

**ADAPTATION AND RESILIENCE  
(CLIMATE CHANGE)  
(A&RCC)**

Report for 2009/10

JULY 2011

# **Adaptation and Resilience**

**(Climate Change)**

**(A&RCC) Report**

**July 2011**

**Commissioned by the Department for Business, Innovation  
and Skills**

**from**



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We welcome feedback on the issues raised by this BIS commissioned study and comments should be sent to:  
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## 1. Introduction

This paper presents the results from a pilot study which aims to identify and measure a defined set of environmental Adaptation and Resilience activities, in relation to Climate Change, (A&RCC) in the UK economy, by drawing on the K-Matrix dataset for Low Carbon Environmental Goods and Services (LCEGS). An initial list of A&RCC activities to be investigated as per Defra's advice were considered, these included:

- Construction & retrofit
- Finance, investment & insurance
- Risk management & business continuity
- Urban environment redesign & re-engineering
- Sustainable drainage & water management
- Energy storage infrastructure resilience
- Transport infrastructure & logistics resilience, and
- Water irrigation & foot printing.

The approach to measuring A&RCC activities is two- fold. Firstly, to quantify activities (listed above) that were new to the current Low Carbon Environmental Goods and Services (LCEGS) definition (see Section 3 and 4 for results) and, secondly, to try and assess existing LCEGS activities in terms of their A&RCC content (see section 5 for results). However, the results in section 5 should be treated with caution given that this is a pilot study and the testing of the methodology suggested that Level 5 data used to derive results was too aggregated to provide a robust assessment of the level of adaptation and resilience content within the activities investigated.

The success, or otherwise, of each approach is outlined in this report, which should be read in conjunction with the main 2009/ 10 LCEGS Report.

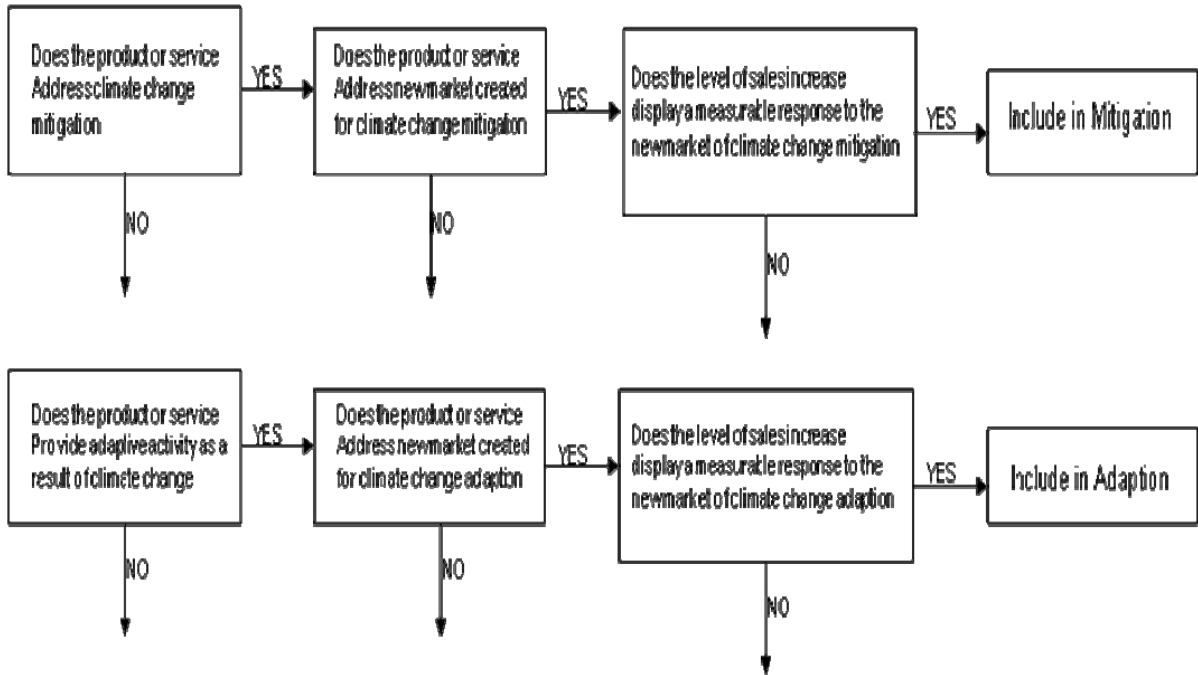
## 2. Methodology and Definition

### 2.1 Methodology

A detailed explanation of our standard methodology is outlined in the main LCEGS 2009/ 10 report and, for brevity, is not repeated here. What is described here is the decision making criteria used to decide if an economic activity should be considered as adaptive or resilient and, therefore, included in this research.

The model at Figure 1 was applied to the new A&RCC activities identified by Defra. It takes into account both Adaptation to and Mitigation of climate change. It is a triple-gate approach that addresses the claim for A&RCC (Step 1), the intent to create new A&RCC market rather than create a substitution effect for existing goods and services (Step 2) and finally, the A&RCC economic impact i.e. is it measurable and significant. The most critical stage in the model is Step 2, trying to isolate the “intent” of use for products and services that may have multiple functions and applications.

**Figure 1: Decision Model**



The inclusion of A&RCC activities is, therefore, subjective but based upon a survey of the available economic (rather than purely environmental) evidence. In reviewing the evidence base (a full list of sources for LCEGS and A&RCC research is provided separately) it became clear that there were three main drivers for A&RCC activity-demand due to climate change itself, demand due to legislation and demand as a result of marketing influence (behavioural change).

## 2.2 Definition

This model was then applied to the suggested Defra headings and a more detailed definition and break down of A&RCC activities was created. Figure 2 shows new A&RCC activity headings at Level 3 and 4. In total, 163 A&RCC activities were identified at Level 5 and the full listings are shown at Annex A.

These are all activities that are currently not included in the LCEGS definition and, therefore, count as “new” A&RCC activities. Most of the activities have been drawn from existing definitions of other sectors- Construction, Finance and Agriculture- but we were careful to ensure that they were substantively different from existing LCEGS activities and that the data values were calculated from different sources.

Once the A&RCC activities had been defined and tested they were then populated with global data so that the new activities could be added to, and compared with, the 2009/ 10 LCEGS data set.

**Figure 2: A&R Activities**

Level 2	Level 3	Level 4
Adaptation and Resilience	Architectural	Architectural Design Services
Adaptation and Resilience	Architectural	Architectural Engineering
Adaptation and Resilience	Architectural	Architectural Project Management Service
Adaptation and Resilience	Climate Change Management	Waterways and Barrier Management
Adaptation and Resilience	Climate Change Management	Weather Station Services
Adaptation and Resilience	Construction & Retrofit	Adaptive Civil Engineering Services
Adaptation and Resilience	Construction & Retrofit	Agricultural
Adaptation and Resilience	Construction & Retrofit	Domestic
Adaptation and Resilience	Construction & Retrofit	Domestic Urban Enviro Redesign & Re Engineering
Adaptation and Resilience	Construction & Retrofit	Industrial
Adaptation and Resilience	Construction & Retrofit	Industrial Urban Enviro Redesign & Re Engineering
Adaptation and Resilience	Construction & Retrofit	Manufacture of retro Fit Engineering Equipment
Adaptation and Resilience	Construction & Retrofit	Manufacture of Retro Fit Materials
Adaptation and Resilience	Construction & Retrofit	Manufactures of Temporary Accommodation for Renovation Projects
Adaptation and Resilience	Construction & Retrofit	Public
Adaptation and Resilience	Construction & Retrofit	Public Urban Enviro Redesign & Re Engineering
Adaptation and Resilience	Construction & Retrofit	Retro Fit Buldings Services

<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
Adaptation and Resilience	Construction & Retrofit	Suppliers of Temporary Accommodation for Renovation Projects
Adaptation and Resilience	Construction & Retrofit	Supply of Retro Fit Engineering Equipment
Adaptation and Resilience	Construction & Retrofit	Supply of Retrofit Materials
Adaptation and Resilience	Enviro Finance	Enviro Finance
Adaptation and Resilience	Enviro Finance	Enviro Finance Planning
Adaptation and Resilience	Finance Investment & Insurance	Banking Services
Adaptation and Resilience	Finance Investment & Insurance	Equity investment Services
Adaptation and Resilience	Finance Investment & Insurance	Insurance Services
Adaptation and Resilience	Risk Management & Business Continuity	Business Continuity
Adaptation and Resilience	Risk Management & Business Continuity	Risk Mitigation
Adaptation and Resilience	Sustainable Drainage & Water Management	Agricultural
Adaptation and Resilience	Sustainable Drainage & Water Management	Domestic
Adaptation and Resilience	Sustainable Drainage & Water Management	Industrial
Adaptation and Resilience	Sustainable Drainage & Water Management	Public
Adaptation and Resilience	Transport Infrastructure	Rail
Adaptation and Resilience	Transport Infrastructure	Road
Adaptation and Resilience	Transport Infrastructure	Waterways
Adaptation and Resilience	Water Irrigation	Agriculture
Adaptation and Resilience	Water Irrigation	Leisure Areas

In Sections 3 and 4 (below) these A&RCC activities are quantified and analysed using the same key measures – sales, employment, companies, growth, imports and exports – as the main LCEGS report.



### 3. Global A&RCC 2009/ 10

The global value of A&RCC activities associated with list of activities in section 1 was £361bn in 2009/10 (see Figure 3). 32% of the total is accounted for by Construction & Retrofit activities, followed by Transport Infrastructure (21%), Environmental Finance (12.5%) and Architectural Services (12.5%).

**Figure 3: Global A&RCC Sales (£m) 2009/ 10**

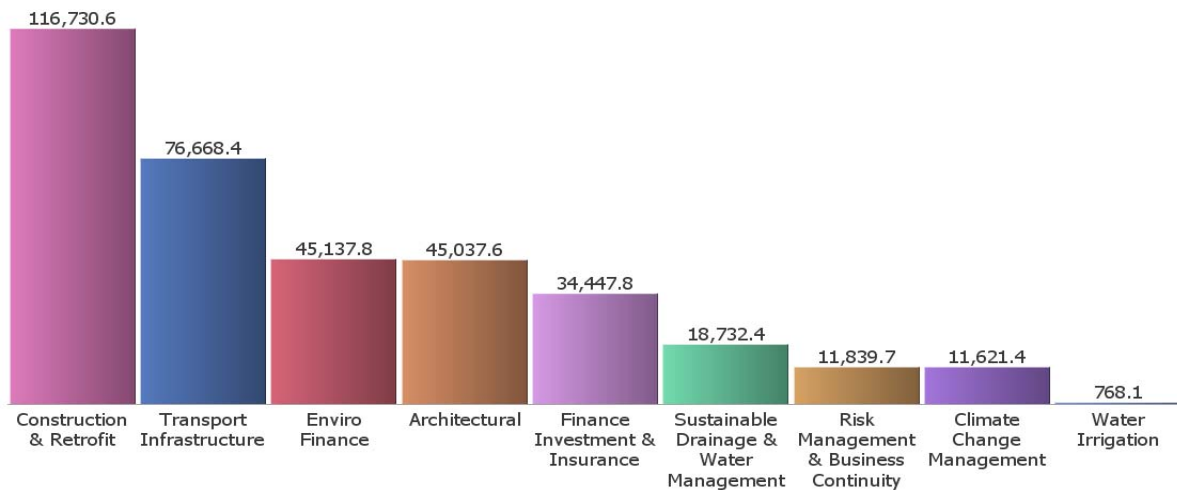


Table 1 shows the Top 50 global economies ranked by value of A&RCC sales for 2009/ 10 and with percentage market share<sup>1</sup>.

<sup>1</sup> As explained in the main LCEGS report, the Top 50 countries generally account for between 85 and 90% of global sales

**Table 1: A&RCC Sales 2009/ 10 by Top 50 Countries**

Country	Sales £m	Ranking	% of Total	Country	Sales £m	Ranking	% of Total
US	76,316	1	21.1	Pakistan	2,361	26	0.7
China	48,892	2	13.5	Saudi Arabia	2,139	27	0.6
Japan	23,530	3	6.5	Egypt	2,033	28	0.6
India	21,878	4	6.1	Colombia	2,019	29	0.6
Germany	15,183	5	4.2	Belgium	2,002	30	0.6
France	11,744	6	3.3	Ukraine	1,974	31	0.5
United Kingdom	11,294	7	3.1	Bangladesh	1,764	32	0.5
Italy	9,923	8	2.7	Sweden	1,682	33	0.5
Brazil	9,359	9	2.6	Austria	1,585	34	0.4
Russian Federation	8,967	10	2.5	Switzerland	1,565	35	0.4
Canada	6,438	11	1.8	Hong Kong	1,558	36	0.4
Mexico	6,432	12	1.8	Greece	1,496	37	0.4
Spain	5,958	13	1.7	Malaysia	1,490	38	0.4
South Korea	5,618	14	1.6	Vietnam	1,488	39	0.4
Indonesia	5,589	15	1.5	Algeria	1,379	40	0.4
Australia	3,979	16	1.1	Portugal	1,198	41	0.3
Taiwan	3,567	17	1.0	Norway	1,169	42	0.3
Thailand	3,441	18	1.0	Romania	1,141	43	0.3
South Africa	3,330	19	0.9	Denmark	1,133	44	0.3
Argentina	3,256	20	0.9	Chile	1,116	45	0.3
Turkey	3,253	21	0.9	Czechia	1,083	46	0.3
Netherlands	3,167	22	0.9	Peru	994	47	0.3
Iran	3,136	23	0.9	Finland	956	48	0.3
Poland	2,871	24	0.8	Venezuela	954	49	0.3
Philippines	2,696	25	0.7	Hungary	941	50	0.3

The UK is seventh overall, with 3.1% market share, behind the US, China, Japan, India, Germany and France. This compares with the UK's position of sixth for LCEGS.

The UK is ranked sixth for Construction & Retrofit, Risk Management & Business Continuity and Sustainable Drainage & Water Management. It is ranked 7th for all other A&RCC activities.

In Figure 4 the Top 13 European economies are ranked by sales value (UK is third).

**Figure 4: A&RCC Sales (£m) 2009/ 10 by Top European Economies**

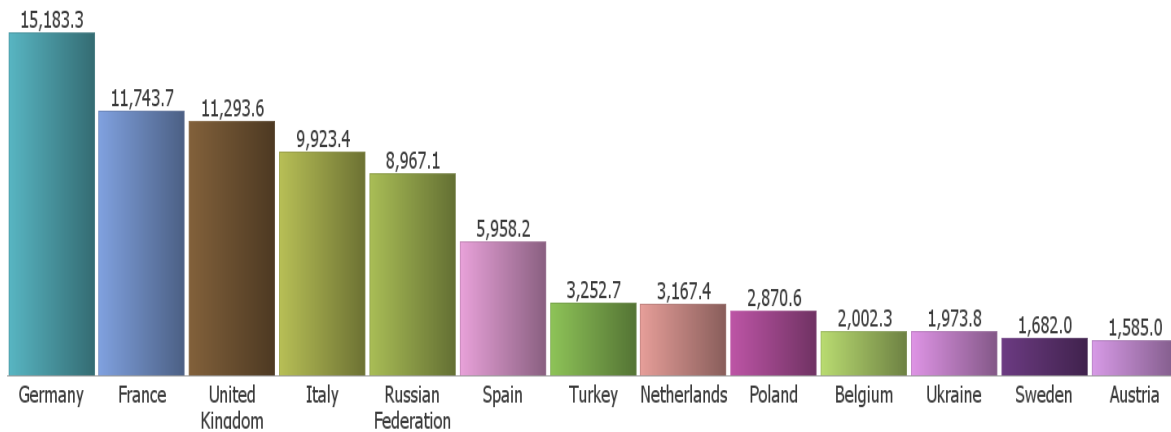
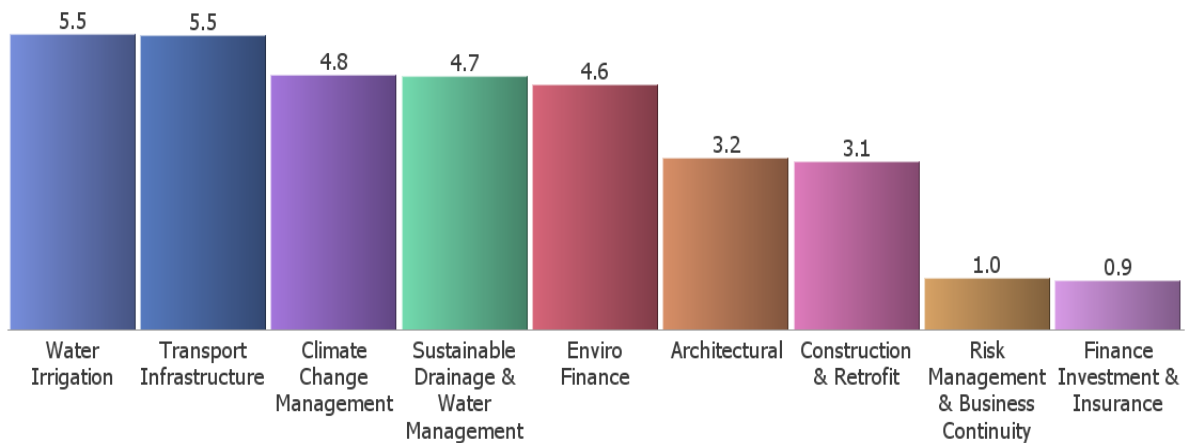


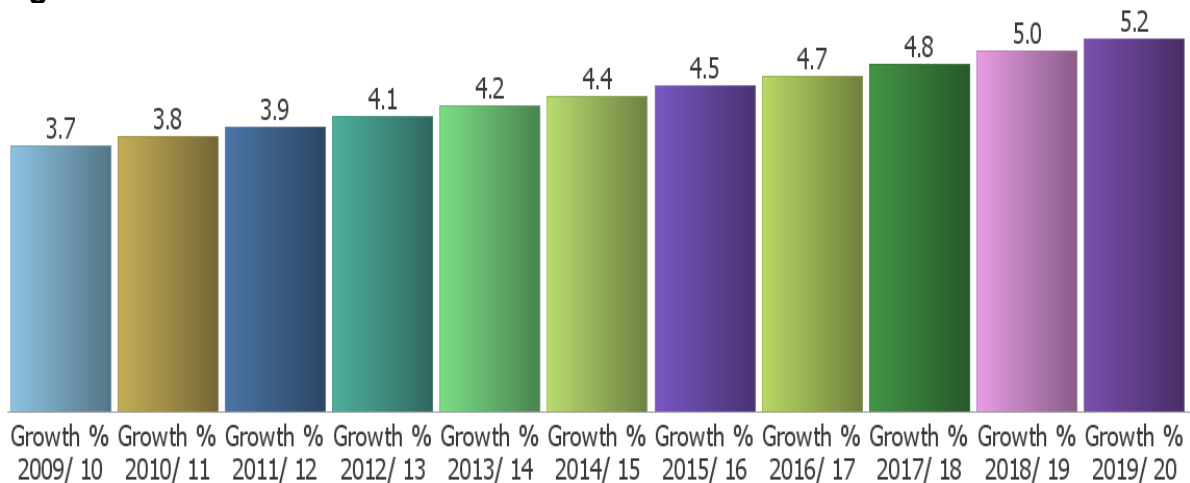
Figure 5 shows how global growth rates varied across the nine Level 3 grouping of A&RCC activities, ranging from 1% to 5%.

**Figure 5: Global Annual Growth 2009/ 10**



Overall, the growth rate for 2009/ 10 was 3.7%, higher than that for LCEGS as a whole. In Figure 6 we show the forecast growths for A&RCC to 2019/ 20. These growth rates are slightly ahead of the forecast for LCEGS over the same period.

**Figure 6: Global Growth Rate Forecast 2009/ 10 to 2019/ 20**

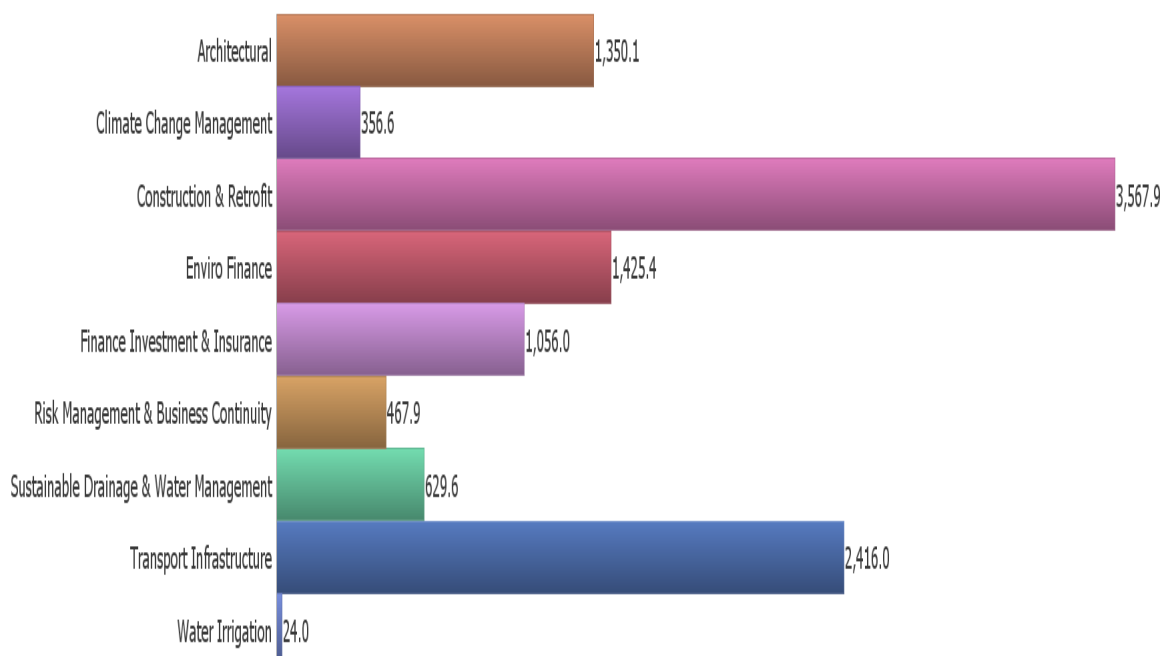


## 4. UK A&RCC 2009/ 10

### 4.1 UK A&R Performance

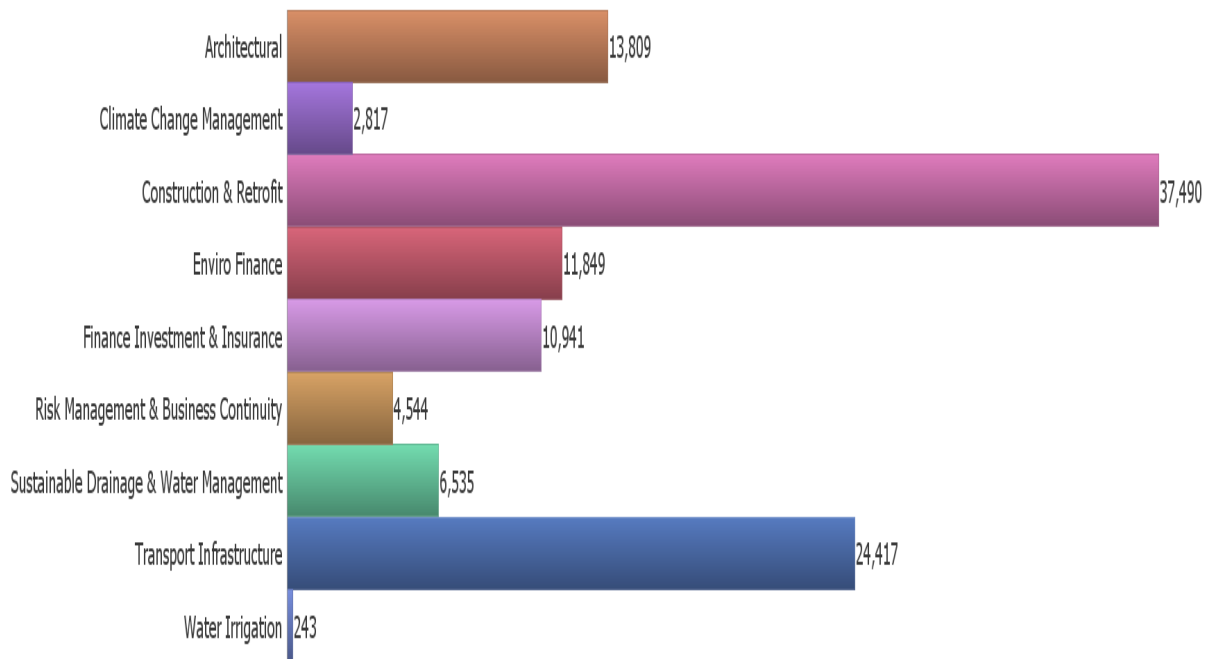
The UK sales value for A&RCC activities in 2009/ 10 was £11.3bn, of which Construction & Retrofit accounts for 32%. The distribution of sales value shown at Figure 7 broadly reflects the global distribution shown at Figure 3.

**Figure 7: UK A&RCC Sales (£m) 2009/ 10**



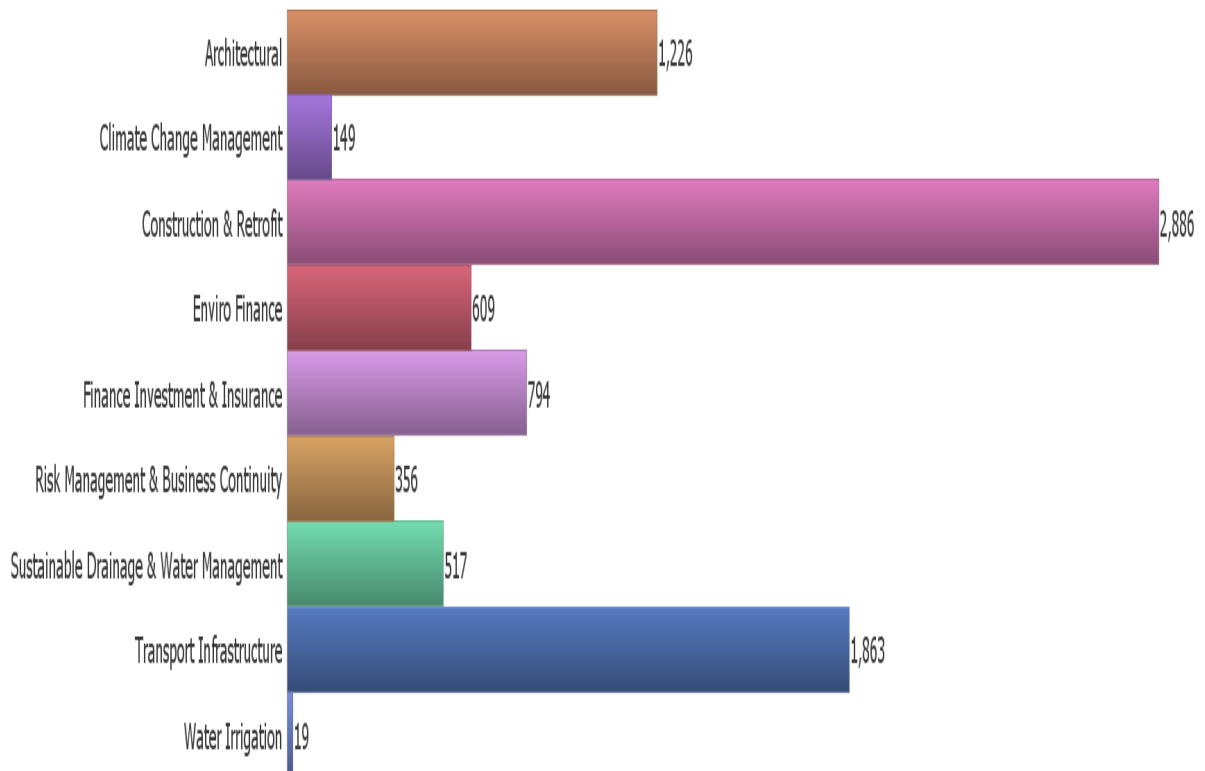
The UK employment level for A&RCC activities in 2009/ 10 was 112,645, of which Construction & Retrofit accounts for 33% (Figure 8).

**Figure 8: UK A&RCC Employment 2009/ 10**

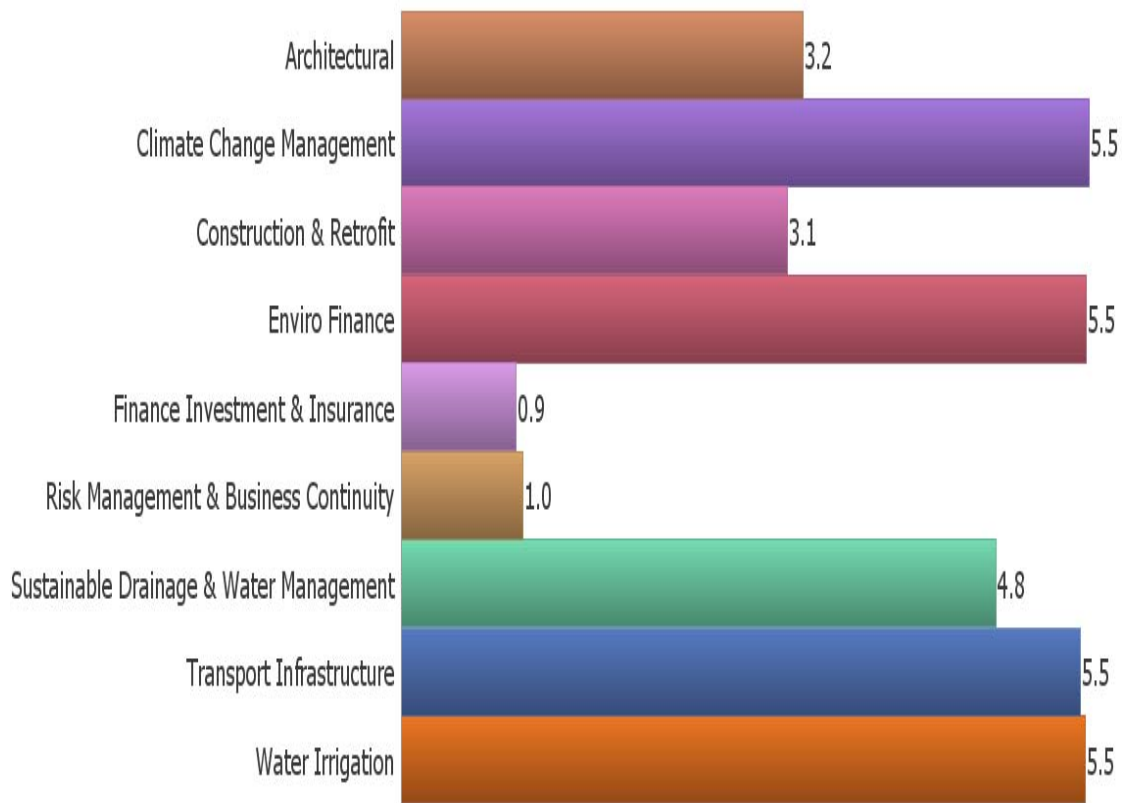


The UK companies involved in new A&RCC activities in 2009/ 10 was 8,420, of which Construction & Retrofit accounts for 34% (Figure 9).

**Figure 9: UK A&RCC Companies 2009/ 10**



**Figure 10: UK A&RCC Growth 2009/ 10**



UK growth rates for A&RCC activities in 2009/ 10 are shown in Figure 10. These rates are broadly similar to the global growth rates, except for Environmental Finance, where UK growth is much higher.

In Table 2 the key measures are shown at the next level of detail. At Level 4 Environmental Finance (£1.2bn) and Road Transport Infrastructure (£1.6bn) are the two largest activities and account for 24% of the total A&RCC value.

**Table 2: UK A&RCC Sales, Employment and Companies for 2009/ 10 at Level 4**

Level 3	Level 4	Sales £m	Companies	Employment
Architectural	Architectural Design Services	115	93	1,185
Architectural	Architectural Engineering	471	412	4,896
Architectural	Architectural Project Management Services	765	721	7,728
Climate Change Management	Waterways and Barrier Management	327	139	2,588
Climate Change Management	Weather Station Services	30	11	229
Construction & Retrofit	Adaptive Civil Engineering Services	198	143	2,058
Construction & Retrofit	Agricultural	219	220	2,406
Construction & Retrofit	Domestic	185	152	1,926
Construction & Retrofit	Domestic Urban Enviro Redesign & Re Engineering	238	183	2,367
Construction & Retrofit	Industrial	365	281	3,477
Construction & Retrofit	Industrial Urban Enviro Redesign & Re Engineering	323	269	3,700
Construction & Retrofit	Manufacture of Retro Fit Engineering Equipment	457	370	4,866
Construction & Retrofit	Manufacture of Retro Fit Materials	278	210	2,596
Construction & Retrofit	Manufacturers of Temporary Accommodation For Renovation Projects	124	105	1,314
Construction & Retrofit	Public	324	261	3,474
Construction & Retrofit	Public Urban Enviro Redesign & Re Engineering	191	134	2,090
Construction & Retrofit	Retro Fit Buildings Services	317	251	3,396
Construction & Retrofit	Suppliers of Temporary Accommodation For Renovation Projects	66	56	737
Construction & Retrofit	Supply of Retro Fit Engineering Equipment	120	99	1,296
Construction & Retrofit	Supply of Retrofit Materials	163	152	1,787
Enviro Finance	Enviro Finance	1160	497	9,373
Enviro Finance	Enviro Finance Planning	266	112	2,476
Finance Investment & Insurance	Banking Services	288	251	3,153
Finance Investment & Insurance	Equity Investment Services	365	271	3,705
Finance Investment & Insurance	Insurance Services	404	272	4,083
Risk Management & Business Continuity	Business Continuity	173	140	1,684
Risk Management & Business Continuity	Risk Mitigation	295	216	2,859
Sustainable Drainage & Water Management	Agricultural	48	42	473
Sustainable Drainage & Water Management	Domestic	143	114	1,510
Sustainable Drainage & Water Management	Industrial	227	209	2,382
Sustainable Drainage & Water Management	Public	212	152	2,171
Transport Infrastructure	Rail	692	573	7,697
Transport Infrastructure	Road	1563	1,161	15,021
Transport Infrastructure	Waterways	160	129	1,699
Water Irrigation	Agriculture	16	13	162
Water Irrigation	Leisure Areas	8	6	81
<b>Total</b>		<b>11294</b>	<b>8,420</b>	<b>112,645</b>

Table 3 shows forecast growth rates to 2019/ 20 for Level 4 activities. The highest growth activities in the UK are: Road Transport Infrastructure (6.1%), Water Irrigation for Leisure Areas (6%), Enviro Finance Planning (5.9%) and Weather Station Services (5.8%).

**Table 3: UK A&RCC Growth Forecast to 2019/ 20 at Level 4**

Level 3	Level 4	Growth % 2009/ 10	Growth % 2010/ 11	Growth % 2011/ 12	Growth % 2012/ 13	Growth % 2013/ 14	Growth % 2014/ 15	Growth % 2015/ 16	Growth % 2016/ 17	Growth % 2017/ 18	Growth % 2018/ 19	Growth % 2019/ 20
Architectural	Architectural Design Services	2.9	3.0	3.0	3.1	3.3	3.4	3.5	3.7	3.8	3.9	4.0
Architectural	Architectural Engineering	3.3	3.4	3.5	3.7	3.8	4.0	4.1	4.3	4.4	4.5	4.7
Architectural	Architectural Project Management Services	3.2	3.3	3.4	3.6	3.7	3.8	3.9	4.2	4.2	4.3	4.5
Climate Change Management	Waterways and Barrier Management	5.5	5.7	5.9	6.0	6.3	6.5	6.7	7.0	7.2	7.4	7.7
Climate Change Management	Weather Station Services	5.8	5.9	6.1	6.3	6.5	6.7	7.0	7.2	7.4	7.7	7.9
Construction & Retrofit	Adaptive Civil Engineering Services	3.8	4.0	4.1	4.4	4.4	4.5	4.7	4.9	5.1	5.2	5.5
Construction & Retrofit	Agricultural	4.5	4.7	4.8	5.0	5.1	5.4	5.6	5.7	6.0	6.1	6.4
Construction & Retrofit	Domestic	1.9	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.5	2.7
Construction & Retrofit	Domestic Urban Enviro Redesign & Re Engineering	4.1	4.1	4.2	4.4	4.6	4.7	5.1	5.1	5.3	5.5	5.7
Construction & Retrofit	Industrial	1.9	1.9	2.0	2.1	2.1	2.2	2.3	2.4	2.4	2.5	2.6
Construction & Retrofit	Industrial Urban Enviro Redesign & Re Engineering	3.5	3.7	3.8	4.0	4.2	4.2	4.3	4.6	4.7	5.0	5.1
Construction & Retrofit	Manufacture of Retro Fit Engineering Equipment	3.0	3.2	3.2	3.4	3.5	3.6	3.7	3.8	3.9	4.1	4.2
Construction & Retrofit	Manufacture of Retro Fit Materials	4.2	4.3	4.6	4.6	4.9	5.1	5.2	5.4	5.6	5.8	6.0
Construction & Retrofit	Manufacturers of Temporary Accommodation For Renovation Projects	1.6	1.7	1.8	1.8	1.9	1.9	2.0	2.1	2.1	2.2	2.3
Construction & Retrofit	Public	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.6	2.6	2.7
Construction & Retrofit	Public Urban Enviro Redesign & Re Engineering	4.0	4.1	4.2	4.4	4.6	4.8	4.9	5.0	5.2	5.5	5.6
Construction & Retrofit	Retro Fit Buildings Services	2.9	2.9	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.1
Construction & Retrofit	Suppliers of Temporary Accommodation For Renovation Projects	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1	2.2	2.3	2.3
Construction & Retrofit	Supply of Retro Fit Engineering Equipment	3.2	3.4	3.6	3.7	3.8	3.9	4.1	4.3	4.3	4.5	4.8
Construction & Retrofit	Supply of Retrofit Materials	4.2	4.3	4.5	4.6	4.9	4.9	5.2	5.4	5.5	5.8	6.0
Enviro Finance	Enviro Finance	5.4	5.6	5.8	5.9	6.2	6.4	6.6	6.8	7.0	7.2	7.5
Enviro Finance	Enviro Finance Planning	5.9	6.1	6.3	6.5	6.8	7.0	7.2	7.5	7.7	7.9	8.3
Finance Investment & Insurance	Banking Services	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.3
Finance Investment & Insurance	Equity Investment Services	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.4
Finance Investment & Insurance	Insurance Services	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.3
Risk Management & Business Continuity	Business Continuity	1.3	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.7	1.8	1.8
Risk Management & Business Continuity	Risk Mitigation	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1
Sustainable Drainage & Water Management	Agricultural	3.6	3.7	3.9	4.1	4.2	4.3	4.4	4.6	4.7	4.9	5.1
Sustainable Drainage & Water Management	Domestic	4.7	4.8	5.1	5.3	5.4	5.6	5.7	6.0	6.2	6.4	6.5
Sustainable Drainage & Water Management	Industrial	4.6	4.8	5.0	5.1	5.4	5.3	5.7	5.7	6.0	6.2	6.4
Sustainable Drainage & Water Management	Public	5.3	5.4	5.7	5.9	6.2	6.2	6.6	6.8	7.2	7.2	7.4
Transport Infrastructure	Rail	4.1	4.2	4.3	4.5	4.7	4.9	5.1	5.2	5.4	5.6	5.7
Transport Infrastructure	Road	6.1	6.3	6.7	6.8	7.0	7.2	7.5	7.7	8.3	8.4	8.6
Transport Infrastructure	Waterways	5.6	5.7	5.9	6.2	6.4	6.5	6.7	7.1	7.1	7.7	7.9
Water Irrigation	Agriculture	5.3	5.3	5.6	5.9	6.1	6.1	6.5	6.7	6.8	7.0	7.4
Water Irrigation	Leisure Areas	6.0	6.3	6.4	6.6	6.9	7.2	7.4	7.7	8.0	8.2	8.6



## 4.2 UK Imports

Figure 11 shows that the total for UK A&RCC imports in 2009/ 10 was £1.34bn, of which Construction & Retrofit was 35% and Transport Infrastructure was 23%.

**Figure 11: A&RCC Imports 2009/ 10 (£m) by Level 3**

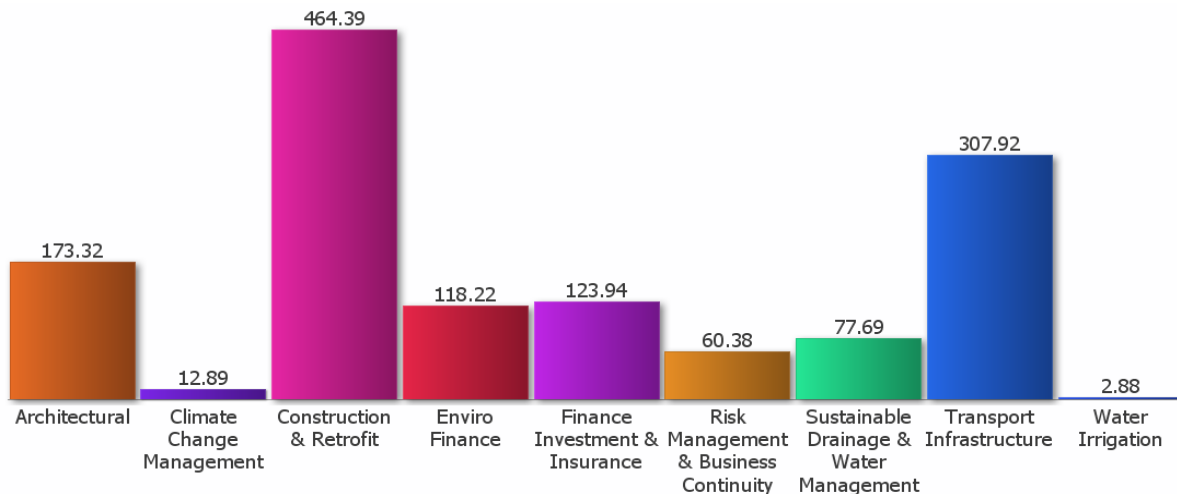


Figure 12 shows the top 13 countries providing A&RCC imports into the UK in 2009/ 10. China accounts for 8%, followed by the US (5%) and Hong Kong (5%). The ranking of countries differs from that of LCEGS, as we would expect for different products and services, with the US ranked much higher for A&RCC activities.

**Figure 12: A&RCC Imports 2009/ 10 (£m) by Country of Origin**

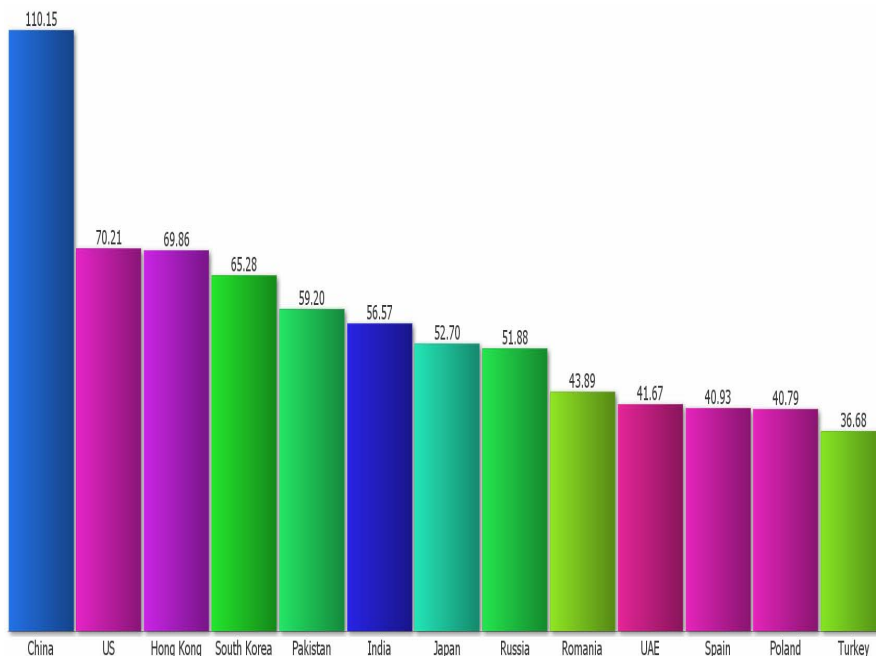


Figure 13 shows UK imports at Level 5 in a heat map format where Red starts at 0, Green finishes at £16m and Orange represents the midpoint (with gradations of colour in between). The heat map has been rationalised down to the 19 largest

importing A&RCC activities and for the top 12 importing destinations. Figure 13 shows a distinctive import pattern for:

- Environmental Banking Services from the US, China, India and Japan; and
- Road Anti Subsistence Works activities from most of the 12 countries.

**Figure 13: Imports 2009/ 10 (£m) at Level 5**

Level 4	Level 5	China	Hong Kong	India	Japan	Malaysia	Pakistan	Poland	Romania	Russia	S Korea	Spain	US
Architectural Project Management Services	Architectural Project Management Services Industrial Projects	2.86	2.19	1.51	1.37	2.84	1.84	1.25	1.37	1.53	1.99	1.22	1.21
Domestic Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Domestic Housing	1.27	0.97	0.67	0.60	1.26	0.82	0.55	0.61	0.68	0.88	0.54	0.54
Industrial Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Industrial Estates	2.54	1.94	1.34	1.21	2.52	1.63	1.11	1.22	1.35	1.76	1.08	1.07
Manufacture of Retro Fit Engineering Equipment	Manufacture of Anti Erosion Constructs	1.31	1.00	0.69	0.62	1.30	0.84	0.57	0.63	0.70	0.91	0.56	0.55
Manufacture of Retro Fit Engineering Equipment	Manufacture of Underpinning Equipment	1.36	1.04	0.72	0.65	1.35	0.88	0.60	0.65	0.73	0.95	0.58	0.58
Public	Manufacture of Path & Standing Area Porous Resurfacing Services	1.01	0.77	0.53	0.48	1.00	0.65	0.44	0.48	0.54	0.70	0.43	0.43
Public	Supply of Porous Surfacing Materials	1.04	0.80	0.55	0.50	1.04	0.67	0.46	0.50	0.56	0.73	0.44	0.44
Public Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Public Areas	1.54	1.18	0.81	0.74	1.53	0.99	0.67	0.74	0.82	1.07	0.66	0.65
Retro Fit Buildings Services	Retro Fit Electrical Services	1.70	1.30	0.90	0.81	1.69	1.10	0.74	0.82	0.91	1.19	0.72	0.72
Enviro Finance	Enviro Banking Services	6.50	0.20	2.66	3.01	0.18	0.33	0.40	0.13	1.13	0.72	0.69	10.14
Enviro Finance	Enviro Specific Capital Venture Services	1.92	0.06	0.96	0.89	0.06	0.10	0.13	0.04	0.38	0.22	0.25	3.48
Enviro Finance	Enviro Specific Equity Investment Services	1.86	0.07	0.84	0.91	0.06	0.08	0.12	0.04	0.38	0.24	0.25	2.95
Enviro Finance Planning	Business & Investment planning Services	1.48	0.06	0.71	0.85	0.05	0.08	0.10	0.03	0.31	0.18	0.23	2.43
Enviro Finance Planning	Enviro Specific Accounting Services	1.96	0.05	0.83	0.91	0.06	0.09	0.10	0.04	0.33	0.21	0.22	3.36
Rail	Anti Subsidence Works	2.76	2.11	1.46	1.32	2.74	1.78	1.21	1.32	1.47	1.92	1.17	1.17
Road	Anti Subsidence Works	5.52	4.22	2.91	2.63	5.48	3.55	2.41	2.65	2.94	3.84	2.35	2.34
Road	Flood Abatement Works	3.38	2.58	1.78	1.61	3.35	2.17	1.47	1.62	1.80	2.35	1.44	1.43
Road	Re Location and & Re laying	2.22	1.70	1.17	1.06	2.20	1.43	0.97	1.07	1.18	1.54	0.94	0.94
Road	Surface Water Drainage Works	3.05	2.33	1.61	1.45	3.03	1.96	1.33	1.46	1.62	2.12	1.30	1.29

### 4.3 UK Exports

Figure 14 shows that the total for UK Exports of A&RCC activities in 2009/10 was £1,412m or £1.4bn, of which Construction & Retrofit accounts for 32%, Transport Infrastructure 22% and Environmental Finance 13%.

**Figure 14: UK Exports by Level 3 (£m) for 2009/ 10**

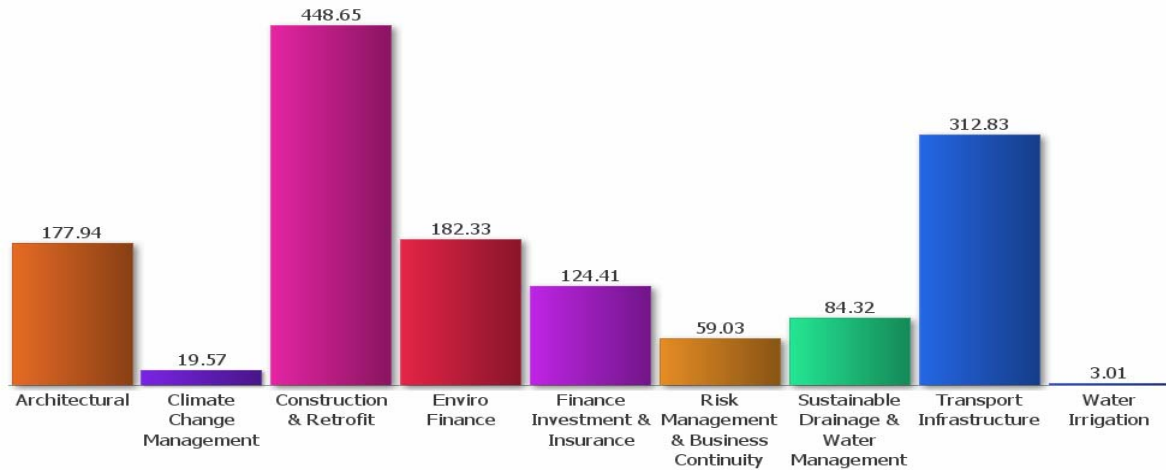


Figure 15 shows UK exports for the top 13 export destinations in 2009/ 10. The top countries are South Africa and Canada (6%), followed by Germany, US, Italy, Hong Kong and Singapore (4%). This is a very different ranking order to LCEGS as a whole.

**Figure 15: UK Exports by Level 3 (£m) for 2009/ 10 by Destination Country**

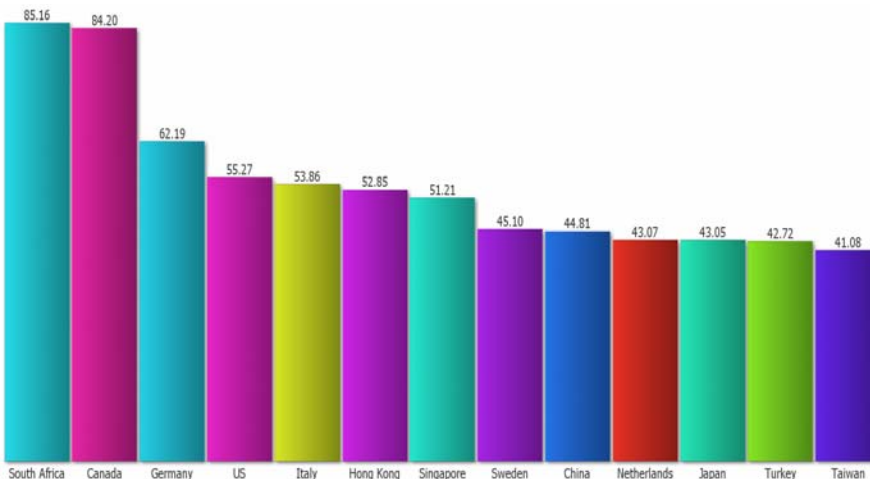


Figure 16 shows UK exports at Level 5 in a heat map format where Red starts at 0, Green finishes at £16m and Orange represents the midpoint (with gradations of colour in between). The heat map has been rationalised down to the 26 largest exporting A&R activities and for the top 12 exporting destinations. Figure 16 shows a polarised export pattern with:

- Environmental Finance activities being most important to the US, China, India, Japan and Germany; and

- Road and Rail Transport Infrastructure activities being most important to Canada, South Africa, Singapore and Hong Kong.

**Figure 16: Exports 2019/20 (£m) at Level 5**

Level 4	Level 5	Canada	China	Germany	Hong Kong	India	Italy	Japan	Netherlands	Romania	Singapore	South Africa	US
Architectural Project Management Services	Architectural Project Management Services Industrial Projects	2.87	0.53	1.90	1.86	0.37	1.71	1.02	1.48	0.88	1.82	2.98	0.26
Waterways and Barrier Management	Sea Defence Management Services	0.25	1.52	0.53	0.05	0.77	0.31	0.77	0.10	0.04	0.03	0.10	2.64
Agricultural	Urban Re Engineering Civil Engineering Services Agricultural Applications	1.08	0.20	0.71	0.70	0.14	0.64	0.38	0.55	0.33	0.68	1.12	0.10
Domestic Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Domestic Housing	1.08	0.20	0.71	0.70	0.14	0.64	0.38	0.55	0.33	0.68	1.12	0.10
Industrial Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Industrial Estates	2.07	0.38	1.37	1.34	0.27	1.23	0.74	1.07	0.64	1.31	2.15	0.18
Manufacture of Retro Fit Engineering Equipment	Manufacture of Anti Erosion Constructs	1.13	0.21	0.74	0.73	0.14	0.67	0.40	0.58	0.35	0.71	1.17	0.10
Public Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Public Areas	1.26	0.23	0.83	0.82	0.16	0.75	0.45	0.65	0.39	0.80	1.31	0.11
Retro Fit Buildings Services	Retro Fit Electrical Services	1.36	0.25	0.89	0.88	0.17	0.81	0.48	0.70	0.42	0.86	1.41	0.12
Enviro Finance	Enviro Banking Services	1.32	9.45	2.86	0.32	4.23	1.90	4.64	0.54	0.20	0.17	0.68	15.49
Enviro Finance	Enviro Specific Capital Venture Services	0.45	2.93	0.90	0.10	1.49	0.61	1.41	0.19	0.07	0.04	0.18	5.16
Enviro Finance	Enviro Specific Equity Investment Services	0.38	3.06	0.90	0.10	1.27	0.54	1.38	0.18	0.06	0.05	0.24	4.81
Enviro Finance	Enviro Specific Fund Management Services	0.26	1.54	0.58	0.05	0.77	0.32	0.73	0.11	0.03	0.03	0.10	2.35
Enviro Finance	Enviro Specific Insurance Services	0.19	1.46	0.43	0.05	0.63	0.33	0.71	0.09	0.03	0.02	0.10	2.23
Enviro Finance	Enviro Specific Investor Relations Services	0.09	0.68	0.18	0.02	0.29	0.15	0.32	0.04	0.01	0.01	0.04	1.03
Enviro Finance	Enviro Specific IPO Services	0.14	1.32	0.34	0.04	0.54	0.26	0.61	0.09	0.03	0.02	0.09	1.73
Enviro Finance Planning	Business & Investment planning Services	0.37	2.37	0.88	0.09	1.06	0.54	1.24	0.15	0.06	0.04	0.15	3.82
Enviro Finance Planning	Enviro Specific Accounting Services	0.38	3.11	0.95	0.09	1.39	0.64	1.31	0.19	0.06	0.04	0.22	5.01
Risk Mitigation	Risk Assessment Services	1.40	0.26	0.93	0.91	0.18	0.84	0.50	0.72	0.43	0.89	1.46	0.12
Public	Bank Maintenance Services	1.14	0.21	0.75	0.74	0.15	0.68	0.41	0.59	0.35	0.72	1.18	0.10
Rail	Anti Subsidence Works	2.48	0.46	1.63	1.61	0.32	1.48	0.88	1.28	0.76	1.57	2.57	0.22
Rail	Flood Abatement Works	1.26	0.23	0.83	0.82	0.16	0.75	0.45	0.65	0.39	0.80	1.31	0.11
Rail	Surface Water Drainage Works	1.17	0.22	0.77	0.76	0.15	0.70	0.42	0.60	0.36	0.74	1.22	0.10
Road	Anti Subsidence Works	5.47	1.01	3.61	3.54	0.70	3.26	1.95	2.82	1.68	3.47	5.68	0.49
Road	Flood Abatement Works	2.98	0.55	1.97	1.93	0.38	1.78	1.06	1.54	0.91	1.89	3.09	0.26
Road	Re Location and & Re laying	1.62	0.30	1.07	1.05	0.21	0.97	0.58	0.84	0.50	1.03	1.68	0.14
Road	Surface Water Drainage Works	2.77	0.51	1.83	1.79	0.36	1.65	0.99	1.42	0.85	1.75	2.87	0.25

## 5. Coding LCEGS Activities

### 5.1 Coding LCEGS

The second part of the brief required an investigation of the A&RCC content of the existing 2400 LCEGS activities. This was conducted at Level 5, using the triple- gate approach outlined in Section 2. In addition to the criteria listed in Section 2 further criteria were applied to each of the 24 sub sectors (see Annex B). Each activity was assessed for Adaptation, Mitigation or Both.

At the end of the exercise the majority of LCEGS (with exceptions for Noise & Vibration Control, Environmental Consultancy, Nuclear Decommissioning, Waste Management, Water and Waste Water Treatment and most Recycling activities) were shown to be “positive” for either the Adaptation or Mitigation effect. If the sales value is used as a measure, then £79bn (67%) of the LCEGS sector value of £117bn tests "positive" for A&RCC content.

While this was a true reading of LCEGS activities and was the rationale behind including many of the Renewable Energy and Low Carbon activities under the LCEGS umbrella heading it was, however, an unhelpful outcome to suggest that two thirds of the current LCEGS definition can be adjudged to have an A&RCC impact.

Further investigations of the results suggested that Level 5 was perhaps too aggregated a level to be able to identify true A&RCC impact i.e. that the Level 5 data headings included both A&RCC and non- A&RCC values that could not be separated out as part of the analysis. We know from experience in other sectors that measuring "market intent", i.e. what a product or service is used for rather than what it is, often requires a more detailed level of data analysis using both procurement and sales (rather than just sales) data sources. We know this because the data system used for market investigations of this type extends to Level 9, providing four more levels of details than is currently reported for LCEGS.

Each of the five levels of data in the current LCEGS definition is an aggregation of activities at the next level down and whereas the current definition stops at Level 5, in reality each Level 5 activity comprises between 2 and 10 Level 6 activities. The concern was that these Level 6 activities included both A&RCC and non- A&RCC activities.

To prove that a Level 5 analysis may be “overstating” A&RCC activities (by including non- A&RCC market activities) a data sample was taken from the Environmental Monitoring sub sector, which had produced mixed results in the previous A&RCC analysis. 10 Level 5 activities were split into their Level 6 product and service lines and were then re-coded for A&RCC impact. The new results were then compared with the previous Level 5 coding and the value of A&RCC activities was then recalculated and compared with the previous Level 5 value. All calculations are shown at Figure 17.

The results were quite dramatic, in that coding at Level 5 would have suggested a value of £22.7m for A&R coded activities in the data sample. At Level 6 the A&RCC value was calculated at £4.7m, a difference of £18m or 79%.

Although this was a small (but representative) sample the results suggested that to continue with a Level 5 analysis of the LCEGS for A&RCC content could only produce significantly overstated results.



**Figure 17: Test Analysis**

Level 4	Level 5	Level 5 Coding	Level 6	Total £m	Adapt	Mitigate	Adapt/Mitigate	Total Mitigation	Total Adaption	Both	Diff £m	% Diff
Software for Environmental Analysis	Software Development for Environmental Analysis	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Software Development for Environmental Emissions Management & Reduction Systems	0.38	Yes	Yes	Yes	0.38	0.38	0.38		
			Software Development for Environmental Emissions Reporting	0.51	No	No	No	0.00	0.00	0.00		
			Software Development for Environmental Flood Detection & Reactive Systems	0.36	Yes	Yes	Yes	0.36	0.36	0.36		
			Software Development for Environmental Flood & Surge Reporting	0.17	Yes	No	No	0.17	0.00	0.17		
				<b>1.42</b>			<b>0.91</b>	<b>0.74</b>	<b>0.91</b>	<b>0.51</b>	<b>36.0</b>	
Software for Environmental Analysis	Supply of Software for Environmental Analysis	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Supply of Software for Environmental Emissions Management & Reduction Systems	0.52	Yes	Yes	Yes	0.52	0.52	0.52		
			Supply of Software for Environmental Emissions Reporting	0.69	Yes	No	No	0.00	0.00	0.00		
			Supply of Software for Environmental Flood Detection & Reactive Systems	0.48	Yes	Yes	Yes	0.48	0.48	0.48		
			Supply of Software for Environmental Flood & Surge Reporting	0.23	Yes	No	No	0.23	0.00	0.23		
				<b>1.91</b>			<b>1.22</b>	<b>0.99</b>	<b>1.22</b>	<b>0.69</b>	<b>36.0</b>	
Manufacture of Instrumentation for the Water Industry	Manufacture of Control Instrumentation for the Water Industry	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Manufacture of Treatment Plant Control Instrumentation for the Water Industry	4.63	no	no	no	0.00	0.00	0.00		
			Manufacture of Remote Systems Instrumentation for the Water Industry	0.45	no	no	no	0.00	0.00	0.00		
			Manufacture of Remote Flood Control Instrumentation for the Water Industry	0.10	yes	yes	yes	0.10	0.10	0.10		
			Manufacture of Remote Flood Monitoring Instrumentation for the Water Industry	0.32	no	no	no	0.00	0.00	0.00		
				<b>5.50</b>			<b>0.10</b>	<b>0.10</b>	<b>0.10</b>	<b>5.40</b>	<b>98.1</b>	
Manufacture of Instrumentation for the Water Industry	Design of Control Instrumentation for the Water Industry	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Design of Treatment Plant Control Instrumentation for the Water Industry	2.41	no	no	no	0.00	0.00	0.00		
			Design of Remote Systems Instrumentation for the Water Industry	0.24	no	no	no	0.00	0.00	0.00		
			Design of Remote Flood Control Instrumentation for the Water Industry	0.05	yes	yes	yes	0.05	0.05	0.05		
			Design of Remote Flood Monitoring Instrumentation for the Water Industry	0.17	no	no	no	0.00	0.00	0.00		
				<b>2.87</b>			<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>2.82</b>	<b>98.1</b>	
Manufacture of Instrumentation for the Water Industry	Supply of Control Instrumentation for the Water Industry	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Supply of Treatment Plant Control Instrumentation for the Water Industry	1.53	no	no	no	0.00	0.00	0.00		
			Supply of Remote Systems Instrumentation for the Water Industry	0.15	no	no	no	0.00	0.00	0.00		
			Supply of Remote Flood Control Instrumentation for the Water Industry	0.05	yes	yes	yes	0.05	0.05	0.05		
			Supply of Remote Flood Monitoring Instrumentation for the Water Industry	0.11	no	no	no	0.00	0.00	0.00		
				<b>1.84</b>			<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>1.79</b>	<b>97.4</b>	
Manufacture of Instrumentation for the Water Industry	Maintenance of Control Instrumentation for the Water Industry	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Maintenance of Treatment Plant Control Instrumentation for the Water Industry	2.35	no	no	no	0.00	0.00	0.00		
			Maintenance of Remote Systems Instrumentation for the Water Industry	0.23	no	no	no	0.00	0.00	0.00		
			Maintenance of Remote Flood Control Instrumentation for the Water Industry	0.08	yes	yes	yes	0.08	0.08	0.08		
			Maintenance of Remote Flood Monitoring Instrumentation for the Water Industry	0.16	no	no	no	0.00	0.00	0.00		
				<b>2.83</b>			<b>0.08</b>	<b>0.08</b>	<b>0.08</b>	<b>2.75</b>	<b>97.0</b>	
Manufacture of Instrumentation for Air Pollution Monitoring	Manufacture of Control Instrumentation for Air Pollution Monitoring	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Manufacture of Control Instrumentation for Emissions Management & Reduction	0.92	yes	yes	yes	0.92	0.92	0.92		
			Manufacture of Control Instrumentation for Emissions Reporting	1.95	no	no	no	0.00	0.00	0.00		
				<b>2.87</b>			<b>0.92</b>	<b>0.92</b>	<b>0.92</b>	<b>1.95</b>	<b>68.0</b>	
Manufacture of Instrumentation for Air Pollution Monitoring	Design of Control Instrumentation for Air Pollution Monitoring	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Design of Control Instrumentation for Emissions Management & Reduction	0.60	yes	yes	yes	0.60	0.60	0.60		
			Design of Control Instrumentation for Emissions Reporting	0.60	no	no	no	0.00	0.00	0.00		
				<b>1.19</b>			<b>0.60</b>	<b>0.60</b>	<b>0.60</b>	<b>0.60</b>	<b>50.0</b>	
Manufacture of Instrumentation for Air Pollution Monitoring	Supply of Control Instrumentation for Air Pollution Monitoring	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Supply of Control Instrumentation for Emissions Management & Reduction	0.35	yes	yes	yes	0.35	0.35	0.35		
			Supply of Control Instrumentation for Emissions Reporting	0.56	no	no	no	0.00	0.00	0.00		
				<b>0.91</b>			<b>0.35</b>	<b>0.35</b>	<b>0.35</b>	<b>0.56</b>	<b>62.0</b>	
Manufacture of Instrumentation for Air Pollution Monitoring	Maintenance of Control Instrumentation for Air Pollution Monitoring	Level 5 Coding Adaptive YES, Imtigate YES, Adapt/Mitigate YES.	Maintenance of Control Instrumentation for Emissions Management & Reduction	0.37	yes	yes	yes	0.37	0.37	0.37		
			Maintenance of Control Instrumentation for Emissions Reporting	0.91	no	no	no	0.00	0.00	0.00		
				<b>1.28</b>			<b>0.37</b>	<b>0.37</b>	<b>0.37</b>	<b>0.91</b>	<b>71.0</b>	
<b>Total</b>				<b>22.62</b>						<b>4.65</b>	<b>17.97</b>	<b>79.4</b>

## **5.2 Conclusion from Test Analysis**

The test analysis confirmed that Level 5 is too high a data level to accurately identify and measure A&R activity for both intent and impact. The test suggests that Level 6 is probably the right level for smaller LCEGS activities like Environmental Monitoring and that Level 7 would be the right level for larger activities like Wind, and Building Technologies. At these lower levels of disaggregation (as demonstrated in Figure 17) end-user markets and, therefore, the intended use of products and services become more evident and much of the guess- work is removed from the A&RCC coding exercise.

We know from other example (including the Wind sub sector and the Digital Media sector) that adding Level 6 to a definition increases the number of activities 3 – fold and adding Levels 6 and 7 together increases the number of activities 10 – fold. This would mean that to conduct a semi- accurate assessment of the current LCEGS sector definition (i.e. scaling up the test analysis) would mean an increase in data lines from 2,400 to about 20,000. This is a considerable hurdle to further detailed analysis of A&RCC activity and would take a further two months to conduct the required data analysis.

If the current sample is taken as indicative of the LCEGS analysis as a whole, then we can extrapolate from the current research that A&RCC activity within the LCEGS is worth approximately £16.6bn (21% of the £117bn total). This conclusion, however, is based upon a less than one percent sample.

The conclusion for A&RCC impact within the current LCEGS data set is that a 100% sample is impractical and a 1% sample is an unreliable indicator. A larger representative sample is required if a more accurate measure of true A&RCC activity is to be achieved.

## **5.3 Lessons Learnt**

The attempt to code LCEGS activities for A&RCC impact has raised a number of learning points.

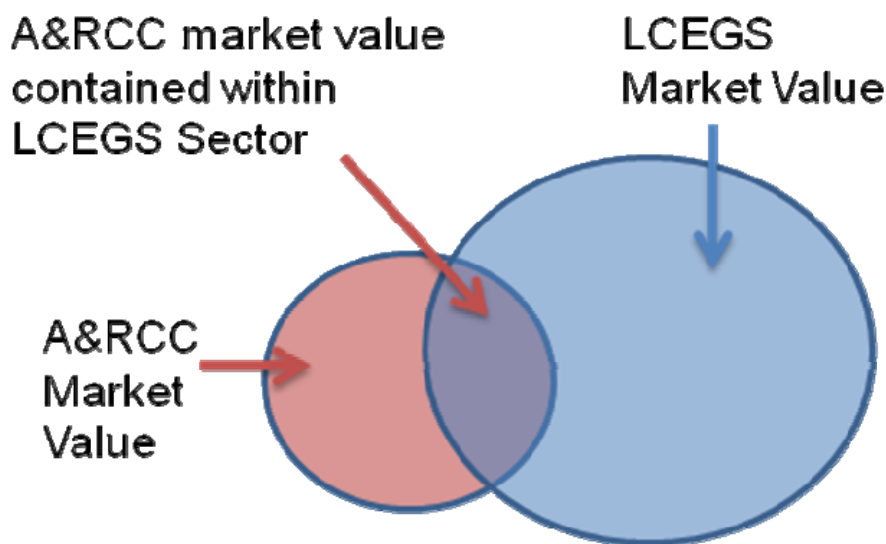
The first is that measuring the intended use of a product/ service requires much more detailed analysis than just reporting sales, where the sales figure contains many different "intents." This more detailed analysis requires access to additional data sources (mostly procurement data) that are not as widely available as sales data for LCEGS activities.

The question of greater accuracy at Level 6 also raises some questions about the overall accuracy of the values assigned to the new A&RCC activities analyses in Sections 3 and 4. These activities were identified specifically for their A&RCC impact and, therefore, should be a more accurate reflection of true value. However, based upon the Level 6 test conducted above, we must assume that there is some level of non- A&RCC activity included in our analysis. This is more likely to be true of broad activities like Transport Infrastructure and Construction & Retrofit and less true of financial, water- related and climate change activities. While the level of overstatement will be nowhere near the sample level of 79% we cannot, without a further sample test, be certain about how much less. Using informed judgement, we

would expect the level of overestimate to average around 20% across all activities identified as containing A&RCC content. Although we are unable to confirm this without further “tests”, the preceding analysis and measurement of A&RCC content meets the requirement in what has been a very exploratory research exercise, consistent with any pilot study.

The final lesson relates to the potential dangers of "double counting" market activity. At this time, the new A&RCC dataset should not be considered as distinct from the existing LCEGS data set. As Figure 18 shows, A&RCC is both a set of new activities that can be added to the LCEGS definition and a set of existing activities that are already contained within the LCEGS sector. To add the value of A&RCC activities recorded in this report to the level of market activity recorded in the LCEGS report would double count some A&RCC market value.

**Figure 18: Dependent Market Values**



There are three ways to avoid this double counting in the future:

- 1. Integrate A&RCC and LCEGS activities within a single definition.** This is comparatively easy to achieve- new activities and old activities are simply added together. This eliminates any potential double counting of the market value of A&RCC activities. A&RCC market value is then calculated as per this report, a combination of adding discrete A&RCC activities to an estimate of "hidden" A&RCC value.
- 2. Integrate the data sets, but record A&RCC and LCEGS market values separately.** This is a complex task, especially where A&RCC in one case is distinctly defined and in another is implicit in wider LCEGS activity. This requires both data sets to be expanded from Level 5 detail to at least Level 6 detail and then for A&RCC activities to be separately coded and counted.
- 3. Completely separating the two data sets so that all A&RCC activity is reported separately to LCEGS is a more complex third option.** This would require LCEGS activities that include A&RCC content to be singled out for analysis,

expanded to at least Level 6, separated into new A&RCC and LCEGS data blocks and then regrouped under new Level 5 headings as part of the existing A&RCC and LCEGS data sets.

These lessons apply to the LCEGS and A&RCC activities already identified. What was not attempted at the onset of this research was any attempt to identify further A&RCC activities not included within the original brief. Given the challenges of measuring "market intent" outlined above, this was probably wise. It is not clear how complete an assessment of "A&RCC" activities this research represents as the assessment reflects a sample of selected activities.

## Appendix A

### Full definition of A&RCC Activities (Levels 3 to 5)

Level 3	Level 4	Level 5
Architectural	Architectural Project Management Services	Architectural Project Management Services Housing Development
Architectural	Architectural Project Management Services	Architectural Project Management Services Highways
Architectural	Architectural Project Management Services	Architectural Project Management Services Public Buildings & Complexes
Architectural	Architectural Project Management Services	Architectural Project Management Services Airports, Ports & Railways
Architectural	Architectural Project Management Services	Architectural Project Management Large Civil Structures Projects
Architectural	Architectural Project Management Services	Architectural Project Management Services Industrial Projects
Architectural	Architectural Project Management Services	Architectural Project Management Services Special Projects
Architectural	Architectural Design Services	Architectural Design Services Housing Development
Architectural	Architectural Design Services	Architectural Design Services Highways
Architectural	Architectural Design Services	Architectural Design Services Public Buildings & Complexes
Architectural	Architectural Design Services	Architectural Design Services Airports, Ports & Railways
Architectural	Architectural Design Services	Architectural Design Services Large Civil Structures Projects
Architectural	Architectural Design Services	Architectural Design Services Industrial Projects
Architectural	Architectural Design Services	Architectural Design Services Special Projects
Architectural	Architectural Design Services	Heritage Advice
Architectural	Architectural Engineering	Architectural Engineering Housing Development
Architectural	Architectural Engineering	Architectural Engineering Highways
Architectural	Architectural Engineering	Architectural Engineering Public Buildings & Complexes
Architectural	Architectural Engineering	Architectural Engineering Airports, Ports & Railways
Architectural	Architectural Engineering	Architectural Engineering Large Civil Structures Projects
Architectural	Architectural Engineering	Architectural Engineering Industrial Projects
Architectural	Architectural Engineering	Architectural Engineering Special Projects
Finance Investment & Insurance	Insurance Services	Flood Insurance Services
Finance Investment & Insurance	Insurance Services	Weather Insurance Services
Finance Investment & Insurance	Insurance Services	Other Major Disaster Insurance Services
Finance Investment & Insurance	Insurance Services	Disaster Actuarial Services
Finance Investment & Insurance	Insurance Services	Insurance Advisory Services for Adaption and Resilience Projects

Finance Investment & Insurance	Banking Services	Banking Services for Community base Projects for Adaption and Resilience
Finance Investment & Insurance	Banking Services	Banking Services for Large Civil Projects for Adaption and Resilience
Finance Investment & Insurance	Banking Services	Banking Services for Corporate Projects for Adaption and Resilience
Finance Investment & Insurance	Banking Services	Banking Services for Other Public Projects for Adaption and Resilience
Finance Investment & Insurance	Banking Services	Banking Advisory Services for Adaption and Resilience
Finance Investment & Insurance	Equity Investment Services	Equity Investment Services for Community base Projects for Adaption and Resilience
Finance Investment & Insurance	Equity Investment Services	Equity Investment Services for Large Civil Projects for Adaption and Resilience
Finance Investment & Insurance	Equity Investment Services	Equity Investment Services for Corporate Projects for Adaption and Resilience
Finance Investment & Insurance	Equity Investment Services	Equity Investment Services for Other Public Projects for Adaption and Resilience
Finance Investment & Insurance	Equity Investment Services	Equity Investment Advisory Services for Adaption and Resilience
Risk Management & Business Continuity	Risk Mitigation	Risk Assessment Services
Risk Management & Business Continuity	Risk Mitigation	Risk Mitigation Implementation Advisory Services
Risk Management & Business Continuity	Risk Mitigation	Risk Mitigation Planning Services
Risk Management & Business Continuity	Risk Mitigation	Disaster Recovery Implementation Services (other than business)
Risk Management & Business Continuity	Risk Mitigation	Risk Mitigation Legal Advisory Services
Risk Management & Business Continuity	Business Continuity	Business Continuity Recovery Implementation Services
Risk Management & Business Continuity	Business Continuity	Business Continuity Planning Services
Risk Management & Business Continuity	Business Continuity	Business Continuity Advisory Services
Risk Management & Business Continuity	Business Continuity	Business Continuity Relocation Services
Risk Management & Business Continuity	Business Continuity	Business Continuity Staff Support Services
Construction & Retrofit	Domestic Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Domestic Housing
Construction & Retrofit	Domestic Urban Enviro Redesign & Re Engineering	Urban Re Engineering & Design Architectural and Technician Services Domestic Housing
Construction & Retrofit	Domestic Urban Enviro Redesign & Re Engineering	Urban Re Engineering & Design Advisory Services Domestic Housing
Construction & Retrofit	Industrial Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Industrial Estates
Construction & Retrofit	Industrial Urban Enviro Redesign & Re Engineering	Urban Re Engineering & Design Architectural and Technician Services Industrial Estates
Construction & Retrofit	Industrial Urban Enviro Redesign & Re Engineering	Urban Re Engineering & Design Advisory Services Industrial Estates
Construction & Retrofit	Public Urban Enviro Redesign & Re Engineering	Urban Re Engineering Civil Engineering Services Public Areas
Construction & Retrofit	Public Urban Enviro Redesign & Re Engineering	Urban Re Engineering & Design Architectural and Technician Services Public Areas
Construction & Retrofit	Public Urban Enviro Redesign & Re Engineering	Urban Re Engineering & Design Advisory Services Public Areas
Construction & Retrofit	Agricultural	Urban Re Engineering Civil Engineering Services Agricultural Applications
Construction & Retrofit	Agricultural	Urban Re Engineering & Design Architectural and Technician Services Agricultural Applications
Construction & Retrofit	Agricultural	Urban Re Engineering & Design Advisory Services Agricultural Applications
Construction & Retrofit	Manufacture of Retro Fit Materials	Manufacture of Replacement Roofing
Construction & Retrofit	Manufacture of Retro Fit Materials	Manufacture of Retro Fit Water Proofing Materials

Construction & Retrofit	Manufacture of Retro Fit Materials	Manufacture of Retro Fit Water Proofing Liquids
Construction & Retrofit	Manufacture of Retro Fit Materials	Manufacture of Retro Fit Flood Abatement Equipment
Construction & Retrofit	Manufacture of Retro Fit Materials	Manufacture of Retro Fit Drainage Systems
Construction & Retrofit	Supply of Retrofit Materials	Supply of Replacement Roofing
Construction & Retrofit	Supply of Retrofit Materials	Supply of Retro Fit Water Proofing Materials
Construction & Retrofit	Supply of Retrofit Materials	Supply of Retro Fit Water Proofing Liquids
Construction & Retrofit	Supply of Retrofit Materials	Supply of Retro Fit Flood Abatement Equipment
Construction & Retrofit	Supply of Retrofit Materials	Supply of Retro Fit Drainage Systems
Construction & Retrofit	Retro Fit Buildings Services	Retro Fit Electrical Services
Construction & Retrofit	Retro Fit Buildings Services	Retro Fit Plastering Services
Construction & Retrofit	Retro Fit Buildings Services	Retro Fit Brick & Stone Laying Services
Construction & Retrofit	Retro Fit Buildings Services	Retro Fit Plumbing Services
Construction & Retrofit	Retro Fit Buildings Services	Retro Fit Engineering Services
Construction & Retrofit	Adaptive Civil Engineering Services	Land Area Stabilization Services
Construction & Retrofit	Adaptive Civil Engineering Services	Manufacture of Land Mass Structural Support Equipment
Construction & Retrofit	Adaptive Civil Engineering Services	Supply of Land Mass Structural Support Equipment
Construction & Retrofit	Adaptive Civil Engineering Services	Installation of Land Mass Structural Support Equipment
Construction & Retrofit	Adaptive Civil Engineering Services	Maintenance of Land Mass Structural Support Equipment
Construction & Retrofit	Manufacture of Retro Fit Engineering Equipment	Manufacture of Structural Braces for Buildings
Construction & Retrofit	Manufacture of Retro Fit Engineering Equipment	Manufacture of Retro Fit Structural Supports for Bridges and Elevated Walkways
Construction & Retrofit	Manufacture of Retro Fit Engineering Equipment	Manufacture of Anti Erosion Constructs
Construction & Retrofit	Manufacture of Retro Fit Engineering Equipment	Manufacture of Coastal Defence Buffer Emplacements
Construction & Retrofit	Manufacture of Retro Fit Engineering Equipment	Manufacture of Underpinning Equipment
Construction & Retrofit	Supply of Retro Fit Engineering Equipment	Supply of Structural Braces for Buildings
Construction & Retrofit	Supply of Retro Fit Engineering Equipment	Supply of Retro Fit Structural Supports for Bridges and Elevated Walkways
Construction & Retrofit	Supply of Retro Fit Engineering Equipment	Supply of Anti Erosion Constructs
Construction & Retrofit	Supply of Retro Fit Engineering Equipment	Supply of Coastal Defence Buffer Emplacements
Construction & Retrofit	Supply of Retro Fit Engineering Equipment	Supply of Underpinning Equipment
Construction & Retrofit	Manufacturers of Temporary Accommodation For Renovation Projects	Manufacturers of Temporary Prefabricated On Site Accommodation
Construction & Retrofit	Manufacturers of Temporary Accommodation For Renovation Projects	Manufacturers of Temporary Prefabricated Temporary Public Assembly Units
Construction & Retrofit	Manufacturers of Temporary Accommodation For Renovation Projects	Manufacturers of Temporary Prefabricated Emergency Services Units
Construction & Retrofit	Manufacturers of Temporary Accommodation For Renovation Projects	Manufacturers of Temporary Prefabricated Housing
Construction & Retrofit	Manufacturers of Temporary Accommodation For Renovation Projects	Manufacturers of Temporary Prefabricated Offices
Construction & Retrofit	Suppliers of Temporary Accommodation For Renovation Projects	Suppliers of Temporary Prefabricated On Site Accommodation

Construction & Retrofit	Suppliers of Temporary Accommodation For Renovation Projects	Suppliers of Temporary Prefabricated Temporary Public Assembly Units
Construction & Retrofit	Suppliers of Temporary Accommodation For Renovation Projects	Suppliers of Temporary Prefabricated Emergency Services Units
Construction & Retrofit	Suppliers of Temporary Accommodation For Renovation Projects	Suppliers of Temporary Prefabricated Housing
Construction & Retrofit	Suppliers of Temporary Accommodation For Renovation Projects	Suppliers of Temporary Prefabricated Offices
Construction & Retrofit	Domestic	Manufacture of Path & Standing Area Porous Resurfacing Services
Construction & Retrofit	Domestic	Manufacture of Rain Water Capture Systems
Construction & Retrofit	Domestic	Supply of Rain Water Capture Systems
Construction & Retrofit	Domestic	Supply of Porous Surfacing Materials
Construction & Retrofit	Domestic	Installation of Rain Water Capture Systems
Construction & Retrofit	Industrial	Manufacture of Path & Standing Area Porous Resurfacing Services
Construction & Retrofit	Industrial	Manufacture of Rain Water Capture Systems
Construction & Retrofit	Industrial	Supply of Rain Water Capture Systems
Construction & Retrofit	Industrial	Supply of Porous Surfacing Materials
Construction & Retrofit	Industrial	Installation of Rain Water Capture Systems
Construction & Retrofit	Public	Manufacture of Path & Standing Area Porous Resurfacing Services
Construction & Retrofit	Public	Manufacture of Rain Water Capture Systems
Construction & Retrofit	Public	Supply of Rain Water Capture Systems
Construction & Retrofit	Public	Supply of Porous Surfacing Materials
Construction & Retrofit	Public	Installation of Rain Water Capture Systems
Construction & Retrofit	Agricultural	Manufacture of Path & Standing Area Porous Resurfacing Services
Construction & Retrofit	Agricultural	Manufacture of Rain Water Capture Systems
Construction & Retrofit	Agricultural	Supply of Rain Water Capture Systems
Construction & Retrofit	Agricultural	Supply of Porous Surfacing Materials
Construction & Retrofit	Agricultural	Installation of Rain Water Capture Systems
Sustainable Drainage & Water Management	Domestic	Anti Subsidence Works
Sustainable Drainage & Water Management	Domestic	Flood Abatement Works
Sustainable Drainage & Water Management	Domestic	Surface Water Drainage Works
Sustainable Drainage & Water Management	Domestic	Re Location and & Re laying
Sustainable Drainage & Water Management	Domestic	Surveying and Assessment Services
Sustainable Drainage & Water Management	Industrial	Anti Subsidence Works
Sustainable Drainage & Water Management	Industrial	Flood Abatement Works
Sustainable Drainage & Water Management	Industrial	Surface Water Drainage Works
Sustainable Drainage & Water Management	Industrial	Re Location and & Re laying
Sustainable Drainage & Water Management	Industrial	Surveying and Assessment Services



Sustainable Drainage & Water Management	Public	Flood Abatement Works
Sustainable Drainage & Water Management	Public	Surveying and Assessment Services
Sustainable Drainage & Water Management	Public	Dredging Services
Sustainable Drainage & Water Management	Public	Maintenance of Locks
Sustainable Drainage & Water Management	Public	Bank Maintenance Services
Sustainable Drainage & Water Management	Agricultural	Manufacture of Path & Standing Area Porous Resurfacing Services
Sustainable Drainage & Water Management	Agricultural	Manufacture of Rain Water Capture Systems
Sustainable Drainage & Water Management	Agricultural	Supply of Rain Water Capture Systems
Sustainable Drainage & Water Management	Agricultural	Supply of Porous Surfacing Materials
Sustainable Drainage & Water Management	Agricultural	Installation of Rain Water Capture Systems
Transport Infrastructure	Rail	Anti Subsidence Works
Transport Infrastructure	Rail	Flood Abatement Works
Transport Infrastructure	Rail	Surface Water Drainage Works
Transport Infrastructure	Rail	Re Location and Re laying
Transport Infrastructure	Rail	Surveying and Assessment Services
Transport Infrastructure	Road	Anti Subsidence Works
Transport Infrastructure	Road	Flood Abatement Works
Transport Infrastructure	Road	Surface Water Drainage Works
Transport Infrastructure	Road	Re Location and & Re laying
Transport Infrastructure	Road	Surveying and Assessment Services
Transport Infrastructure	Waterways	Flood Abatement Works
Transport Infrastructure	Waterways	Surveying and Assessment Services
Transport Infrastructure	Waterways	Dredging Services
Transport Infrastructure	Waterways	Maintenance of Locks
Transport Infrastructure	Waterways	Bank Maintenance Services
Water Irrigation	Agriculture	Manufacture of Agricultural Irrigation Systems
Water Irrigation	Agriculture	Supply of Agricultural Irrigation Systems
Water Irrigation	Agriculture	Installation of Agricultural Irrigation Systems
Water Irrigation	Agriculture	Maintenance of Agricultural Irrigation Systems
Water Irrigation	Agriculture	Design of Agricultural Irrigation Systems
Water Irrigation	Leisure Areas	Manufacture of Irrigation Systems for Leisure Areas
Water Irrigation	Leisure Areas	Supply of Irrigation Systems for Leisure Areas
Water Irrigation	Leisure Areas	Installation of Irrigation Systems for Leisure Areas
Water Irrigation	Leisure Areas	Maintenance of Irrigation Systems for Leisure Areas

Water Irrigation	Leisure Areas	Design of Irrigation Systems for Leisure Areas
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## Appendix B

### A&RCC Inclusion Criteria for LCEGS Activities

**Air Pollution:** Reduction of emissions, Defence from emission, Conversion of emissions

**Environmental Consultancy:** Reduction of emissions, Defence from emission, Conversion of emissions

**Environmental Monitoring:** Reduction of emissions, Defence from emission

**Marine Pollution Control:** Pollution reduction as a direct result of climate change, Treatment and conversion as a direct result of climate change

**Noise & Vibration Control:** No identified mitigation or adaptive categories

**Contaminated Land Reclamation & Remediation:** Anti flood products and services, Reclamation as a result of climate change, Stabilisation activities as a result of climate change

**Waste Management:** No identified mitigation or adaptive categories

**Water Supply and Waste Water Treatment:** Anti flood products and services

**Recovery and Recycling:** No identified mitigation or adaptive categories

**Hydro:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Wave & Tidal:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Biomass:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Wind:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Geothermal:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Renewable Energy General Consultancy:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Photovoltaic:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Alternative Fuels:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Alternative Fuel Vehicle:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Nuclear Power:** Alternative Energy Generation to mitigate use of fossil fuels in production of CO<sub>2</sub>

**Carbon Capture & Storage:** Capture of CO<sub>2</sub> emissions, Sequestration of Carbon, Development and implementation of policy

**Carbon Finance:** Enforcement of policy

**Energy Management:** Reduction of emissions, Heat control

**Building Technologies:** Reduction of emissions, Heat Control

**Additional Energy Sources:** Reduction of emissions

**Cleaner Processes & Materials:** Reduction of emissions

**Cleaner Manufacturing:** Reduction of emissions

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