Life Cycle Greenhouse Gas Assessment Summary Report

Kodak i2400, i2420, i2600, i2620, i2800, i2820, i2900, i3200, i3250, i3000, i3400, i3450, i4200, i4250, i4600, i4650, i4850, i5200, i5200v, i5600, i5600v, i5800 and i5850 Scanners
ISO 14044 Protocol

Latest Update: June 2015

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Initial report: June 12, 2013

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Summary

Kodak conducted an ISO 14044 Greenhouse Gas (GHG) assessment of five document scanner families – i2000 series, i2900, i3000 series, i4000 series, and i5000 series. The initial assessment was completed in June 2013 and included ten representative models from five product families. As subsequent product models have been added to the product families, the corresponding GHG results have been calculated and included in this summary. The GHG Assessment covers the full life cycle - raw materials, manufacturing, packaging, distribution, use, and end of life. The GHG assessment objectives were:

1. Identify the key drivers of GHG emissions from these scanners to provide data that can be used to reduce the life cycle GHG emissions of future versions of these or other scanner models.
2. Provide average scanner GHG emissions data for customers and formulas that will allow customers to customize results to their specific location and use scenario.
3. Meet the optional IEEE 1680.2 Imaging equipment EPEAT greenhouse gas emissions calculation requirement in 4.5.2.1.

Because these scanners are used in variable office environments around the globe, there is a range of actual use scenarios and transportation modes and distances for each model, which impact the scanner's GHG emissions. The base case calculations used weighted average transportation distances and modes and typical use scenarios. Factors were developed to allow each customer to customize the GHG emissions to their scanner if they choose.

The primary functional unit of this study is one "scanner life", which assumed an average use scenario (9 hr./day, 5 day/wk., 50 wk./yr.) and lifetime of either 5 yrs. for larger production scanners (i4000-series & i5000-series) or 3 yrs. for smaller scanners (i2000-series & i3000-series). It should be noted that Kodak document scanners typically continue to function properly beyond the lifetime assumed in this study, however, it's recognized that some may be replaced due to technological improvements in the next generation of scanners.

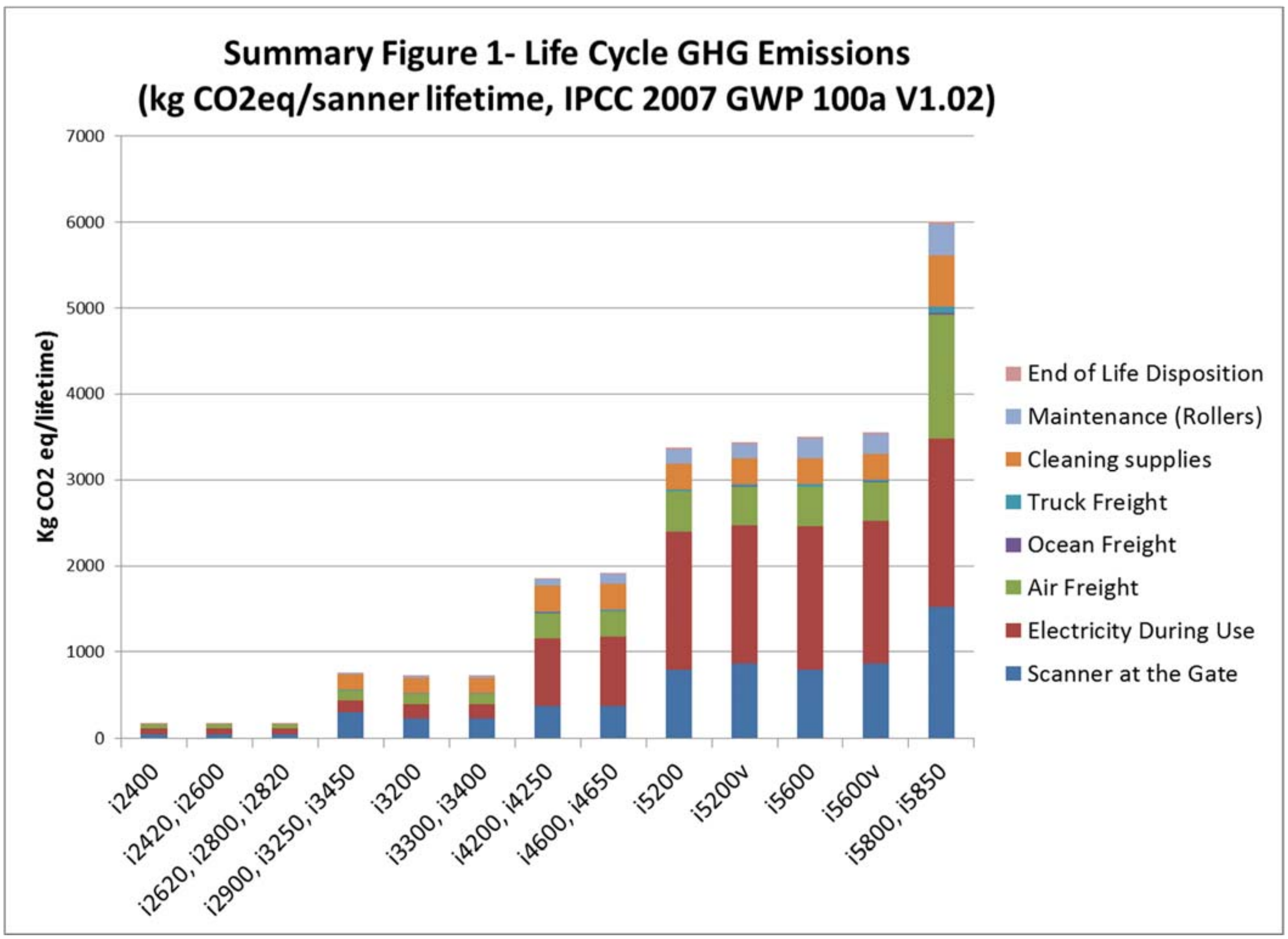
A secondary functional unit of 1000 A4 scans (A4 images are 210 mm x 297 mm, which is 7.3 x 11.7 in) was also evaluated. The number of images scanned is representative of the actual function or value of a scanner, but this was not chosen as the primary functional unit, because users often purchase a scanner to serve a particular department or area rather than to maximize throughput.

The base case GHG emissions calculations were based on IPCC 2007 GWP 100a Version 1.02 (100 year timeframe) with 20 yr and 500 yr timeframes used in addition for comparison for the largest and smallest model. Beginning with scanner specific primary data, Simapro version 7.3.3 software with secondary data from Ecoinvent was used to conduct these GHG Assessments.

The base case GHG emissions for each scanner are shown by life cycle stage in Summary Table 1 below. The same results are provided graphically in Summary Figure 1. Results are provided per 1000 A4 scans in Summary Table 2.

Summary Table 1 - Summary of Scanner GHG Emissions (kg CO2eq/scanner life)
(IPCC 2007 GWP 100a V1.02**)**

Model	Scanner at the Gate	Electricity During Use	Air Freight	Ocean Freight	Truck Freight	Cleaning supplies	Maintenance (Rollers)	End of Life Disposition	Total
i2400	50	66	49	1.1	3	0	0	5	173
i2420, i2600	50	64	49	1.1	3	0	0	5	172
i2620, i2800, i2820	50	64	49	1.1	3	0	0	5	171
i2900, i3250, i3450	300	140	110	1.4	6	180	14	10	761
i3200	227	169	112	1.5	6	180	18	10	723
i3300, i3400	227	169	112	1.5	6	180	24	10	729
i4200, i4250	371	786	294	3.9	15	300	71	16	1857
i4600, i4650	371	802	294	3.9	15	300	118	16	1921
i5200	793	1606	461	6.1	24	300	166	22	3379
i5200v	861	1606	451	5.9	23	300	166	22	3436
i5600	793	1662	461	6.1	24	300	231	22	3500
i5600v	861	1662	451	5.9	23	300	231	22	3556
i5800, i5850	1523	1957	1440	19.0	74	600	357	36	6005



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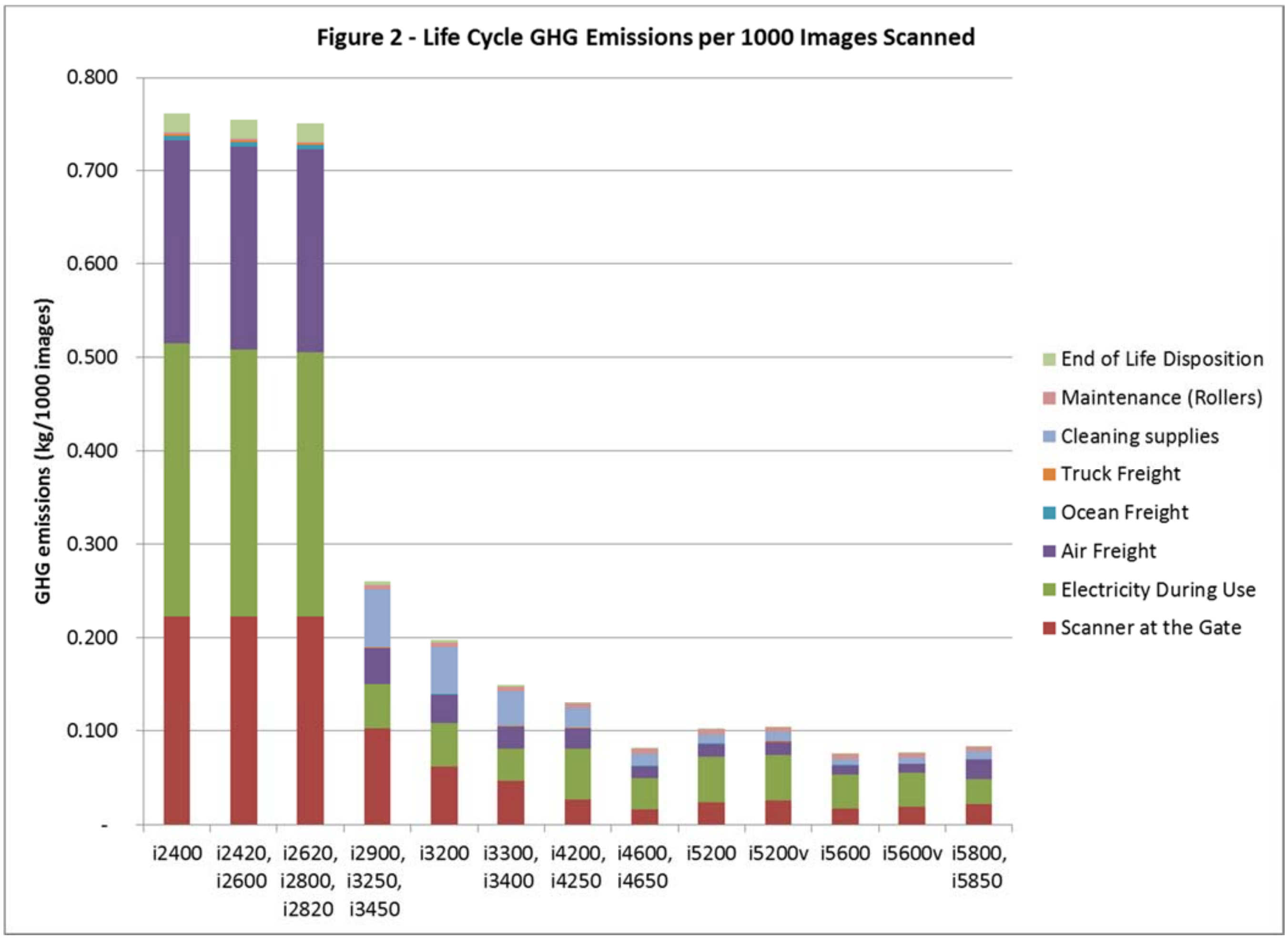
Summary Table 2- Life Cycle GHG emissions kg CO2eq /1000 pages scanned (100 yr timeframe)

Model	Thousand Images/ Scanner Life	Scanner at the Gate	Electricity During Use	Air Freight	Ocean Freight	Truck Freight	Cleaning supplies	Maintenance (Rollers)	End of Life Disposition	Total
i2400	225	0.223	0.292	0.218	0.005	0.012	-	0.002	0.020	0.771
i2420, i2600	225	0.223	0.286	0.218	0.005	0.012	-	0.002	0.020	0.764
i2620, i2800, i2820	225	0.223	0.283	0.218	0.005	0.012	-	0.002	0.020	0.762
i2900, i3250, i3450	2,916	0.103	0.048	0.038	0.000	0.002	0.062	0.005	0.003	0.261
i3200	3,645	0.062	0.046	0.031	0.000	0.002	0.049	0.005	0.003	0.198
i3300, i3400	4,860	0.047	0.035	0.023	0.000	0.001	0.037	0.005	0.002	0.150
i4200, i4250	14,175	0.026	0.055	0.021	0.000	0.001	0.021	0.005	0.001	0.131
i4600, i4650	23,490	0.016	0.034	0.013	0.000	0.001	0.013	0.005	0.001	0.082
i5200	33,075	0.024	0.049	0.014	0.000	0.001	0.009	0.005	0.001	0.102
i5200v	33,075	0.026	0.049	0.014	0.000	0.001	0.009	0.005	0.001	0.104
i5600	45,900	0.017	0.036	0.010	0.000	0.001	0.007	0.005	0.000	0.076
i5600v	45,900	0.019	0.036	0.010	0.000	0.001	0.007	0.005	0.000	0.077
i5800, i5850	70,875	0.021	0.028	0.020	0.000	0.001	0.008	0.005	0.001	0.085



The key conclusions from this GHG assessment are:

1. Shipment of scanners and cleaning supplies by ocean instead of by air significantly reduces the GHG emissions from all the scanners. Reducing shipping distances might also reduce impact.
2. Despite significant improvements compared to previous models, energy consumption in the ready and scan modes are significant sources of GHG emissions. Further reductions in power required in the scan and ready modes and changes to the programming that move the scanner from ready to sleep after a shorter time would reduce emissions.
3. Reducing weight in any component category, particularly electronic components would reduce life cycle GHG emissions. Reducing weight also reduces GHG emissions from transport, which is significant as long as air transport is a major transport mode.
4. Cleaning supplies are significant contributors to overall GHG emissions. Elimination of air transport of these supplies and development of reusable supplies could significantly reduce the cleaning supply contribution to the overall GHG emissions.
5. This report provides weighted average GHG emissions for each of the ten scanners. GHG emissions can vary significantly based on customer location, electricity emissions factors, scanning rates, time in ready mode, and consumption of cleaning supplies. This report provides factors for customizing results for the individual customer based on these key factors.