

**Medium-term Management Plan**

# **DRIVE NTN 100**

**DRIVE NTN Transformation for New 100**

May 17, 2018

NTN Corporation

# NTN Corporate Philosophy and Vision

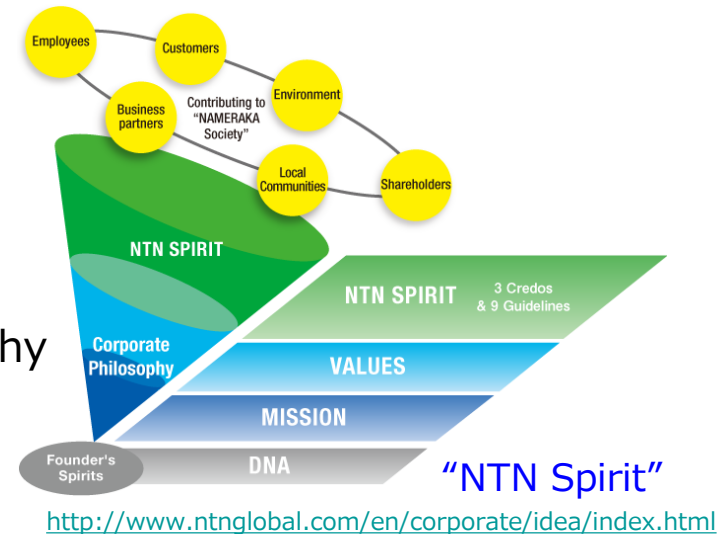
## NTN Corporate Philosophy

“We shall contribute to international society through creating new technologies and developing new products”

## Corporate philosophy code of conduct "NTN Spirit"

Newly established for the Company's 100th Anniversary

Deepen the understanding of corporate philosophy and promote its implementation



## Our Vision

- (1) A company where its corporate philosophy is understood by all employees around the world and where all employees think and act for themselves
- (2) A company with original new products and services, appreciated for its high quality and functions, and has a global presence
- (3) A company where everyone involved with NTN be able to be proud of the "NTN" brand

# Initiatives for Realizing Our Vision

**Our Vision toward a New 100 Years**

**(1) Strengthen core technologies and products**  
Pursue competitive advantages (over other suppliers)

**Sustainable growth**

**(2) Develop businesses in new areas**  
Utilize core competence and cooperation with external organizations

**Management bases that support our businesses**

- ESG
- Profit creation
- Pursue high productivity and quality
- Improve efficiency in asset management

**Corporate Philosophy**

**“We shall contribute to international society through creating new technologies and developing new products”**

# Initiatives for ESG

NTN is working on ESG issues through the implementation of its corporate philosophy, contributing to the realization of a sustainable society

## Environmental

- ✓ Develop innovative technologies, products, and services
- ✓ Reduce environmental burdens
- ✓ Prevent global warming



NTN hybrid street light that does not emit CO<sub>2</sub>

## Social

- ✓ Social contribution activities
- ✓ Coexistence with local communities
- ✓ Work style reform



Contributing to the revitalization of local communities



"NTN Rotating Workshop" – Environmental education to the next generation



Improving working environment – The second intra-company child day care center in NTN

## Governance

- ✓ Strengthen and enhance corporate governance
- ✓ Risk management
- ✓ Promote compliance



CSR global conference



BCP/BCM committees

## Responding to social issues

### UN Global Compact –

Ten principles in four areas: human rights, labor, environment, and anti-corruption

### Sustainable Development Goals (SDGs) –

Business activities in consideration of SDGs



## Adopted in the SRI indices

### Promote the disclosure of ESG information



FTSE4Good



Member of SNAM Sustainability Index 2017



FTSE Blossom Japan



NTN is a company selected in the ESG indices adopted by the GPIF

# NTN in 10 Years

## NTN in 10 years

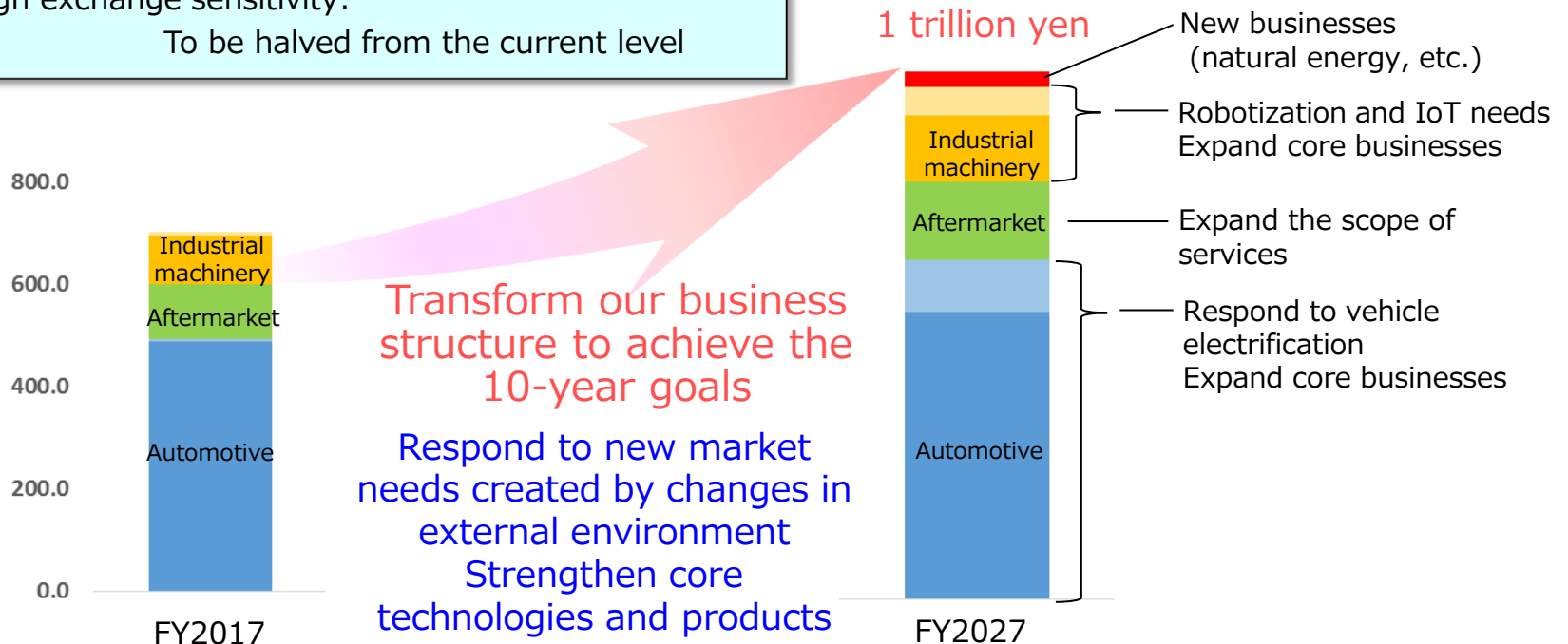
Transform from a "Manufacturing Company" into a "Company that Delivers Value to Customers through Products and Services"

### Numerical targets

- Net sales: 1 trillion yen or more
- Operating income to sales: 10% or more
- Total assets turnover: 1.0 or more
- Foreign exchange sensitivity: To be halved from the current level

## Changes in external environment

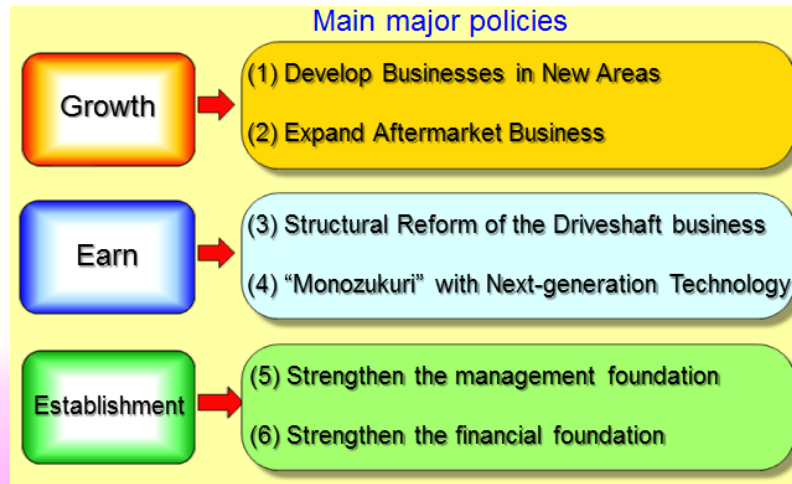
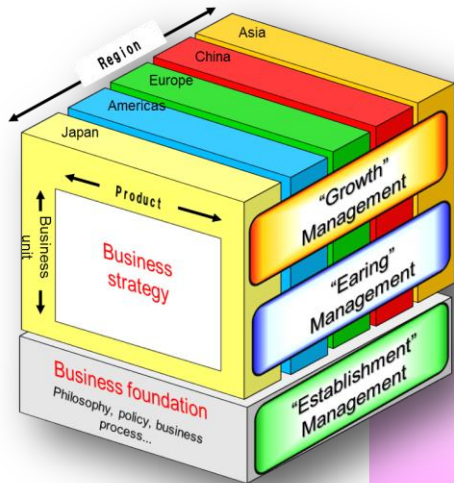
- Automotive industry: A change that occurs only once a century (CASE)
- Overall industry: IoT, robotization, and AI
- Social issues: Population increase, climate change, resource depletion, poverty, starvation, etc. (SDGs)



# Business Review and Accomplishments

Previous Medium-term Management Plan "NTN100" April 2015 through March 2018

**Building a foundation for the next 100 years** in accordance with three basic policies: "Manage Growth," "Manage Profitability," and "Manage Foundation"



Transform our business structure

**Develop businesses in new areas**

- (1) Commercialize EV-related products (actuator sales, licensing agreements)
- (1) Commercialize green energy products (start of sale)

**Strengthen core technologies and products**

- (2) Expand the scope of aftermarket services
- (3) Improve the profitability of driveshafts (+4.5%)
- (4) Practical use of next-generation technologies(EBW, etc.)

**Build a foundation for transformation**

Drive forward the transformation of our business structure in the next three years "DRIVE"

**Management bases that support our businesses:**

- (5) Step up the existing compliance structure
- (6) Reduce interest-bearing debts, etc.

# Basic Policy for "DRIVE NTN100"

## Basic Policy

Drive forward the transformation of business structure for the new 100 years

**DRIVE NTN Transformation for New 100**

Period: April 2018 through March 2021

- Integrate latest technologies (**D**igitalization) into the management resources that NTN has cultivated (**R**esources)
- Develop innovative technologies, products, and services (**I**nnovation)
- Accelerate global procurement and Accelerate centralized purchasing (**V**ariable cost reformation)
- Achieve the world's highest productivity and quality and improved efficiency in asset management (**E**fficiency improvement)

**D**igitalization

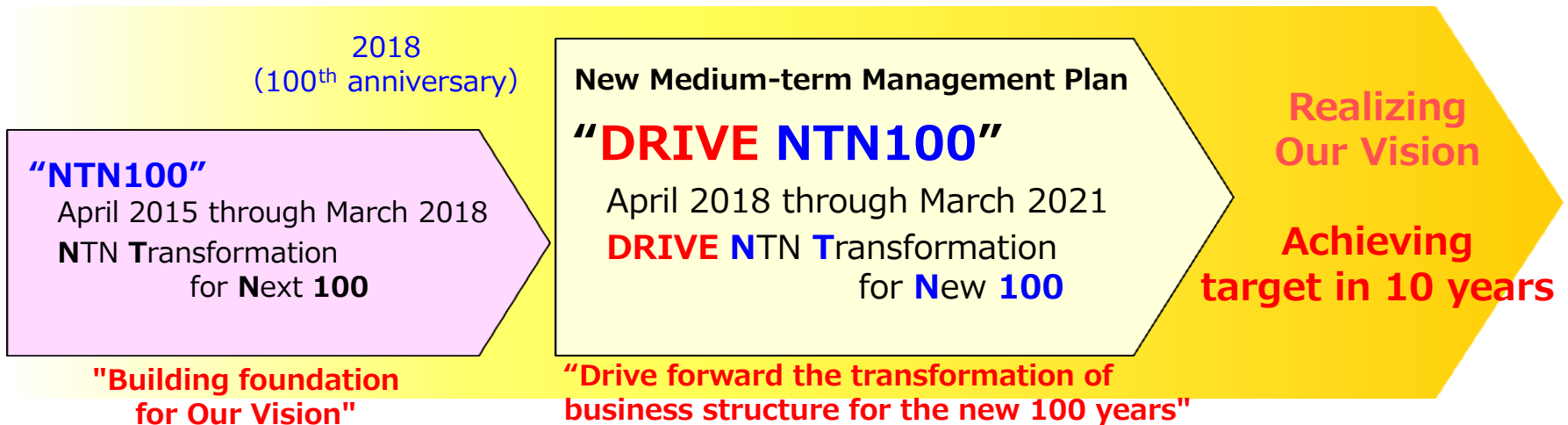


**R**esources

**I**nnovation

**V**ariable cost reformation

**E**fficiency improvement



# 3-Year Plan for "DRIVE NTN100"

	Revival 2014 FY2014	NTN100 FY2017			DRIVE NTN100 FY2020	
	Results ①	Plan	Results ②	②vs① excl. Forex	Plan ③	③vs② excl. Forex
Net Sales	¥701.9 billion	¥800.0 billion	¥744.4 billion	+9%	¥800.0 billion	+12%
Automotive	¥480.5 billion	¥530.0 billion	¥508.6 billion	+9%	¥550.0 billion	+13%
Industry Machinery	¥109 billion	¥120.0 billion	¥119.1 billion	+12%	¥125.0 billion	+11%
Aftermarket	¥112.4 billion	¥150.0 billion	¥116.7 billion	+7%	¥125.0 billion	+13%
Operating Income	¥43.9 billion	¥70.0 billion	¥39.6 billion	-2%	¥57.0 billion	+68%
Automotive	¥18.4 billion	¥32.0 billion	¥21.8 billion	+32%	¥30.0 billion	+62%
Industry Machinery	¥6.3 billion	¥9.0 billion	¥2.8 billion	-48%	¥7.0 billion	+368%
Aftermarket	¥19.2 billion	¥29.0 billion	¥15.0 billion	-20%	¥20.0 billion	+47%
Operating Margin	6.2%	8.8%	5.3%	-0.6pt	7.1%	+2.4pt
Automotive	3.8%	6.0%	4.3%	+0.8pt	5.5%	+1.7pt
Industry Machinery	5.7%	7.5%	2.3%	-3.1pt	5.6%	+3.9pt
Aftermarket	17.1%	19.3%	12.9%	-4.3pt	16.0%	+3.6pt
Net Income	¥23.4 billion	¥42.0 billion	¥20.4 billion	-	¥30.0 billion	-
Exchange rates	USD=¥109.8	USD=¥110	USD=¥110.9	-	USD=¥110	-
	Euro=¥138.7	Euro=¥130	Euro=¥129.6	-	Euro=¥115	-



# Accelerating Initiatives in the Next 3 Years

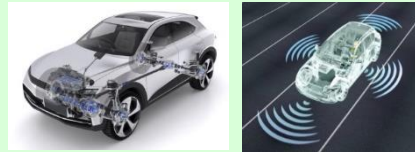
Drive forward transformation: Strengthen core technologies and products, develop businesses in new areas, strengthen management bases that support our businesses and further improve efficiency in asset management

**Develop  
businesses  
in new areas**

Natural energy, etc.

Utilize core technologies  
and external technologies

Automobile  
business



Improve the profitability of core  
products  
Product development in response  
to vehicle electrification

Industrial  
machinery  
business



Expand core businesses  
Develop robot and IoT-related businesses

Aftermarket business



Reinforcing sales and technical  
service network

**Strengthen  
management bases  
that support our  
businesses**

Focus our efforts on improvements in  
profitability and asset management  
efficiency in preparation for new  
competitive environments

Variable cost reformation  
Structural reform of man-hours and resources  
Enhanced SCM and concentrated investment

# Automotive Business (1): Market Trends and Goals

Target: As an indispensable presence for the automotive market, NTN will become a company that offers products and services for vehicles all over the world

## Market trends

### 1. Electrification and EVs, automated driving

Connected

Autonomous (automated driving)

Shared (from ownership to sharing)

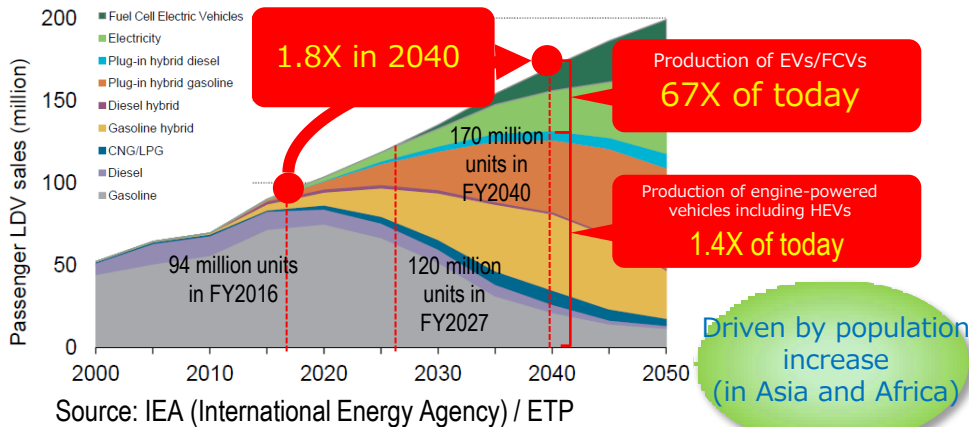
Electric (vehicle electrification)



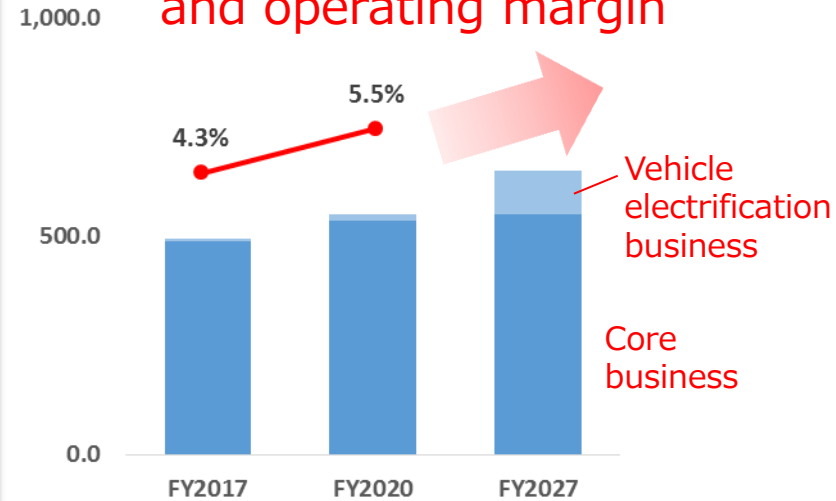
### 2. Increasing global automobile production

Automobile production will increase by 1.8 times by 2040 compared to that of today

- Electric vehicles (EVs/FCVs): 67X
- Engine-powered vehicles including hybrids: 1.4X



## Projections of net sales and operating margin



# Automotive Business (2): Strengthen Core Products and Efforts for Business in New Areas

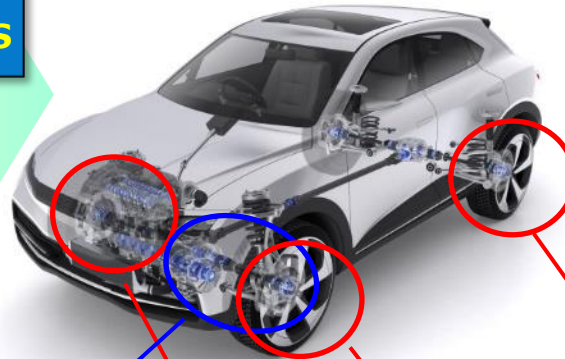
Improve the profitability of core businesses and integrate mechanical modules into control systems taking advantage of core competence

## Strengthen core technologies and products

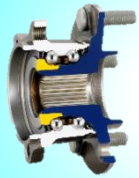
Become the world's top maker of drive-train systems (including EVs)

## Develop businesses in new areas

Respond to electrification and EVs



### Low friction Lightweight



Hub bearings  
World's No. 1 share

Driveshafts  
World's No. 2 share

### Respond to 48V mild HVs Vehicle stabilization Expanding the scope of electric-powered devices



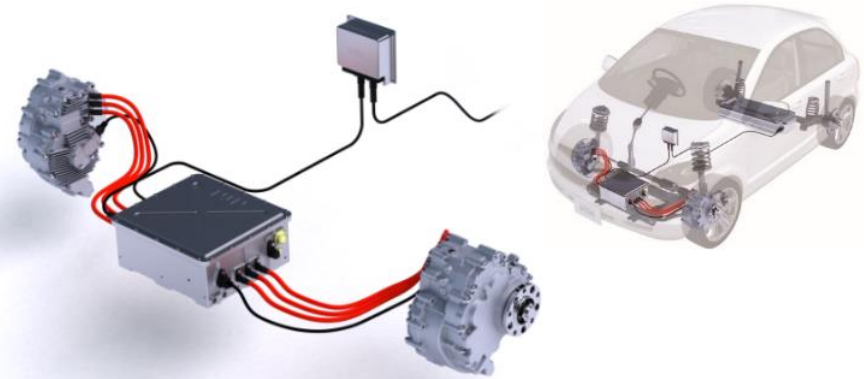
Electric motors and actuators

"sHUB"  
Hub bearing with a power steering function

"eHUB"  
Hub bearing with a motor-generator function

# Automotive Business (3): Topics

For the world's first mass-production of an EV using in-wheel motors



**In-wheel motor driving system**

## **"Concluded license contract with Chinese EV manufacturer"**

NTN will provide technical support in the mass production of in-wheel motors in China

**Business partner: Changchun Fawsn Auto Tech Co., Ltd. (FSAT)**

**FSAT's plans: Starting the production of an EV using in-wheel motors in 2019, and producing 300,000 units/year of the EV in 2023**

**NTN expects to receive technical licensing revenue of approximately 7.0 billion yen/year in 2023**



An EV that FSAT will mass-produce

# Industrial Machinery Business (1): Market Trends and Target; Core Products

Target: NTN will become a company that customers in the industrial machinery market rely on most for its exceptional technological competence

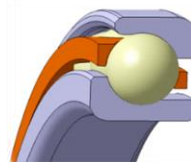
## Market trends

- Widespread use of IoT and utilization of AI in the industry
- Increasing demand for robot-related products
- Preventive measures through monitoring



## Strengthen core technologies and products

Further development of core technologies;  
development of high-performance products

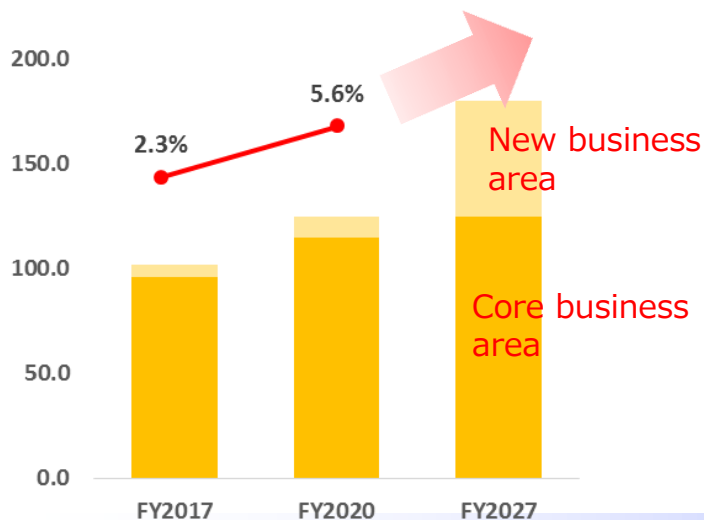


For gearboxes of robot  
Compact, high rigidity



For main spindles of machine tools  
Proprietary air-cooling technology

## Projections of net sales and operating income to sales



## Market forecasts by industry

	Industry	FY2017 vs FY2020
Growth	Robot and Gearbox	↑ ↑ ↑
	Wind Turbine	↑ ↑ ↑
	Aerospace	↑ ↑ ↑ ↑
	Rolling Stock	↑
Core	Construction Machinery	→
	Agricultural Machinery	↑ ↑
	Machine Tool	↑ ↑



For main spindles of wind power generators  
Long-life, large and offshore needs

# Industrial Machinery Business (2): Develop businesses in new areas

## New business area: Robot-related business (robotics)

Develop system products for collaborative robots

### i-WRIST™

Parallel link high speed angle control equipment



Early 2000



Constant velocity joint with an operating angle of 90deg



Grease application



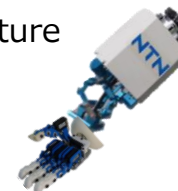
Appearance inspection

Today



Robot wrist module

Future



AI-controlled robotic hand system

Labor-saving applications using wrist joint modules

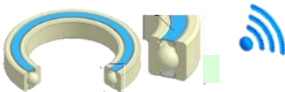
## New business area: Service, solutions business

From monitoring to AI WEB services

Develop latest algorithms



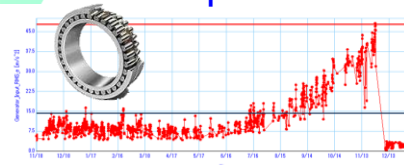
Bearing condition monitoring system (CMS)



Sensornize bearings



AI-based bearing residual life prediction



Research for the application of microscopic coating technology in the medical field



- Early illness detection (microscopic coating of reagents)
- Drug development, regenerative medicine (iPS-derived 3D tissue layers)

# Aftermarket Business

## Tasks

- Enhance brand power through the expansion of MRO sales
- Expand aftermarket parts lineup not to miss sales opportunities

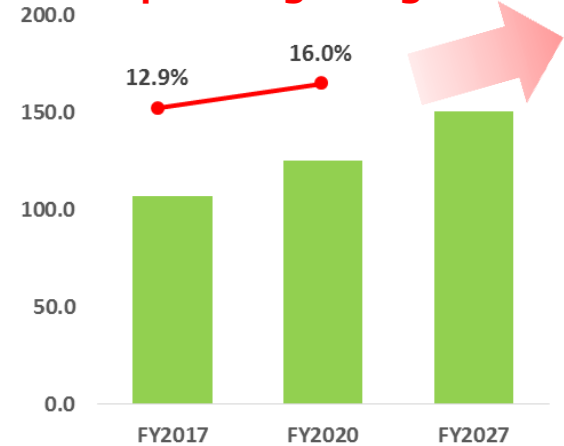


## Actions

- Continue to improve technical services including maintenance
- Establish a production system independent of OEM business, and maintaining sufficient quantities of aftermarket parts in stock
  - ➔ Utilize overseas production bases and globally available stocks
  - ➔ Aftermarket parts production and efficient stock management using a new core IT system

- Global Utilize overseas production bases (Italy and Germany) and globally available stocks  
Reinforce a system for MRO sales expansion led by technical groups
- Japan Drastically change the existing sales organization (integrating domestic sales channels, establishing NTN Sales Japan Corporation)  
➔ Expand the existing sales and service network by drastically changing the sales system and by introducing a core IT system

## Projections of net sales and operating margins



Proactive utilization of overseas production bases

## Target

Transform our business from products to services, or from selling bearings to selling services

- ➔ Utilize bearing sensing technology for industrial machinery business



# New Business: Green Energy Products Business

From BtoB to BtoC ... Build sales and service networks for green energy products



## NTN Micro Hydro Turbine

**The world's first flow-through hydro power generator.** Launch the type intended for electric power selling. Promoting the development of high-power type.



NTN Green Power Park  
(Kuwana, Mie)

## NTN Hybrid Street Light

**The highest hybrid power generation performance in the world.** Promote the creation of demand for this product as a social stock that contributes to crime prevention and disaster preparedness. Develop a community surveillance function and a Wi-Fi-based communication function jointly with Osaka University, etc. Install this product at disaster evacuation sites (500,000 locations in Japan).



Utilized in a campaign to invite Osaka Expo 2025 (NTN is an official partner)

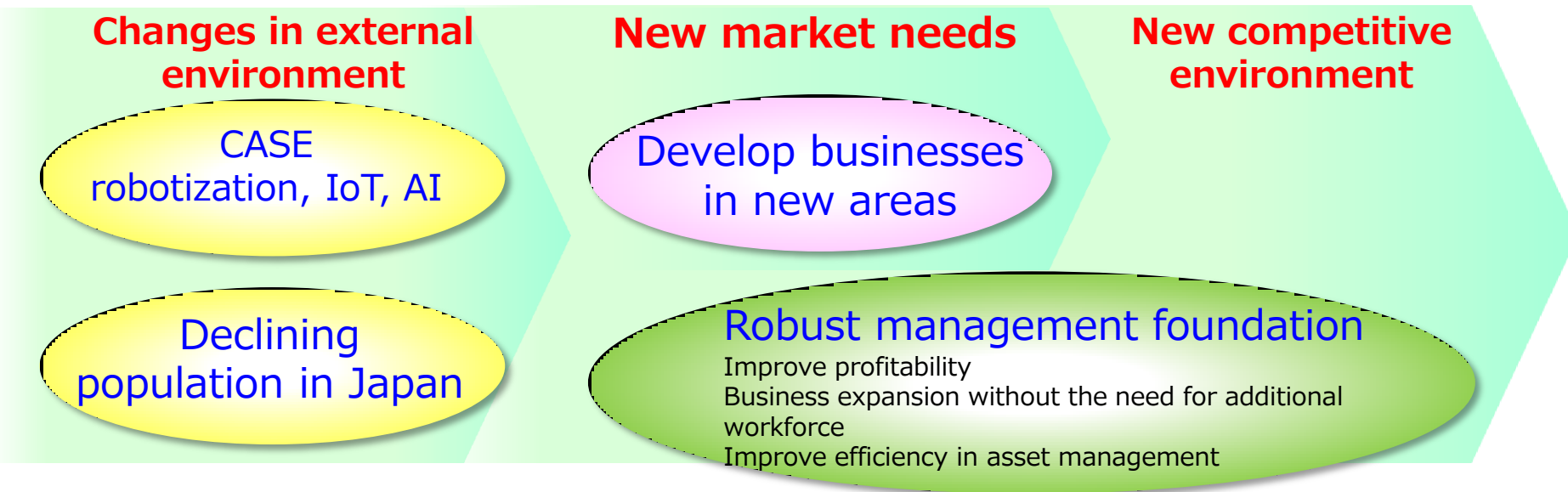


**Contribute to a low-carbon society; responding to the needs to utilize natural energy in local communities**



# Strengthen Management Bases to Respond to Future Changes

Robust management bases needed to overcome changes in competitive environments



Focus points of "DRIVE NTN100" in building robust management bases

- **Variable cost reformation**
- **Structural reform of man-hours and resources**
- **Enhanced SCM and concentrated investment**



## NTN in 10 years

- Operating profit to sales ratio:  
10% or more
- Total assets turnover: 1.0 or more
- Foreign exchange sensitivity:  
To be halved from the current level

# Variable Cost Reformation

Build a procurement network that supports the expansion of global production capacity and the utilization of external production capacity  
Reduce external procurement cost

## 1. Accelerate global procurement

- Promote procurement in the most appropriate regions based primarily on local procurement
- Pursue cost reduction effects
- Minimize exchange and inventory risks

## 2. Accelerate centralized purchasing

- Promote the control of the number of suppliers and the centralization of procurement price management

## 3. Establish Procurement Headquarters (April 2018)

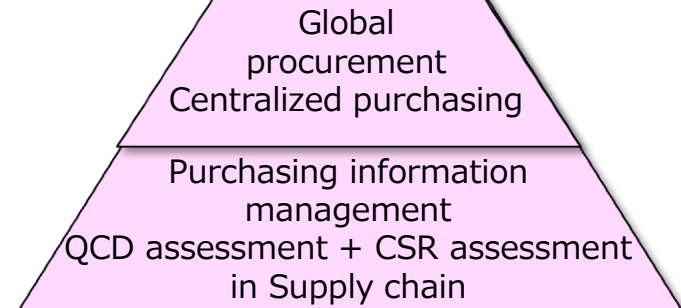
- Promote global procurement
- Promote centralized purchasing
- Quality, price, production capacity, and compliance assessment (QCD+CSR assessment)

### Goals for effects of variable cost reformation

3rd year: 3 billion yen on top of conventional cost reductions

10th year: 30 billion yen on top of conventional cost reductions

### Reducing external procurement cost



# Structural Reform of Man-Hours and Resources

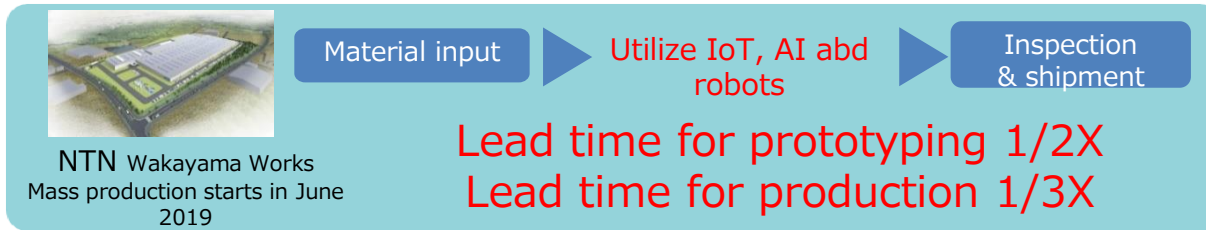
Use IoT, AI, and robots to take care of part of operations in the manufacturing department

Introduce RPA to improve the quality of operations in back-office departments

## 1. Promote the introduction of smart factory designs

- Optimize and automating manufacturing processes using IoT and AI
- Use robots to take care of part of operations in the manufacturing department
- Reduce lead time to improve responsiveness to customer needs

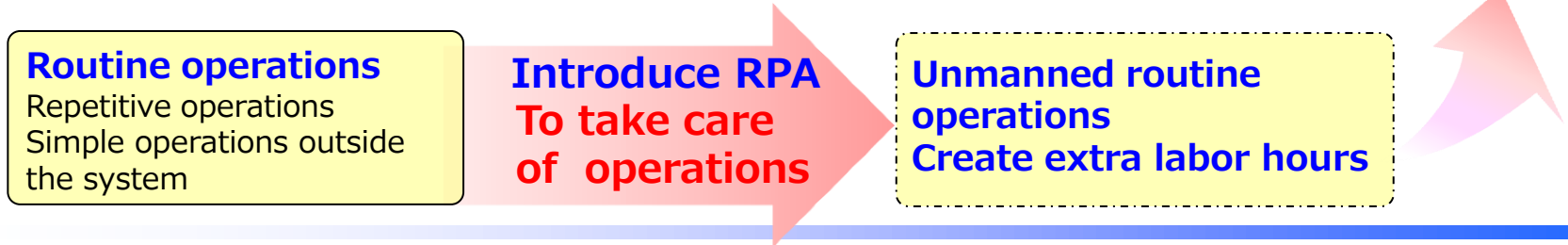
**3-year goals for reductions in personnel expense**  
Manufacturing department: ¥1 billion  
Technical and administrative departments: ¥500 million



## 2. Use robots to take care of part of operations in indirect departments (introduction of RPA)

- Introduce RPA (Robotics Process Automation) in indirect departments
- Use robots to take care of routine operations in technical and administrative departments

**High-value-added operations**  
Shift workforce to more professional work such as new product development

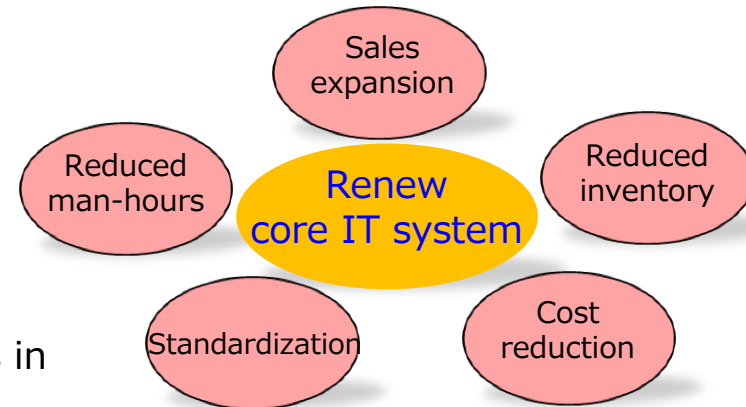


# Enhance SCM and Concentrated Investment

Renew the core IT system for enhanced SCM and concentrated investment

## 1. Enhance supply chain management

- Utilize the new core IT system
- Efficient inventory holdings and reducing lead time  
Inventory visualization and efficient inventory holdings  
Promoting the utilization of globally available inventories



**Enhance and optimize SCM**

## 2. Concentrated investment

- Intensively investing management resources in processes in which our technical strengths can be demonstrated  
Proactively utilizing outsourcing

### Reorganize existing domestic production with a central focus on Wakayama Works

- Reorganize domestic radial ball bearing production bases in Japan
- Intensively invest in high-value-added products such as for EVs. Utilize outsource for standard products



**Concentrate on high-value-added products**

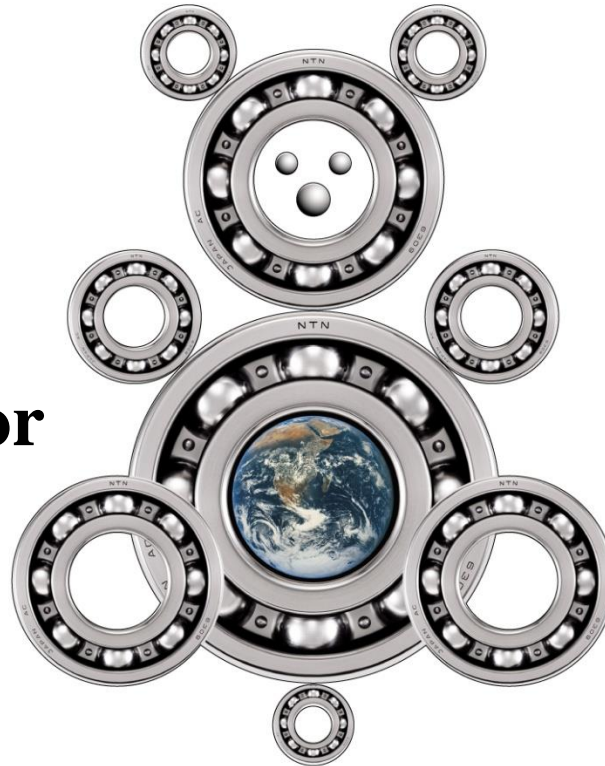
# Key Management Indicators of "DRIVE NTN100"



		DRIVE NTN100		
		FY2017 Results	FY2018 Plan	FY2020 Target
Net Sales		¥744.4 billion	¥750.0 billion	¥800.0 billion
Operating Income		¥39.6 billion	¥43.0 billion	¥57.0 billion
Operating Margin		5.3%	5.7%	7.1%
Net Income		¥20.4 billion	¥21.0 billion	¥30.0 billion
Capital expenditure		¥37.6 billion	¥55.0 billion	¥170.0 billion/3 years (incl. intangible ¥20.0 billion)
FCF		¥13.4 billion	¥0.0 billion	¥45.0 billion/3 years
Inventory turnover ratio		4.1 times	4.0 times	4.5 times
Net D/E ratio		0.9	1.0	1.0 or less
Equity to capital ratio		30.2%	29.5%	30% or more
ROE		8.4%	8.1%	10.0% or more
NTN-ROI*		5.7%	5.9%	7.5% or more
Dividends		¥15.0	¥15.0	¥15.0 or more
Exchange rates	USD	¥110.8	¥105	¥110
	Euro	¥129.6	¥130	¥115

\*NTN-ROI = Net operating income after tax / (Inventories + tangible fixed assets)

**DRIVE**  
**NTN**  
**Transformation for**  
**New**  
**100**



For New Technology Network

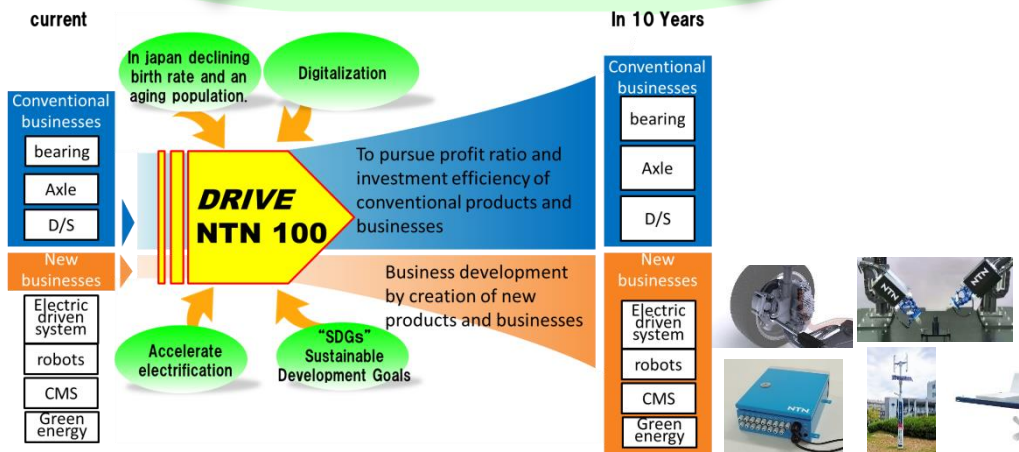
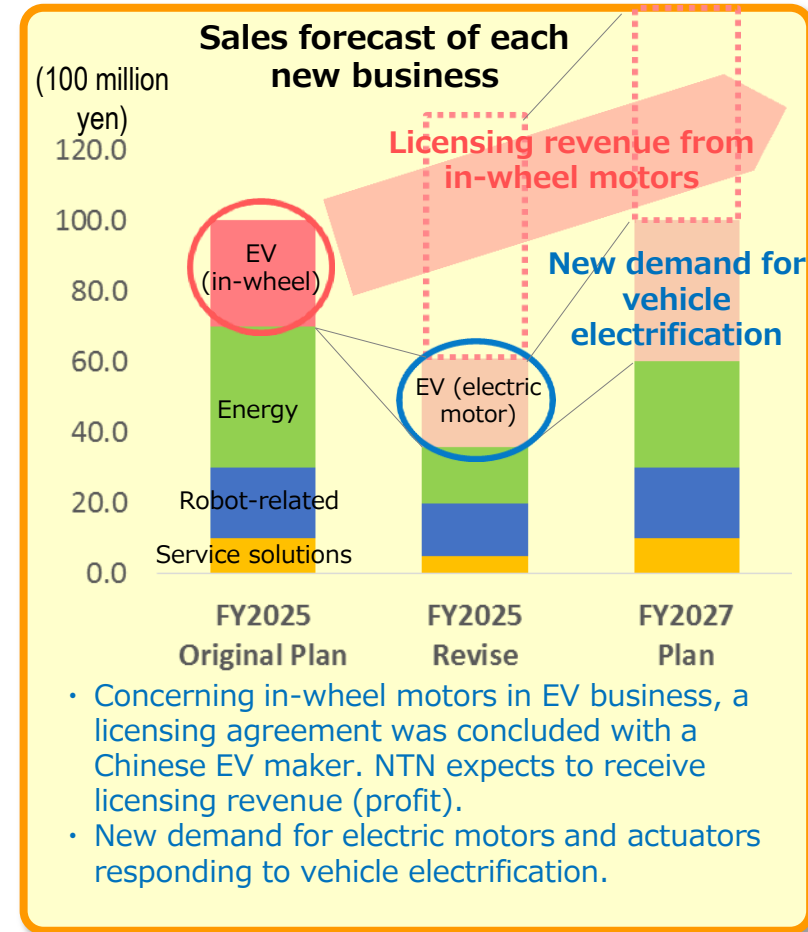
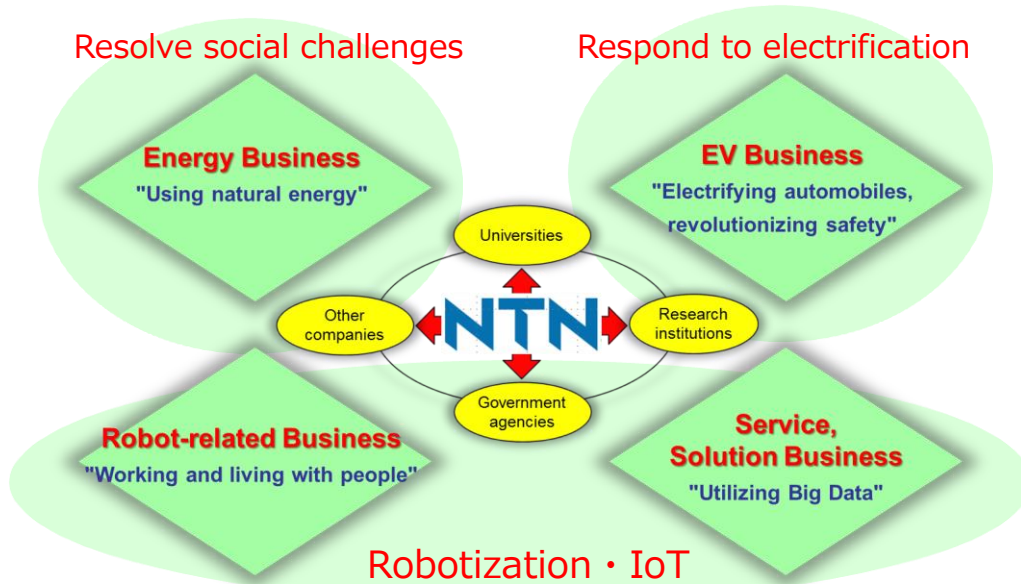


NTN corporation

- This presentation material, our statements made during the presentation, and our comments made during the subsequent Q&A session include forward-looking statements about our future performance and business strategies. These statements and comments are made based on the information currently available and at the discretion of our management.
- These statements and comments based on future forecasts do not guarantee our future performance. Please understand that actual results may differ from our performance forecasts depending on various factors such as changes in demand for our products, exchange rates, interest rates, and contingent liabilities.

# Reference: Sales Forecasts in New Business Areas

Business development in four new business areas (since 2015)  
Accelerate the business development through "DRIVE NTN100"



# Reference: Results of Previous Medium-term Management Plan "NTN100"

	Revival 2014 FY2014 Results	NTN100 FY2017 Plan	NTN100 FY2017 Results
Net Sales	¥701.9 billion	¥800.0 billion	¥744.4 billion
Operating Income	¥43.9 billion	¥70.0 billion	¥39.6 billion
Operating Margin	6.2%	8.8%	5.3%
Net Income	¥23.4 billion	¥42.0 billion	¥20.4 billion
Reduction of interest-bearing debt (excluding foreign exchange impact)	-	¥60.0 billion reduction /3 years	¥27.8 billion reduction /3 years
Inventory turnover ratio	3.8 times	4.5 times	4.1 times
Capital expenditure	-	¥135.0 billion/3 years	¥109.3 billion /3 years
FCF	-	¥67.0 billion/3 years	¥47.1 billion/3 years
Equity to capital ratio	28.6%	30.0% or more	30.2%
Net D/E ratio	1.11	1.0 or less	0.9
R O E	10.5%	Over 14%	8.4%
Dividend payout ratio	13.7%	Average 30%	Average 49%
Exchange rates	USD=¥109.8 Euro=¥138.7	USD=¥110 Euro=¥130	USD=¥110.9 Euro=¥129.6