Supplementary Material

Influence of Different Allocation Methods for Recycling and Dynamic Inventory on CO_2 Savings and Payback Times of Light-Weighted Vehicles Computed under Product- and Fleet-Based Analyses: A Case of Internal Combustion Engine Vehicles

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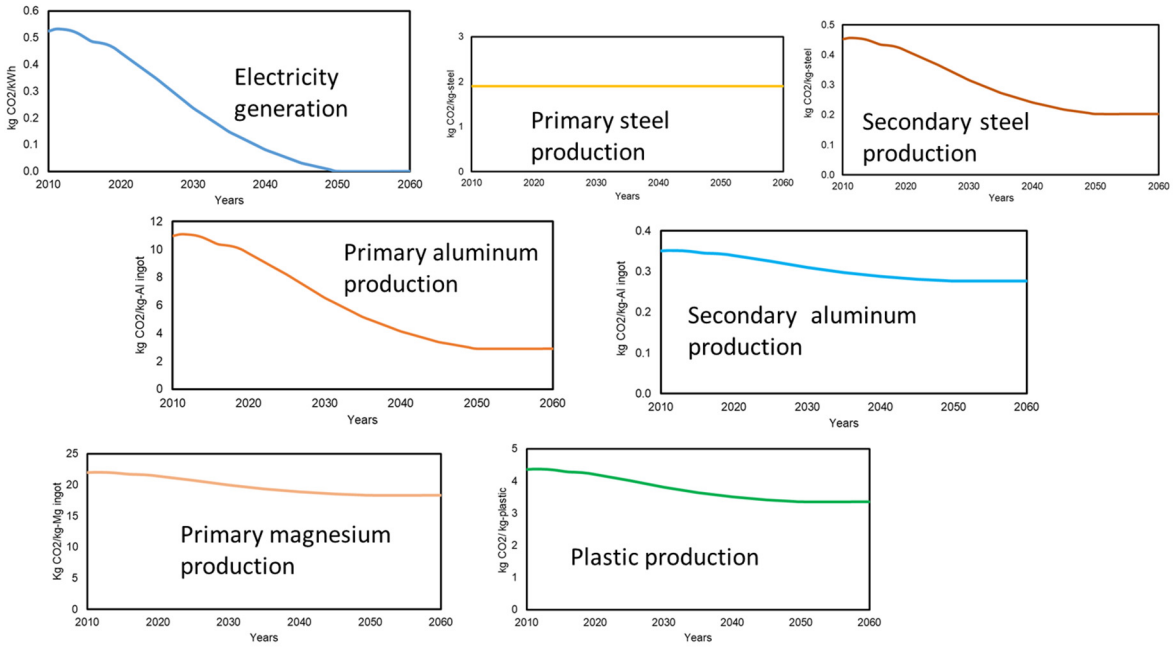

Figure S1. Parameters considered for dynamic inventory and their variations along the period forecast

Table S1. Parameters considered for the study and their values. BOF and EAF and ICEV refer to blast oxygen furnace, electric arc furnace and internal combustion engine vehicle, respectively.

	Parameter	Value	Reference
Production	Steel (BOF)	1.9 kg CO2/kg product	[1]

	Steel (EAF)	0.6 kg CO2/kg product	[2]
	Aluminum (primary ingot)	11.1 kg CO2/kg product	[3]
	Aluminum (secondary ingot)	0.3 kg CO2/kg product	[2]
	Primary magnesium (pigeon process)	25.8 kg CO2/kg product	[4]
	Primary magnesium (electrolytic process)	13.9 kg CO2/kg product	[5]
	Magnesium (secondary)	1.7 kg CO2/kg product	[6]
	Plastic	4.5 kg CO2/kg product	[2]
	Rubber	1.3 kg CO2/kg product	[7]
	Glass	1.1 kg CO2/kg product	[7]
	Copper	4.6 kg CO2/kg product	[7]
	Battery	19.5 kg CO2/p	[8]
	Fluids	10.25 kg CO2/L	[8]
	Tire	24.13 kg CO2/p	[8]
	Gasoline	0.5 kgCO2/L	[9]
Finishing	Flat carbon steel	0.6 kg CO2/kg product	[10]
	Long & special steel	0.2 kg CO2/kg product	[10]
	Cast iron and steel	0.1 kg CO2/kg product	[10]
	Rolled aluminum	0.5 kg CO2/kg product	[11]
	Extruded aluminum	0.9 kg CO2/kg product	[11]
	Cast aluminum	0.7 kg CO2/kg product	[11]
	Rolled magnesium	0.8 kg CO2/kg product	[8]
Waste treatment	Metals	0.00016 kg CO2/kg	[2]
	Plastic	0.765 kg CO2/kg	[12]
	Rubber	0.533 kg CO2/kg	[2]
	Glass	0.015 kg CO2/ kg	[13]
	Fluids	2.9 kg CO2/kg	[12]
	Tires	0.533 kg CO2/kg	[2]
Others	ICEV assembly	1051.2 kg CO2/ICEV	[7]
	Gasoline combustion	2.3 kg CO2/L	[9]

	Fuel reduction value	0.34 L/ 100 kg 100km	Own estimation
Recycled content (S)	Flat carbon steel	30%	Assumption
	Long & special steel	30%	Assumption
	Cast iron	100%	[8]
	Wrought aluminum	0%	[8]
	Secondary aluminum	100%	[8]
	Rolled Magnesium	0%	Assumption
Production yield (Y)	Steel	0.92	[1]
	Aluminum	0.96	[14]
End-of-life recycling rates (R)	Flat carbon steel	85%	[15]
	Long & special steel	85%	[15]
	Cast iron	85%	[15]
	Wrought aluminum	85%	[16]
	Cast aluminum	85%	[16]
	Rolled Magnesium	0%	Assumption

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