# Today's objectives

What is PPG's sustainability strategy?

Cradle-to-grave carbon emissions for OEM coatings

What are the hotspots the industry can address?

Creating a level playing field for carbon footprint calculation

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# 2030 PPG sustainability targets vs. 2019 baseline with validated Science-Based Targets (SBTs)

Validated SBTs

**50%** ⬇
reduction in Scope 1 and 2 GHG emissions

**30%** ⬇
reduction in Scope 3 GHG emissions

**15%** ⬇
reduction in water intensity at priority sites

**25%** ⬇
reduction in waste intensity

**100%**
of process waste to reuse, recycle or recovery

**50%**
sales from sustainably advantaged products

**$5MM**
additional funding to COLORFUL COMMUNITIES® with sustainability

**100%**
of key suppliers assessed against sustainability and social responsibility standards

**100%**
employees go home safely each day

**5%** ⬇
annual reduction in spill and release rate

**First U.S. coatings manufacturer to have validated Science-Based Targets**



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# PPG scope 3: 30% reduction by 2030

## Collaboration

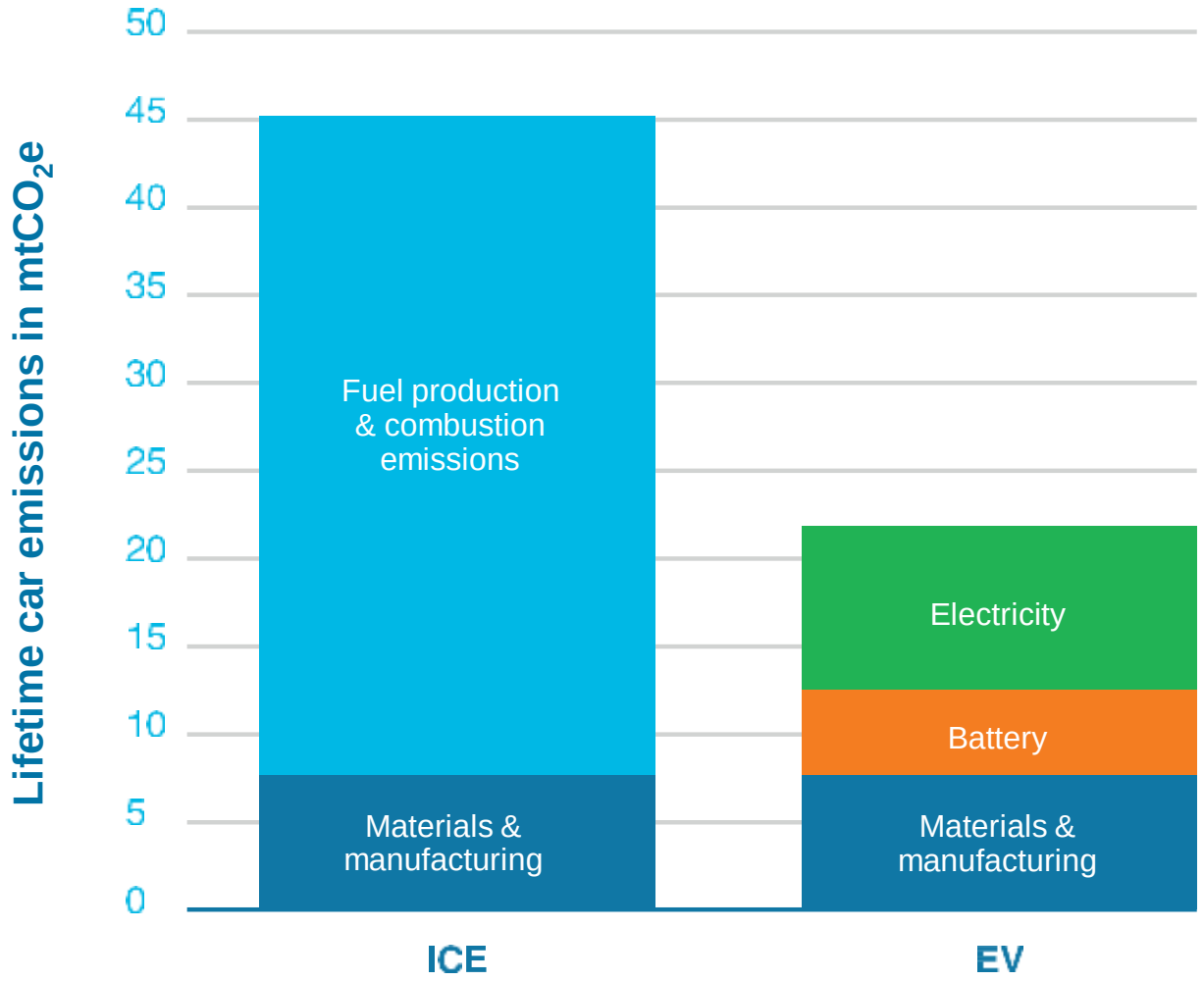
**Suppliers** | **Manufacturer** | **Tier 1** | **OEM** | **Customer**





**Delivering on scope 3 decarbonization requires collaboration across the entire value chain**

# Electrification divides $CO_2$ emissions by 2

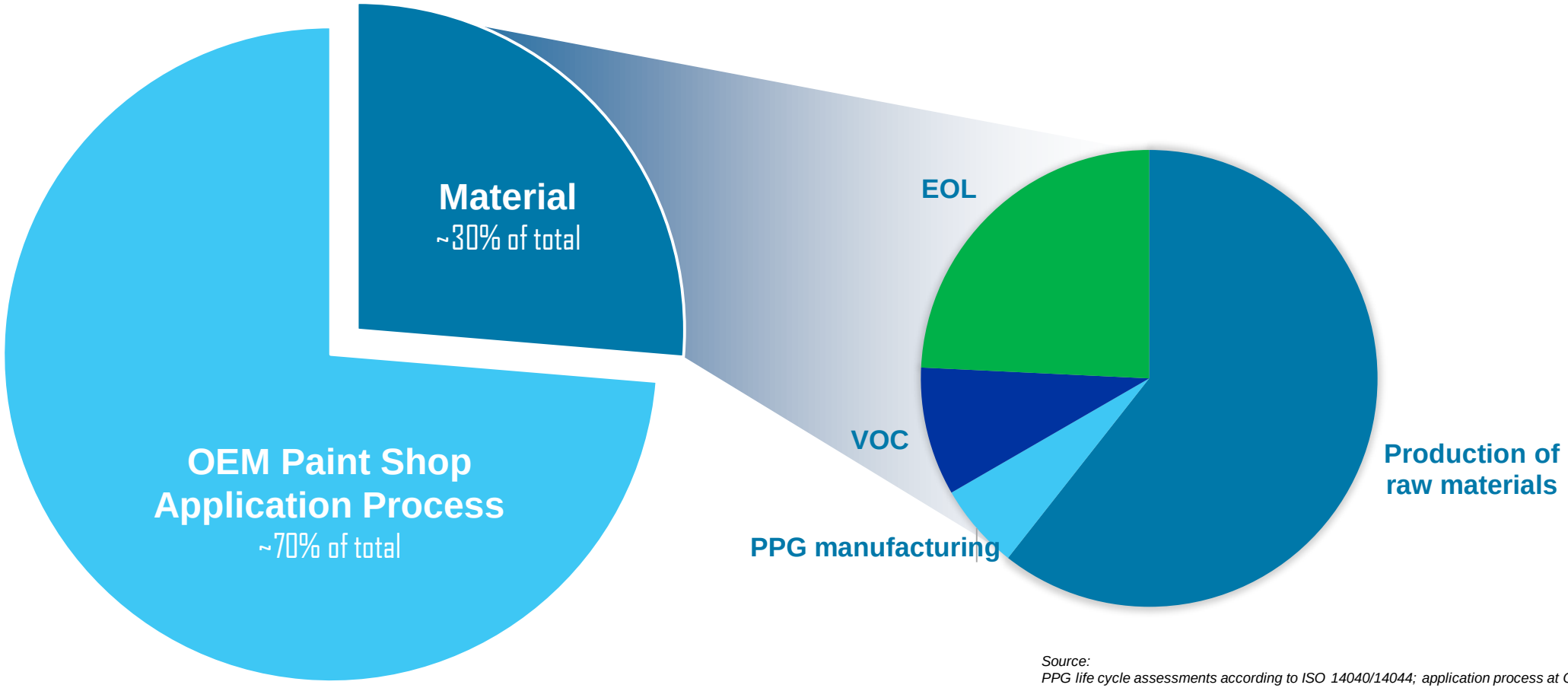



- BEV cars emit c.50% less $CO_2$ than ICE over full life cycle…
- OEM manufacturing plants are moving to decarbonized energy…
- …this will lift the materials to a $CO_2$ hotspot

*Source: Auto industry average (OEM CSR and ESG reports); Martin Rothbart 2022; 125000 miles driven*

# GHG emissions from OEM paint material + paint shop process

## Pie charts show an average of GHG contribution stages for coating layers applied on a vehicle




*Source:*
*PPG life cycle assessments according to ISO 14040/14044; application process at OEM facility: energy consumption per vehicle calculated with PPG process modeling tool - average electricity conversion factor of 0.380kg$CO_2$e/kWh and a Natural Gas conversion factor of 0.201kg$CO_2$e/kWh*

**#1 hotspot is the paint shop application process**
**#2 hotspot is raw material production (chemical industry & mining)**

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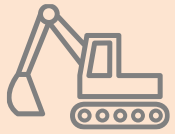
# To select the best decarbonization solutions, it is key to look at the full life cycle impact

## PPG assesses GHG emissions and other environmental impacts over entire value chain

| UPSTREAM PROCESS | | | | CORE PPG PROCESS | DOWNSTREAM PROCESS | | | | | END OF LIFE |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |
| **U1** | **U2** | **U3** | **U4** | **C1** | **D1** | **D2** | **D3** | **D4** | **D5** | **EOL** |
| Raw materials supply | Transport of raw materials | Packaging supply | Packaging transport | PPG production processes | Transport to customer | Disposal of packaging | Product VOC emissions | Losses during application | OEM application process | Disposal at end of life |

**FROM EXTRACTION** → **TO END OF LIFE DISPOSAL**

**We must look at the total life cycle impact to define the best decarbonization options**

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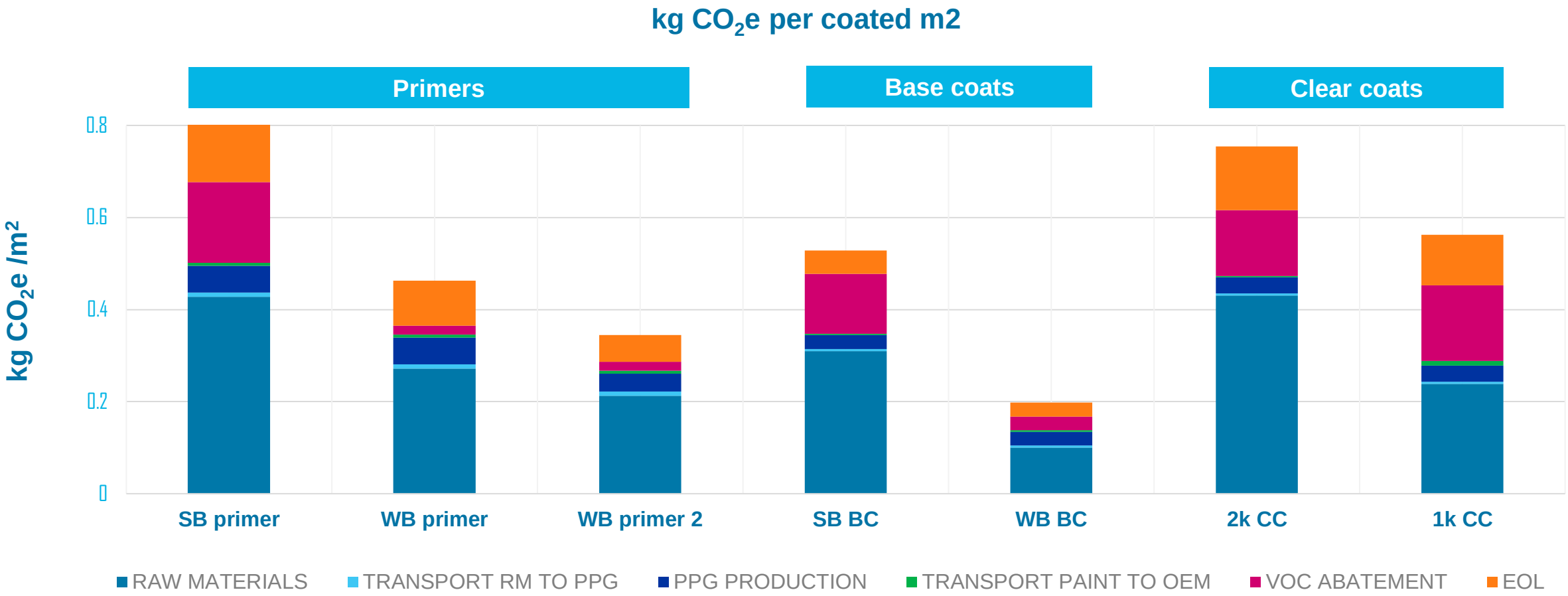
# Comparing deco layers technologies – excluding paint shop energy

## Scope: Material only (Cradle to Gate + VOC + EOL)




**Average CO2 contribution from the deco layers**
**From c.40kg (WB) to c. 55kg (SB) per vehicle**

*Source*
*PPG life cycle assessments according to ISO 14040/14044*
*SimaPro software v.9.4.0.1; primary data for PPG manufacturing; Raw Material and Transportation derived from Ecoinvent and Industry 2.0*

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# PPG paint shop energy modeling tools

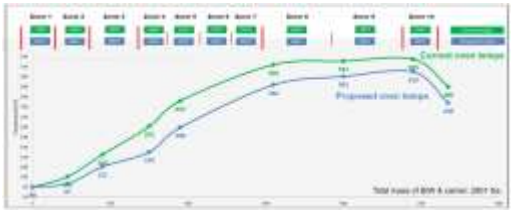
## Process Cost Model


### Advantages
- Quick analysis turnaround
- Simple customer inputs
- % savings & CO2e output

### Drawbacks
- Directional estimates
- General process & tech assumptions

### Data Needed
- Line speed
- Oven type
- Target metal hold temp
- Bake time

## ASPEN+

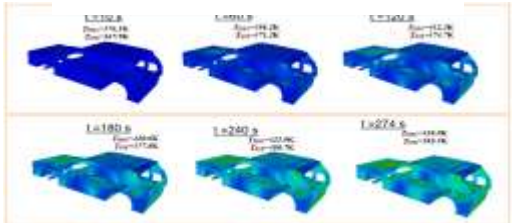


### Advantages
- Quick analysis turnaround
- Technology dependent analysis
- % savings & CO2e output by zone

### Drawbacks
- Ignores BIW dimensions
- Steady state assumptions

### Data Needed
- Line speed
- BIW & carrier mass
- Oven zone setpoint temps
- Oven zone lengths
- Oven zone air flow rate
- Exhausted gas recirc rate
- Minimum cure time

## CFD Model



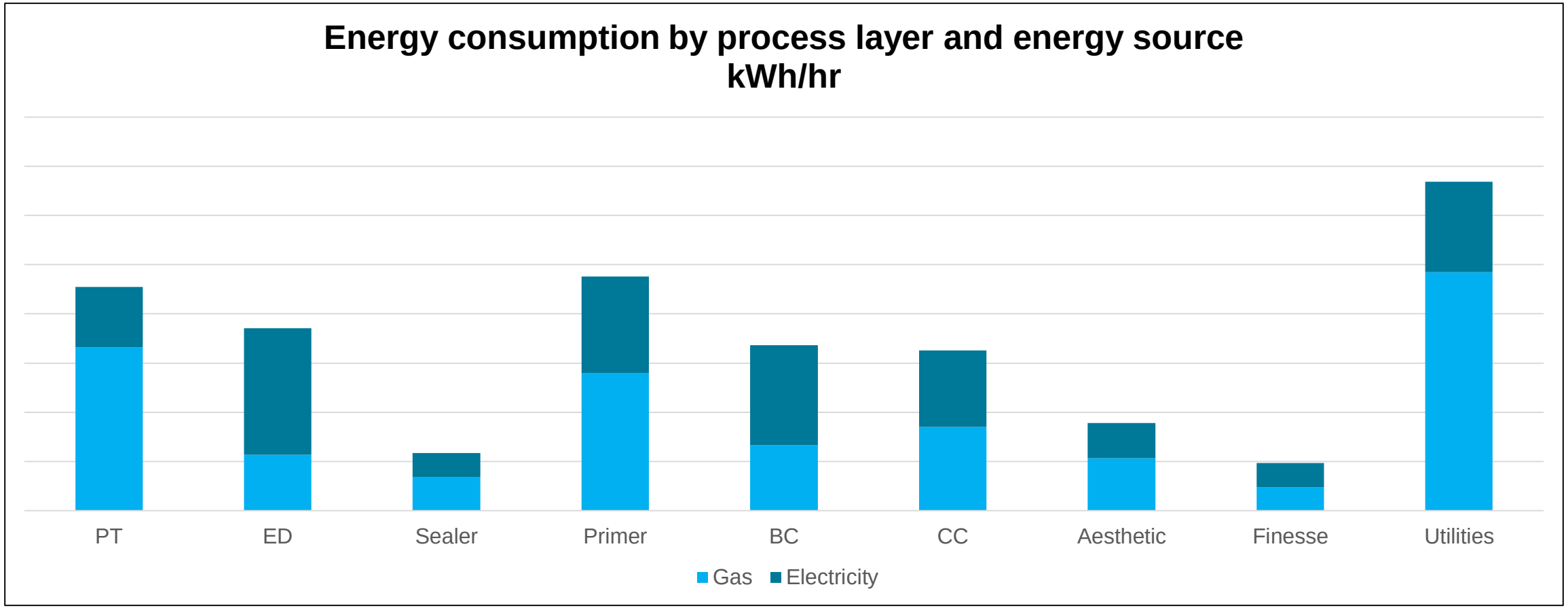
### Advantages
- Technology specific analysis
- Dynamic temperature & time simulation
- Identifies BIW & oven cold spots

### Drawbacks
- Turnaround time
- Complex customer data request

### Data Needed
- ASPEN+ parameters
- BIW 3D drawings
- Oven 3D drawings

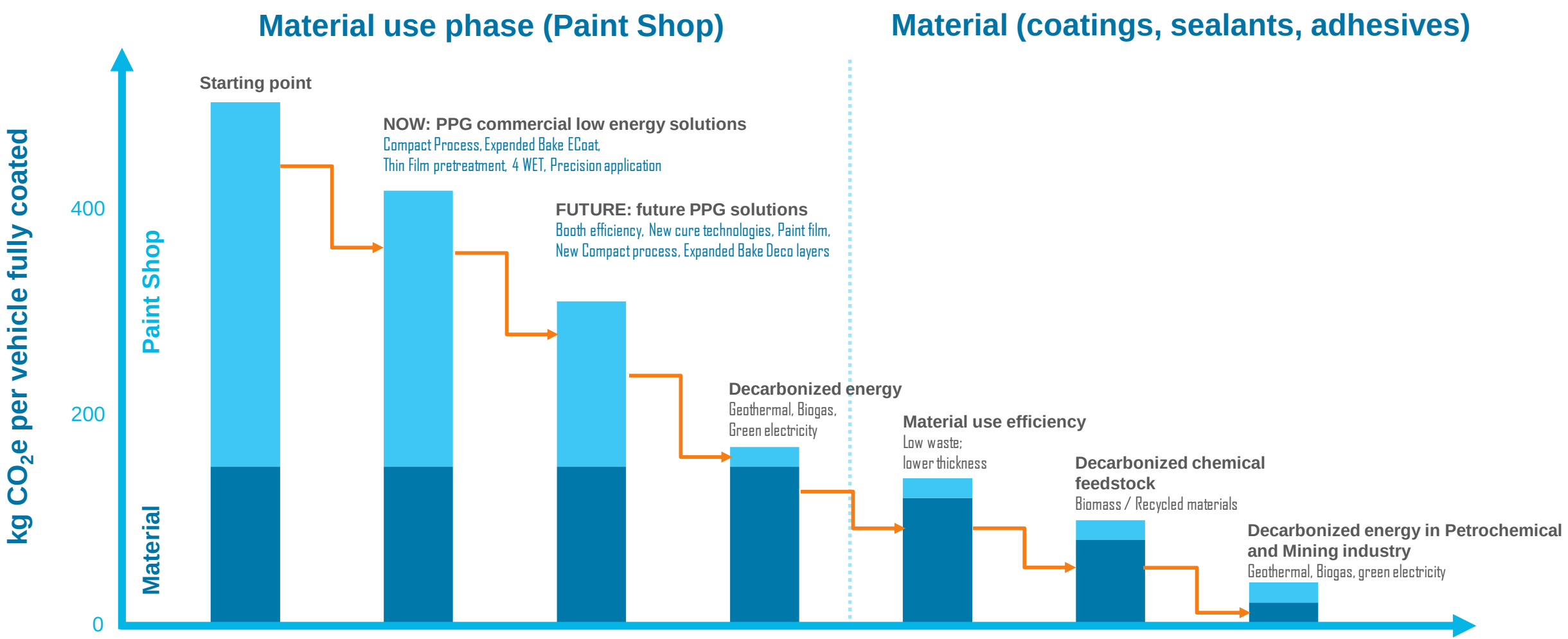
Screen | Simulate | Predict

# Output example - Energy Breakdown Gas / Electricity (OEM 1)




***PPG screening tool identifies the hotspots to address for Scope 1 / 2 reduction***

# Innovation for low energy paint shop and low carbon footprint materials

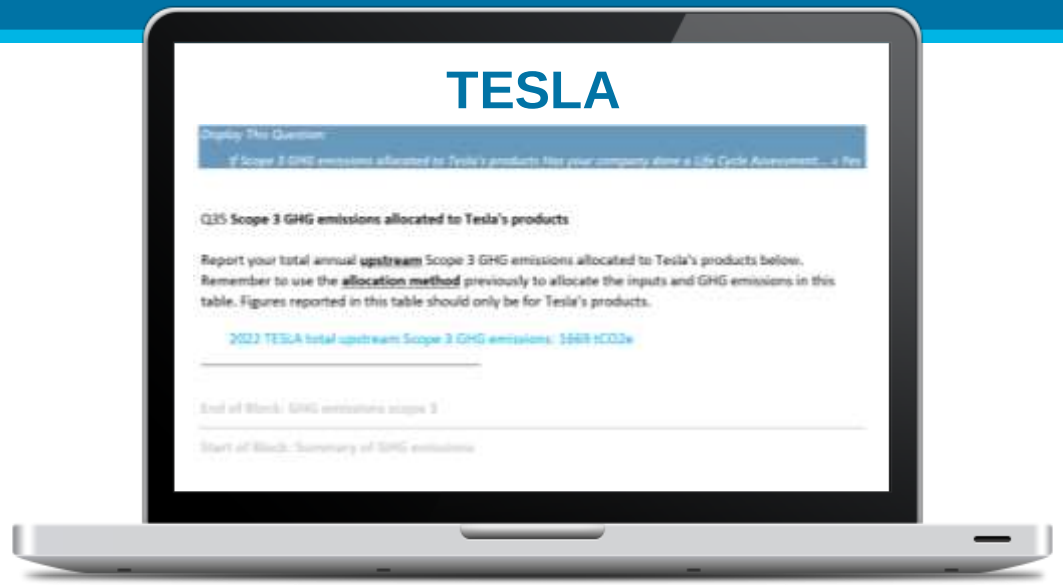



Values are estimated average GHG emissions calculated for average electricity conversion factor of 0.380 and a Natural Gas conversion factor of 0.201 for Paint Shop process and using PPG Life Cycle Assessment method (Simapro) for the Material

# OEM requests for scope 3 carbon footprint disclosing

## Life cycle approach required

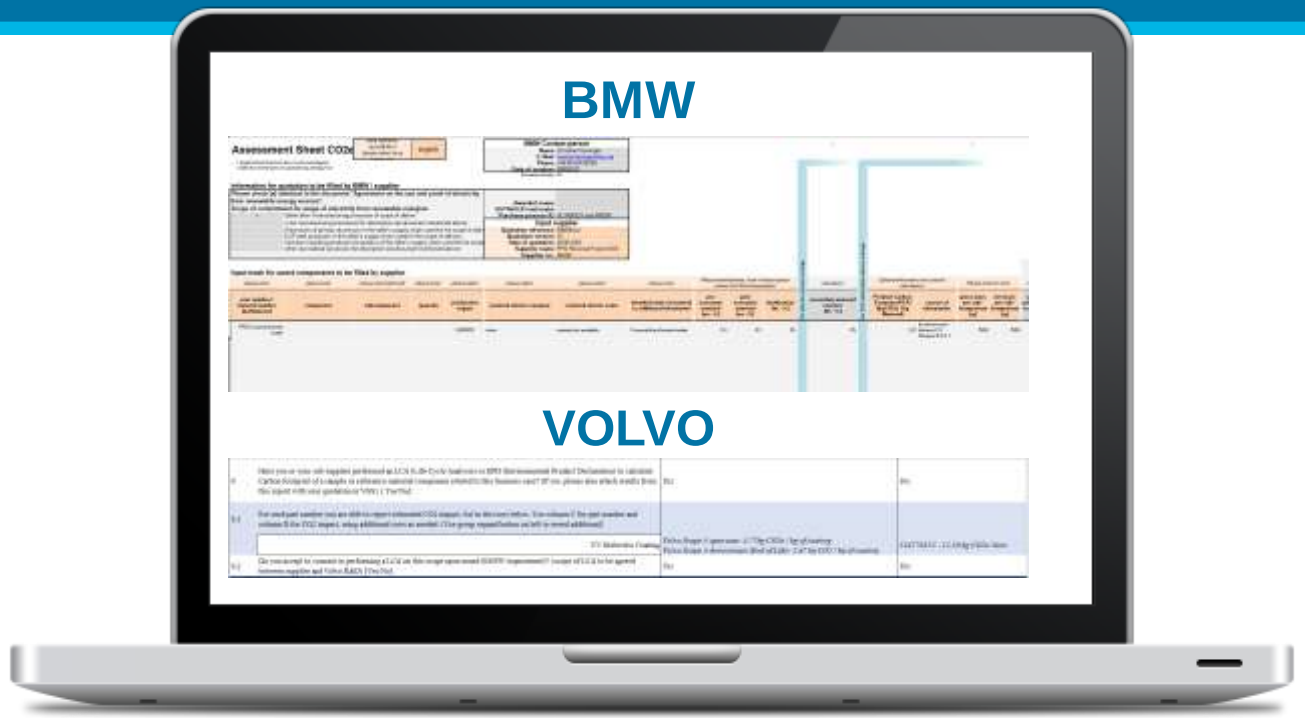
### TESLA



Q35 **Scope 3 GHG emissions allocated to Tesla's products**

Report your total annual **upstream** Scope 3 GHG emissions allocated to Tesla's products below. Remember to use the **allocation method** previously to allocate the inputs and GHG emissions in this table. Figures reported in this table should only be for Tesla's products.

### BMW

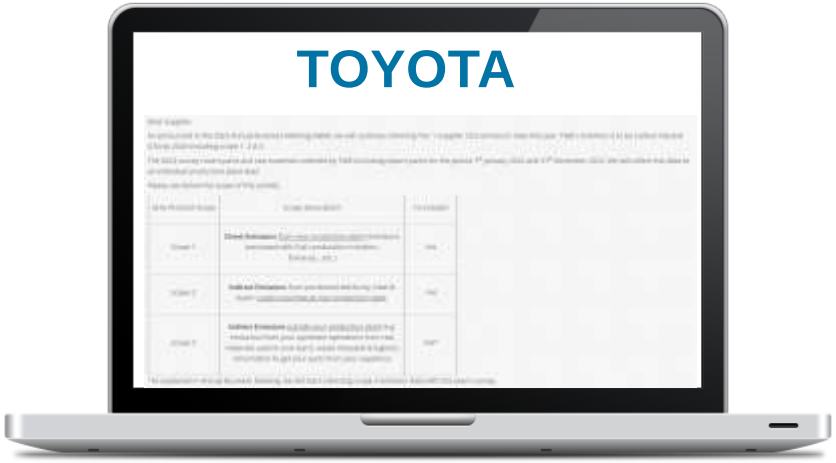


### VOLVO



### STELLANTIS

### TOYOTA

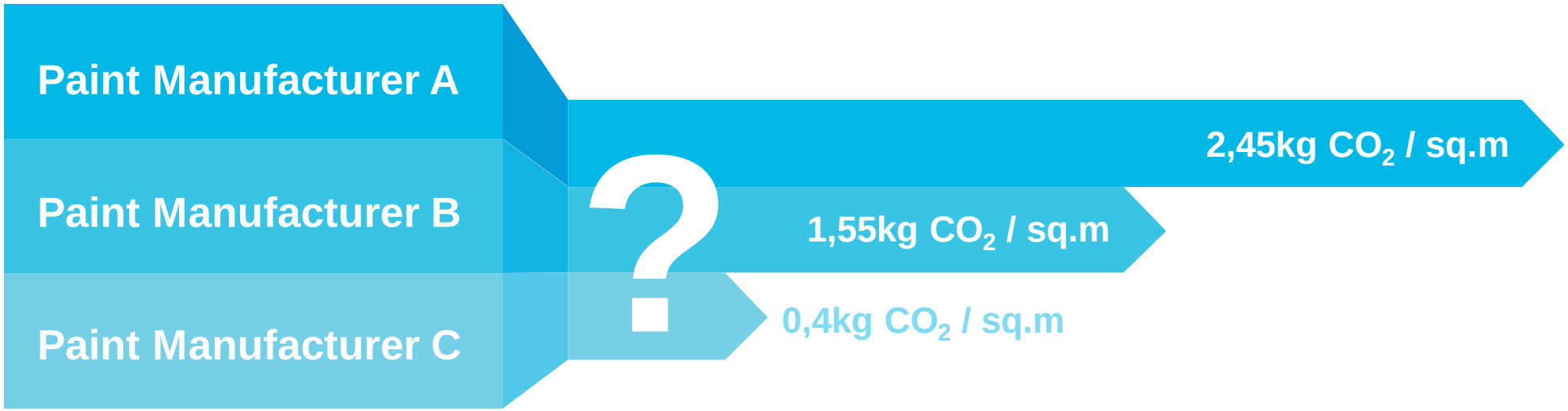


# Carbon Footprint: need for an Industry Level Playing field

**FROM** | **Inconsistency; no alignment on calculation practices**

**TO** | **Industry alignment on:**
- **Scope of LCA**
- **Data source**
- **Calculation rules - GHG protocol and ISO standards**
- **Identified $CO_2$ hotspots to address**

Assessing the Carbon Footprint of the **same product** by 3 different suppliers. **These results should be the same**.

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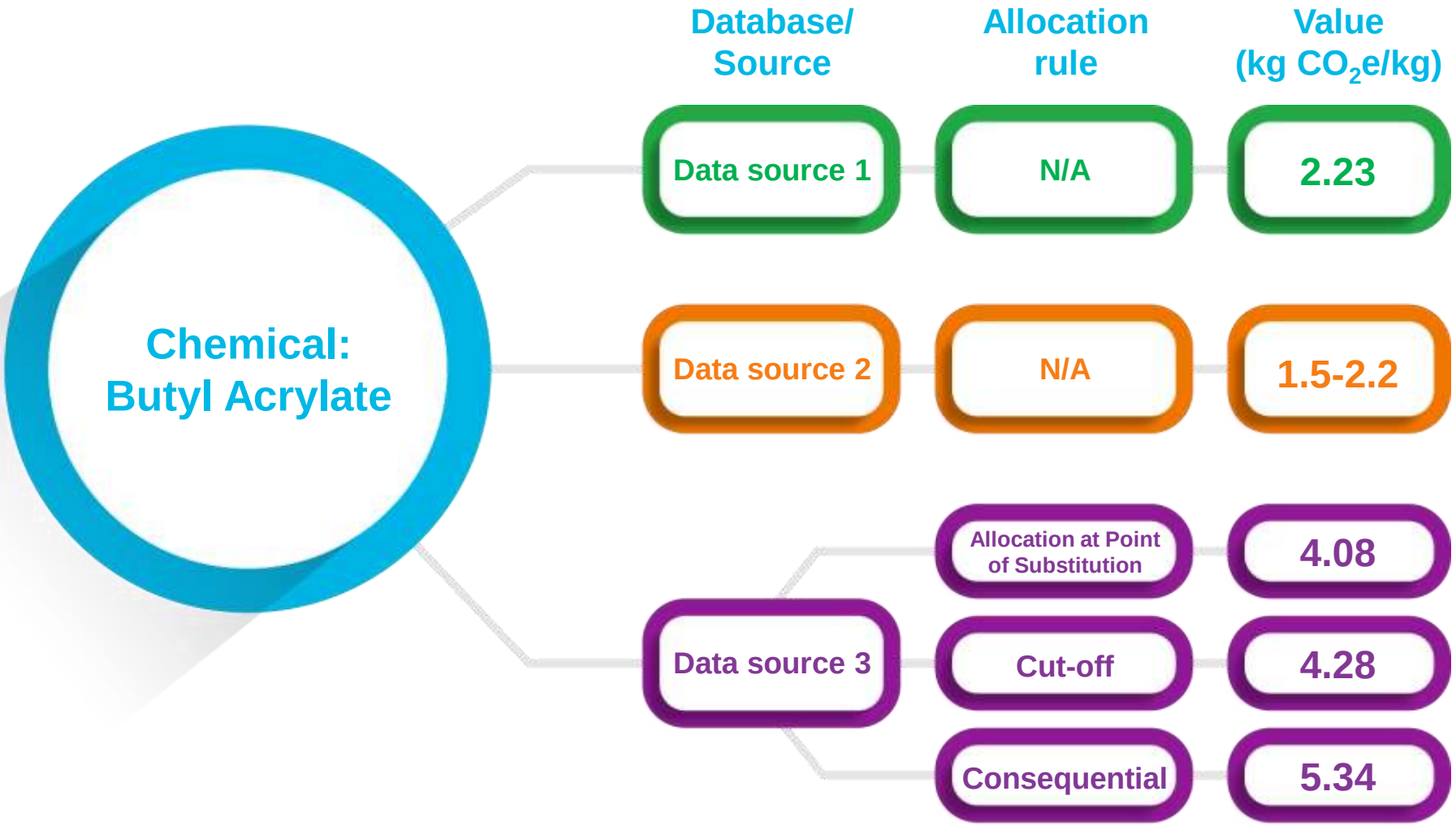
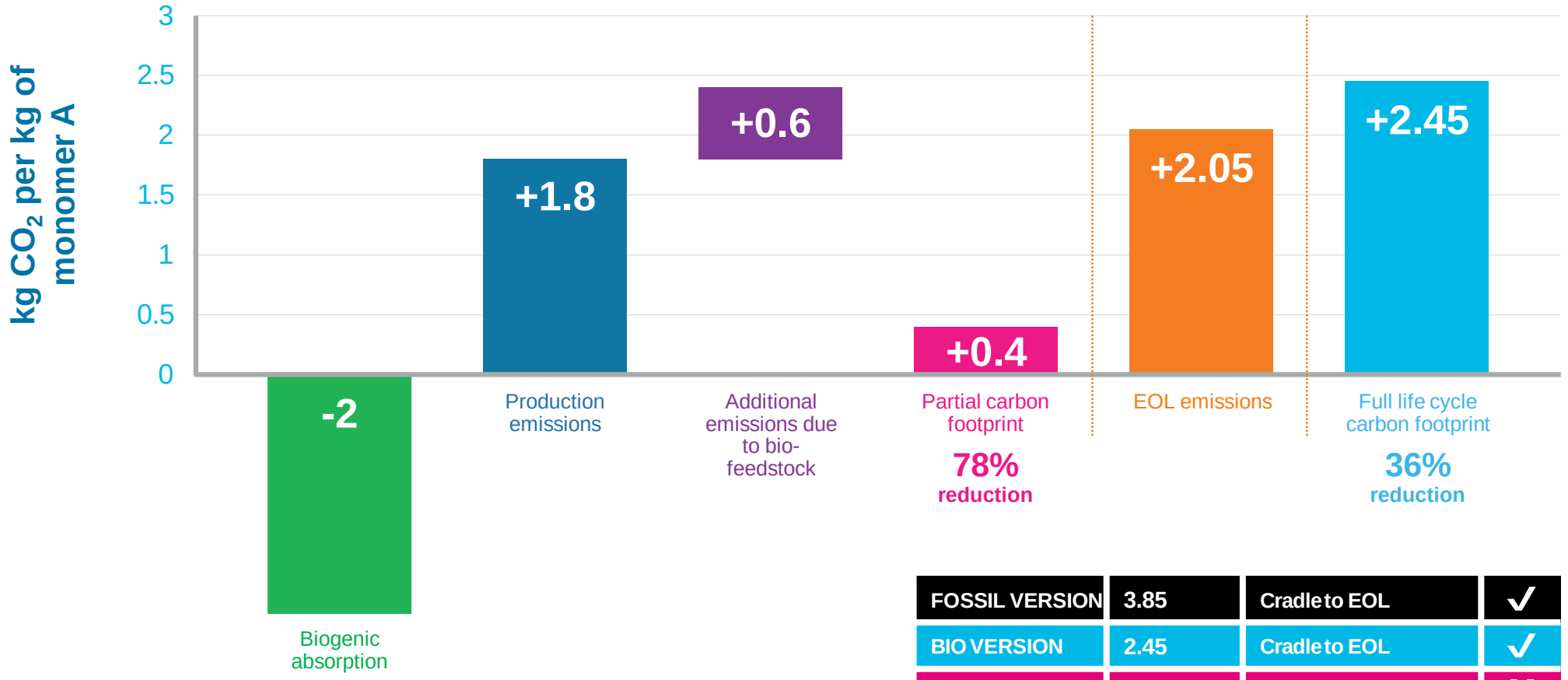
# Example of typical data source issue



# Example of typical scope issue

## Biobased carbon footprint benefits should be claimed when the entire life cycle is considered




| | | | |
|---|---|---|---|
| FOSSIL VERSION | 3.85 | Cradle to EOL | ✓ |
| BIO VERSION | 2.45 | Cradle to EOL | ✓ |
| BIO VERSION | 0.4 | INCOMPLETE SCOPE | X |

*Source: PPG life cycle assessment method + proprietary supplier data*

# Industry alignment is required

## Calculation rules

- Adopt calculation rules from SBTI and Green House Gas Protocol
- Define minimum requirement for data quality
- VOC emissions: photochemical ozone pollution only or $CO_2$ emissions too?
- EOL – landfill or full oxidation of the materials? Every single C atom becomes $CO_2$ unless recycled

## Identify solutions and quantify benefits

- Biobased chemicals: biogenic carbon true benefit is that carbonated content in the material comes from and go back to the atmosphere
- Recycled content: open loop vs. closed loop?
- What are the raw material $CO_2$ hotspots? Can the OEM industry influence the chemical/mining sector?

# To Meet the Challenge of Decarbonization…

## We Need to define a level playing field enabling collaboration along the value chain

### INDUSTRY LEVEL

**Understanding:**

Value chain carbon emission hot spots, what is material and where to focus our efforts for fast and large GHG emission reduction?

**Create:**

Common calculation rules: scope, reporting practices to enable the full supply chain to make the right decisions; create an Industry charter?

**Data source:**

Identify or create an OEM database; get it 3rd party verified

### INDIVIDUAL COMPANY LEVEL

**Contribute:**

Align on $CO_2$ disclosure format to support Introduction of low emission, energy saving, positive impacting products

**Innovation:**

New processes and products to create a future business model that enables growth while limiting carbon impact

**Create a level playing field to enable the industry to define a roadmap for low carbon emission OEM coating innovations**

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To learn more about PPG's environmental, social and governance progress:

ppg.com/sustainability