

CAR CARE PRODUCTS INDUSTRY HIGH CARBON EMISSION PRACTICES

Scope 1 = Direct emissions from on-site fuel use or on-site combustion sources

Scope 2 = Indirect emissions from electricity or purchased energy

Your excessive carbon emissions could be due to following reasons:

Scope 1: Direct Emissions & Fuel Consumption

These are direct, on-site combustion or fuel-use causes of emissions:

Fossil-Fuel Fired Boilers & Thermal Systems: Coal, diesel or furnace oil combustion produces direct CO₂ that is used for generating steam for cleaning solvent recovery, heat for batch reactors, and drying coatings and finishing products.

Diesel Generator (DG) Sets:

Used for backup or unstable grid conditions; frequently run during peak hours leads to direct fuel combustion emissions.

On-Site Solvent Handling & Evaporation:

Open solvent storage, mixing & distillation can release VOCs and unburned hydrocarbons, sometimes combusted for cleanup or waste reduction.

Direct Use of Fuel in Batch Reactors:

Reactors using direct burner heat instead of electric heat lead to direct fossil fuel emission.

On-Site Waste Incineration:

Burning sludge, solvent residues, and waste packaging leads to on-site CO₂ and NO_x.

Internal Diesel Logistics:

Diesel forklifts and transfer vehicles used within factory premises contribute direct emissions.

Company-Owned Fuel Vehicles:

Tankers or delivery vehicles used by the facility and fueled on-site are counted under Scope 1.

Fugitive Emissions from Solvents:

Evaporative losses from cleaning/processing chemicals increase direct greenhouse gas equivalents (VOCs).

Petroleum-Derived Raw Materials Usage:

Raw materials (solvents, carriers) directly release carbon when evaporated or heated.

Scope 2: Indirect Emissions & Energy Consumption

These practices increase electricity or purchased energy demand, boosting emissions based on grid carbon intensity.

Electric Motors & Mixers:

High electrical loads from agitators, homogenizers, mixers, and stirrers run for long batch cycles.

Poorly Designed HVAC / Climate Control:

Manufacturing areas and storage rooms often have continuous AC or humidity control systems that add 24/7 electricity load.

Inefficient Lighting & Base Load:

High-bay fluorescent or outdated lighting systems without occupancy or daylight automation inflate baseline kWh.

Electric Drying Ovens & Curing Lines:

Continuous infrared/ convection ovens for curing coatings consume significant electricity.

Refrigeration & Cold Storage for Precursors:

Cold chain or low-temperature storage systems for raw materials or product stability are often inefficient.

Inefficient Compressed Air Systems:

Compressed air for pneumatic tools, packaging lines, and coating sprays, with leaks and non-optimized use, waste power.

Water Treatment & Effluent Pumps:

On-site ETPs (Effluent Treatment Plants), filtration, and effluent recirculation pumps increase electricity demand.

Unoptimized R&D & Pilot Lines:

R&D labs with high energy use per unit output (small batches) drive higher per-unit emissions.

Lack of Load Optimization:

Heavy dependence on continuous operation instead of smart demand control that turns equipment off when idle.

BEST PRACTICES TO REDUCE EMISSIONS

(Aligned to each Scope 1 & Scope 2 cause above)

Scope 1: Reducing Direct Emissions & Fuel Consumption

Electrified & Low-Carbon Thermal Systems: Replace coal/diesel furnaces/boilers with electric steam generators or electric heat pumps powered by renewables and use temperature control systems for precision heat rather than open flame.

DG Phase-Out with Energy Resilience: Install rooftop solar + battery storage to eliminate diesel generator reliance and use hybrid microgrid systems featuring solar, wind, and storage to stabilize power.

Closed Solvent Handling & Recovery: Use vapor recovery units (VRUs) and sealed systems to minimize VOC release and adopt low-temperature solvent recovery via membranes instead of heat evaporation.

Electric Heated Batch Reactors: Switch from direct burners to electric jacketed reactors with process automation.

Certified Off-Site Waste Disposal: Replace on-site incineration with off-site licensed waste treatment and co-processing facilities.

Electrify Material Handling: Use electric forklifts and transfer vehicles, charged with renewable electricity.

Fleet Transition: Convert company-owned fuel vehicles to CNG, electric, or biofuel variants.

VOC Capture Instead of Venting: Use activated carbon or condensers to capture VOCs instead of combustion.

Scope 2: Reducing Indirect Emissions & Electricity Consumption

Energy-Efficient Mixers & Motors: Install IE4/IE5 motors, high-efficiency drives, and optimized mixers with lower electricity draw.

Smart HVAC & Climate Systems: Deploy sensor-based HVAC controls, zonal temperature management, and demand response systems.

Upgrade Lighting to LEDs & Automation: Replace outdated lights with LEDs + occupancy sensors + daylight harvesters to discard unnecessary baseload.

Energy-Optimized Drying & Curing: Use infrared/UV curing with energy recovery features and integrate smart energy management in ovens to reduce idle heat output.

Efficient Refrigeration: Replace old chillers with variable capacity, magnetic refrigeration, and thermal storage to avoid peak grid loads.

Compressed Air Optimization: Use leak detection programs, VFDs on compressors, and pressure optimization to reduce kWh.

Efficient ETP & Filtration Systems: Deploy energy-efficient pumps, solar-assisted evaporation, and intelligent aeration control.

Batch Optimization & Automation: Standardize batch sizes to full capacity rather than partial loads and use process control systems to reduce rework or idle cycles that waste electricity.

On-Site Renewables & Green Tariffs: Adopt rooftop solar, open-access renewable PPAs, and green power certificates and shift major operations to off-peak tariff periods when grid is greener and loads are lower.

Real-Time Energy Monitoring: Install smart meters, energy dashboards, alerts, and ISO 50001 controls to drive continual improvement.