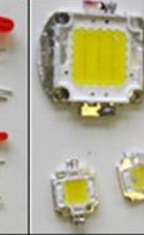


Table 1: Chemical analysis of sampled LED products and components

		Separated LEDs	Handlight: casing+LED	TV backlight	Retrofits: driver+LED	LED panel	LED on Pb	Retrofits: convertors
								
Ag	ppm	2435	207	141	1203	2870	4784	3969
Au	ppm	132	< 20	< 20	96,33	63,45	66,48	<200
Pt	ppm	< 2	< 20	< 20	< 2,016	< 1	-	-
Pd	ppm	< 2	< 20	< 20	2,645	28,22	-	-
Pb	%	< 0,05	0,0881	< 0,05	2,82	0,8798	0,0709	0,1281
Cu	%	< 0,05	15,28	12,16	2,55	4,827	0,7381	87,05
In	%	< 0,05	< 0,05	< 0,05	< 0,05	< 0,1	< 0,02	< 0,02
Ga	%	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	-	< 0,02
Sn	%	< 0,05	2,678	0,1499	4,918	2,132	1,712	0,88
Al	%	< 0,1	5	19	3	3,581	0,23	0,1198
Fe	%	17,24	2,555	0,1113	11,92	7,474	38,42	0,1544
Ni	%	0,1012	0,2289	< 0,05	0,2352	0,1302	-	-
Si	%	< 0,1	23	8	14	7,125	-	-
Zn	%	< 0,05	< 0,05	< 0,05	0,1946	0,1639	-	-
Y	%	0,16	< 0,05	< 0,05	< 0,05	< 0,1	< 0,02	0,13
La	%	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	-	-
Ce	%	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	-	-
Eu	%	< 0,05	< 0,05	< 0,05	< 0,05	< 0,1	-	< 0,01
Tb	%	< 0,05	< 0,05	< 0,05	< 0,05	< 0,1	-	-
SUM	%	18,61	49,41	40,09	40,27	27,31	41,70	88,91
Remainder	%	81,39	50,59	59,91	59,73	72,69	58,30	11,09

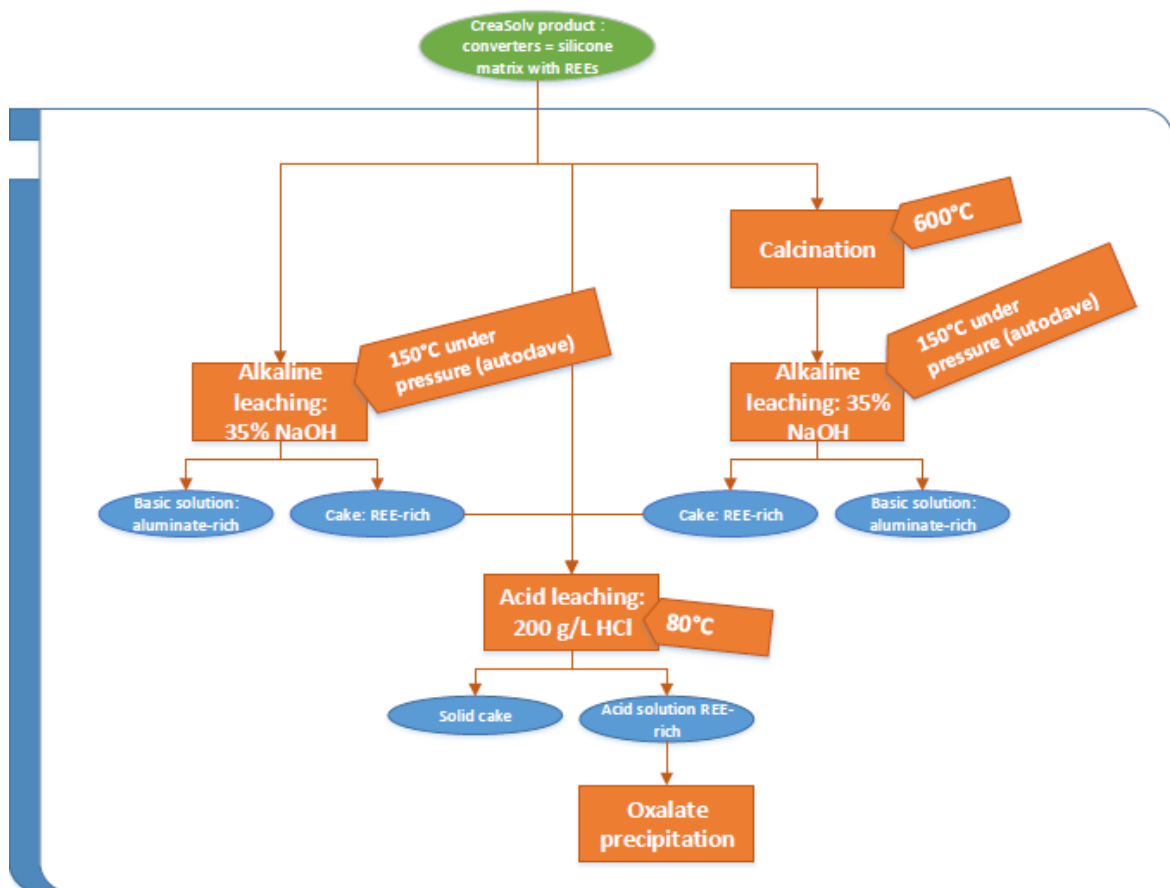


Figure 1: Overview of three investigated end-processing routes for recycling REEs from LED converters

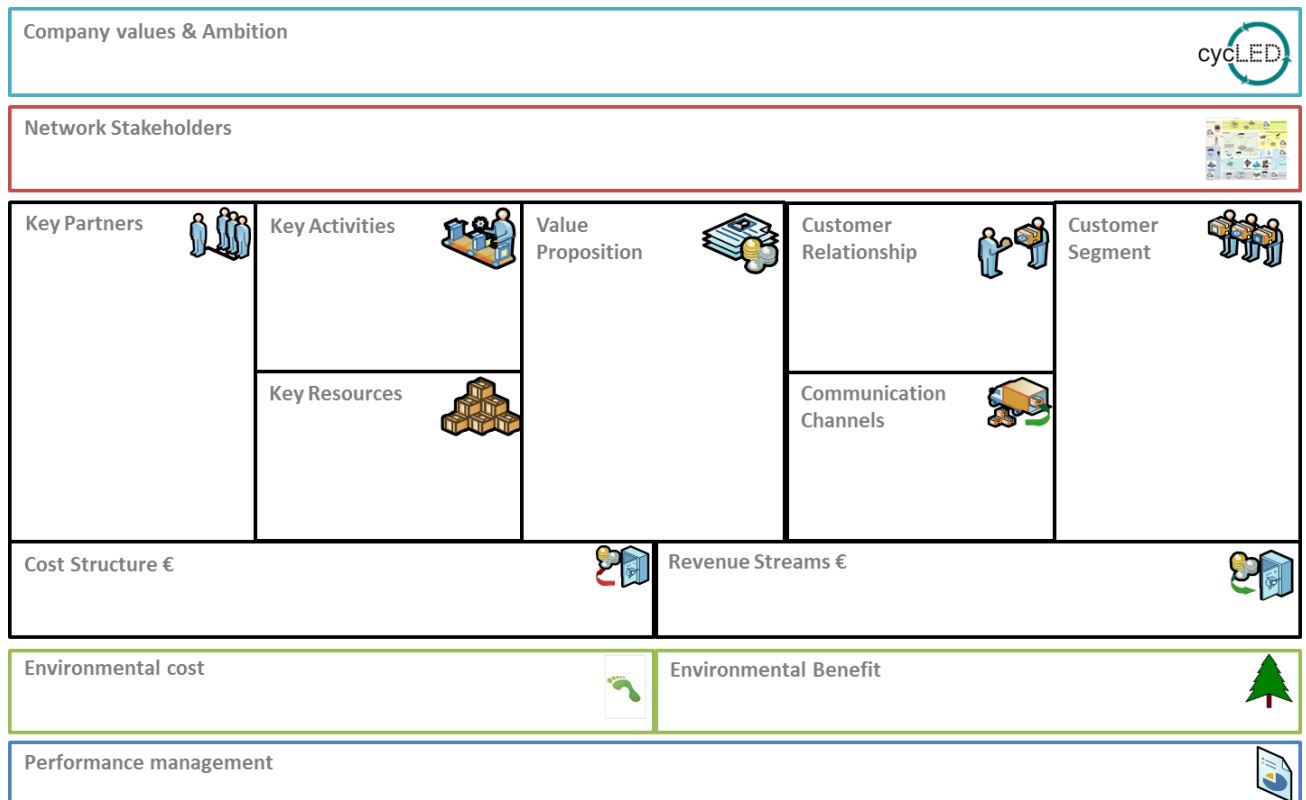


Figure 2: the cycled BM canvas

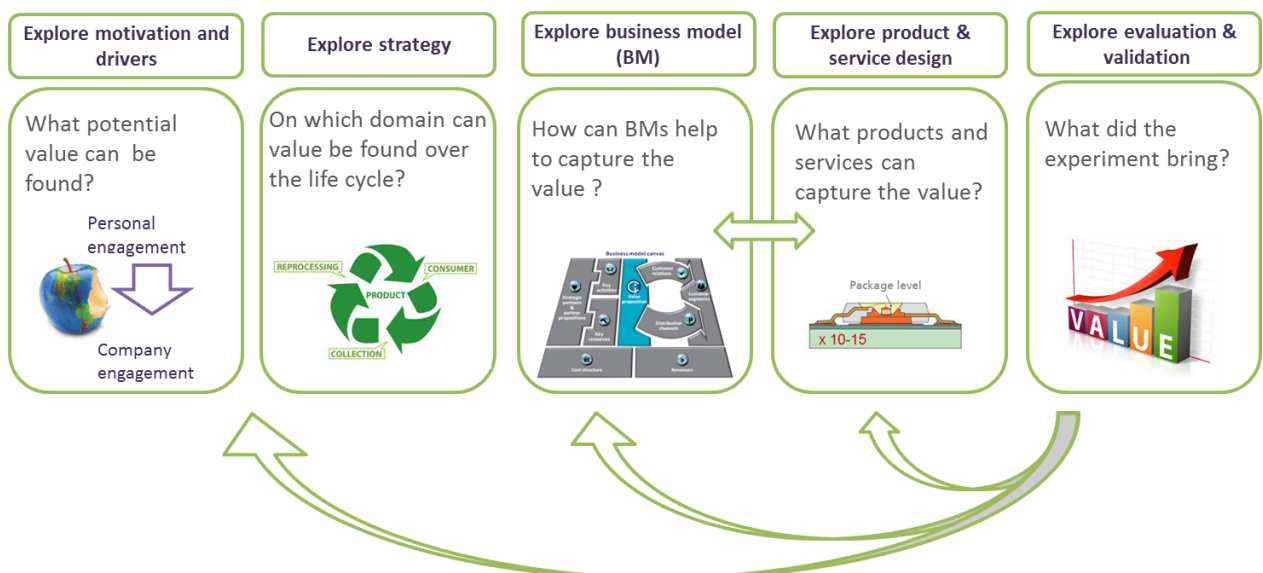


Figure 3: simplified cycled BM framework

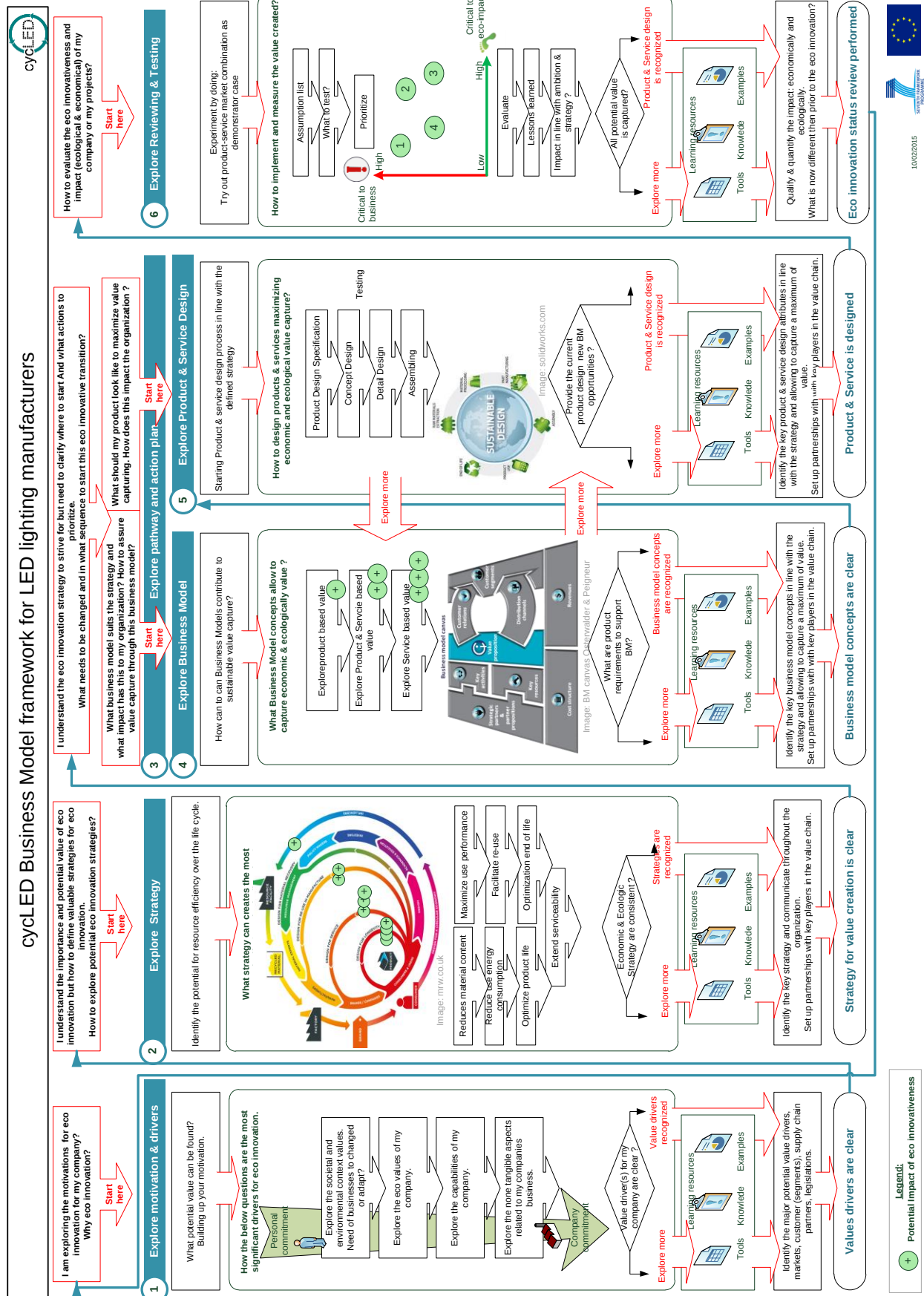


Figure 4: the cycled BM framework

