Quantitative analysis of carbon neutrality by 2030
July 2020 addendum

The Quantitative analysis of carbon neutrality by 2030 report, was prepared by Oxera at the end of 2019. At the time of development, the most appropriate carbon factor for imported electricity was 0.092kgCO$_2$e/kWh, as stated in *Table 3.4 Carbon emission factors by heating sources* on page 22 of the report:

Table 3.4   Carbon emission factors by heating sources

Heating sources	Carbon factor (kgCO$_2$e/kWh)
Fuel oil	0.26
LPG	0.21
Electricity	0.092

This carbon factor for imported electricity was sourced from the Developing an approach to domestic energy efficiency retrofit in Jersey report as prepared by Richardo-AEA in 2015.

After the development of the Quantitative analysis of carbon neutrality by 2030 report, we worked with Aether on the Development of an emission factor for imported electricity. This report focuses on establishing and understanding a nationwide grid electricity carbon factor. *Table 1 Emissions electricity and grid emission factor* from this report highlights in a red box the recommended factors to use for each given year:

	2014	2015	2016	2017	2018	Trend
Electricity Generation emissions (kt CO2eq)						
A: JE Generation	53.66	6.42	17.73	3.81	2.29	
B: JE Operations (non electricity use)	0.39	0.44	0.44	0.44	0.38	
C: Imported electricity (Scope 2)	2.75	2.95	2.90	2.96	3.04	
D: Energy from Waste	9.12	9.85	11.80	10.37	10.36	
E: Waste collection and WfE Operations			! No Data !			
Total emissions	65.92	19.65	32.87	17.57	16.07	
Electricity						
F: Total generated & imported (GWh)	667	667	676	666	674	
G: Total consumed (GWh)	616	624	638	622	635	
Losses GWh	51	43	37	44	39	
Losses %	8%	6%	6%	7%	6%	
Grid electricity factor (kt CO2eq/GWh)						
1.Full scope emissions/electricity supplied:- *[Sum(A:E)/G]*	0.107	0.032	0.051	0.028	0.025	
2.Full scope emissions/electricity generated :- *[Sum(A:E)/F]*	0.099	0.029	0.049	0.026	0.024	
3.Pure Scope 2:- *[(A+D)/F]*	0.094	0.024	0.044	0.021	0.019	
Std dv.	0.006	0.004	0.004	0.004	0.003	
Min	0.09	0.02	0.04	0.02	0.02	
Max	0.11	0.03	0.05	0.03	0.03	
Imported electricity Implied Emission Factor (kt CO2eq/GWh)	0.0049	0.0047	0.0047	0.0047	0.0048	

The intention is for this more accurate method of calculating annual carbon factors for imported electricity to be used to help better understand the carbon impacts of ongoing electricity use in Jersey.

Applying the latest (2018) carbon factor of 0.025kgCO$_2$e/kWh to the Oxera modelling results in a 27% reduction in average carbon emissions for all electric heating systems across each housing type. These changes are highlighted in red boxes on the below updated version of *Table 3.5 Breakdown of*

average energy consumption for heating from page 23 of the Quantitative analysis of carbon neutrality by 2030 report:

Property type		Average energy consumption (unscaled) (kWh/annually)	Scaling factor	Carbon factor kgCO2e/kWh)	Average carbon emission (kg CO2e)
		[A]	[B]	[C]	[A] x [B] x [C]
Detached house	Fuel oil	20,897	120%	0.26	6542
	LPG	6,888	120%	0.21	1742
	Air source heat pumps	3,776	120%	0.025	114
	Other electric technologies	11,327	120%	0.025	341
Semi-detached house	Fuel oil	20,897	107%	0.26	5788
	LPG	6,888	107%	0.21	1541
	Air source heat pumps	3,776	107%	0.025	101
	Other electric technologies	11,327	107%	0.025	302
Terraced house	Fuel oil	20,897	93%	0.26	5056
	LPG	6,888	93%	0.21	1346
	Air source heat pumps	3,776	93%	0.025	88
	Other electric technologies	11,327	93%	0.025	264
Flat	Fuel oil	20,897	80%	0.26	4347
	LPG	6,888	80%	0.21	1157
	Air source heat pumps	3,776	80%	0.025	76
	Other electric technologies	11,327	80%	0.025	227