

INDUSTRIAL, INFRASTRUCTURE AND IoT STRATEGY

MAY 19, 2023

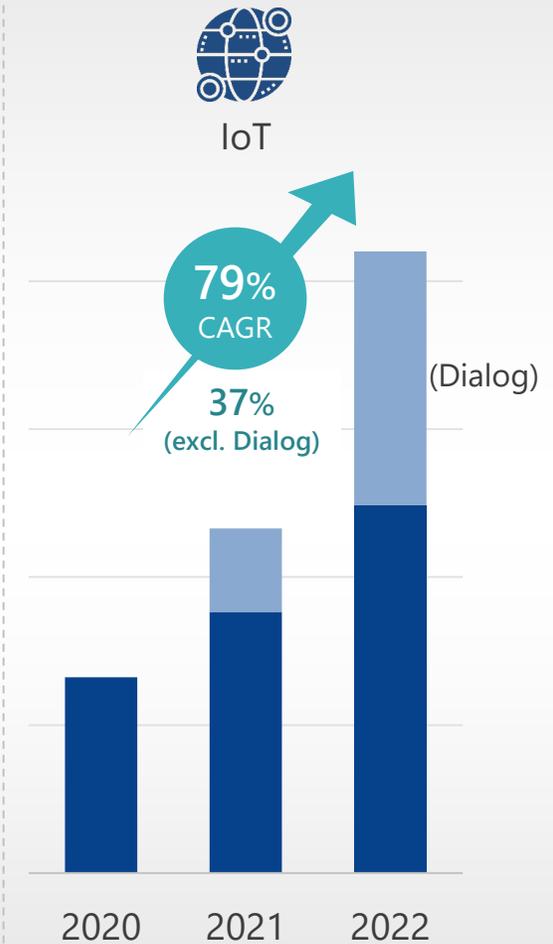
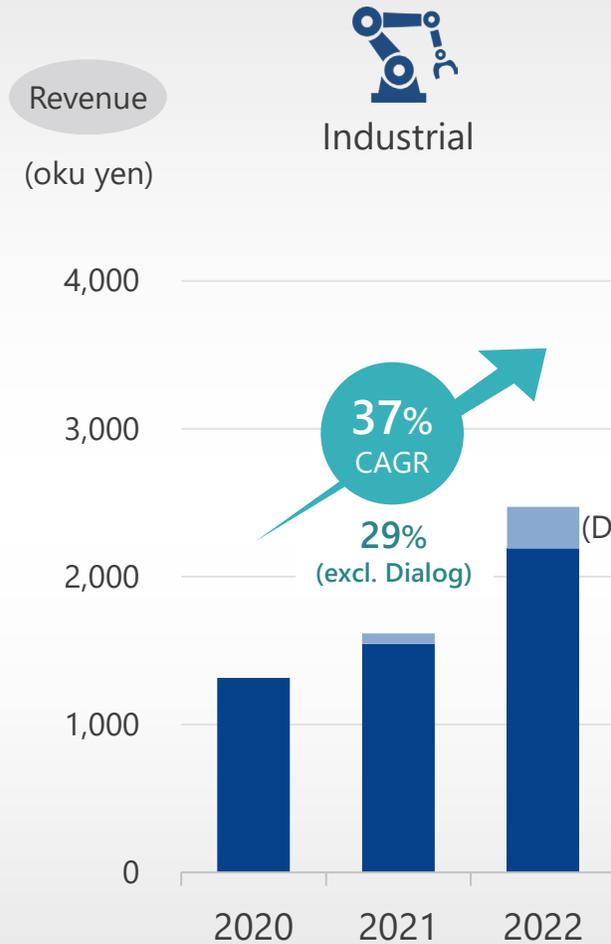
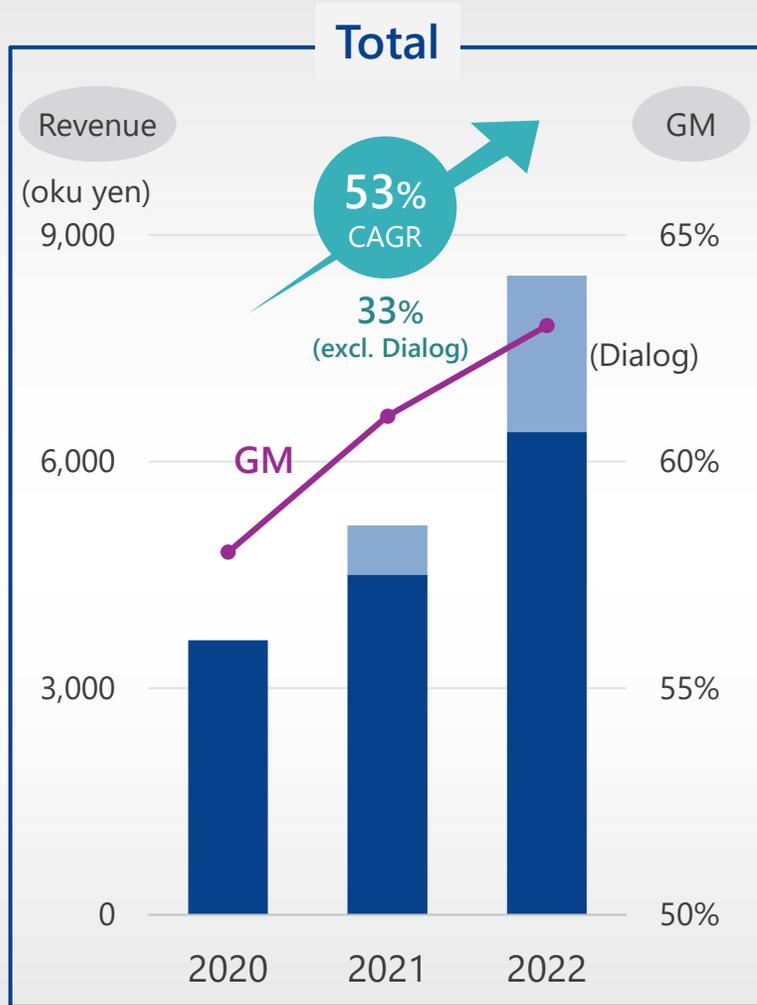
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SIGNAL CHAIN SOLUTIONS GROUP
RENESAS ELECTRONICS CORPORATION

AGENDA

- Results Recap
- Share Gains in MCU & MPU
- Secular Growth Opportunities
 - Embedded Processing + Analog, Power & Connectivity
 - Embedded Processing + Ethernet PHY for Industrial Markets
- The AI Opportunity
 - AIoT Artificial Intelligence in the AI landscape
 - AI in the Industrial landscape
 - AI in the infrastructure landscape
- X- SG Collaboration to drive growth
- UX improvements to combine the best of SW and HW
- Summary

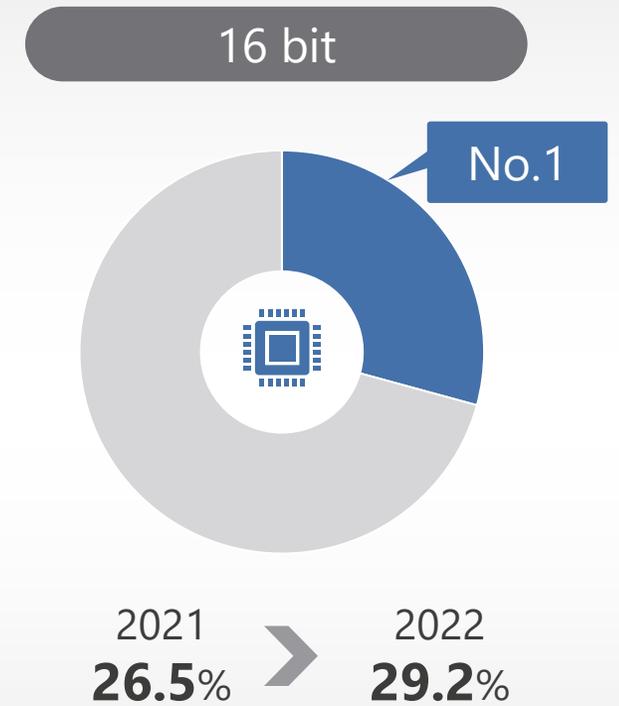
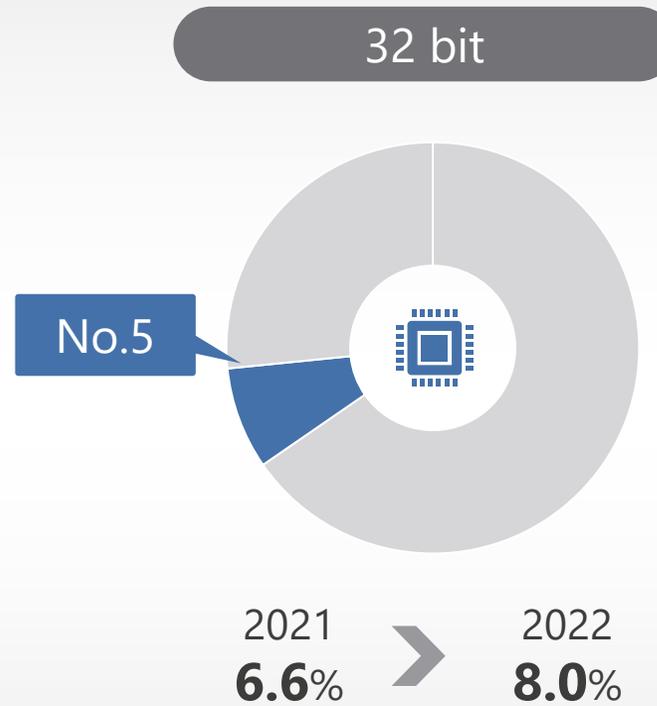
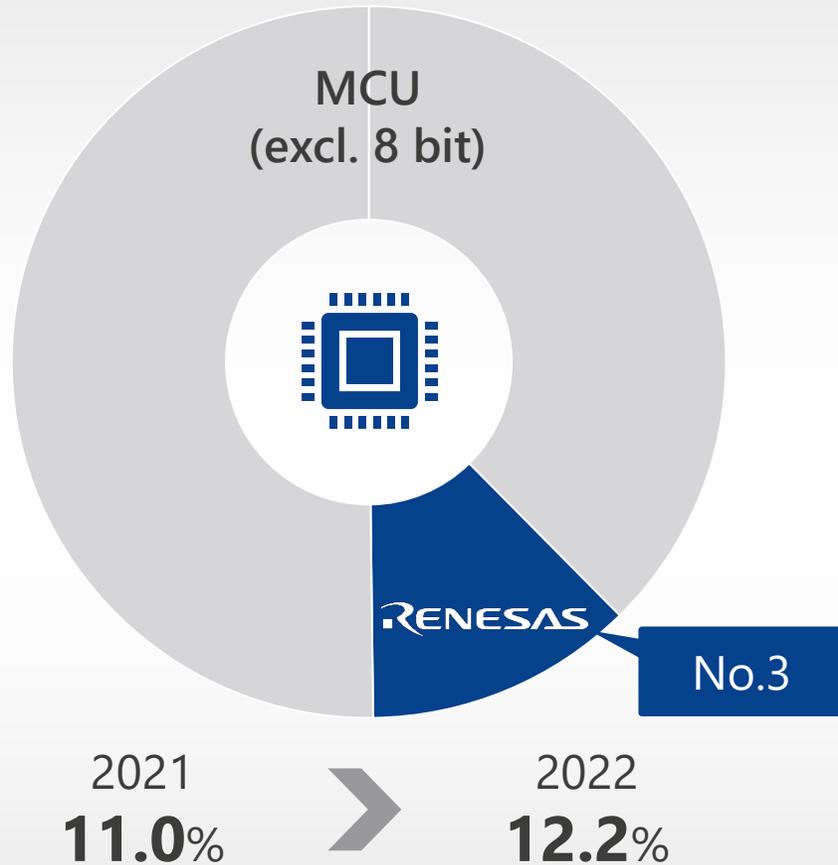
AIoT: Artificial Intelligence of Things

FINANCIALS AT A GLANCE



1 USD=100 JPY

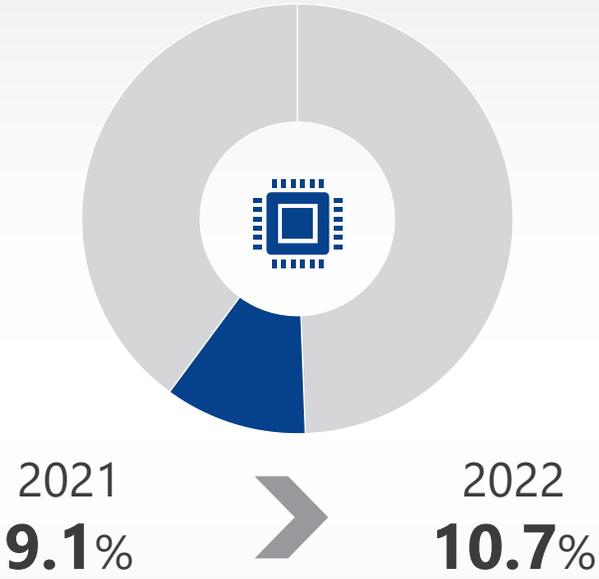
MARKET SHARE GAIN IN MCU FOR INDUSTRIAL/IOT APPLICATIONS



Graphs created by Renesas based on Gartner Research. Calculations performed by Renesas Source: Gartner®, Market Share: Semiconductors by End Market, Worldwide, 2022, Andrew Norwood et al., 31 March 2023, MCU = Total Microcontroller(16bit & 32bit.), excluding Automotive, GARTNER is a registered trademark and service mark of Gartner, Inc. and/or its affiliates in the U.S. and internationally and is used herein with permission. All rights reserved. Gartner does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with the highest ratings or other designation. Gartner research publications consist of the opinions of Gartner's research organization and should not be construed as statements of fact. Gartner disclaims all warranties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose.

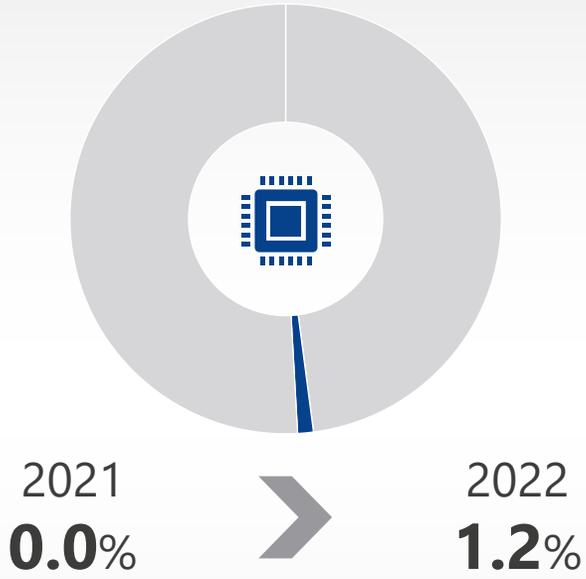
MARKET SHARE GAIN ON MPU FOR INDUSTRIAL/IoT APPLICATIONS

General purpose and Industrial automation



25+%

AI

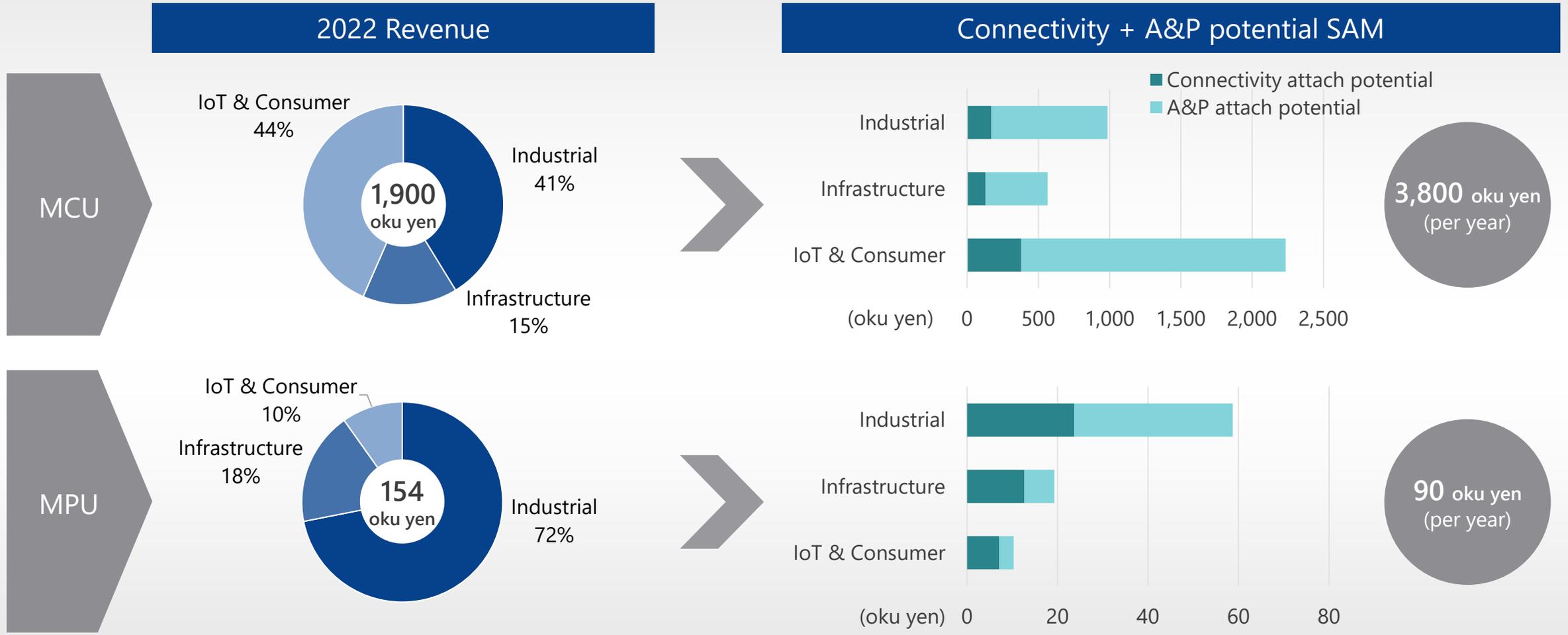


15-%

2026 target share

Source: Renesas estimation

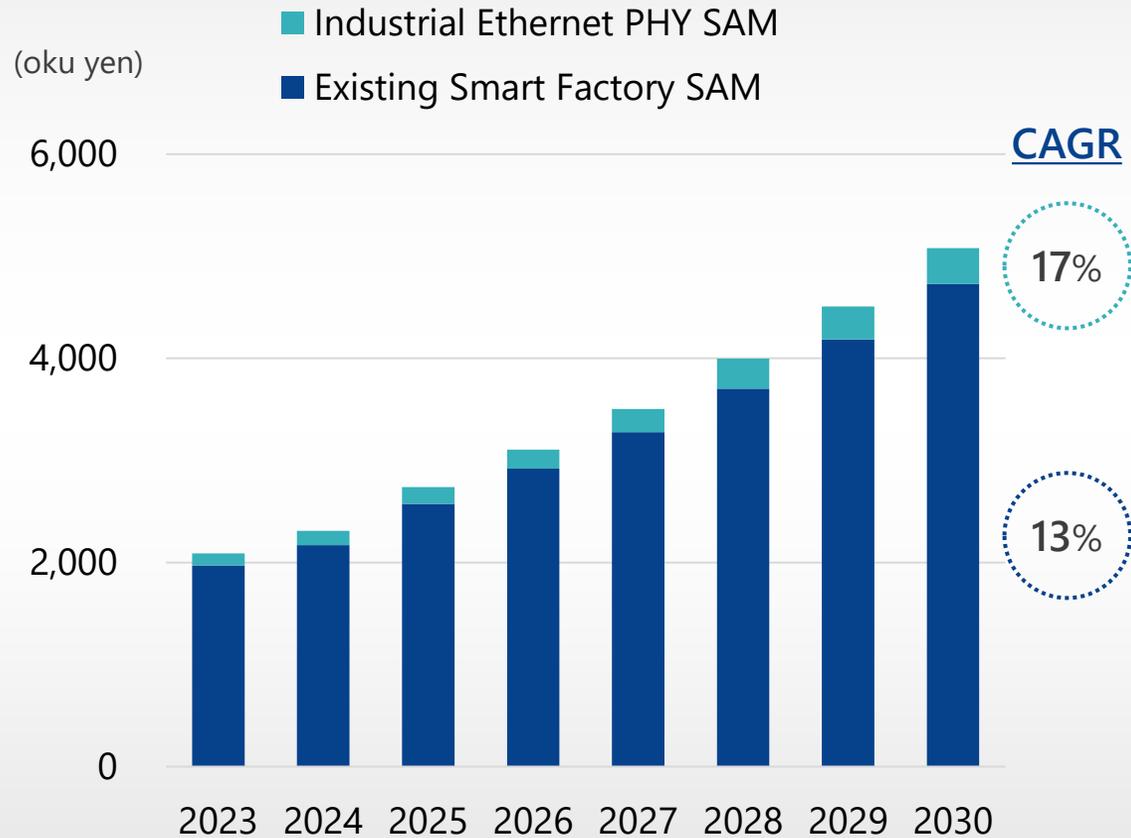
SAM EXPANSION BY ATTACHING A&P, CONNECTIVITY



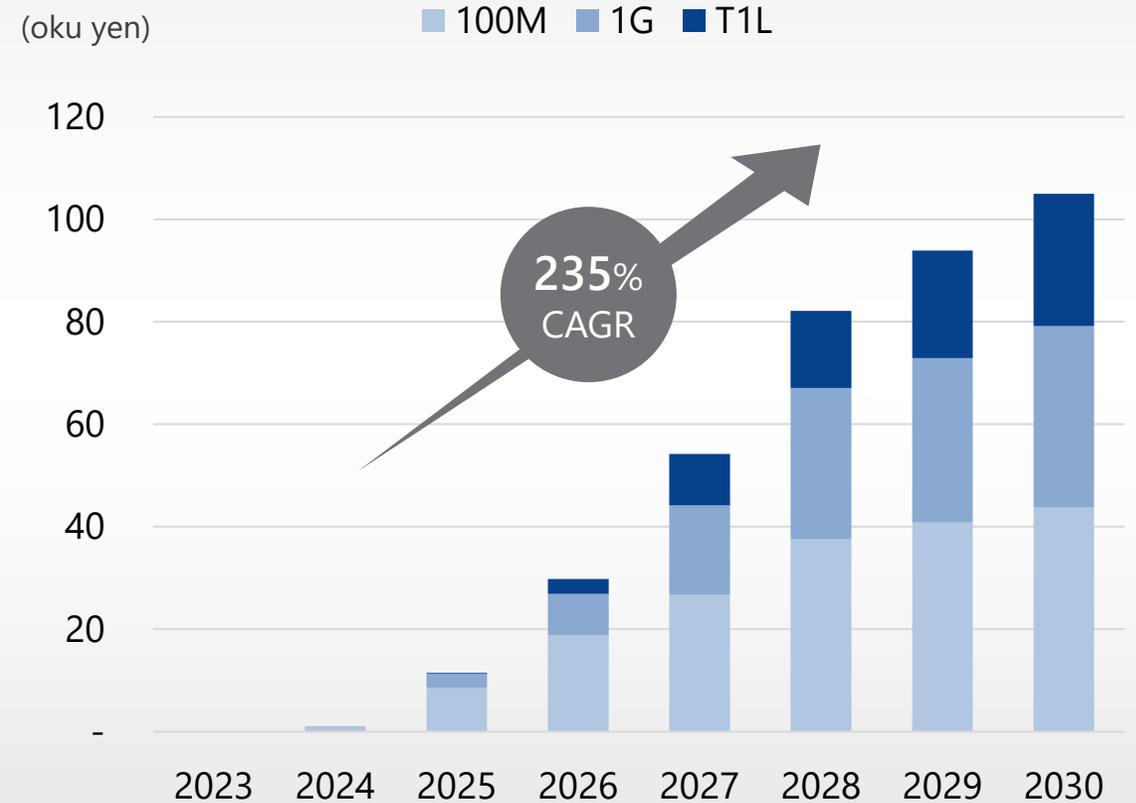
Source: Renesas estimation 1 USD=100 JPY

SAM EXPANSION INDUSTRIAL: MPU + ETHERNET PHY

Industrial Ethernet PHY IC SAM*1



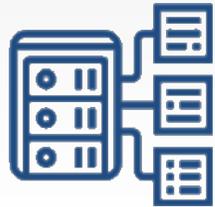
Renesas Industrial Ethernet PHY IC Growth Plan



*1: Source: Techinsights (Nov 2022) 1 USD=100 JPY

ADDITIONAL GROWTH ACCELERATED BY AI ADOPTION

Enabling Intelligence From The Cloud To The End-Point Sustainably



AI at the core

Timing
Power
Memory Interface



AI at the edge

Timing
Power
Memory Interface
RF



AI at the endpoint

MCU/MPU/e-AI
Power
Connectivity
AMS & CMIC



Sustainability

MCU
Ultra-Low Power
Power
Connectivity
Environmental Sensors

AI: TRANSFORMATIONAL GROWTH AT END-POINT, EDGE AND CORE

AIoT @END POINT: EXPLOSIVE MARKET GROWTH

Why endpoint intelligence?

 Real-time response

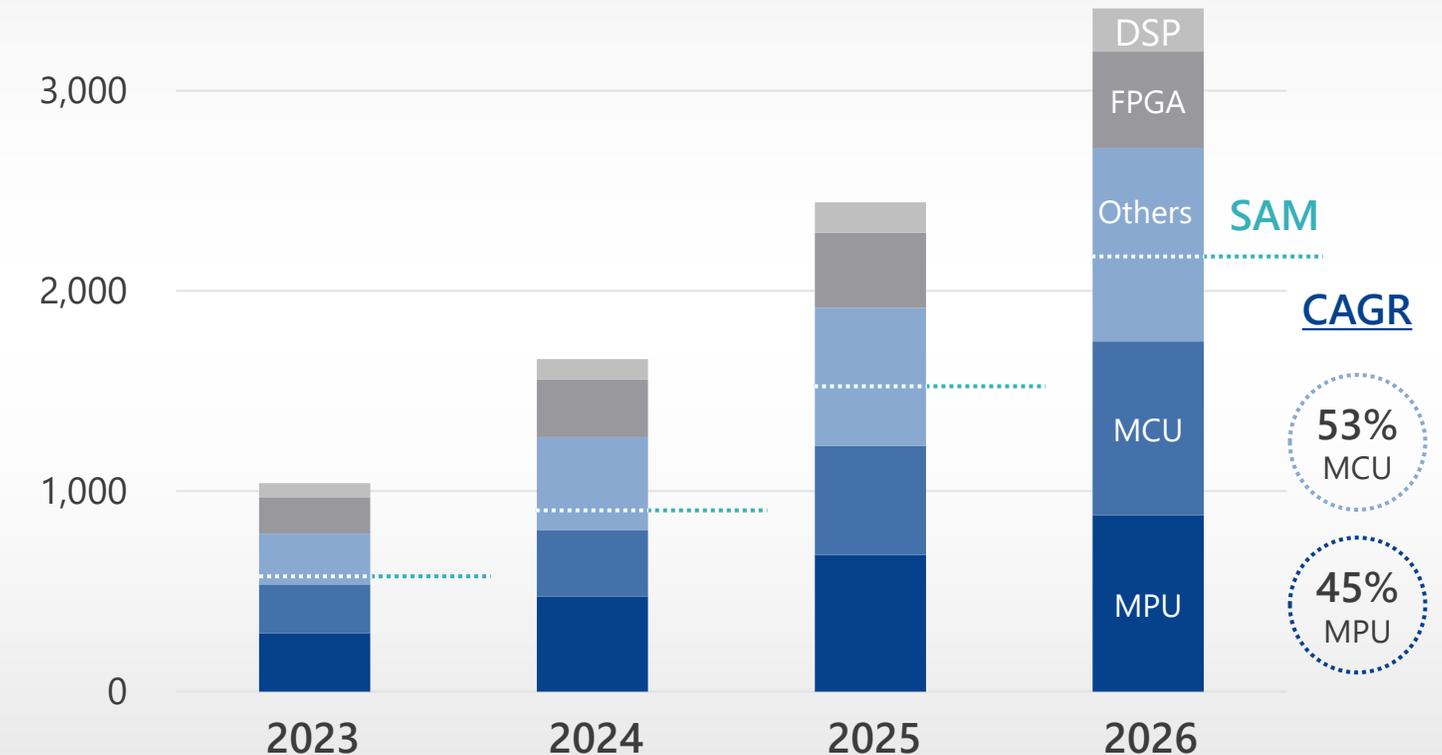
 Security & Data privacy

 Efficiency & Low power

 Low cost

AI chip TAM

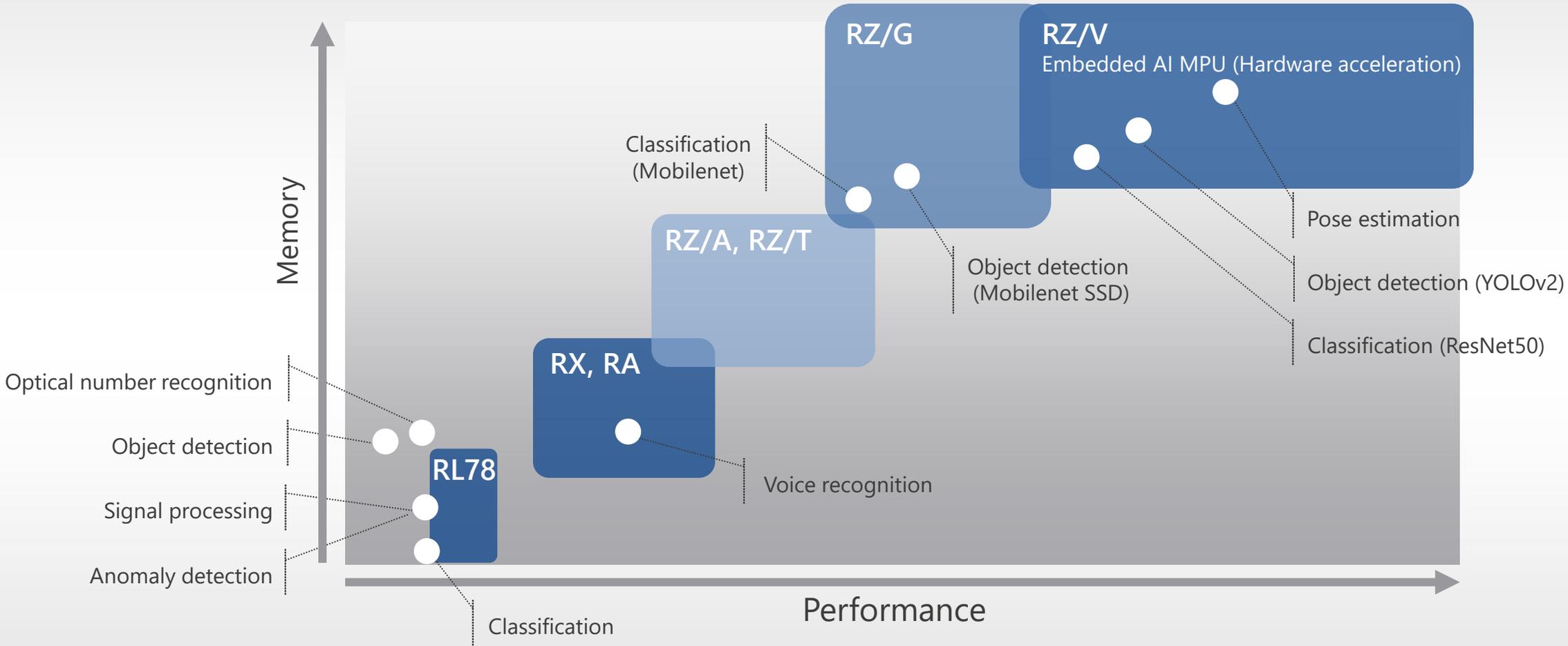
(oku yen)



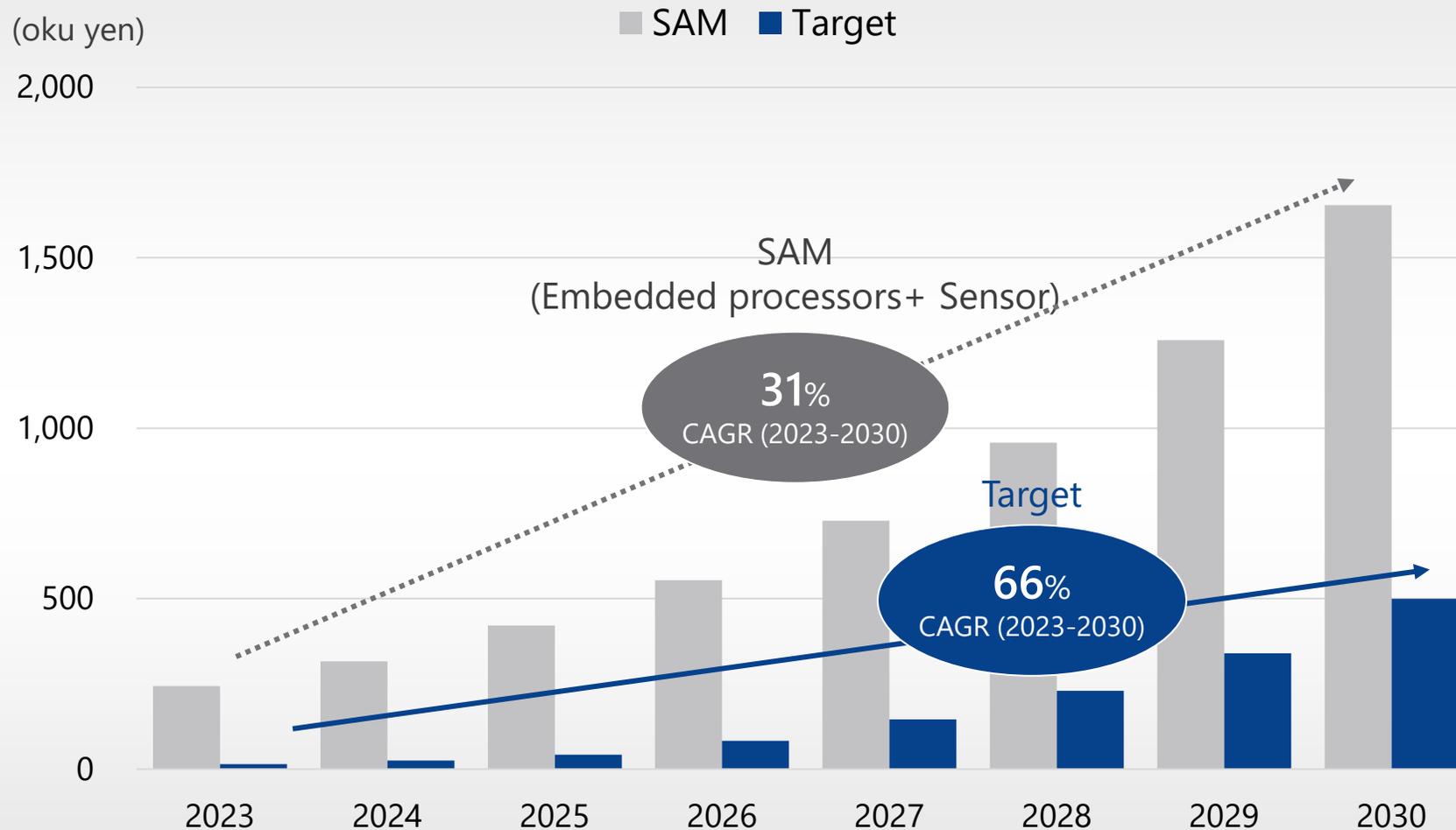
AIoT: Artificial Intelligence of Things

Source: Renesas estimation 1 USD=100 JPY DSP: Digital Signal Processing

SCALABLE EMBEDDED PROCESSOR SOLUTIONS BY AI APPLICATION TYPE



AI OPPORTUNITY @EDGE: INDUSTRIAL AUTOMATION MARKET

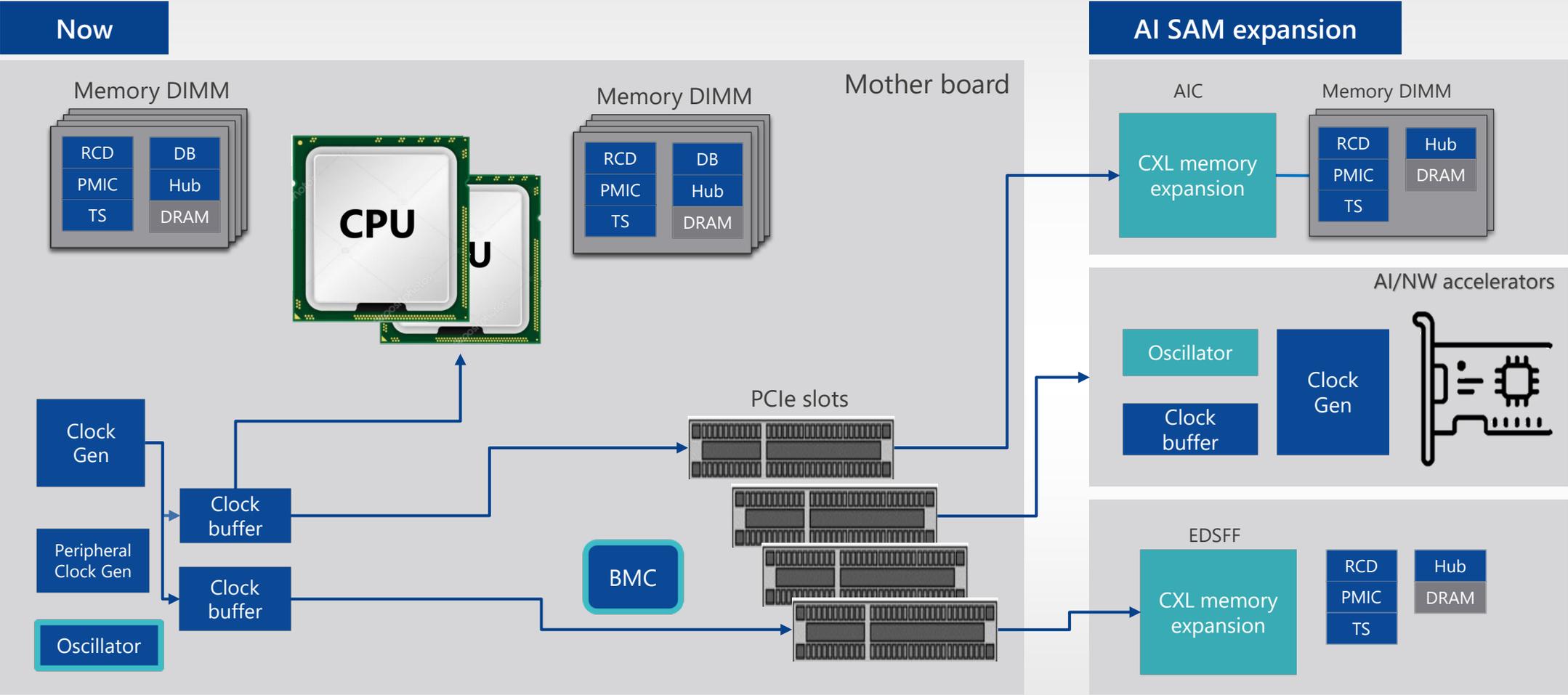


Source: Renesas estimation 1 USD=100 JPY

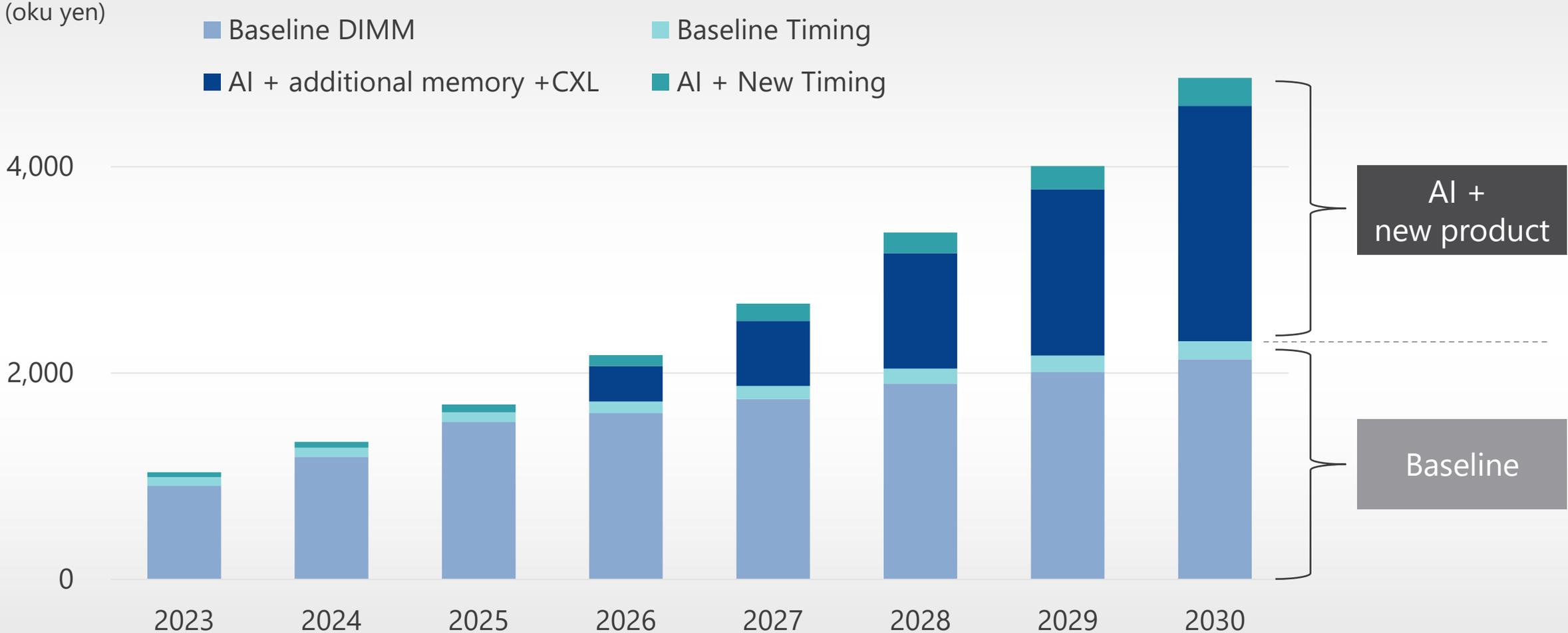
Use cases driving market potential

- Predictive maintenance
- Real-time monitoring of process conditions
- Preventive quality control
- Machine inspection
- Machine vision
- Data pre-processing – edge computing

AI OPPORTUNITY FOR INFRASTRUCTURE: MEMORY & TIMING



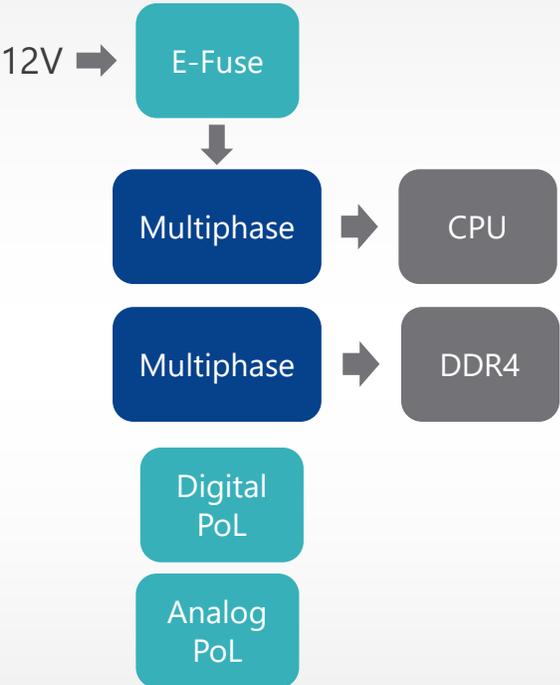
AI OPPORTUNITY FOR INFRASTRUCTURE: SAM EXPANSION OPPORTUNITY



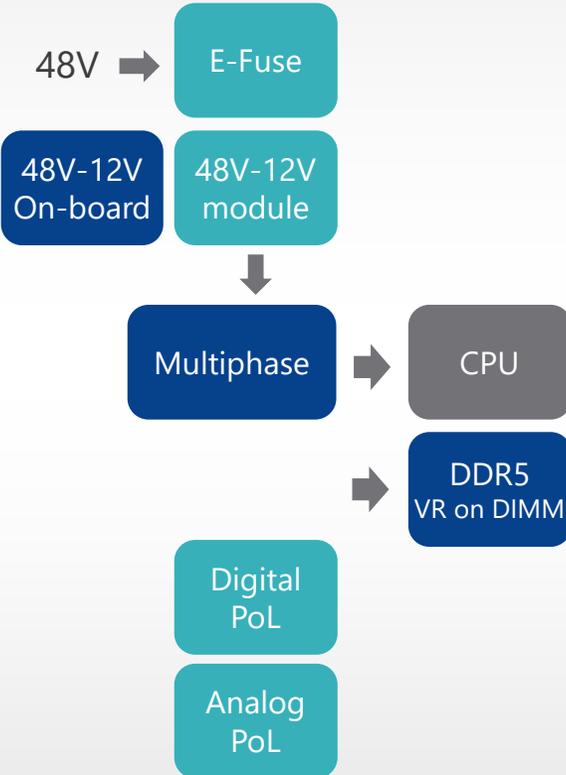
Source: Renesas estimation 1 USD=100 JPY

AI OPPORTUNITY FOR INFRASTRUCTURE: PERFORMANCE DIGITAL POWER BY PLATFORM & GENERATION

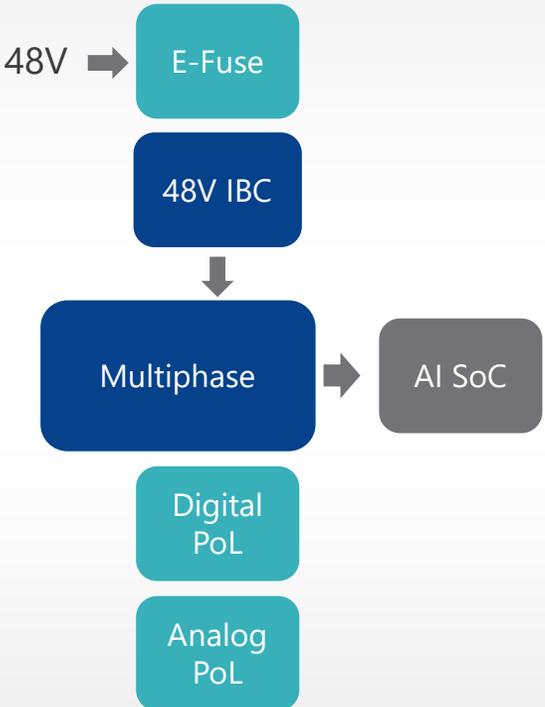
VR13HC Server
In Production



VR14 Birchstream
Production 2H 2024



Next Gen AI
In design

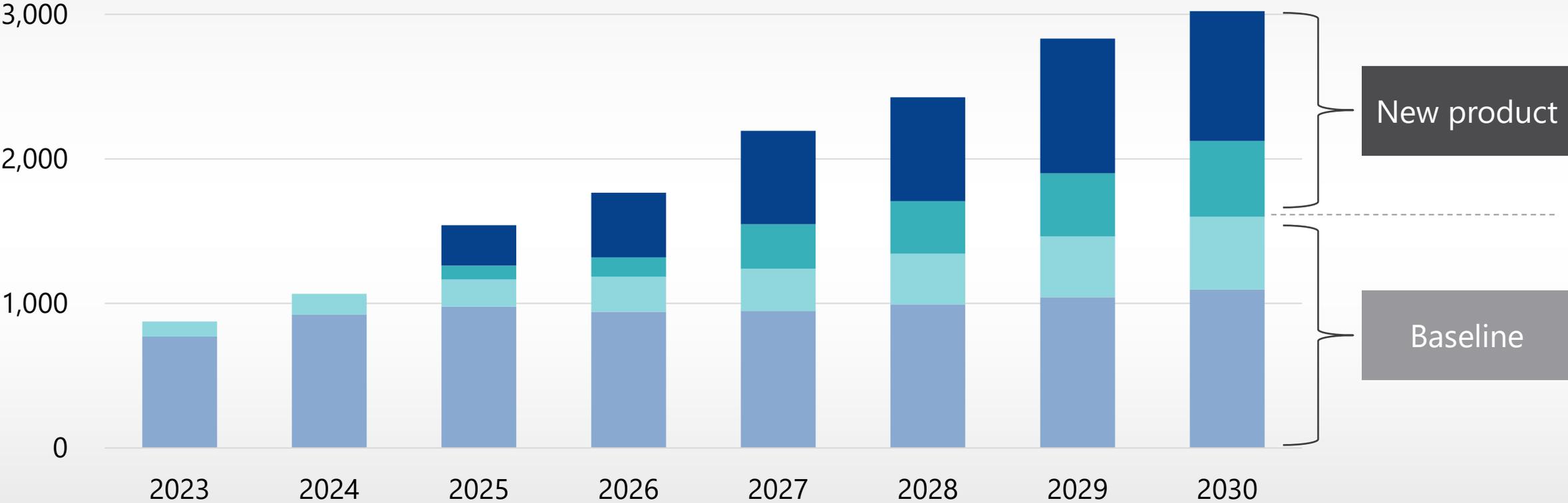


■ Renesas content
 ■ Renesas opportunity

DATA CENTER PERFORMANCE DIGITAL POWER SAM EXPANSION OPPORTUNITY

(oku yen)

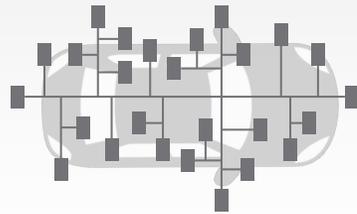
- Baseline - Non-AI
- Baseline - AI
- New Products - AI
- New Products - Non-AI



Source: Renesas estimation 1 USD=100 JPY

DIGITAL MULTIPHASE MIGRATION IN AUTOMOTIVE

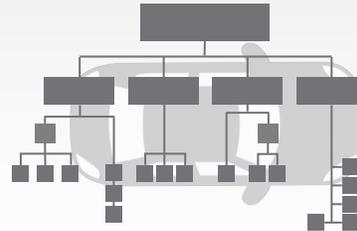
Today



Distributed architecture

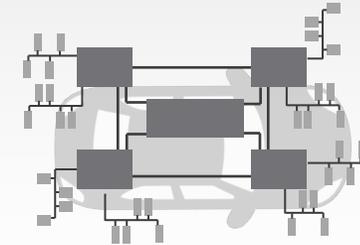
- Distributed low power MCU's
- No application for multiphase

Tomorrow



Centralized architecture

Future



Zone architecture

- Software-Defined Vehicle
- High compute/High Security

High power multiphase needed

Digital control
& Telemetry

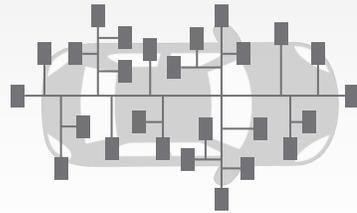
Performance-
based
technology

Readiness
& Quality

Capacity,
manufacturing
& supply

TIMING CONTENTS INCREASE IN AUTOMOTIVE

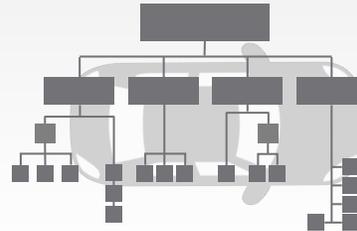
Today



Distributed architecture

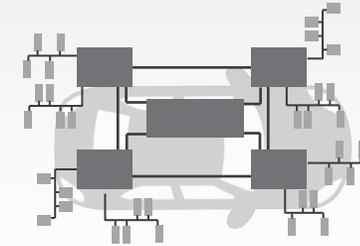
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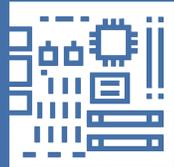
~1 clock

~2 clocks

>4 clocks

Contents per vehicle

UX ENHANCEMENT



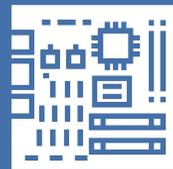
Development kits



Embedded SW
(Flexible software package)



Tool chains
(e² Studio)



Configurable
mixed-signal tools



Integrating
AI training models

FINANCIAL MODEL

 Grow @SAM++

 GM \approx 60%

 OM 30-35%

SUMMARY



Market share gain for MCU and MPU,
using attach as a growth opportunity

Exponential data growth, pervasive AI

Integrating AI elements into industrial
infrastructure, and IoT

UX enhancement & SG collaboration



THANK YOU

(FORWARD-LOOKING STATEMENTS)

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