries
 - Overheads and profit
 - VAT

Scaffold access requirements				
S1	Full scaffold to front and back of houses / maisonettes	/house	S1: Full scaffold to front and back of houses / maisonettes	1,650
S3	Intermediate scaffold - for single measures - external walls, windows; Single storey dwellings	/dwelling	S3: Intermediate scaffold - for single measures - external walls, windows; Single storey dwellings	700
S4	Scaffolding - associated with PV / SWH	/dwelling	S4: Scaffolding - associated with PV / SWH	400
Wall insulation measures (U ≤ 0.30 W/m ² K)*				
External Wall Area - Type 1				
W1	Cavity fill - EPS Beads + Binder (Springvale EcoBead)	/m ²	W1: Cavity fill - EPS Beads + Binder (Springvale EcoBead)	10
W2	Dry lining - thermal board (PU) min.65 mm +12.5mm plasterboard	/m ²	W2: Dry lining - thermal board (PU) min.65 mm +12.5mm plasterboard	70
W3	Dry lining - thermal board (PU) 100 mm +12.5mm plasterboard	/m ²	W3: Dry lining - thermal board (PU) 100 mm +12.5mm plasterboard	90
W4	Proprietary insulated render (100mm PU)	/m ²	W4: Proprietary insulated render (100mm PU)	55
W5	Solid Wall Insulation (External)	/m ²	W5: Solid Wall Insulation (External)	55
	Percentage W3 in W3/W5			20%
W3/W5	Wall insulation (internal/external)	/m ²	W3/W5: Wall insulation (internal/external)	62
External Wall Area - Type 2				
W1.2	Cavity fill - EPS Beads + Binder (Springvale EcoBead)	/m ²	W1.2: Cavity fill - EPS Beads + Binder (Springvale EcoBead)	10
W2.2	Dry lining - thermal board (PU) min.65 mm +12.5mm plasterboard	/m ²	W2.2: Dry lining - thermal board (PU) min.65 mm +12.5mm plasterboard	70
W2.3	Dry lining - thermal board (PU) 100 mm +12.5mm plasterboard	/m ²	W2.3: Dry lining - thermal board (PU) 100 mm +12.5mm plasterboard	90
W4.2	Proprietary insulated render (100mm PU)	/m ²	W4.2: Proprietary insulated render (100mm PU)	55
W5.2	Solid Wall Insulation (External)	/m ²	W5.2: Solid Wall Insulation (External)	55
	Percentage W3 in W3/W5			50%
W3/W5.2	W3: W5	/m ²	W3/W5.2: W3: W5	72.5

Option Evaluation

Summary of Archetypal Dwelling Energy Efficiency Assessments to Achieve SAP 80 and 50% CO₂ Emissions Reduction

Dwelling: 308, Barn Mead, Harlow, CM18 6SY
 Dwelling type: Low Rise: Ground Floor Flat, 1930-75, electric heating



UNIMPROVED DWELLING

Energy Ratings:
 SAP Energy Rating: 62 SAP CO₂ emissions (kg/yr): 3507
 EPC Band: D 50% CO₂ Reduction (kg/yr): 1753

Estimated annual fuel use, fuel costs and CO₂ emissions

End Use	Energy (kWh/yr)	Fuel Cost (£/yr)	CO ₂ (kg/yr)
Space Heating - Main	3894	214	2021
Space Heating - Secondary	687	105	357
Water heating	2019	133	1048
Pumps and fans	0	0	0
Lighting	157	22	81
Standing Charges	-	24	-
Totals	6757	499	3507

RECOMMENDED IMPROVEMENTS - TO ACHIEVE SAP 80

Improvement	Capital Cost (£)	Saving (£/yr)	CO ₂ Saving (kg/yr)
S3: Intermediate scaffold - for single measures - external walls, windows; Single storey dwellings	£700		
W3/W5: Wall insulation (Internal/external)	£998		
W3: Dry lining - thermal board (PU) 100 mm +12.5mm plasterboard	£1,449		
G5: New windows - PVCu frames (Whole unit U=1.2)	£2,658		
G14: New proprietary insulated door and frame (U=1.0) to corridor - flats	£650		
V1: Install extract fan in kitchen	£190		
V2: Install extract fan in bathroom	£190		
HW5: New dual immersion system (210 l, 80 mm insuln.)	£850		
HW13: Pipe Lagging - Bungalow / Flat	£100		
PV1: Photovoltaics (including inverter)	£900		
Take out hot water cylinder			
Overall Package	£8,685	£235	1536
Cost per tonne CO₂ saved	£5,655		

Improved Energy Ratings:

SAP Energy Rating: 80 CO₂ emissions (kg/yr): 1971
 EPC Band: C CO₂ emissions reduction: 43.79%

Improved annual fuel use, fuel costs and CO₂ emissions

End Use	Energy (kWh/yr)	Fuel Cost (£/yr)	CO ₂ (kg/yr)
Space Heating - Main	2050	113	1064
Space Heating - Secondary	362	55	189
Water heating	1476	83	766
Pumps and fans	0	0	0
Lighting	157	22	81
Standing Charges	-	24	-
Generation Savings	-247	-34	-128
Totals	3798	264	1971

Improvement Plans

- A medium-term plan for every dwelling type
- What needs to be done to meet the standard(s)
 - And what it will cost
- Annual and lifetime savings
 - Fuel use
 - Fuel cost
 - Carbon dioxide emissions
- Performance indicators:
 - Cost effectiveness (£ invested / £ saved by residents)
 - Energy effectiveness (£ invested / SAP point)
 - Carbon cost effectiveness (£ invested / tCO₂ saved)

Aggregation

- Assign every dwelling to a type
 - Aggregate evaluation results to stock level
- Tabular summaries for each standard
 - Number of required measures of each type
 - Overall capital cost (by dwelling types and measures)
 - Including work already budgeted (e.g. boiler replacement)
 - Fuel cost savings (by dwelling types)
 - Carbon dioxide emissions saving (by dwelling types)
- Evaluate potential for external funding
 - ECO, FiT, RHI, etc (according to improvement plans)
 - By dwelling type and measure
 - Current options indicate medium-term potential

Outputs

- Housing stock profiles
 - And stock level KPIs
- Estimates of energy efficiency
 - For every dwelling
- Evaluation of improvement options
 - For every dwelling type
- Medium-term low-carbon improvement plan
 - For every dwelling type
- Detailed stock level information
 - Measures, costs and savings for each standard
 - To underpin the broader asset management strategy

Thank you for listening

Peter Rickaby

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Example images courtesy of Savills and Harlow Council

NHMF Conference 2016

**Housing stock assessment:
at what point do you dispose of a
property?**

Approaches to Housing Stock Energy Assessments

A decorative graphic in the bottom-left corner of the slide. It features a stylized blue house roof with white outlines. A large, light green leaf with a white vein is positioned as if it is growing out of the roofline.

26th January 2016

Russell Smith

Parity Projects

www.parityprojects.com

Introduction

- 🌱 About Parity Projects
- 🌱 Assessing energy efficiency, evaluating improvement options, various types and sizes
- 🌱 Making the most of existing data
- 🌱 Aligning with planned works
- 🌱 Tailoring the data strategy, assessment process and option evaluation to support corporate objectives and constraints

Who we are

- We are **award-winning** experts serving the retrofit industry
- Core activity is working with **both household and housing managers** to plan and design effective retrofit
- Company culture of **independence, rigorous analysis and client-specific solutions**



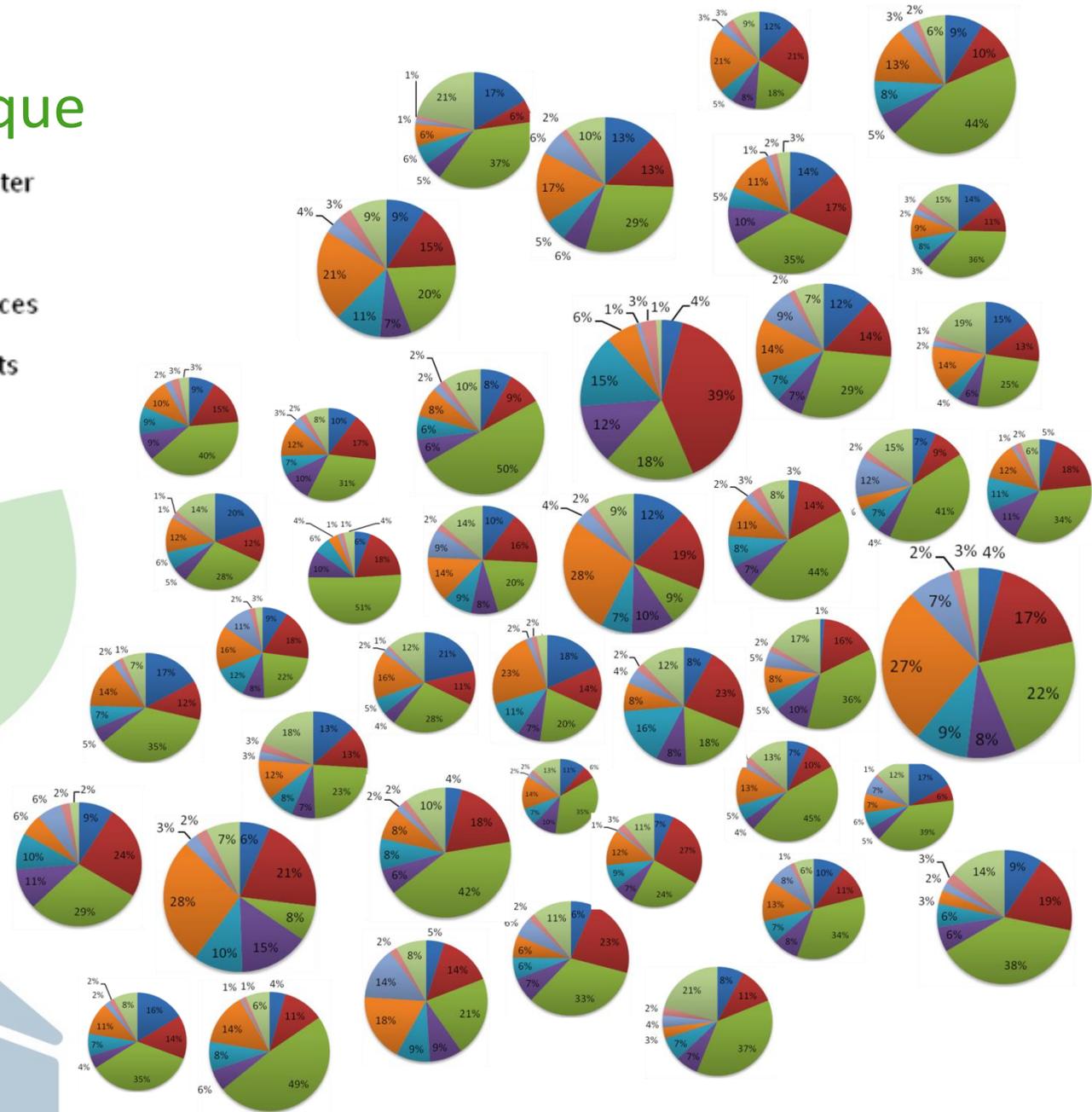
Our recent CV

- Individual “Masterplan” assessment of over 1200+ homes
- “CROHM” stock assessments covering 1,250,000+ properties
- Training 100s of SMEs on retrofit theory & practice
- Member of various Gov’t working groups including Bonfield Review, Green Construction Board



Every home is unique

- Windows/Doors
- Heating inefficiency
- Roof
- Floor
- Lights
- Hot Water
- Walls
- Appliances
- Draughts

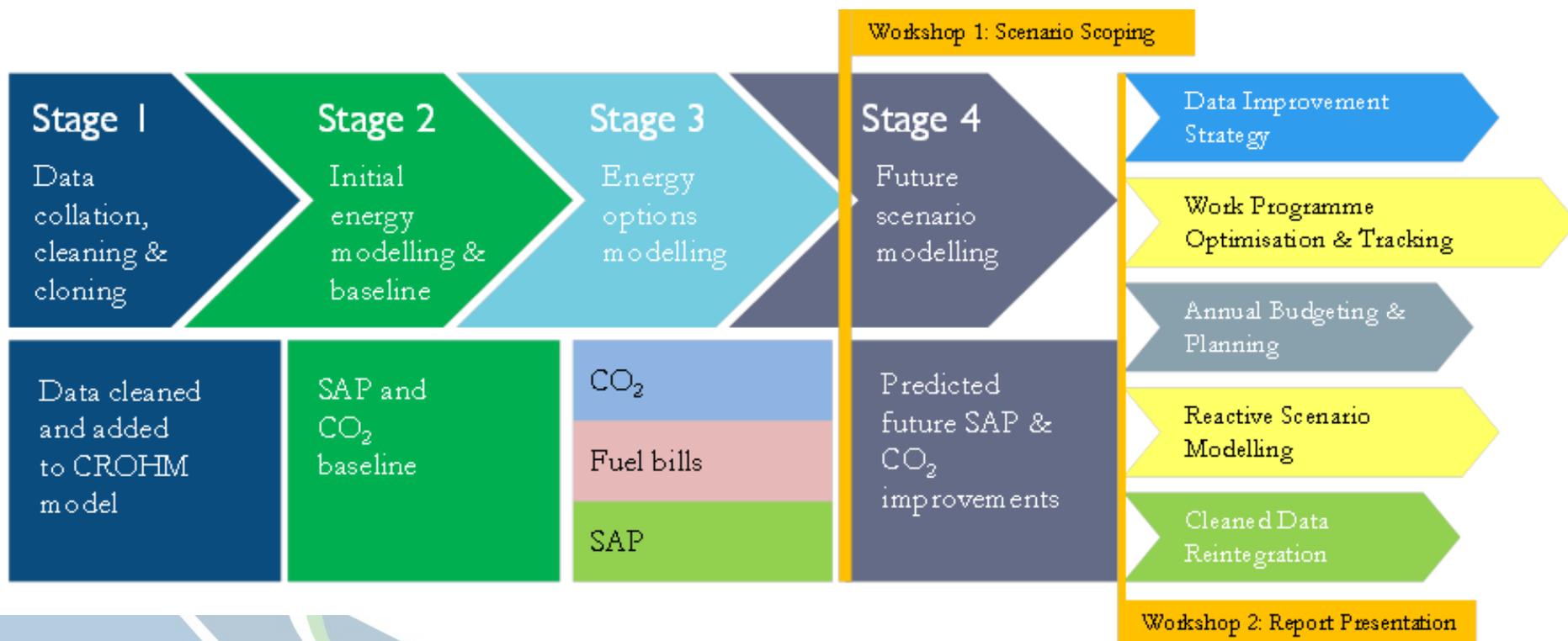


Seems straightforward, but...

- What is your **baseline**?
- Do you trust your current **data**? (We can build a database, but.....)
- How much will it **cost** to reach a given standard?
- What contribution to the cost might **funding schemes** make?
- How will improvements **integrate** with existing programmes?
- Are there any homes where the compliance will mean “**excessive cost**”
- Should you dispose of high-cost homes?

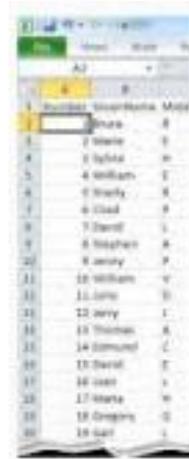
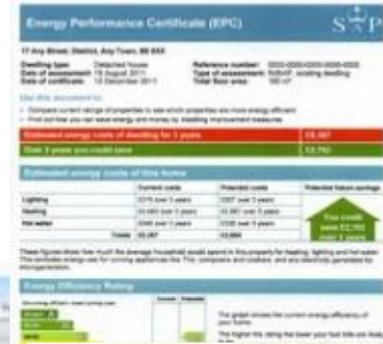


CROHM Process



1. Data

- Full RdSAP data for each property?
- Other data sources:
 - Boiler records
 - Stock condition surveys
 - Schedules of works
 - Etc.
 - Etc.

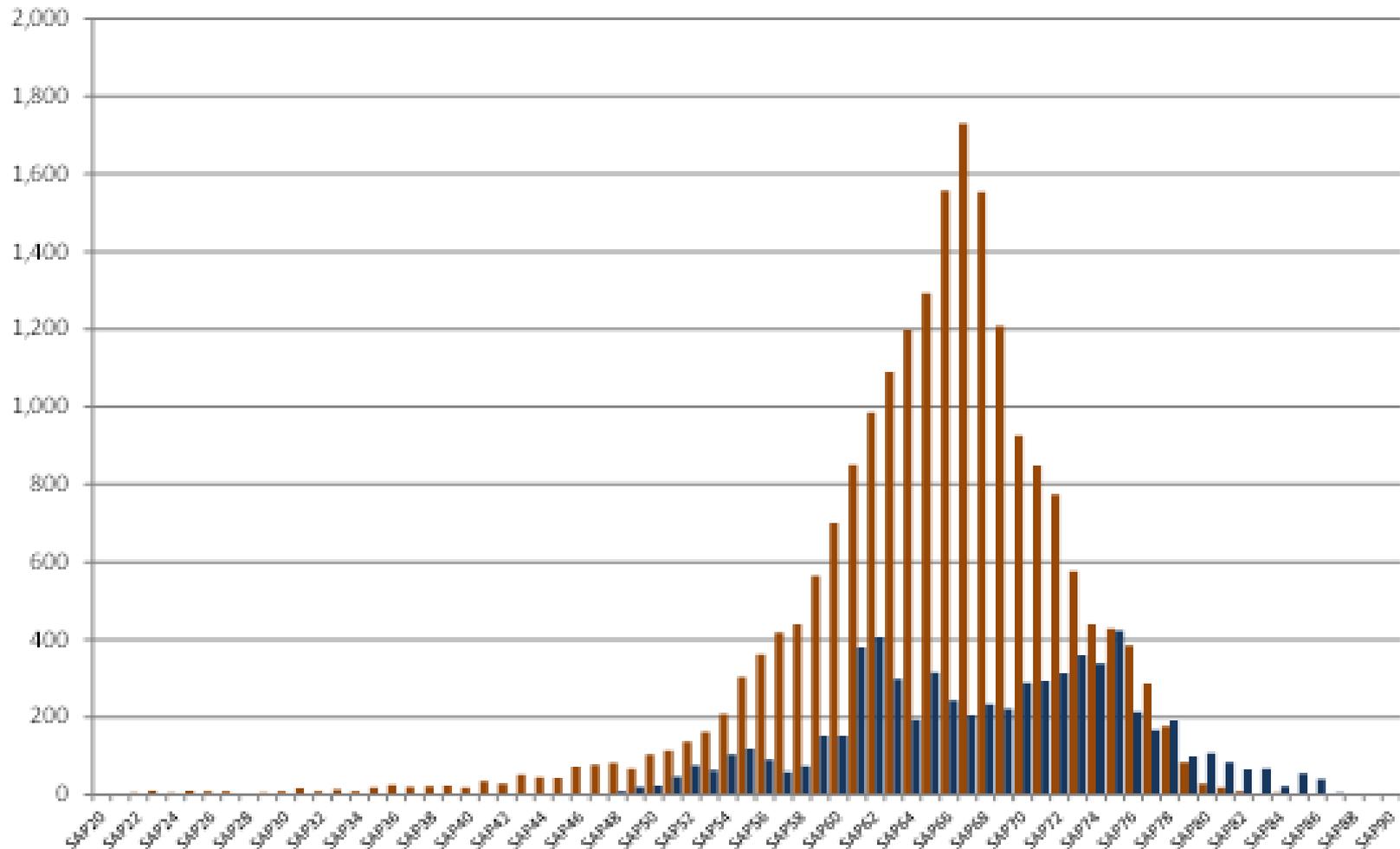


- Cloning
- Conversion to SAP2012
- Conflicts identification

- We don't start with architypes – calculate every dwelling – then architype if necessary, particularly special situations.
- Tag the data to indicate its provenance and confidence level.
- Data improvement strategies – not all data is equal.

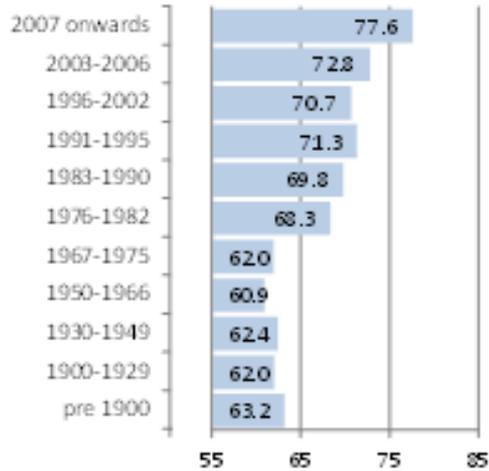
2. Baseline

Estimated SAP rating

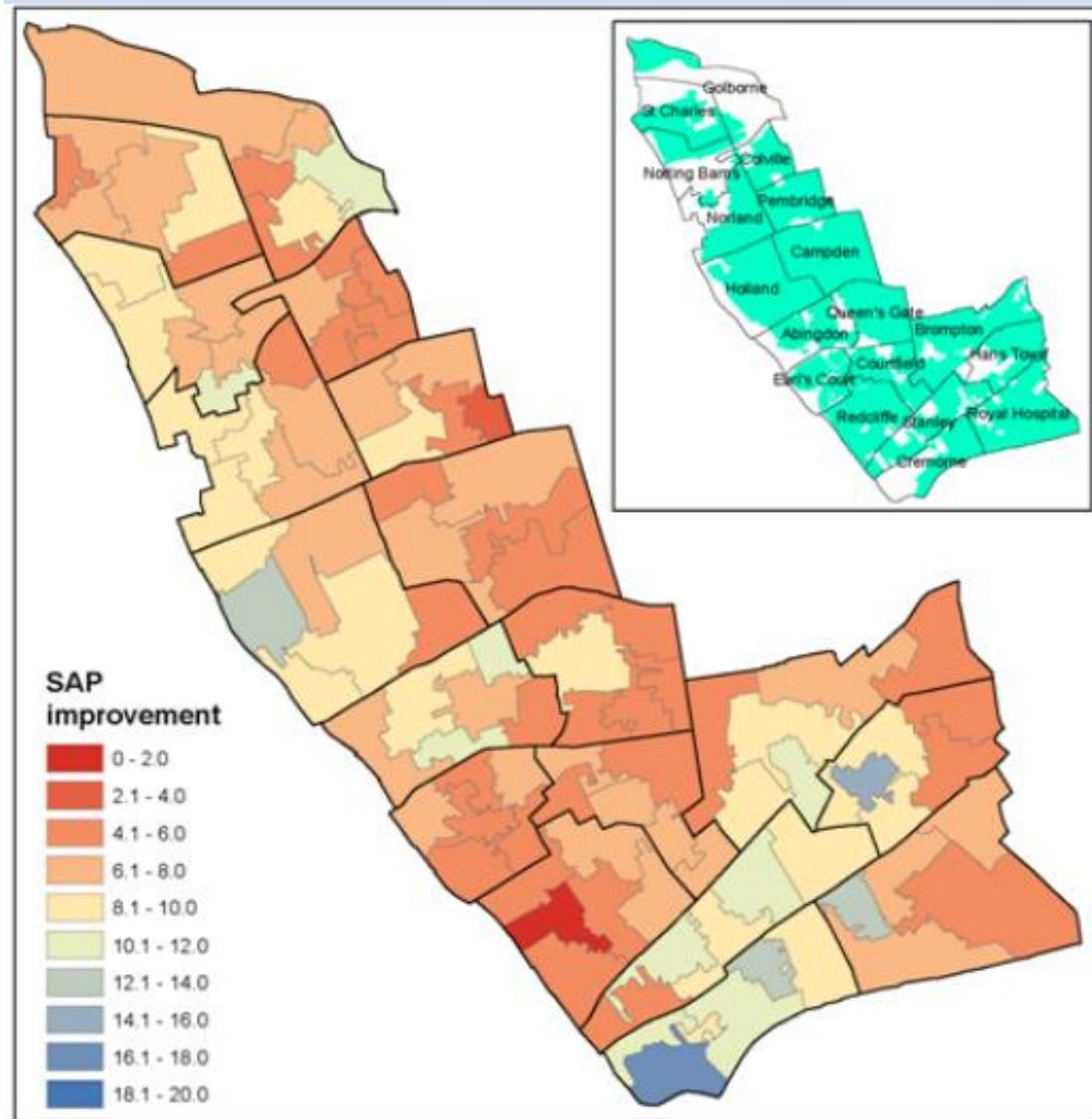
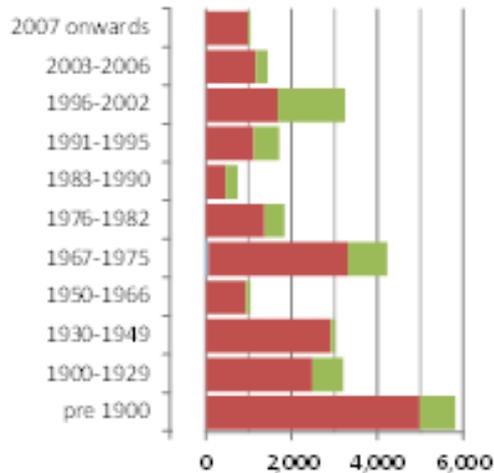


2. Baseline

Build-date band

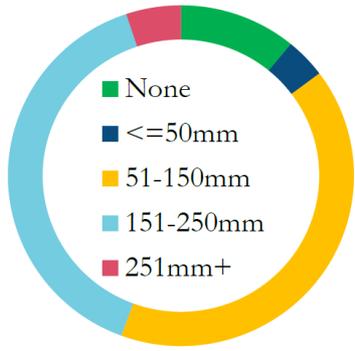


Build-date band

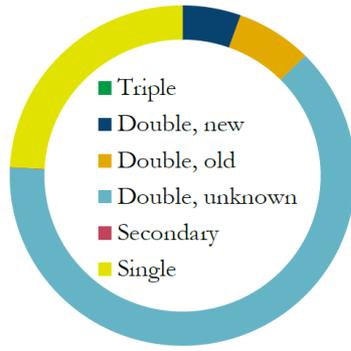


2. Baseline

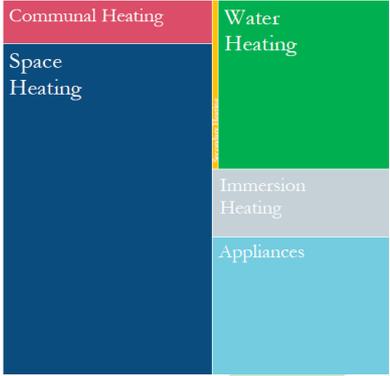
Roof Insulation



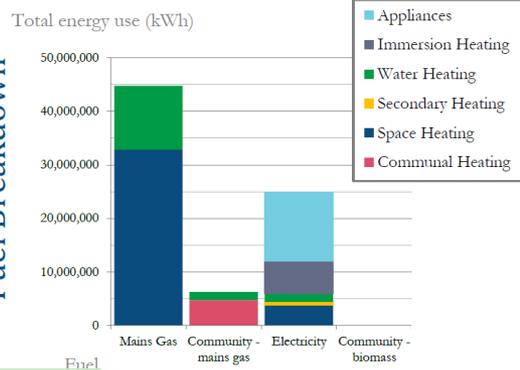
Glazing Type



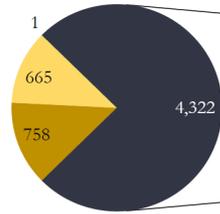
Energy Use Breakdown



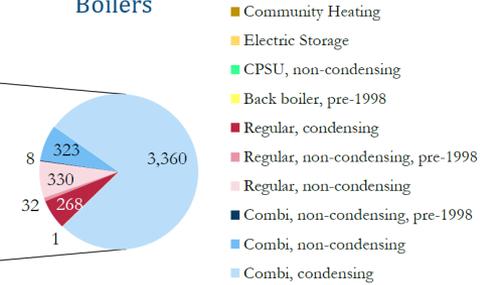
Fuel Breakdown



All Heating Types

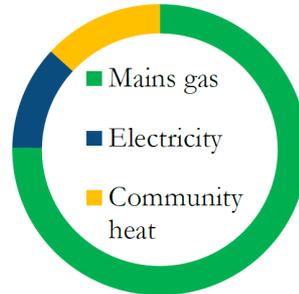


Boilers

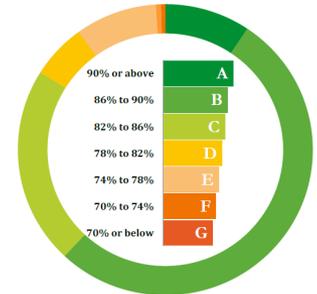


Heating System Type

Main Heating Fuel

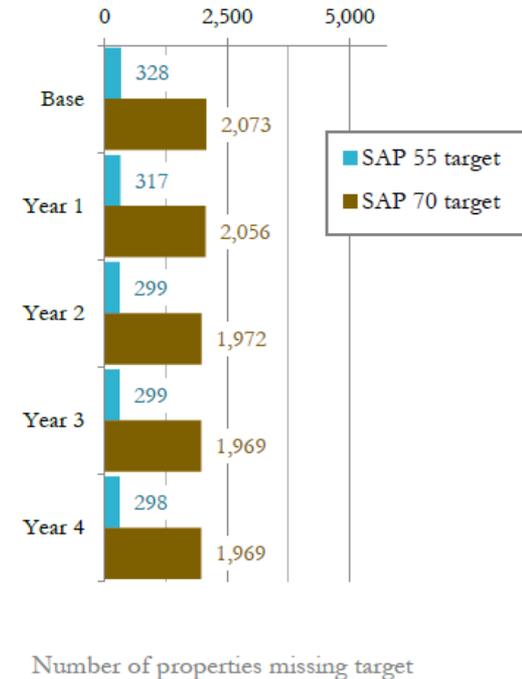
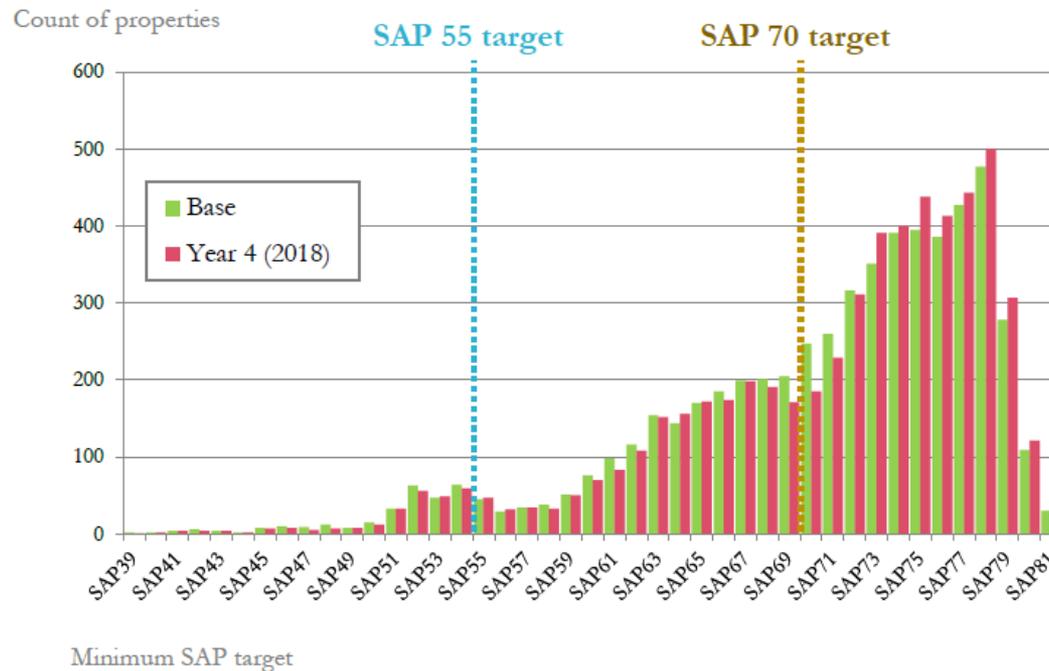


Boiler Efficiencies



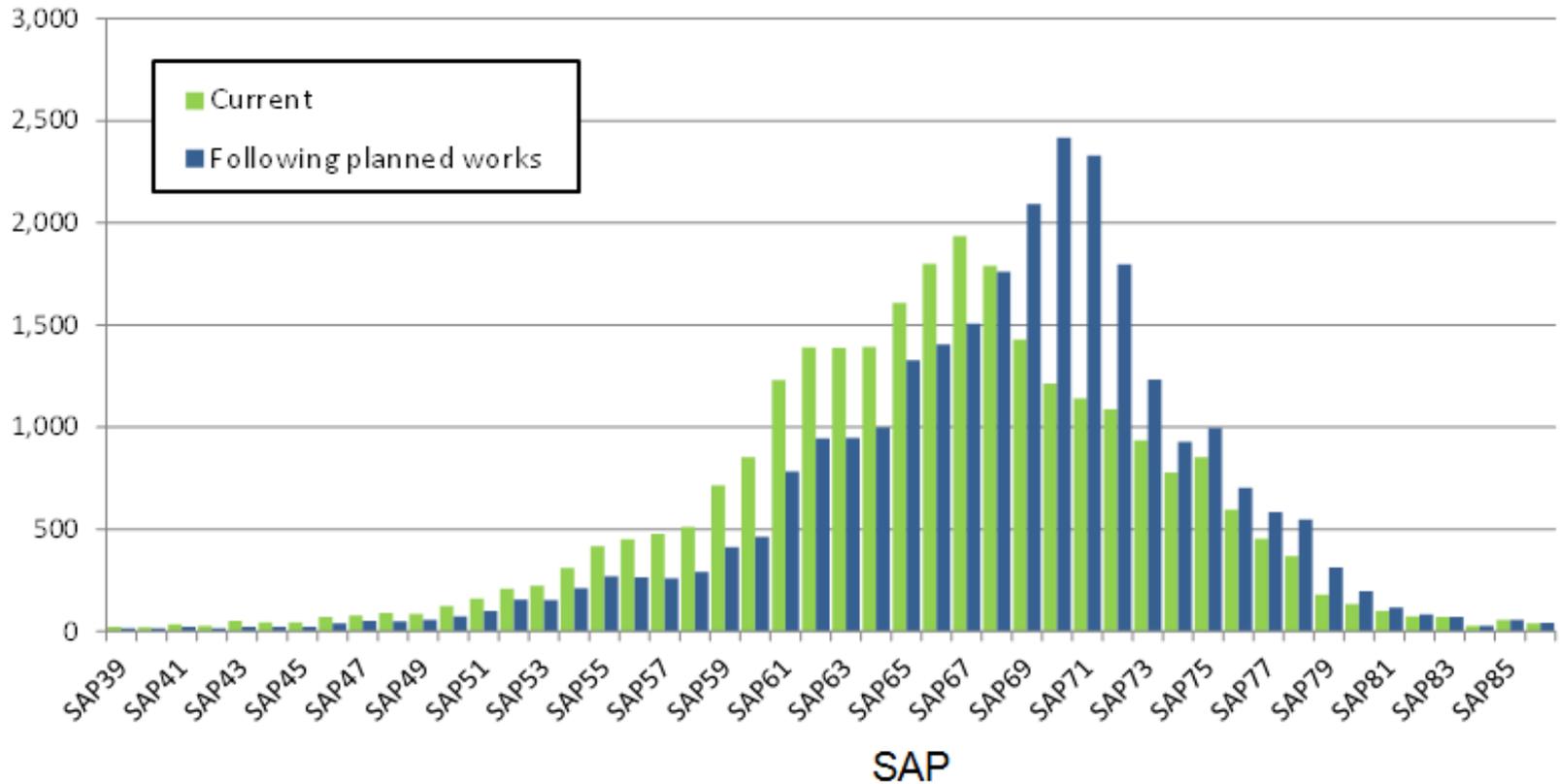
3. Programme Modelling

- Where do planned works get you?
 - Boiler replacement and maintenance
 - Planned Maintenance
 - Major works
 - Voids
- How far are future plans?



3. Programme Modelling

Count of properties



EPC recommendations:

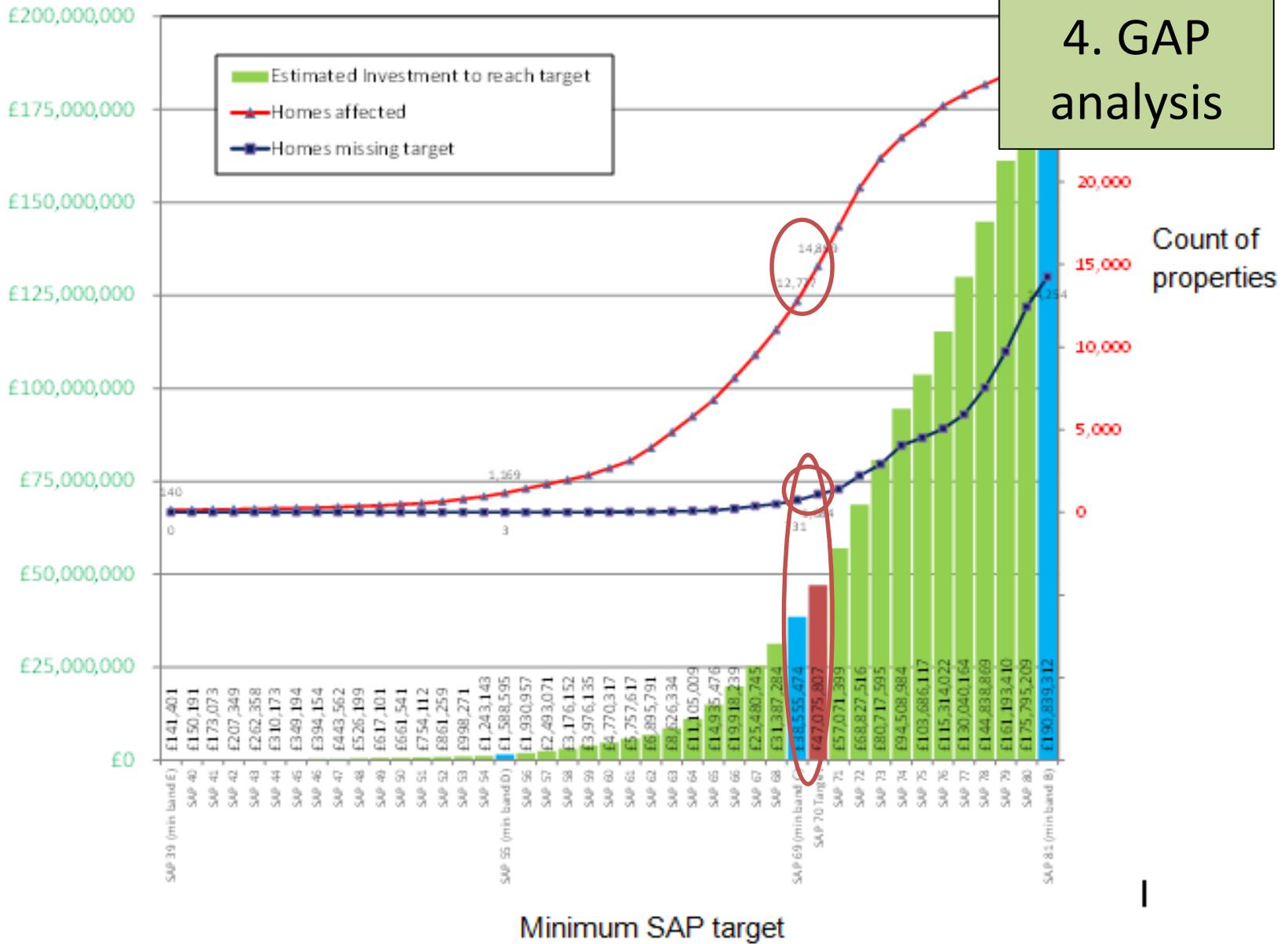
- Static prices
- Defined measures **order**
- Limited **number of recommendations**

Most cost effective way to get to your standard:

- Additions to planned works
- Integrated programmes reduce overall cost
- Changes to planned works
- Speeding up planned works
- Funding – how can this be leveraged

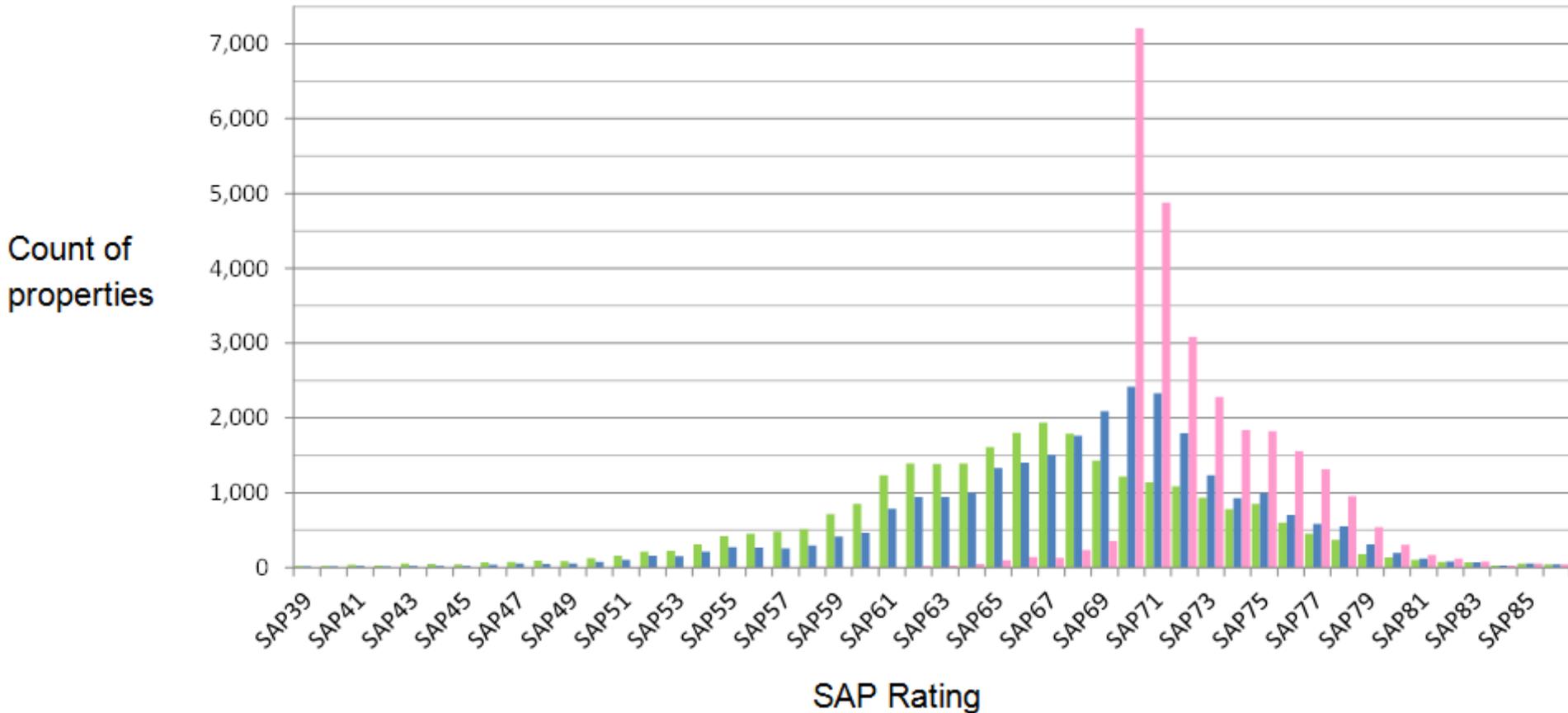
4. GAP analysis

Investment required (cumulative)

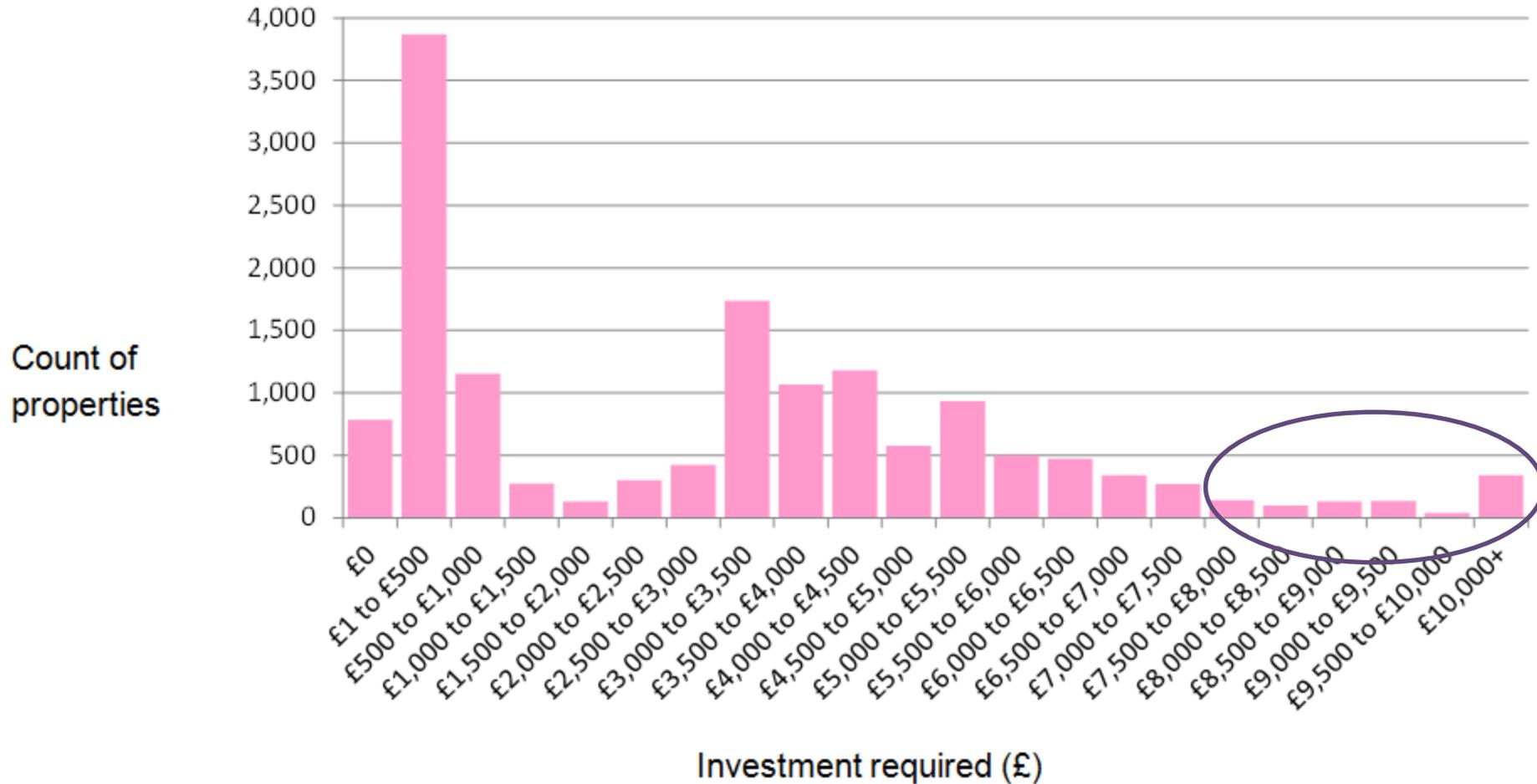


Baseline, planned, min SAP

4. GAP analysis

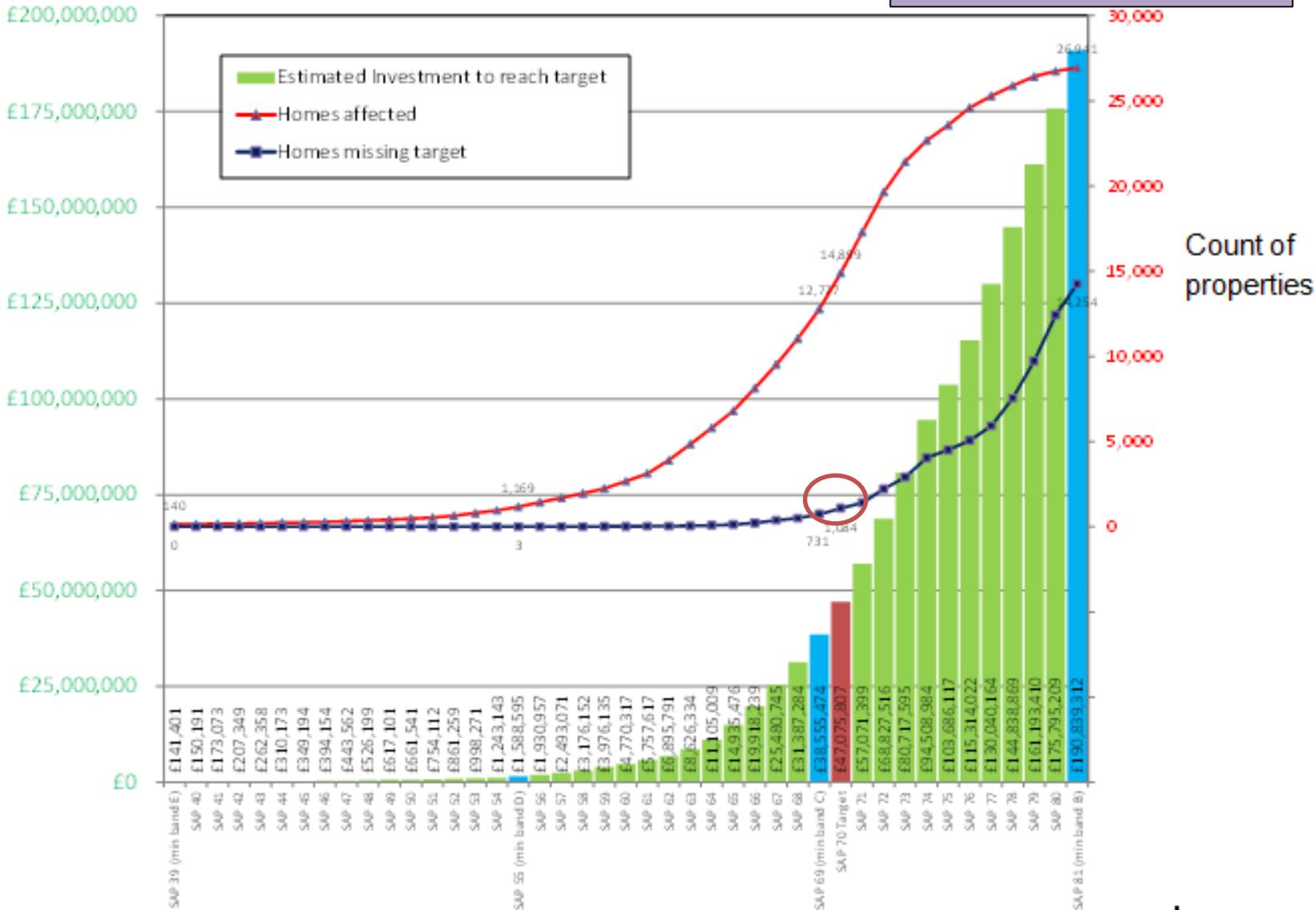


4. GAP analysis



5. Exemptions

Investment required (cumulative)



Minimum SAP target

4. GAP analysis

				All Applicable Initiatives	
Address	SAP2dp		Initiative Type	Initiative Name	Cost
9	58.81			STARTING POINT / CURRENT SCORE	
All applicable initiatives individually applied					
9	64.79	5.98	ROOF	Insulate loft from 25mm to 300mm	£400
9	59.67	0.86	LIGHTING	Upgrade remaining inefficient lighting	£50
9	66.51	7.7	WALLS	Insulate 1900-1929 solid main walls internally	£5,000
9	66.51	7.7	WALLS	Insulate 1900-1929 solid main walls externally	£6,000
9	70.47	11.66	SOLAR PV	Add 2.5kWp PV panel on S facing roof	£5,000
9	64.54	5.73	HEATING SYSTEM	Upgrade E rated gas combi	£2,400
9	61.17	2.36	HEATING SYSTEM	Upgrade E rated gas boiler to ASHP	£6,000
9	60.87	2.06	GLAZING	Replace single glazing with new double glazing	£4,500
9	60.9	2.09	GLAZING	Replace single glazing with new triple glazing	£5,500
9	65.74	6.93	HEATING SYSTEM	Upgrade E rated gas combi and FGHR5	£2,700
9	60.06	1.25	WWHRS	WWHRS MixerWithBath	£900
9	61.25	2.44	HEATING DATA	Add real boiler data	£0
9	59.04	0.23	DOORS	Replace uninsulated doors with insulated doors	£1,200
9	59.5	0.69	OPENING DRAUGHTS	Draughtproof all doors and windows	£300

How are you defining what is an excessive cost?

Can you readily identify them?

What do you do with them:

- a) look at them in detail
- b) upgrade them anyway
- c) dispose / rebuild

Designing the retrofit:

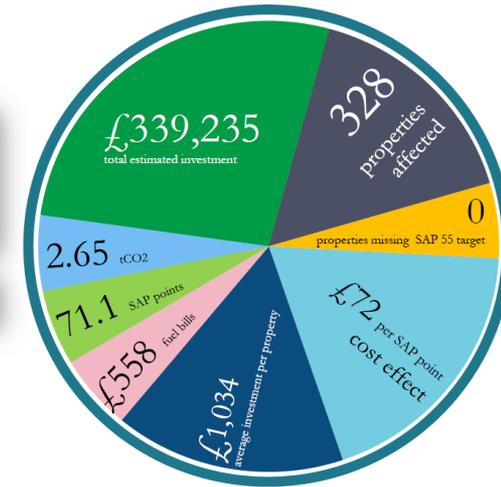
That's the easy bit



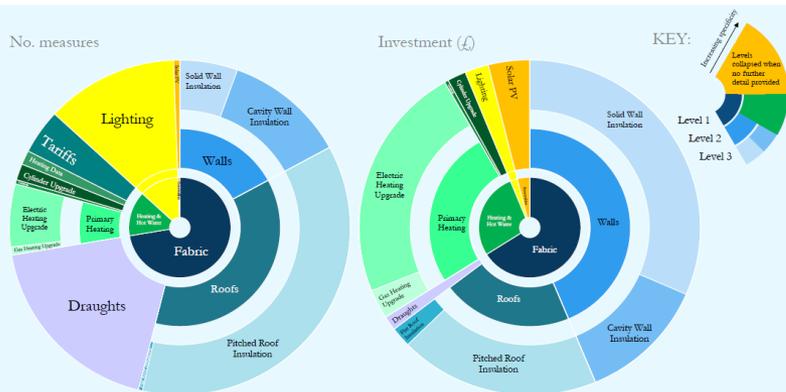
Presenting the results:

7.2.1 Minimum SAP 55 detail

Number of Measures	CapEx	Level 1	Number of Measures	CapEx	Level 2	Number of Measures	CapEx	Level 3	Number of Measures	CapEx
510	£339,235	Fabric	369	£223,970	Walls	87	£148,240	Solid wall insulation	28	£106,940
					Cavity wall insulation	59	£41,300			
					Roof	188	£71,030	Pitched roof insulation	186	£64,400
					Draughts	94	£4,700	Flat roof insulation	2	£6,630
		Heating and hot water	74	£94,350	Primary heating	35	£87,100	Gas heating upgrade	4	£9,600
					Controls	2	£1,250	Electric heating upgrade	31	£77,500
					Cylinder upgrade	8	£6,000			
					Heating data	7	£0			
					Tariffs	22	£0			
		Lighting	64	£7,640						
Renewables	3	£13,275	Solar PV	3	£13,275					



Measures Breakdown



- 83% of investment directed towards wall improvements
- 188 roof insulation upgrades recommended
- 29 zero cost measures updating boiler make and model data

Revised SAP Profile



- ➔ Targets lowest performing properties and reduces SAP 'tail'
 - 0 properties remain below SAP 55 target
 - 2,067 properties remain below SAP 70
- 0.8 point improvement of average SAP
- ➔ Minor change to upper end of the profile

Investment Breakdown



- 83% of the properties affected can be bought up to SAP 55 target score at low cost (<£1,000)
 - including 4% achieving the target with no cost measures.
- All properties meet or exceed the target score with an investment less than £10,000.

Presenting the results:

Base case

Base case property data and results

Homes in analysis



RefNumber	ParityAddressID	HouseNo	Locality	Street	County	Town	PostCode	Owner	Include/Exclude	LSOA11NM	EnergyCost	SAP2dp	TotalCO2	zTerrainType	xRoofType	xRoofType_clone	xRoofInsulation	xRoofInsulation_clone	Wall			
1		3	Watford	Stripling W -			WD18 6QT	Origin	Include	Watford 01	£586	71.7	2,625	LR	PitchedNor		1	100		3	CA-I	
3		2	Flat 1	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
4		3	Flat 10	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
5		4	Flat 2	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
6		5	Flat 3	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
7		6	Flat 4	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
8		7	Flat 5	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
9		8	Flat 6	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
10		9	Flat 7	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
11		10	Flat 8	Off Orchari	Bramley Co Herts	Watford	WD25 7JD	Origin														
12		11																				
14		12																				
15		13																				
17		14																				
18		15																				

Contents

Section	Sheet Name	Description
1	1. Base case	Base case property data and results
2	2.1 All Applicable Initiatives	All applicable initiatives detailed with respective results and savings
2	2.2 Initiative Summary	Summary of energy saving initiatives modelled for Origin Housing
3	3.1 Planned Works	Detail of the current and next phases of Origin Housing's energy related planned works
3	3.2 Ordered Initiatives	Selected ordered initiatives detailed with respective results and savings
3	3.3 Automatic Min SAP Summary	Section introduction and detail
3	3.4 Minimum SAP 55 Detail	Detail of measures applied with the intention of reaching a minimum SAP 55 target
3	3.5 Minimum SAP 70 Detail	Detail of measures applied with the intention of reaching a minimum SAP 70 target
5	5.1 Data Details	Detail on key data sources and discussion on their applicability
5	5.2 Data Scoring	Data scoring for property fields
5	5.3 Compatible Measure Set	Measures universe used for minimum and average SAP scenarios
5	5.4 Price Framework	Price framework used to estimate cost of initiatives
6	6.1 Methodology/Terminology	Discussion of CROHM methodology and key terminology
6	6.2 Translation Codes	Guide to codes used for CROHM property data
6	6.3 Clone Key	Guide to clone codes used for CROHM property data

originHOUSING

CROHM Stock Assessment

Tables and Graphs

v1pt1

January-16

- 1 This spreadsheet contains the raw data outputs from the Parity Modelling of Origin's housing stock based on data supplied by Origin.
- 2 The data is designed to be useful at the aggregate level: for many of the properties where data was unavailable the modelling included cloned or randomly allotted assumptions about installed measures or heating pattern etc (see report). We have marked data with an indication of how this has been done but caution must be used in drawing conclusions at the individual property level. If in doubt about a particular application of the data please contact Parity Projects, otherwise such application is at your own risk.
- 3 The data has been used for application in evaluation of cost effect of various different energy saving initiatives thought to be applicable to the housing stock, and should NOT be used for statutory reporting purposes, instead of EPC surveys, instead of stock condition surveys, or for other purposes other than strategic decision making about energy retrofit works. If in doubt about a particular application of the data please contact Parity Projects, otherwise such application is at your own risk.

Systematising decisions:

- Health
 - Fuel poverty
 - Comfort
 - Control
 - Market value
-
- Data cleansed? Data strategy?

Systematising decisions:

ECO had us all chasing the money...



No data, uninformed decisions, no confidence.

Thank you

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