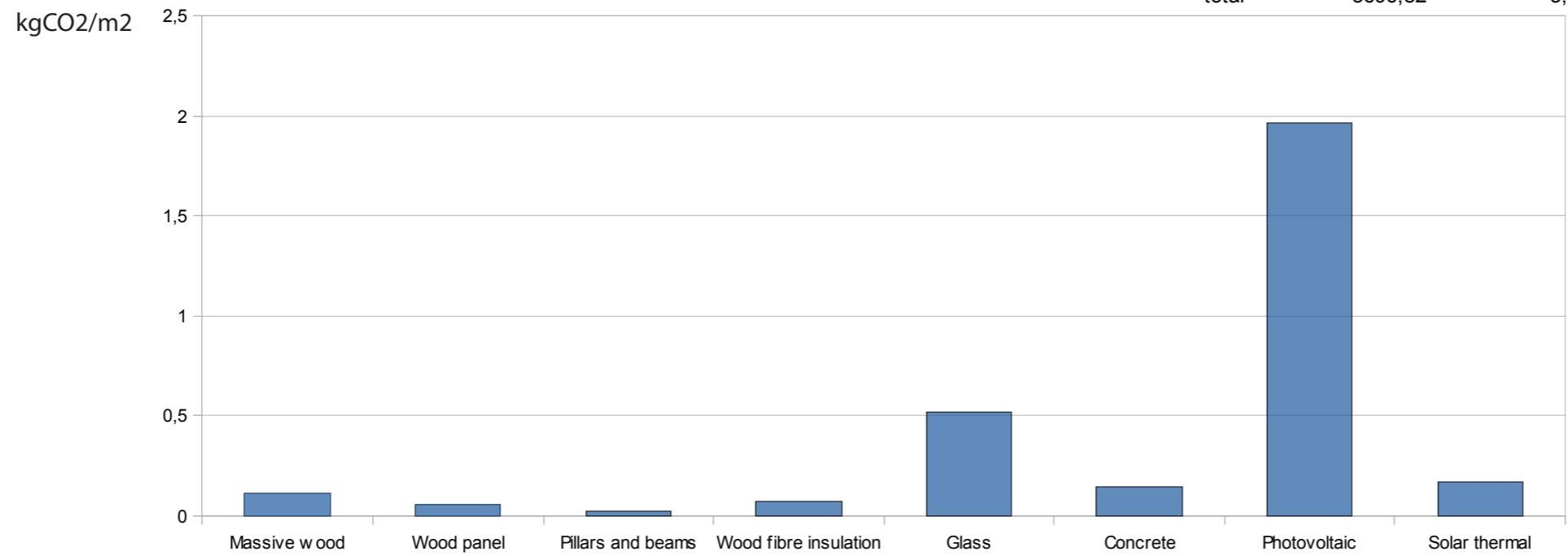


EMISSION CALCULATIONS

**Embodied emissions**

	Amount	kg/m3	kg	kgCO2/kg or /m2	kgCO2	Lifetime kgCO2/year	kgCO2/m2/year
Massive wood	222,8 m3	450	100260	0,08	8000,75	60	133,35
Wood panel	26,9 m3	450	12105	0,08	965,98	15	64,4
Pillars and beams	35,8 m3	450	16119	0,08	1286,3	60	21,44
Wood fibre insulation	337,2 m3	40	13488	0,37	4963,58	60	82,73
Glass	331,8 m2			56,9	18879,42	30	629,31
Concrete	38,8 m3	2400	93120	0,11	10243,2	60	170,72
Photovoltaic	360 m2			199,28	71740,8	30	2391,36
Solar thermal	45 m2			90,45	4070,25	20	203,51
						total	3696,82
							3,04



Energy production						
	<b>Area</b>	<b>Efficiency</b>	<b>Irradiation</b>	<b>Energy output</b>	<b>CO2 repaid</b>	
Photovoltaics	360 m2	20 %	1005 kwh/m2	72360 kwh	9551,52 kgCO2	7,85 kgCO2/m2
Solar thermal	45 m2	60 %	1005 kwh/m2	27135 kwh	3581,82	

Energy demand		Heated area Apartments if	1216 m2 15		
Heating	6,9 kwh/m2	8390 kwh	1107,53	0,91	
Hot water	9 kwh/m2	10944 kwh	1444,61	1,19	
Lighting	10 kwh/m2	12160 kwh	1605,12	1,32	
Appliances	828 kwh/m2	12420 kwh	1639,44	1,35	
Total	853,9	43914 kwh	5796,7 kgCO2	4,77 kgCO2/m2	

Heating is simulated with use of heat pump with heat recovery (80% recovery and COP 3,0)

Hot water is taken from a report from Sintef about energy use in buildings

Lighting is taken from enovas homepage, with an efficient lighting system.

Hot water is reduced with 40% because of a heat exchanger (could be 70% if it was directly next to the shower/washing machine, but then you would need many devices)

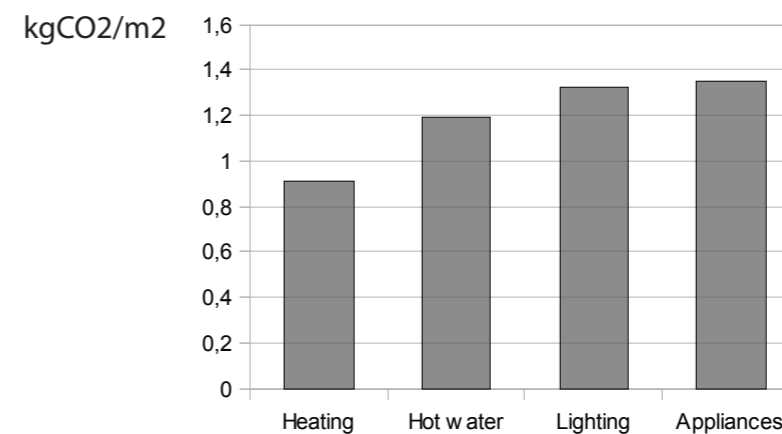
Appliances are the most energy efficient ones.

Appliances  
Family 4

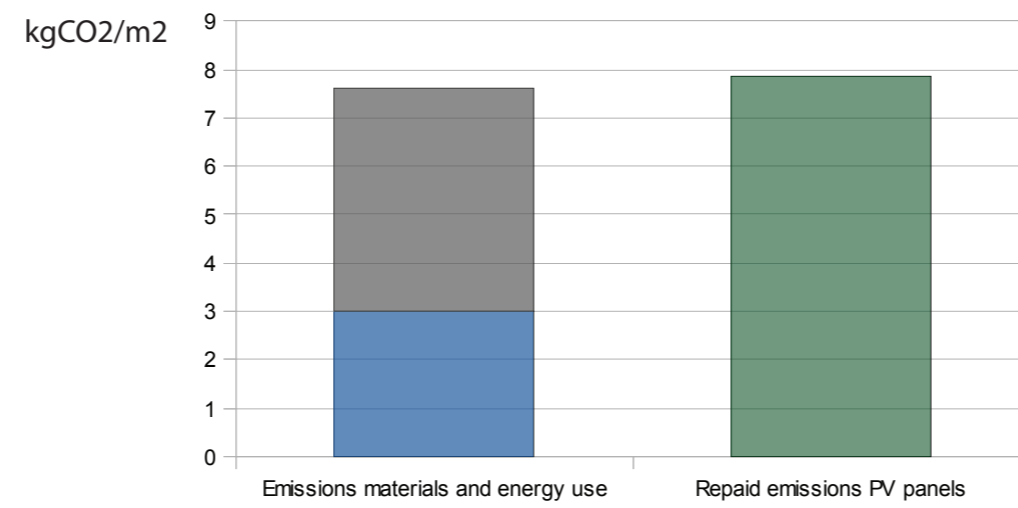
**A++ market**

Fridge + freezer (	177 kwh
Dish washer	180
Washing machine	100
Oven	146
TV	124
Computer	21
Coffee maker	80

Total	828	8280
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Emissions materials and energy use	3	4,59 kgCO2/m2
Repaid emissions PV panels	7,85	



ARK 5