

# HIGH PERFORMANCE COMPUTING



MAY 16, 2024

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SVP AND GM OF HIGH PERFORMANCE COMPUTING PRODUCT GROUP

RENESAS ELECTRONICS CORPORATION

# AT A GLANCE

## HIGH PERFORMANCE COMPUTING

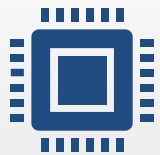
### Our products / technologies



High performance, ultra-low power consumption 32bit Automotive MCU

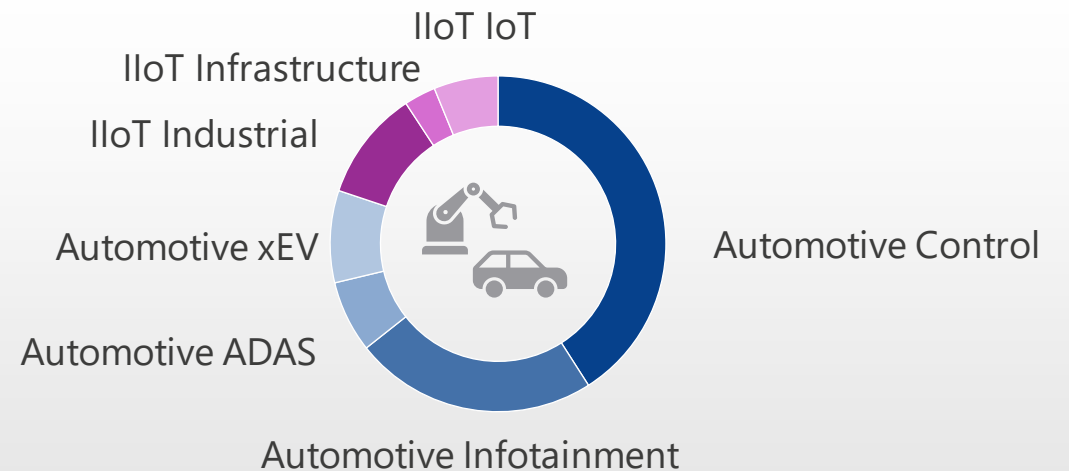
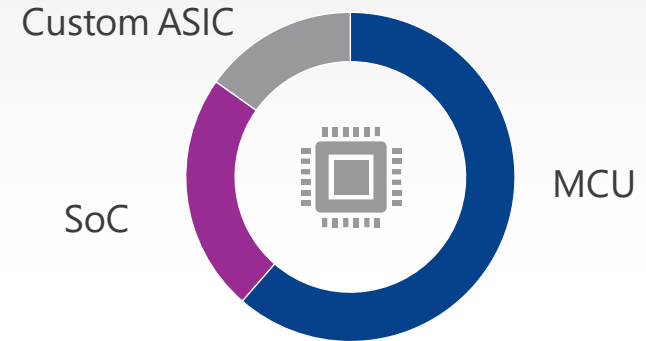


High performance, high efficiency SoC for Automotive



High performance Custom ASIC & ASSP

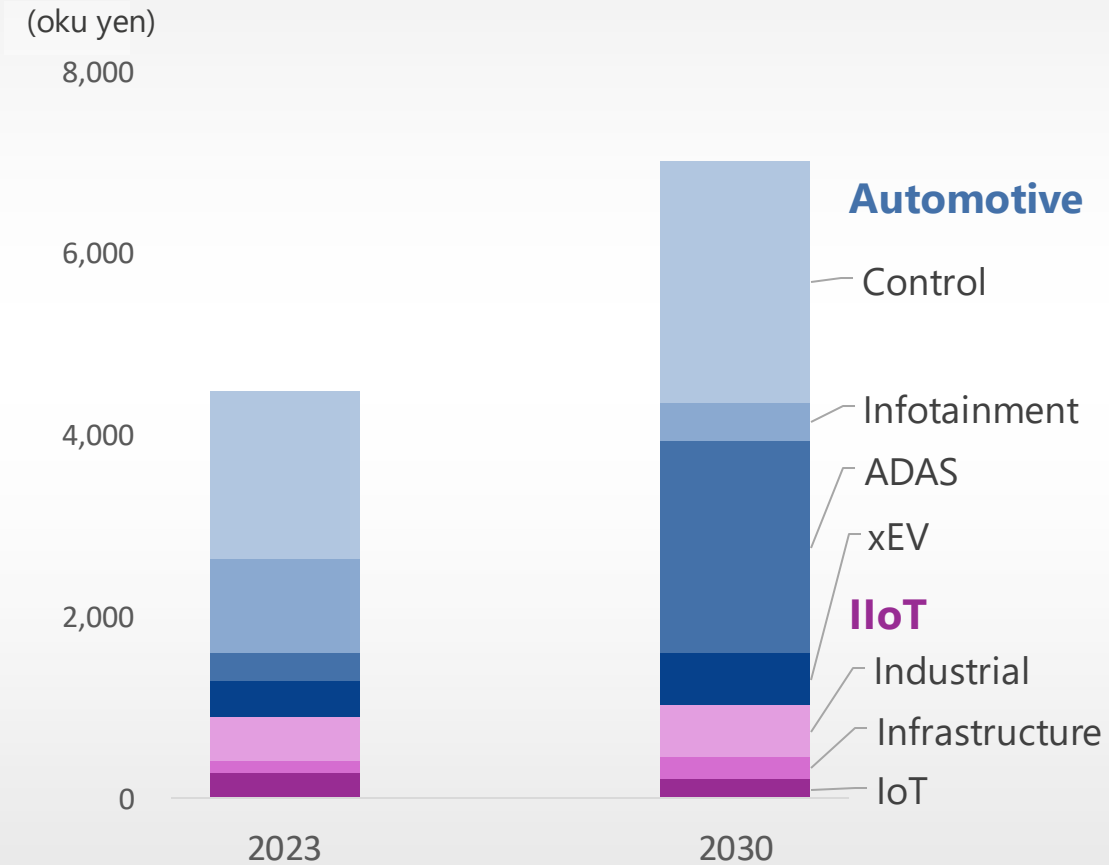
### 2023 Revenue



# GROWTH DRIVERS





## HIGH PERFORMANCE COMPUTING

### Revenue



\* FX \$1 = 100yen, €1 = 120yen

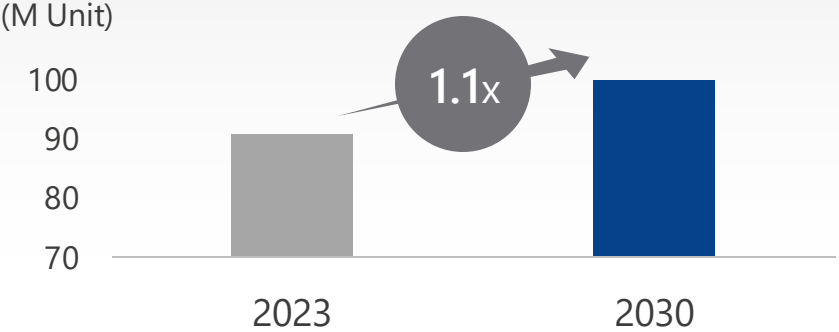
### Growth drivers

- 
**ADAS** → ADAS/AD with AI integration R-Car Gen4/5
- 
**Control** → Strong MCU/SoC portfolio for E/E architecture
- 
**xEV** → Motor Control MCU with Power and Analog solution
- 
**Industrial & Infrastructure** → ASIC and ASSP for FA/OA and Data center

# MARKET OUTLOOK (AUTOMOTIVE)

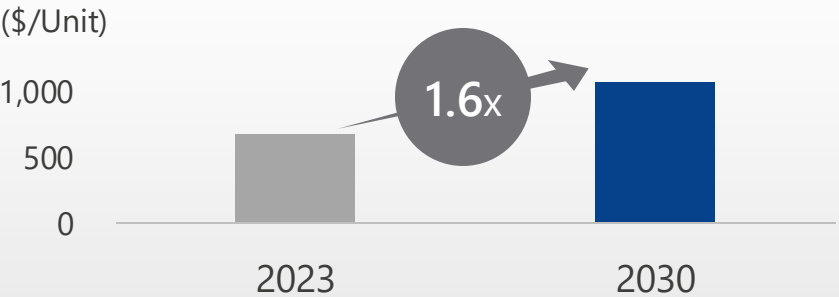
AUTO SEMICONDUCTOR MARKET GROWTH IS DRIVEN BY CONTENT PER VEHICLE

## Global light vehicle production

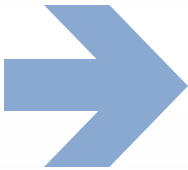


Source: GlobalData Global Light Vehicle Forecast (December 2023)

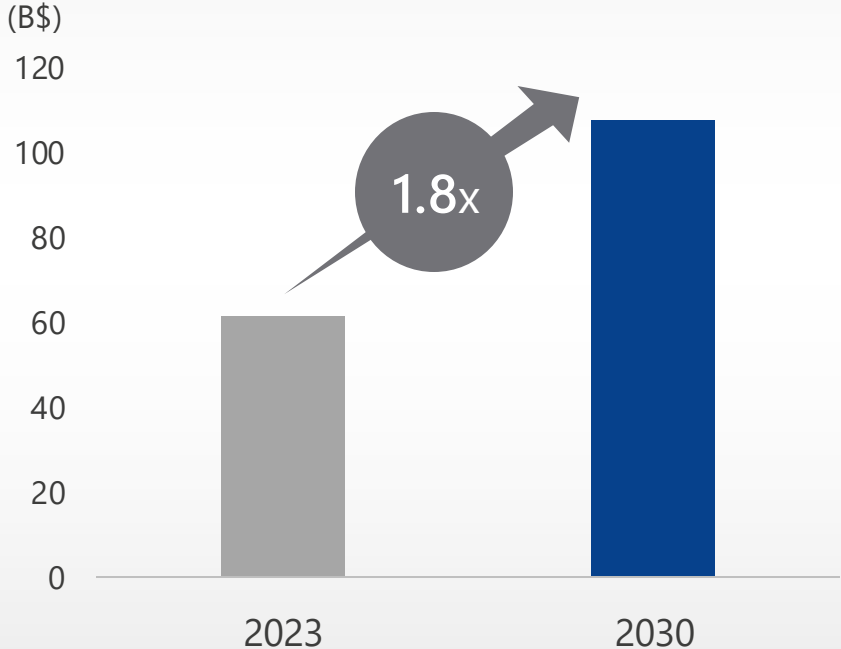
## Content per vehicle



Source: TechInsights Automotive Semiconductor Demand Forecast 2021 to 2030 – January 2024



## Automotive semiconductor TAM



Source: TechInsights Automotive Semiconductor Demand Forecast 2021 to 2030 – January 2024

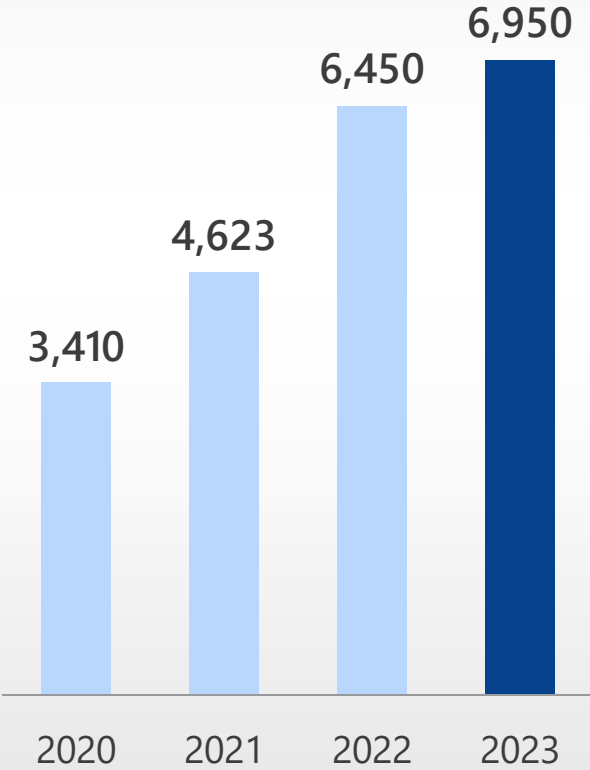
\* FX \$1 = 100yen

# FINANCIAL VIEW (AUTOMOTIVE)

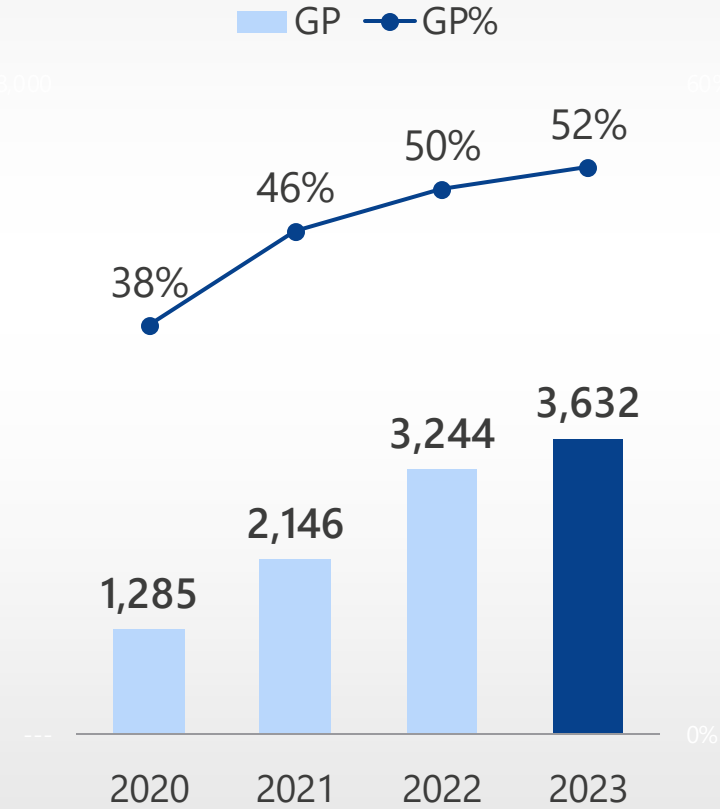
## ACHIEVED HIGHS IN BOTH SALES AND PROFIT MARGINS

### Revenue

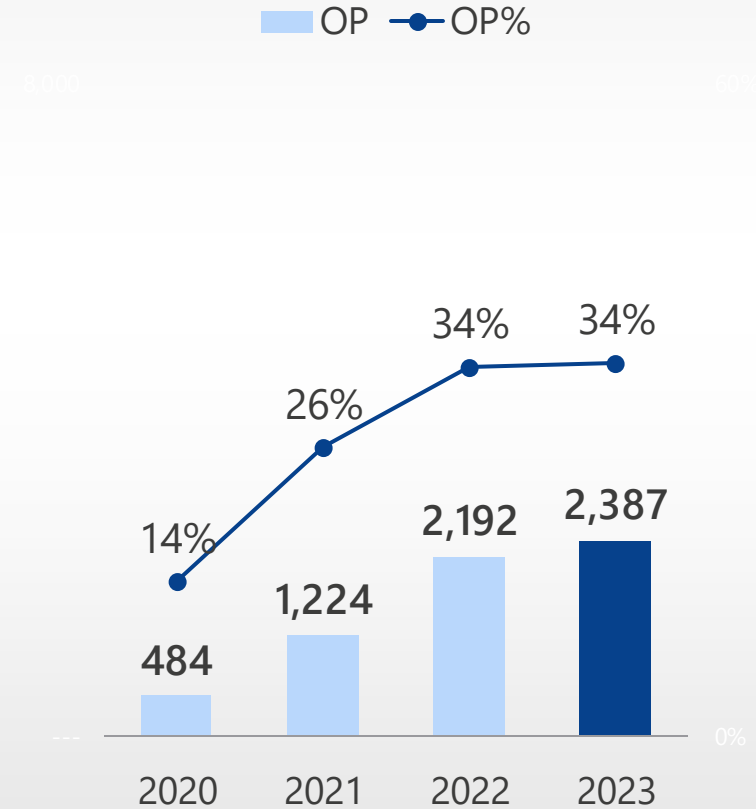
(oku yen)



### Gross margin (GM)



### Operating margin (OM)



Source: Statutory segment result before change in segmentation in 2024

# RENESAS GROWTH IN ADAS MARKET

REVENUE GROWTH IS EXPECTED TO OUTPERFORM THE MARKET

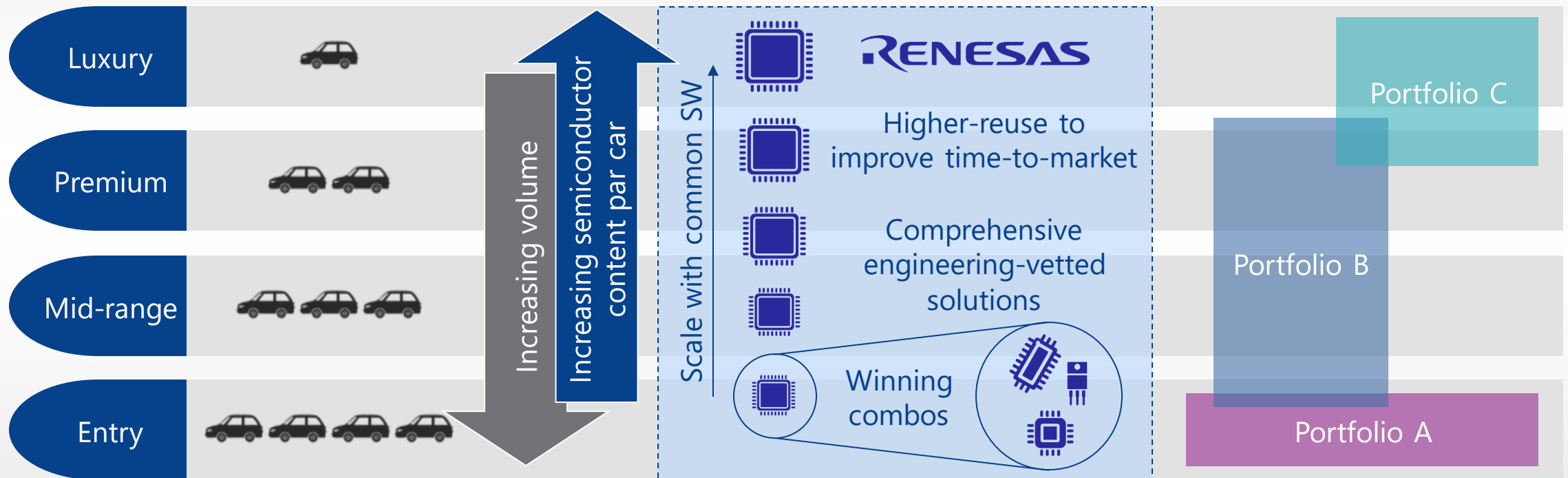


# AUTOMOTIVE STRATEGY

FULL PORTFOLIO FROM MCU TO SOC WITH SCALABLE, FLEXIBLE AND CUSTOMIZABLE PLATFORM

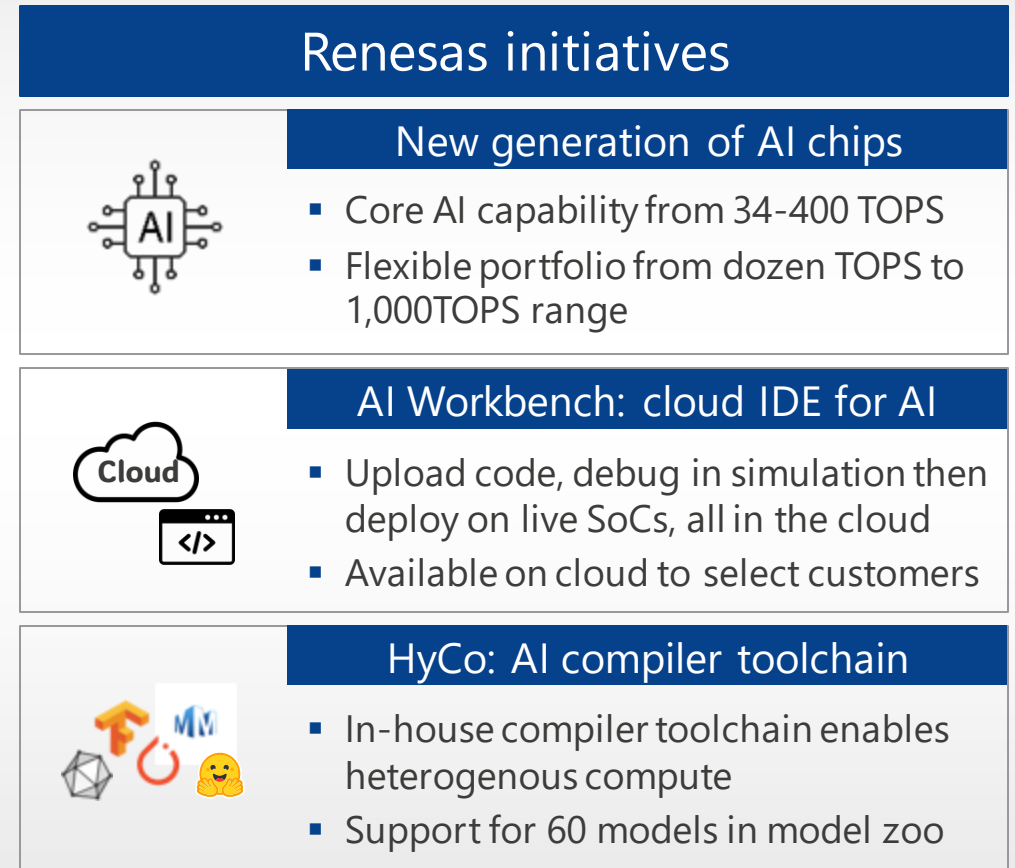
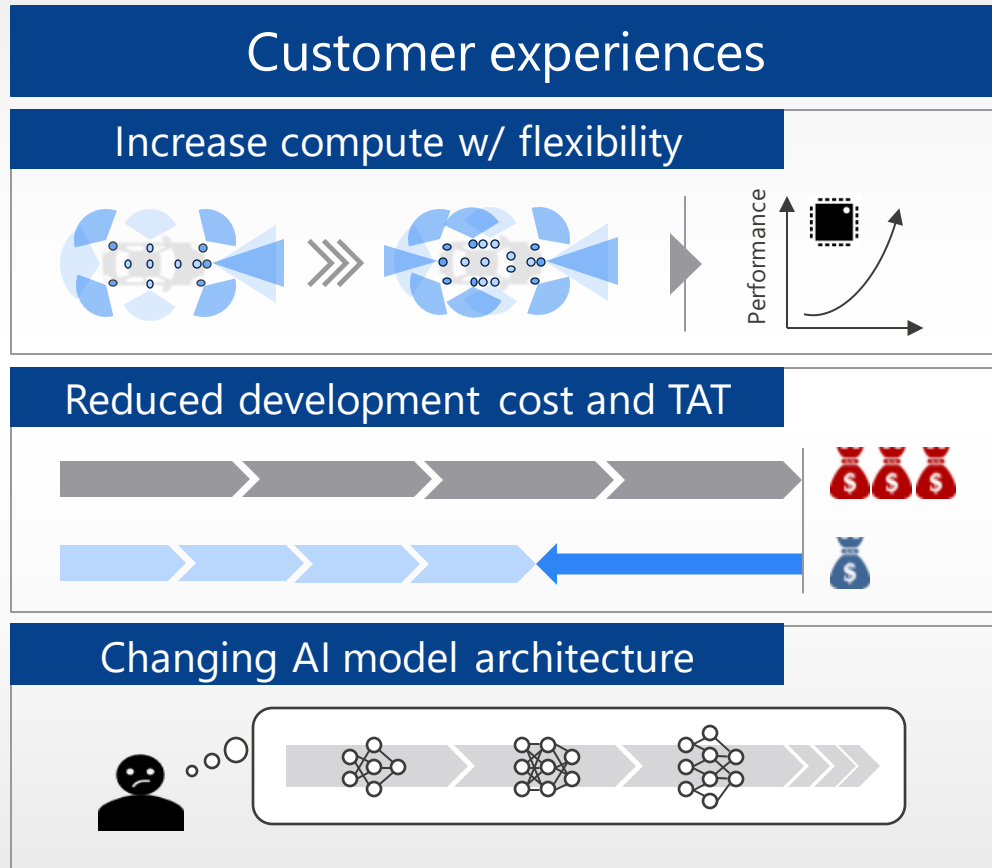
**OEM:** scale across entire vehicle fleet

Electrified, Automated & Connected



# TRANSFORMING ADAS/AD WITH AI INTEGRATION

## ENHANCED AI TOOL CHAIN





# RENESAS AI GIGAFACTORY CONCEPT

INTEGRATED, COMPREHENSIVE AND EASY TO USE AI TECHNOLOGY FOR CUSTOMERS

## Renesas initiatives



### New generation of AI chips

- Core AI capability from 34-400 TOPS
- Flexible portfolio from dozen TOPS to 1,000TOPS range



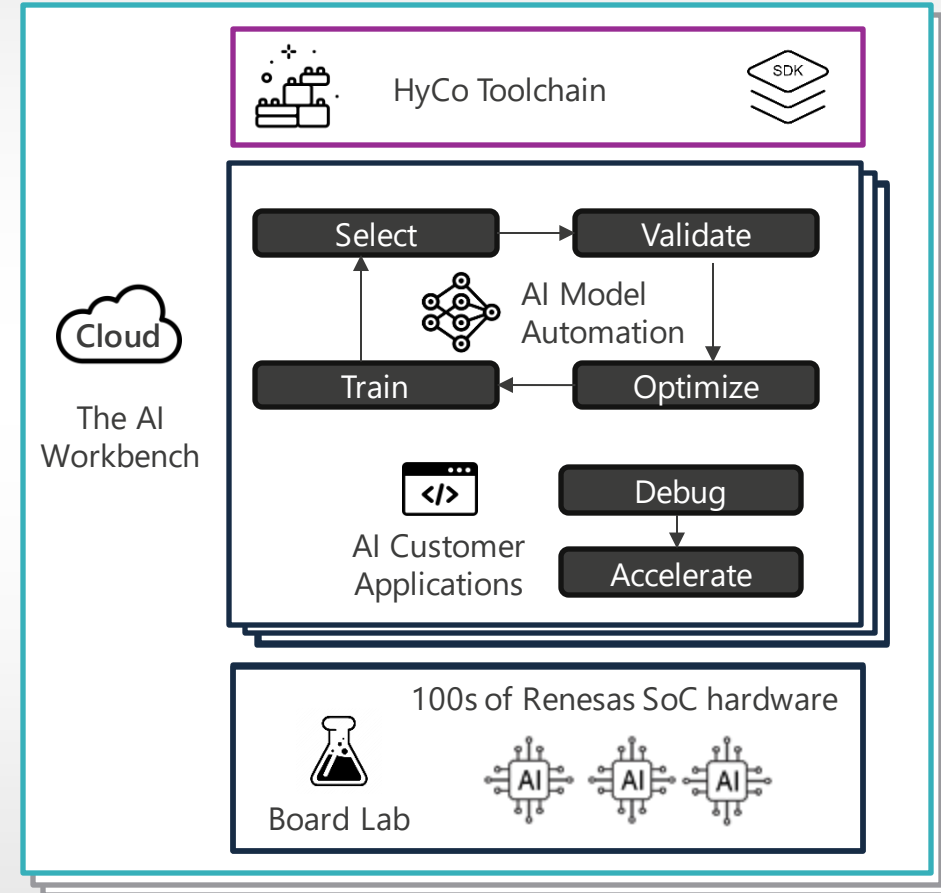
### AI Workbench: cloud IDE for AI

- Upload code, debug in simulation then deploy on live SoCs, all in the cloud
- Available on cloud to select customers



### HyCo: AI compiler toolchain

- In-house compiler toolchain enables heterogenous compute
- Support for 60 models in model zoo



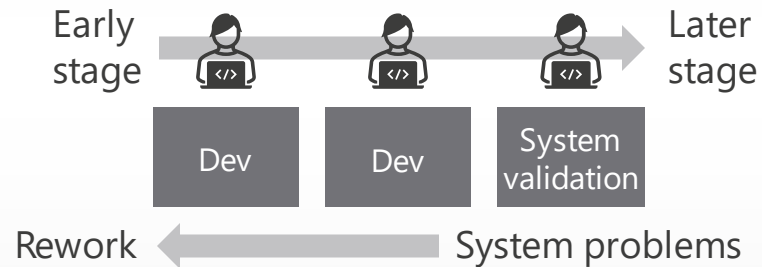
# COMPELLING ADAS SOLUTION – SDV IMPLEMENTATION

## INTEGRATED AND UNIFIED ENVIRONMENT ENABLES PARALLEL H/W AND S/W DEVELOPMENT

### Customer pain points

#### Real environment

- System problems are found at the later stage
- Costly and time-consuming due to rework



Distributed environments

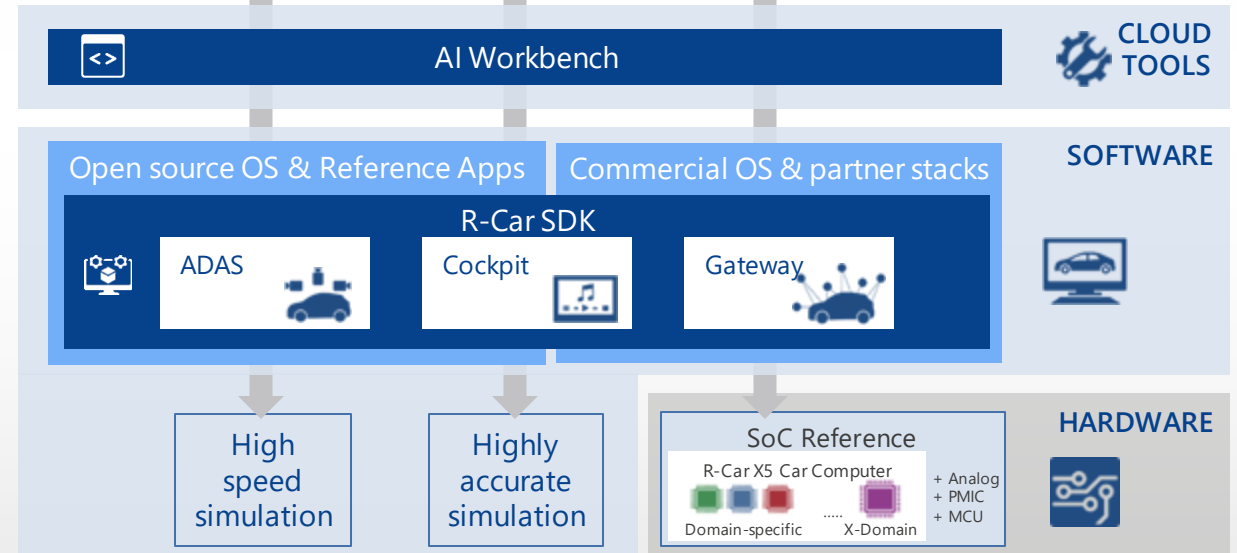
#### Cloud expertise

- Need knowledge to build cloud environment



### SDV Platform (with partners)

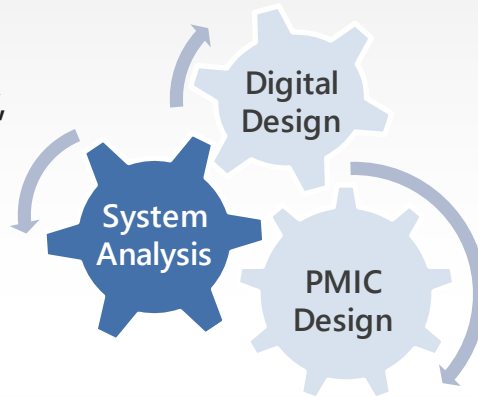
#### Software-first approach



# SOLUTION SELLING WITH ANALOG - VALUE PROPOSITIONS

## System-level optimized design and validation

- Co-development of SoC/MCU & PMIC ensure perfect interoperability, system-level optimization
- Enabling easy realization of ASIL-D functional safety and reduction of verification efforts for customers



## Turn-key Designs

- Turn-key Reference designs available to reduce cost and risk while speeding time to market for customers



R-CAR + PMIC Starter Kit

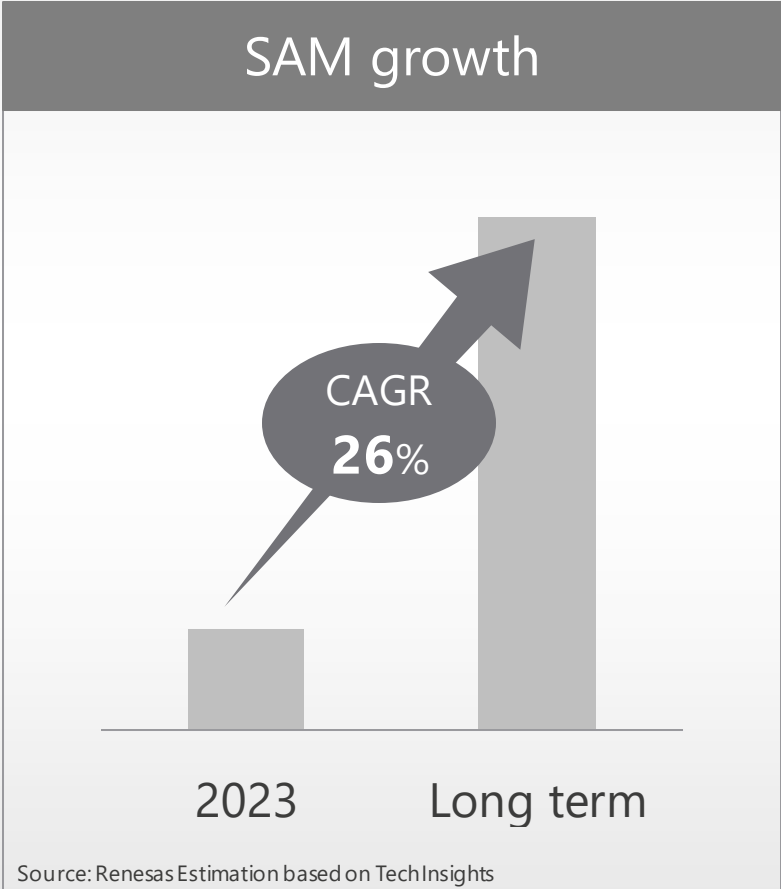
## Sensor & Sensor signal conditioning

- Sensor signal processing for:
  - 6 deg. of freedom inertial sensors, enhancing ADAS system capabilities.
  - Strain gage applications in electromechanical braking and brake-by-wire applications.
- “Hands on steering wheel” sensing as a prerequisite for L2 – L4 ADAS implementations.
- Steering torque & angle sensing (TAS) for ASIL-D classical and steer-by-wire applications.



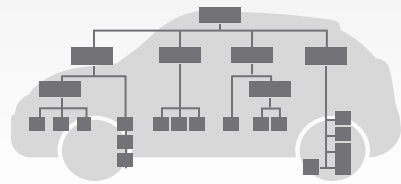
# RENESAS GROWTH IN E/E ARCHITECTURE MARKET

REVENUE GROWTH IS EXPECTED TO OUTPERFORM THE MARKET

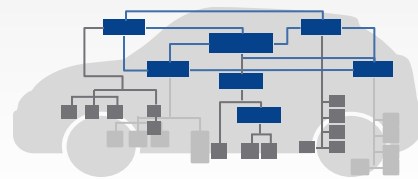


# ZONAL ARCHITECTURE TREND IN VEHICLE CONTROL

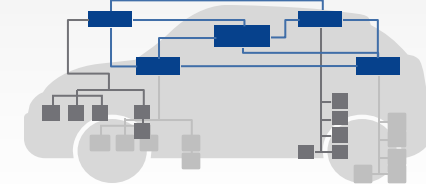
OUR FLEXIBLE AND SCALABLE INTEGRATED SOLUTIONS SUPPORT THE NEEDS OF GLOBAL OEMS



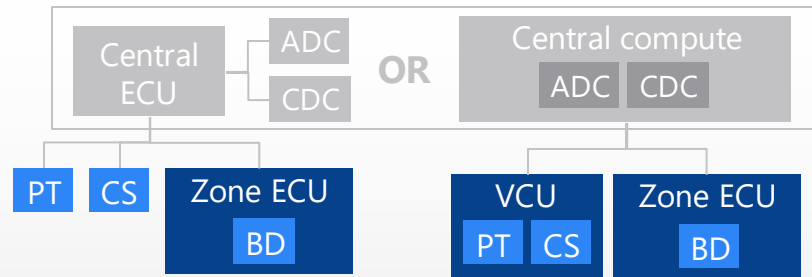
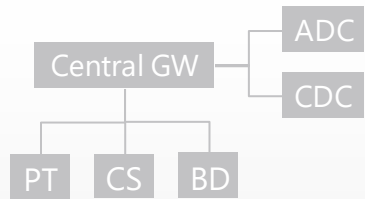
Domain



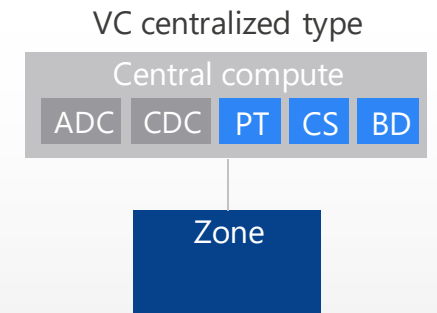
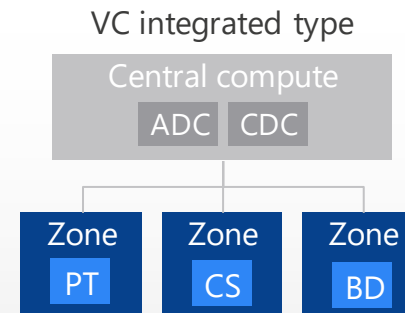
Hybrid (Domain + Zone)



Zone



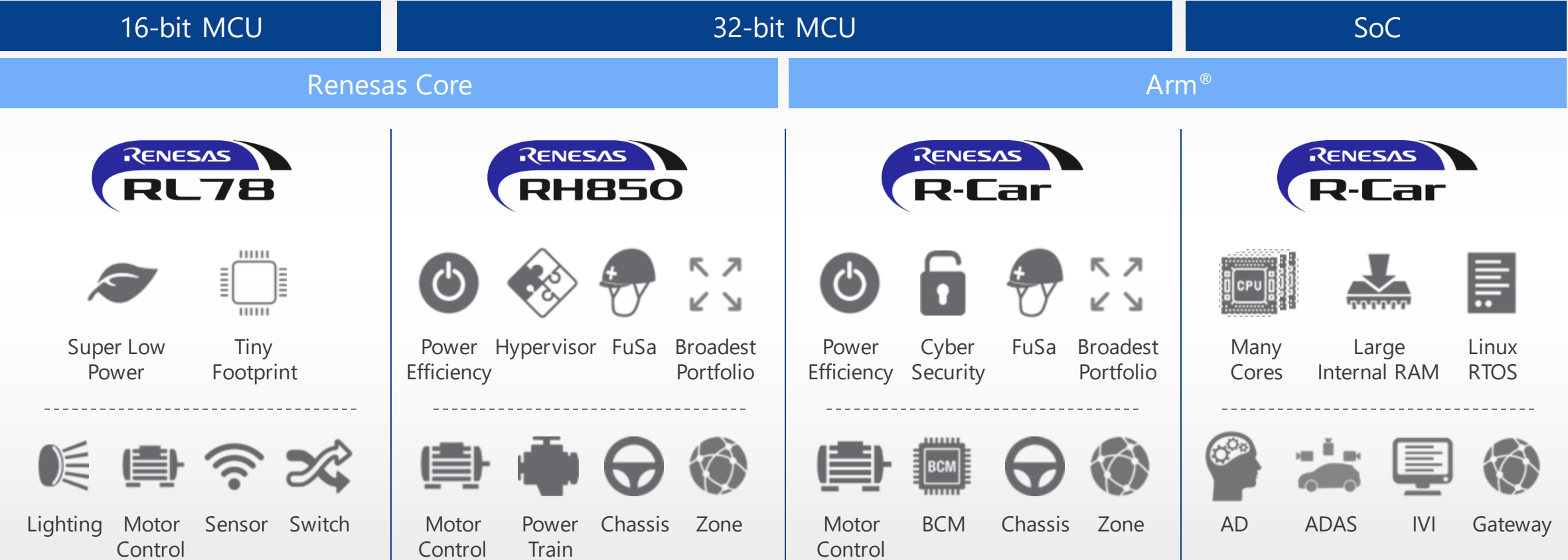
Dev cost minimization



System BOM cost minimization

VCU: Vehicle Control Unit (incl. DCU) PT: Powertrain (xEV), CS: Chassis and Safety BD: Body (BCM) ADC: ADAS Domain Controller CDC: Cockpit Domain Controller

# STRONG AND WIDE PORTFOLIO FOR E/E ARCHITECTURE



# SUMMARY



Flexible and scalable portfolio for ADAS and E/E

Integrated system solutions with digital, analog and software

Augmented software, AI, cloud infrastructure and tool chain

High performance SoCs to cross domain smart compute to MCUs, using the same SW framework and infrastructure

Gaining good market traction and partnerships



THANK YOU



(FORWARD-LOOKING STATEMENTS)

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