



# **CARBON COMPLIANCE**

Setting an appropriate limit for zero carbon new homes

## **Technical Feasibility Charts**

# TECHNICAL FEASIBILITY HOUSES

East Pennines Location			Carbon Compliance Level									
kgCO <sub>2</sub> (eq)/m <sup>2</sup> /yr			12		11		10		9		8	
<b>Detached House</b>	<b>Communal options</b>	Biomass boiler										
		Biomass CHP					1.5		3.4		5.3	
		Gas CHP	4.9		6.8		8.7		10.6	0.6	12.6	2.5
		GSHP	2.1		4.0		5.9		7.9	1.8	9.8	3.8
	<b>Individual options</b>	ASHP + SHW	5.1		7.1		9.0	1.6	10.9	3.6	12.9	5.5
		ASHP	11.6	4.3	13.6	6.3	15.5	8.2	17.4	10.1	19.4	12.1
		Gas + SHW	5.5		7.4		9.3	1.1	11.3	3.0	13.2	5.0
		Gas	10.1	2.0	12.0	3.9	14.0	5.9	15.9	7.8	17.8	9.7
<b>End Terrace House</b>	<b>Communal options</b>	Biomass boiler										
		Biomass CHP					0.6		1.8		3.1	
		Gas CHP	4.5		5.8		7.0		8.3		9.5	1.1
		GSHP	3.7		4.9		6.2	1.1	7.4	2.3	8.7	3.6
	<b>Individual options</b>	ASHP + SHW	6.0		7.2	1.1	8.5	2.3	9.7	3.6	11.0	4.8
		ASHP	11.9	5.8	13.1	7.0	14.4	8.3	15.6	9.5	16.9	10.8
		Gas + SHW	5.9		7.2	0.4	8.4	1.6	9.7	2.9	10.9	4.1
		Gas	10.1	3.5	11.4	4.7	12.6	6.0	13.9	7.2	15.1	8.5
<b>Mid Terrace House</b>	<b>Communal options</b>	Biomass boiler										
		Biomass CHP									0.9	
		Gas CHP	2.3		3.6		4.8		6.1		7.3	
		GSHP	2.1		3.4		4.6	0.1	5.9	1.3	7.1	2.6
	<b>Individual options</b>	ASHP + SHW	4.2		5.4		6.7	1.2	7.9	2.4	9.2	3.7
		ASHP	10.1	4.7	11.3	5.9	12.6	7.2	13.8	8.4	15.1	9.7
		Gas + SHW	4.0		5.2		6.5	0.4	7.7	1.6	9.0	2.9
		Gas	8.2	2.3	9.4	3.5	10.7	4.8	11.9	6.0	13.2	7.3
<b>Fabric specification *</b>			FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C

Number in cell = m<sup>2</sup> PV required

Key	Area of solar technology required, as % of ground floor area <sup>†</sup>	No PV	Up to 25%	25% to 40%	40% to 60%	60% to 80%	over 80%
-----	---	-------	-----------	------------	------------	------------	----------

\* FEES = Minimum Fabric Energy Efficiency Standard for 2016; Spec C = Example higher fabric specification

<sup>†</sup> SE/SW facing, 45 deg pitch, none/ v. little overshadowing

# TECHNICAL FEASIBILITY LOW-RISE APARTMENT BLOCKS

East Pennines Location			Carbon Compliance Level									
kgCO <sub>2</sub> (eq)/m <sup>2</sup> /yr			14		13		12		11		10	
<b>3-Storey Apartment Block</b>	<b>Shared/Communal options</b>	Biomass boiler										
		Biomass CHP										
		Gas CHP			2		23		44		66	
		GSHP	3		24		46		67		89	18
	<b>Individual options</b>	ASHP + SHW	59		80		102	17	123	39	144	60
		ASHP	170	83	191	105	213	126	234	148	256	169
		Gas + SHW	47		68		90		111	18	133	40
		Gas	126	30	148	52	169	73	191	94	212	116
<b>4-Storey Apartment Block</b>	<b>Shared/Communal options</b>	Biomass boiler										
		Biomass CHP										
		Gas CHP					17		46		74	
		GSHP			24		52		81		109	18
	<b>Individual options</b>	ASHP + SHW	68		96		125	17	154	45	182	74
		ASHP	219	105	247	134	276	162	304	191	333	219
		Gas + SHW	51		80		109		137	18	166	47
		Gas	157	33	186	61	215	90	243	119	272	147
<b>Fabric specification *</b>			FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C

Number in cell = m<sup>2</sup> PV required

Key	Area of solar technology required, as % of ground floor area <sup>†</sup>	No PV	Up to 25%	25% to 40%	40% to 60%	60% to 80%	over 80%
-----	---	-------	-----------	------------	------------	------------	----------

\* FEES = Minimum Fabric Energy Efficiency Standard for 2016; Spec C = Example higher fabric specification

<sup>†</sup> SE/SW facing, 45 deg pitch, none/ v. little overshadowing

# TECHNICAL FEASIBILITY HIGH-RISE APARTMENT BLOCKS

East Pennines Location			Carbon Compliance Level									
kgCO <sub>2</sub> (eq)/m <sup>2</sup> /yr			14		13		12		11		10	
<b>8-Storey Apartment Block</b>	Shared/ Communal options	Biomass boiler										
		Biomass CHP										
		Gas CHP							51		109	
		GSHP			20		78		135		192	20
	Individual options	ASHP	414	192	471	249	528	306	586	364	643	421
		Gas	281	44	338	101	395	158	453	215	510	273
<b>20-Storey Apartment Block</b>	Shared/ Communal options	Biomass boiler										
		Biomass CHP										
		Gas CHP							68		211	
		GSHP			11		154		297		440	25
	Individual options	ASHP	999	453	1143	596	1286	739	1429	882	1572	1026
		Gas	652	76	795	220	938	363	1081	506	1224	649
Fabric specification *			FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C	FEES	Spec C

Number in cell = m<sup>2</sup> PV required

Key	Area of solar technology required, as % of ground floor area †	No PV	Up to 25%	25% to 40%	40% to 60%	60% to 80%	over 80%
-----	--	-------	-----------	------------	------------	------------	----------

\* FEES = Minimum Fabric Energy Efficiency Standard for 2016; Spec C = Example higher fabric specification

† SE/SW facing, 45 deg pitch, none/ v. little overshadowing