



# AUTOMOTIVE LIGHTING SYSTEMS EVOLUTION TOWARDS THE AUTONOMOUS VEHICLE

# OVERVIEW OF VALEO GROUP

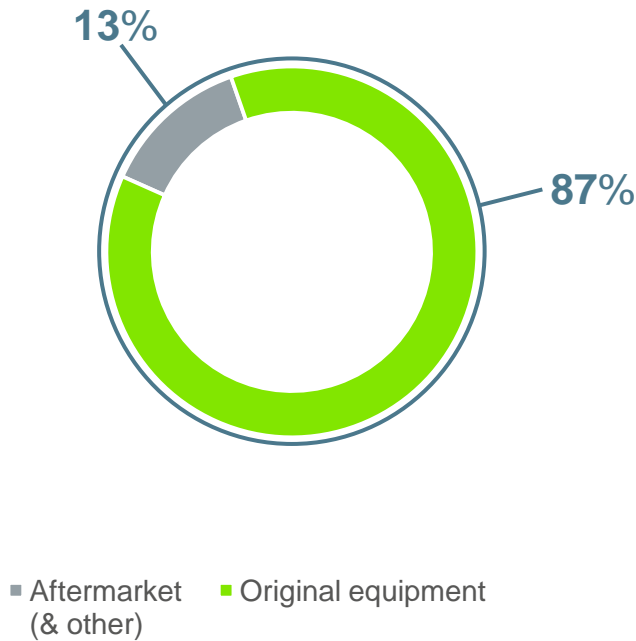
# VALEO IN THE AUTOMOTIVE VALUE CHAIN



\*Source CLEPA

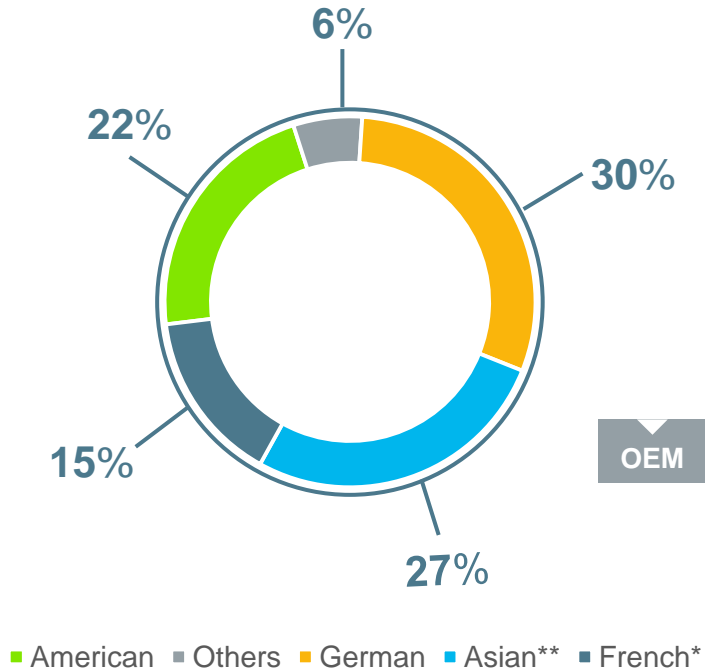
# A WELL-BALANCED CUSTOMER BASE

► 16.5 BN € SALES <sup>(1)</sup>



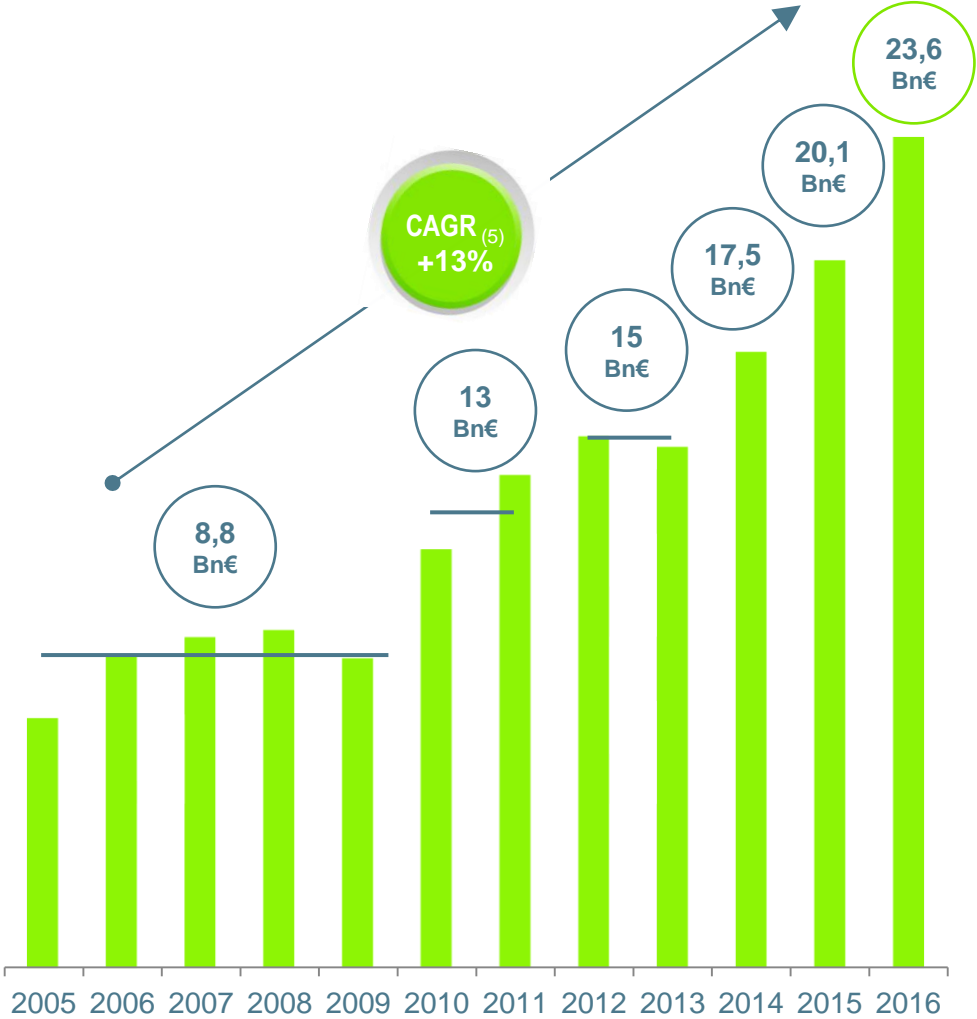
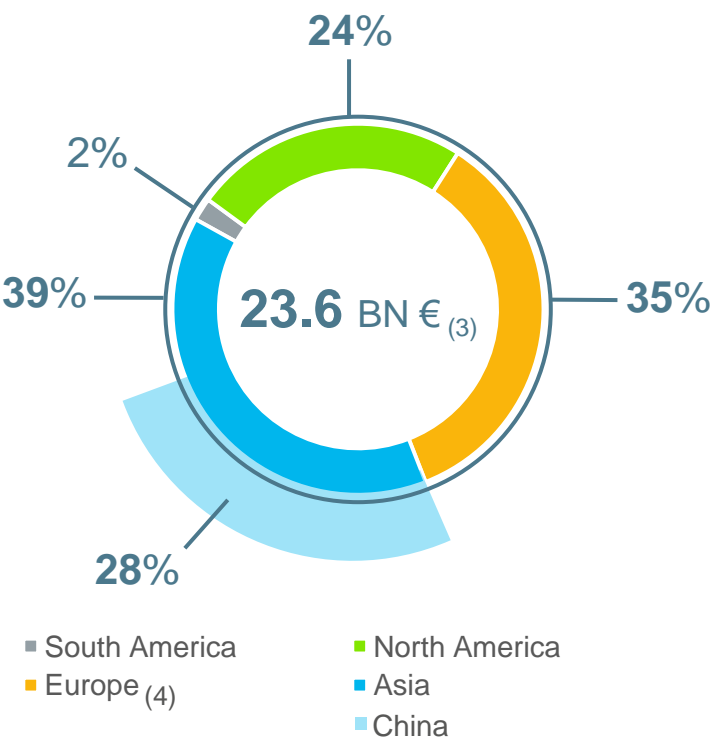
<sup>(1)</sup> At end 2016

► % OF 2016 OEM SALES



\* Excluding Nissan  
\*\* Including Nissan

# ORDER INTAKE<sub>(1)</sub> FUELLED BY INNOVATIONS<sub>(2)</sub>

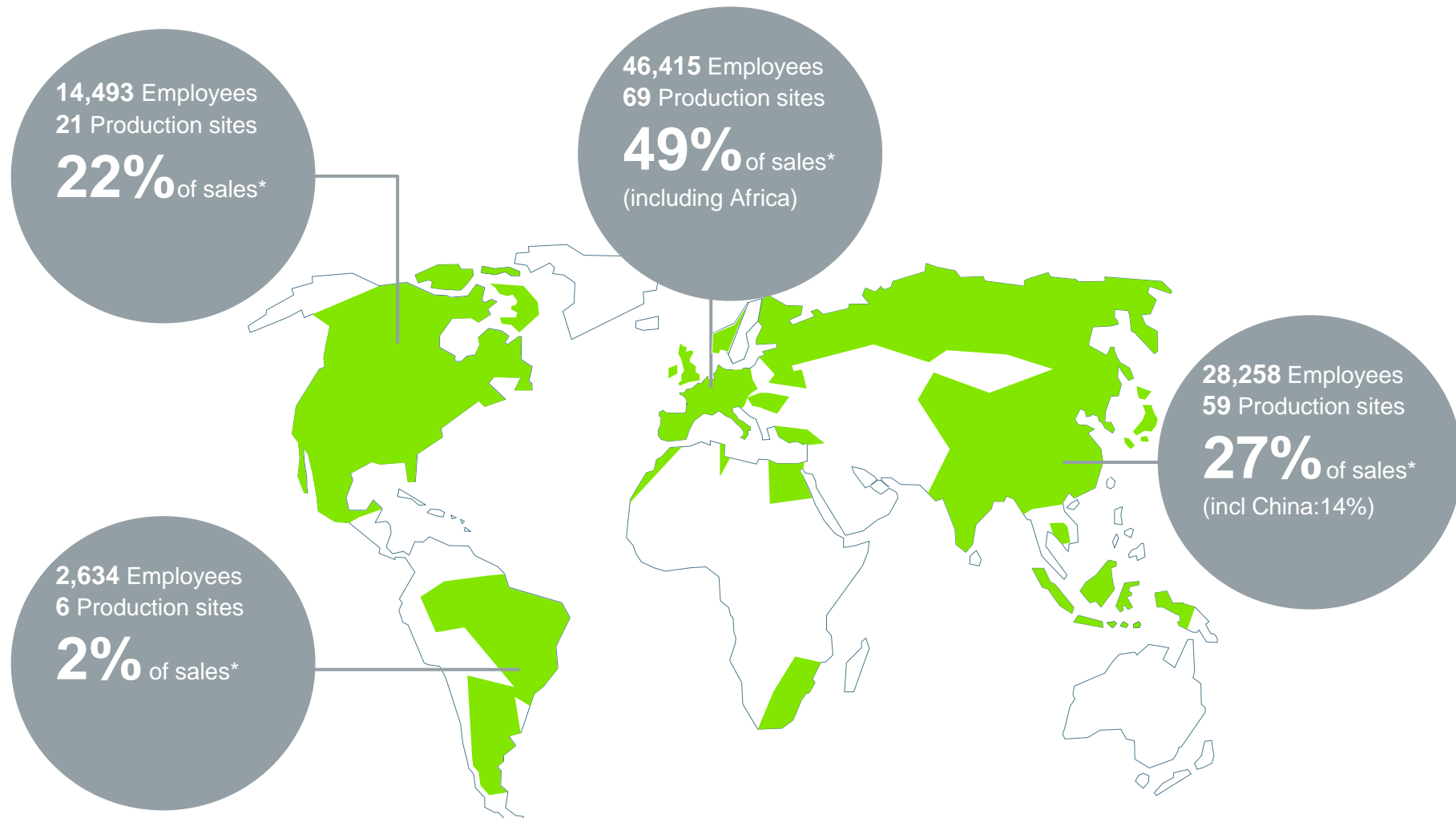


(1) Excluding Access Mechanisms business from 2005 to 2013 and including joint ventures consolidated proportionally  
(2) Products and technologies in series production for less than 3 years  
(3) Order intake in 2016  
(4) Including Africa  
(5) Reference 2008 (average 2005-2009) >2016

# KEY FIGURES 2016

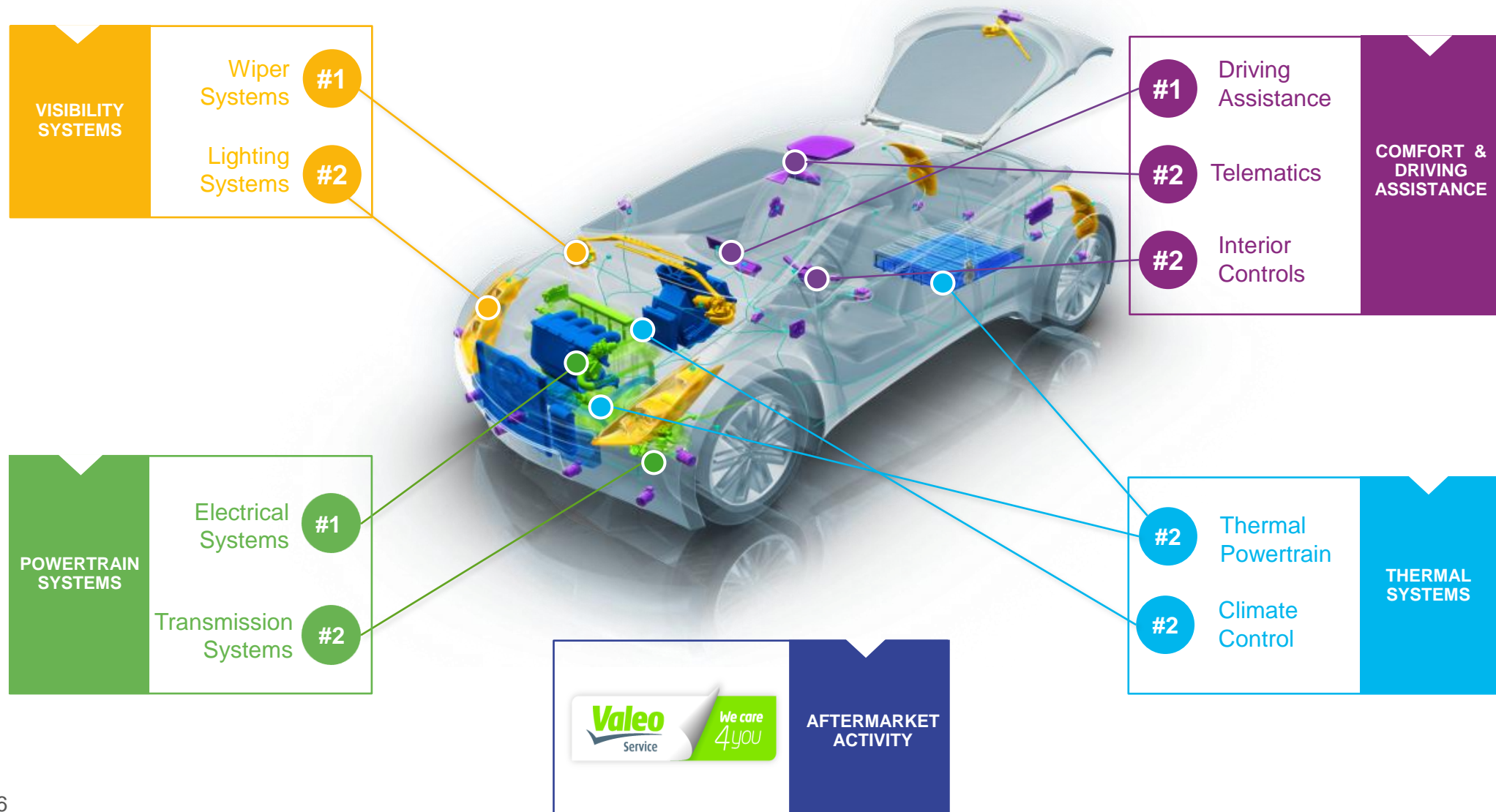


# A BALANCED WORLDWIDE PRESENCE



\* In % of OEM sales at end 2016

# VALEO, A WORLD LEADER IN EACH BUSINESS



end 2016

# VALEO'S STRATEGY - BASED ON 2 PRIORITIES



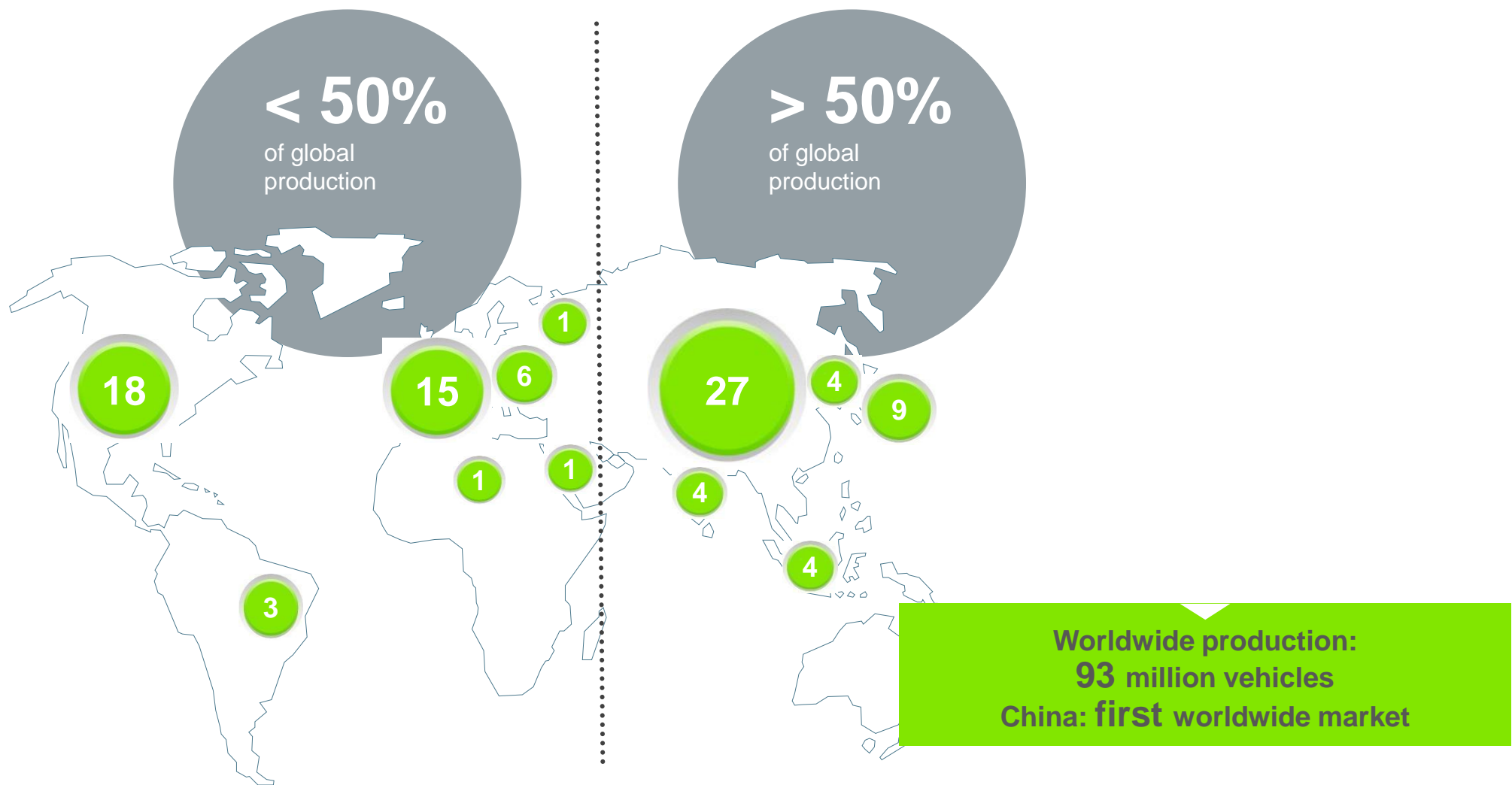
**CO<sub>2</sub> emissions reduction and intuitive driving**



**Development in Asia and high growth potential regions**

**With the ambition to generate growth higher than the market in each production region**

# AUTOMOTIVE PRODUCTION: 2016 GEOGRAPHICAL BREAKDOWN

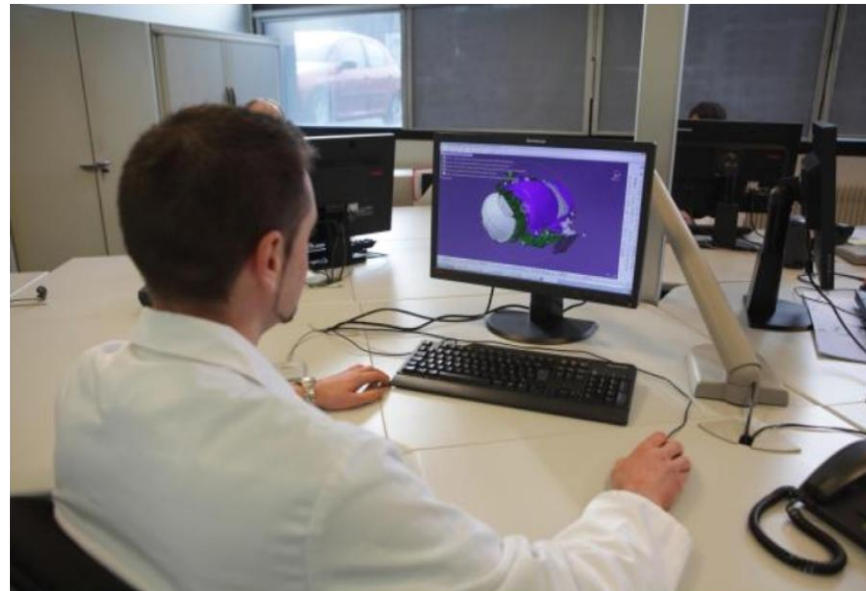


# VISIBILITY SYSTEMS

## Key Figures\*

**€4.6** billion Sales  
**28%** of Group total  
**29,000** Employees

**37** Production units  
**15** Development centers  
**5** Research centers





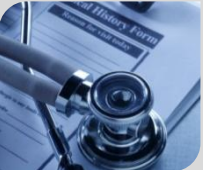







\*end of December 2016











# MEGATRENDS IN AUTOMOTIVE

# GLOBAL MEGATRENDS

	<b>POPULATION</b>		<b>SCARCITY OF RESOURCES</b>
	<b>SOCIETY</b>		<b>POWER OF TECHNOLOGY</b>
	<b>HEALTH</b>		<b>CONNECTED LIVING &amp; DIGITAL WORLD</b>
	<b>URBANISATION</b>		<b>ECONOMY &amp; POLITICS</b>
	<b>CLIMATE CHANGE</b>		<b>BUSINESS &amp; WORK</b>

# AUTOMOTIVE TRENDS OVERVIEW

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	<b>MOBILITY</b>		<b>TRAFFIC DENSITY</b>
	<b>AUTOMATED &amp; CONNECTED CAR</b>		<b>GREEN CARS &amp; ENERGY EFFICIENCY</b>
	<b>CONSUMER BEHAVIORS</b>		<b>CAR SEGMENTS</b>
	<b>NEW PARADIGMS</b>		<b>EMOTIONS</b>

# DEVELOPED MARKETS / EMERGING MARKETS

## Developed Markets

### • AGEING POPULATION

### • HIGH PURCHASE POWER

### • LIMITED ECONOMIC GROWTH (<2%)

### • SATURATION OF EXISTING CITIES

### • LAND-USE PLANNINGS: BETTER USE OF CURRENT ASSETS

## Emerging Markets

### • GROWING POPULATION AFRICA AND ASIA

### • ECONOMIC GROWTH (~7/8%)

### • RISING MIDDLE-CLASS

### • EMERGENCE MEGACITIES

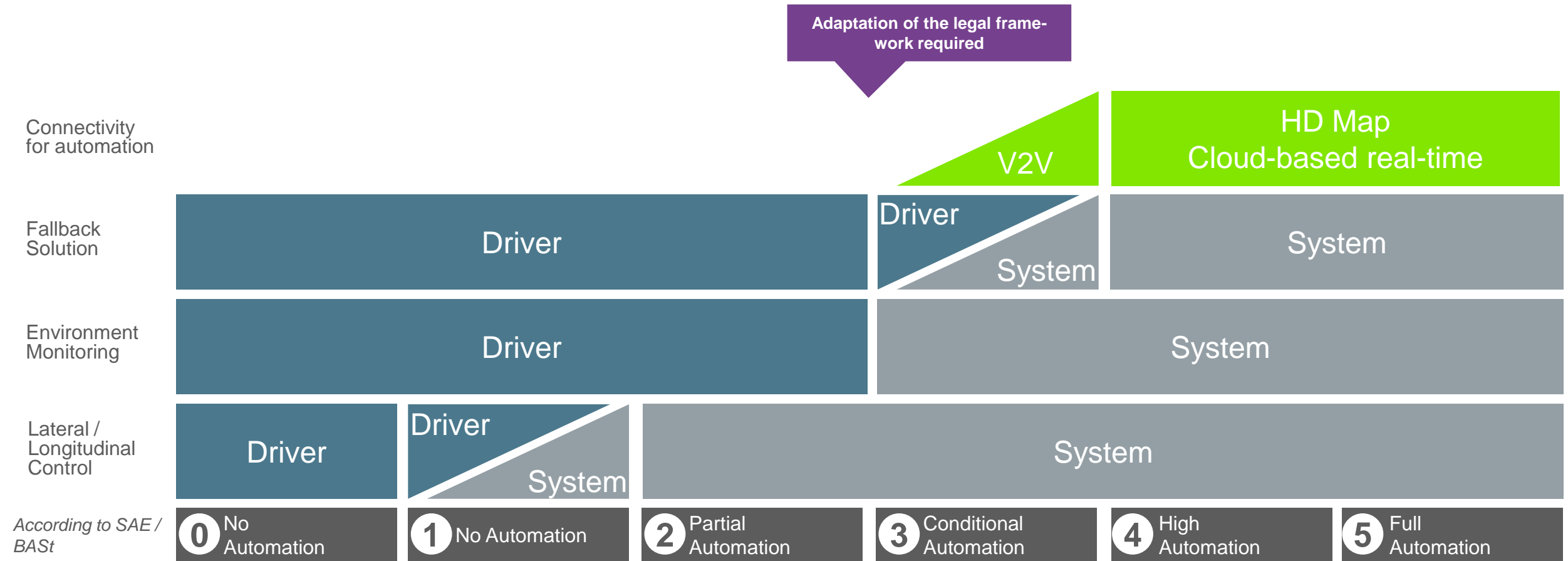
### • DEMAND FOR INFRASTRUCTURE AND TRANSPORTATION



DEVELOPED AND EMERGING MARKETS FACING DIFFERENT CHALLENGES

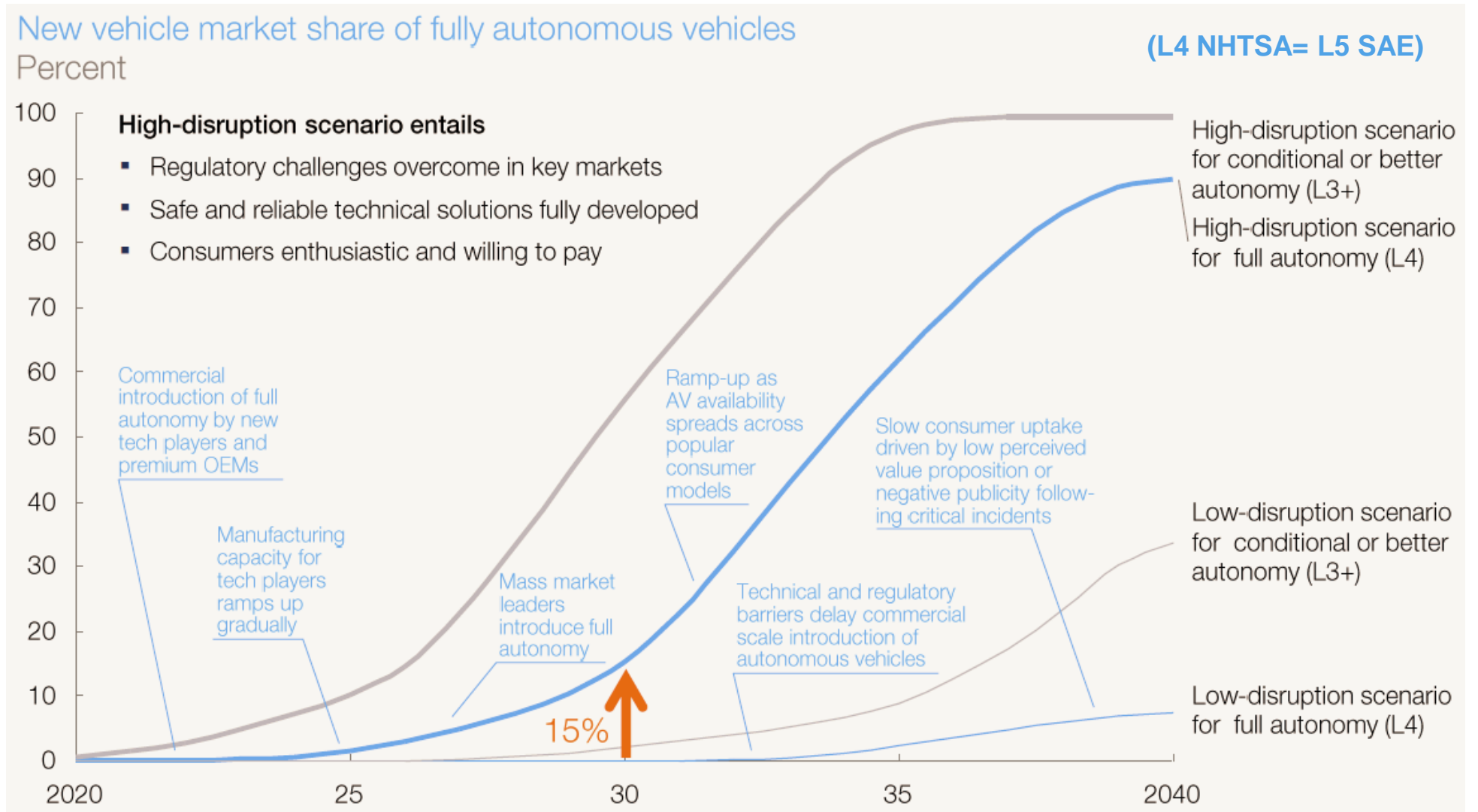
# AUTONOMOUS VEHICLE EVOLUTION

# DRIVING AUTOMATION TREND



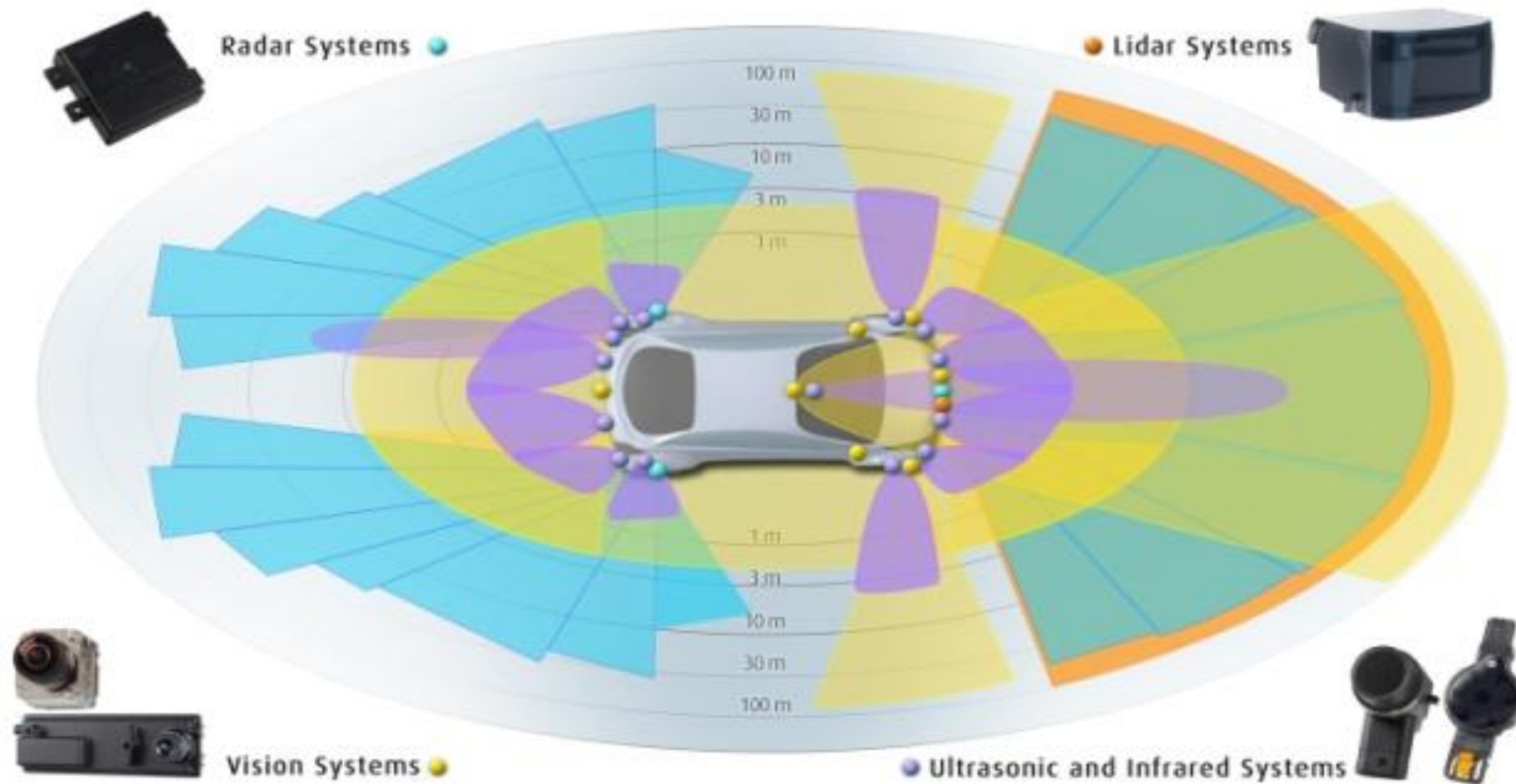
From Driving Assistance towards Autonomous Vehicle

# CAR AUTOMATION FORECASTS







SOURCE: McKinsey

# AUTOMATED CAR: SENSOR CATEGORIES



# DISRUPTIVE TRENDS

4 TRENDS	HIGH DISRUPTION HYPOTHESIS*
 ELECTRIFIED	<ul style="list-style-type: none"><li>• 50% of electric vehicles in 2030</li></ul>
 AUTONOMOUS	<ul style="list-style-type: none"><li>• 15% of fully autonomous vehicles in 2030</li></ul>
 SHARED	<ul style="list-style-type: none"><li>• 10 millions shared vehicles in 2030</li><li>• - 23 millions owned vehicles</li></ul>
 CONNECTED	<ul style="list-style-type: none"><li>• a \$1.5 trillion new market in 2030</li></ul>

\* McKinsey | Automotive revolution – perspective towards 2030

# DRIVING STRENGTHS FOR LIGHTING

# VALEO VISIBILITY SYSTEMS MISSION & PROFILE

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## Augmented Visibility

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### THE TASK OF DRIVING



- ▶ Provide systems to see ahead and be seen, in all conditions.

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### THE EXPERIENCE OF TRAVELING

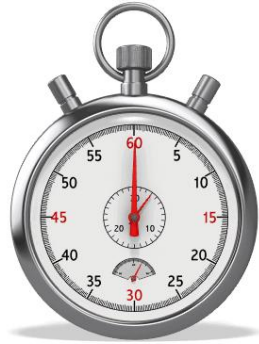
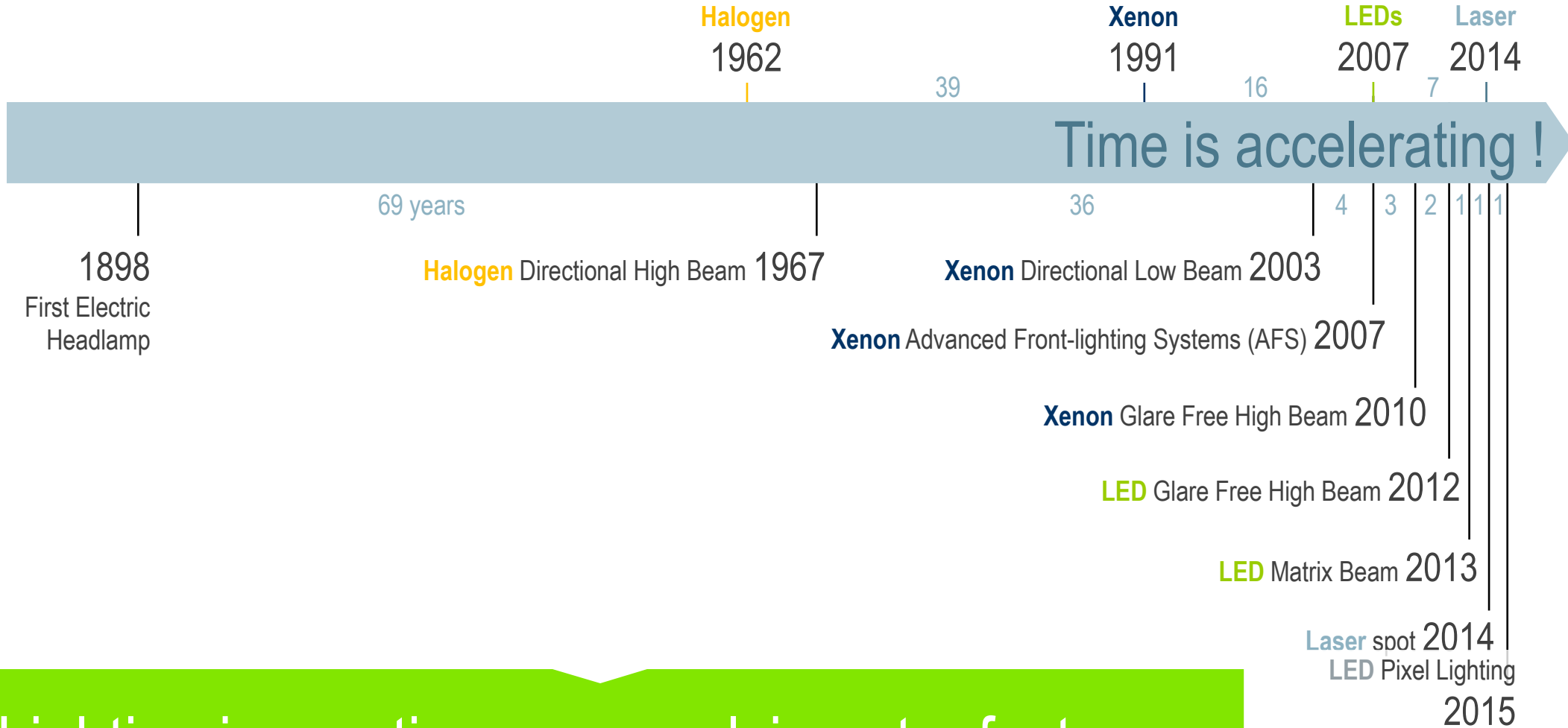


- ▶ Make the use of the car an easy and relaxing ride



- ▶ Allow sensors to see in all conditions, for self-driving cars.

# A BRIEF HISTORY OF FRONT LIGHTING



Lighting innovations are evolving at a fast pace

# VALEO LIGHTING SYSTEMS PRODUCT PORTFOLIO

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## FRONT LIGHTING

- Main headlamps
- Fog lamps and Auxiliary lamps
- Daytime Running lamps



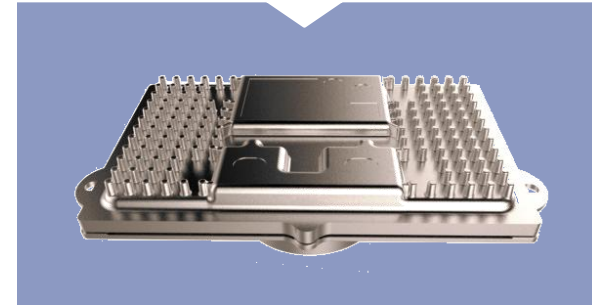
## REAR LIGHTING

- Rear combi lamps
- Central stop lamps
- Small signaling lamps



## INTERIOR LIGHTING

- Ambient lighting
- Intuitive lighting
- Connectivity



## ELECTRONICS

- Control Units
- RGB modules
- LED Assembly Group

# VALEO LIGHTING SYSTEMS MISSION

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**Style**



**Safety**



**Environment**

# VALEO LIGHTING SYSTEMS DRIVERS OF INNOVATION

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## Style

Valeo invent solutions for a differentiated brand signature

**Styling and design of the exterior lighting has become a major differentiation factor in the car branding (Face Strategy)**

**Approximately 25% of the appearance of a new car model is affected by the lighting systems**

Oliver Wyman

**Valeo stylists help OEM stylists and Valeo R&D to focus on the right technology to achieve the right design**

**Appealing Lighting Systems make cars**

# BMW 4-SERIES

## LED GLARE-FREE HIGH BEAM HEADLIGHT

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# AUDI Q5

## HOMOGENENOUS 3D TAIL LAMP

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# BUGATTI CHIRON

## HIGH PERFORMANCE FULL LED HEADLIGHT

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# BUGATTI CHIRON

## FULL-WIDTH TAIL LIGHT WITH MASSIVE LIGHT GUIDE

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# CITROEN C6

## FULL LED HEADLIGHT WITH POWERFULLED40

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# DS 4S

## FULL LED HEADLIGHT WITH BILED GEN 2

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# PORSCHE 718 CAYMAN & BOXSTER

## FULL LED REAR LAMP WITH 3D HOMOGENEOUS TAIL

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# RANGE ROVER VELAR

## THIN LENS MATRIX BEAM & LASER SPOT HEADLIGHT

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# VOLVO S90

## LED GLARE-FREE HIGH BEAM HEADLIGHT WITH BEAMATIC® SAIL BEAM

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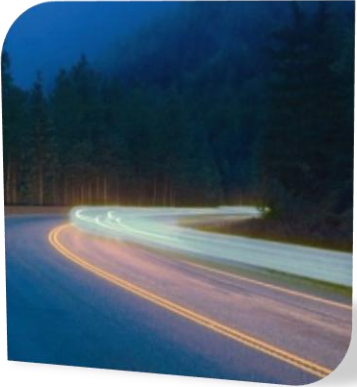
# VOLVO S90

## FULL LED REAR LAMP WITH GRAPHIC LIGHT® TECHNOLOGY

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# VALEO LIGHTING SYSTEMS DRIVERS OF INNOVATION



## Safety

Valeo engineer systems for safe and comfortable driving

**60% of accidents occurring at night on countryside could be avoided if all cars would be equipped with high end front lighting**

Accident statistics - TÜV Rheinland - 2007

**Glare Free high beams give an additional 1.3 seconds to react at 80 km/h**

Performance Evaluation of Vehicles with Adaptive Headlamp Systems – Darmstadt University - 2013

**LED stop lamps reduce by 4.5 m the breaking distance at 80 km/h**

**Ambient Lighting makes drivers feel safer**

BMW and the Lighting Engineering Group at Ilmenau University of Technology - 2010

**Performing Lighting Systems save lives**

# GLARE FREE HIGH BEAM

## BeamAtic® PremiumLED



**VOLVO XC90 / S90 / V90**

SAIL BEAM ADD



**BMW 4-SERIES**

SAIL BEAM ADD



**AUDI A3**

MATRIX BEAM



**RANGE ROVER VELAR**

MATRIX BEAM



# VALEO LIGHTING SYSTEMS DRIVERS OF INNOVATION



## Environment

Valeo optimize  
energy  
consumption and  
product recyclability

- ▶ LEDs systems are 5 times more efficient than halogen systems and 2 times more efficient than xenon systems
- ▶ Weight reduction by design optimization and development of lightweight materials
- ▶ Development of recyclable and green materials.
- ▶ Continuous improvement of environmental performances with 92% certified ISO 14001 sites and implementation of ISO 50001 certification

**CO<sub>2</sub> reduction is not an option**

# FRONT LIGHTING EVOLUTION

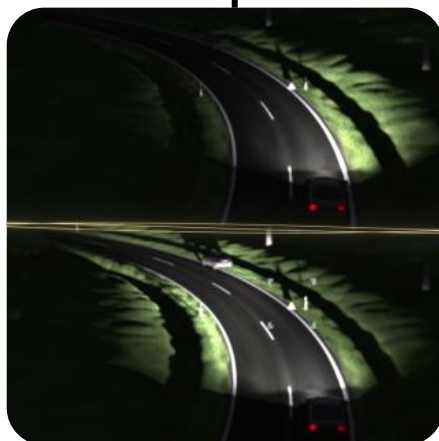
# FRONT LIGHTING: FROM ILLUMINATING TO ROAD WRITING

2000



*Convey style*

2010



*Provide safety*

2020



*Ease my drive*

2025



*Communicate*

2030



*Spread light*



# FRONT LIGHTING TAKE AWAY

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## FROM

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- Spread light
- High beam / low beam
- Lighten area
- Light for driving



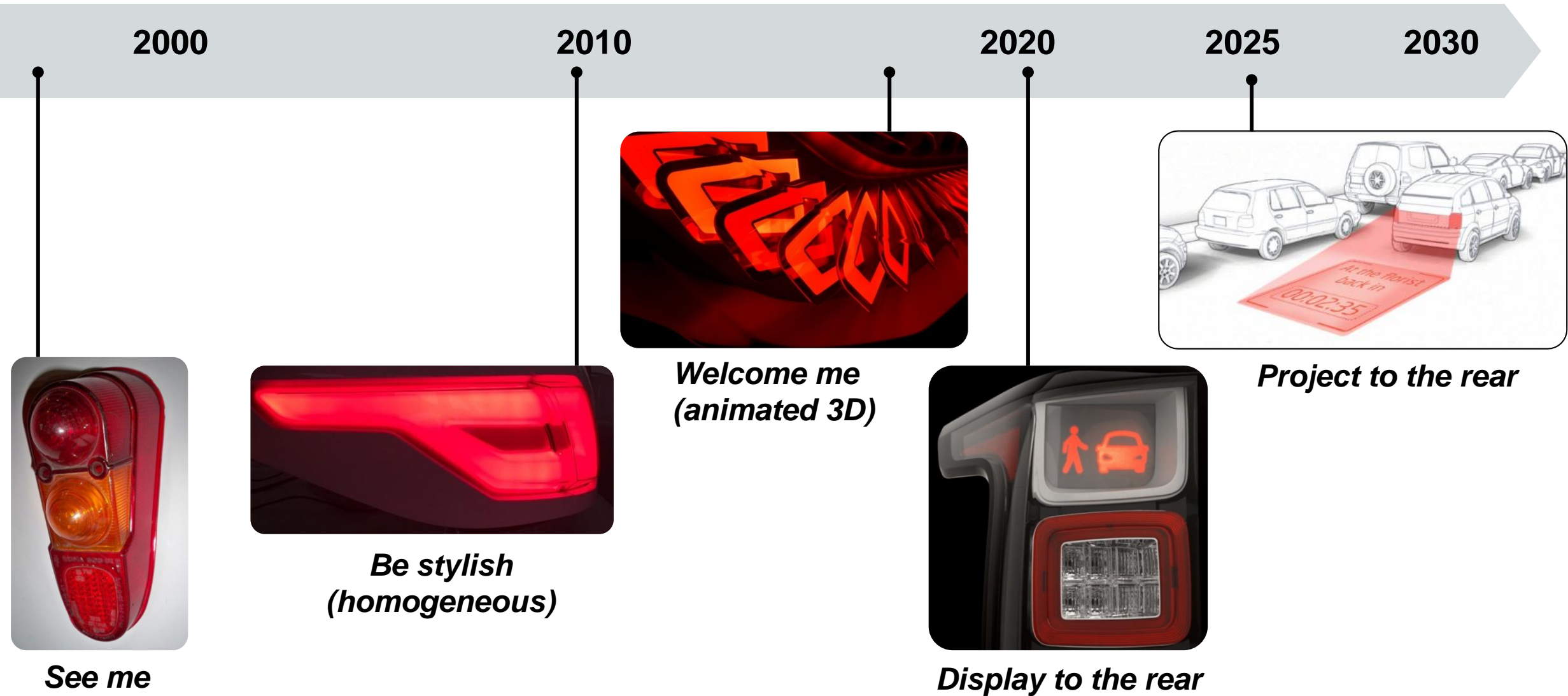
## TO

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- Sculptured beam
- Glare free and bending light
- Pixelated scene
- Light for communicating

# REAR LIGHTING EVOLUTION

# REAR LIGHTING: FROM SIGNALING TO COMMUNICATION





# REAR LIGHTING TAKE AWAY

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## FROM

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- Light to be seen
- Static lighting
- “You see me”
- My place (displayed light)



## TO

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- Light to be stylish
- Dynamic lighting (welcome scenario)
- “I see you and communicate to you”
- Your place (projected light)

# INTERIOR LIGHTING EVOLUTION

# INTERIOR LIGHTING: FROM AMBIENCE TO HOME PLACE

2000



*Light when entering*

2010



*Ambient light*

2020



*Connected light to in & out vision*

2025



*Light for value added tasks*

2030



*Light for my mobile home*



# INTERIOR LIGHTING TAKE AWAY

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## FROM

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- Light to enter the vehicle
- Light to see in the vehicle
- Light for all
- Light for the interior only



## TO

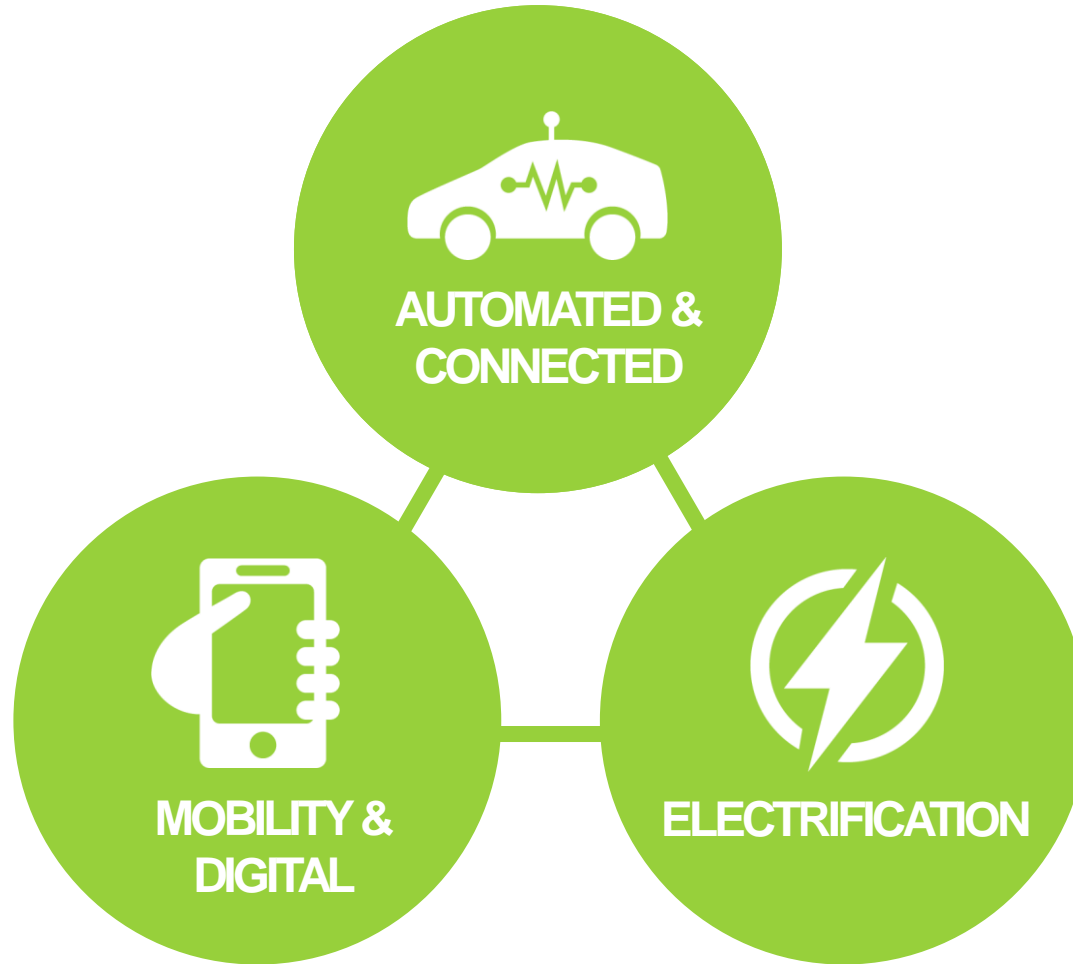
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- Light to live in the vehicle
- Light to work, light to relax
- Light for each and very one
- Light connected to outside scene

# CONCLUSION

## DISRUPTION IS ON ITS WAY....

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...AND VALEO WILL BE A PART OF IT



SMART TECHNOLOGY  
FOR SMARTER CARS