

Green Production for Automotive Industry

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Project Co-Director
German International Cooperation (GIZ)

A part of:



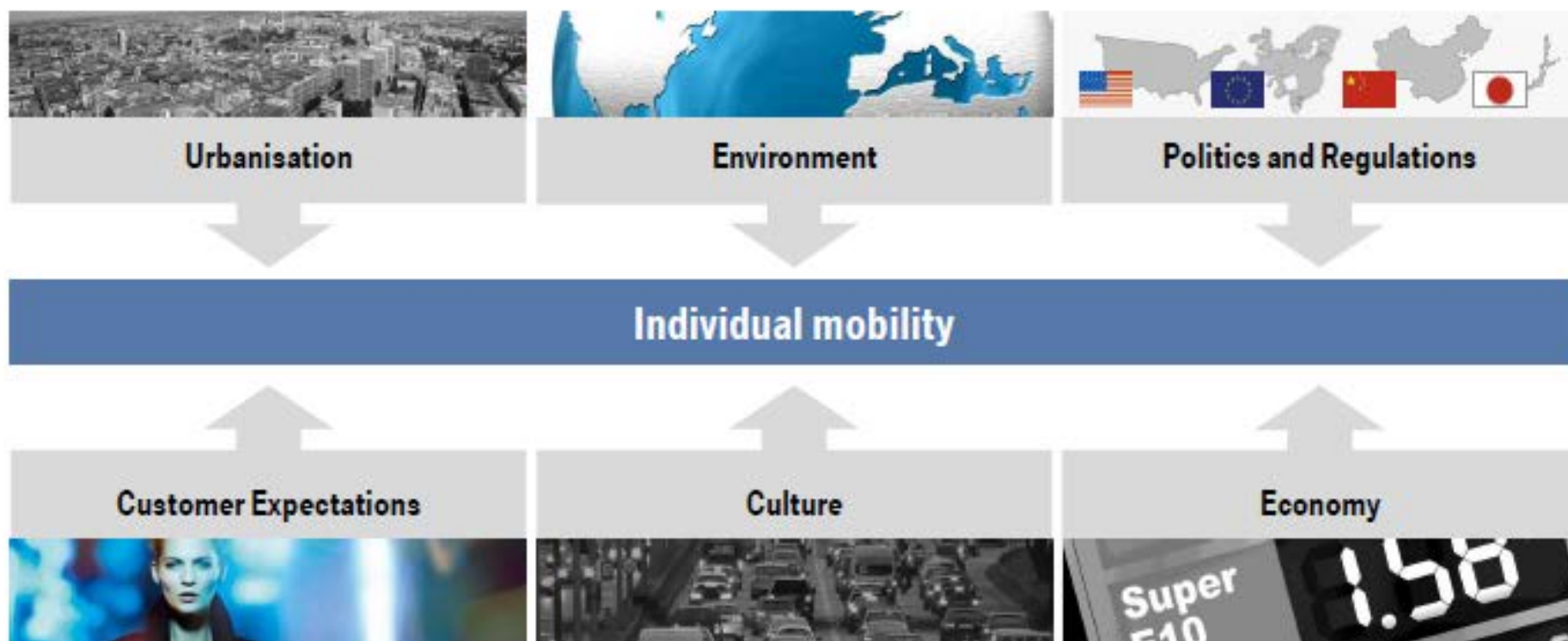
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WHY IS SUSTAINABLE DEVELOPMENT NECESSARY?



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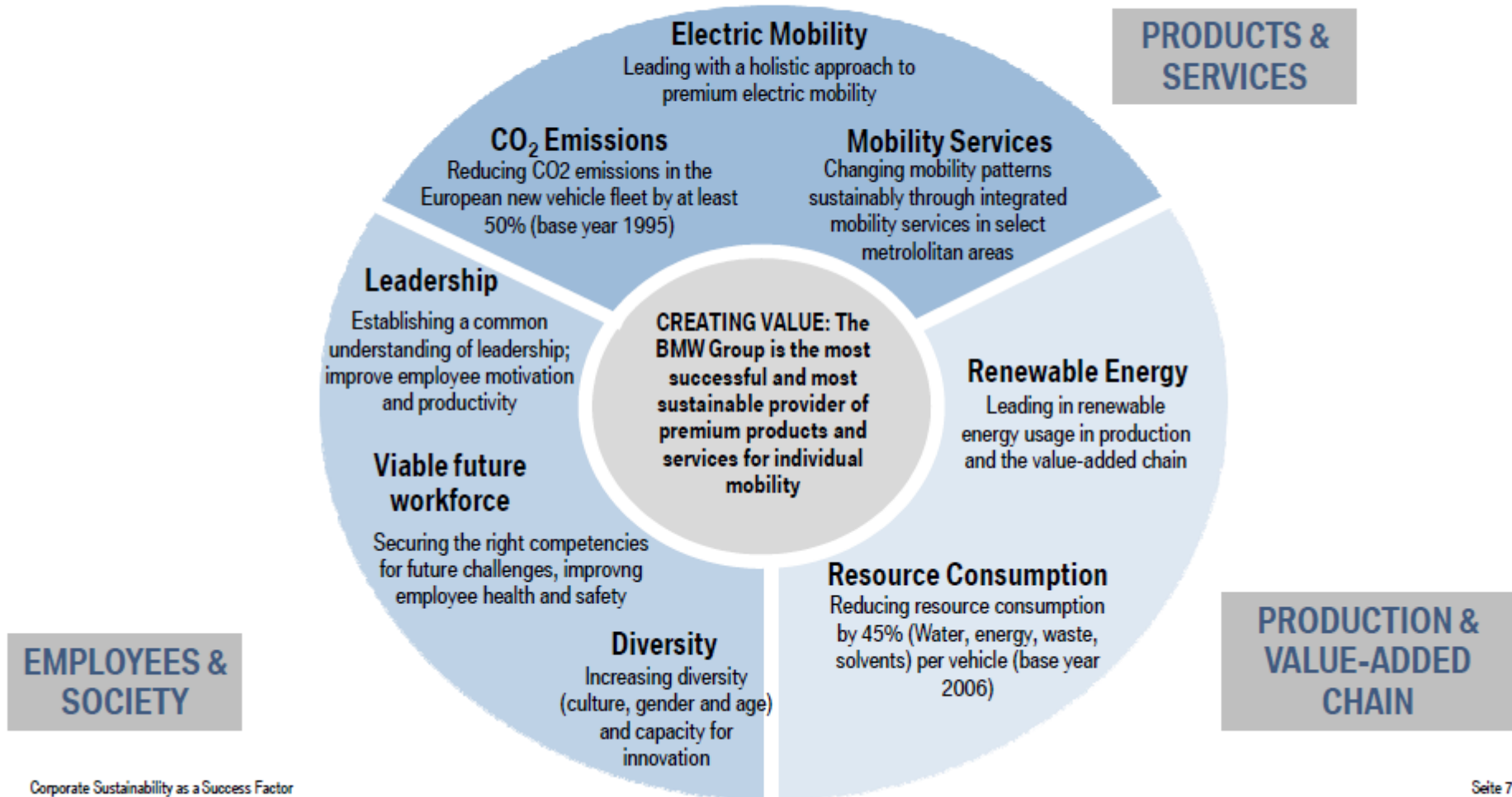
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SUSTAINABILITY TARGETS BMW GROUP 2020.



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THE BMW GROUP'S CLEAN PRODUCTION PHILOSOPHY.

Certified environmental management systems (ISO 14001/EMAS) at all sites worldwide

Reducing Solvent
Emissions



Reducing water usage
and process



Saving energy and
reducing CO₂



Avoiding or recycling
waste



Targeted management of environmental performance:

- Monthly recording of consumption/emission figures at all sites
- Target: 45% reduction in emissions/resource usage from 2006-2020
- Average improvement in resource efficiency since 2006: 45%

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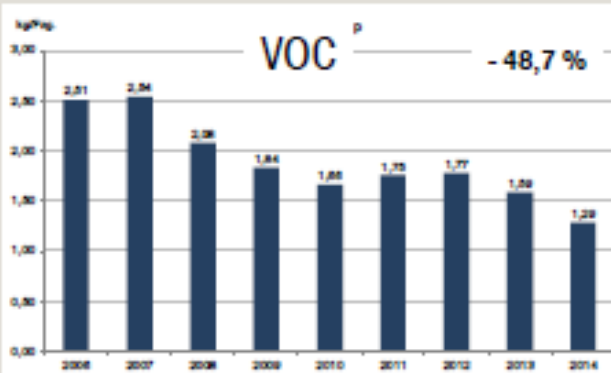
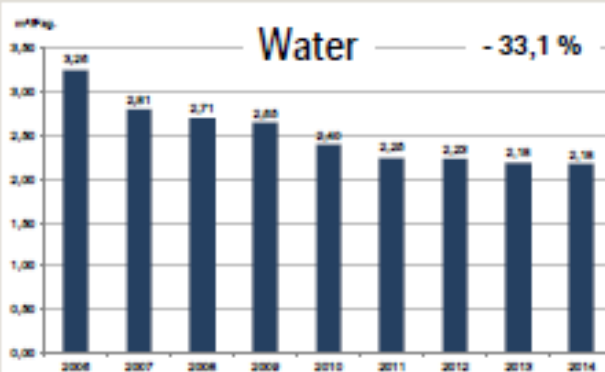
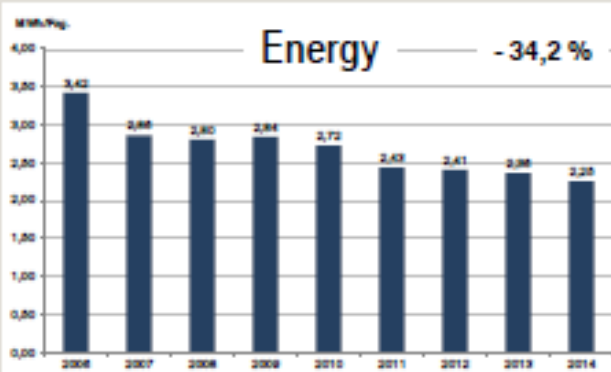
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CLEAN PRODUCTION BMW GROUP. RESSOURCE EFFICIENCY PER VERHICLE 2006 - 2014.



On average, a reduction was achieved by 45% since 2006!

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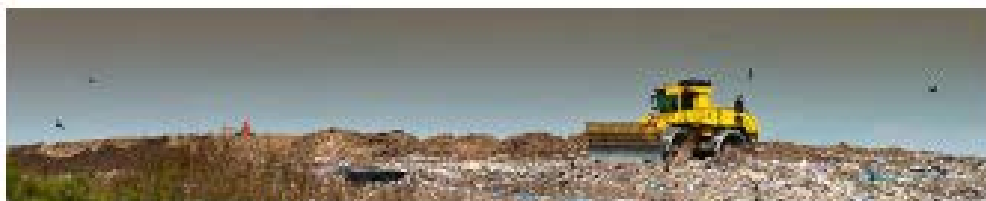
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EXAMPLES: ENERGY CONSUMPTION AND EMISSIONS



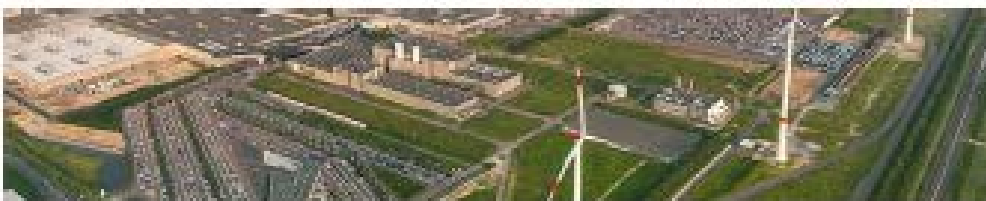
Spartanburg plant.

50% of the energy needed comes from methane gas from a nearby refuse site.



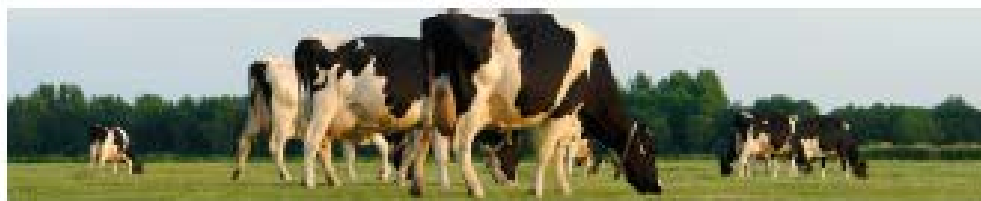
Moses Lake joint venture.

Production of carbon fibre with 100% hydropower.



Leipzig plant.

100% of the electricity needed for BMW i production comes from wind power.



Rosslyn plant.

Energy from biomass.

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EXAMPLES: MATERIALS USE AND WASTE MANAGEMENT

With raw materials becoming increasingly scarce worldwide, the BMW Group engages in recycling management throughout material life cycles.

Target: Reduce non-recyclable production waste by 45% per vehicle by 2020 (base year: 2006).



Production without any non-recyclable waste, e.g. at the Rolls-Royce plant in Goodwood, UK



Materials separation project in Rosslyn, South Africa



Control of the collection and recycling of waste through ABIS

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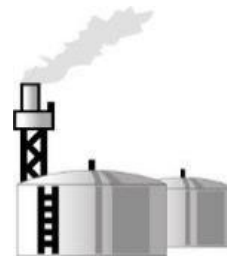
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An important view of 'Resource and Energy Efficiency'

Resources are raw material, water, and energy that are taken into production process for products or services. They are definitely important but normally considered as second priority to finished goods or desired services.

These resources are thought that they are almost best utilized and can not even further be reduced or corrected in the eyes of many operators. Simply said that there is no room for improvement which is precisely incorrect.



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Better Resource Utilization or Resource Efficiency

Changing paradigm of resource utilization in organizations is the first hurdle. We are in need of better resource conservation from beginning, in-process, and final stage of operations. It's significance should not be secondary to finished products, but it should be supplement. Better resource utilization can be done through the participation of all employee.



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What is Profitable Resource and Energy Management

Profitable Resource and Energy Management is a systematic approach aiming to reduce, change, and improve the resources utilization in the operations of businesses. It can be achieved through participation of all human resources in the organization by first recognizing new resource utilization concept which will lead to cost reduction, lessen environmental impact, and improve working condition.

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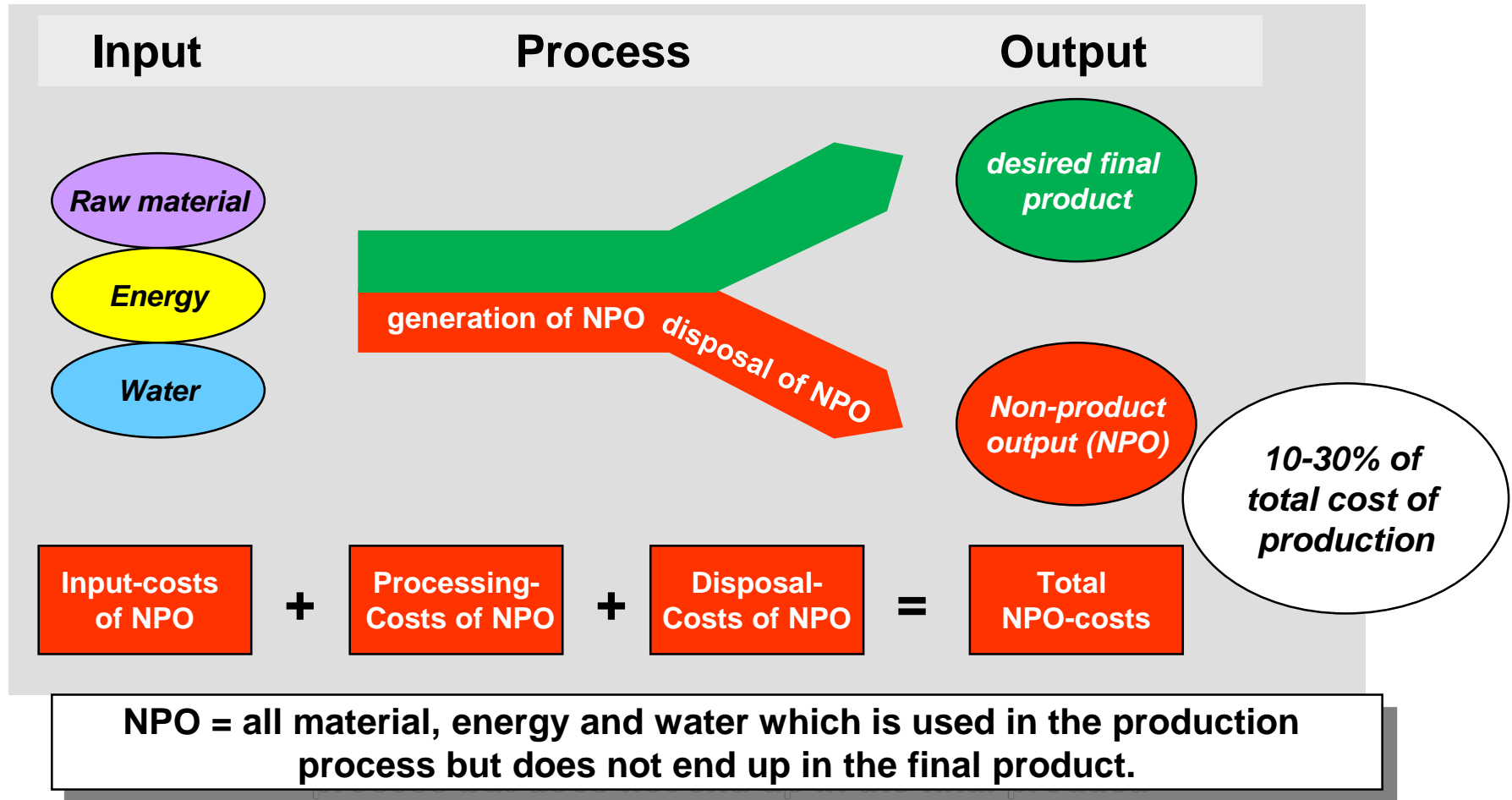
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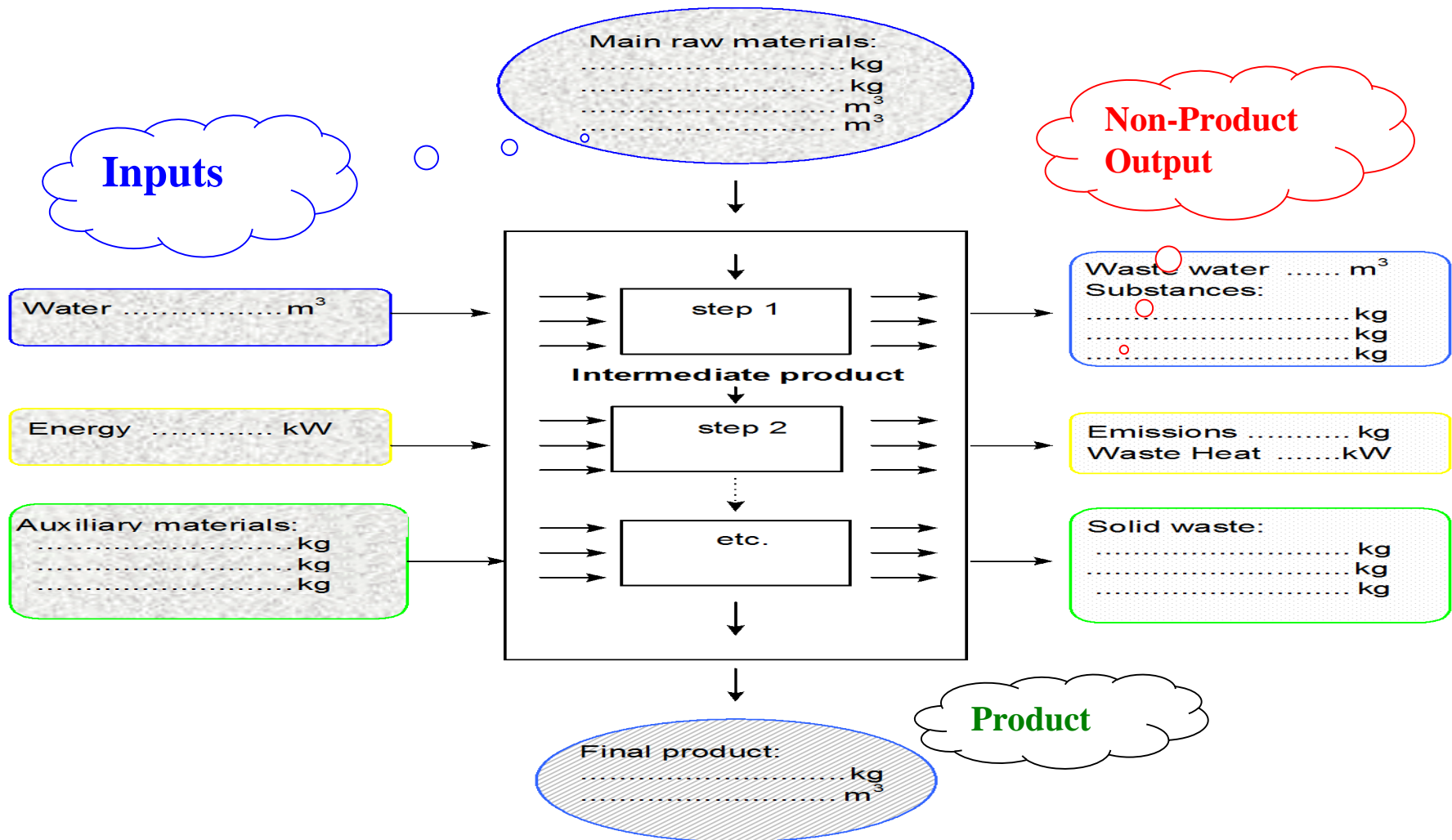
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Concept of Resource and Energy Management



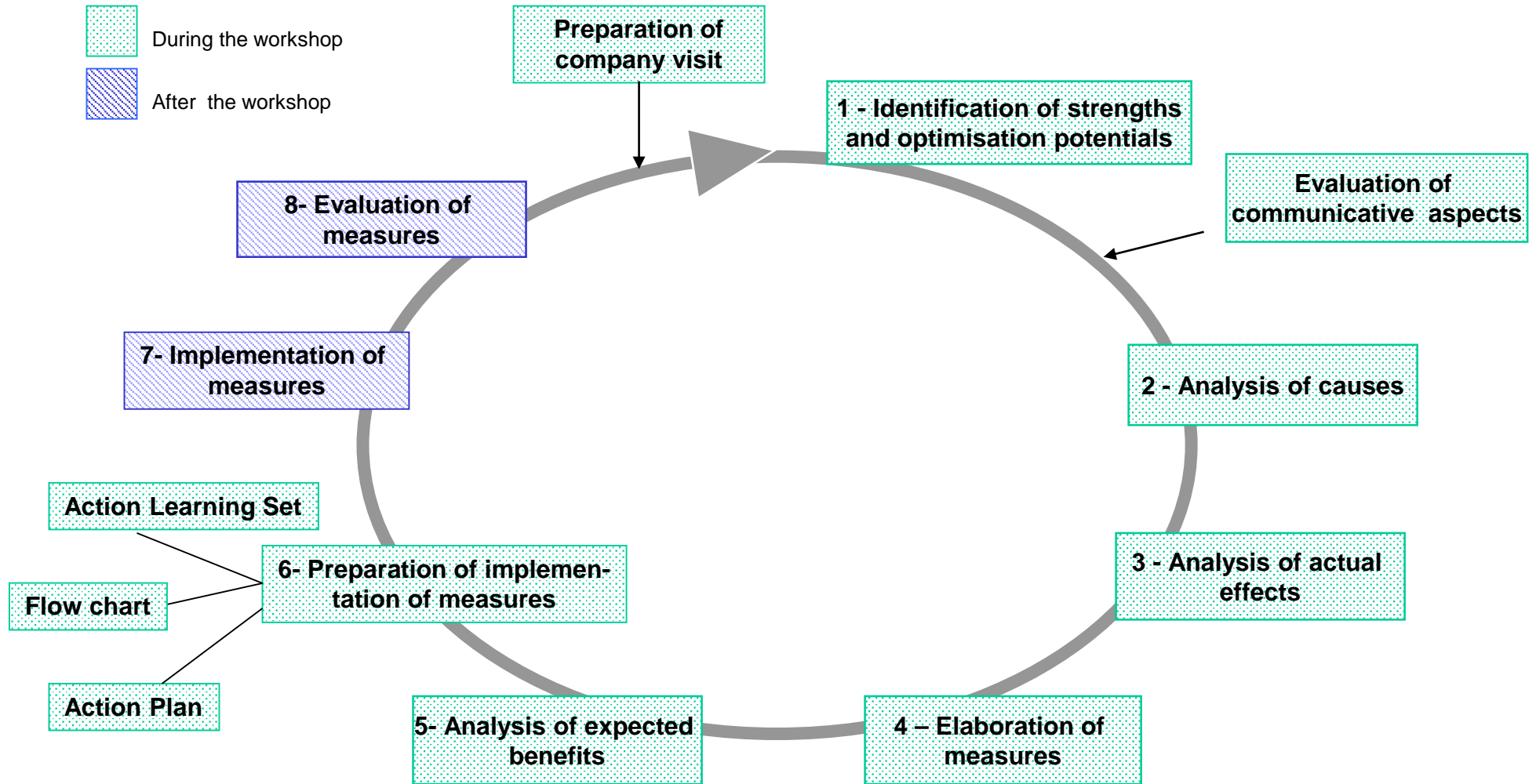
Material Flowchart as one instrument to identify Non-Product Output



Checklist as one instrument to identify Non-Product Output

Checklist 3: Storage and Handling of Materials	
Objective: Appropriate Storage, Handling and Transport of Materials	
Actions to consider	Observations
<p>key questions →</p> <p>list of sub-questions {</p> <p>Do you <u>avoid losses</u> of raw materials during storage?</p> <p><input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> partially</p> <ul style="list-style-type: none"> • Do you ensure that the packaging of materials is not damaged during storage? • Have to verified the expiration dates for all raw materials to avoid having inputs that are no longer usable? • Do you carry out regular checks and keep written records? • Do you avoid keeping unnecessarily large quantities of stock on hand? • Have you instructed employees to use raw materials on a first-in-first-out basis? 	<p>Column for observations</p>

Cycle of Change



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Example of Achievements of Green Auto Parts Project In Thailand (2012-2015)

502 SMEs participated and received consultancy programme, 1,000 RE/EE measures proposed

452 SMEs completed measures implementation, resulting to

- Production cost reduced in total 292,559,212 Baht (7.3 Milo. Euro)
- Energy consumption reduced in total 71,116,231 MJ/year
- Solid waste reduced in total 3,952 tons/year
- Water consumption reduced in total 118,230 m³/year
- GHG mission reduce in total 16,413 tons CO₂eq/year
- 78 SMEs complied to “Green Industry Mark” of Ministry of Industry



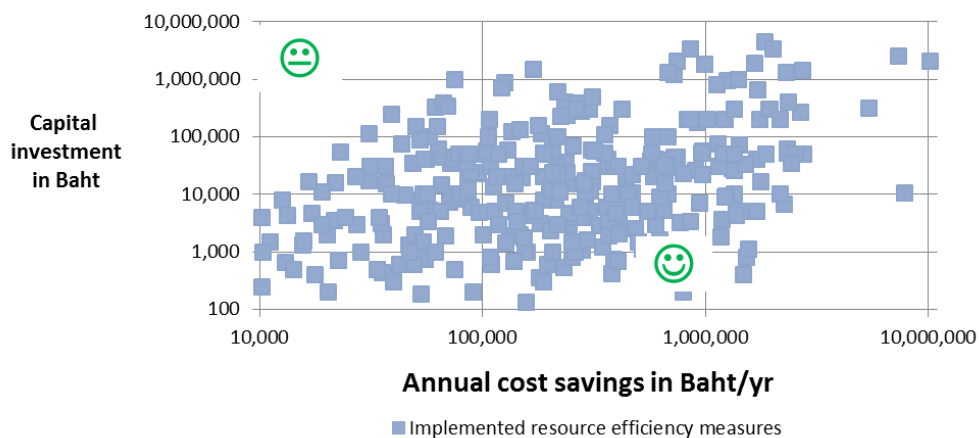
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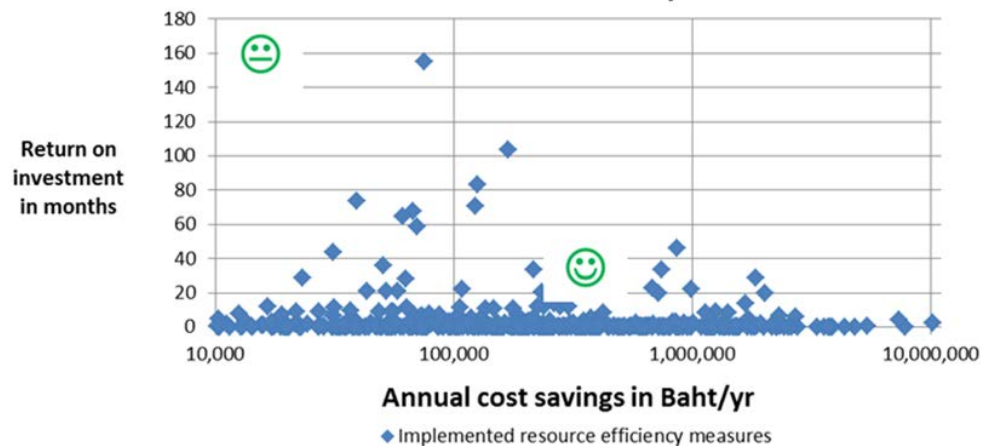
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Economic benefits (ประโยชน์ด้านเศรษฐศาสตร์)

Annual Cost Savings versus Capital Investment
Company Results - Update September 2015
SWITCH Thailand Automotive Project



Annual Cost Savings versus Return on Investment
Company Results - Update September 2015
SWITCH Thailand Automotive Project



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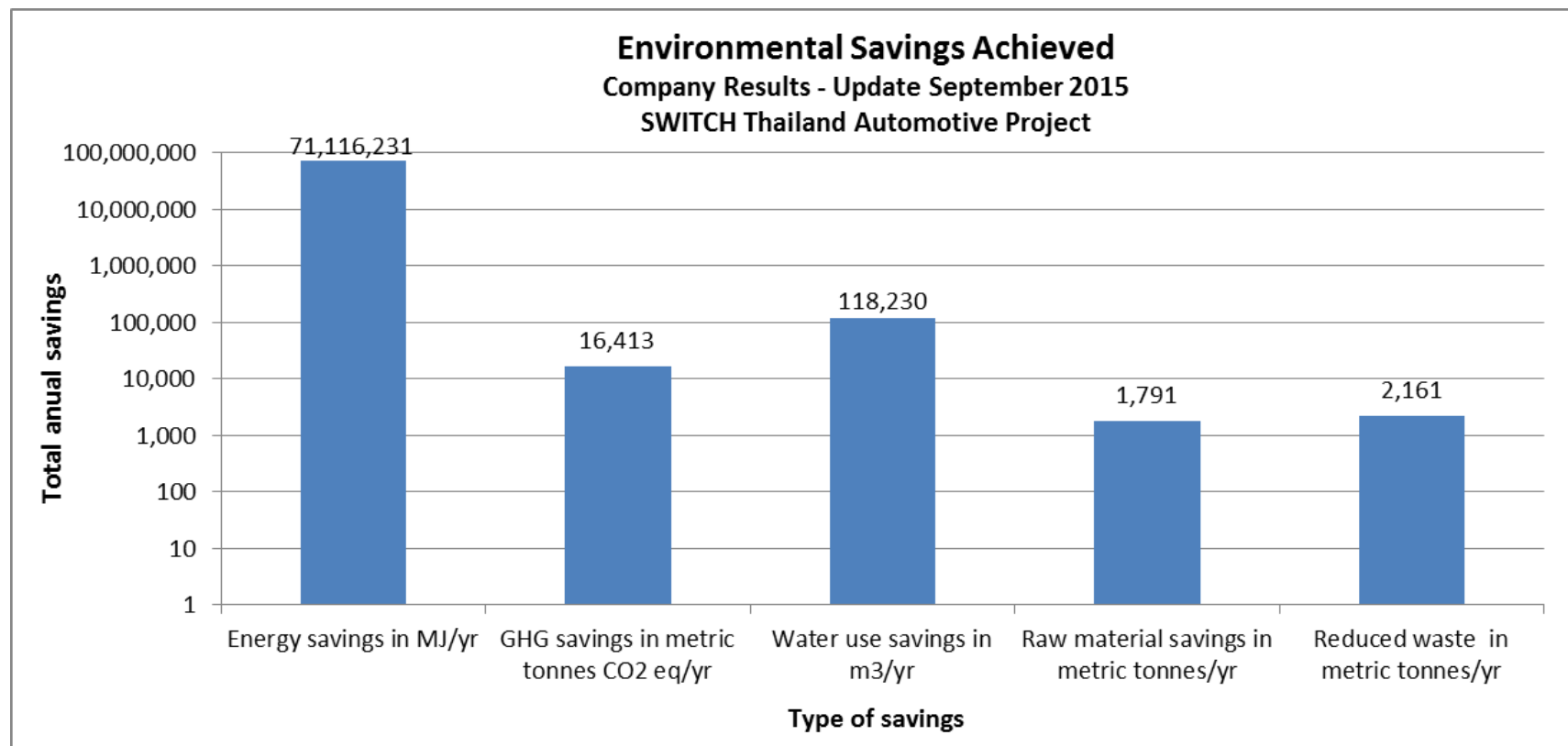
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Environmental and energy benefits (ประโยชน์ทางด้านสิ่งแวดล้อมและพลังงาน)



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Success Case: Thai Chanathorn Industry Co., Ltd. Measure: Reducing aluminium scrap in the injection process

Causes

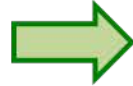
Setting the thickness of stamping head at 30 mm to prevent TIP head to hit the mold

Before



Runner gate , over flow , stamping head

30mm- thick stamping head



Problems

Aluminium scrap in the injection process at the amount of 407,401 kg/year

After



Adjusting the size of stamping head to 20 mm

Measures

Adjusting the thickness of stamping head from 30 mm to 20 mm

Achieved results

1. Reduced use of aluminium for injection
2. Reduced production costs
3. Reduced aluminium scrap to be re-melted

In economic terms

Net saving: 2,878,854 Baht/year
Investment: -
Payback Period : immediate

In environmental terms

- 1.Reduced amount of aluminum scrap in the injection process by 73,462 kg/year
- 2.Reduced LPG consumption in the process of melting aluminum waste by
(73,462kg/year/8.6 kg = 8,542 kg/year)
- 3.Reduced GHG emissions by 197.51 tCO₂e /year

On organizational development

1. Improvement of the standard for injection (Condition standard)
2. Reduced amount of aluminium used for injection per piece (0.36 kg/pcs)

On health and safety

Reduced risk of accidents caused by the re-melting of aluminium

Success Case TS Interseats Measure : reset spray robot

Causes

- Current mode of robot in paint spraying intervals and spray amount higher than required



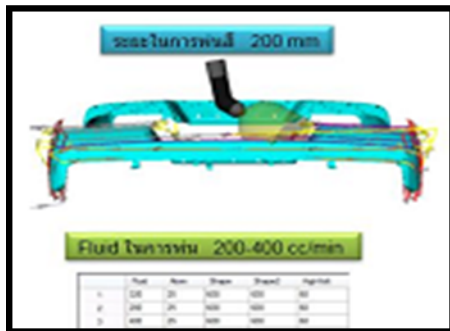
Problems

- 8,295.49 Kg/yr waste paint

Economic Advantages

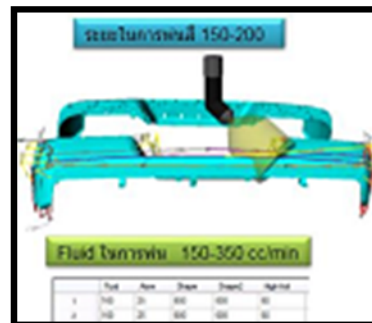
Net saving 3,857,101 Baht/yr
Investment - Baht
Payback Period Immediate Month

before



Velocity paint 1,300 mm/sec

after



Velocity paint 1,000 mm/sec

Environmental Advantages

- Less paint waste by 1,446.57 Kg/yr (17.44% decrease)
- Less elusive paint dust

Organizational Advantages

- Less work for cleaning and removing paint waste
- Awareness of resource efficiency
- Manual for setting up robot

Measure

- Set up practical mode for spray robot

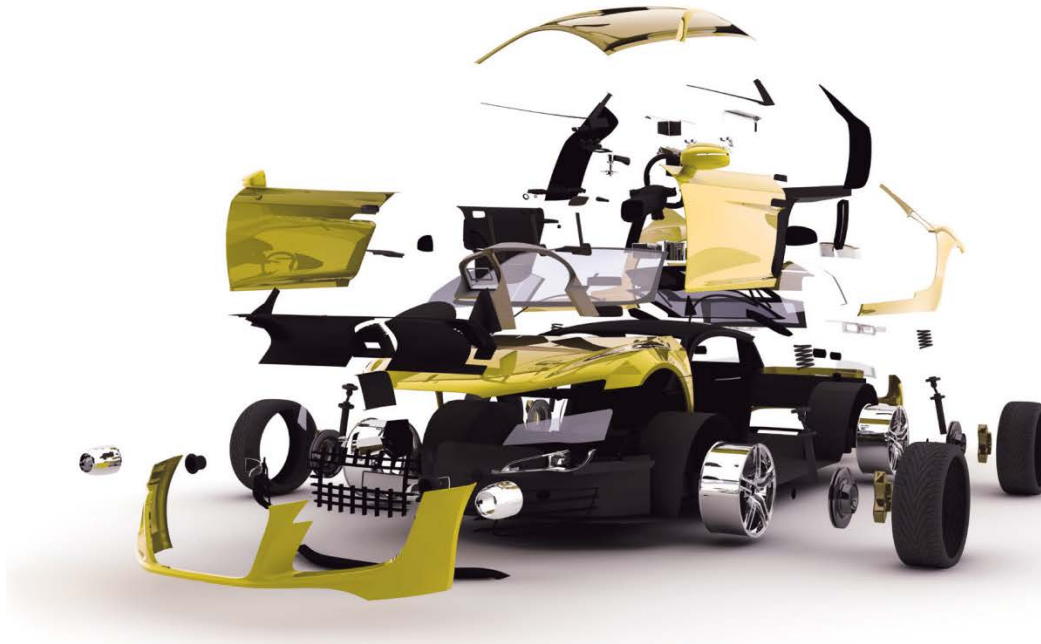


results

- less 1,446.57 kg/yr paint waste

Organizational Advantages

- Less exposure to waste paint smell and elusive paint dust



Thank You

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