

**NSG**  
GROUP

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**NSG Group**  
**FY2019 Annual Results**  
(from 1 April 2018 to 31 March 2019)

**Nippon Sheet Glass Company, Limited**  
**10 May 2019**



**Shigeki Mori**  
Chief Executive Officer

**Kenichi Morooka**  
Chief Financial Officer

**Clemens Miller**  
Chief Operating Officer

# Agenda



1. FY2019 Financial Results
2. FY2019 Business Update
3. FY2020 Forecast
4. Ordinary Dividends and Redemption of Class A Shares
5. Medium-term Plan (MTP) Phase 2 Update & FY2020 Policy
6. Summary

## FY2019 Results Highlights



	(JPY bn)	
Revenue	<b>612.8</b> (+2%)	Reflects stable or improving conditions in some areas, offset by sluggish market conditions in Automotive Europe and North America in H2
Trading profit	<b>38.8</b> (+3%)	Sixth consecutive year of profit growth
Profit before taxation	<b>22.7</b> (+3%)	Finance cost reduction and better JV results more than offset increase in exceptional costs
Taxation	<b>(8.4)</b>	No repeat of prior-year one-off charge (JPY 9.6 bn) in the U.S.
Profit attributable to owners of the parent	<b>13.3</b> (+116%)	Significant improvement in attributable profit
Free cash flow	<b>0.9</b>	Due to below-target operating cash flows and working capital increases

### Improved and stabilized attributable profit

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Revenue increased by 2% from the previous year to 612.8 billion yen. At constant exchange rates, the increase would have been 6%. The Group experienced sluggish conditions in Automotive European and North American markets in the second half of the year, while other markets were stable.

Trading profit increased by 3% from the previous year to 38.8 billion yen. The Group attained a sixth consecutive year of profit growth, despite the sluggish market conditions in Automotive Europe and North America, in addition to increase in energy-related costs and deterioration of South American currencies.

Profit before taxation improved by 3% from the previous year to 22.7 billion yen. Despite the restructuring costs in Europe and Japan in Exceptional items, a reduction of net finance costs and improved Cebrace's results which also includes an one-off gain due to sale tax refund recorded in the first half of the year, contributed to this improvement.

Tax charges decreased significantly to 8.4 billion yen, as last year's charge of 9.6 billion yen due to a change in the U.S. tax rate was not repeated.

As a result, profit attributable to owners of the parent improved significantly by 7.1 billion yen from the previous year to 13.3 billion yen.

Free cash inflow was 0.9 billion yen. This was below the previous year due to increases in working capital and a reduction of asset disposal proceeds from the previous year.

## Consolidated Income Statement



(JPY bn)	FY2018 <sup>*1</sup>	FY2019	Change
<b>Revenue</b>	<b>598.9</b>	<b>612.8</b>	<b>13.9</b>
<b>Trading profit</b>	<b>37.7</b>	<b>38.8</b>	<b>1.1</b>
Amortization <sup>*2</sup>	(2.0)	(1.9)	0.1
<b>Operating profit</b>	<b>35.7</b>	<b>36.9</b>	<b>1.2</b>
Exceptional items	(1.3)	(7.1)	(5.8)
Finance expenses (net)	(14.6)	(13.3)	1.3
Share of JVs and Associates	2.4	6.2	3.8
<b>Profit before taxation</b>	<b>22.2</b>	<b>22.7</b>	<b>0.5</b>
<b>Profit for the period</b>	<b>7.9</b>	<b>14.4</b>	<b>6.5</b>
<b>Profit attributable to owners of the parent</b>	<b>6.2</b>	<b>13.3</b>	<b>7.1</b>
EBITDA	<b>63.6</b>	<b>64.7</b>	

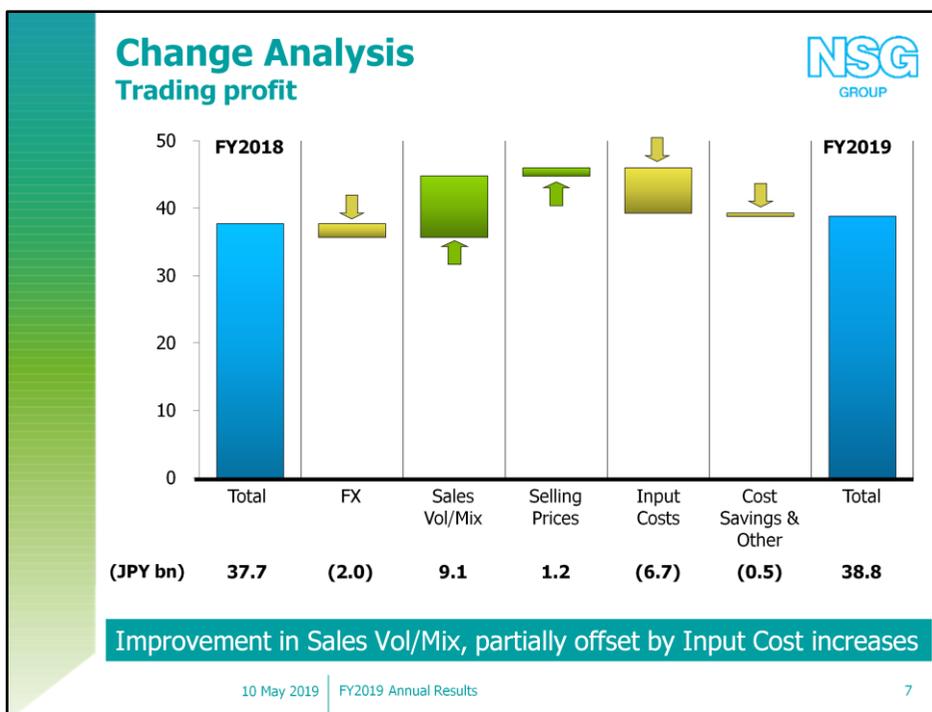
<sup>\*1</sup>: Restated due to adoption of IFRS 15 "Revenue from Contracts with Customers"  
<sup>\*2</sup>: Amortization arising from the acquisition of Pilkington plc only

Sixth consecutive year of profit growth, in line with forecast

The left column shows the last year's results and the right column shows the results of this year.

Revenue, trading profit and profit before tax are all as explained on the previous slide.

Results were in line with the forecast announced in February, as the Group attained sixth consecutive year of profit growth.



The FX impact is negative mainly due to the declining value of South American currencies, especially Argentine peso, including the JPY0.6 billion impact of hyper-inflation accounting.

Increases in volumes and improvements in product mix were seen in almost all of our businesses and regions.

Prices have generally remained stable across most of our businesses.

Input costs are affected mainly by increases in energy and logistics costs.

The cost savings and other column is slightly negative, as various factors such as labor and other cost increases, a production cost increase in certain regions and the effect of a float repair in Germany, were offset by cost reductions and efficiency improvements.

<h2>Key Performance Indicators</h2>		
	<u>31 March 2018</u> <sup>*1</sup>	<u>31 March 2019</u>
Net Debt (JPY bn)	306.5	<b>317.7</b>
Net Debt / EBITDA	4.8x	<b>4.9x</b>
Net Debt / Equity Ratio	2.1x	<b>2.4x</b>
Shareholders' Equity Ratio	17.1%	<b>16.2%</b>
Return on Equity (ROE)	4.7%	<b>10.3%</b>
	<u>FY2018</u> <sup>*1</sup>	<u>FY2019</u>
Operating Return <sup>*2</sup> on Sales	6.3%	<b>6.3%</b>

\*1: Restated due to adoption of IFRS 15 "Revenue from Contracts with Customers"  
\*2: Trading profit

**Net Debt/EBITDA ratio affected by increase in Net Debt**

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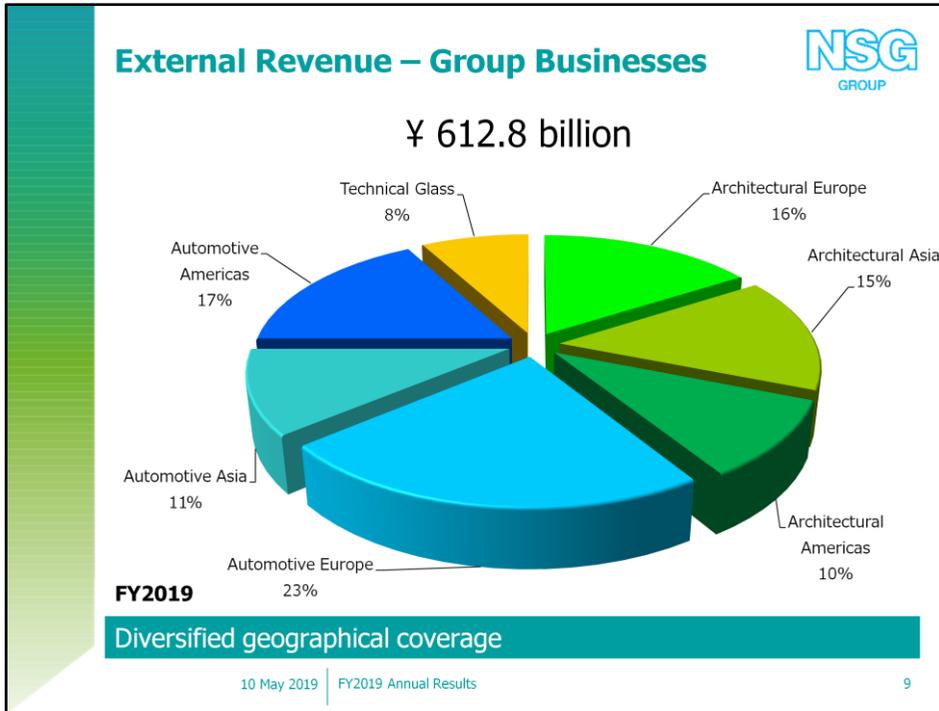
Affected by the working capital movements, net debt increased by 11.2 billion yen from the previous year to 317.7 billion yen.

The Net debt/EBITDA ratio worsened slightly from the previous year to 4.9 times, due to the increased net debt.

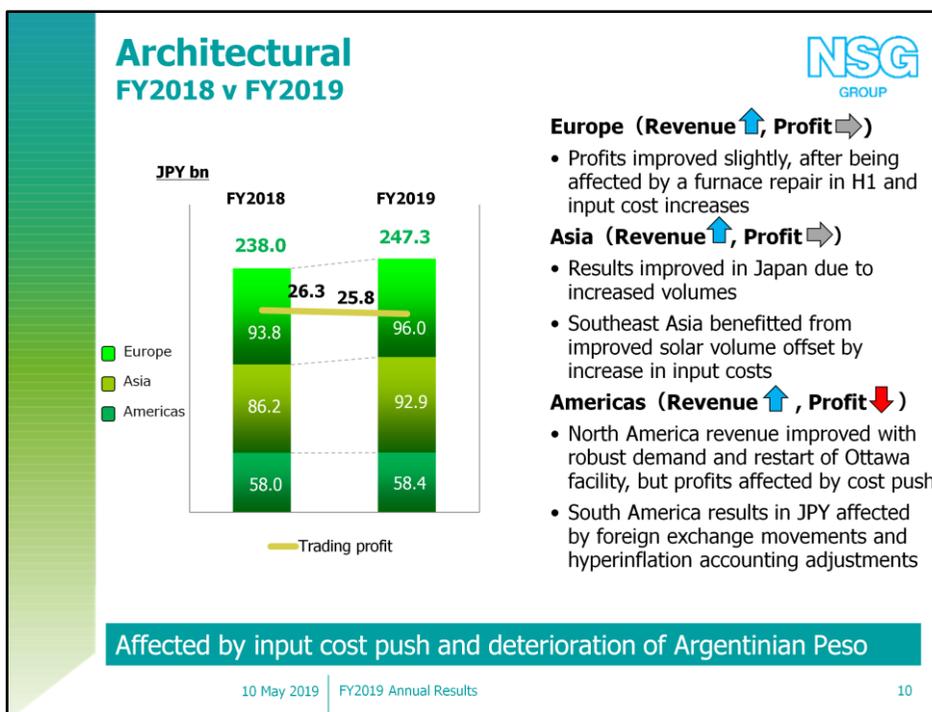
The Net debt/Equity ratio increased to 2.4 times, as net debt (numerator) increased and equity (denominator) decreased.

As result of weakening European and South American currencies, the shareholders' equity ratio stands at 16.2%.

Return on Equity (ROE) improved, as the attributable profit increased from the previous year.



40 percent of the Group's sales are in Europe, 33 percent in Asia including Japan and 27 percent in Americas.

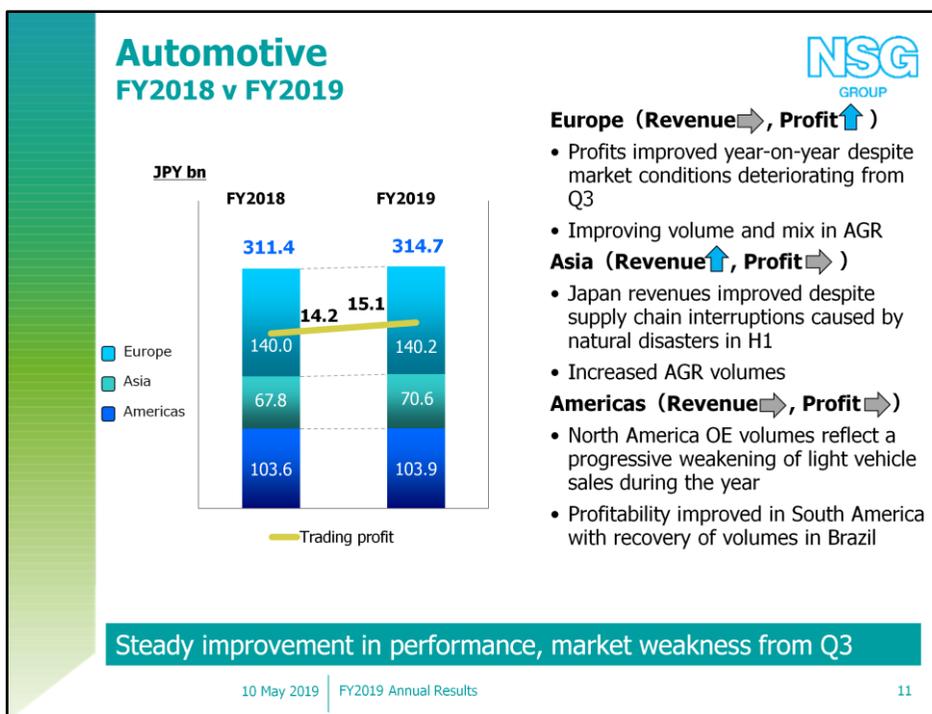


The revenue in our Architectural business increased by 4% from the previous year to 247.3 billion yen, but due to the increase in input costs and the translational impact of weakening South American currencies, the profit decreased by 0.5 billion yen to 25.8 billion yen.

In Europe, revenues increased, supported by robust demand and improved volumes and prices, but the profit improved only slightly due to increased energy-related input costs and the effect of a float repair in Germany earlier in the year.

In Asia, while affected by increased input costs, the performance in Japan improved due to increased volumes and prices. In South East Asia, increased Solar volumes contributed to profit, but this was offset by increased input costs.

In North America, revenues improved with robust market demand, in addition to the effect of restarting the Ottawa facility. South American markets remain robust and recorded improved local currency revenues and profits. However, affected by foreign exchange movements and hyperinflationary accounting adjustments, revenues and profits translated in Japanese yen decreased.



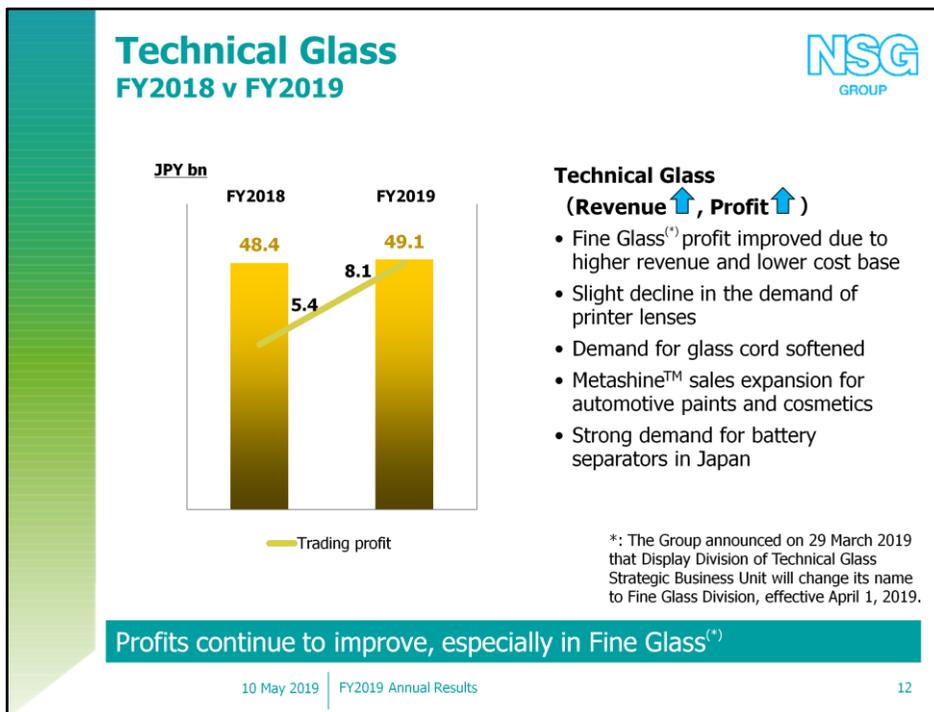
Automotive businesses recorded a revenue of 314.7 billion yen, which is an increase of 1% from the previous year. Profits increased by 6% to 15.1 billion yen. Despite being affected by the sluggish market conditions in Europe and North America during the second half of the year, revenues and profits showed growth from the previous year as a consequence of the stronger conditions experienced earlier in the year.

In Europe, market conditions softened after the implementation of WLTP(\*) measures in September 2019 exacerbated by decline in exports of luxury vehicles, but the Group's profit increased due to the performance earlier in the year.

In Asia, Japan was affected by the interruptions to the automotive supply chain arising from natural disasters in the first half of the year, but light vehicle sales were similar to the previous year and OE revenue increased year on year. In AGR business, volumes increased across the region, contributing to the improved profitability.

In the Americas, despite the OE business being affected by weakening market conditions, profitability in North America was stable due to a good level of volume and improved performance in AGR business. In South America, business performance also improved as Brazilian volumes continue to recover, but the reported results are affected by weakening Brazilian Real and Argentine Peso. The impact of hyperinflation accounting is less material for the Automotive business.

(\*) WLTP: Worldwide harmonized Light vehicles Test Procedure



As announced on 29 March, the Display Division, one of the four divisions in the Technical Glass SBU, has changed its name to the Fine Glass Division. The new name for the division reflects recent expansion of its business to automotive interior cover glass and other products beyond display.

Revenues improved by 1% from the previous year to 49.1 billion yen. Profits improved by 2.7 billion yen to 8.1 billion yen. Most businesses demonstrated a solid performance and Fine Glass's improved cost base contributed strongly to the profit growth.

Demand for the components used in multi-function printers declined slightly.

The demand for glass cord used in engine timing belts also softened, in line with Automotive market conditions in Europe and China.

Sales volume of Metashine increased, as demand for automotive paint and cosmetics applications was strong.

As for Battery separator, the automotive applications were robust in Japan.

## FY2020 Forecast Consolidated income statement



(JPY bn)	Actuals FY2019	Forecast FY2020	Change
<b>Revenue</b>	<b>612.8</b>	<b>620.0</b>	<b>7.2</b>
<b>Trading profit</b>	<b>38.8</b>	<b>37.0<sup>+2</sup></b>	<b>(1.8)</b>
Amortization <sup>+1</sup>	(1.9)	(2.0)	(0.1)
<b>Operating profit</b>	<b>36.9</b>	<b>35.0</b>	<b>(1.9)</b>
Exceptional items	(7.1)	(6.0)	1.1
Finance expenses (net)	(13.3)	(14.0) <sup>+2</sup>	(0.7)
Share of JVs and Associates	6.2	4.0	(2.2)
<b>Profit before taxation</b>	<b>22.7</b>	<b>19.0</b>	<b>(3.7)</b>
<b>Profit for the period</b>	<b>14.4</b>	<b>12.0</b>	<b>(2.4)</b>
<b>Profit attributable to owners of the parent</b>	<b>13.3</b>	<b>11.0</b>	<b>(2.3)</b>

<sup>+1</sup>: Amortization arising from the acquisition of Pilkington plc only

<sup>+2</sup>: As result of the adoption of IFRS16 'Leases', finance expenses expected to increase by JPY 1bn and operating expenses expected to decrease by JPY 1bn. No significant impact expected on profit before taxation or profit for the period.

FY2020 Forecast Assumptions:

Page 44: Depreciation, CAPEX, R&D expenditures  
Page 45: Foreign exchange rates and oil prices

**Decrease in profit reflects increases in input costs**

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Revenue is expected to improve slightly from the previous year to 620.0 billion yen due to an increase in VA sales, despite the challenging market conditions.

The market conditions of each businesses and regions will be discussed afterwards.

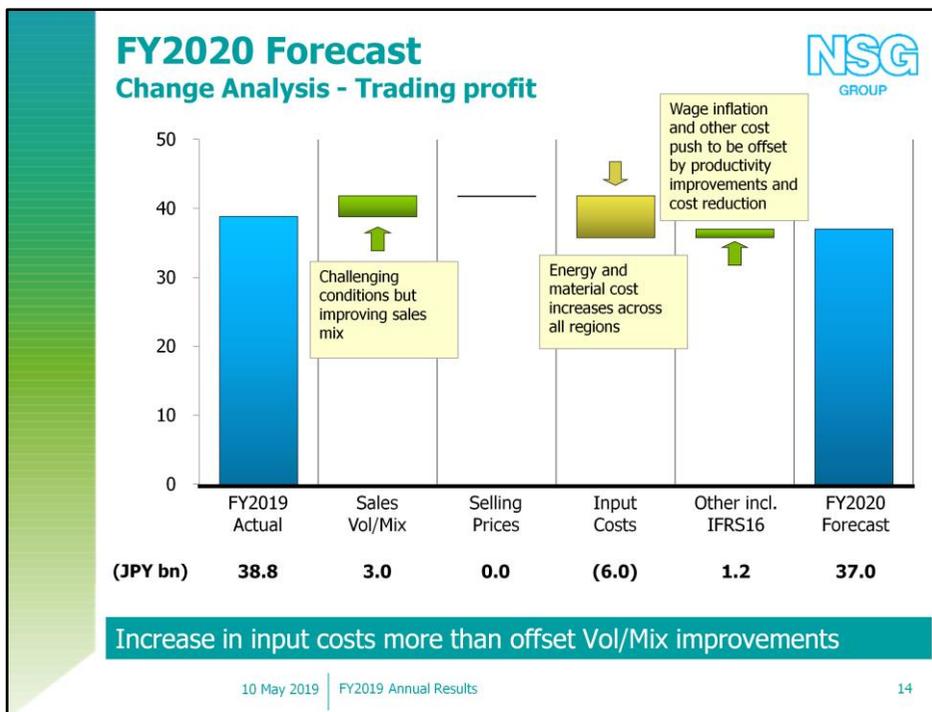
Trading profit is expected to show a modest decrease from the previous year to 37.0 billion yen, as raw materials and logistics costs are expected to increase in most of the regions.

Exceptional items will include restructuring costs to further improve operational efficiency and reduce cost base.

Net finance expenses are expected to increase by 1.0 billion yen from the previous year, due to the adoption of IFRS16.

Share of joint ventures and associates is expected to decrease despite the improved Cebrace results, as an one-off gain due to a sale tax refund in the first half of the previous year will not be repeated.

As a result, attributable profit of 11.0 billion yen will be slightly below the previous year.



Sales volume/mix is planned to be positive, as more challenging market conditions will be more than offset by the VA sales ratio improvement. We will talk about the market conditions more fully in the next slide.

Sales prices are forecast to be flat. Cost inflation in South America will be passed on to prices but the effect is excluded here.

Input costs are expected to increase in all regions, especially affected by rises in raw material and transportation costs. Architectural Glass will be most affected, as more than half of the impact will be borne by the business.

Other assumes wage inflation and other cost increases, which we plan to offset largely with the efforts of efficiency improvement and cost reduction. The 1.0 billion yen impact of lease accounting under IFRS16 will positively contribute to the trading profits.

Overall, as a result of the challenging market conditions expected, not all of the cost push is to be passed on to the customers through higher sale prices, resulting in a modestly lower trading profit forecast.

## Outlook



- **Overall**
  - Revenues slightly above FY2019 with further improved VA sales
  - Trading profit impacted by input cost increases, limited pass-through due to market conditions
- **Architectural: most affected by input cost increases**
  - European markets to remain robust
  - Asian markets to remain stable, while solar glass volumes to increase
  - Increasingly competitive markets in North America
- **Automotive: challenging market conditions expected**
  - Subdued demand in Europe
  - Cost increase expected in Asia, especially in Japan
  - North American markets to remain challenging, improving volumes in Brazil
- **Technical glass: markets generally positive**
- **Net debt: increase expected**
  - Recurring cash flows to be positive
  - Strategic investment projects impact
  - IFRS 16 impact expected - approximately JPY 40bn of new assets & liabilities (impact to Net Debt/EBITDA expected to be immaterial)

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Overall, revenue is expected to increase slightly due to improved VA sales. Trading profit is to reduce by 5% from the previous year, as it will be affected by the input cost increases which cannot be passed-through due to challenging market conditions.

Architectural business will be affected the most by the input cost push. European markets are expected to remain robust. In Asia, solar volumes are expected to increase, while markets will remain stable. In North America, markets will be increasingly competitive, as glass imports to the region and competitors' capacities are expected to increase.

Challenging market conditions are also expected for the Group's Automotive business. Europe will see subdued demand and production costs are expected to increase due to aging facilities in Japan. North American markets will continue to be challenging, while in South America, volumes in Brazil are expected to increase.

Technical glass markets are expected to be generally positive.

As for the net debt, the Group expects this to increase due to the following reasons.

Firstly, the impact of the strategic investments will contribute to the increase. Strategic investments will be more fully explained later by the CEO. The expected capital expenditures are described on slide 44.

Secondly, the impact due to adoption of IFRS16 "Leases" from FY2020 will also contribute to the increase in net debt. Due to this new accounting standard, the Group will account for all leases on the balance sheet as right-of-use assets and liabilities. We are still evaluating the impact of this but expect an increase of up to 40 billion yen in both assets and liabilities. Please refer to the Group's FY2019 Annual Consolidated Financial Results which has been filed to the Tokyo Stock Exchange.

Please take note that the impact on the Net Debt/EBITDA ratio due to adoption of IFRS16 is immaterial.

With regards to free cash flow for FY2020, the Group expects this to be 10 billion yen disregarding the impact of the strategic investments. Free cash flow was 0.9 billion yen in the previous year, but the Group expects this to improve by the drive to reduce working capital.

## Dividends



**Ordinary dividends for FY2019 year-end: JPY20 per share**  
**Forecast for FY2020 year-end: JPY20 per share**

	FY2019			FY2020 Forecast		
	Interim	Year end	Total	Interim	Year end	Total
Ordinary (JPY/share)	-	20	20	-	20	20
Commemoration (JPY/share)	10	-	10	-	-	-
Total Ordinary Dividend	10	20	30	-	20	20
Dividend Amount (JPY bn)	20	28	48	-	35	35
(Ordinary Dividends)	(9)	(18)	(27)	(-)	(18)	(18)
(Preferred Dividends)	(11)	(10)	(21)	(-)	(17)	(17)
Consolidated Payout Ratio (Ordinary)			26%			21%

\* Resumption of ordinary dividend payment at the end of FY2018 (JPY20 per share)

### **Dividend Policy:**

- To secure dividend payments based on sustainable business results
- Once Class A Shares are fully redeemed, to aim to maintain a consolidated dividend pay-out ratio of 30 percent

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After the Group resumed dividend payments on ordinary shares at the end of FY2018, it also declared a commemoration dividend to celebrate its centennial anniversary in November 2018 as an interim dividend.

The Board of Directors decided the final dividend on ordinary shares for FY2019 to be JPY20 per share as previously planned.

The forecast for FY2020's final dividend is planned to be JPY20 per share, same as the final dividend for FY2019.

Going forward, based on the dividend policy, the Group intends to secure dividend payments based on sustainable business results and, once Class A Shares are fully redeemed, aims to maintain a consolidated dividend pay-out ratio of 30 percent.

## Redemption of Class A Shares (Acquisition & Cancellation)



**Considering continued stability in net profitability,  
the second redemption of a portion of Class A shares decided**

Number of shares to be acquired and cancelled	5,000
Amount	JPY5,800m including JPY750m premium and JPY50m dividends
Planned date of acquisition	6 June 2019
Number of outstanding shares after redemption	30,000 (Issued value: JPY30,000m)

(Note) Issuance on 31 Mar '17: 40,000 share (JPY40 bn)  
First acquisition on 7 Dec '18: 5,000 shares (JPY 5bn)

### **Redemption Policy:**

- To redeem Class A Shares at the earliest possible timing, considering attributable profit and preferred and ordinary dividends, while maintaining financial stability.
- By reducing the outstanding shares, the amount of preferred dividends and redemption premium will be reduced.

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As disclosed separately today, the Group has decided to redeem a portion of its Class A shares.

On March 31, 2017, the Group issued Class A shares totaling JPY40,000 million to improve its equity and stabilize its financial base.

With the improved equity and resulting lower finance expenses, the Group has been able to stabilize attributable profits, helped of course by the steady improvement in trading profits.

Based on the materialization of intended benefits of Class A Shares, the Board of Directors decided to acquire and cancel 5,000 shares (issue price: JPY5,000 million) in December 2018.

Now, considering FY2019 results and FY2020 forecast, the Board of Directors resolved at today's meeting to acquire and cancel further 5,000 shares (issue price: JPY5,000 million).

The acquisition price is JPY5,800 million in total, which includes premium of JPY750 million and a daily pro-rated preferential dividend of JPY50 million.

The acquisition and cancellation date is scheduled on 6 June 2019.

The early redemption has the merit of reducing the preferred dividend and its redemption and in the future, it should help to bolster an improvement in EPS.

After this redemption, the number of shares outstanding will be 30,000 shares (issue price: JPY30,000 million).

Regarding the rest of Class A shares, the Group intends to redeem these as early as possible, whilst maintaining financial stability and taking account of net profits, both preferred and ordinary dividends.

This concludes the explanation on FY2019 financial and business results, FY2020 forecast, ordinary dividends and redemption of Class A Shares.

## Medium-term Plan (MTP) Phase 2 Update & FY2020 Policy



### Shift to VA + Growth



Courtesy of First Solar Inc.

\* VA: Value-added

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In FY2019, our policy for the year was "Shift to VA + Growth", which meant we would not only drive our shift to VA (value-adding) but also take actions for growth and in FY2020, we will continue to follow the same policy, "Shift to VA+Growth".

## Key Message



- Since MTP started in FY2015:
  - Trading profits have expanded continuously, resulting in significantly improved and stable attributable profits; and
  - Preparations for the next growth phase have begun
- However, the financial targets of MTP are unlikely to be achieved – contributing factors identified
- The MTP direction remains unchanged
 

With a view to returning to profitability growth from FY2021, the Group will stay focused on what needs to be done to reform its businesses

  - Profitability enhancement: VA shift acceleration and continuous efficiency and cost improvement
  - Development of future growth opportunities: execution of strategic investment projects and new product sales
  - New business development: enhancement of BIC\* and R&D

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\* BIC: Business Innovation Center

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The NSG Group started the Medium-term Plan (MTP), after going through a major restructuring phase to adjust its production capacities to prevailing market demands after the global financial crisis and European sovereign debt crisis.

With a review in 2016, the Group is currently in MTP Phase 2, which is to end in FY2020.

Since the start of the MTP, profitability has significantly improved and attributable profits have become stabilized. The Group has also begun preparations for the next growth phase, deciding to make multiple strategic investments.

FY2020 is the final year of MTP Phase 2. Regrettably, however, the forecast for the year as shown in an earlier slide will be insufficient for achieving the financial targets of MTP.

There are several contributing factors for the shortfall and the Group will focus on taking actions to overcome them in FY2020, with a view to returning to profitability growth from FY2021.

The direction we are heading for under the MTP is still valid. Through the end of FY2020, we will continue to carry out what needs to be done to reform our businesses.

Specifically:

In order to enhance profitability, we will accelerate the VA shift and cost improvement further;

In order to develop future growth opportunities, we will execute the strategic investment projects and increase new product sales; and

In order to develop new businesses, we will : further enhance the role of the BIC

We would like to accelerate such measures. Details will be explained in a later slide.

## MTP Phase 2 – Update on Key Measures



### 1. Four Key Measures

Drive VA No.1 Strategy	<ul style="list-style-type: none"><li>Enhanced competitiveness of online-coated architectural glass</li><li>Increased order awards of value-added automotive glass</li></ul>
Establish Growth Drivers	<ul style="list-style-type: none"><li>Expedited new business development process by managing promising R&amp;D projects as 'Star Projects'</li></ul>
Business Culture Innovation	<ul style="list-style-type: none"><li>Productivity improvement of automotive glass with 'Manufacturing Excellence'</li><li>Establishing common mindset of 'Customer First' not only in sales teams but across the Group with marketing focused approach</li></ul>
Enhance Global Management	<ul style="list-style-type: none"><li>Setting up shared service centers at four locations in the world to streamline administrative work</li><li>Improving diversity and inclusion with the 'Inclusion &amp; Diversity' declaration</li></ul>

### 2. Financial Measure

Issuance of Class A Shares to improve equity ratio, resulting in reduced financial expenses one year ahead of plan

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During the three years of MTP Phase 2 starting in FY2018, the Group has been implementing the following four key growth measures:

- Drive VA No.1 Strategy;
- Establish Growth Drivers;
- Business Culture Innovation; and
- Enhance Global Management,

together with a financial measure to improve the equity ratio and reduce net debt.

Consequently, the 'Drive VA No. 1 Strategy' measures have enhanced the competitiveness of online-coated architectural glass and increased order awards of value-added automotive glass.

In the area of 'Establish Growth Drivers', management of promising R&D projects called 'Star Projects' has been improved to expedite their development.

With the 'Business Culture Innovation', we have improved the production efficiency of automotive glass with emphasis on 'Manufacturing Excellence' and 'focus on marketing' has made 'Customer First' the common culture not only in sales and marketing teams but also across the Group.

In our efforts to 'Enhance Global Management', four shared service centers have been established at four different locations in the world to streamline administrative work and 'Inclusion & Diversity' declaration promoted diversity in our people and their inclusion.

On the finance side, we issued Class A Shares to improve the equity ratio, resulting in a finance expenses reduction, one year ahead of plan.

Improvements since MTP Started		
Actions taken in line with Long-term Strategic Vision, 'Transformation into VA Glass Company'		
~FY14	MTP	
	FY15-FY17	Phase 2 FY18-FY20
Global financial crisis & European sovereign debt crisis	<ul style="list-style-type: none"> <li>VA sales increase</li> <li>Efficiency &amp; cost improvement</li> </ul>	Trading profits increase
↓ Restructuring phase to cope with drastic market decline	<p><b>Additionally</b></p> <p><b>FY16: Pending issues dealt with:</b></p> <ul style="list-style-type: none"> <li>Exited crystalline solar glass in China</li> <li>Suspended thin glass furnace in Vietnam</li> </ul> <p><b>FY17: Issuance of Class A Shares</b></p> <ul style="list-style-type: none"> <li>→ Financial stability</li> <li>→ Financial expense reduction</li> </ul>	<p><b>Stable attributable profit</b></p> <p>'18/3 YE: Ordinary dividend payment resumed</p> <p>'18/12: Partial redemption of Class A shares started</p> <p><b>FY19: Start preparations for next growth phase</b></p> <ul style="list-style-type: none"> <li>- Strategic investment decisions: thin-film solar glass &amp; South America</li> <li>- Launch of BIC</li> </ul>
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Before the MTP, the NSG Group went through a major restructuring phase to adjust its production capacities to significantly contracted market demands after the global financial crisis and European sovereign debt crisis.

In FY2015, we started the MTP aiming for improving financial strength and a more value-added business structure, with our Long-term Strategic Vision to transform into a VA (value-added) Glass Company, announced at the same time.

While the Group's performance had been improving under the MTP with VA sales expansion, continued efforts of efficiency improvement and cost reduction, there were some remaining issues which might hinder further improvement.

They included rapidly commoditized crystalline silicon solar glass and thin glass for display suffering from drastically heightened competition.

Though it was a tough decision, considering it essential for future profitability improvement, we decided to take care of them, such as exiting from commodity solar glass business in China and suspending the production at a thin glass furnace in Vietnam.

By taking these decisive actions, a good foundation was laid for us to promote the ensuing VA shift and growth strategies, improving our profitability steadily.

The issuance of Class A Shares improved our financial stability and reduced finance expenses.

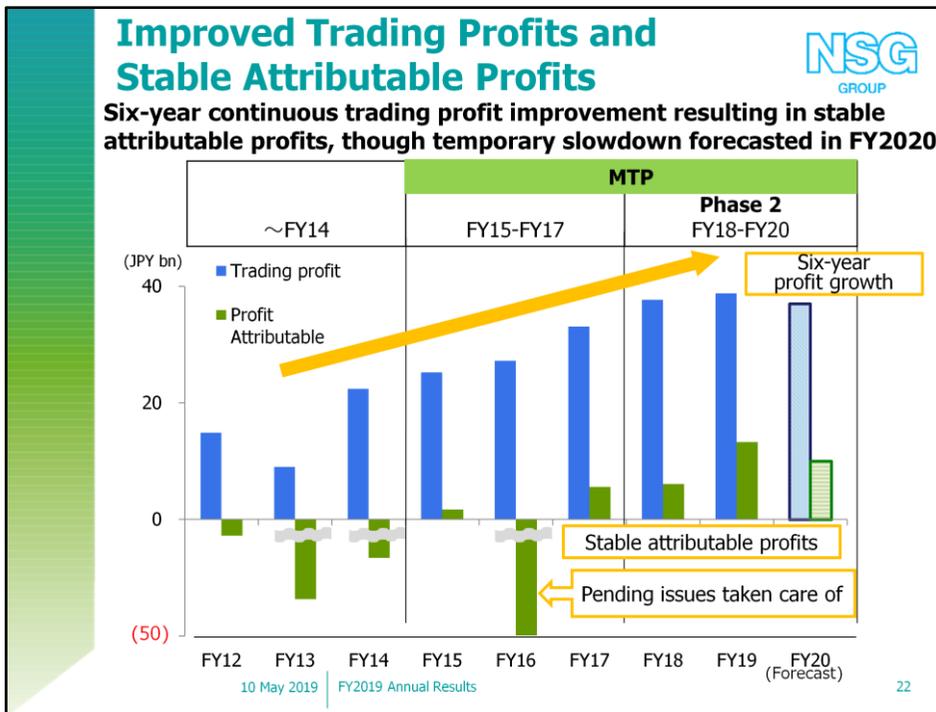
All the above have led to increased trading profits and stabilized attributable profits.

Therefore, at the end of FY2018, we decided to resume the distribution of ordinary dividends and in FY2019, and we began to redeem Class A Shares.

While further improving performance, we started preparing for the growth phase after the MTP.

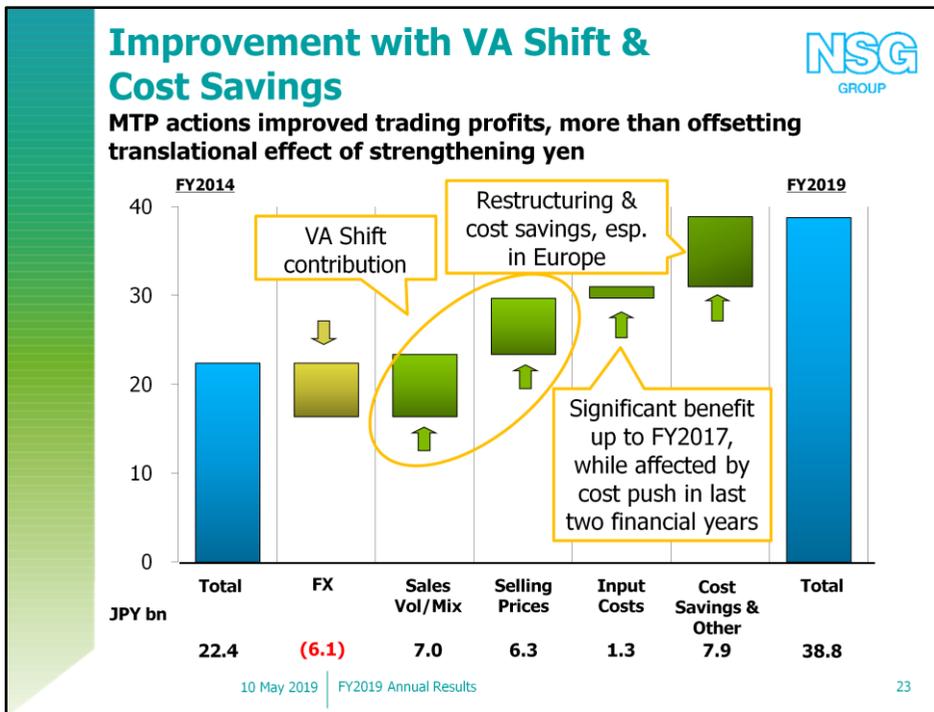
Investments in promising markets have been decided, including production capacity expansions for thin film solar glass in Vietnam and in the US and float glass in Argentina, South America.

Also, a new organization, Business Innovation Center, to expedite new business development has been launched.



As explained, the measures taken under the MTP have achieved six years of trading profit growth, though we are expecting some headwind in FY2020.

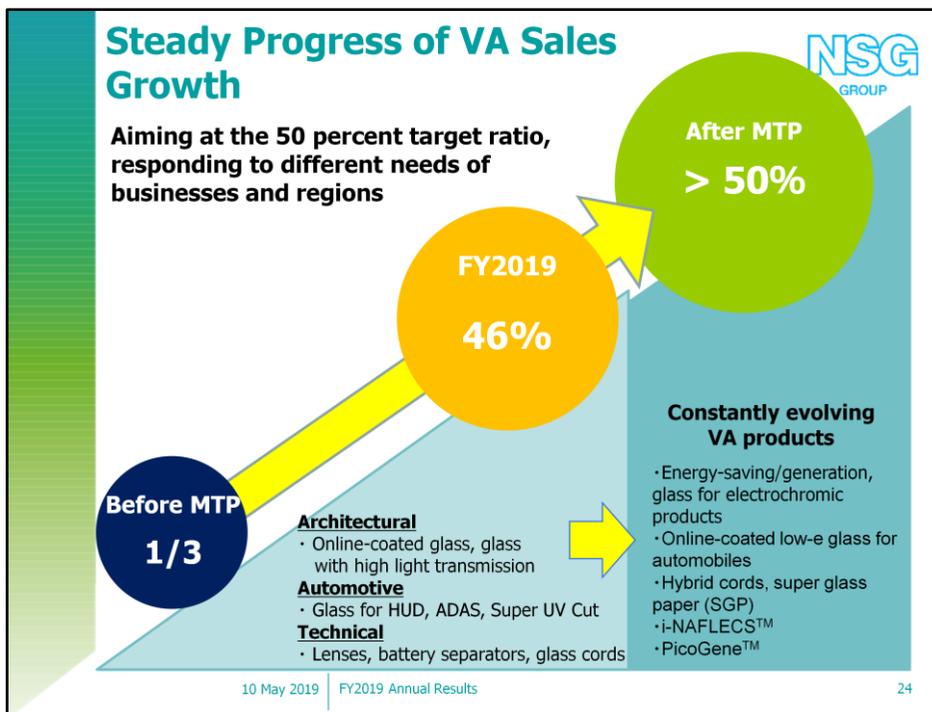
Attributable profits have become much more stable into Phase 2, especially after taking actions on the pending issues in FY2016 and improved trading profits.



Our efforts to drive the VA shift contributed to Sales Volume/Mix improvement significantly, while we also enjoyed favorable market conditions.

Improvement in Cost Savings and Other shows notable benefits of continued restructuring, efficiency improvement and cost reduction efforts.

Trading profits grew significantly as these positive effects much more than offset the negative exchange rate impact and input cost increase over the last two years.



One of our key actions to improve trading profit is driving the VA shift.

This chart shows our progress in the VA sales ratio, which was about one third of our revenue before the MTP but rose to 46 percent at the end of FY2019.

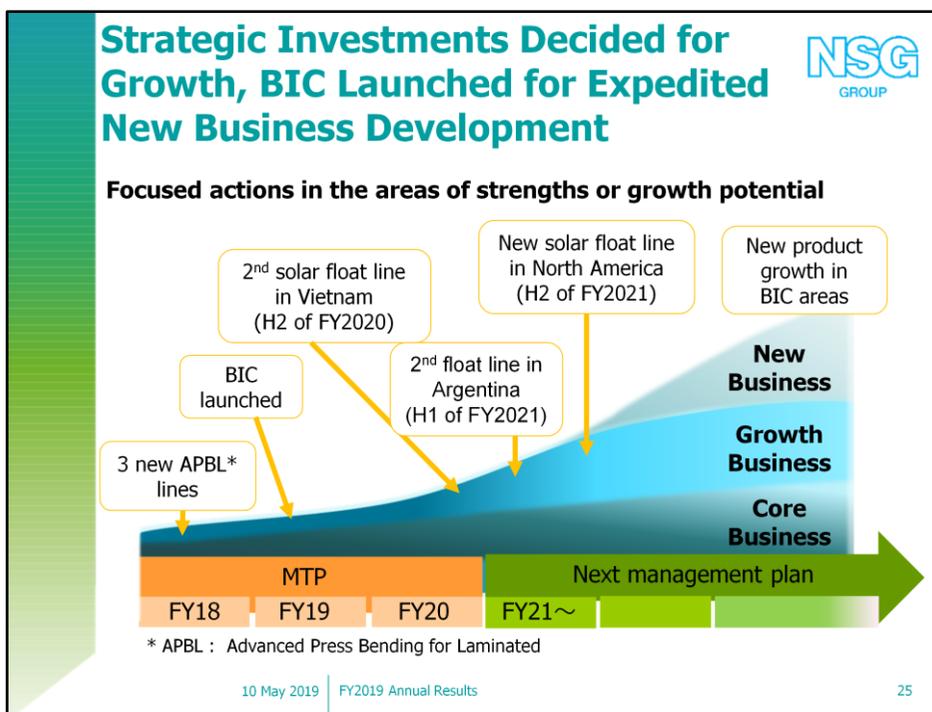
In FY2020, we will continue tenaciously to increase it to the target, 50%.

VA products may not remain VA because they constantly face the risk of commoditization.

Therefore, we must keep evolving and developing our products, even just to keep the VA sales ratio at a constant level.

The areas we consider promising, and are exploring the potential of, include:

- Energy-saving and energy-generation applications, glass for electrochromic products;
- Online-coated low-e glass for automobiles;
- Hybrid cords as improved alternative for glass cords and super glass paper (SGP) as separator for next generation batteries;
- functional glass flake, i-NAFLECS; and
- mobile DNA testing equipment, PicoGene, which is now on market and I will talk about in more detail later.



Looking beyond the MTP, which ends this year, we began preparations for the ensuing growth stage as early as last year.

Specifically, as I have already mentioned, we have decided to make strategic investments, which include two float lines with online coaters for thin-film solar applications and a new float line in Argentina to capture the emerging market opportunities.

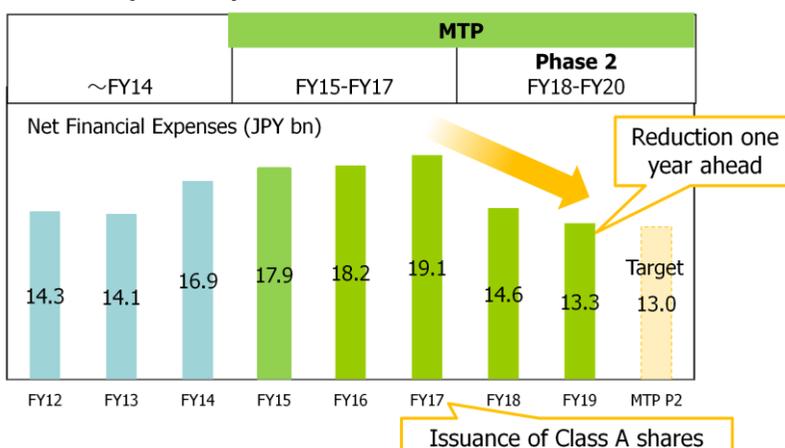
For new business development, a new organization, BIC, has been established.

Contributions from these actions are mostly expected in FY2021 and onward. However, these are essential seeds for our future growth.

## Attributable Profit Boosted by Financial Expense Reduction



Target reduction achieved in FY2019, helping attributable profit improvement



- FY2019 financial expenses would have been JPY11.8 bn without JPY1.5 bn hyperinflation opportunity costs in Argentina

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The Group's financial stability was significantly improved with the Issuance of Class A Shares. After the issuance, net debt decreased considerably in FY2018.

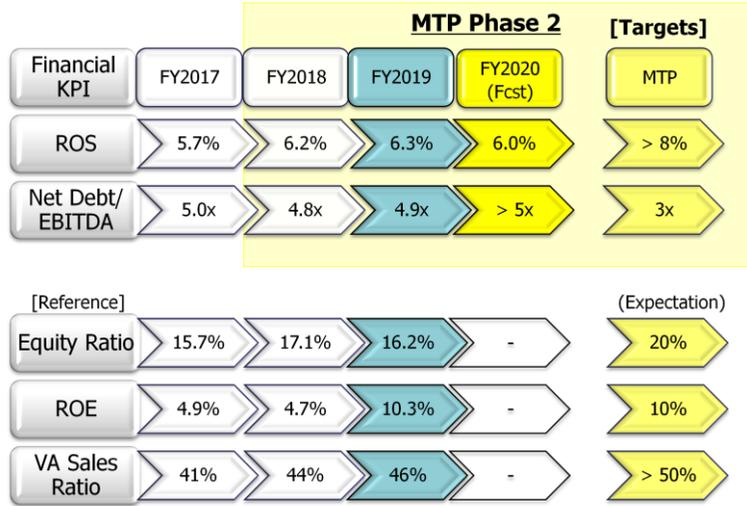
With reduced borrowings and improved balance sheet, borrowing conditions became more favorable, resulting in a net financial expenses, reaching to the target level one year ahead.

Please note that financial expenses for FY2019 includes a JPY1.5 billion impact of hyperinflationary accounting and excluding it, the underlying financial expenses were even lower at JPY11.8 billion.

# Financial Targets of MTP Unlikely to be Achieved



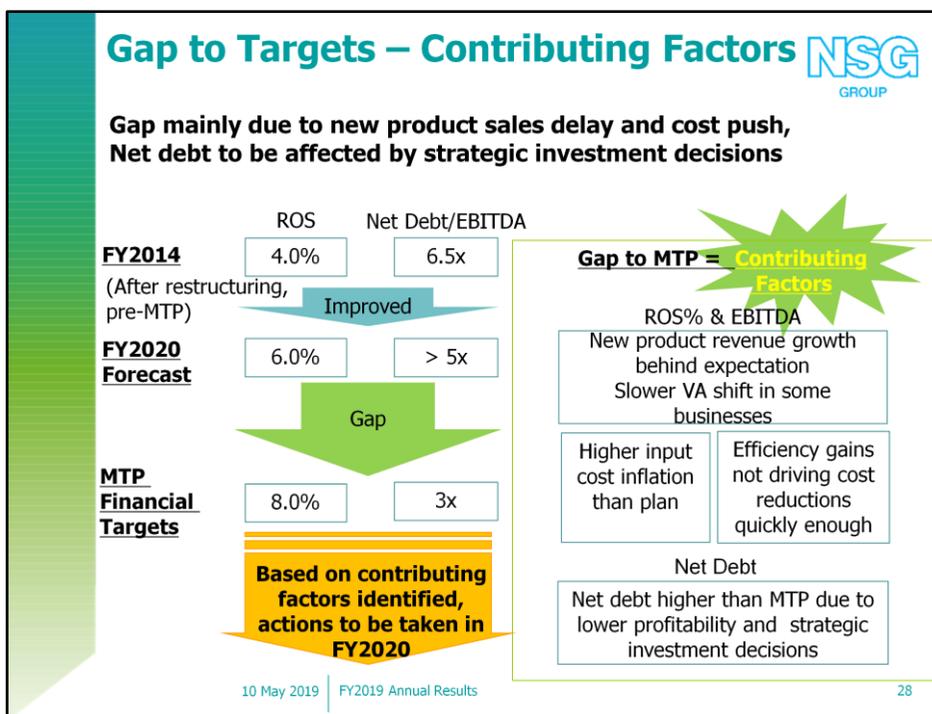
Improving up to FY2019 but FY2020 to slow down



Here are the key performance indices and the MTP financial targets.

You can see improvements up to FY2019.

However, the figures for FY2020 forecast show that the Group is unlikely to achieve either the targets of ROS 8 percent or Net Debt/EBITDA X3.



While one year remaining for the MTP to end, given the less-than-target forecast, we reviewed the current status as shown in the chart.

The biggest factor affecting profitability will be that the revenue growth from new products are expected be behind our expectation and the VA sales increases are slower in certain businesses.

Additionally, both input cost increases more than expectation, and shortfall in our cost savings and efficiency improvement actions would similarly contribute. The size of these boxes indicate the magnitude of impact of each factor.

Factors for the higher Net Debt/EBITDA index is two pronged. The denominator is expected to be lower due to lower profitability as explained. The numerator will be higher because of borrowing increases, based on lower operational cash flow and higher cash outflow related to the decisions to make strategic investments, as explained earlier.

These contributing factors are also what we need to improve and where we will focus in FY2020.

**FY20 Policy: Shift to VA + Growth** **NSG GROUP**

**With a view to returning to profitability growth from FY2021, the Group will stay focused on what needs to be done to reform its businesses**

Actions based on different growth phases

<b>Core Business</b>	<p><b>Profitability Enhancement</b></p> <ul style="list-style-type: none"> <li>➢ Further accelerate VA shift to achieve 50% target</li> <li>➢ Cost structure review in addition to productivity improvement</li> <li>➢ Continuous efficiency improvement of underperforming businesses;</li> </ul>
<b>Growth Business</b>	<p><b>Development of Future Growth Opportunities</b></p> <ul style="list-style-type: none"> <li>➢ Sound execution of strategic investment projects</li> <li>➢ Enhancing marketing capability for growth</li> <li>➢ Increase and re-focus R&amp;D</li> <li>➢ Acceleration of new product launches</li> </ul>
<b>New Business</b>	<p><b>New Business Development</b></p> <ul style="list-style-type: none"> <li>➢ Additional resources to Business Innovation Center (BIC), moving to execution phase</li> </ul>

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As explained in the previous slide, we have identified the areas that we need to improve in order to reach where we are heading.

Based on them, we will take actions for businesses in three different growth stages: core; growth; and new businesses.

The chart may look familiar but some changes have been made to reflect the review of the MTP.

Each stage will be explained further in the following slides.

**To improve business profitability further**

- Further accelerate VA shift to achieve 50% target
  - Technical Glass above target, Architectural Glass on course
  - Automotive business on track to achieve profit improvements at model change timings
- Cost structure review in addition to productivity improvement
  - Stepping up operational capabilities in response to stricter quality requirement for VA products; manufacturing excellence enhancement
  - Supply chain cost reduction (logistics) and production process improvement
- Acceleration of underperforming businesses improvement (business structure review and selection & focus)
  - Restructuring, selection & focus, efficiency improvement in low Ros businesses such as Architectural Glass Japan

The key for core businesses is profitability improvement and the actions are focused on it. First, we will accelerate the VA shift and aim for achieving the VA sales ratio of 50 percent. Technical Glass has already achieved it and Architectural Glass is steadily improving.

Automotive Glass is also on track but improvements have to wait for the timing of new car model introductions.

Second, in addition to conventional productivity improvement, we will take additional measures to improve cost.

The increase in VA product sales means more stringent requirements for product quality, which translates into a higher level of operations and manufacturing excellence.

Improvement actions will focus on manufacturing excellence in Automotive Glass and North American Architectural Glass.

Further at the Group level, we will review supply chain cost, including logistics cost, and production process improvement.

Third is to expedite the improvement of underperforming businesses.

Some businesses are constantly below the Group's ROS target of 8 percent including Architectural Glass Japan. We will put more emphasis on them and drive structural changes and selection & focus.

**All strategic investment projects on schedule**

- New float lines for thin film solar glass
  - Equipment is being installed for the 2<sup>nd</sup> solar float line in Vietnam to start up in FY2020 H2
  - The ground breaking ceremony was held in April for the new solar float line in the US to start up in FY2021 H2
  
- New float line in Argentina, South America
  - The building construction is underway for the 2<sup>nd</sup> float line in Argentina to start up in FY2021 H1.



↑ Equipment installation in Vietnam



↑ Ground breaking in the US



↑ Building construction in Argentina

In the growth businesses, revenue growth will be the key.

Some will come from the strategic investments decided last year, as already explained.

All the projects are progressing on plan.

In relation to thin-film solar glass capacity expansion, equipment is being installed at the second float line in Vietnam planned to start in the latter half of this year. In the US, we had a groundbreaking ceremony for a new float line to start in the latter half of FY2021.

In the promising emerging market, South America, the building is being built for the second float line to start in the first half of FY2021.

**Acceleration of new product launches**

- Enhancing marketing capability for growth
  - More customer-focused activities
- Reinforcing R&D
  - Increase and re-focus R&D
  - Resource allocation to BIC
- Acceleration of new product launches
  - Architectural Glass: environmental regulations to provide opportunities for ZEH and ZEB\*, pursuing new opportunities for online-coated glass such as electrochromic applications
  - Automotive Glass: ADAS, HUD, EV opportunities
  - Technical Glass: battery separators for ISS\*, hybrid cord, Metashine™
  - BIC: launch of PicoGene™



↑ Electrochromic glass  
(Photo: View Dynamic Glass)

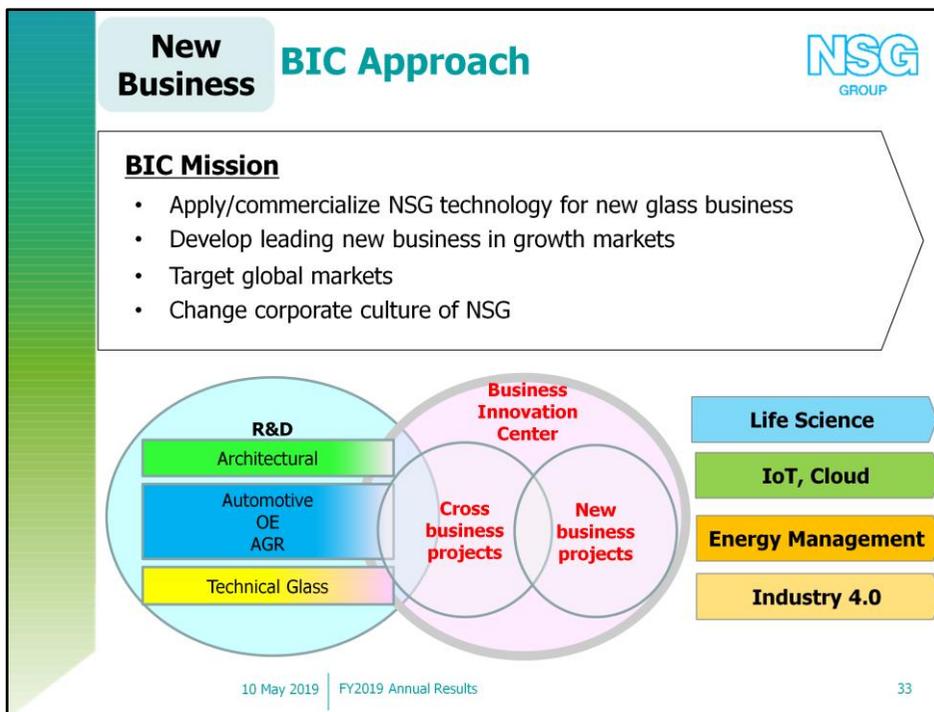
- ZEH/ZEB: Net Zero Energy House/ Building
- ISS: Idling Stop & Start

The second key approach in the growth businesses is the speedier commercialization and sales expansion of new products.

Specifically, in Architectural Glass, environmental regulations such as ZEH and ZEB will provide opportunities and new applications such as electrochromic products will be opportunities for online-coated glass.

Growth in Automotive Glass will be made possible by responding to new automobile technologies such as ADAS, HUD and EVs.

In Technical Glass, battery separators for ISS, hybrid cords and Metashine are growing. And a new product, PicoGene has been launched in the BIC area.



In the new business area, I would like to explain what we are trying to do with the newly established BIC.

Now about 100 people are working for the organization, headed by an external talent who has abundance of experiences in new business development.

The role of BIC is to develop two areas. First, in the cross-business area, BIC will leverage existing Group technologies to develop new areas other than the existing three ones. Second, any other projects will be defined as the new business projects.

The Group has many effective core technologies such as surface treatment and shaping, which can be used outside the existing businesses. At the same time we are selling our products in more than 100 countries and have good local resources. It means we do not have to start from scratch, such as conducting a rudimentary market research. It is a significant advantage when we want to sell our products globally.

We have defined the four key fields for BIC to work on: life science; IoT & cloud; energy management; and Industry 4.0. Please refer to the appendices for more information.

The life science field is related to food and water safety and environment and I will talk about a new product in this area later.

In the IoT & cloud field, we will focus on 5G, sensors and filters, based on our proprietary lens products, which can support high-speed large-volume communications.

In the energy management field, an example is high functional glass which does not obstruct the passage of electric wave. Windows used to be a good path for electric wave but with new functionality added to glass is making it more difficult. BIC is working with Architectural Glass to develop new products. Another example is new SGP development for batteries, jointly with a Technical Glass team. Batteries without power failure will be crucial for future communication systems.

Industry 4.0 generally means digitalized and fully-automated manufacturing. To make it possible, in addition to the brain to think (i.e. computers), five senses and limbs will be also needed. NSG will be able to contribute to the development of sensors.

## New Business BIC Approach

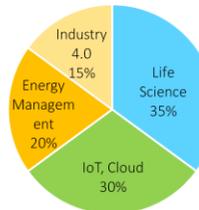


### New Business Development and Creation of Customer Value

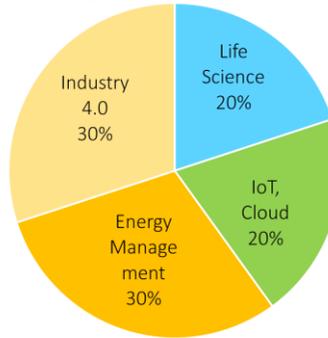
- BIC moving to Enhancement and execution phase

### BIC Target

**5 years later** (around 2023)  
Revenue: JPY20billion



**10 years later** (around 2027)  
Revenue: JPY100billion



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This year, we will further increase BIC resources and move from the preparatory on to the execution phase.

The figures here are not the defined targets but to provide the image of where BIC is heading, which is aiming at JPY20 billion revenue in five years and JPY100 billion revenue in ten years. With these numbers in mind, we are developing the organization.

These four fields will be the basis for developing new applications other than the existing ones, utilizing promising glass technologies.

**New Business** **Life Science Applications – PicoGene™ for global markets** 

**Sales launch announced on 10 April**

**Environmental Study**

**Food Sanitation**  
Bacteria, virus

**Water Analysis**

**Research and Education**



**Global health and environmental issues**

- Secure safe drinking water
- Rising risks of infectious disease
- Changing ecosystem

**Conventional PCR Issues**

Though highly precise and useful...

- Only usable in specialized labs
- Long time required for testing

Mobile and rapid DNA testing system is needed

**Enabling quick, high-precision DNA testing with handheld equipment**

website : <https://pcr-nsg.jp/>

Compact

Light-weight

Quick

Energy saving

High-precision

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As the first of the new products in the life science business field for the execution phase of BIC, mobile DNA testing equipment, 'PicoGene (PCR1100)' was launched in the market recently.

I do not want to go into the details today but simply put, PicoGene is a small-size fluorescence detector using our proprietary selfoc lens. Unlike conventional large equipment, which has to be installed at a place like research center and takes several days to test. The breakthrough for PicoGene is that it is a small hand-held tester people can take it with them and test samples in a short period of time. We believe there is great demand not only from research institutions but also for more day-to-day requirements such as water quality or food safety testing globally.

The trial sale began one year ago and we have received favorable customer feedback from food and restaurant businesses, which are required to conduct food poisoning tests regularly.

We are working on to increase the product range going forward.

## Summary



### **FY2019 Results**

- Results in line with forecast, despite input cost rise and slowdown in automotive markets in Europe and North America later in the year
- Six years of profit growth achieved, with significantly improved profit attributable

### **FY2020 Assumptions**

- Revenues: slightly above FY2019 with further improved VA sales
- Trading profit: impacted by input cost increases, limited pass-through due to market conditions
- Architectural: most affected by input cost increases
- Automotive: challenging market conditions expected
- Technical Glass: markets generally positive
- Net debt increase expected due to strategic investment projects

### **FY2020 Policy: Shift to VA + Growth**

- MTP directions remain unchanged; for returning to profitability growth, the Group will continue to focus on what needs to be done to reform its businesses
- Profitability enhancement: VA shift acceleration and continuous efficiency and cost improvement
- Development of future growth opportunities: execution of strategic investment projects and new product sales expansion
- New business development: enhancement of BIC and R&D

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In the final year of MTP, we will focus on what needs to be done in accordance with 'Shift to VA+Growth'

## Notice



The projections contained in this document are based on information currently available to us and certain assumptions that we consider to be reasonable. Hence the actual results may differ. The major factors that may affect the results are the economic and competitive environment in major markets, product supply and demand shifts, currency exchange and interest rate fluctuations, changes in supply of raw materials and fuel and changes and laws and regulations, but not limited.

Nippon Sheet Glass Company, Limited

## Appendices

- FY2019 Annual Results
  - Revenue & Trading Profit - Business and Regions
  - Revenue & Trading Profit - Quarterly trend
  - Exceptional items
  - Consolidated Balance Sheet
  - Consolidated Cash Flow Summary
  - Depreciation & Amortization, CAPEX and R&D expenditures
  - Exchange rates & Oil prices
  - Argentina hyperinflation accounting
  
- Medium-term Plan (MTP) Phase 2
  - BIC Approach Area
  - News Releases (November 2018 to Apr 2019)

## Revenue & Trading Profit by Business & Regions



### Revenue

JPY bn	Full-year (12 months)			4th Quarter (Jan - Mar: 3 months)		
	FY2018 *	FY2019	Change	FY2018 *	FY2019	Change
<b>Architectural</b>	<b>238.0</b>	<b>247.3</b>	<b>9.3</b>	<b>58.4</b>	<b>60.6</b>	<b>2.2</b>
Europe	93.8	96.0	2.2	23.5	23.3	(0.2)
Asia	86.2	92.9	6.7	21.3	23.1	1.8
Americas	58.0	58.4	0.4	13.6	14.2	0.6
<b>Automotive</b>	<b>311.4</b>	<b>314.7</b>	<b>3.3</b>	<b>83.1</b>	<b>79.7</b>	<b>(3.4)</b>
Europe	140.0	140.2	0.2	39.5	35.5	(4.0)
Asia	67.8	70.6	2.8	18.1	18.3	0.2
Americas	103.6	103.9	0.3	25.5	25.9	0.4
<b>Technical Glass</b>	<b>48.4</b>	<b>49.1</b>	<b>0.7</b>	<b>11.7</b>	<b>12.4</b>	<b>0.7</b>
Europe	7.9	8.1	0.2	2.2	2.3	0.1
Asia	39.2	39.5	0.3	9.1	9.7	0.6
Americas	1.3	1.5	0.2	0.4	0.4	0.0
<b>Other</b>	<b>1.1</b>	<b>1.7</b>	<b>0.6</b>	<b>0.4</b>	<b>0.7</b>	<b>0.3</b>
<b>Total</b>	<b>598.9</b>	<b>612.8</b>	<b>13.9</b>	<b>153.6</b>	<b>153.4</b>	<b>(0.2)</b>

### Trading profit

JPY bn	Full-year (12 months)			4th Quarter (Jan - Mar: 3 months)		
	FY2018 *	FY2019	Change	FY2018 *	FY2019	Change
Architectural	26.3	25.8	(0.5)	5.8	7.5	1.7
Automotive	14.2	15.1	0.9	6.6	6.0	(0.6)
Technical Glass	5.4	8.1	2.7	0.4	1.6	1.2
Other	(8.2)	(10.2)	(2.0)	(2.6)	(3.5)	(0.9)
<b>Total</b>	<b>37.7</b>	<b>38.8</b>	<b>1.1</b>	<b>10.2</b>	<b>11.6</b>	<b>1.4</b>
Europe	17.9	18.6	0.7	5.5	6.1	0.6
Asia	16.9	19.8	2.9	4.0	5.4	1.4
Americas	11.1	10.6	(0.5)	3.3	3.6	0.3
Other	(8.2)	(10.2)	(2.0)	(2.6)	(3.5)	(0.9)
<b>Total</b>	<b>37.7</b>	<b>38.8</b>	<b>1.1</b>	<b>10.2</b>	<b>11.6</b>	<b>1.4</b>

\*: Restated due to adoption of IFRS 15 "Revenue from Contracts with Customers"

# Revenue & Trading Profit

## Quarterly trend



### Architectural



### Automotive



### Technical Glass



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## Exceptional items

(JPY bn)	<u>FY2018</u>	<u>FY2019</u>
Reversal of impairment of non-current assets	0.1	<b>2.7</b>
Exchange gain on business closure	-	<b>0.7</b>
Reversal of impairment of investments in JVs	4.1	-
Gain on disposal of non-current assets	2.1	-
Gain on disposal of investments in JVs	1.5	-
Gain on settlement of insurance proceeds	1.0	-
Restructuring costs	(5.2)	<b>(4.4)</b>
Impairment of non-current assets	(0.5)	<b>(3.5)</b>
Retirement benefit obligations – past service cost	-	<b>(1.4)</b>
Suspension of facilities	(4.6)	<b>(1.0)</b>
Other items	0.2	<b>(0.2)</b>
	<hr/>	<hr/>
	(1.3)	<b>(7.1)</b>

# Consolidated Balance Sheet



JPY bn	31-Mar-18 <sup>*</sup>	31-Mar-19	Change
<b>Assets</b>	<b>788.6</b>	<b>761.9</b>	<b>(26.7)</b>
<b>Non-current assets</b>	<b>530.8</b>	<b>516.3</b>	<b>(14.5)</b>
Goodwill & intangible assets	169.7	161.1	(8.6)
Property, plant and equipment	244.1	241.5	(2.6)
Other	117.0	113.7	(3.3)
<b>Current assets</b>	<b>257.8</b>	<b>245.6</b>	<b>(12.2)</b>
Cash & cash equivalents	64.8	52.4	(12.4)
Other	193.0	193.2	0.2
<b>Liabilities</b>	<b>644.9</b>	<b>629.4</b>	<b>(15.5)</b>
<b>Current liabilities</b>	<b>255.0</b>	<b>193.0</b>	<b>(62.0)</b>
Financial liabilities	97.6	42.2	(55.4)
Other	157.4	150.8	(6.6)
<b>Non-current liabilities</b>	<b>389.9</b>	<b>436.4</b>	<b>46.5</b>
Financial liabilities	275.1	329.3	54.2
Other	114.8	107.1	(7.7)
<b>Equity</b>	<b>143.7</b>	<b>132.5</b>	<b>(11.2)</b>
Shareholders' equity	135.2	123.8	(11.4)
Non-controlling interests	8.5	8.7	0.2
<b>Total liabilities and equity</b>	<b>788.6</b>	<b>761.9</b>	<b>(26.7)</b>

\*: Restated due to adoption of IFRS15 "Revenue from Contracts with Customers"  
 [Assets] Pre-IFRS15: JPY 791.9bn - an adjustment of JPY (3.3)bn  
 [Equity] Pre-IFRS15: JPY 142.8bn - an adjustment of JPY +0.9bn

## Consolidated Cash Flow Summary



JPY bn	FY2018*	FY2019	Change
Profit for the period	7.9	14.4	6.5
Taxation	4.6	8.4	3.8
Adjustment in respect of US tax rate change	9.6	-	(9.6)
Depreciation and amortization	29.4	27.9	(1.5)
Net impairment	(3.6)	1.9	5.5
Gain on disposal of assets	(4.0)	(0.2)	3.8
Exchange gain on business closure	-	(0.7)	(0.7)
Share of profit from joint ventures and associates	(2.4)	(6.2)	(3.8)
Tax paid	(5.8)	(5.4)	0.4
Others	(3.1)	(6.1)	(3.0)
<b>Net operating cash flows before movement in working capital</b>	<b>32.6</b>	<b>34.0</b>	<b>1.4</b>
Net change in working capital	2.1	(5.0)	(7.1)
<b>Net cash flows from operating activities</b>	<b>34.7</b>	<b>29.0</b>	<b>(5.7)</b>
Purchase of property, plant and equipment	(29.1)	(28.1)	1.0
Disposal proceeds	10.5	0.5	(10.0)
Others	0.7	(0.5)	(1.2)
<b>Net cash flows from investing activities</b>	<b>(17.9)</b>	<b>(28.1)</b>	<b>(10.2)</b>
<b>Free cash flow</b>	<b>16.8</b>	<b>0.9</b>	<b>(15.9)</b>

\*: Restated due to adoption of IFRS15 "Revenue from Contracts with Customers"

## Depreciation & Amortization, CAPEX and R&D expenditures



(JPY bn)	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>
	<u>Actual</u>	<u>Actual</u>	<u>Forecast</u>
<b>Depreciation and amortization</b>	29.4	<b>27.9</b>	30.0
<b>Capital expenditures (including intangibles)</b>			
Ordinary	35.5	<b>27.1</b>	30.0
Strategic projects and other	-	<b>5.1</b>	60.0
Total	35.5	<b>32.2</b>	90.0
<b>R&amp;D expenditures</b>			
Architectural	2.7	<b>2.6</b>	-
Automotive	2.8	<b>3.0</b>	-
Technical Glass	2.0	<b>0.8</b>	-
Other	1.6	<b>3.0</b>	-
Total	9.1	<b>9.4</b>	10.0

## Exchange rates & Oil prices



### Average rates used

	FY2017	FY2018				FY2019				FY2020
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Forecast
<b>GBP</b>	142	142	144	146	147	149	147	146	<b>146</b>	<b>145</b>
<b>EUR</b>	119	122	126	128	130	131	130	129	<b>129</b>	<b>130</b>
<b>USD</b>	108	111	112	111	111	110	111	111	<b>111</b>	<b>110</b>
<b>BRR</b>	32.8	34.6	35.0	34.8	34.4	30.4	29.3	29.3	<b>29.4</b>	<b>28.0</b>
<b>ARS</b>	7.22	7.06	6.74	6.65	6.30	4.70	-	-	-	-

### Closing rates used

	FY2017	FY2018				FY2019			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>GBP</b>	139	146	151	152	150	145	148	141	<b>144</b>
<b>EUR</b>	119	128	132	136	132	128	132	127	<b>124</b>
<b>USD</b>	111	112	113	113	106	111	113	111	<b>111</b>
<b>BRR</b>	35.5	34.0	35.4	33.9	32.1	28.6	28.2	28.5	<b>28.3</b>
<b>ARS</b>	7.24	6.81	6.42	6.03	5.30	3.94	2.84	2.93	<b>2.53</b>

### FX Sensitivity

Increase (decrease) if the value of the yen increases by 1% (all other things being equal):

(JPY bn)	FY2017	FY2018	FY2019
<b>Equity</b>	(3.5)	(3.5)	<b>(3.3)</b>
<b>Profit for the period</b>	(0.2)	(0.1)	<b>(0.2)</b>

### Oil prices (Brent)

FY2020 Forecast US\$ 67 per barrel

## Argentina hyperinflation accounting



### Treatments adopted from Q2 FY2019

- In accordance with IAS29 rules, hyperinflation accounting adopted for Argentina subsidiaries from Q2 FY2019
  - Property, plant and equipment, and related deferred taxation balances restated to measuring unit current as at latest balance sheet date
  - Hyperinflation adjustments applied to current year income statement and cash flow
  - Opportunity cost loss on monetary items recorded as a financial expense
  - Income statement and cash flows consolidated using closing rates of exchange

### Financial impact at Q4 FY2019 (JPY bn)

<u>Consolidated income statement</u>	
Revenue	(1.7)
Operating profit	(0.6)
Profit after taxation	(1.6)
<i>Attributable to:</i>	
Non-controlling interest	(0.7)
Owners of the parent	(0.9)
<u>Consolidated balance sheet</u>	
Property, plant & equipment	3.8
Deferred tax liability	(0.9)
Total shareholders equity	1.7
Non-controlling interest	1.2
Total equity	2.9

# BIC Approach Area: (1) Life Science Business



Focus on food/water safety, environment, academia

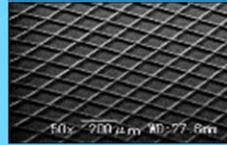
Mobile DNA detector



Disposable kit



Fine glass processing



Chip with flow channel



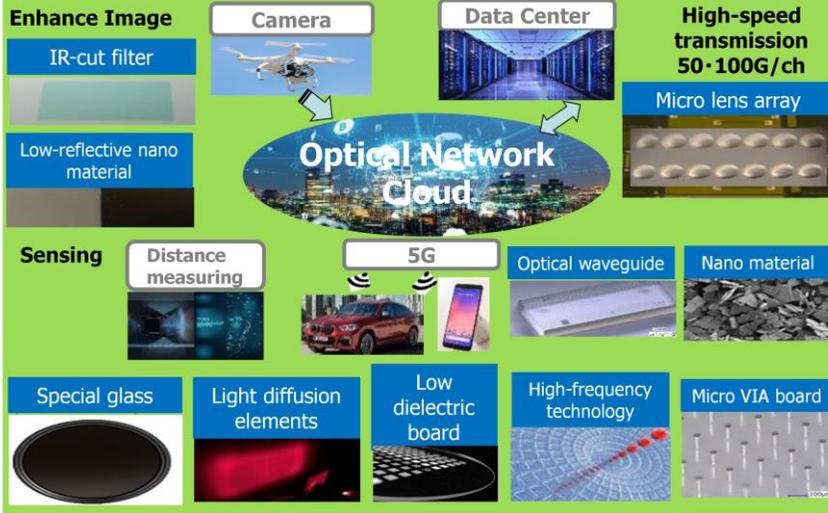
Inorganic fine particle material



# BIC Approach Area: (2) IoT, Cloud Business



Focus on high-speed data transmission, sensors, filters

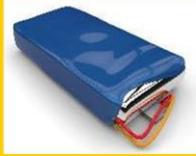


## BIC Approach Area: (3) Energy Management Business



Improve conversion efficiency with functional material

### New battery solution



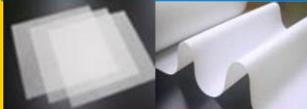
### High-efficiency motor solution



#### Ionic material



#### Super glass paper for separator



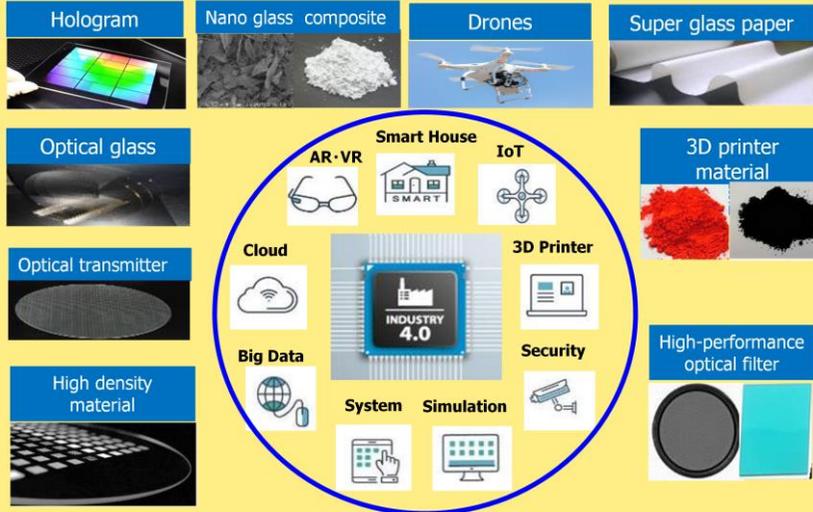
#### i-NAFLECS porous fine glass particle



# BIC Approach Area: (4) 'Industry 4.0'



Improve sensor capability with fine glass applications



## News Releases — November 2018 to April 2019



1 Nov 2018	NSG Group Announces “Our Vision”
1 Nov 2018	Partial Acquisition and Retirement of Class A Shares
14 Nov 2018	NSG Received High Scores in the First Commitment Line Syndication based on ESG/SDGs Evaluation by SMBC
21 Nov 2018	NSG Receives ‘Gold’ CSR Rating from EcoVadis
8 Jan 2019	NSG Foundation for Materials Science and Engineering to Host 36 <sup>th</sup> Research Presentation
30 Jan 2019	Sale of Shares in Nippon Sheet Glass Environment Amenity
12 Feb 2019	NSG Group Donates Spacia® Vacuum Glazing Glass to Ryugasaki City, Ibaraki Prefecture
28 Mar 2019	NSG Receives Japan’s first Environmental Product Declaration for Architectural Glass Products
29 Mar 2019	Display Division of Technical Glass Business Strategic Unit to be Renamed
10 April 2019	NSG Group to Drive New Business Development - Launches Mobile Real-time PCR Device -

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