



# A smart watch on life cycle costs of power supplies for Industry 4.0

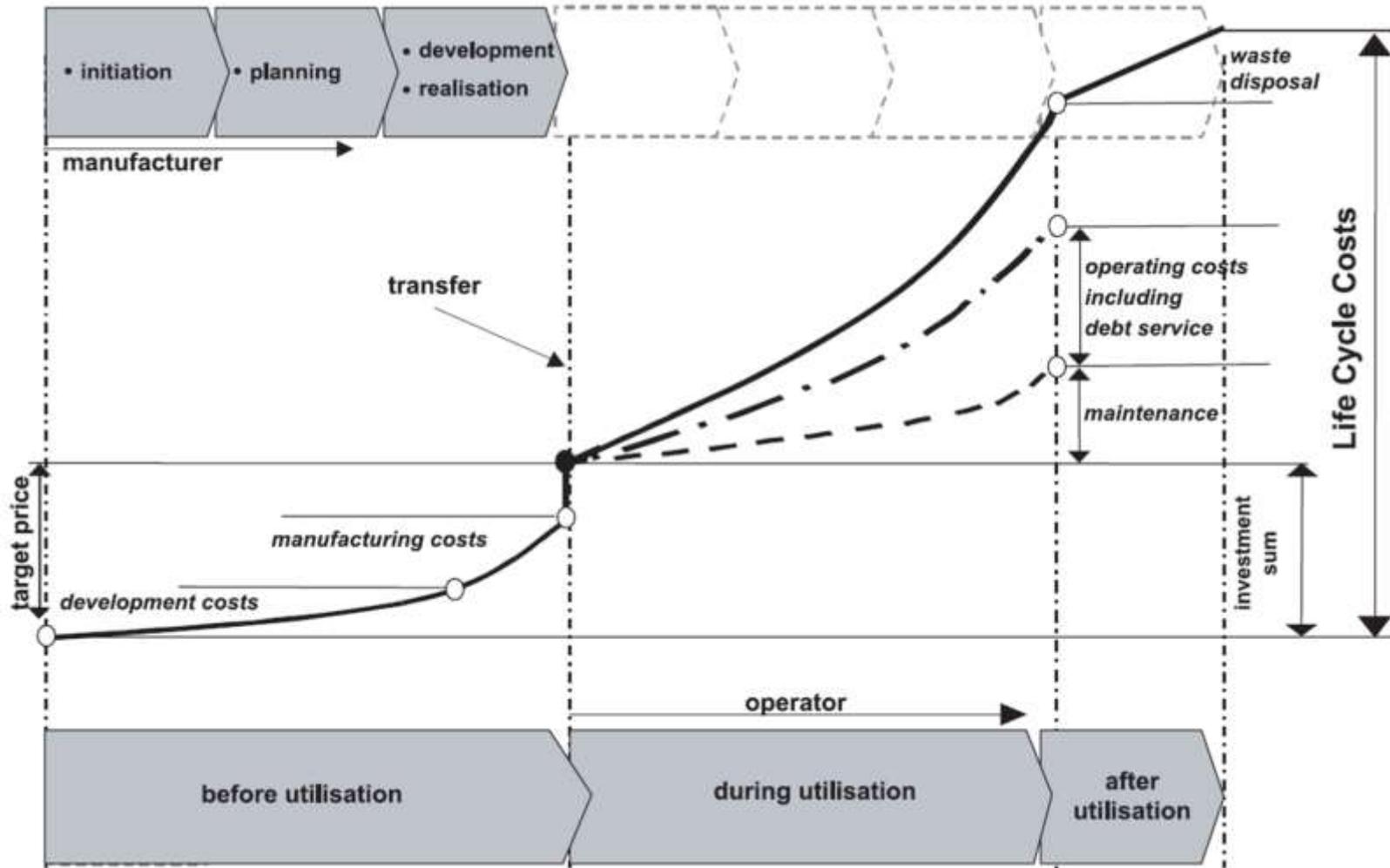
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PULS GmbH – 14.06.2018

14 juni 2018  
1931 Congrescentrum Den Bosch

**POWER  
ELECTRONICS**

**2018**

# VDI guideline VDI 2884 – Life Cycle Costs



# Example: Choosing the Ideal Car

(not quite serious)

Which car would you buy for the next 10 years at an annual mileage of 15.000 km?



Ford Mustang Version 2016

Source: <http://www.ford.de/Pkw-Modelle/FordMustang/Design>



BMW 4.40i Version 2016

Source: <https://www.bmw.de/de/neufahrzeuge/4/coupe/2013/fakten.html>

# Resolution and Application Discussion: The Ideal Car?



	Ford Mustang 2016	BMW 4.40i 2016
Initial costs	0 €	0 €
Initial costs per unit	38 000 €	52 800 €
Usage costs per unit	15 972 €	15 373 €
After usage costs per unit	0 €	0 €
<b>Total costs per unit</b>	<b>53 972 €</b>	<b>68 173 €</b>
<b>Total costs per year</b>	<b>~ 5 400 €</b>	<b>~ 6 820 €</b>

# Resolution and Application Discussion: The Ideal Car?

Do you trust the given data and the assumptions we made:

1. Do we really use the car for 15.000km?
2. Is the datasheet information accurate?
3. Do car and driver behave ideally, like stated in the datasheet?

How do we act in a similar situation on Industry 4.0 shopfloor?

# Example: Power Supplies

The VDI 2884 guideline will be applied to two DIN-rail power supplies in the following example.

## General conditions

- 1-phase-system 230V, 10A with 12A boost at 24Vdc
- Products: PULS CP10.241 & German market companion "GC 1"
- 10.000 units will be installed in a superior machine of the customer over the next 10 years

## Assumptions for the Operations:

- 24/7 at an average of 20°C
- Temperature max. 35°C and min. 10°C
- 40% relative humidity
- No special height requirement
- 20% idling
- 0,08€ per kWh

# Overall Life Cycle Costs

	<b>PULS CP10.241</b>	<b>German Competitor GC 1</b>
Initial costs (overall general costs)	2 300 €	12 872.09 €
Initial costs per unit	179.15 €	129.45 €
Usage costs per unit	103.13 €	304.56 €
After usage costs per unit	4.86 €	1.16 €
<b>Total LCC per unit (10 000 pcs)</b>	<b>287.37 €</b>	<b>436.46 €</b>



**34.2 % less / 51.9 % more**  
**Total savings: 149.09 €**

# From an Economic Point-of-View ...

- Higher investment per device for PULS = **54.26 €**
- Total savings after 10 years per device = **149.09€**
  
- **Return on Invest** per device = **94.83 €**
- → **6,4% p.a.**

An investment in the power supply of your product is worth it and can be more profitable (see our example) than investing in banks for less than 5% interest or far less risky than high-risk funds.

# Utilizing “Life Cycle Costs” in daily „Sales Life“

## Challenges:

- No Exact Knowledge about Load Profiles
- Little Trust in Calculations based on assumptions



## PULS SmartFab Box

### PULS SmartFab Box Solution:

- In Line Power and Thermal Monitoring in Costumers' Application
- Access Live Data and Savings

# PULS Connect: SmartFab Box



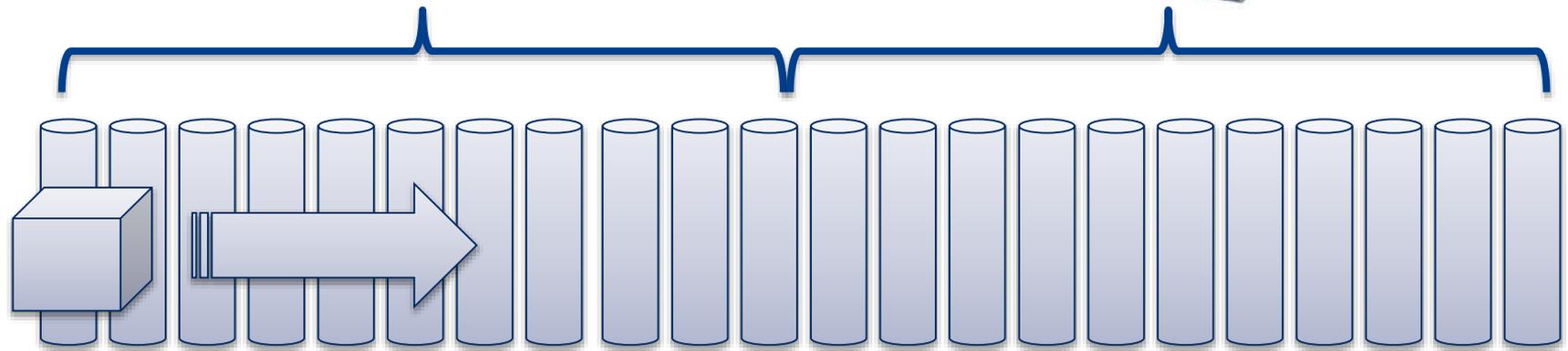
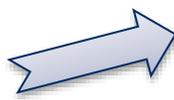
# PULS Connect: SmartFab Box



# PULS Connect: SmartFab Box



Competitor  
Product





## SmartFab Box Live Demo

<http://www.pulspower.com/support/service/smartfab-box/>

# PULS Connect : SmartFab Box



## Power

The value shows the output power wattage delivered by the power supply.

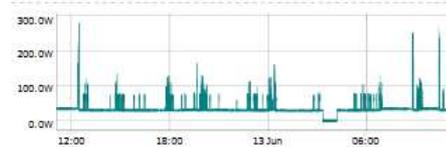
### Active Power | Live

— P\_Wirk\_IN



### Active Power | 24h overview

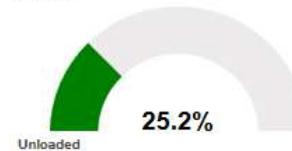
— P\_Wirk\_IN



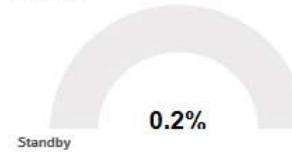
## Capacity Utilisation

The diagrams show the load status of the conveyor system.

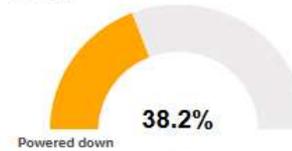
### Loaded



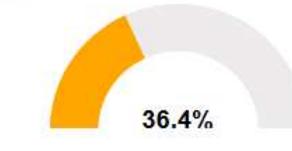
Unloaded



Standby



Powered down



## Cost savings per power supply

This value shows the energy cost-savings achieved at the customer's site since March 2017 using highly-efficient PULS power supplies instead of a competitive product.

**39.26**  
**EURO**

## CO2 savings per power supply

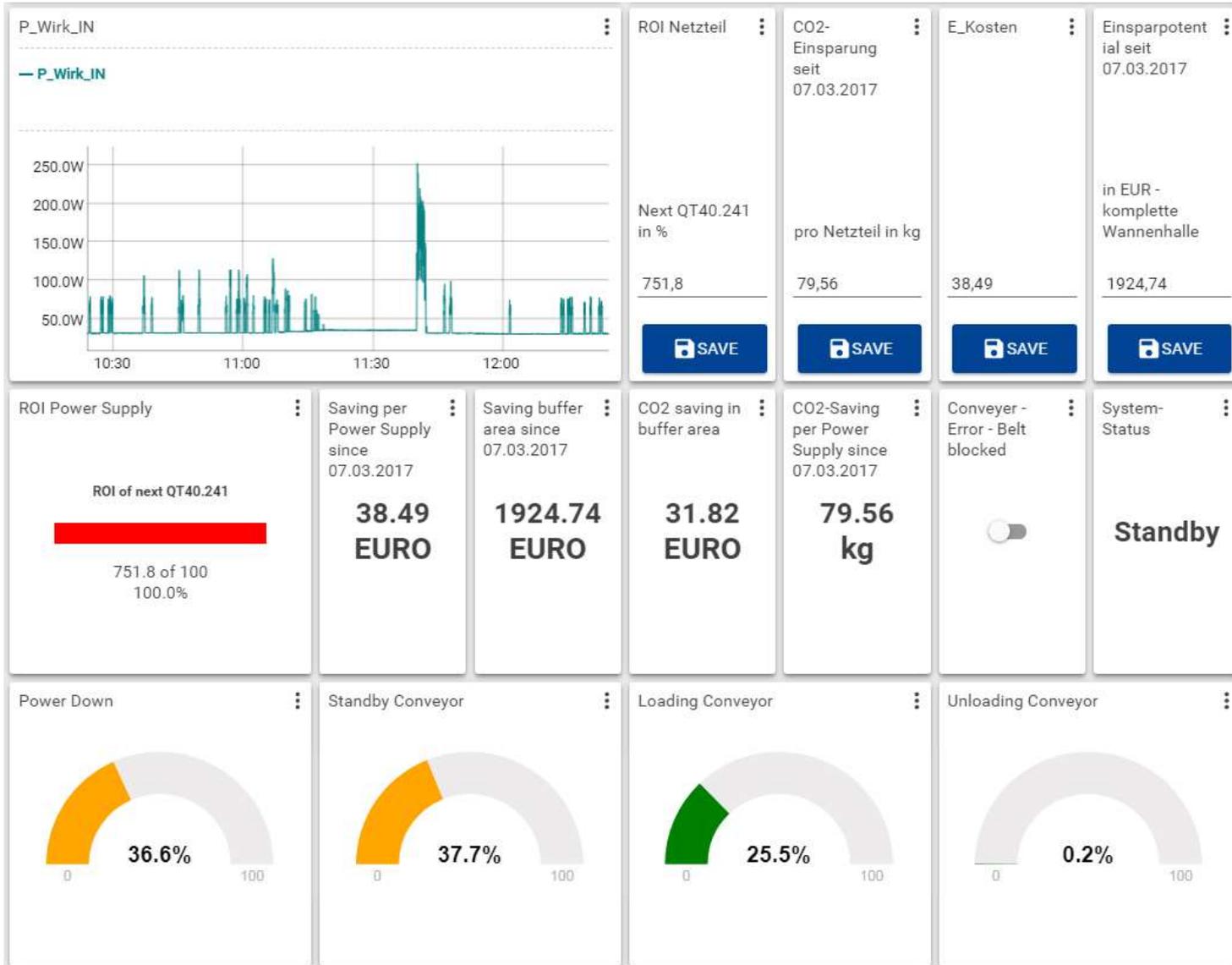
This value shows the CO2 emission the company has reduced since March 2017 per power supply by using PULS.

**81.13**  
**kg**

# PULS Connect : SmartFab Box



# PULS Connect : SmartFab Box





**Thank you!**

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