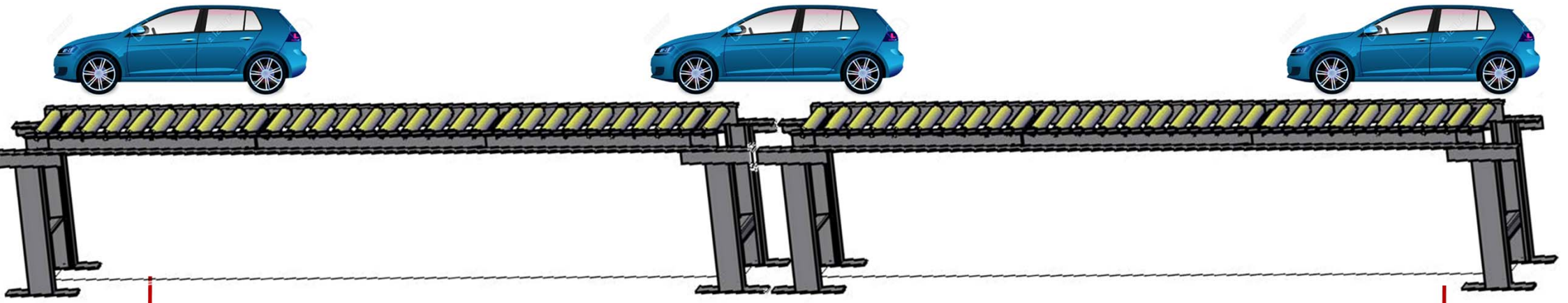

EVALUATION OF THE SOLID AND HAZARDOUS WASTES GENERATED BY THE AUTOMOTIVE INDUSTRY IN TURKEY

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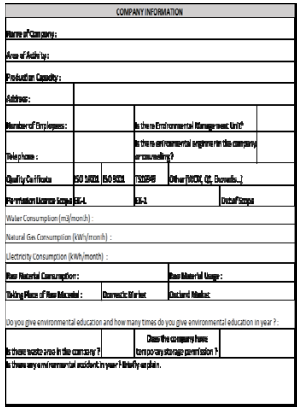
6. ***CONCLUSIONS***

Purpose & Methods

To quantify

the amount of solid and hazardous waste generated by the supplier companies and main industry


COMPANY INFORMATION

Name of Company :

Area of Activity :

Production Capacity :

Address :

Number of Employees :

Is there Environmental Management Unit?

Telephone :

Is there environmental engineer in the company, or consulting?

Quality Certificate ISO 14001 ISO 9001 TS16949 Other (HACCP, CE, Domestic...)

Fermentation Licence Scope EIA-4 EIA-3 Detail Scope

Water Consumption (m3/month) :

Natural Gas Consumption (KWh/month) :

Electricity Consumption (KWh/month) :

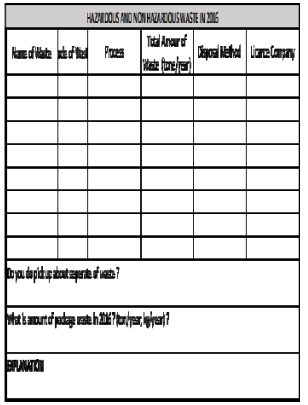
Raw Material Consumption : Raw Material Usage :

Taking Place of Raw Material : Domestic Market Outland Market

Do you give environmental education and how many times do you give environmental education in year ? :

Is there waste area in the company ? Does the company have temporary storage permission ?

Is there any environmental accident in year ? Briefly explain.


HAZARDOUS AND NON HAZARDOUS WASTE IN 2015

Name of Waste	Code of Waste	Process	Total Amount of Waste (tone/year)	Disposal Method	Licence Company

Do you do/do you about separate of waste ?

What is amount of package waste in 2015 ? (ton/year, kg/year) ?

EXPLANATION

To quantify

the amount of natural sources usage by the supplier companies and main industry

Methods

Interviews with automotive companies

To determine

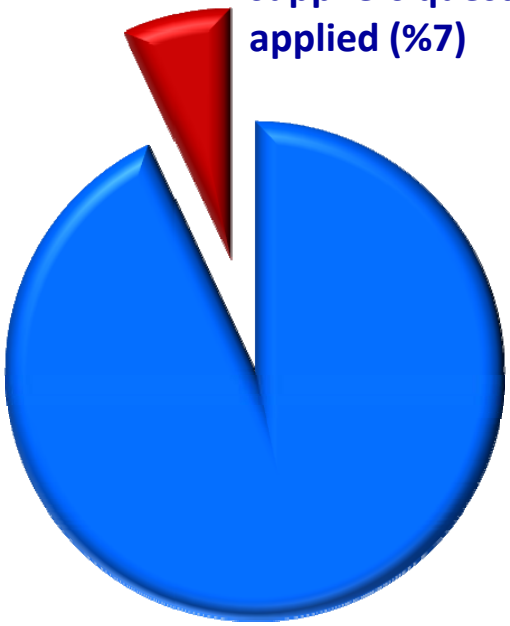
the types of solid and hazardous waste generated by automotive industry (suppliers & main)

Method

A survey via questionnaire

Materials & Methods

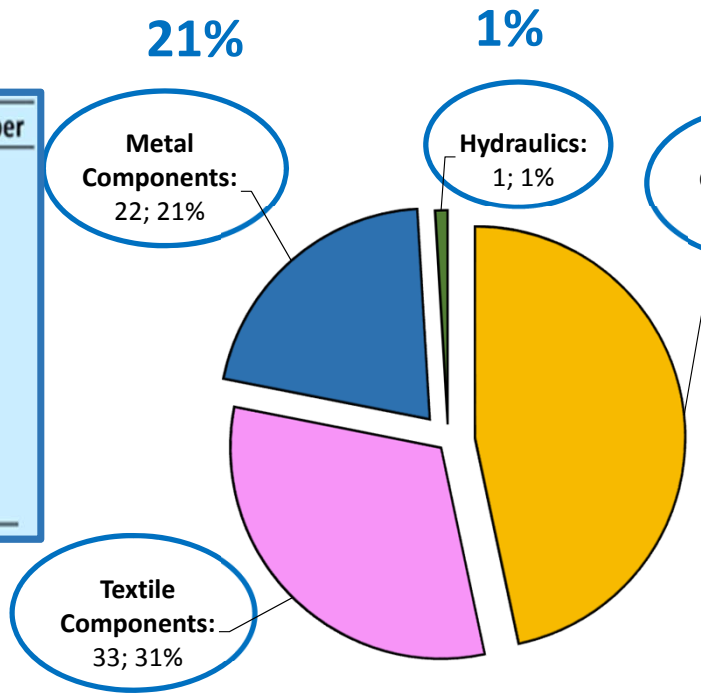
A survey was conducted.



Representative suppliers questionnaire applied (%7)

Total suppliers in Turkey (%93)

Component	Number
Seat framework	5
Armrest	2
Rear parcel shelf	5
Suspension bush	4
Suspension system	4
Chassis	1
Drive train	7
Door arms	5



Component	Number
Seat fabric	5
Seat cushion foam	15
Roof	1
Rear deck	1

Component	Number
Bumper	2
Interior, back, front illumination	3
Signal, head, stop lights	7
Torpedo	1
Door panel	4
Front bracket	1
Mud flap	4
Seat Belt	4
Sun visor	2
Rear view mirror	3
Trunk lock	5
Sigunit tank	2
Wiper	3
Floor mats	5
Brake , gas, clutch pedal	3

Components in the Car

PLASTIC COMPONENTS
- Bumper
- Door Panel
- Torpedo
- Rear Mirror
- Seat Belt
- Sun Visor

TEXTILE COMPONENTS
- Seat Fabric
- Seat Foam
- Roof
- Hood

METAL COMPONENTS
- Drive Train
- Structure
- Shelf

Raw Material Usage by Automotive Industry

Cold - rolled
Materials
Steel Tube
Round Steel
Flat Steel
Aluminium Pipe
Alüminium Plate
Rubber
Plastic Parts
Hot - rolled
Materials
Iron Pipe
Line Shaft
Composite tan
Composite Screw

METAL RAW MATERIALS

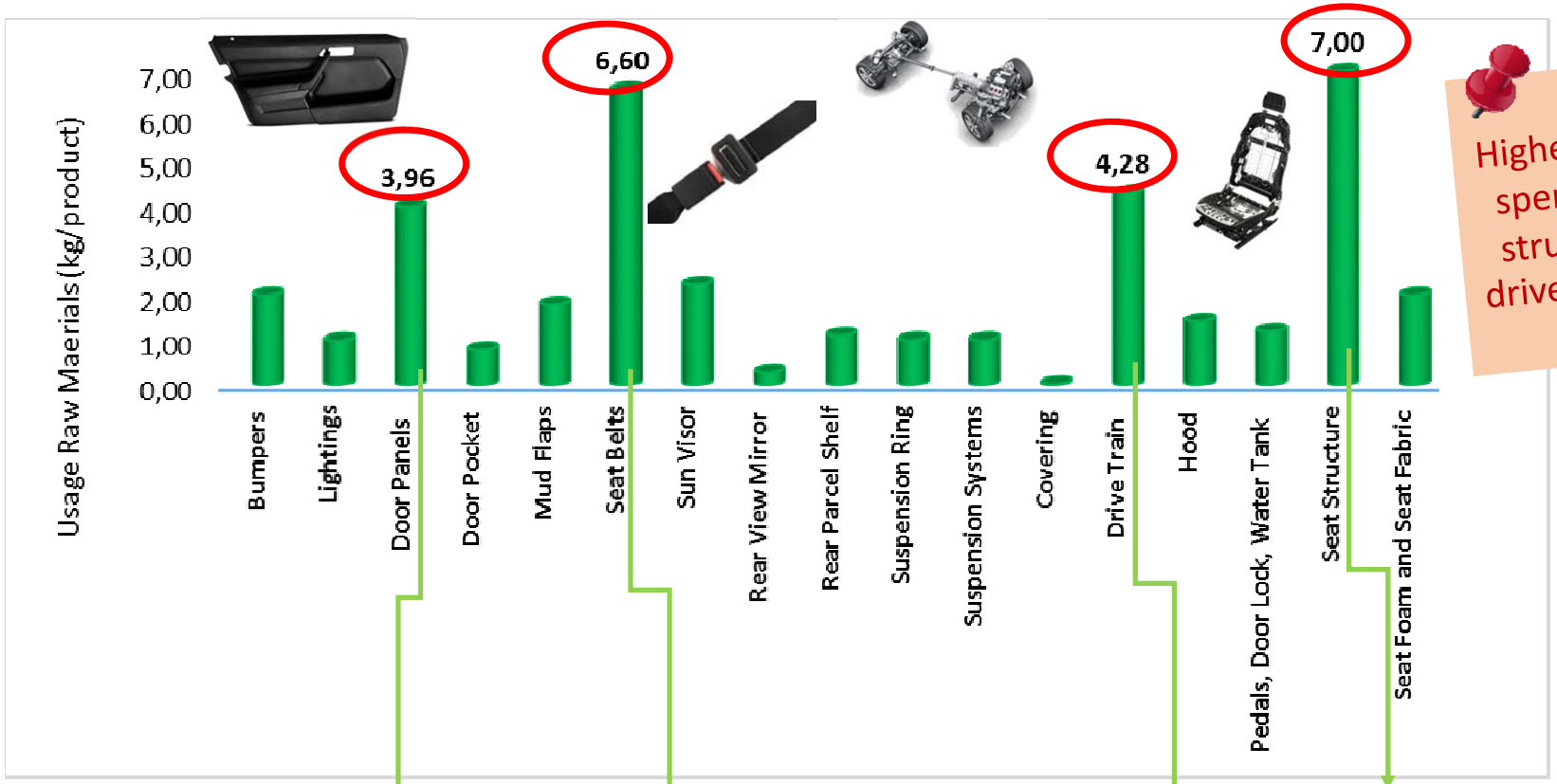
Staple Sliver
Rigid Foam
Glue
Solvent
Woodstock Plate
Felting
Isocyanate
Poliol

TEXTILE RAW MATERIALS

PE-Foam
PVC Plate
Polypropylene
Polyamide
ABS
Polyethylene

PLASTIC RAW MATERIALS

Raw Material Usage by Automotive Supplier Companies



Highest amount of raw material is spent for the production of seat structure, seat belt, followed by drive train and finally door panels.

RAW MATERIAL PLASTIC

RAW MATERIAL TEXTILE

RAW MATERIAL METAL

Raw Material Usage by Automotive Supplier Companies

Cold - rolled Materials
Steel Tube
Round Steel
Flat Steel
Aluminium Pipe
Alüminium Plate
Rubber
Plastic Parts
Hot - rolled Materials
Iron Pipe
Line Shaft
Composite tan
Composite Screw

1- SEAT STRUCTURE

Staple Sliver
Rigid Foam
Glue
Solvent
Woodstock
Plate
Felting
Isocyanate
Poliol

2- SEAT BELT

3- DRIVE TRAIN

PE-Foam
PVC Plate
Polypropyle
ne
Polyamide
ABS
Polyethylene

4- DOOR PANEL

Raw Material Usage by Automotive Main Industry

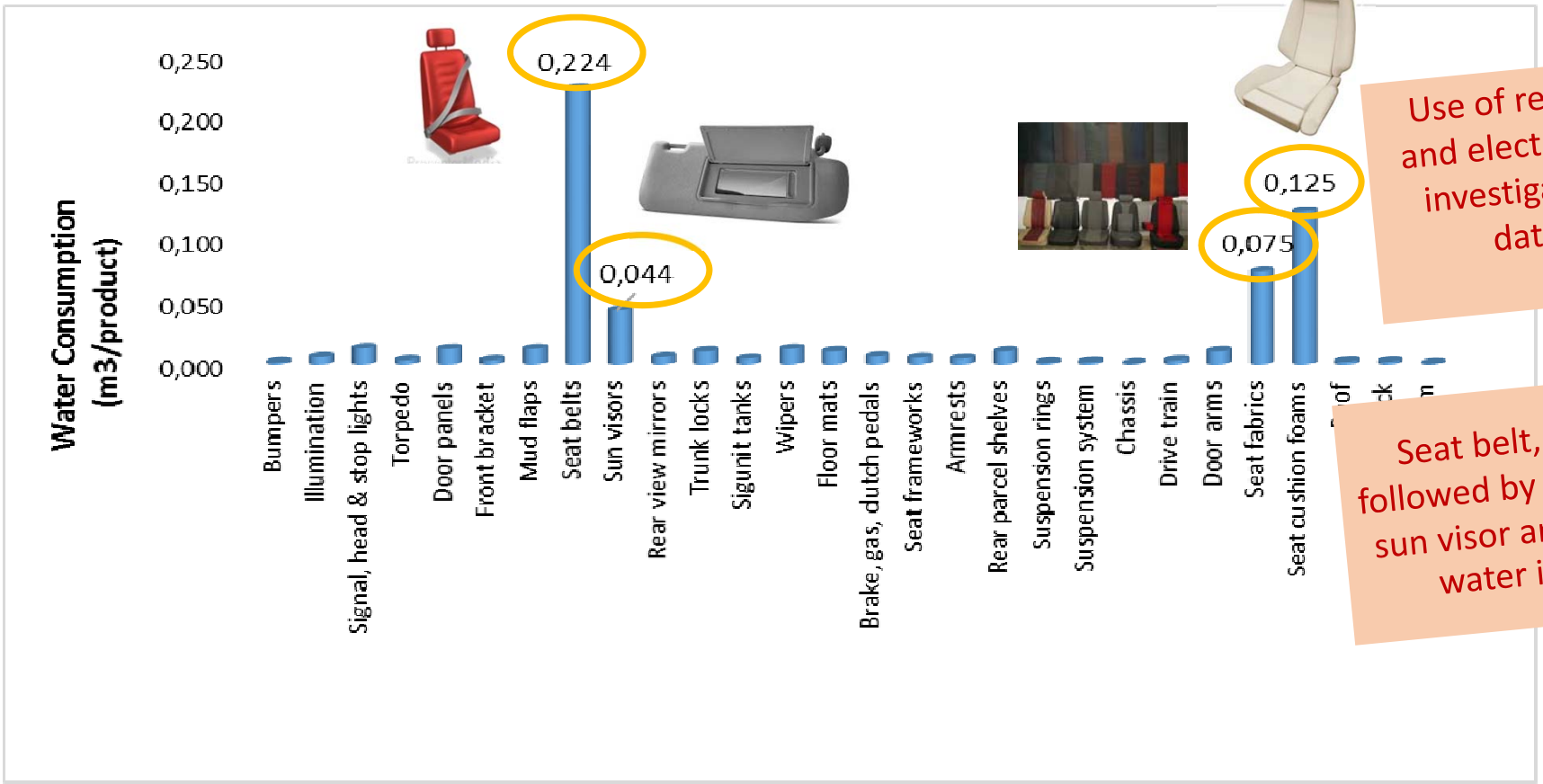
SEMI FINISHED PRODUCT

Chemicals
Fuel Tanks
Oil Drums
Compressed Gas Cylinders
Solvents

800 chemicals

Resource Usage By The Automotive Suppliers Companies

Water Consumption

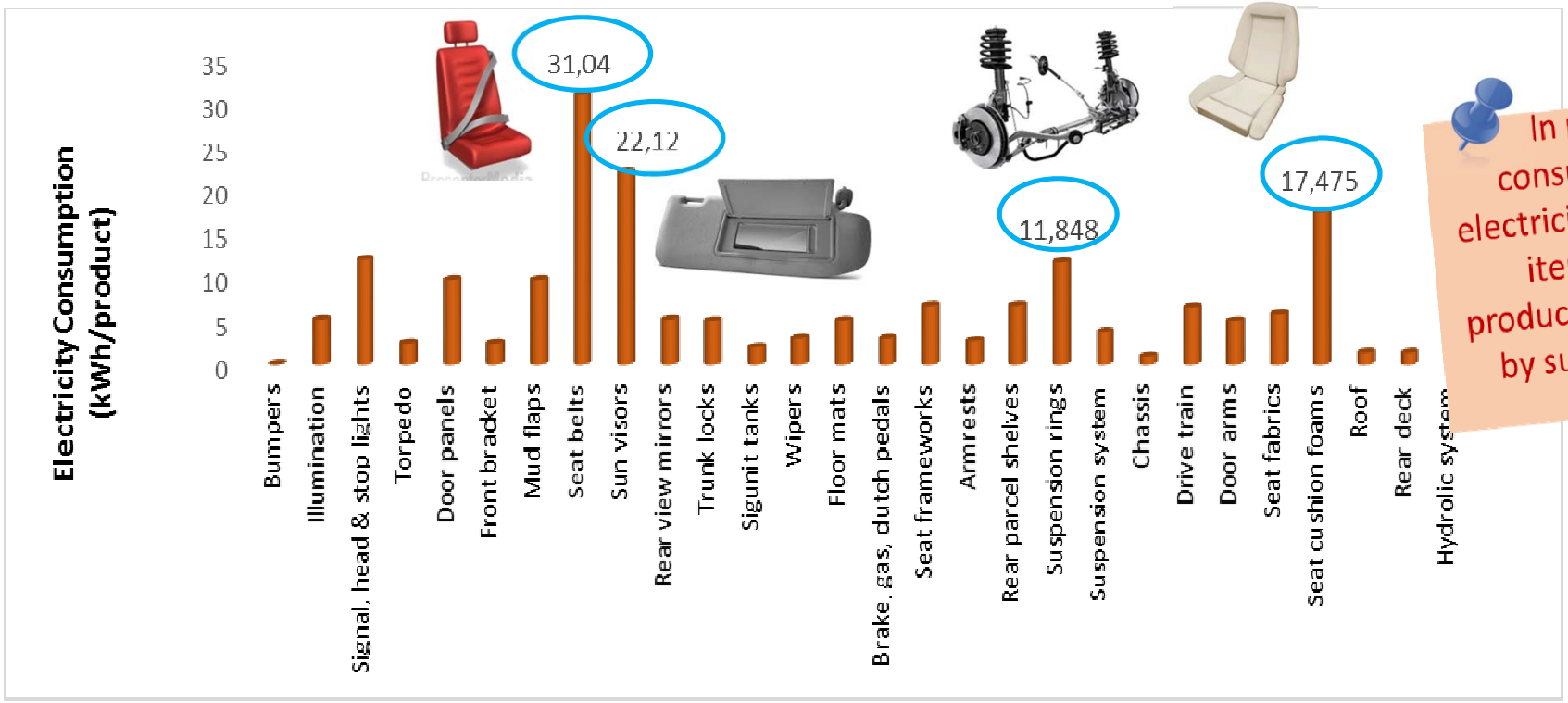


Use of resources such as water and electricity consumption was investigated by evaluating the data collected via the questionnaire

Seat belt, seat cushion foam, followed by seat fabrics and finally sun visor are the products where water is consumed most.

Resource Usage By The Automotive Suppliers Companies

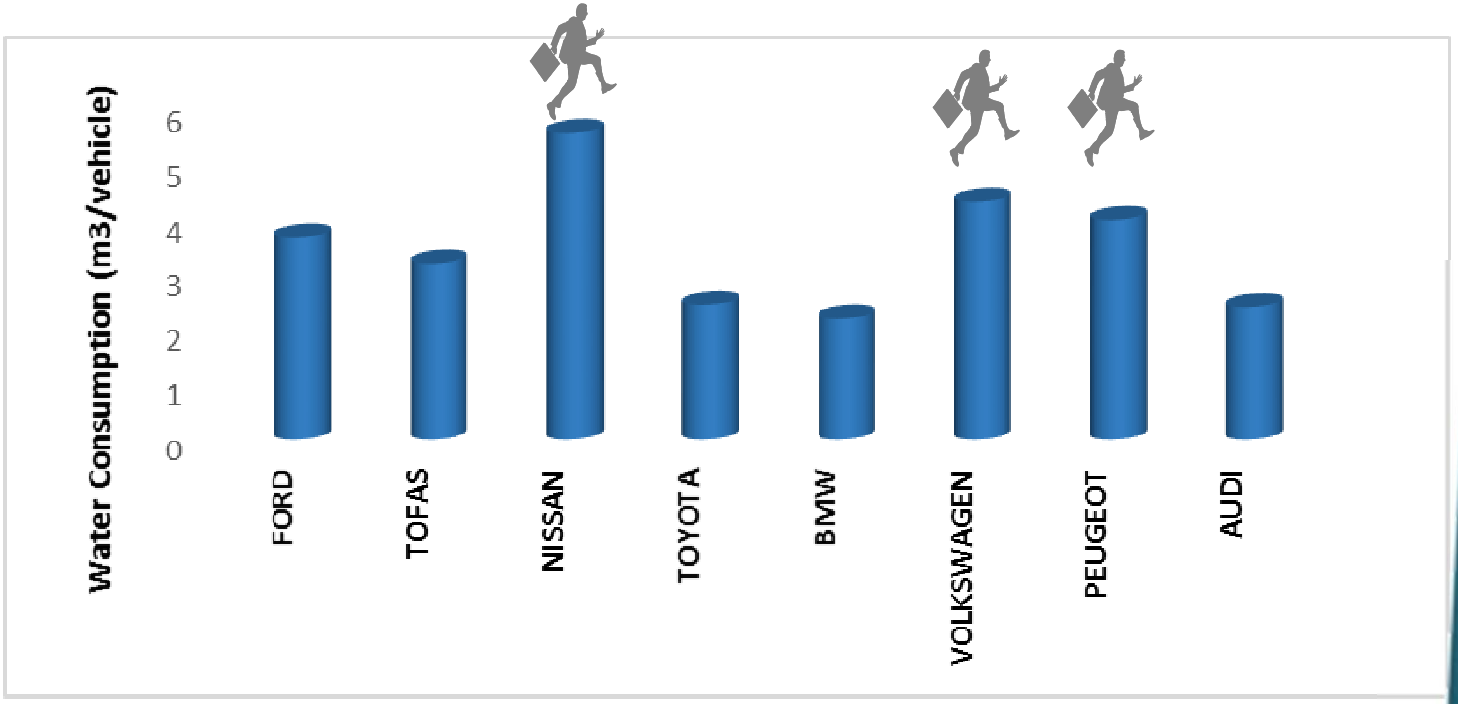
Electricity Consumption



In parallel to the water consumption levels, highest electricity consumption among all items were found for the production of seat belts, followed by sun visor, and seat fabric & foam.

Resource Usage By Automotive Main Industry

Water Consumption



5.57 m^3/vehicle.

4.33 m^3/vehicle.

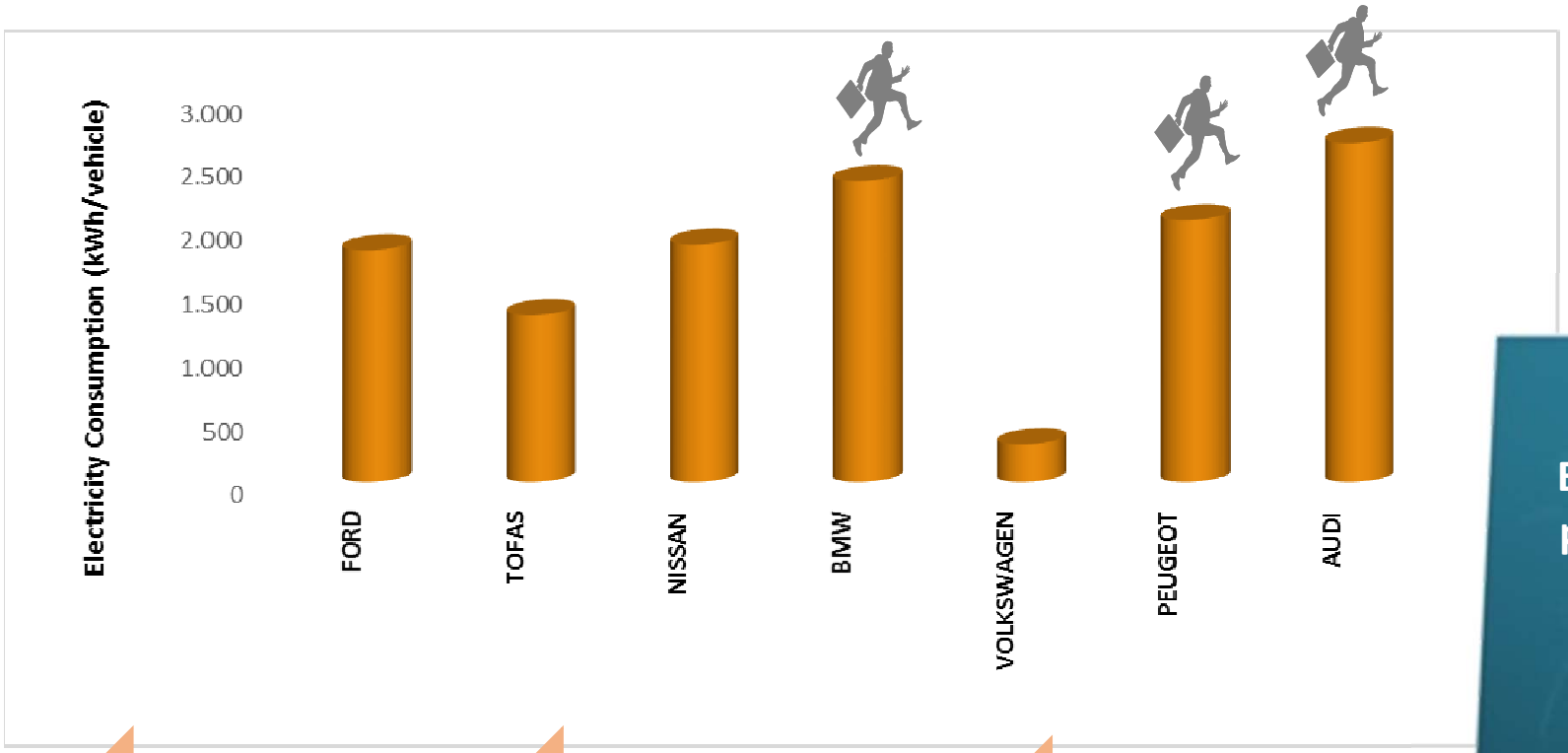
4.00 m^3/vehicle.

Data from the Sustainability Reports by the main industry.

Water usage during the production ranges between 2.18-5.57 m^3/vehicle.

Resource Usage By Automotive Main Industry

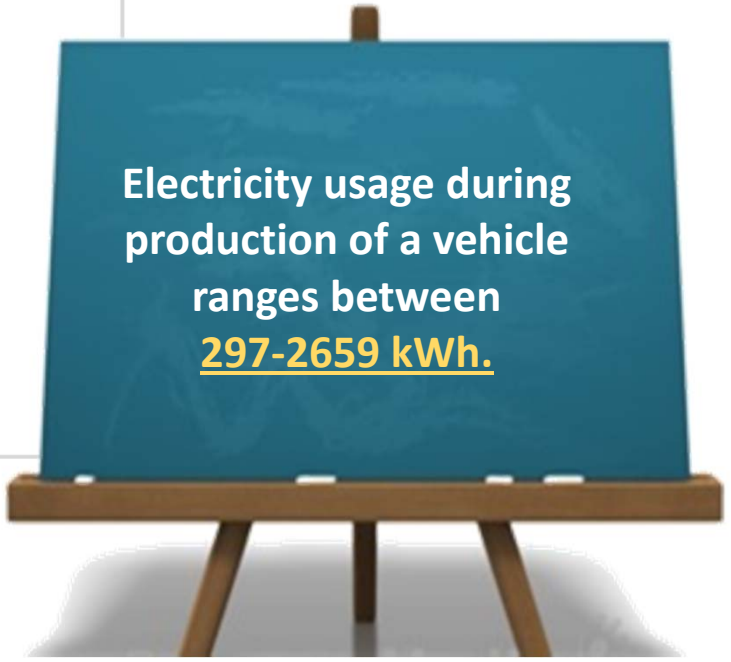
Electricity Consumption



2359 kWh/vehicle

2050 kWh/vehicle

2650 kWh/vehicle



Waste Generated by the Automotive Supplier Companies & Main Industry

DISTRIBUTION OF THE WASTES SUPPLIERS COMPANIES

45%

Waste by Plastics Industry

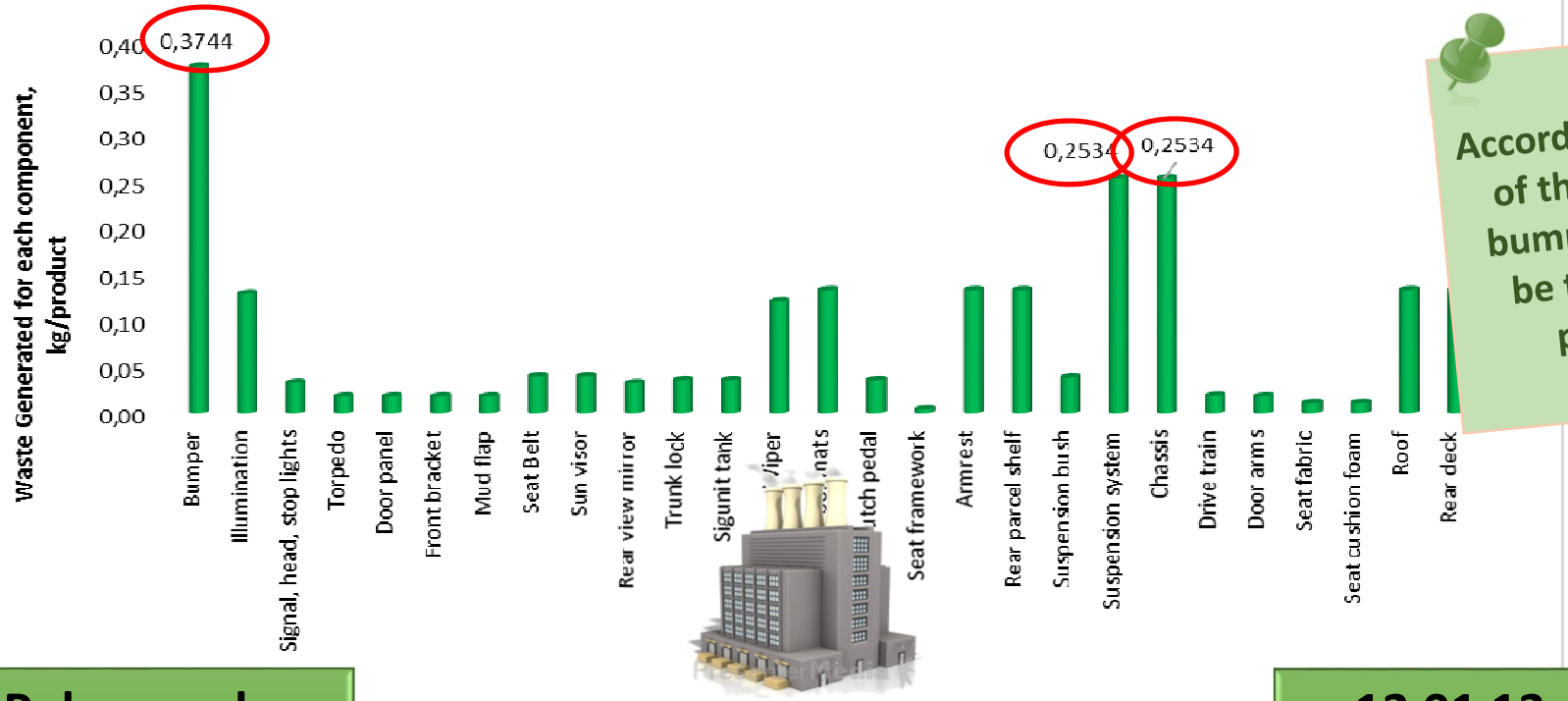
28%

Waste by Textile Industry

26%

Waste by Metal Industry

Waste Generated by the Automotive Supplier Companies – Total Waste

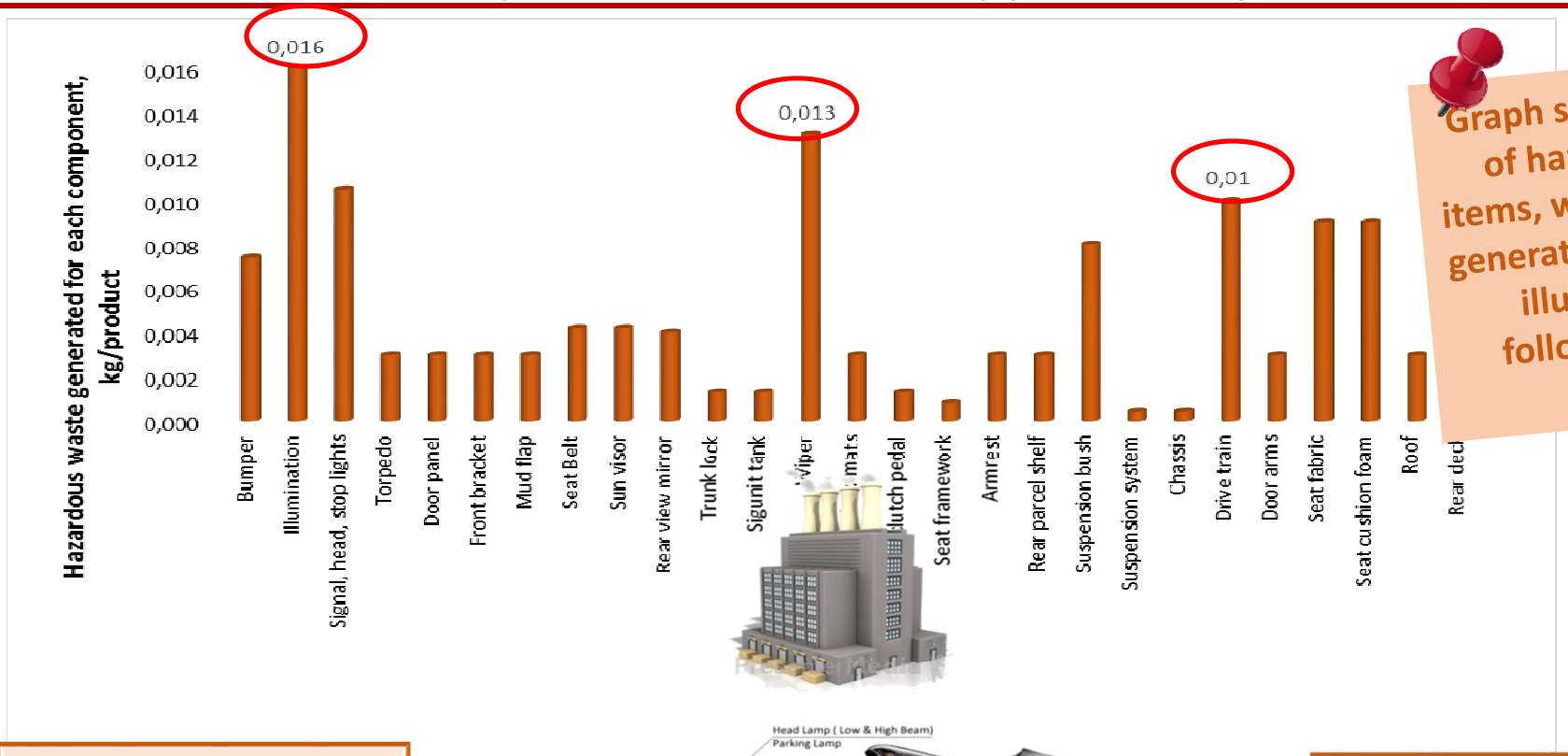


According to the graph, the amount of the solid waste generated for bumper production was found to be the highest among all items produced by the suppliers

- **Polypropylene**
- **Polyamide**
- **ABS**
- **Polyethylene**

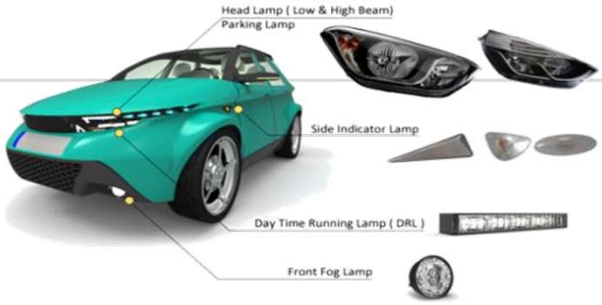
- **13 01 13**
- **15 01 02**
- **07 02 13**
- **03 01 05**

Waste Generated by the Automotive Supplier Companies – Hazardous Waste



Graph shows that highest amount of hazardous waste among all items, which is 0.016 kg/product, is generated during the production of illumination items which is followed by wipers and wiper system.

- **Rear View Mirror**
- **Polypropylen**
- **Polyamide**
- **ABS**
- **Polyethylene**

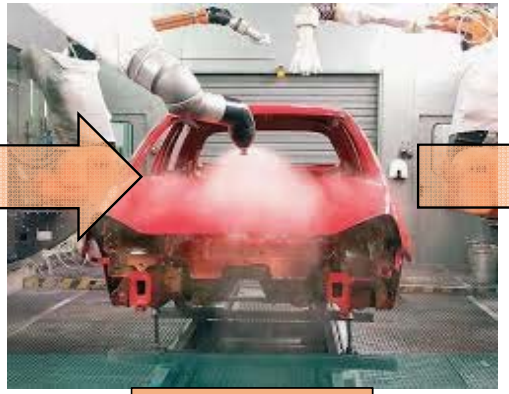


- **08 01 15**
- **08 01 11**
- **20 01 39**
- **20 01 35**
- **15 01 02**

Waste Generated by the Automotive Main Industry – Total Waste

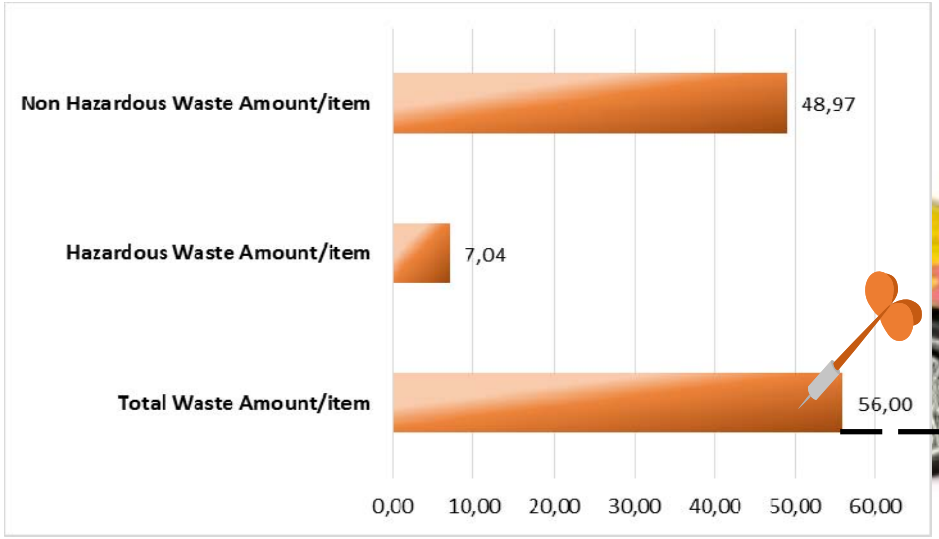
STAMPİNG

WELDİNG



PAINTING

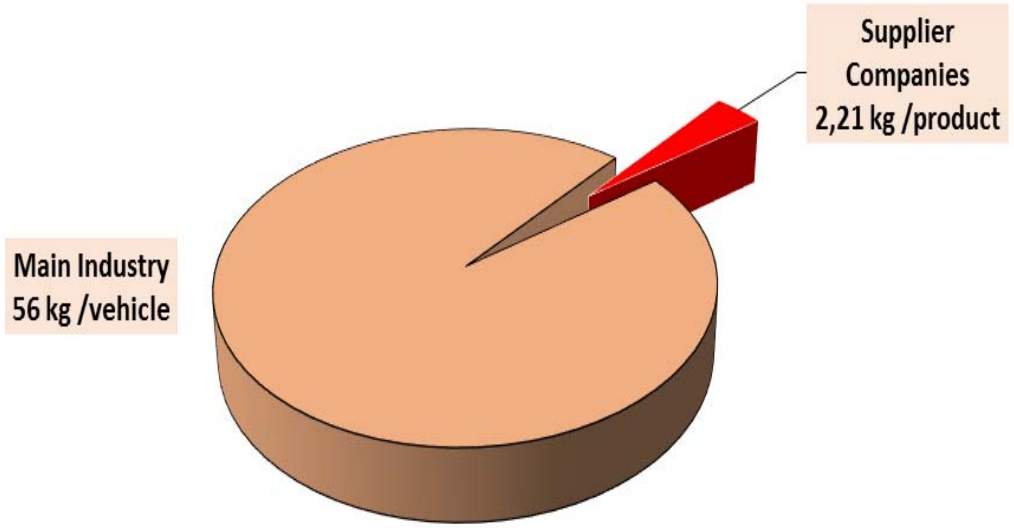
ASSEMBLY



56 kg/vehicle

Waste Generated by the Automotive Main Industry and Suppliers Companies

Total Waste



Total amount of waste generated during the stamping, welding, painting, and assembly processes by the automotive main industry amounts to 56 kg/vehicle.

Amount of total waste to Main Industry 12.5% is hazardous

In total, 62.3 kg/vehicle solid waste is generated for the production of a standard vehicle by supplier companies and the main industry.

Approximately 10% of the total solid waste is generated by the supplier companies.

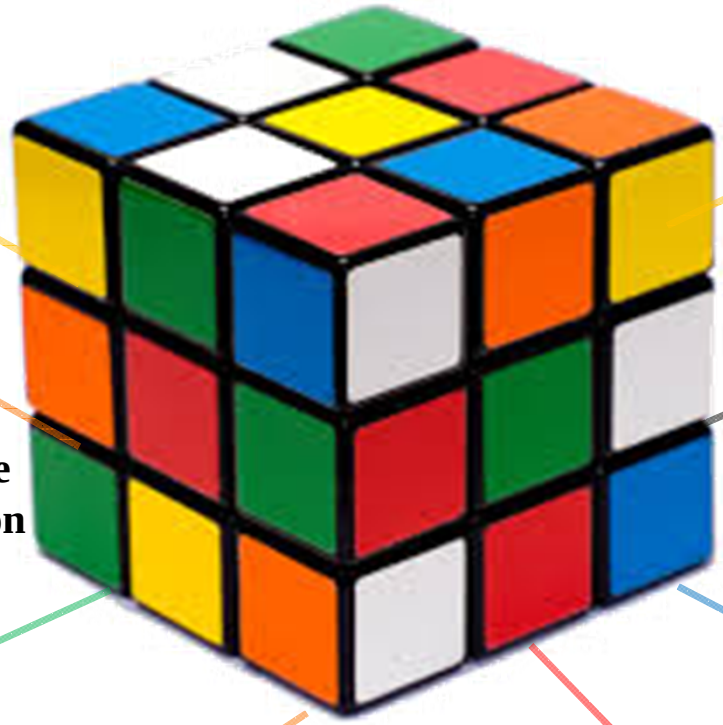
Conclusions

Automobile engine, which is not produced in Turkey, is excluded from the boundaries of this study.

Approximately, 840,000 vehicles/year are produced in Turkey.

The total amount of solid waste produced during the production of these vehicles will be 52,340 tonnes.

The number and amount of the chemicals used by the main industry excessive.



Water usage by the automotive sector amounts to 3.42 million m^3/year

Electricity consumption is about 1,640,520 MWh.

800 tons/year chemicals is consumed by an automotive manufacturer (main industry) that produces 400,000 vehicles/year.

Automotive main industry is the predominant source of waste.

Raw material usage and waste generation by the supplier companies showed that these two parameters are not proportional.

Conclusions

Water Consumption by the Supplier Companies
0.60 m3/vehicle

Hazardous Waste Generation by the Supplier Companies
0.60 kg/vehicle

Water Consumption by the Main Industry
3.47 m3/vehicle

Hazardous Waste Generation by the Main Industry
7.04 kg/vehicle

Electricity Consumption by the Main Industry
1763 kWh/vehicle

Non-Hazardous Waste Generation by the Main Industry
48.97 kg/vehicle

Electricity Consumption by the Supplier Companies
190 kWh/vehicle

Non-Hazardous Waste Generation by the Supplier Companies
5.71 kg /vehicle


Thank You