

LCRI Convergence Cross Cutting Themes

Scenario Modelling for a Low Carbon Wales

Regional scale modelling on the potential for CO₂ emission and cost savings
by low carbon measures in the Welsh domestic sector

Annex

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre76 cavity wall insulation	76-83 cavity wall insulation	Post 83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder	Modest cylinder to high performance	Room thermostat to high performance	Room thermostat to control heating	Total	
Blaenau Gwent	0.16	0.17	0.20	0.34	0.02	0.08	0.12	0.15		2.48	0.24	0.06		0.31	0.21	0.03	0.21					5
Bridgend	0.30	0.34	0.39	0.69	0.06	0.13	0.64	0.23		4.24	0.30	0.14		0.62	0.42	0.06	0.42					9
Caerphilly	0.42	0.41	0.48	0.47	0.10	0.27	0.37	0.76		4.54	0.25	0.16		0.76	0.51	0.08	0.51					10
Cardiff	1.07	1.19	1.02	1.34	0.23	0.62	0.62	0.92		9.37	0.35	0.58	8.03	1.61	1.10	0.16	1.07					29
Carmarthenshire	0.78	0.67	0.59	0.48	0.06	0.25	0.28	0.44		3.56	0.21	0.22	5.76	0.92	0.63	0.09	0.60					16
Ceredigion	0.67	0.23	0.24	0.58	0.05	0.16	0.30	0.30	0.03	2.87	0.26	0.12	5.36	0.38	0.26	0.04	0.24	0.14	0.10			12
Conwy	0.42	0.37	0.33	0.62	0.05	0.24	0.30	0.40		3.04	0.21	0.09	3.79	0.52	0.35	0.05	0.35					11
Denbighshire	0.34	0.35	0.30	0.48	0.05	0.21	0.29	0.33		2.99	0.21	0.16	3.50	0.47	0.32	0.05	0.31					10
Flintshire	0.30	0.45	0.44	0.39	0.06	0.27	0.36	0.41		3.39	0.21	0.17	3.23	0.69	0.47	0.07	0.46					11
Gwynedd	0.80	0.38	0.35	0.62	0.03	0.18	0.19	0.34		2.15	0.34	0.36	3.05	0.55	0.37	0.05	0.34		0.15			10
Isle of Anglesey	0.54	0.22	0.21	0.18	0.01	0.08	0.13	0.24		1.24	0.15	0.06	2.03	0.33	0.23	0.03	0.20		0.09			6
Merthyr Tydfil	0.41	0.11	0.15	0.27	0.04	0.12	0.15	0.36		1.22	0.08	0.05		0.24	0.16	0.02	0.16					4
Monmouthshire	0.57	0.18	0.26	0.31	0.04	0.23	0.41	0.61		5.65	0.41	0.21	3.73	0.40	0.28	0.04	0.27					14
Neath Port Talbot	0.39	0.46	0.41	0.58	0.16	0.35	0.31	0.55		4.43	0.27	0.16		0.65	0.45	0.06	0.44					10
Newport	0.57	0.35	0.38	0.65	0.07	0.32	0.37	0.69		8.30	0.72	0.29	4.24	0.60	0.41	0.06	0.41					18
Pembrokeshire	0.81	0.39	0.36	0.50	0.05	0.17	0.32	0.48		6.03	0.41	0.17	5.00	0.57	0.39	0.05	0.38					16
Powys	0.65	0.49	0.44	0.69	0.08	0.24	0.35	0.38		4.03	0.19	0.18	6.31	0.69	0.47	0.06	0.44					16
Rhondda, Cynon, Taff	0.76	0.52	0.63	1.01	0.09	0.35	0.70	0.56		4.87	0.45	0.17		0.99	0.67	0.10	0.67					13
Swansea	1.65	0.57	0.68	1.66	0.11	0.47	1.27	1.09		7.31	0.40	0.34		1.07	0.72	0.11	0.71					18
The Vale of Glamorgan	0.51	0.27	0.36	0.79	0.07	0.27	0.48	0.55		6.39	0.39	0.27	4.89	0.56	0.38	0.06	0.38					17
Torfaen	0.51	0.22	0.24	0.35	0.04	0.14	0.27	0.22		3.14	0.21	0.12		0.37	0.25	0.04	0.25					6
Wrexham	0.36	0.44	0.39	0.39	0.06	0.27	0.29	0.52		4.29	0.10	0.16	3.78	0.62	0.42	0.06	0.41					13
Total	12.99	8.78	8.83	13.37	1.54	5.40	8.50	10.52	0.03	95.51	6.34	4.23	62.70	13.94	9.47	1.36	9.23	0.14	0.34		273	

Table A.1 : Absolute savings kton CO2 / year by 2022. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre76 cavity wall insulation	76-83 cavity wall insulation	Post '83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder	Modest cylinder to high performance	Room thermostat to high performance	Total from all measures	
Blaenau Gwent	5.0	5.2	6.2	10.6	0.7	2.5	3.7	4.8		78.2	7.5	2.0			9.8	6.7	1.0	6.6		151	
Bridgend	4.9	5.6	6.5	11.5	1.0	2.2	10.7	3.9		70.4	5.0	2.3			10.3	7.0	1.0	6.9		149	
Caerphilly	5.4	5.3	6.3	6.2	1.3	3.6	4.8	9.9		59.2	3.2	2.1			9.9	6.6	1.0	6.7		131	
Cardiff	7.6	8.4	7.2	9.5	1.6	4.4	4.4	6.5		66.2	2.5	4.1	56.7		11.4	7.8	1.1	7.6		207	
Carmarthenshire	9.6	8.1	7.2	5.8	0.8	3.1	3.4	5.3		43.5	2.5	2.7	70.4		11.3	7.7	1.1	7.3		190	
Ceredigion	20.4	7.1	7.4	17.6	1.4	4.7	9.2	9.3	1.0	87.3	7.8	3.7	163.2		11.6	7.8	1.1	7.4	4.2	3.1	375
Conwy	7.8	7.0	6.1	11.5	0.9	4.4	5.6	7.4		56.8	3.9	1.6	70.7		9.7	6.6	1.0	6.5		207	
Denbighshire	8.1	8.3	7.0	11.3	1.2	4.9	6.8	7.8		70.4	5.0	3.7	82.6		11.1	7.5	1.1	7.4		244	
Flintshire	4.6	6.9	6.7	6.0	0.9	4.2	5.6	6.4		52.4	3.3	2.6	49.9		10.7	7.2	1.0	7.0		175	
Gwynedd	13.9	6.6	6.0	10.7	0.5	3.1	3.2	5.9		37.0	5.8	6.3	52.6		9.5	6.4	0.9	5.9		2.6	177
Isle of Anglesey	16.2	6.7	6.4	5.3	0.4	2.5	3.8	7.4		37.3	4.4	1.9	61.2		10.0	6.8	0.9	6.2		2.7	180
Merthyr Tydfil	15.7	4.4	5.8	10.5	1.5	4.5	5.7	14.0		47.1	3.0	1.8			9.2	6.2	0.9	6.2			136
Monmouthshire	14.7	4.5	6.6	8.0	1.0	5.8	10.6	15.5		144.8	10.4	5.5	95.4		10.4	7.1	1.0	6.9			348
Neath Port Talbot	6.1	7.3	6.6	9.1	2.6	5.5	4.9	8.6		70.1	4.2	2.5			10.4	7.1	1.0	7.0			153
Newport	9.2	5.7	6.2	10.5	1.1	5.1	5.9	11.1		134.0	11.6	4.6	68.4		9.7	6.6	1.0	6.6			297
Pembrokeshire	14.2	6.8	6.3	8.8	1.0	2.9	5.5	8.3		104.8	7.0	2.9	86.9		10.0	6.8	1.0	6.5			280
Powys	10.5	8.0	7.1	11.2	1.2	4.0	5.6	6.1		65.3	3.1	2.9	102.4		11.1	7.5	1.0	7.1			254
Rhondda, Cynon, Taff	7.2	5.0	6.0	9.6	0.9	3.3	6.7	5.3		46.4	4.3	1.6			9.4	6.4	0.9	6.4			119
Swansea	15.5	5.3	6.4	15.6	1.1	4.4	11.9	10.2		68.5	3.8	3.2			10.0	6.8	1.0	6.7			170
The Vale of Glamorgan	9.5	5.0	6.6	14.5	1.3	4.9	8.9	10.1		117.7	7.2	5.0	89.9		10.4	7.0	1.0	7.0			306
Torfaen	12.7	5.5	5.9	8.7	0.9	3.4	6.8	5.4		78.6	5.4	2.9			9.3	6.3	0.9	6.3			159
Wrexham	6.2	7.7	6.8	6.8	1.0	4.6	5.0	9.0		74.2	1.8	2.8	65.4		10.8	7.3	1.0	7.2			218
Average per measure	9.6	6.5	6.5	9.9	1.1	4.0	6.3	7.8	0.0	70.8	4.7	3.1	46.5	10.3	7.0	1.0	6.8	0.1	0.3	202	

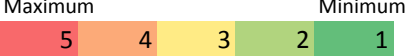
Table A.2 : Emission savings normalised by the size of the local authority (number of households). Savings in kg CO2 / household / year by 2022. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend : 5 4 3 2 1

Five colour scale from maximum (red) to minimum (green) values
Colour coded per column i.e. where is the measure most effective per instance.

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre76 cavity wall insulation	76-83 cavity wall insulation	Post '83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder	Modest cylinder to high performance	Room thermostat to control heating
Blaenau Gwent	397	148	133	561	245	148	102	75		539	287	159		198	88	34	417		
Bridgend	400	149	134	564	247	149	103	75		542	288	160		199	88	34	418		
Caerphilly	399	149	134	564	246	149	103	75		541	288	160		199	88	34	418		
Cardiff	404	150	135	570	249	151	104	76		547	291	161	1602	201	89	34	416		
Carmarthenshire	423	158	142	598	261	158	109	80		574	305	169	1681	211	93	35	428		
Ceredigion	455	169	152	642	281	170	117	85	276	617	328	182	1804	227	100	36	452	78	131
Conwy	406	151	136	573	251	151	104	76		550	293	162	1611	202	90	34	420		
Denbighshire	409	152	137	578	253	153	105	77		555	295	164	1624	204	90	34	421		
Flintshire	425	158	142	600	262	158	109	80		576	306	170	1686	212	94	35	432		
Gwynedd	425	158	142	601	263	159	109	80		577	307	170	1689	212	94	34	424		123
Isle of Anglesey	430	160	144	607	265	160	110	81		583	310	172	1706	214	95	35	430		124
Merthyr Tydfil	398	148	133	562	246	149	102	75		540	287	159		199	88	34	417		
Monmouthshire	409	152	137	578	253	153	105	77		555	295	164	1624	204	90	34	421		
Neath Port Talbot	402	149	134	567	248	150	103	75		545	290	161		200	89	34	419		
Newport	400	149	134	565	247	149	103	75		543	289	160	1589	200	88	34	418		
Pembrokeshire	422	157	141	595	260	157	108	79		572	304	169	1674	210	93	34	426		
Powys	438	163	146	618	270	163	112	82		593	316	175	1737	218	97	35	435		
Rhondda, Cynon, Taff	399	148	133	563	246	149	102	75		541	287	159		199	88	34	417		
Swansea	403	150	135	568	248	150	103	76		546	290	161		201	89	34	419		
The Vale of Glamorgan	402	149	134	567	248	150	103	75		545	290	161	1595	200	89	34	419		
Torfaen	399	149	133	563	246	149	103	75		541	288	160		199	88	34	418		
Wrexham	412	153	138	581	254	154	106	77		558	297	165	1634	205	91	34	423		
Average per measure	412	153	137	578	252	153	105	77	276	555	295	164	1659	204	90	34	422	78	126

Table A.3 : Emission savings normalised by instances of the measure per LA. Savings in kg CO2 / instance / year by 2022. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend :  Five colour scale from maximum (red) to minimum (green) values
Colour coded per row i.e. which measure most effective per local authority.

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre76 cavity wall insulation	76-83 cavity wall insulation	Post '83 cavity wall insulation	Solid wall insulation	DIV floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder to high performance	Modest cylinder insulation to high performance	Room thermostat to control heating	Total
Blaenau Gwent	3%	3%	4%	7%	0%	2%	2%	3%		52%	5%	1%		6%	4%	1%	4%			100%
Bridgend	3%	4%	4%	8%	1%	1%	7%	3%		47%	3%	2%		7%	5%	1%	5%			100%
Caerphilly	4%	4%	5%	5%	1%	3%	4%	8%		45%	2%	2%		8%	5%	1%	5%			100%
Cardiff	4%	4%	3%	5%	1%	2%	2%	3%		32%	1%	2%	27%	5%	4%	1%	4%			100%
Carmarthenshire	5%	4%	4%	3%	0%	2%	2%	3%		23%	1%	1%	37%	6%	4%	1%	4%			100%
Ceredigion	5%	2%	2%	5%	0%	1%	2%	2%	0%	23%	2%	1%	43%	3%	2%	0%	2%	1%	1%	100%
Conwy	4%	3%	3%	6%	0%	2%	3%	4%		27%	2%	1%	34%	5%	3%	0%	3%			100%
Denbighshire	3%	3%	3%	5%	1%	2%	3%	3%		29%	2%	1%	34%	5%	3%	0%	3%			100%
Flintshire	3%	4%	4%	3%	1%	2%	3%	4%		30%	2%	1%	28%	6%	4%	1%	4%			100%
Gwynedd	8%	4%	3%	6%	0%	2%	2%	3%		21%	3%	4%	30%	5%	4%	1%	3%		1%	100%
Isle of Anglesey	9%	4%	4%	3%	0%	1%	2%	4%		21%	2%	1%	34%	6%	4%	1%	3%		2%	100%
Merthyr Tydfil	12%	3%	4%	8%	1%	3%	4%	10%		35%	2%	1%		7%	5%	1%	5%			100%
Monmouthshire	4%	1%	2%	2%	0%	2%	3%	4%		42%	3%	2%	27%	3%	2%	0%	2%			100%
Neath Port Talbot	4%	5%	4%	6%	2%	4%	3%	6%		46%	3%	2%		7%	5%	1%	5%			100%
Newport	3%	2%	2%	4%	0%	2%	2%	4%		45%	4%	2%	23%	3%	2%	0%	2%			100%
Pembrokeshire	5%	2%	2%	3%	0%	1%	2%	3%		37%	3%	1%	31%	4%	2%	0%	2%			100%
Powys	4%	3%	3%	4%	0%	2%	2%	2%		26%	1%	1%	40%	4%	3%	0%	3%			100%
Rhondda, Cynon, Taff	6%	4%	5%	8%	1%	3%	6%	4%		39%	4%	1%		8%	5%	1%	5%			100%
Swansea	9%	3%	4%	9%	1%	3%	7%	6%		40%	2%	2%		6%	4%	1%	4%			100%
The Vale of Glamorgan	3%	2%	2%	5%	0%	2%	3%	3%		38%	2%	2%	29%	3%	2%	0%	2%			100%
Torfaen	8%	3%	4%	5%	1%	2%	4%	3%		49%	3%	2%		6%	4%	1%	4%			100%
Wrexham	3%	4%	3%	3%	0%	2%	2%	4%		34%	1%	1%	30%	5%	3%	0%	3%			100%
Wales	5%	3%	3%	5%	1%	2%	3%	4%	0%	35%	2%	2%	23%	5%	3%	0%	3%	0%	0%	100%

Table A.4 : Contribution of each measure to the savings total for each local authority. Percentages based on absolute values. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend : Maximum 5 4 3 2 1 Minimum

Five colour scale from maximum (red) to minimum (green) values
 Colour coding per row i.e. which measure offers the greatest reduction in absolute terms per local authority.

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre 76 cavity wall insulation	76-83 cavity wall insulation	Post '83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder	Modest cylinder to high performance	Room thermostat to high performance	Share of savings across Wales from all measures
Blaenau Gwent	1%	2%	2%	3%	1%	1%	1%	1%		3%	4%	1%		2%	2%	2%	2%			2%
Bridgend	2%	4%	4%	5%	4%	2%	8%	2%		4%	5%	3%		4%	4%	5%	5%			3%
Caerphilly	3%	5%	5%	4%	7%	5%	4%	7%		5%	4%	4%		5%	5%	6%	6%			4%
Cardiff	8%	14%	12%	10%	15%	12%	7%	9%		10%	5%	14%	13%	12%	12%	12%	12%			11%
Carmarthenshire	6%	8%	7%	4%	4%	5%	3%	4%		4%	3%	5%	9%	7%	7%	6%	7%			6%
Ceredigion	5%	3%	3%	4%	3%	3%	4%	3%	100%	3%	4%	3%	9%	3%	3%	3%	3%	100%	30%	5%
Conwy	3%	4%	4%	5%	3%	4%	4%	4%		3%	3%	2%	6%	4%	4%	4%	4%			4%
Denbighshire	3%	4%	3%	4%	3%	4%	3%	3%		3%	3%	4%	6%	3%	3%	3%	3%			4%
Flintshire	2%	5%	5%	3%	4%	5%	4%	4%		4%	3%	4%	5%	5%	5%	5%	5%			4%
Gwynedd	6%	4%	4%	5%	2%	3%	2%	3%		2%	5%	9%	5%	4%	4%	4%	4%		43%	4%
Isle of Anglesey	4%	3%	2%	1%	1%	2%	1%	2%		1%	2%	1%	3%	2%	2%	2%	2%		26%	2%
Merthyr Tydfil	3%	1%	2%	2%	2%	2%	2%	3%		1%	1%	1%		2%	2%	2%	2%			1%
Monmouthshire	4%	2%	3%	2%	3%	4%	5%	6%		6%	6%	5%	6%	3%	3%	3%	3%			5%
Neath Port Talbot	3%	5%	5%	4%	11%	6%	4%	5%		5%	4%	4%		5%	5%	5%	5%			4%
Newport	4%	4%	4%	5%	4%	6%	4%	7%		9%	11%	7%	7%	4%	4%	4%	4%			7%
Pembrokeshire	6%	4%	4%	4%	4%	3%	4%	5%		6%	6%	4%	8%	4%	4%	4%	4%			6%
Powys	5%	6%	5%	5%	5%	5%	4%	4%		4%	3%	4%	10%	5%	5%	5%	5%			6%
Rhondda, Cynon, Taff	6%	6%	7%	8%	6%	6%	8%	5%		5%	7%	4%		7%	7%	7%	7%			5%
Swansea	13%	7%	8%	12%	7%	9%	15%	10%		8%	6%	8%		8%	8%	8%	8%			7%
The Vale of Glamorgan	4%	3%	4%	6%	4%	5%	6%	5%		7%	6%	6%	8%	4%	4%	4%	4%			6%
Torfaen	4%	2%	3%	3%	2%	3%	3%	2%		3%	3%	3%		3%	3%	3%	3%			2%
Wrexham	3%	5%	4%	3%	4%	5%	3%	5%		4%	2%	4%	6%	4%	4%	4%	4%			5%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table A.5 : Share of the potential for savings per measure located in each local authority. Percentages based on absolute values. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend : 5 4 3 2 1

Five colour scale from maximum (red) to minimum (green) values
 Colour coded per column i.e. which local authority has the greatest reduction potential in absolute terms per measure.

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre'76 cavity wall insulation	76-83 cavity wall insulation	Post '83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder	Modest cylinder insulation to high performance	Room thermostat insulation to high performance	Room thermostat to control heating	Total	
Blaenau Gwent	402	1117	1475	599	94	538	1153	2054		4593	825	399		1563	2412	912	505					18639
Bridgend	739	2269	2934	1222	252	902	6247	3112		7813	1041	868		3109	4807	1814	995					38125
Caerphilly	1045	2727	3591	840	411	1831	3559	10073		8375	853	988		3805	5747	2220	1222					47285
Cardiff	2657	7893	7537	2356	930	4137	5948	12153		17116	1193	3615	5010	7986	12317	4660	2583					98091
Carmarthenshire	1854	4224	4133	795	244	1600	2577	5471		6191	672	1322	3427	4379	6766	2555	1403					47612
Ceredigion	1474	1374	1590	899	164	918	2599	3562	117	4654	782	666	2972	1685	2571	983	536	1774	788			30106
Conwy	1029	2470	2427	1075	197	1562	2888	5236		5530	721	535	2354	2571	3947	1500	827					34870
Denbighshire	835	2308	2170	829	205	1369	2741	4294		5381	716	947	2156	2300	3507	1342	740					31841
Flintshire	703	2832	3076	647	231	1724	3299	5168		5894	696	982	1916	3259	5000	1902	1054					38383
Gwynedd	1890	2402	2451	1037	114	1148	1699	4249		3721	1100	2135	1808	2596	3984	1515	806		1214			33867
Isle of Anglesey	1249	1387	1469	291	55	520	1134	3027		2125	469	366	1192	1557	2390	908	476		728			19342
Merthyr Tydfil	1021	772	1128	483	156	778	1445	4842		2259	270	286		1195	1816	698	383					17532
Monmouthshire	1403	1151	1870	538	158	1486	3925	7880		10186	1383	1309	2295	1982	3063	1156	643					40427
Neath Port Talbot	964	3075	3082	1015	658	2323	2967	7231		8123	923	972		3266	5033	1906	1048					42586
Newport	1430	2380	2851	1146	268	2128	3547	9149		15287	2489	1785	2667	3020	4644	1762	976					55527
Pembrokeshire	1932	2475	2577	846	211	1059	2924	6059		10541	1332	985	2985	2731	4208	1593	882					43343
Powys	1483	3035	2972	1118	285	1500	3069	4611		6784	614	1026	3635	3149	4821	1837	1008					40948
Rhondda, Cynon, Taff	1897	3508	4700	1795	381	2335	6867	7446		9017	1573	1036		4980	7632	2906	1598					57672
Swansea	4101	3814	5038	2924	454	3098	12311	14398		13391	1392	2122		5338	8150	3115	1704					81348
The Vale of Glamorgan	1280	1830	2661	1385	276	1779	4684	7261		11734	1350	1706	3064	2820	4321	1645	906					48702
Torfaen	1275	1468	1766	615	154	918	2652	2893		5800	743	735		1871	2859	1091	601					25442
Wrexham	872	2896	2859	671	227	1731	2729	6715		7680	344	988	2315	3029	4666	1767	977					40465
Total	31535	57408	64358	23127	6124	35383	80962	136885	117	172196	21480	25773	37796	68189	104661	39787	21871	1774	2729		932156	

Table A.6 : Absolute figures of cost effective retrofit instances per measure for each local authority. Number of homes receiving the measure. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend : 5 4 3 2 1

Five colour scale from maximum (red) to minimum (green) values
 Colour coded per column i.e. which local authority has the greatest number of homes to be retrofitted.

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre76 cavity wall insulation	76-83 cavity wall insulation	Post '83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder to high performance	Modest cylinder insulation to high performance	Room thermostat to control hr	
Blaenau Gwent	1.3%	3.5%	4.7%	1.9%	0.3%	1.7%	3.6%	6.5%		14.5%	2.6%	1.3%			4.9%	7.6%	2.9%	1.6%		
Bridgend	1.2%	3.8%	4.9%	2.0%	0.4%	1.5%	10.4%	5.2%		13.0%	1.7%	1.4%			5.2%	8.0%	3.0%	1.7%		
Caerphilly	1.4%	3.6%	4.7%	1.1%	0.5%	2.4%	4.6%	13.1%		10.9%	1.1%	1.3%			5.0%	7.5%	2.9%	1.6%		
Cardiff	1.9%	5.6%	5.3%	1.7%	0.7%	2.9%	4.2%	8.6%		12.1%	0.8%	2.6%	3.5%		5.6%	8.7%	3.3%	1.8%		
Carmarthenshire	2.3%	5.2%	5.1%	1.0%	0.3%	2.0%	3.1%	6.7%		7.6%	0.8%	1.6%	4.2%		5.4%	8.3%	3.1%	1.7%		
Ceredigion	4.5%	4.2%	4.8%	2.7%	0.5%	2.8%	7.9%	10.8%	0.4%	14.2%	2.4%	2.0%	9.0%		5.1%	7.8%	3.0%	1.6%	5.4%	2.4%
Conwy	1.9%	4.6%	4.5%	2.0%	0.4%	2.9%	5.4%	9.8%		10.3%	1.3%	1.0%	4.4%		4.8%	7.4%	2.8%	1.5%		
Denbighshire	2.0%	5.4%	5.1%	2.0%	0.5%	3.2%	6.5%	10.1%		12.7%	1.7%	2.2%	5.1%		5.4%	8.3%	3.2%	1.7%		
Flintshire	1.1%	4.4%	4.7%	1.0%	0.4%	2.7%	5.1%	8.0%		9.1%	1.1%	1.5%	3.0%		5.0%	7.7%	2.9%	1.6%		
Gwynedd	3.3%	4.1%	4.2%	1.8%	0.2%	2.0%	2.9%	7.3%		6.4%	1.9%	3.7%	3.1%		4.5%	6.9%	2.6%	1.4%		2.1%
Isle of Anglesey	3.8%	4.2%	4.4%	0.9%	0.2%	1.6%	3.4%	9.1%		6.4%	1.4%	1.1%	3.6%		4.7%	7.2%	2.7%	1.4%		2.2%
Merthyr Tydfil	3.9%	3.0%	4.4%	1.9%	0.6%	3.0%	5.6%	18.7%		8.7%	1.0%	1.1%			4.6%	7.0%	2.7%	1.5%		
Monmouthshire	3.6%	2.9%	4.8%	1.4%	0.4%	3.8%	10.0%	20.2%		26.1%	3.5%	3.4%	5.9%		5.1%	7.8%	3.0%	1.6%		
Neath Port Talbot	1.5%	4.9%	4.9%	1.6%	1.0%	3.7%	4.7%	11.5%		12.9%	1.5%	1.5%			5.2%	8.0%	3.0%	1.7%		
Newport	2.3%	3.8%	4.6%	1.8%	0.4%	3.4%	5.7%	14.8%		24.7%	4.0%	2.9%	4.3%		4.9%	7.5%	2.8%	1.6%		
Pembrokeshire	3.4%	4.3%	4.5%	1.5%	0.4%	1.8%	5.1%	10.5%		18.3%	2.3%	1.7%	5.2%		4.7%	7.3%	2.8%	1.5%		
Powys	2.4%	4.9%	4.8%	1.8%	0.5%	2.4%	5.0%	7.5%		11.0%	1.0%	1.7%	5.9%		5.1%	7.8%	3.0%	1.6%		
Rhondda, Cynon, Taff	1.8%	3.3%	4.5%	1.7%	0.4%	2.2%	6.5%	7.1%		8.6%	1.5%	1.0%			4.7%	7.3%	2.8%	1.5%		
Swansea	3.8%	3.6%	4.7%	2.7%	0.4%	2.9%	11.5%	13.5%		12.5%	1.3%	2.0%			5.0%	7.6%	2.9%	1.6%		
The Vale of Glamorgan	2.4%	3.4%	4.9%	2.5%	0.5%	3.3%	8.6%	13.4%		21.6%	2.5%	3.1%	5.6%		5.2%	8.0%	3.0%	1.7%		
Torfaen	3.2%	3.7%	4.4%	1.5%	0.4%	2.3%	6.6%	7.2%		14.5%	1.9%	1.8%			4.7%	7.2%	2.7%	1.5%		
Wrexham	1.5%	5.0%	4.9%	1.2%	0.4%	3.0%	4.7%	11.6%		13.3%	0.6%	1.7%	4.0%		5.2%	8.1%	3.1%	1.7%		
Wales	2.3%	4.3%	4.8%	1.7%	0.5%	2.6%	6.0%	10.1%	0.0%	12.8%	1.6%	1.9%	2.8%		5.1%	7.8%	2.9%	1.6%	0.1%	0.2%

Table A.7 : Share of the stock that is cost-effective to retrofit per measure. Each home may receive multiple measures. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend : 5 4 3 2 1

Five colour scale from maximum (red) to minimum (green) values
 Colour coded per row i.e. which measure has the greater potential in the stock per local authority.

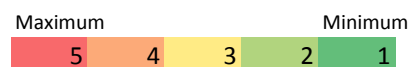
	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre/75 cavity wall insulation	75-83 cavity wall insulation	Post 83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate Primary pipework	Uninsulated cylinder to high performance	Modest cylinder insulation to high performance	Room thermostat to control heating	Total
Blaenau Gwent	£6,255	£5,745	£737,363	£178,799	£21,759	£110,101	£195,526	£548,995	£1,920,330	£355,352	£169,604	£271,801	£277,096	£30,327	£223,644					£5,052,697
Bridgend	£11,515	£11,667	£1,467,120	£364,675	£58,110	£184,610	£1,059,306	£831,774	£3,266,717	£448,547	£368,612	£540,800	£552,405	£60,341	£441,130					£9,667,327
Caerphilly	£16,274	£14,019	£1,795,546	£250,577	£94,824	£374,734	£603,487	£2,692,669	£3,501,807	£367,314	£419,518	£661,862	£660,350	£73,849	£541,657					£12,068,486
Cardiff	£41,392	£40,576	£3,768,737	£703,234	£214,717	£846,633	£1,008,622	£3,248,709	£7,156,512	£513,874	£1,535,326	£34,497,834	£1,389,206	£1,415,236	£155,003	£1,144,785				£57,680,395
Carmarthenshire	£28,874	£21,717	£2,066,471	£237,200	£56,300	£327,442	£436,927	£1,462,583	£2,588,403	£289,599	£561,653	£23,594,584	£761,728	£777,445	£84,991	£621,638				£33,917,554
Ceredigion	£22,958	£7,063	£795,014	£268,146	£37,934	£187,891	£440,642	£952,285	£206,755	£1,945,854	£336,891	£282,750	£20,460,840	£293,053	£295,464	£32,698	£237,654	£781,498	£227,639	£27,813,028
Conwy	£16,031	£12,700	£1,213,313	£320,923	£45,535	£319,677	£489,706	£1,399,754	£2,312,245	£310,400	£227,364	£16,208,453	£447,243	£453,474	£49,902	£366,521				£24,193,242
Denbighshire	£13,000	£11,867	£1,085,220	£247,425	£47,413	£280,084	£464,807	£1,147,941	£2,249,996	£308,215	£402,395	£14,845,109	£400,026	£403,020	£44,634	£328,100				£22,279,252
Flintshire	£10,949	£14,558	£1,538,139	£193,120	£53,291	£352,890	£559,352	£1,381,537	£2,464,184	£299,886	£416,977	£13,190,308	£566,978	£574,540	£63,262	£467,303				£22,147,275
Gwynedd	£29,447	£12,347	£1,225,267	£309,390	£26,251	£234,878	£288,113	£1,135,852	£1,555,665	£473,978	£906,784	£12,448,770	£451,649	£457,749	£50,394	£357,138			£350,834	£20,314,507
Isle of Anglesey	£19,450	£7,128	£734,599	£86,916	£12,705	£106,449	£192,217	£809,216	£888,689	£202,097	£155,449	£8,204,869	£270,783	£274,650	£30,213	£210,782			£210,340	£12,416,553
Merthyr Tydfil	£15,899	£3,970	£564,130	£144,162	£36,036	£159,283	£245,011	£1,294,351	£944,393	£116,289	£121,529	£207,946	£208,651	£23,202	£169,974					£4,254,827
Monmouthshire	£21,856	£5,918	£935,147	£160,472	£36,436	£304,158	£665,477	£2,106,571	£4,258,849	£595,569	£555,856	£15,800,158	£344,707	£352,008	£38,461	£284,784				£26,466,426
Neath Port Talbot	£15,014	£15,806	£1,541,139	£302,822	£152,058	£475,399	£503,076	£1,933,064	£3,396,459	£397,667	£413,022	£568,084	£578,320	£63,385	£464,349					£10,819,664
Newport	£22,272	£12,237	£1,425,258	£342,016	£61,801	£435,433	£601,544	£2,445,654	£6,391,547	£1,071,968	£758,141	£18,363,748	£525,369	£533,589	£58,619	£432,475				£33,481,670
Pembrokeshire	£30,090	£12,725	£1,288,639	£252,593	£48,772	£216,783	£495,757	£1,619,720	£4,407,349	£573,956	£418,576	£20,553,993	£475,009	£483,565	£53,000	£391,105				£31,321,634
Powys	£23,102	£15,602	£1,486,123	£333,617	£65,774	£306,974	£520,481	£1,232,696	£2,836,362	£264,317	£435,784	£25,028,316	£547,804	£553,953	£61,122	£446,752				£34,158,778
Rhondda, Cynon, Taff	£29,547	£18,034	£2,350,185	£535,715	£88,026	£477,831	£1,164,461	£1,990,533	£3,770,296	£677,550	£440,219	£866,309	£876,976	£96,660	£708,157					£14,090,501
Swansea	£63,876	£19,605	£2,519,047	£872,754	£104,911	£634,028	£2,087,485	£3,848,782	£5,598,854	£599,422	£901,334	£928,554	£936,433	£103,605	£755,061					£19,973,753
The Vale of Glamorgan	£19,943	£9,407	£1,330,629	£413,301	£63,827	£364,070	£794,182	£1,941,048	£4,905,978	£581,585	£724,542	£21,098,291	£490,487	£496,515	£54,727	£401,576				£33,690,109
Torfaen	£19,865	£7,548	£882,766	£183,596	£35,553	£187,947	£449,709	£773,454	£2,425,246	£319,955	£312,264	£325,399	£328,495	£36,307	£266,368					£6,554,471
Wrexham	£13,589	£14,886	£1,429,350	£52,332	£354,308	£462,676	£1,795,199	£3,211,157	£148,053	£419,497	£15,936,896	£526,877	£536,167	£58,787	£432,909					£25,593,050
Total	£491,198	£295,122	£32,179,200	£6,901,821	£1,414,364	£7,241,604	£13,728,566	£36,592,388	£206,755	£71,996,893	£9,252,485	£10,947,196	£260,232,168	£11,861,673	£12,026,102	£1,323,490	£9,693,863	£781,498	£788,813	£487,955,200

Table A.8 : Absolute figures of the investment estimated per local authority for the implementation of cost- effective measures. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre76 cavity wall insulation	76-83 cavity wall insulation	Post 83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder	Modest cylinder to high performance	Room thermostat to high performance	Average per property
Blaenau Gwent	£0.2	£0.2	£23.3	£5.6	£0.7	£3.5	£6.2	£17.3		£60.7	£11.2	£5.4		£8.6	£8.8	£1.0	£7.1			£160
Bridgend	£0.2	£0.2	£24.4	£6.1	£1.0	£3.1	£17.6	£13.8		£54.3	£7.5	£6.1		£9.0	£9.2	£1.0	£7.3			£161
Caerphilly	£0.2	£0.2	£23.4	£3.3	£1.2	£4.9	£7.9	£35.1		£45.7	£4.8	£5.5		£8.6	£8.6	£1.0	£7.1			£158
Cardiff	£0.3	£0.3	£26.6	£5.0	£1.5	£6.0	£7.1	£23.0		£50.6	£3.6	£10.9	£243.8	£9.8	£10.0	£1.1	£8.1			£408
Carmarthenshire	£0.4	£0.3	£25.3	£2.9	£0.7	£4.0	£5.3	£17.9		£31.6	£3.5	£6.9	£288.4	£9.3	£9.5	£1.0	£7.6			£415
Ceredigion	£0.7	£0.2	£24.2	£8.2	£1.2	£5.7	£13.4	£29.0	£6.3	£59.2	£10.3	£8.6	£622.8	£8.9	£9.0	£1.0	£7.2	£23.8	£6.9	£847
Conwy	£0.3	£0.2	£22.6	£6.0	£0.8	£6.0	£9.1	£26.1		£43.1	£5.8	£4.2	£302.2	£8.3	£8.5	£0.9	£6.8			£451
Denbighshire	£0.3	£0.3	£25.6	£5.8	£1.1	£6.6	£11.0	£27.1		£53.1	£7.3	£9.5	£350.0	£9.4	£9.5	£1.1	£7.7			£525
Flintshire	£0.2	£0.2	£23.7	£3.0	£0.8	£5.4	£8.6	£21.3		£38.0	£4.6	£6.4	£203.6	£8.8	£8.9	£1.0	£7.2			£342
Gwynedd	£0.5	£0.2	£21.1	£5.3	£0.5	£4.0	£5.0	£19.6		£26.8	£8.2	£15.6	£214.6	£7.8	£7.9	£0.9	£6.2		£6.0	£350
Isle of Anglesey	£0.6	£0.2	£22.1	£2.6	£0.4	£3.2	£5.8	£24.4		£26.8	£6.1	£4.7	£247.1	£8.2	£8.3	£0.9	£6.3		£6.3	£374
Merthyr Tydfil	£0.6	£0.2	£21.8	£5.6	£1.4	£6.1	£9.5	£49.9		£36.4	£4.5	£4.7		£8.0	£8.0	£0.9	£6.6			£164
Monmouthshire	£0.6	£0.2	£23.9	£4.1	£0.9	£7.8	£17.0	£53.9		£109.0	£15.2	£14.2	£404.6	£8.8	£9.0	£1.0	£7.3			£678
Neath Port Talbot	£0.2	£0.3	£24.4	£4.8	£2.4	£7.5	£8.0	£30.6		£53.8	£6.3	£6.5		£9.0	£9.2	£1.0	£7.4			£171
Newport	£0.4	£0.2	£23.0	£5.5	£1.0	£7.0	£9.7	£39.5		£103.2	£17.3	£12.2	£296.4	£8.5	£8.6	£0.9	£7.0			£540
Pembrokeshire	£0.5	£0.2	£22.4	£4.4	£0.8	£3.8	£8.6	£28.2		£76.6	£10.0	£7.3	£357.4	£8.3	£8.4	£0.9	£6.8			£545
Powys	£0.4	£0.3	£24.1	£5.4	£1.1	£5.0	£8.4	£20.0		£46.0	£4.3	£7.1	£405.8	£8.9	£9.0	£1.0	£7.2			£554
Rhondda, Cynon, Taff	£0.3	£0.2	£22.4	£5.1	£0.8	£4.6	£11.1	£19.0		£35.9	£6.5	£4.2		£8.3	£8.4	£0.9	£6.7			£134
Swansea	£0.6	£0.2	£23.6	£8.2	£1.0	£5.9	£19.5	£36.0		£52.4	£5.6	£8.4		£8.7	£8.8	£1.0	£7.1			£187
The Vale of Glamorgan	£0.4	£0.2	£24.5	£7.6	£1.2	£6.7	£14.6	£35.7		£90.3	£10.7	£13.3	£388.4	£9.0	£9.1	£1.0	£7.4			£620
Torfaen	£0.5	£0.2	£22.1	£4.6	£0.9	£4.7	£11.3	£19.4		£60.7	£8.0	£7.8		£8.1	£8.2	£0.9	£6.7			£164
Wrexham	£0.2	£0.3	£24.7	£3.5	£0.9	£6.1	£8.0	£31.1		£55.6	£2.6	£7.3	£275.8	£9.1	£9.3	£1.0	£7.5			£443
Average per measure	£0.4	£0.2	£23.8	£5.1	£1.0	£5.4	£10.2	£27.1	£0.2	£53.3	£6.9	£8.1	£192.8	£8.8	£8.9	£1.0	£7.2	£0.6	£0.6	£362

Table A.9 : Normalised figures of the investment needed per household in each local authority. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend :



Five colour scale from maximum (red) to minimum (green) values
 Colour coded per column i.e. which local authority has the greatest need for investment per household.

Scenario Modelling for a Low Carbon Wales
Residential sector regional modelling results - Annex

2012	2012																	
	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre76 cavity wall insulation	76-83 cavity wall insulation	Post 83 cavity wall insulation	Solid wall insulation	Dry floor insulation	Improve airtightness	Insulate primary pipework	Uninsulated cylinder to high performance	Room thermostat to control heating
Blaenau Gwent	-£96	-£98		-£56	-£45	-£35	-£28			-£50	-£32	-£4		-£47	-£45	-£111	-£97	
Bridgend	-£96	-£99		-£57	-£46	-£36	-£29			-£51	-£33	-£6		-£47	-£47	-£110	-£97	
Caerphilly	-£96	-£98		-£56	-£46	-£35	-£28			-£50	-£32	-£5		-£47	-£46	-£110	-£97	
Cardiff	-£103	-£105		-£61	-£50	-£40	-£33			-£55	-£37	-£10		-£51	-£52	-£111	-£99	
Carmarthenshire	-£93	-£95		-£56	-£46	-£37	-£31			-£50	-£34	-£10		-£47	-£48	-£97	-£87	
Ceredigion	-£101	-£103	-£13	-£63	-£56	-£49	-£44	-£12		-£59	-£47	-£28		-£57	-£66	-£112	-£100	
Conwy	-£97	-£99		-£58	-£48	-£38	-£32			-£52	-£36	-£11		-£49	-£51	-£108	-£95	
Denbighshire	-£98	-£100		-£59	-£49	-£39	-£33			-£53	-£36	-£11		-£50	-£51	-£106	-£94	
Flintshire	-£94	-£96		-£56	-£46	-£36	-£30			-£50	-£33	-£8		-£47	-£47	-£100	-£89	
Gwynedd	-£102	-£104	-£6	-£63	-£55	-£47	-£42	-£7		-£59	-£45	-£24		-£56	-£63	-£100	-£91	
Isle of Anglesey	-£99	-£101	-£2	-£61	-£53	-£45	-£40	-£4		-£56	-£43	-£22		-£54	-£60	-£102	-£91	
Merthyr Tydfil	-£96	-£98		-£56	-£45	-£35	-£28			-£50	-£32	-£5		-£47	-£45	-£110	-£97	
Monmouthshire	-£97	-£98		-£58	-£48	-£38	-£32			-£52	-£36	-£11		-£49	-£50	-£105	-£93	
Neath Port Talbot	-£95	-£97		-£56	-£45	-£35	-£29			-£50	-£32	-£6		-£47	-£46	-£109	-£96	
Newport	-£97	-£100		-£58	-£47	-£37	-£30			-£51	-£34	-£8		-£48	-£48	-£111	-£97	
Pembrokeshire	-£96	-£97		-£58	-£49	-£41	-£35			-£53	-£38	-£16		-£50	-£54	-£99	-£89	
Powys	-£96	-£97		-£58	-£49	-£40	-£35			-£53	-£38	-£16		-£50	-£54	-£97	-£87	
Rhondda, Cynon, Taff	-£96	-£98		-£56	-£46	-£35	-£29			-£50	-£32	-£5		-£47	-£46	-£110	-£97	
Swansea	-£96	-£98		-£57	-£46	-£36	-£29			-£50	-£33	-£7		-£47	-£47	-£110	-£97	
The Vale of Glamorgan	-£99	-£101		-£58	-£47	-£37	-£30			-£52	-£34	-£7		-£49	-£48	-£110	-£97	
Torfaen	-£96	-£98		-£57	-£46	-£36	-£30			-£51	-£34	-£7		-£48	-£47	-£110	-£97	
Wrexham	-£96	-£98		-£57	-£47	-£37	-£31			-£51	-£34	-£9		-£48	-£48	-£106	-£94	
2017	2017																	
Blaenau Gwent	-£163	-£166	-£37	-£111	-£100	-£89	-£82	-£34		-£104	-£86	-£58	-£16	-£101	-£110	-£227	-£203	
Bridgend	-£164	-£167	-£39	-£112	-£101	-£90	-£83	-£36		-£105	-£87	-£59	-£18	-£102	-£112	-£226	-£203	
Caerphilly	-£163	-£166	-£38	-£111	-£100	-£89	-£82	-£35		-£104	-£86	-£58	-£17	-£101	-£111	-£226	-£203	£0
Cardiff	-£177	-£179	-£54	-£122	-£111	-£100	-£93	-£47		-£115	-£97	-£70	-£30	-£112	-£125	-£228	-£206	
Carmarthenshire	-£160	-£163	-£43	-£110	-£99	-£89	-£83	-£38		-£104	-£86	-£60	-£22	-£100	-£111	-£225	-£185	
Ceredigion	-£191	-£193	-£92	-£135	-£126	-£117	-£112	-£75	-£4	-£130	-£115	-£93	-£60	-£127	-£149	-£235	-£213	-£19
Conwy	-£168	-£171	-£47	-£115	-£104	-£94	-£87	-£41		-£109	-£91	-£64	-£24	-£106	-£117	-£223	-£201	
Denbighshire	-£170	-£173	-£50	-£117	-£106	-£96	-£89	-£44		-£111	-£93	-£67	-£27	-£108	-£120	-£220	-£199	
Flintshire	-£153	-£156	-£36	-£104	-£94	-£83	-£77	-£33		-£98	-£81	-£55	-£16	-£95	-£104	-£198	-£179	
Gwynedd	-£196	-£199	-£87	-£138	-£128	-£118	-£112	-£71		-£132	-£116	-£92	-£55	-£129	-£150	-£219	-£201	-£47
Isle of Anglesey	-£185	-£187	-£76	-£129	-£119	-£110	-£104	-£63		-£124	-£108	-£84	-£47	-£121	-£139	-£216	-£197	-£34
Merthyr Tydfil	-£163	-£166	-£37	-£111	-£99	-£88	-£82	-£34		-£104	-£86	-£58	-£16	-£101	-£110	-£227	-£203	
Monmouthshire	-£169	-£172	-£49	-£116	-£105	-£95	-£88	-£43		-£110	-£92	-£65	-£25	-£106	-£118	-£219	-£197	
Neath Port Talbot	-£163	-£165	-£38	-£111	-£99	-£89	-£82	-£35		-£104	-£86	-£58	-£17	-£101	-£110	-£225	-£202	
Newport	-£166	-£168	-£41	-£113	-£102	-£91	-£84	-£37		-£106	-£88	-£61	-£19	-£103	-£113	-£227	-£203	
Pembrokeshire	-£171	-£174	-£56	-£118	-£108	-£98	-£91	-£48		-£112	-£95	-£70	-£31	-£109	-£123	-£211	-£191	-£6
Powys	-£167	-£169	-£56	-£115	-£105	-£96	-£90	-£48		-£109	-£93	-£69	-£32	-£106	-£120	-£201	-£183	-£9
Rhondda, Cynon, Taff	-£163	-£166	-£38	-£111	-£100	-£89	-£82	-£35		-£105	-£86	-£58	-£17	-£101	-£111	-£227	-£203	
Swansea	-£163	-£165	-£39	-£111	-£100	-£89	-£82	-£35		-£104	-£86	-£59	-£17	-£101	-£111	-£225	-£201	
The Vale of Glamorgan	-£167	-£169	-£43	-£114	-£103	-£92	-£85	-£39		-£107	-£89	-£62	-£21	-£104	-£115	-£225	-£202	
Torfaen	-£165	-£167	-£39	-£112	-£101	-£90	-£83	-£36		-£105	-£87	-£59	-£18	-£102	-£112	-£227	-£203	
Wrexham	-£162	-£165	-£42	-£111	-£100	-£89	-£83	-£37		-£104	-£87	-£60	-£20	-£101	-£112	-£218	-£196	
2022	2022																	
Blaenau Gwent	-£147	-£150	-£16	-£92	-£81	-£70	-£63	-£15		-£85	-£67	-£39		-£82	-£94	-£250	-£212	
Bridgend	-£149	-£151	-£19	-£93	-£82	-£71	-£64	-£17		-£87	-£69	-£40		-£84	-£96	-£250	-£212	
Caerphilly	-£148	-£150	-£17	-£93	-£81	-£70	-£63	-£16		-£86	-£68	-£39		-£83	-£95	-£250	-£212	
Cardiff	-£165	-£168	-£35	-£105	-£94	-£83	-£76	-£28		-£99	-£80	-£52	-£10	-£95	-£113	-£252	-£216	
Carmarthenshire	-£147	-£150	-£25	-£93	-£83	-£72	-£66	-£21		-£87	-£70	-£43	-£4	-£84	-£98	-£217	-£186	
Ceredigion	-£196	-£198	-£83	-£129	-£119	-£109	-£104	-£62		-£123	-£107	-£83	-£46	-£120	-£150	-£270	-£234	-£8
Conwy	-£155	-£158	-£27	-£98	-£87	-£76	-£70	-£23		-£92	-£74	-£46	-£5	-£89	-£103	-£245	-£209	
Denbighshire	-£158	-£161	-£31	-£100	-£90	-£79	-£72	-£26		-£94	-£76	-£49	-£8	-£91	-£107	-£240	-£206	
Flintshire	-£140	-£142	-£18	-£88	-£77	-£67	-£60	-£16		-£81	-£64	-£38		-£78	-£90	-£209	-£179	
Gwynedd	-£197	-£199	-£73	-£128	-£118	-£107	-£101	-£56		-£122	-£105	-£78	-£38	-£119	-£147	-£239	-£210	-£51
Isle of Anglesey	-£182	-£184	-£62	-£118	-£108	-£98	-£91	-£47		-£112	-£95	-£69	-£30	-£109	-£133	-£234	-£204	-£37
Merthyr Tydfil	-£147	-£149	-£16	-£92	-£81	-£70	-£63	-£15		-£85	-£67	-£39		-£82	-£94	-£250	-£212	
Monmouthshire	-£156	-£159	-£29	-£99	-£88	-£77	-£71	-£24		-£93	-£75	-£47	-£6	-£89	-£105	-£238	-£203	
Neath Port Talbot	-£147	-£150	-£18	-£92	-£81	-£70	-£64	-£16		-£86	-£68	-£39		-£83	-£95	-£248	-£210	
Newport	-£151	-£153	-£21	-£95	-£84	-£73	-£66	-£18		-£88	-£70	-£42	£0	-£85	-£98	-£251	-£213	
Pembrokeshire	-£161	-£163	-£38	-£103	-£92	-£82	-£75	-£30		-£97	-£79	-£53	-£13	-£94	-£111	-£225	-£194	-£5
Powys	-£158	-£160	-£40	-£101	-£91	-£81	-£75	-£31		-£95	-£78	-£53	-£15	-£92	-£110	-£212	-£184	-£9
Rhondda, Cynon, Taff	-£148	-£150	-£17	-£93	-£81	-£70	-£64	-£16		-£86	-£68	-£39		-£83	-£95	-£250	-£212	
Swansea	-£148	-£150	-£19	-£93	-£82	-£71	-£64	-£17		-£86	-£68	-£40		-£83	-£95	-£247	-£210	
The Vale of Glamorgan	-£153	-£155	-£23	-£96	-£85	-£74	-£67	-£20		-£90	-£71	-£43	-£1	-£86	-£100	-£248	-£211	
Torfaen	-£149	-£152	-£19	-£94	-£83	-£72	-£65	-£17		-£87	-£69	-£40		-£84	-£96	-£250	-£213	
Wrexham	-£149	-£151	-£23	-£94	-£83	-£72	-£66	-£19		-£87	-£70	-£42	-£1	-£84	-£98	-£237	-£202	

Table A.10 : Cost effectiveness of each measure assuming lifetime cost and CO2 savings as calculated at 2012, 2017 and 2022. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend : Maximum 5 4 3 2 1 Minimum

Five colour scale from maximum (red) to minimum (green) values
Colour coded per row i.e. most cost effective measure per local authority.

Scenario Modelling for a Low Carbon Wales
Residential sector regional modelling results - Annex

2012	2012								2017								2022							
	Glazing - single to new	Glazing - old double to new	Glazing (to Best Practice)	Loft insulation 0 - 270mm	Loft insulation 25 - 270mm	Loft insulation 50 - 270mm	Loft insulation 75 - 270mm	Loft insulation 100 - 270mm	Paper type solid wall insulation	Pre-76 cavity wall insulation	75-83 cavity wall insulation	Post 83 cavity wall insulation	Solid wall insulation	DIY floor insulation	Improve airtightness	Insulate airtightness	Uninsulated pipework	Modest cylinder to high performance	Room thermostat to control heating					
Blaenau Gwent	-£96	-£98		-£56	-£45	-£35	-£28		-£50	-£32	-£4		-£47	-£45	-£111	-£97								
Bridgend	-£96	-£99		-£57	-£46	-£36	-£29		-£51	-£33	-£6		-£47	-£47	-£110	-£97								
Caerphilly	-£96	-£98		-£56	-£46	-£35	-£28		-£50	-£32	-£5		-£47	-£46	-£110	-£97								
Cardiff	-£103	-£105		-£61	-£50	-£40	-£33		-£55	-£37	-£10		-£51	-£52	-£111	-£99								
Carmarthenshire	-£93	-£95		-£56	-£46	-£37	-£31		-£50	-£34	-£10		-£47	-£48	-£97	-£87								
Ceredigion	-£101	-£103	-£13	-£63	-£56	-£49	-£44	-£12	-£59	-£47	-£28		-£57	-£66	-£112	-£100								
Conwy	-£97	-£99		-£58	-£48	-£38	-£32		-£52	-£36	-£11		-£49	-£51	-£108	-£95								
Denbighshire	-£98	-£100		-£59	-£49	-£39	-£33		-£53	-£36	-£11		-£50	-£51	-£106	-£94								
Flintshire	-£94	-£96		-£56	-£46	-£36	-£30		-£50	-£33	-£8		-£47	-£47	-£100	-£89								
Gwynedd	-£102	-£104	-£6	-£63	-£55	-£47	-£42	-£7	-£59	-£45	-£24		-£56	-£63	-£100	-£91								
Isle of Anglesey	-£99	-£101	-£2	-£61	-£53	-£45	-£40	-£4	-£56	-£43	-£22		-£54	-£60	-£102	-£91								
Merthyr Tydfil	-£96	-£98		-£56	-£45	-£35	-£28		-£50	-£32	-£5		-£47	-£45	-£110	-£97								
Monmouthshire	-£97	-£98		-£58	-£48	-£38	-£32		-£52	-£36	-£11		-£49	-£50	-£105	-£93								
Neath Port Talbot	-£95	-£97		-£56	-£45	-£35	-£29		-£50	-£32	-£6		-£47	-£46	-£109	-£96								
Newport	-£97	-£100		-£58	-£47	-£37	-£30		-£51	-£34	-£8		-£48	-£48	-£111	-£97								
Pembrokeshire	-£96	-£97		-£58	-£49	-£41	-£35		-£53	-£38	-£16		-£50	-£54	-£99	-£89								
Powys	-£96	-£97		-£58	-£49	-£40	-£35		-£53	-£38	-£16		-£50	-£54	-£97	-£87								
Rhondda, Cynon, Taff	-£96	-£98		-£56	-£46	-£35	-£29		-£50	-£32	-£5		-£47	-£46	-£110	-£97								
Swansea	-£96	-£98		-£57	-£46	-£36	-£29		-£50	-£33	-£7		-£47	-£47	-£110	-£97								
The Vale of Glamorgan	-£99	-£101		-£58	-£47	-£37	-£30		-£52	-£34	-£7		-£49	-£48	-£110	-£97								
Torfaen	-£96	-£98		-£57	-£46	-£36	-£30		-£51	-£34	-£7		-£48	-£47	-£110	-£97								
Wrexham	-£96	-£98		-£57	-£47	-£37	-£31		-£51	-£34	-£9		-£48	-£48	-£106	-£94								
2017																								
Blaenau Gwent	-£163	-£166	-£37	-£111	-£100	-£89	-£82	-£34	-£104	-£86	-£58	-£16	-£101	-£110	-£227	-£203								
Bridgend	-£164	-£167	-£39	-£112	-£101	-£90	-£83	-£36	-£105	-£87	-£59	-£18	-£102	-£112	-£226	-£203								
Caerphilly	-£163	-£166	-£38	-£111	-£100	-£89	-£82	-£35	-£104	-£86	-£58	-£17	-£101	-£111	-£226	-£203								
Cardiff	-£177	-£179	-£54	-£122	-£111	-£100	-£93	-£47	-£115	-£97	-£70	-£30	-£112	-£125	-£228	-£206			£0					
Carmarthenshire	-£160	-£163	-£43	-£110	-£99	-£89	-£83	-£38	-£104	-£86	-£60	-£22	-£100	-£111	-£205	-£185								
Ceredigion	-£191	-£193	-£92	-£135	-£126	-£117	-£112	-£75	-£130	-£115	-£93	-£60	-£127	-£149	-£235	-£213			-£19					
Conwy	-£168	-£171	-£47	-£115	-£104	-£94	-£87	-£41	-£109	-£91	-£64	-£24	-£106	-£117	-£223	-£201								
Denbighshire	-£170	-£173	-£50	-£117	-£106	-£96	-£89	-£44	-£111	-£93	-£67	-£27	-£108	-£120	-£220	-£199								
Flintshire	-£153	-£156	-£36	-£104	-£94	-£83	-£77	-£33	-£98	-£81	-£55	-£16	-£95	-£104	-£198	-£179								
Gwynedd	-£196	-£199	-£87	-£138	-£128	-£118	-£112	-£71	-£132	-£116	-£92	-£55	-£129	-£150	-£219	-£201			-£47					
Isle of Anglesey	-£185	-£187	-£76	-£129	-£119	-£110	-£104	-£63	-£124	-£108	-£84	-£47	-£121	-£139	-£216	-£197			-£34					
Merthyr Tydfil	-£163	-£166	-£37	-£111	-£99	-£88	-£82	-£34	-£104	-£86	-£58	-£16	-£101	-£110	-£227	-£203								
Monmouthshire	-£169	-£172	-£49	-£116	-£105	-£95	-£88	-£43	-£110	-£92	-£65	-£25	-£106	-£118	-£219	-£197								
Neath Port Talbot	-£163	-£165	-£38	-£111	-£99	-£89	-£82	-£35	-£104	-£86	-£58	-£17	-£101	-£110	-£225	-£202								
Newport	-£166	-£168	-£41	-£113	-£102	-£91	-£84	-£37	-£106	-£88	-£61	-£19	-£103	-£113	-£227	-£203								
Pembrokeshire	-£171	-£174	-£56	-£118	-£108	-£98	-£91	-£48	-£112	-£95	-£70	-£31	-£109	-£123	-£211	-£191			-£6					
Powys	-£167	-£169	-£56	-£115	-£105	-£96	-£90	-£48	-£109	-£93	-£69	-£32	-£106	-£120	-£201	-£183			-£9					
Rhondda, Cynon, Taff	-£163	-£166	-£38	-£111	-£100	-£89	-£82	-£35	-£105	-£86	-£58	-£17	-£101	-£111	-£227	-£203								
Swansea	-£163	-£165	-£39	-£111	-£100	-£89	-£82	-£35	-£104	-£86	-£59	-£17	-£101	-£111	-£225	-£201								
The Vale of Glamorgan	-£167	-£169	-£43	-£114	-£103	-£92	-£85	-£39	-£107	-£89	-£62	-£21	-£104	-£115	-£225	-£202								
Torfaen	-£165	-£167	-£39	-£112	-£101	-£90	-£83	-£36	-£105	-£87	-£59	-£18	-£102	-£112	-£227	-£203								
Wrexham	-£162	-£165	-£42	-£111	-£100	-£89	-£83	-£37	-£104	-£87	-£60	-£20	-£101	-£112	-£218	-£196								
2022																								
Blaenau Gwent	-£147	-£150	-£16	-£92	-£81	-£70	-£63	-£15	-£85	-£67	-£39		-£82	-£94	-£250	-£212								
Bridgend	-£149	-£151	-£19	-£93	-£82	-£71	-£64	-£17	-£87	-£69	-£40		-£84	-£96	-£250	-£212								
Caerphilly	-£148	-£150	-£17	-£93	-£81	-£70	-£63	-£16	-£86	-£68	-£39		-£83	-£95	-£250	-£212								
Cardiff	-£165	-£168	-£35	-£105	-£94	-£83	-£76	-£28	-£99	-£80	-£52	-£10	-£95	-£113	-£252	-£216								
Carmarthenshire	-£147	-£150	-£25	-£93	-£83	-£72	-£66	-£21	-£87	-£70	-£43	-£4	-£84	-£98	-£217	-£186								
Ceredigion	-£196	-£198	-£83	-£129	-£119	-£109	-£104	-£62	-£123	-£107	-£83	-£46	-£120	-£150	-£270	-£234			-£8					
Conwy	-£155	-£158	-£27	-£98	-£87	-£76	-£70	-£23	-£92	-£74	-£46	-£5	-£89	-£103	-£245	-£209								
Denbighshire	-£158	-£161	-£31	-£100	-£90	-£79	-£72	-£26	-£94	-£76	-£49	-£8	-£91	-£107	-£240	-£206								
Flintshire	-£140	-£142	-£18	-£88	-£77	-£67	-£60	-£16	-£81	-£64	-£38		-£78	-£90	-£209	-£179								
Gwynedd	-£197	-£199	-£73	-£128	-£118	-£107	-£101	-£56	-£122	-£105	-£78	-£38	-£119	-£147	-£239	-£210			-£51					
Isle of Anglesey	-£182	-£184	-£62	-£118	-£108	-£98	-£91	-£47	-£112	-£95	-£69	-£30	-£109	-£133	-£234	-£204			-£37					
Merthyr Tydfil	-£147	-£149	-£16	-£92	-£81	-£70	-£63	-£15	-£85	-£67	-£39		-£82	-£94	-£250	-£212								
Monmouthshire	-£156	-£159	-£29	-£99	-£88	-£77	-£71	-£24	-£93	-£75	-£47	-£6	-£89	-£105	-£238	-£203								
Neath Port Talbot	-£147	-£150	-£18	-£92	-£81	-£70	-£64	-£16	-£86	-£68	-£39		-£83	-£95	-£248	-£210								
Newport	-£151	-£153	-£21	-£95	-£84	-£73	-£66	-£18	-£88	-£70	-£42	£0	-£85	-£98	-£251	-£213								
Pembrokeshire	-£161	-£163	-£38	-£103	-£92	-£82	-£75	-£30	-£97	-£79	-£53	-£13	-£94	-£111	-£225	-£194			-£5					
Powys	-£158	-£160	-£40	-£101	-£91	-£81	-£75	-£31	-£95	-£78	-£53	-£15	-£92	-£110	-£212	-£184			-£9					
Rhondda, Cynon, Taff	-£148	-£150	-£17	-£93	-£81	-£70	-£64	-£16	-£86	-£68	-£39		-£83	-£95	-£250	-£212								
Swansea	-£148	-£150	-£19	-£93	-£82	-£71	-£64	-£17	-£86	-£68	-£40		-£83	-£95	-£247	-£210								
The Vale of Glamorgan	-£153	-£155	-£23	-£96	-£85	-£74	-£67	-£20	-£90	-£71	-£43	-£1	-£86	-£100	-£248	-£211								
Torfaen	-£149	-£152	-£19	-£94	-£83	-£72	-£65	-£17	-£87	-£69	-£40		-£84	-£96	-£250	-£213								
Wrexham	-£149	-£151	-£23	-£94	-£83	-£72	-£66	-£19	-£87	-£70	-£42	-£1	-£84	-£98	-£237	-£202								

Table A.11 : Cost effectiveness of each measure assuming lifetime cost and CO2 savings as calculated at 2012, 2017 and 2022. High fuel cost scenario, EMR grid decarbonisation profile, 7% interest rate, taxation included.

Legend :

Maximum	5	4	3	2	1	Minimum
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Five colour scale from maximum (red) to minimum (green) values
Colour coded per column i.e. local authority where the measure is most cost effective.