



**SIEMENS**

# SUSTAINABLE PRODUCT DESIGN

**SYSTEMS ENGINEERING**  
*meets*  
**DATA CONTINUITY**

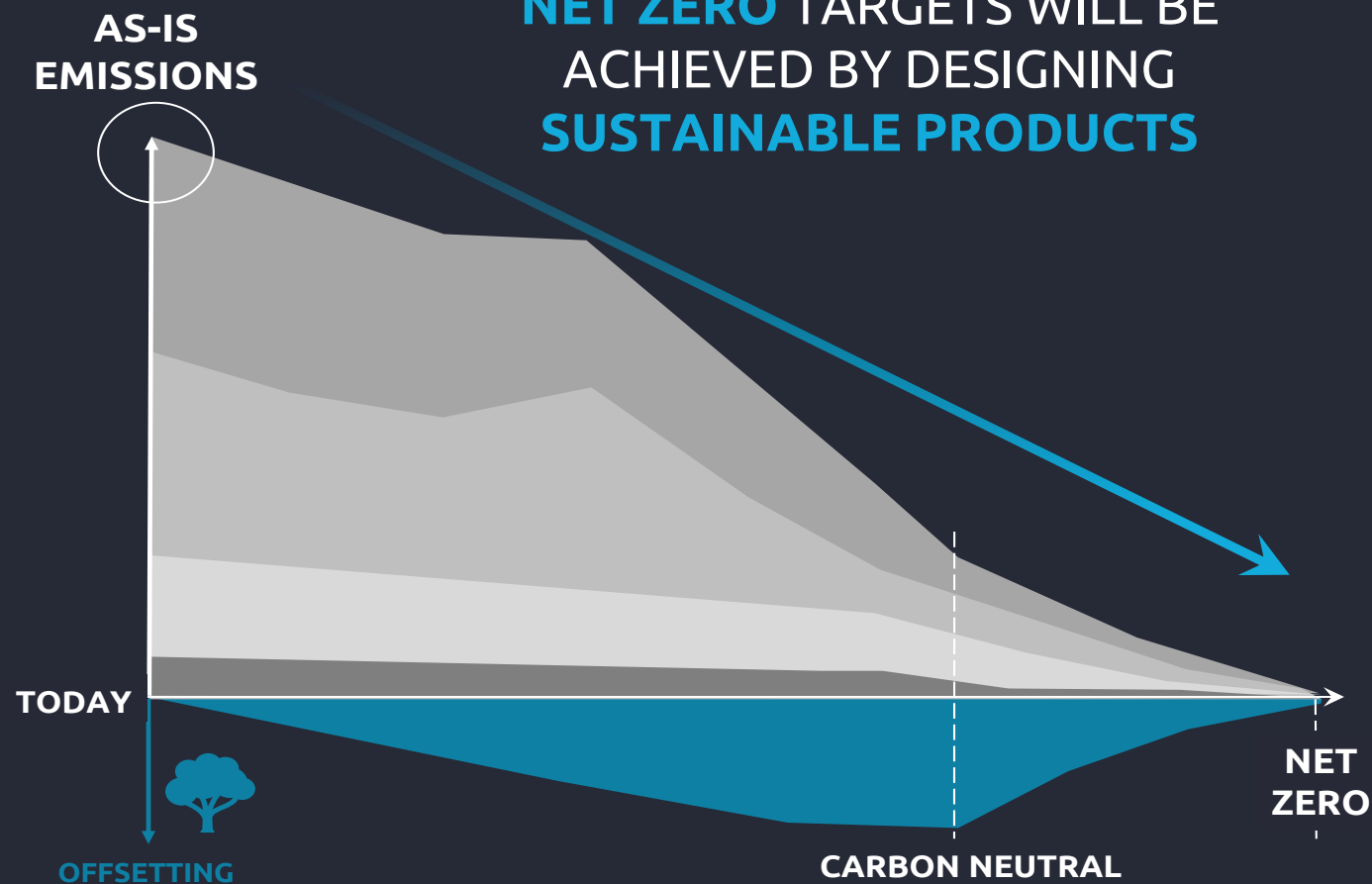
**Digital,**  
*meet*  
**physical.**

Unlock the potential of your  
digital and physical worlds.



# CLIENTS RACE TOWARDS NET ZERO

**NET ZERO** TARGETS WILL BE  
ACHIEVED BY DESIGNING  
**SUSTAINABLE PRODUCTS**



Up to **99%\***

of a company's environmental impact  
originates from  
**PRODUCTS** incl. the **SUPPLY CHAIN**

**80%**

of a product's environmental impact  
result from decisions made  
**AT DESIGN STAGE**

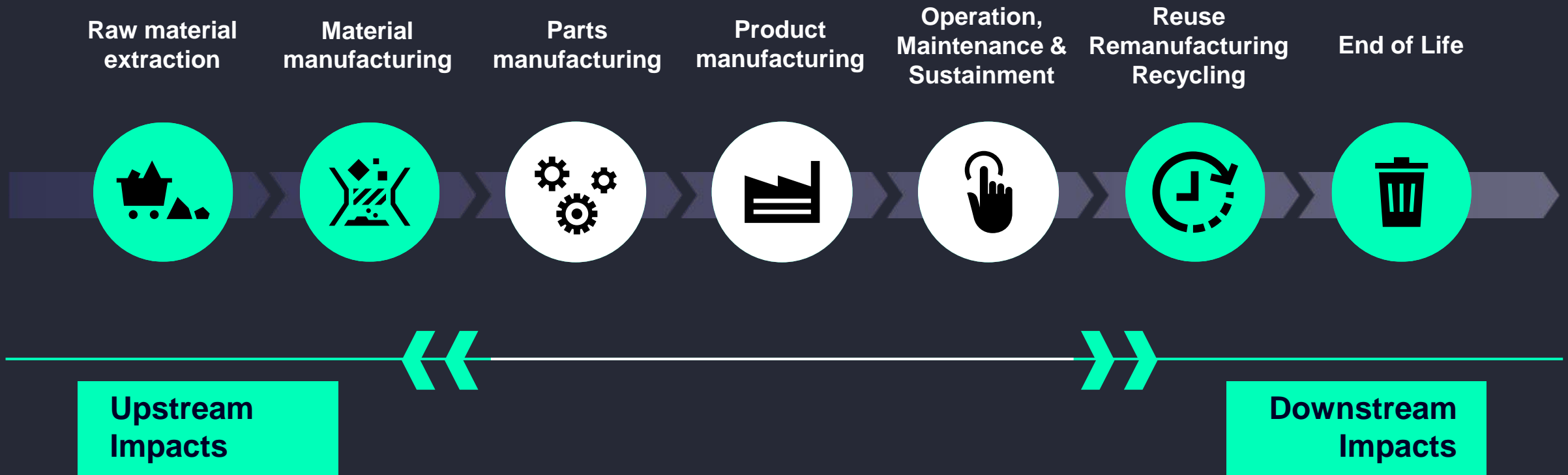
\*depends on industry and type of product

# BIG SUSTAINABILITY LEVERS IN PRODUCT DESIGN





# ASSESS BASED ON RELIABLE DATA



# DESIGN PRODUCTS BASED ON TANGIBLE FIGURES

## THE GAMECHANGERS

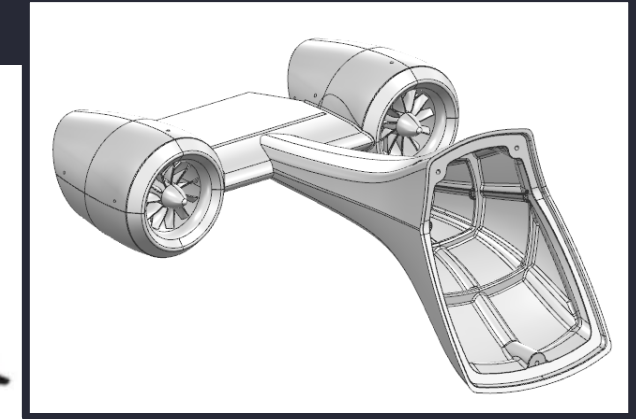
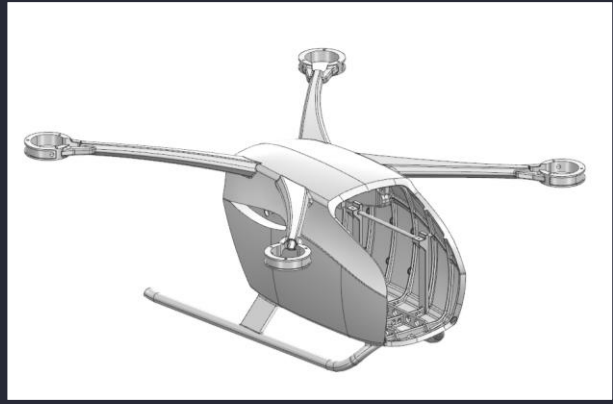
**Data-driven optimization  
for effective sustainability  
action**

**Sustainability driven  
product & systems  
engineering**

**Real Digital**



# CHALLENGE: REDUCE ENVIRONMENTAL EMISSIONS OF A MEDICAL DELIVERY DRONE & PREPARE FOR ESPR DIRECTIVE



AS-IS  
CARBON  
FOOTPRINT\*

**118**  
kg CO<sub>2</sub>e



# SIEMENS NX ALLOWS TO OPTIMIZE TOWARDS A MORE SUSTAINABLE DESIGN – OPTIMIZED RESULT

FOCUS ON THE DRONE'S BODY



Sustainability Navigator	
Results	
Key Performance Indicator	
<b>Raw Material</b>	
<b>Assigned Environment Material</b>	
Climate change total CO2 eq	
Total non-renewable primary energy use	
Fresh water consumptions	
Human toxicity, cancer, non-cancer	
Freshwater eutrophication(kg P/N eq)	
<b>Recycled Environment Material</b>	
Climate change total CO2 eq, Recycled	
Total non-renewable primary energy use, ...	
Fresh water consumptions, Recycled	
Human toxicity, cancer, non-cancer, Rec...	
Freshwater eutrophication(kg P/N eq), Re...	
<b>Renewable Environment Material</b>	
Climate change total CO2 eq, Renewable	
Total non-renewable primary energy use, ...	
Fresh water consumptions, Renewable	
Human toxicity, cancer, non-cancer, Ren...	
Freshwater eutrophication(kg P/N eq), Re...	

MATERIAL BASELINE : ALUMINUM	MATERIAL VARIANT 1: PA12	MATERIAL VARIANT 2: BIO-PLASTICS
Total Score	Total Score	Total Score
20.2589 [kg]	12.4576 [kg]	1.19347 [kg]
280.872 [MJ]	156.504 [MJ]	57.9501 [MJ]
7.19889 [m^3]	3.96933 [m^3]	8.24924 [m^3]
4.37241e-07 [CTUh]	1.08229e-08 [CTUh]	5.54104e-08 [CTUh]
0.00775469 [kg]	0.000277362 [kg]	0.00171595 [kg]
3.42153 [kg]	7.17555 [kg]	0.68744 [kg]
35.7095 [MJ]	90.1461 [MJ]	33.3792 [MJ]
3.23038 [m^3]	2.28633 [m^3]	4.75156 [m^3]
1.32161e-07 [CTUh]	6.23396e-09 [CTUh]	3.19164e-08 [CTUh]
0.00116023 [kg]	0.00015976 [kg]	0.000988389 [kg]
18.7283 [kg]	12.2627 [kg]	0.349649 [kg]
243.195 [MJ]	151.706 [MJ]	37.1784 [MJ]
6.99173 [m^3]	3.94295 [m^3]	8.13504 [m^3]
4.32677e-07 [CTUh]	1.02416e-08 [CTUh]	5.28939e-08 [CTUh]
0.00632137 [kg]	9.48423e-05 [kg]	0.000925752 [kg]

SUSTAINABILITY KPI FOR ASSIGNED MATERIAL (PRIMARY MATERIAL)

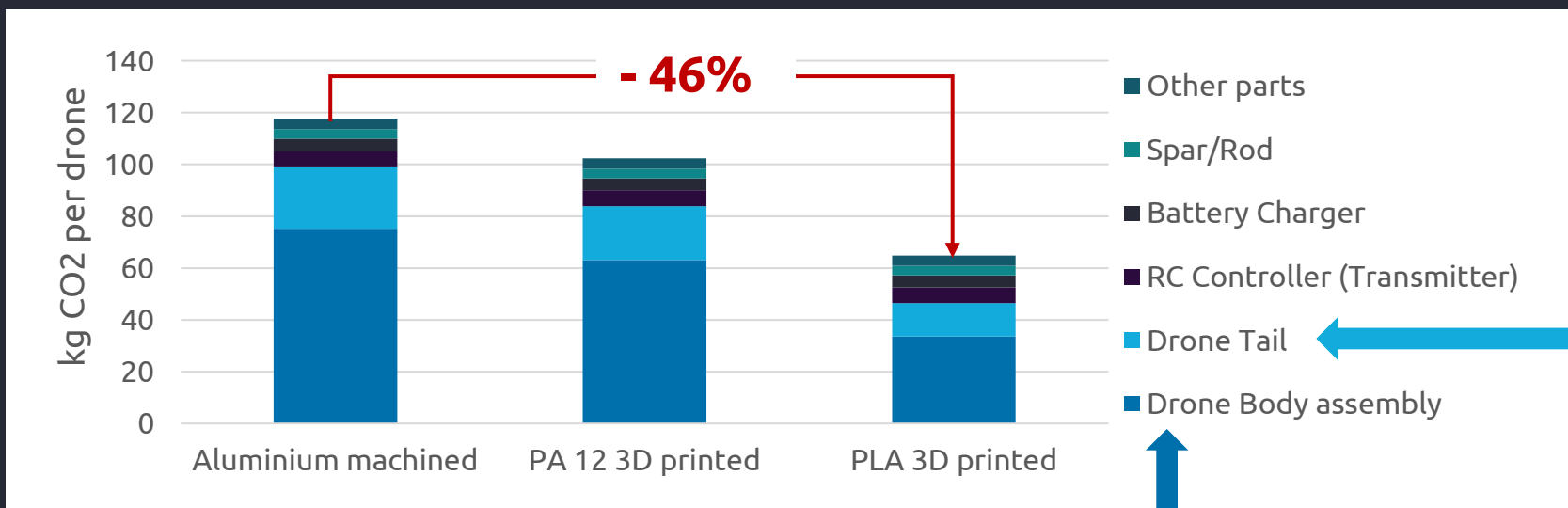
SUSTAINABILITY KPI FOR SAME MATERIAL BUT FROM A SECONDARY SOURCE

SUSTAINABILITY KPI FOR SECONDARY MATERIAL BUT RECYCLED FOR 2<sup>ND</sup> LIFE

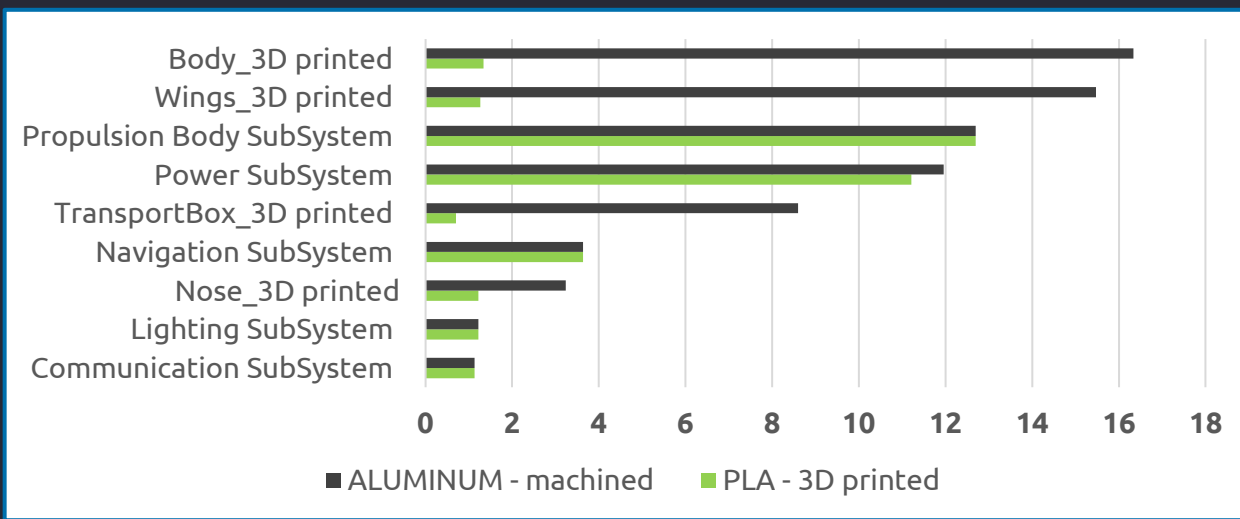




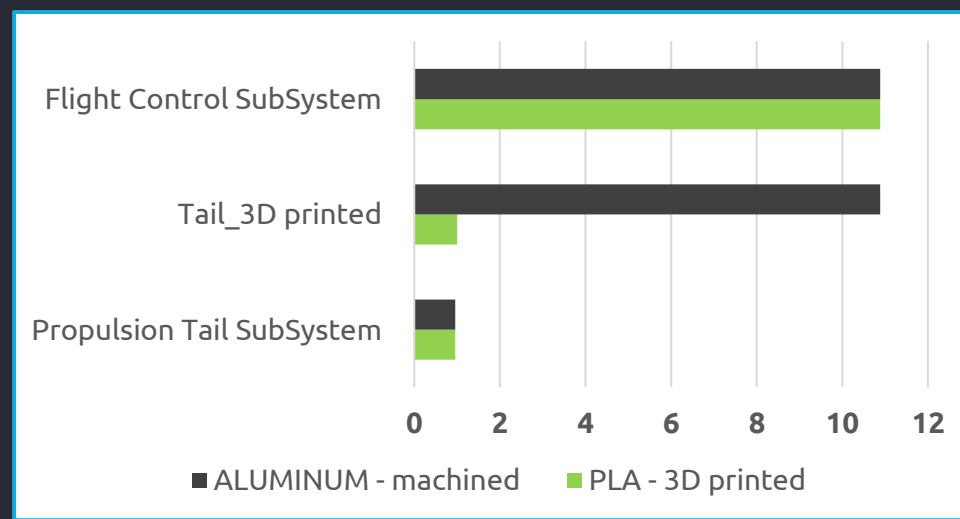
# FINAL ASSESSMENT OF THE DIFFERENT DRONE VARIANTS



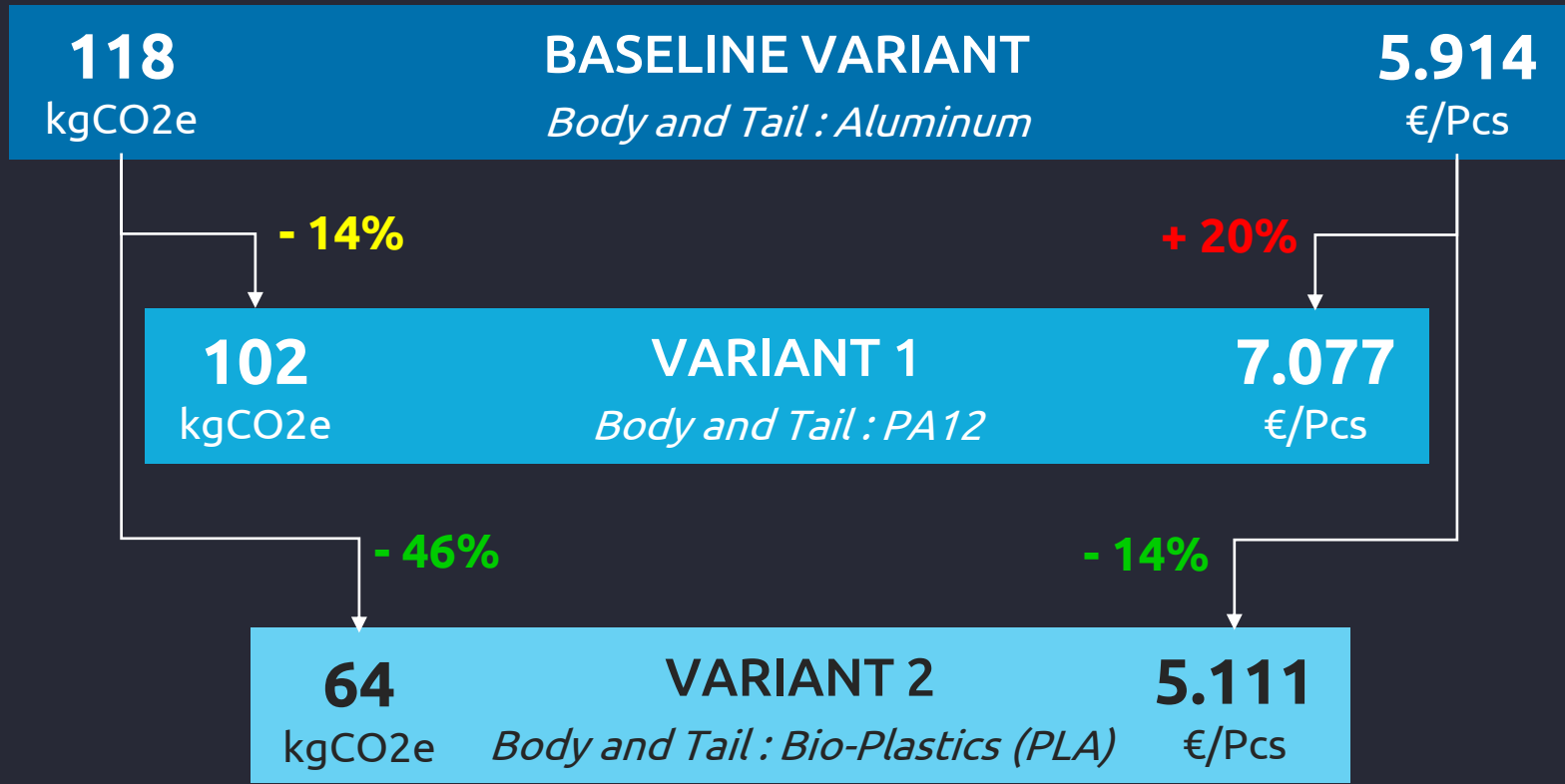
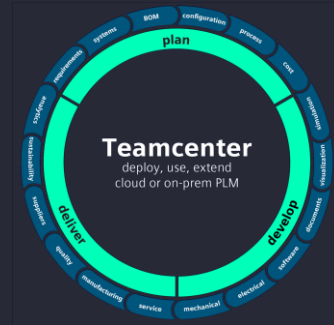
## DRILL DOWN DRONE BODY ASSEMBLY



## DRILL DOWN DRONE TAIL



# SIEMENS PCM MODULE ALLOWS TO BALANCE CARBON EMISSIONS AND COSTS FOR THE DIFFERENT PRODUCT VARIANTS

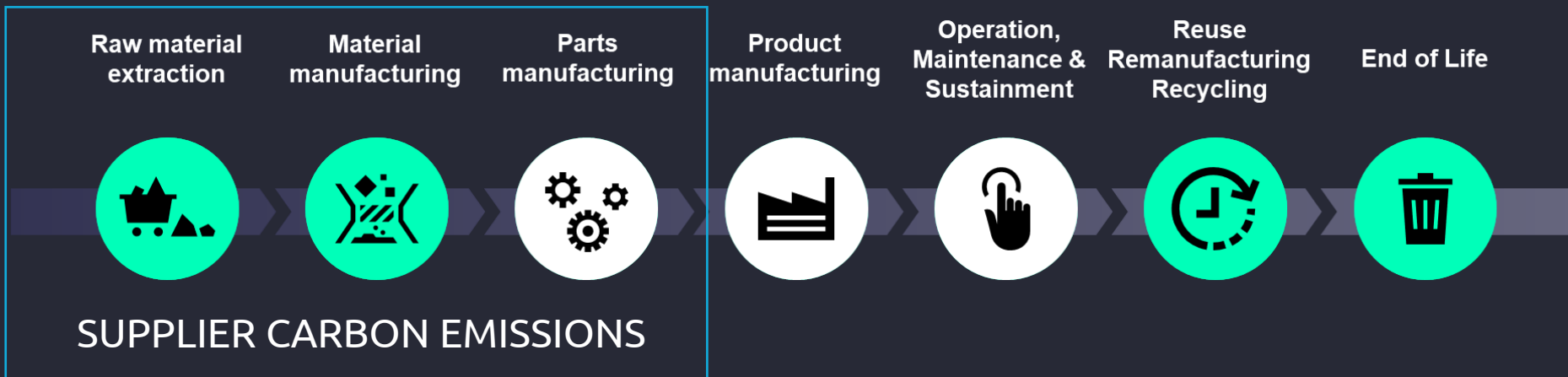


Changing materials and production methods

Further reducing CO<sub>2</sub> emissions by choosing bio-based material



# SIEMENS SIGREEN SOLUTION ALLOWS TO ENGAGE WITH THE SUPPLY CHAIN TO SUPPORT SUSTAINABLE PROCUREMENT



## TRACKING & MONITORING OF SUPPLIER PCF INFORMATION

Component - Supplier Overview

Q motor plate123 x Total 03

SAP Number	Component	Total emission	Status
Motor Plate123	Motor Plate 123	1.45 kg CO <sub>2</sub> e	PCF Self Published
Motor Plate123	Motor Plate123	0.98 kg CO <sub>2</sub> e	PCF Certified
Motor Plate123	Motor Plate123	--	Supplier Not Joined

## ENHANCE QUALITY & ROBUSTNESS BY ENGAGING WITH SUPPLIERS

Message from Customer

Dear Plastics & Metal,  
We would like to request the PCF for the product via SIGREEN

The following are the identifiers employed for product identification on our end

PCF Overview

This is your PCF request

- Location DE
- Declared Unit piece
- Requested standard ISO 14063

This is your Product's Carbon Footprint

- Total Production Stage 0.98 kg CO<sub>2</sub>e
- Declared quantity 1 piece

Data Quality Based on your Selected Credential

- Transparency 89.57%
- Reliability 100%
- Validity & Data Accuracy 28.57%

## LEVERAGE PCF SUPPLIER DATA TO REDUCE OWN CARBON EMISSIONS

PCF State	Total Emissions	Proofs
Self Published	1.45 kg CO <sub>2</sub> e (for 1 piece)	1
Secondary Data	1.365 kg CO <sub>2</sub> e (for 1 piece)	0
Certified: Standard Cert...	0.98 kg CO <sub>2</sub> e (for 1 piece)	1



# ARE YOU READY TO ACCELERATE YOUR SUSTAINABILITY JOURNEY?



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