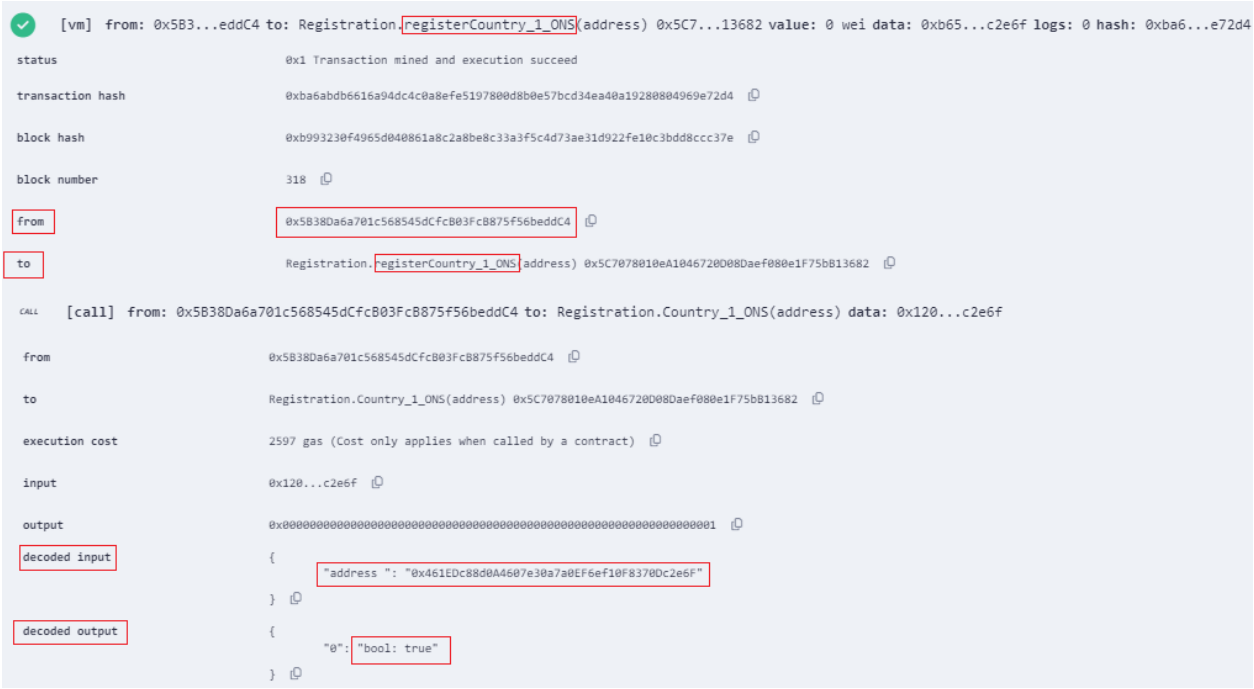
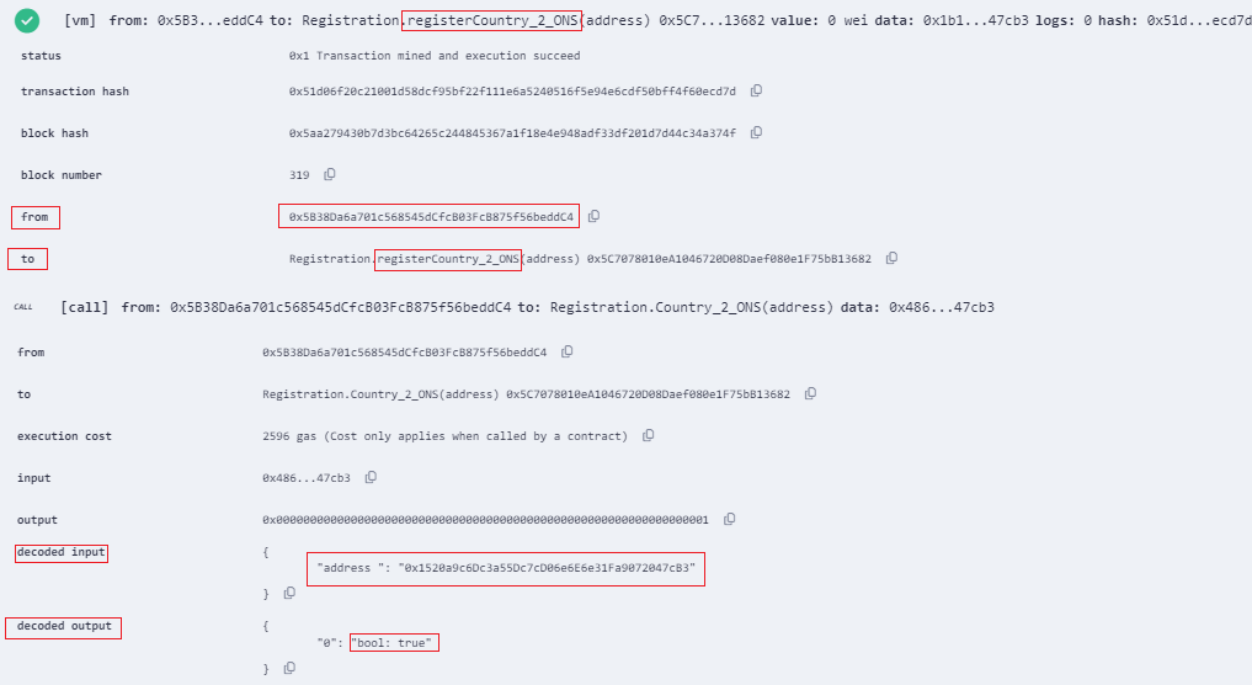
<Supplemental material>

Manuscript title: Blockchain-based multi-regional input-output (MRIO) framework for carbon accounting in global supply chains

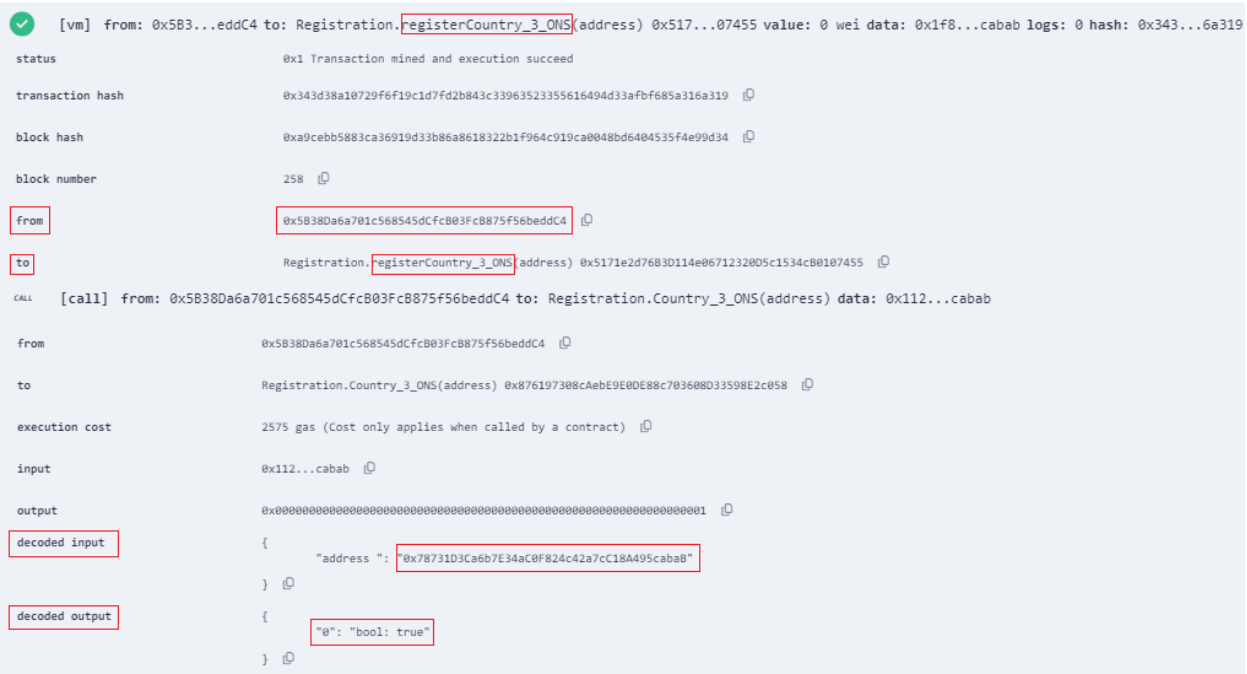
Supplementary Figure 1: Log showing the successful Deployment of Registration Smart Contract



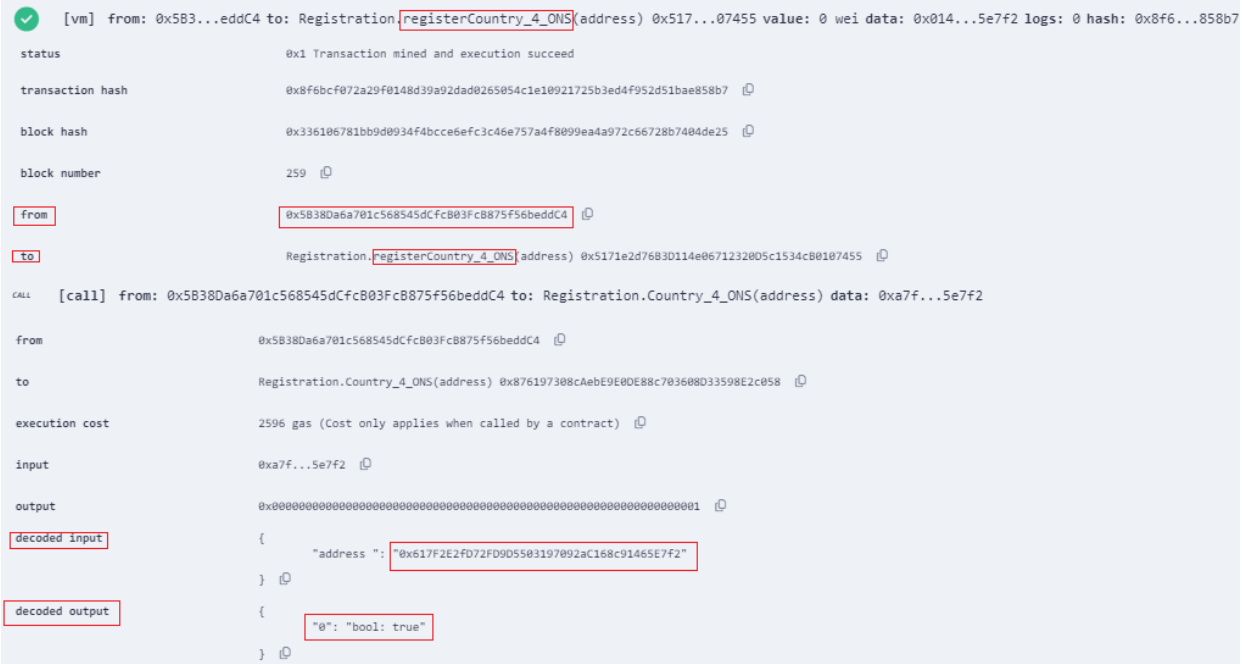
Supplementary Figure 2: Log showing the successful registration of Country 1 ONS



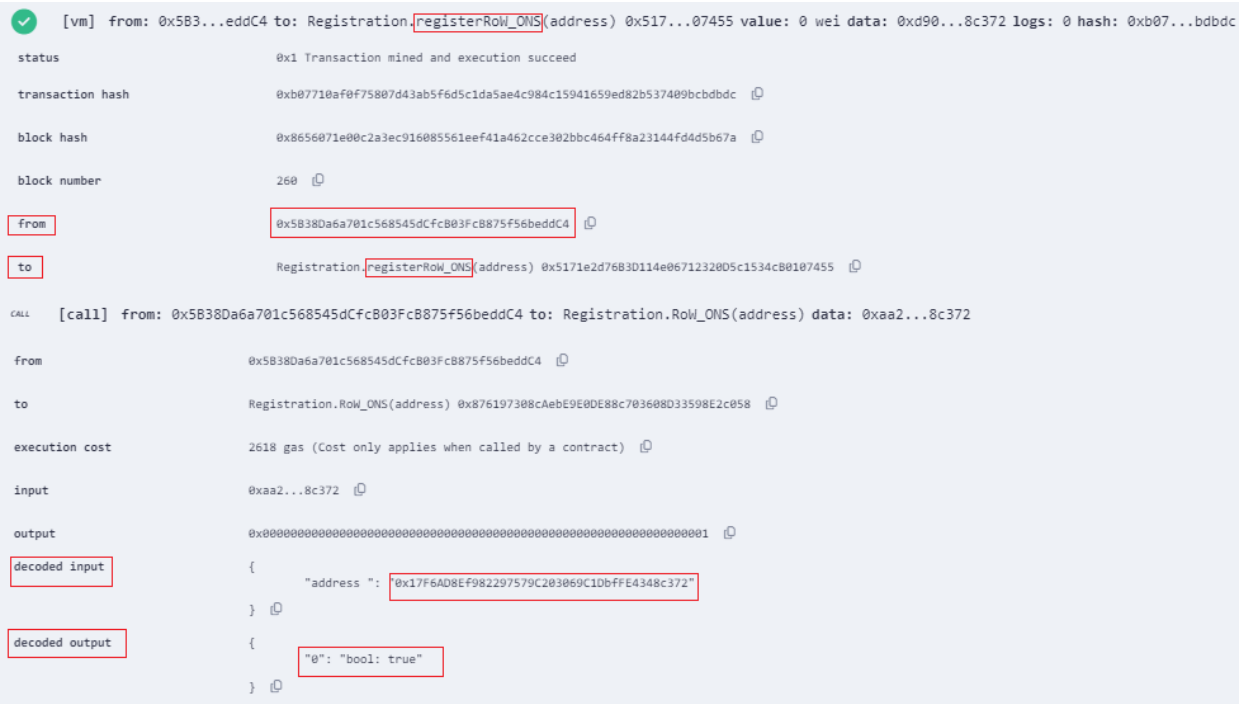
Supplementary Figure 3: Log showing the successful registration of all Country 2 ONS



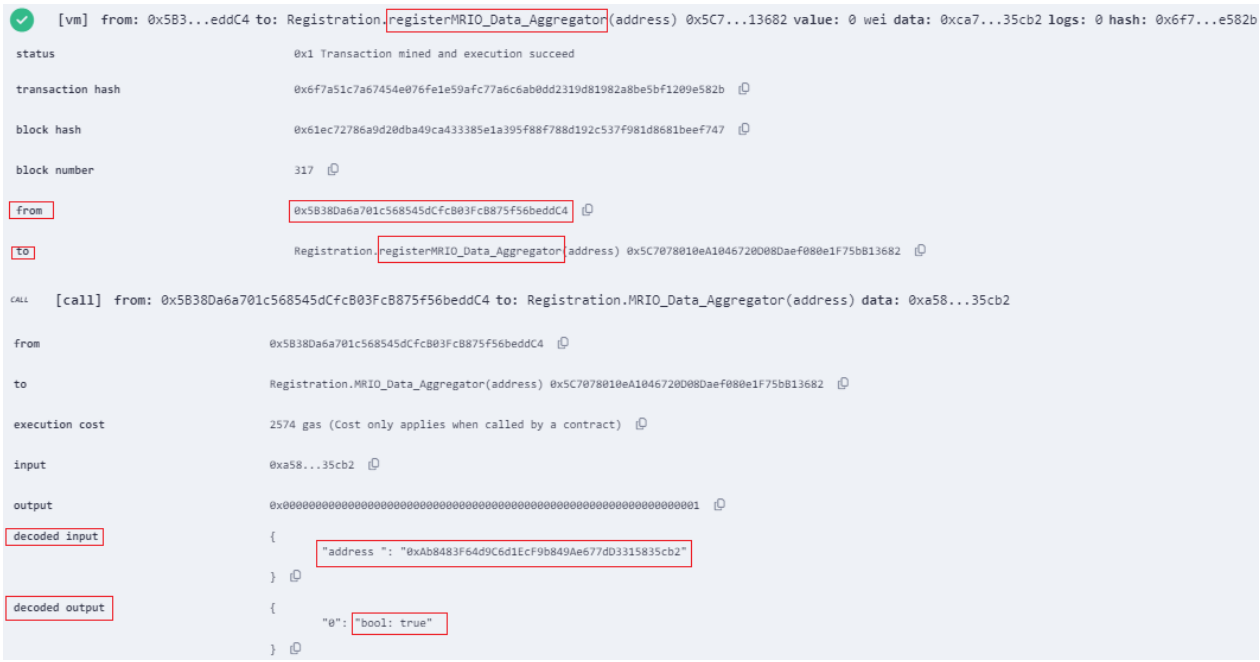
Supplementary Figure 4: Log showing the successful registration of all Country 3 ONS



Supplementary Figure 5: Log showing the successful registration of Country 4 ONS

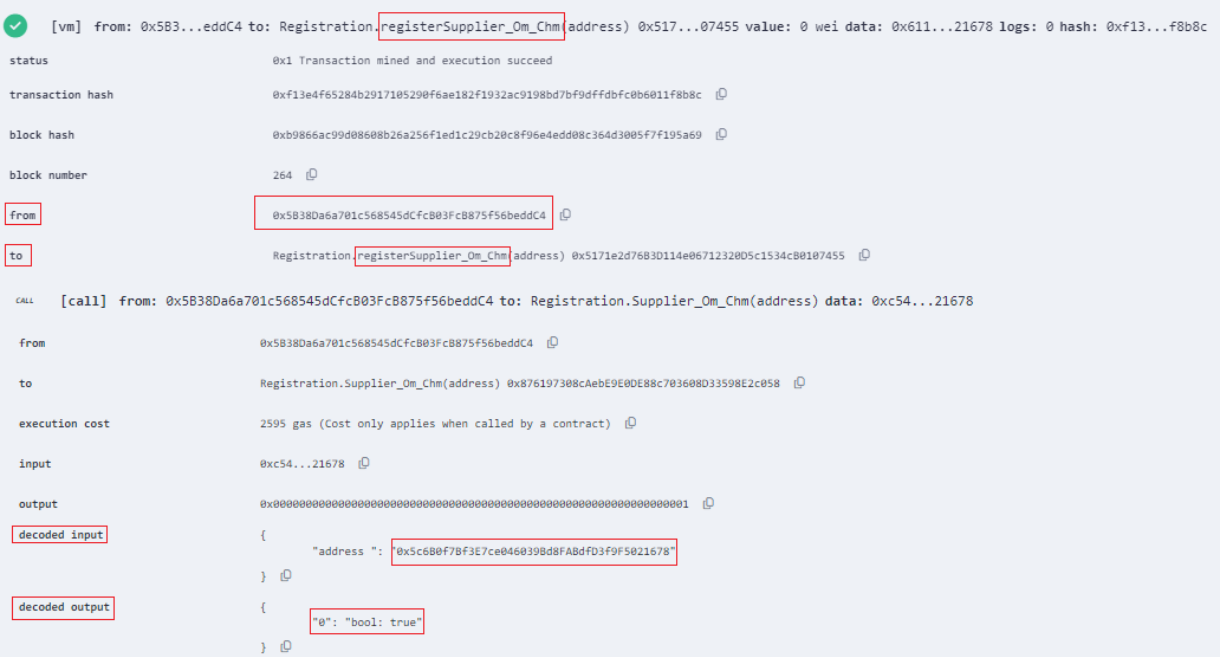


Supplementary Figure 6: Log showing the successful registration of Rest-of-the-World ONS

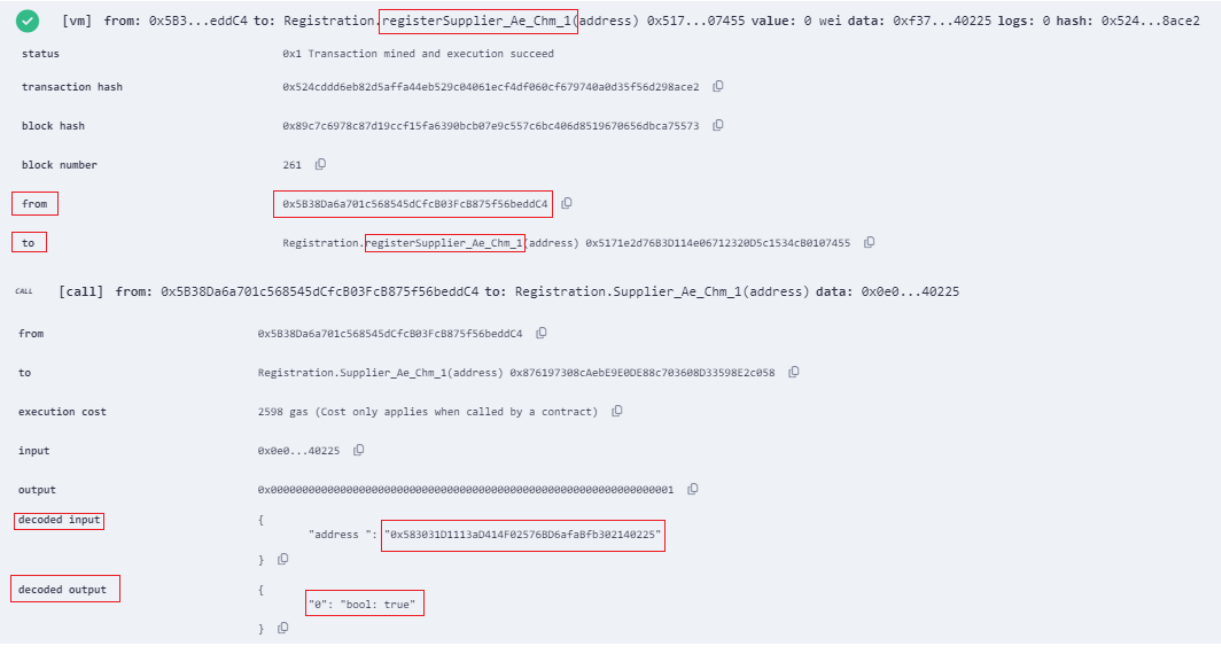


Supplementary Figure 7: Log showing the successful registration of MRIO Data Aggregator

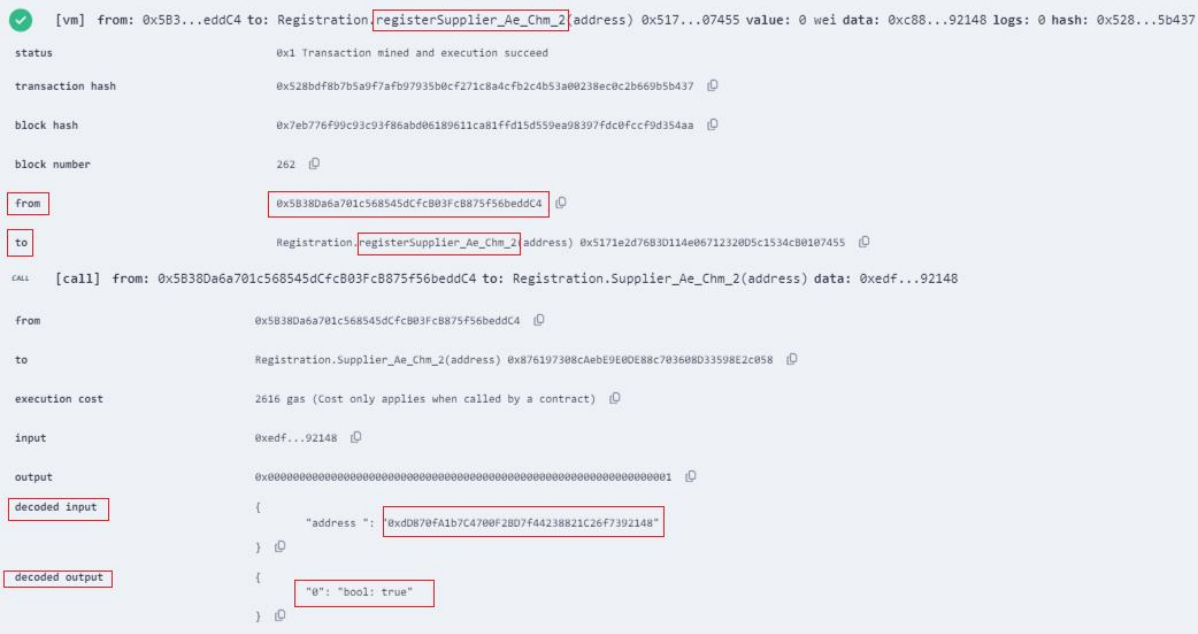
Supplementary Figure 8: Log showing the successful registration of Focal Company



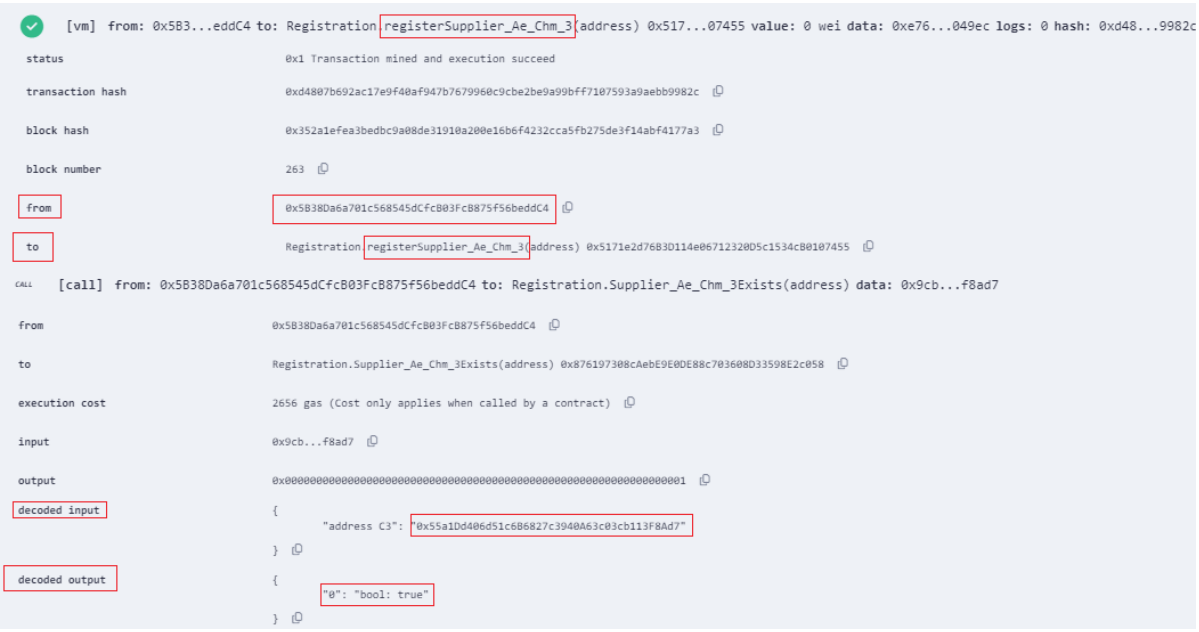
Supplementary Figure 9: Log showing the successful registration of Chemical Industry Supplier in Oman



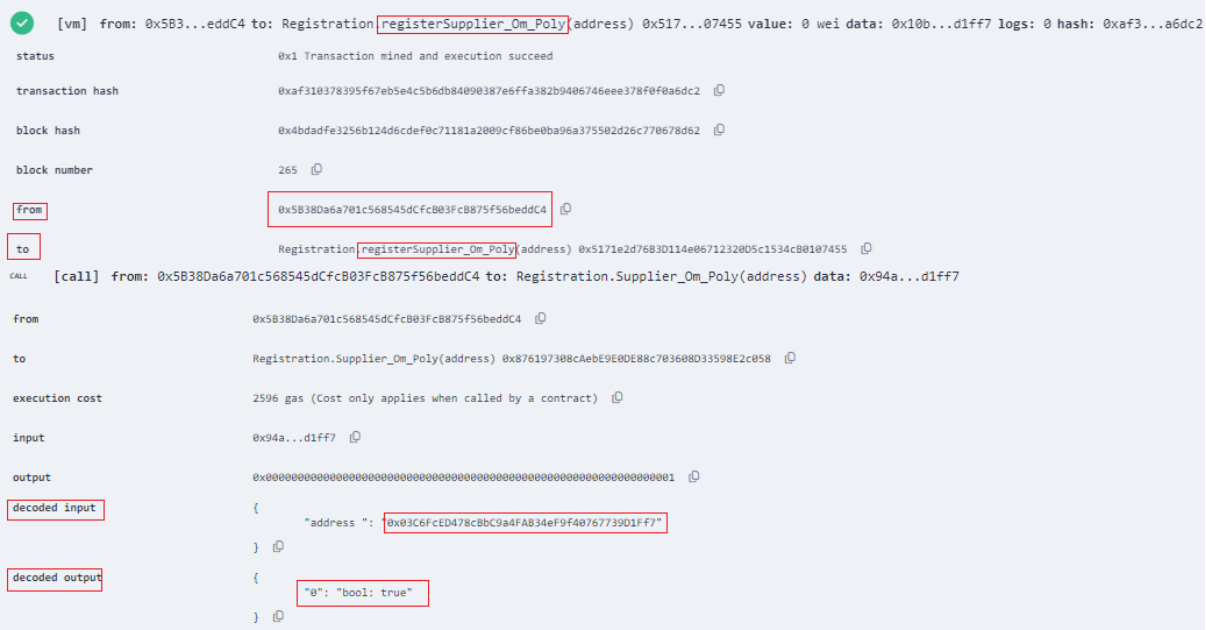
Supplementary Figure 10: Log showing the successful registration of Chemical Industry Supplier 1 in Oman



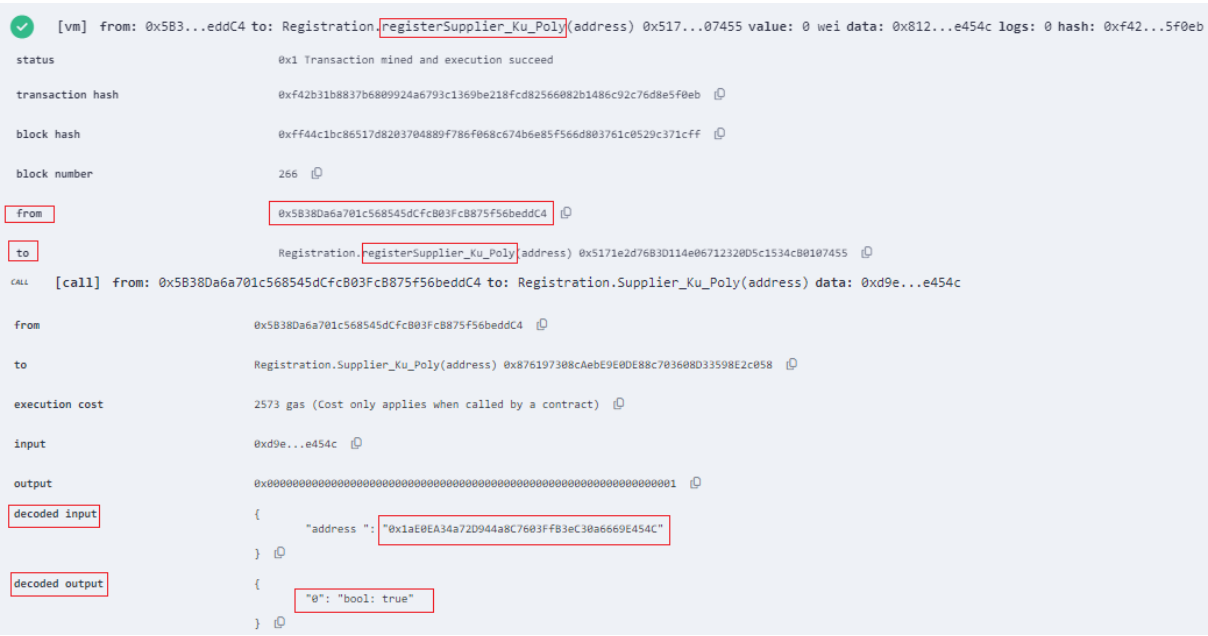
Supplementary Figure 11: Log showing the successful registration of Chemical Industry Supplier 2 in UAE



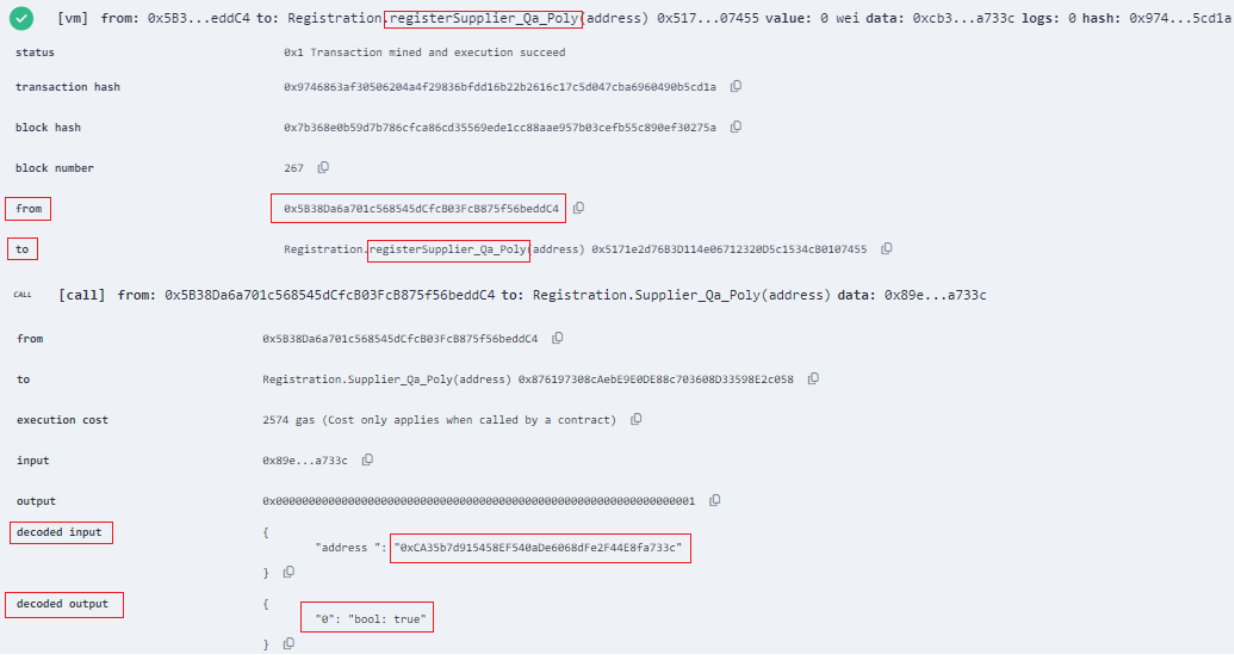
Supplementary Figure 12: Log showing the successful registration of Chemical Industry Supplier 3 in UAE



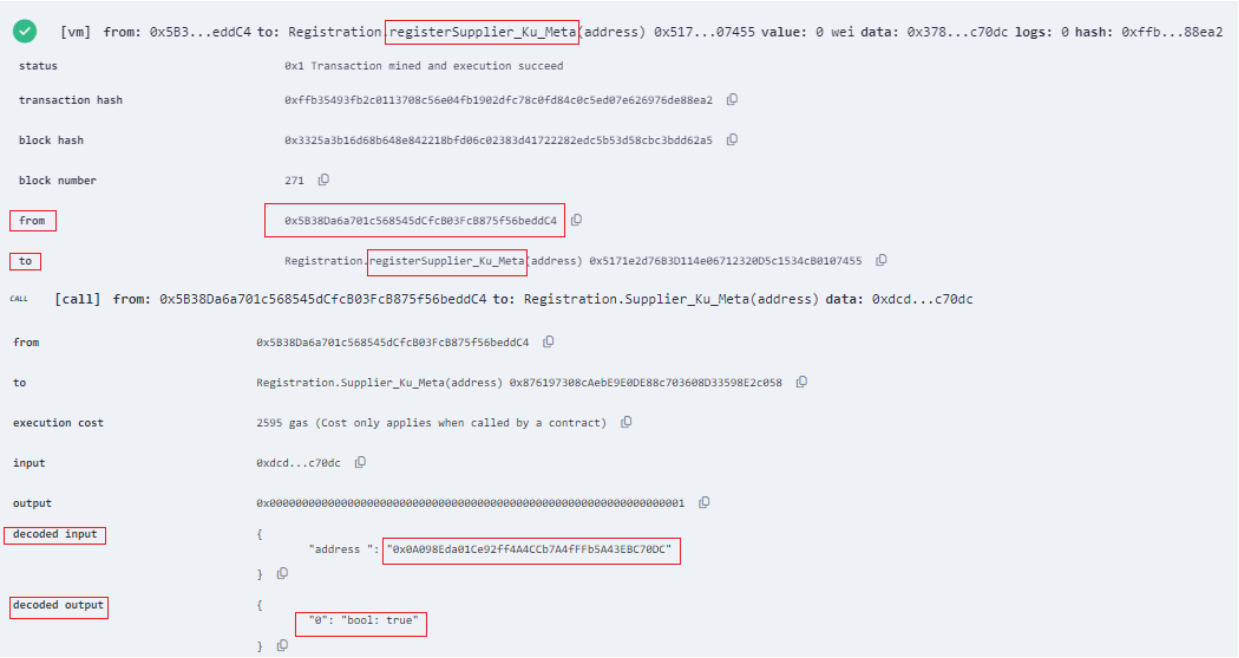
Supplementary Figure 13: Log showing the successful registration of Polymer Industry Supplier in Oman



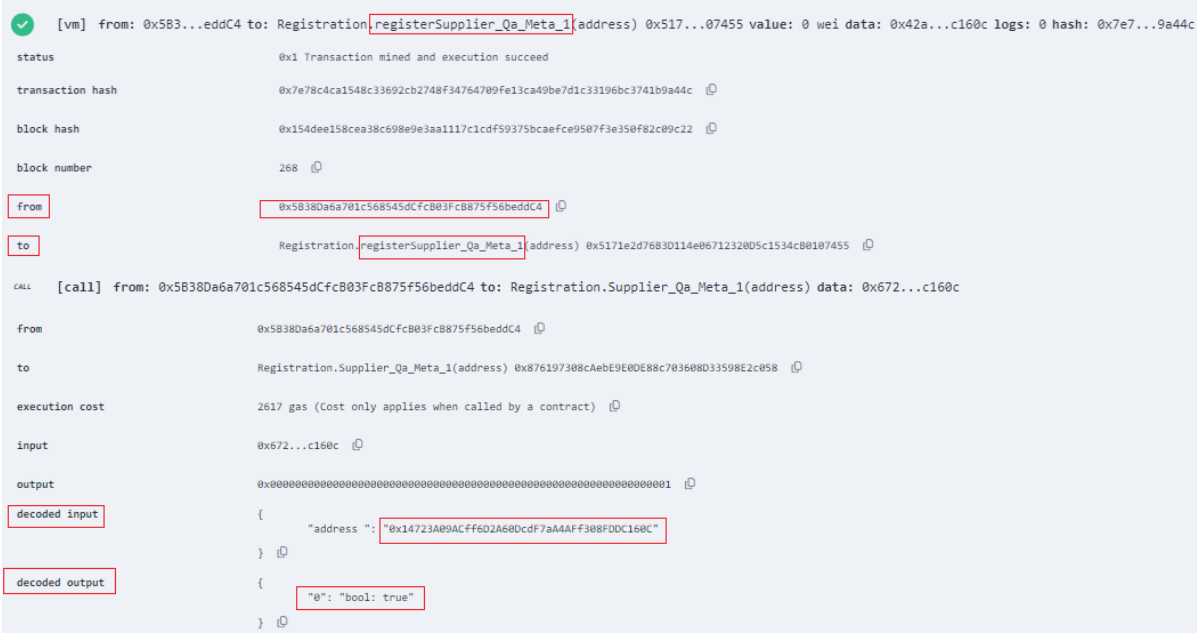
Supplementary Figure 14: Log showing the successful registration of Polymer Industry Supplier in Kuwait



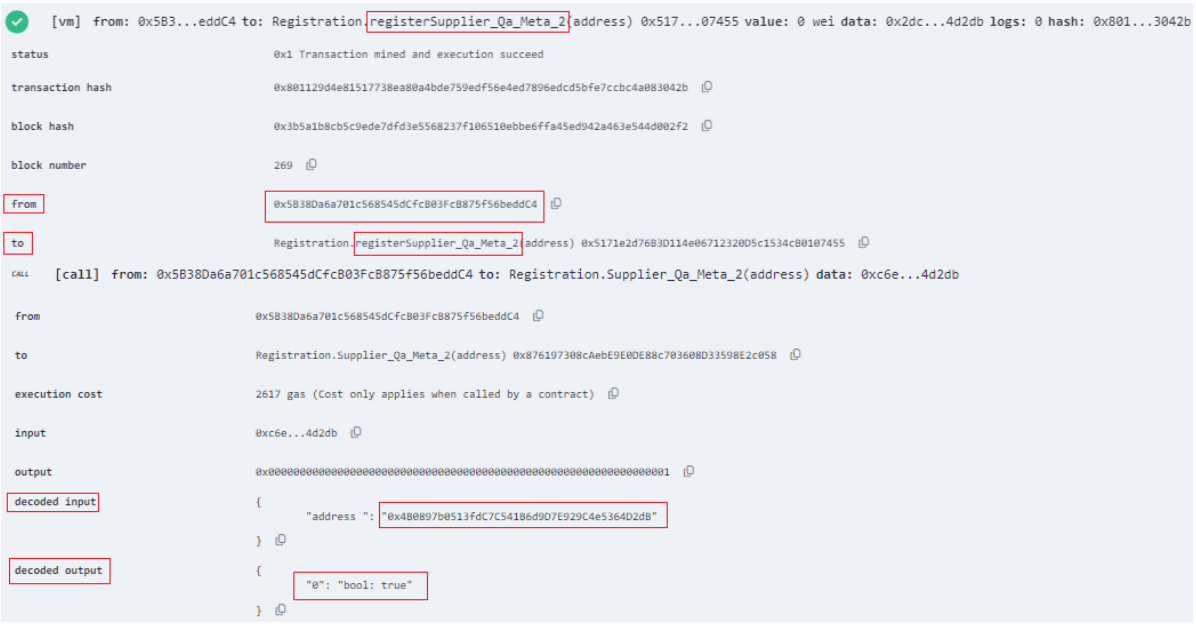
Supplementary Figure 15: Log showing the successful registration of Polymer Industry Supplier in Qatar



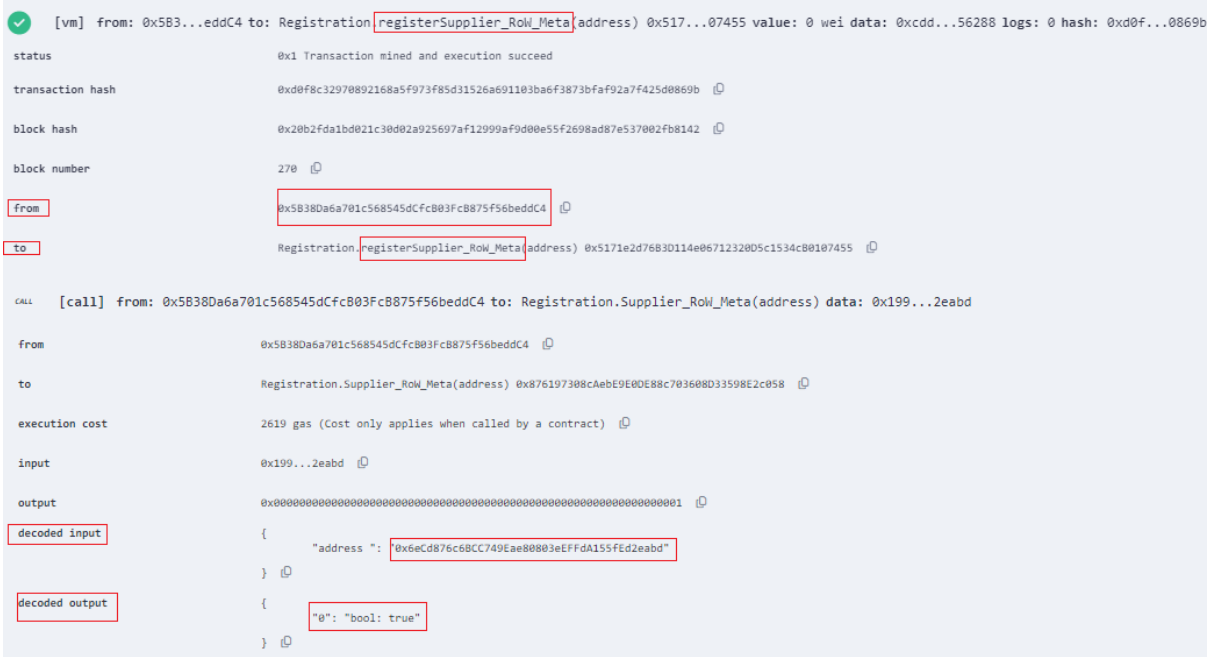
Supplementary Figure 16: Log showing the successful registration of Metal Industry Supplier in Kuwait



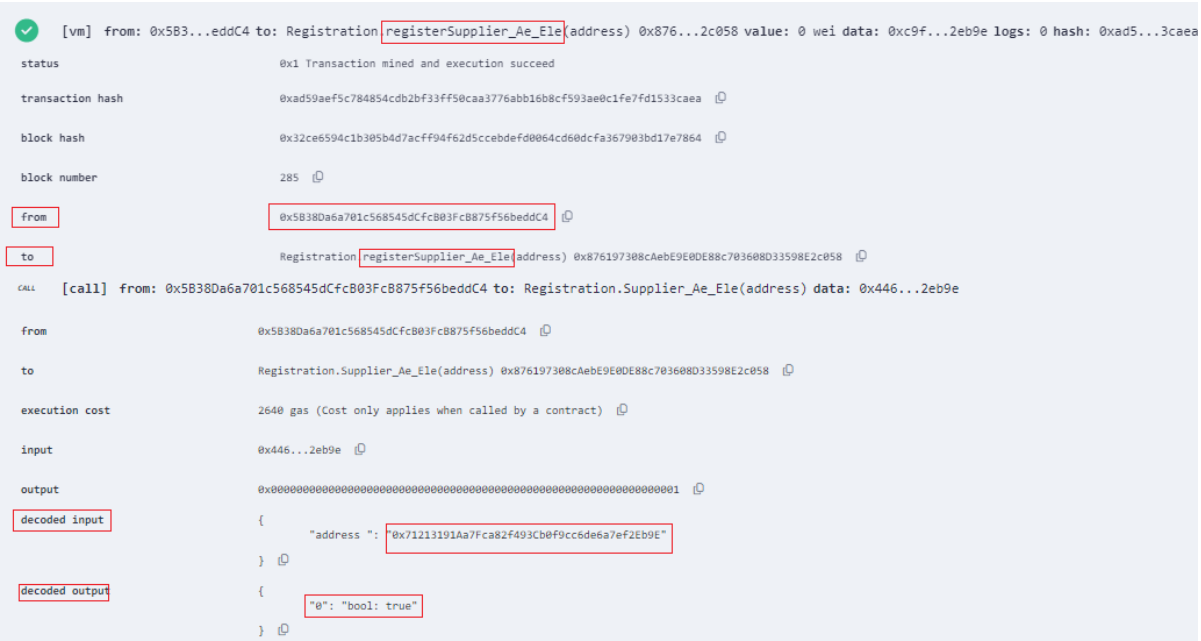
Supplementary Figure 17: Log showing the successful registration of Metal Industry Supplier 1 in Qatar



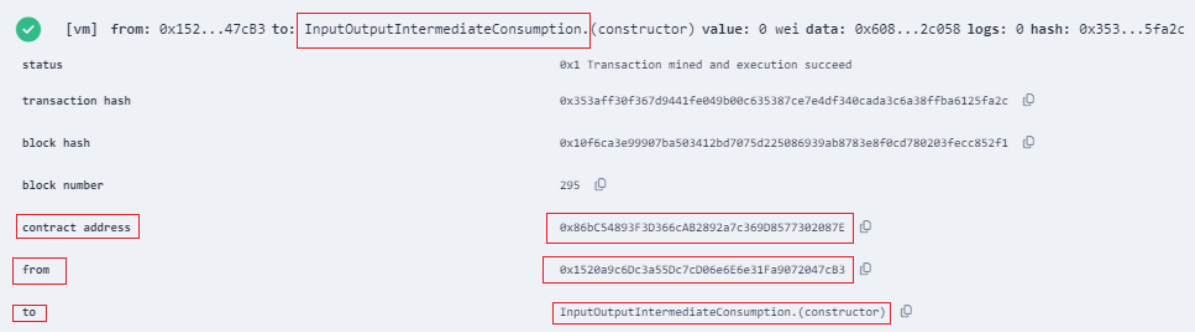
Supplementary Figure 18: Log showing the successful registration of Metal Industry Supplier 2 in Qatar



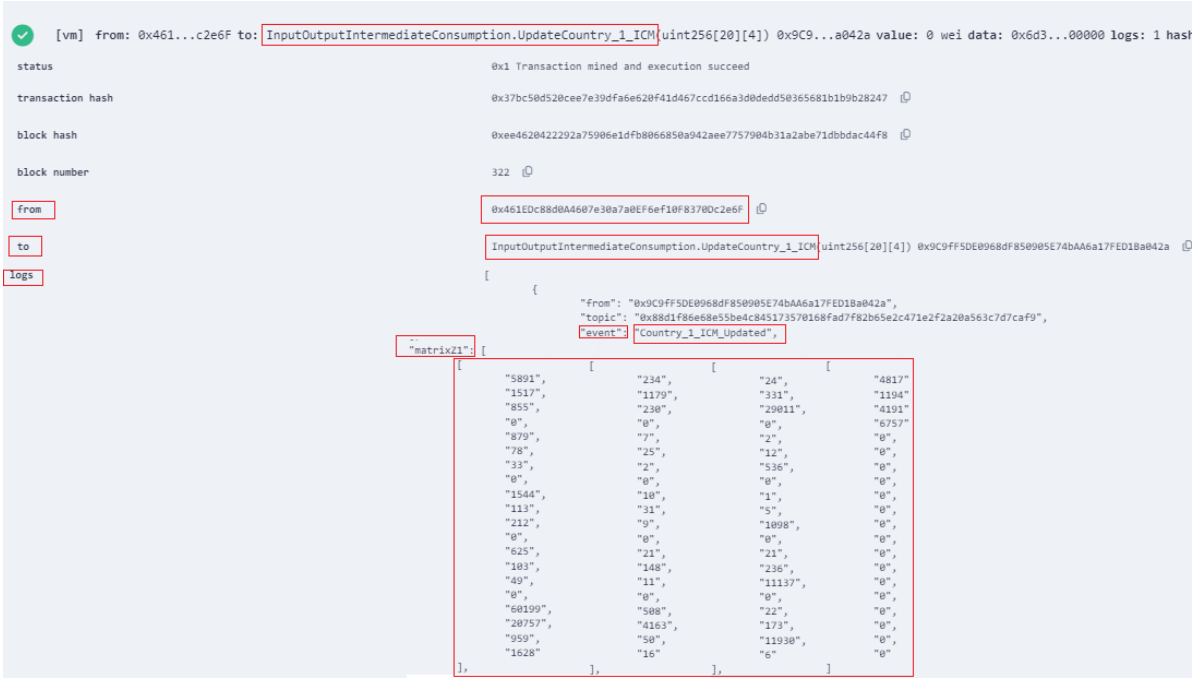
Supplementary Figure 19: Log showing the successful registration of Metal Industry Supplier in Rest-of-the-World region



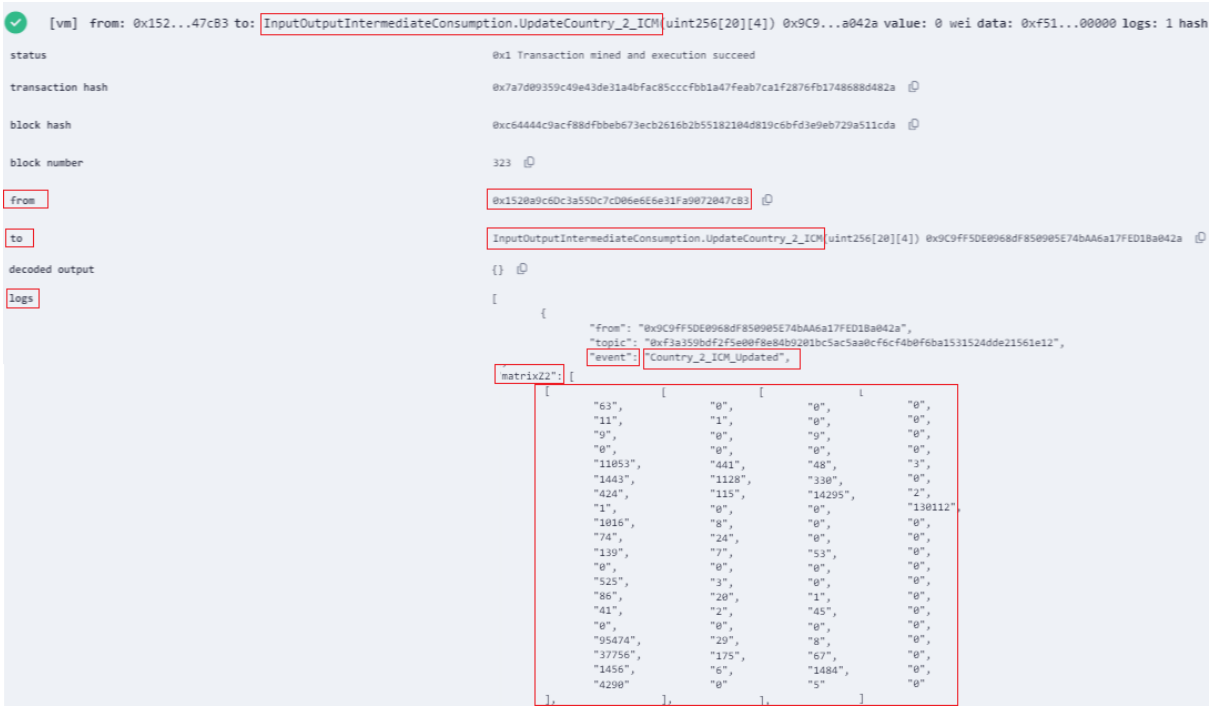
Supplementary Figure 20: Log showing the successful registration of Electricity Supplier in UAE



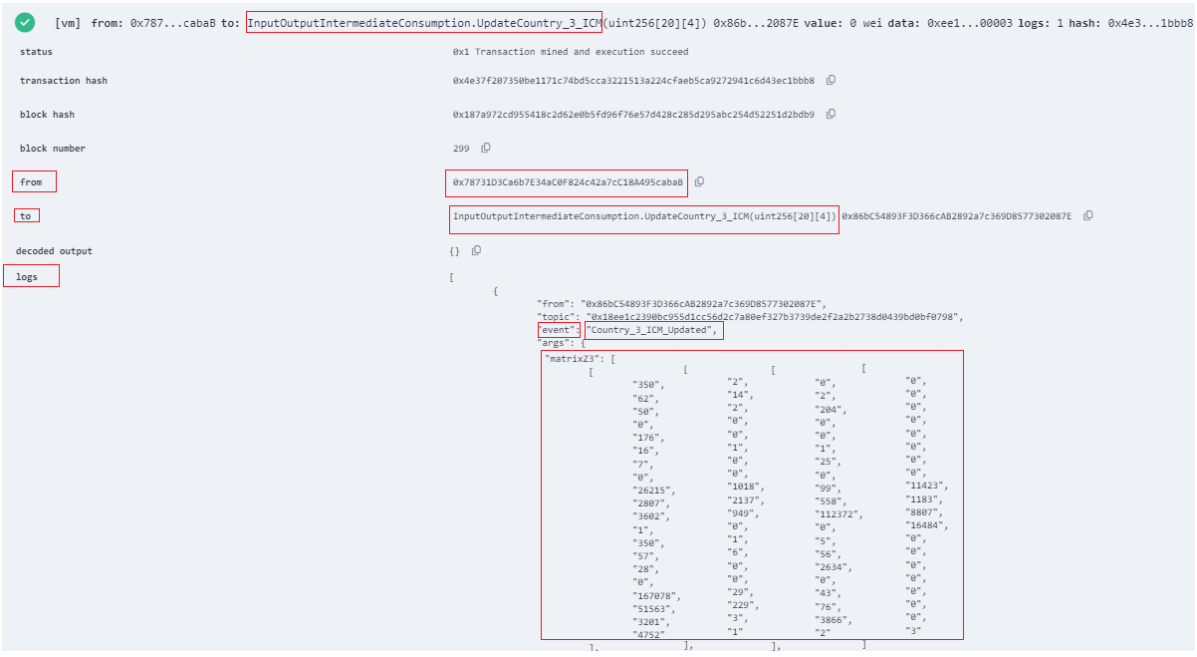
Supplementary Figure 21: Log showing the successful deployment of InputOutputIntermedicateConsumption Contract



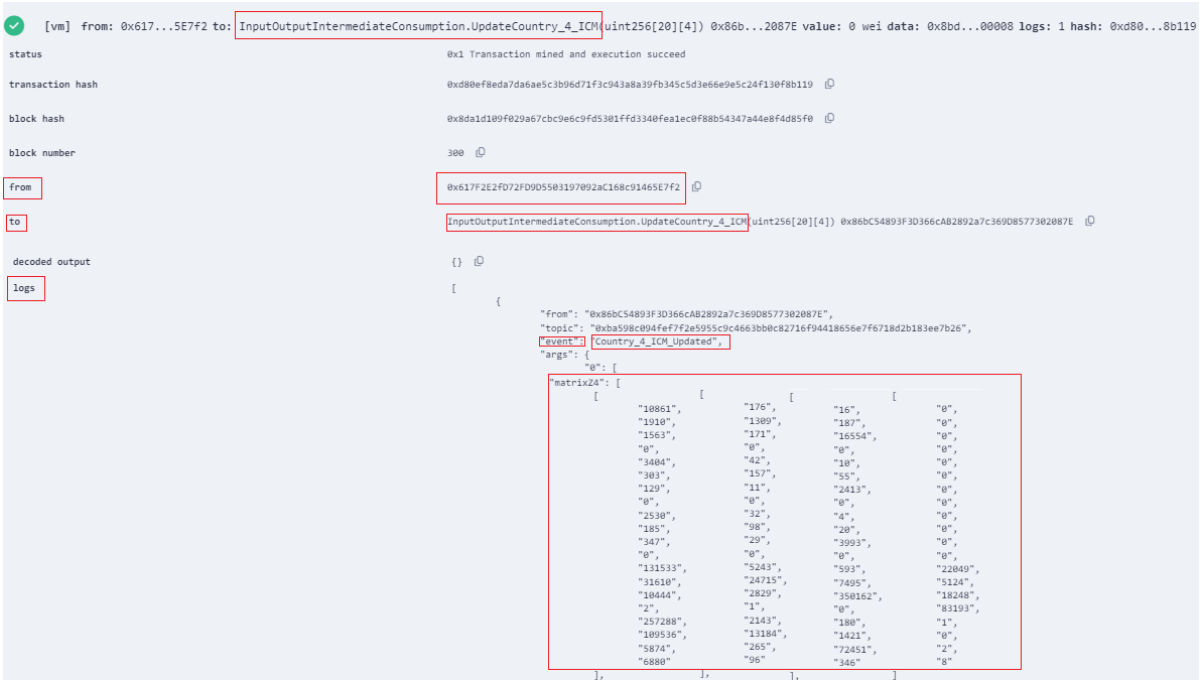
Supplementary Figure 22: Log showing the successful updating of Country 1 Intermediate Consumption Matrix (ICM)



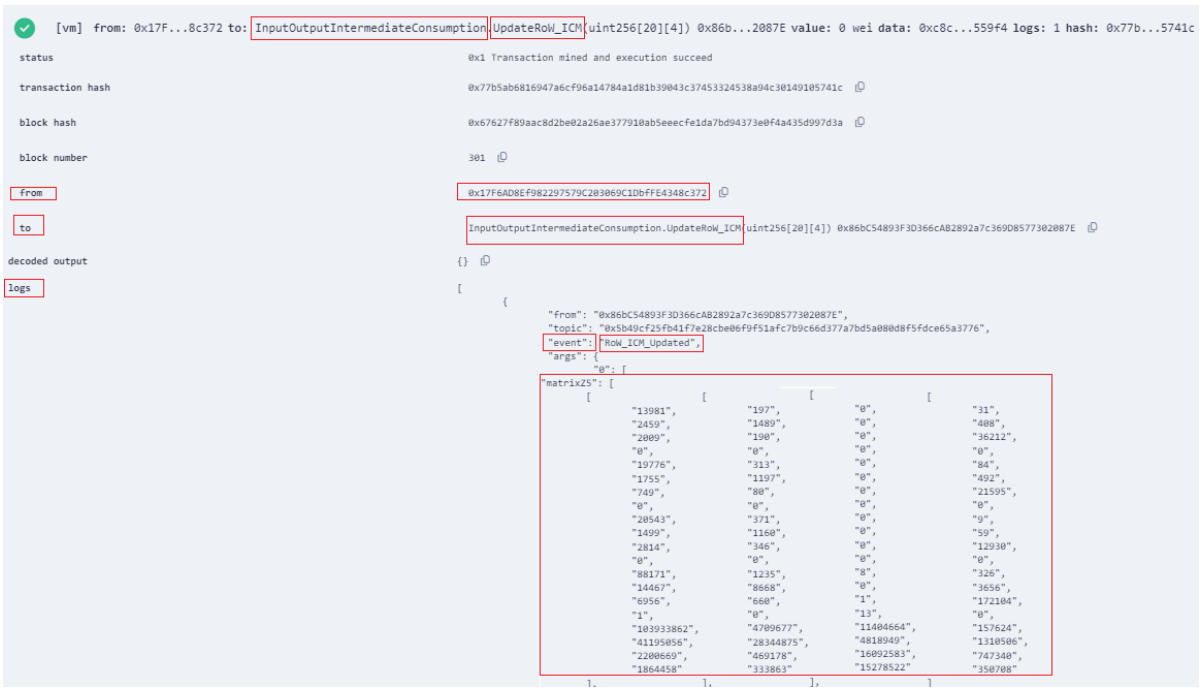
Supplementary Figure 23: Log showing the successful updating of Country 2 Intermediate Consumption Matrix (ICM)



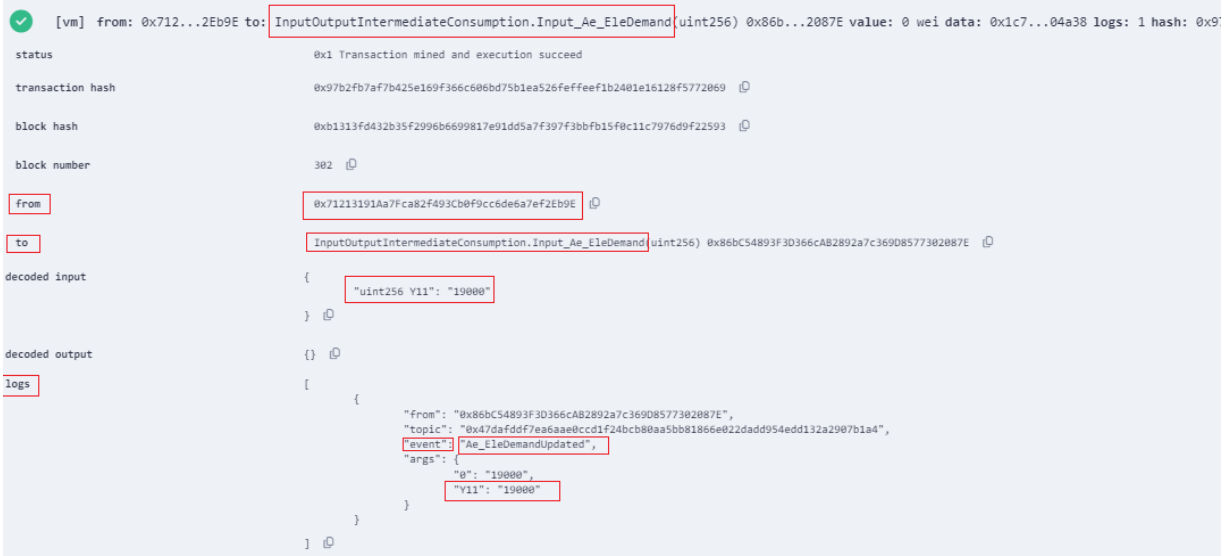
Supplementary Figure 24: Log showing the successful updating of Country 3 Intermediate Consumption Matrix (ICM)



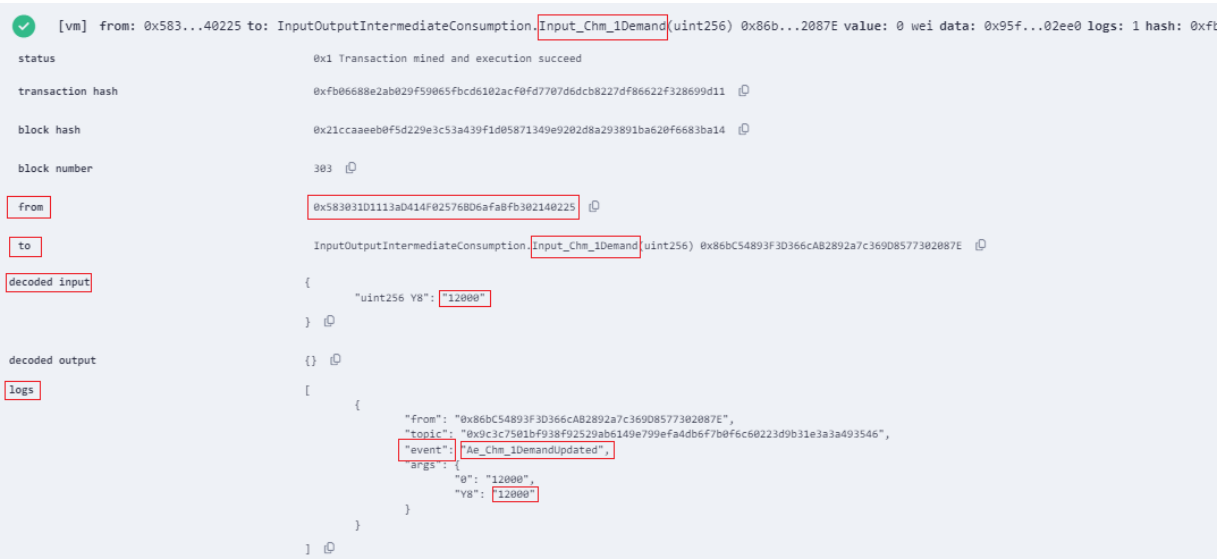
Supplementary Figure 25: Log showing the successful updating of Country 4 Intermediate Consumption Matrix (ICM)



Supplementary Figure 26: Log showing the successful updating of Rest-of-the-World Intermediate Consumption Matrix (ICM)



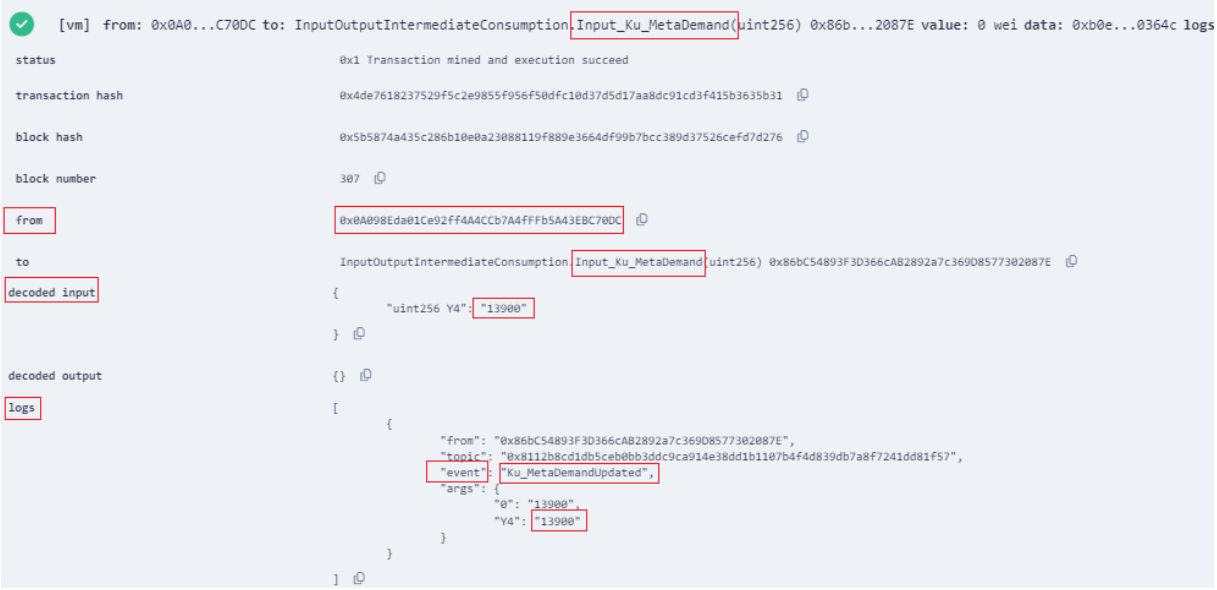
Supplementary Figure 27: Log showing the successful updating of Electricity Demand in UAE



Supplementary Figure 28: Log showing the successful updating of Chemical Products Demand by Supplier 1 in UAE

Supplementary Figure 29: Log showing the successful updating of Chemical Products Demand by Supplier 2 in UAE

Supplementary Figure 30: Log showing the successful updating of Chemical Products Demand by Supplier 3 in UAE

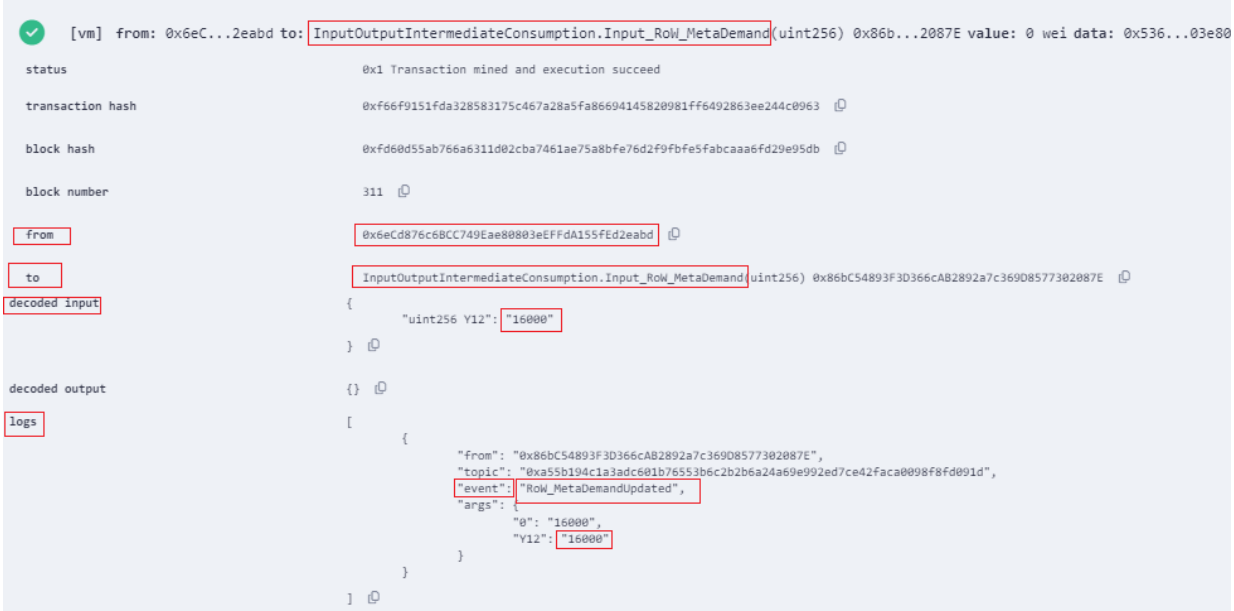


Supplementary Figure 31: Log showing the successful updating of Metal Products Demand by Supplier in Kuwait

Supplementary Figure 32: Log showing the successful updating of Polymer Products Demand by Supplier in Kuwait

Supplementary Figure 33: Log showing the successful updating of Chemical Products Demand by Supplier in Oman

Supplementary Figure 34: Log showing the successful updating of Polymer Products Demand by Supplier in Oman



Supplementary Figure 35: Log showing the successful updating of Metal Products Demand by Supplier in Rest-of-the-World

Supplementary Figure 36: Log showing the successful updating of Polymer Products Demand by Supplier in Qatar

Supplementary Table 1: Intermediate Consumption Matrix (Z)

		Country 1 (Oman)				Country 2 (Kuwait)				Country 3 (Qatar)				Country 4 (UAE)				Rest-of-the-World			
		Chemical	**Polymer**	**Metal**	**Electricity**	**Chemical**	**Polymer**	**Metal**	**Electricity**	**Chemical**	**Polymer**	**Metal**	**Electricity**	**Chemical**	**Polymer**	**Metal**	**Electricity**	**Chemical**	**Polymer**	**Metal**	**Electricity**
Country 1 (Oman)	Chemical	58.91	15.17	8.55	0	8.79	0.78	0.33	0	15.44	1.13	2.12	0	6.25	1.03	0.49	0	601.99	207.57	9.59	16.28
	Polymer	2.34	11.79	2.3	0	0.07	0.25	0.02	0	0.1	0.31	0.09	0	0.21	1.48	0.11	0	5.08	41.63	0.5	0.16
	Metal	0.24	3.31	290.11	0	0.02	0.12	5.36	0	0.01	0.05	10.98	0	0.21	2.36	111.37	0	0.22	1.73	119.3	0.06
	Electricity	48.17	11.94	41.91	67.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Country 2 (Kuwait)	Chemical	0.63	0.11	0.09	0	110.53	14.43	4.24	0.01	10.16	0.74	1.39	0	5.25	0.86	0.41	0	954.74	377.56	14.56	42.9
	Polymer	0	0.01	0	0	4.41	11.28	1.15	0	0.08	0.24	0.07	0	0.03	0.2	0.02	0	0.29	1.75	0.06	0
	Metal	0	0	0.09	0	0.48	3.3	142.95	0	0	0	0.53	0	0	0.01	0.45	0	0.08	0.67	14.84	0.05
	Electricity	0	0	0	0	0.03	0	0.02	1301.12	0	0	0	0	0	0	0	0	0	0	0	0
Country 3 (Qatar)	Chemical	3.5	0.62	0.5	0	1.76	0.16	0.07	0	262.15	28.07	36.02	0.01	3.5	0.57	0.28	0	1670.78	515.63	32.01	47.52
	Polymer	0.02	0.14	0.02	0	0	0.01	0	0	10.18	21.37	9.49	0	0.01	0.06	0	0	0.29	2.29	0.03	0.01
	Metal	0	0.02	2.04	0	0	0.01	0.25	0	0.99	5.58	1123.72	0	0.05	0.56	26.34	0	0.43	0.76	38.66	0.02
	Electricity	0	0	0	0	0	0	0	0	114.23	11.83	88.07	164.84	0	0	0	0	0	0	0	0.03
Country 4 (UAE)	Chemical	108.61	19.1	15.63	0	34.04	3.03	1.29	0	25.3	1.85	3.47	0	1315.33	316.1	104.44	0.02	2572.88	1095.36	58.74	68.8
	Polymer	1.76	13.09	1.71	0	0.42	1.57	0.11	0	0.32	0.98	0.29	0	52.43	247.15	28.29	0.01	21.43	131.84	2.65	0.96
	Metal	0.16	1.87	165.54	0	0.1	0.55	24.13	0	0.04	0.2	39.93	0	5.93	74.95	3501.62	0	1.8	14.21	724.51	3.46
	Electricity	0	0	0	0	0	0	0	0	0	0	0	0	220.49	51.24	182.48	831.93	0.01	0	0.02	0.08
Rest-of-the-World	Chemical	139.81	24.59	20.09	0	197.76	17.55	7.49	0	205.43	14.99	28.14	0	881.71	144.67	69.56	0.01	1039339	411950.6	22006.69	18644.58
	Polymer	1.97	14.89	1.9	0	3.13	11.97	0.8	0	3.71	11.6	3.46	0	12.35	86.68	6.6	0	47096.77	283448.8	4691.78	3338.63
	Metal	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0	0.01	0.13	114046.6	48189.49	160925.8	152785.2
	Electricity	0.31	4.08	362.12	0	0.84	4.92	215.95	0	0.09	0.59	129.3	0	3.26	36.56	1721.04	0	1576.24	13105.06	747339.7	3507.08
	Output	2891.28	780.74	2367.92	2223.09	4446.65	516.74	1050.53	9890.04	7373.43	1013.14	5519.18	2343.05	27403.06	9248.05	19278.08	12063.02	3732402	2035283	2623273	2874747
	Carbon emissions	3.895275	1.193152	2.843123	14.53232	5.946167	0.931505	0.68661	40.74667	8.685134	1.030444	1.374334	18.54859	15.52457	4.525441	6.936519	43.81777	660.1689	91.60576	1102.881	12560.83

Supplementary Table 2: Final Demand and Number of Suppliers

Regions	Industries	Final Demand (Y)	No. of Suppliers	Supplier by Product
Oman	Chemical	14600	1	1
	Polymer	9500		1
	Metal	0		0
	Electricity	0		0
Kuwait	Chemical	0	2	0
	Polymer	8800		1
	Metal	13900		1
	Electricity	0		0
Qatar	Chemical	0	3	0
	Polymer	16000		1
	Metal	12000		2
	Electricity	0		0
UAE	Chemical	32000	6	3
	Polymer	0		0
	Metal	0		0
	Electricity	19000		1
Rest-of-the-World	Chemical	0	1	0
	Polymer	0		0
	Metal	16000		1
	Electricity	0		0