Table 1. Description of Waste (Valley), 2017

Type of Waste	Weight/ tonnes
Hazardous Waste	8256.07
Discarded tires	88.3
Construction waste class 170904	14.4
Construction waste class 170904	85.8
Large-size waste	496.4
Paper and cardboard	2947.04
Plastic Packaging	230.835
Glass containers	1431.3
Non-ferrous metal	12.123
Metals (I)	130.4
Metals (II)	834.147
Metals (III)	556.942
House hold Waste	250569.61
Unsorted municipal waste	16211.42
Unsorted municipal waste	41775
Total	323639.79

Table 2. Estimation of properties of municipal waste

Total Organic	Waste fraction (%)	Moisture content (%)	Dry Calorific value (MJ/kg)
Food Waste	8	70	4.65
Paper	21	6	16.7
Cardboard	6	5	16.2
Plastics	3	2	32.6
Textiles	3	10	17.5
Rubber	1	2	23.4
Leather	1	10	17.4
Yard Waste	12	60	6.5
Wood	2	20	18.6

Table 3. Typical composition of dry Municipal Waste

Total Organic	C (%)	H (%)	O (%)	N (%)	S (%)	Ash (%)
Food Waste	48	6.4	37.6	2.6	0.4	5
Paper	43.5	6	44	0.3	0.2	6
Cardboard	44	5.9	44.6	0.3	0.2	5
Plastics	22.8	7.2	22.8	0	0	10
Textiles	31.2	6.6	31.2	4.6	0.15	2.5
Rubber	78	10	0	2	0	10
Leather	60	8	11.6	10	0.4	10
yard Waste	47.8	6	38	3.4	0.3	4.5
wood	49.5	6	42.7	0.2	0.1	1.5

Table 4. Weight of elements in the Municipal Waste

Total Organic	C (t)	H (t)	O (t)	N (t)
Food Waste	355456.55	47394.21	278440.96	19253.90
Paper	2649539.79	365453.76	2679994.27	18272.69
Cardboard	773858.53	103767.39	784411.14	5276.31
Plastics	206831.28	65315.14	206831.28	0.00
Textiles	259927.60	54984.68	259927.60	38322.66
Rubber	235860.23	30238.49	0.00	6047.70
Leather	166620.26	22216.03	32213.25	27770.04
yard Waste	707950.96	88864.14	562806.20	50356.34
wood	244376.38	29621.38	210805.48	987.38

Table 5. Calculation of final Stoichiometric composition of the Municipal Waste

	M(gm/mol)	Mass (tonnes)	Moles (Mmol)	Ratio
C	12	5600422	466701.8	39.3
H	1	807855.2	807855.2	68.0
O	16	5015430	313464.4	26.4
N	14	166287	11877.64	1.0

The final chemical composition of the organic waste was calculated as $C_{39.3}H_{68.0}O_{26.4}N_{1.}$

$$C_aH_bO_cN_d+\frac{4a-b-2c+3d}{4}H_2O\rightarrow\frac{4a+b-2c-3d}{8}CH_4+\frac{4a-b+2c+3d}{8}CO_2+dNH_3 \quad (1)$$

a = 39.3 b = 68 c = 26.4 d =1

The resulting equation is as following:

$$\underset{975.8}{C_{39.3}H_{68}O_{26.4}N}+\underset{75.15}{4.175H_2O}\rightarrow\underset{381.15}{21.175CH_4}+\underset{797.15}{18.125CO_2}+\underset{17}{NH_3} \quad (2)$$

$$Methane=\frac{381.8}{975.8}\times 308556\,tonnes=120527\,tonnes \quad (3)$$

$$Carbon\,dioxide = \frac{797.15}{975.8} \times 308556\,tonnes = 252072\,tonnes \quad (4)$$

Using the density value for Methane as 0.656kg/m^3 and carbon dioxide as 1.97kg/m^3.

$$Methane = \frac{120527 * 10^3 kg}{0.656 \frac{kg}{m^3}} = 1.84 * 10^8 m^3 \quad (5)$$

$$Carbon\,dioxide = \frac{252071 * 10^3 kg}{1.97 \frac{kg}{m^3}} = 1.28 * 10^8 m^3 \quad (6)$$

Methane % = 58.95%
Carbon dioxide % = 41.05%
Total Energy Potential of Methane = 1840 Gwh

Table 7. Methane production when 72% of waste is deposited to landfill

Year	Methane (tonnes)	Methane (m^3)
2018	659.3265	1.01E+06
2019	574.7345	8.76E+05
2020	502.7031	7.66E+05
2021	441.2294	6.73E+05
2022	388.6397	5.92E+05
2023	343.5353	5.24E+05
2024	304.7465	4.65E+05
2025	271.294	4.14E+05
2026	242.3579	3.69E+05
2027	217.2509	3.31E+05
2028	195.3966	2.98E+05
2029	176.3107	2.69E+05
2030	159.5865	2.43E+05
Total	4477.112	6.82E+06