



Methodology for calculating Carbon Footprint

The scope and principles laid out below are applied in Imery's carbon footprint reporting for kaolin, GCC and PCC alike. Processing of pigments involves some minor use of chemicals. The extent of use is below 1% by weight and the small impact on carbon footprint is not included here. For Imery's kaolin products the key differentiator for carbon footprint is the product form. The lowest carbon footprint form is lump, followed by slurry and granulate. Spray dried products use more energy and have higher carbon footprint. The product, product form and logistics mix is unique for most customers. Due to this it is Imery's policy to calculate carbon footprint on a customer by customer basis only. It is worth pointing out that Imery's is using a "cradle to agreed point of delivery" principle in assessing the carbon footprint of its products. Using a "cradle to grave" view would result in significantly different results where carbonate products (GCC and PCC) would have higher carbon footprints based on conversion of CaCO_3 to CaO as a result of burning of some waste paper and deinking sludge.

Scope

Main steps	Including (as applicable)	Typical activity (as applicable)	Typical sources of CO ₂ generation
Raw Material	Mine exploration	Vehicles and drilling	Fuels
	Ground preparation	Overburden removal, back filling	Fuels
	Mineral extraction	Mining, drilling, blasting, etc.	Fuels & Electricity
	Raw material processing	Crushing, slurring, calcination	Fuels & Electricity
	Transport to plant	Ship, Rail, Road or Pipeline	Fuels & Electricity
Product Processing	General plant energy	Heating, pumping, lighting, etc.	Fuels & Electricity
	Specific processes	Grinding, Screening, Centrifuging, etc.	Electricity
Product Form Preparation	Lump	Pressing	Fuels & Electricity
	Slurry	Filtering, dispersion, evaporation	Fuels & Electricity
	Granulate	As slurry, plus drying	Fuels & Electricity
	Spray Dried	As slurry, plus drying	Fuels & Electricity
Logistics	Road, rail or ship loading	Conveyors, pumping or road	Fuels & Electricity
	Transport to market	Ship, Rail or Road	Fuels & Electricity
	Unloading/reloading	Cranes, conveyors, etc.	Fuels & Electricity
	Intermediate storage	Handling, heating, pumping, agitation, etc.	Fuels & Electricity
	Slurry make down	Dispersion, screening and general plant	Electricity
	Transport to delivery point	Rail or road transport	Fuels & Electricity

⊕ PCC

⊕ GCC

⊕ KAOLIN

Conversion factors used:

Generally accepted conversion factors from ton of fuels as purchased to kg of CO₂ equivalents. National grid average conversions from electricity kWh to kg CO₂ equivalents, unless electricity is derived from own CHP when above model is applied. The US is an exception where relevant regional electricity grid averages are used. Imerys source for national grid average electricity generation carbon footprint:

International Energy Agency Data Services "CO₂ emissions from fuel combustion" (2007 edition).



Imerys fuel conversion factors:

	Unit	kWh	kg CO ₂ eqv.	kg CO ₂ eqv/kWh
Natural Gas	m ³	9.917	1.835	0.185
Butane	ton*	13750	3053	0.222
Petrol	ton*	13055	3107	0.238
Diesel	ton*	12778	3220	0.252
Fuel Oil #2	ton*	12778	3220	0.252
Fuel Oil #6	ton*	11945	3237	0.271

* Metric ton

Principles for PCC reporting:

The raw material for PCC manufacturing is lime (CaO). This is made from calcination of limestone (CaCO₃). Heat is required for the calcination and the process also releases CO₂ when limestone is converted to lime. CO₂ is later consumed when the lime is converted back to CaCO₃ in the PCC manufacturing process. Imerys is reporting the net CO₂ equivalent number after lime losses.

Accuracy:

The calculation model used gives an accurate overall view on Imerys total pigments carbon footprint by production site. Due to difficulties in allocation to individual products we estimate the reported product footprints to have an accuracy of about ±10%.

Principles for logistics assessment:

Shipping impact is based on Carbon Footprint reporting from our suppliers of shipping services.

Rail is based on information from our rail service suppliers on a case by case basis.

Road is based on 33g CO₂ equivalents/km and ton (as is). This is an average of the road routes where Imerys has received information so far.

Imerys is continuously collecting CO₂ data from our suppliers of rail and road services to enable fine tuning of these emission factors over time. In cases where specific road transport emission details are known we will use this information in our carbon footprint calculation. Impact of intermediate storage, handling and make down to slurry is included where applicable.