

# Orica's New Approach to Carbon Emissions Reporting

*Note – Graphs can be found in the relevant Sustainability Report*

## BACKGROUND

In FY17, Orica developed a company-wide position on Climate Change. As part of this work, a recommendation was put forward to include a carbon emissions intensity metric, and relevant target, for disclosure and monitoring of our sustainability performance. The purpose of this text is to outline the approach taken to develop this new metric and the initial assumptions made.

## PREVIOUS METRIC

In the past, as well as reporting on net emissions and abatement performance, Orica has also set emissions intensity targets. For example, in the 2015 and 2016 Sustainability Reports the Sustainability Scorecard reported greenhouse gas emissions intensities of:



This previous intensity metric was defined as follows:

$$\text{GHG Intensity} = \frac{\text{Total Greenhouse Gas Emissions Direct (Scope 1) + Indirect (Scope 2)}}{\text{Total Tonnes of (Internal) Reportable Production}}$$

As indicated, the scope of this metric was limited to Orica's internal greenhouse gas emissions and energy use only. This incorporated the following:

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- **Greenhouse gas emissions and energy use from all Australian facilities under Orica's operational control (as per National Greenhouse and Energy Reporting Scheme (NGERS) requirements);**
- and**
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- **Greenhouse gas emissions and energy use from all other Orica facilities globally that meet the internal reporting threshold (>5,000 GJ of energy consumption over a 12-month period).**
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In this instance, “reportable production” was defined as the volume of any material processed and sold by an Orica facility that meets the internal environmental reporting threshold (as defined above). This excluded purchased product that passed through facilities without undergoing any processing, as well as product that was “used” internally.

This approach presented several issues:

- Internal “Reportable Production” does not align with the publicly disclosed AN sales volume used in Orica’s annual financial reporting (as it incorporates a number of additional product streams);
  - Intensity levels determined using this methodology are susceptible to internal commercial and operational decisions on product blend, and can be subject to carbon leakage when product is externally sourced;
- and
- The emissions intensity value from taking this approach (0.5 – 0.6 tCO<sub>2</sub>-e/t) does not provide a complete picture of the carbon footprint for Orica’s most emissions intensive facilities and core product stream.

## NEW METRIC FROM FY18

To address the issues and limitations associated with the previously defined metric, we have made some key changes to our emissions intensity metric, which from FY18 is defined as follows:

$$\text{GHG Intensity} = \frac{\text{Total Greenhouse Gas Emissions Direct (Scope 1) + Indirect (Scope 2 + "Material" (Scope 3))}{\text{Total AN Sales Volume (tonnes)}}$$

In the above formula, the following applies:

- Scope 1 and Scope 2 emissions incorporate the greenhouse gas emissions and energy use from all Orica facilities that meet the corporate reporting threshold (and including all Australian facilities under Orica’s operational control, as per NGERs requirements);
- “Material” Scope 3 emissions is defined as the estimated greenhouse gas emissions and energy use associated with Orica’s purchased ammonium nitrate (AN) volume, as well as all purchased ammonia (NH<sub>3</sub>)<sup>1</sup>;

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<sup>1</sup> This is believed to capture the bulk of Orica’s Scope 3 emissions and hence has been selected as a meaningful addition to the metric, without conducting a complete Scope 3 profile analysis. “Estimated” emissions data will be used until further information can be obtained from suppliers, refer to “New Metric – Base Assumptions” section below.

- Total AN Sales Volume is consistent with the ammonium nitrate volume publicly disclosed in the Annual Report, and includes product that is both manufactured internally and sourced from third parties;

And

- Internal production of materials other than ammonium nitrate have been excluded from the calculation due to their relatively low impact on a “per tonne” basis (typically <10% of total AN Sales Volume), though the emissions and energy use from these production processes have been included.

## NEW METRIC – BASE ASSUMPTIONS

Typically, Orica’s overall greenhouse gas footprint is dominated by direct Scope 1 greenhouse gas emissions in the form of nitrous oxide (N<sub>2</sub>O) from our nitric acid manufacturing plants, and direct carbon dioxide (CO<sub>2</sub>) emissions from our ammonia production (refer to chart below). As both ammonia and nitric acid are precursors to the production of ammonium nitrate, our Scope 3 profile is also impacted by material emissions from our third-party suppliers of these bulk products, that is, the equivalent Scope 1 and Scope 2 emissions from our suppliers of ammonia and ammonium nitrate.

As the inclusion of this Scope 3 detail is a new development in Orica’s emissions reporting, we do not immediately have access to specific emissions performance information for all our suppliers. In the absence of this complete data set, we have assumed an average of the past performance from Orica’s major manufacturing facilities to estimate our “material” Scope 3 contribution. As data becomes available from our supply chain, our assumptions for calculating material Scope 3 emissions will be adjusted and disclosed.

The decision to use an Orica average emissions intensity for our purchased ammonia contribution was deemed a reasonable “first-pass” approach as, historically, Orica’s Kooragang Island (KI) Ammonia Plant has operated within the range of an accepted industry average. Hence, the emissions contribution from purchased ammonia was determined by multiplying Orica’s average emission intensity for ammonia manufacture, with the volume of purchased ammonia, as per the following equation:

$$\text{"Material" Scope 3 (NH}_3\text{)} = \text{NH}_3 \text{ Purchased Volume} \times \text{KI NH}_3 \text{ Plant Average GHG Intensity}$$

In comparison to purchased ammonia, estimating an emissions intensity number for purchased ammonium nitrate (AN) required some additional analysis. In this instance, it was identified that the emissions profile can be effectively broken down into three key components, namely the emissions associated with the consumption of nitric acid, emissions due to the consumption of ammonia, and the “other” AN plant emissions.

The bulk of the emissions profile for Orica’s ammonium nitrate production can be attributed to the emissions from the manufacture of the required nitric acid. As such, this was the primary focus for work to provide a reasonable estimate for the purchased AN contribution. Through a review of the performance from our own nitric acid plants, comparative to default factors accepted within the industry, and knowledge from internal technical networks, it was identified that again, the average emission intensity performance of Orica’s nitric acid plants would provide a reasonable starting point.

Emissions from consumed ammonia (in both the manufacture of nitric acid and AN), were estimated using the average Orica performance, as described previously, and assuming conversion efficiencies also based on Orica's past experience. For consistency, the "other" AN plant emissions were then also based on Orica average performance.

The overall emissions intensity for Orica's purchased ammonium nitrate was therefore calculated by combining the emissions intensity determined for each key component. This was then converted to an absolute emissions contribution using the following equation:

**"Material" Scope 3 (AN) = AN Purchased Volume × Orica AN Plant Average GHG Intensity**

Using this approach, the "estimated" Scope 3 emissions for Orica's purchased AN and ammonia could then be combined with the actual Orica emissions to provide an overall emissions intensity, as reported in the 2017 Sustainability Report.

## FY17 PERFORMANCE

In FY17, Orica achieved a net greenhouse gas emissions intensity of 1.86 tCO<sub>2</sub>-e/tAN, as determined by our newly defined metric. This compares to a figure of 0.55 tCO<sub>2</sub>-e/tAN which would have been reported using the previous methodology. Recent trends using both the previous and new metrics are presented in the charts below.

As disclosed in the 2017 Sustainability Report, Orica's abatement activities in the Nitric Acid plants reduced our global N<sub>2</sub>O emissions for 2017 by 500,000 tCO<sub>2</sub>-e compared to our 2010 baseline level. Unfortunately, due to the nature of a number of our plants, we are currently faced with a situation where our previous abatement catalyst is now no longer commercially available, and there is no "like-for-like" replacement. Consequently, we expect to experience a short-term period of declining abatement performance (as already observed in recent years), as we work to identify alternate technology options, to replace these previous systems that have now reached end-of-life.

## FY18 TARGET

For FY18, our newly defined emissions intensity metric will be included on the Sustainability Scorecard, with a target to maintain our emissions intensity ≤2 tCO<sub>2</sub>-e per tonne of AN product sold. This target recognises the challenge we face in maintaining our past and current abatement performance, and provides an opportunity to re-establish our base under the new methodology and set the course for future commitments.