



**Arup BV**

# CO2 Performance Portfolio

Energy Management Plan

Reference: 074764-56-005

P03 | 3 May 2023

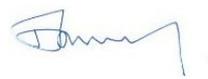
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Job number 074764-56

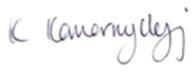
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## Document Verification

**Project title** CO2 Performance Portfolio  
**Document title** Energy Management Plan  
**Job number** 074764-56  
**Document ref** 074764-56-005  
**File reference** File Reference

| Revision | Date       | Filename           |   |   |   |
|----------|------------|--------------------|---|---|---|
| P01      | 24/03/2023 | <b>Description</b> | Reporting Period Jan to Dec 2022 – First Version  |   |   |
|          |            |                    | <b>Prepared by</b>  | <b>Checked by</b>   | <b>Approved by</b>  |
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|          |            | <b>Signature</b>   |   |  |  |
| P02      | 12/04/2023 | <b>Filename</b>    |   |   |   |
|          |            | <b>Description</b> | Reporting Period Jan to Dec 2022 – Second Version – update to Section 4.2   |   |   |
|          |            |                    | <b>Prepared by</b>  | <b>Checked by</b>   | <b>Approved by</b>  |
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|          |            | <b>Signature</b>   |   |  |  |
| P03      | 03/05/2023 | <b>Filename</b>    |   |   |   |
|          |            | <b>Description</b> | Post audit update – inclusion of §6.2.2 in Table 2, update to Table 20 and update for error in emissions factors used in calculations |   |   |

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|                  | Prepared by  | Checked by  | Approved by   |
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Issue Document Verification with Document

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## 1. Introduction

At Arup we aim to contribute towards a more sustainable future. Arup in the Netherlands has adopted the CO<sub>2</sub> -performance ladder as a tool to map and reduce CO<sub>2</sub>-emissions. The aims of the CO<sub>2</sub> Performance Ladder are in line with:

- Arup's Global Net Zero GHG Emission Statement;
- Arup's Global Net Zero Carbon Strategy; and
- Arup's Europe Region GHG Emissions Reduction Plan.

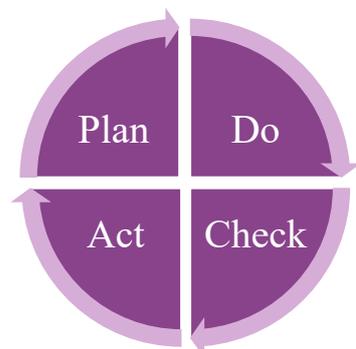
This Energy Management Plan combines our global company aims and strategies to reduce CO<sub>2</sub>-emissions and the local CO<sub>2</sub> performance ladder aims. Reduction targets and measures are set-up for emissions of scopes 1, 2 and 3 on the basis of the insight gained through the documents: GHG-inventory report, analysis of downstream scope 3 emissions and the chain analysis.

When reading this report it should be noted that, for most of 2020 and 2021, the Arup Amsterdam office was closed with the exception of business-critical activities or open with limited capacity to enable physical distancing to be implemented. This resulted in very limited staff office presence. Reception services continued during this period and regular lighting and heating in the office was provided. In 2022 the situation improved and office activities increased with staff aiming to spend at least 50% of their time in the office.

The ER Net Zero reduction plan is set for the period from 2020 to 2030, with an annual update by the end of 2022. In a section of the plan we will discuss the post-COVID measures we aim to uphold in order to achieve our carbon reduction goals. The shown COVID-induced carbon reduction is assumed to be temporary and a slight increase of emissions is expected for 2022. The plan is written in accordance with ISO 50001.

The energy management planning is intended to be a process of continuous improvement, on the basis of a Plan, Do, Check and Act system:

- Plan:** Set energy management targets and measures
- Do:** Implement the CO<sub>2</sub> strategy.
- Check:** Measure and monitor performance
- Act:** Analyse the variances, recommend improvements



### 1.1 Compliance to ISO 50001

This Energy Management Plan is written in accordance with NEN-ISO 50001 as shown in Table 1.

**Table 1: Compliance with ISO 50001 2011 vs 2018**

| ISO 50001:2011 <sup>1</sup> | ISO 50001:2018 <sup>2</sup> | Topic   |
|-----------------------------|-----------------------------|---|
| §4.4.3                      | §6.3                        | Energy review   |
| §4.4.4                      | §6.5                        | Energy baseline   |
| §4.4.5                      | §6.4                        | Energy performance indicators                           |
| §4.4.6                      | §6.2                        | Objectives, energy targets and planning to achieve them |
| §4.6.1                      | §6.6 & §9.1.1               | Planning for collection of energy data                  |
| §4.6.4                      | §10.1                       | Nonconformity and corrective action                     |

**Table 2: Compliance with ISO 50001:2018**

| <b>§6.2 Objectives, energy targets and planning to achieve them</b>   |   |
|---|---|
| §6.2.1 The organisation shall establish objectives at relevant functions and level. The organisation shall establish energy targets.            | Section 2.1                                       |
| §6.2.2 The objective and energy targets shall:  | -   |
| a) Be consistent with the energy policy   | Section 2.1                                       |
| b) Be measurable (if practicable)   | Section 2.1                                       |
| c) Take into account applicable requirements  | Section 2.1                                       |
| d) Consider Significant Energy Uses (SEUs)  | Section 2.1 and Strategies described in Section 1 |
| e) Take into account opportunities to improve energy performance  | Section 1.1                                       |
| f) Be monitored   | Section 3   |
| g) Be communicated  | Section 3   |
| h) Be updated as appropriate  | Section 1.1                                       |
| The organization shall retain documented information on the objectives and energy targets   | This document                                     |
| §6.2.2 When planning how to achieve its objectives and energy targets, the organization shall establish and maintain action plans that include: | Table 20  |
| - What shall be done;   | Table 20  |
| - What resources will be required;  | Table 20  |
| - Who will be responsible;  | Table 20  |

<sup>1</sup> Clauses referred to in CO2 Performance Ladder Handbook

<sup>2</sup> Latest version of the standard

|  |   |
|--|---|
| - When it will be completed;   | Table 20  |
| - How the results will be evaluated, including the method(s) used to verify energy performance improvement.  | Table 20  |
| The organization shall consider how the actions to achieve its objectives and energy targets can be integrated into the organization's business processes. The organization shall retain documented information on action plans. | This document   |
| <b>§6.3 Energy Review – To develop the energy review, the organisation shall:</b>  |   |
| a) Analyse energy use and consumption based on measure and other data, i.e.:<br>1. Identify current types of energy;<br>2. Evaluate past and current energy uses(s) and consumption  | Section 3   |
| b) Based on the analysis, identify SEUs (significant energy use)   | Section 2 and Section 3                                 |
| c) For each SEU:<br>1. Determine relevant variables;<br>2. Determine current energy performance;<br>3. Identify person(s) doing work under its control that influence or affect the SEUs   | Section 1.3, Section 3 and Section 1.1                  |
| d) Determine and prioritise opportunities for improving energy performance   | Section 1.1   |
| e) Estimate future energy use(s) and energy consumption  | Section 4.2   |
| The energy review shall be updated at define intervals, as well as in response to major changes in facilities, equipment, systems or energy-using processes.   | Updated annually  |
| The organisation shall maintain as documented information the methods and criteria used to developed the energy review, and shall retain documented information of its results.  | Data retained within office electronic filing locations |
| <b>§6.4 Energy Performance Indicators – The organisation shall determine EnPIs that:</b>   |   |
| a) Are appropriate for measuring and monitoring its energy performance   | Section 2   |
| b) Enable the organisation to demonstrate energy performance improvement   | Section 1.1   |
| The method for determining and updating the ENPI(s) shall be maintained as documented information.   | This document.  |
| Where the organisation has data indicating that relevant variables significantly affect the energy performance, the organisation shall consider such data to establish appropriate EnPI(s).                                      | Not applicable.   |
| ENPI value(s) shall be reviewed and compared to their respective ENB(s), as appropriate. The organisation shall retain documented information of EnPI values.  | Section 2.2 shows energy baseline                       |
| <b>§6.5 Energy baseline</b>  |   |
| The organization shall establish (an) EnB(s) using the information from the energy review(s) taking into account a suitable period of time.  | Section 2.2 shows energy baseline                       |
| Where the organisation has data indicating that relevant variable significantly affect energy performance, the organisation shall carry out normalisation of the EnPI value(s) and corresponding EnB(s).                         | Not applicable.   |
| EnB(s) shall be revised in the case of one or more of the following:   | Not applicable.   |
| a) EnPI(s) no longer reflect the organisation's energy performance   | -   |
| b) There have been major changes to the static factors   | -   |

|   |  |
|---|--|
| c) According to a pre-determined method   | -  |
| The organisation shall maintain information of EnB(s), relevant variable data and modifications to EnB(s) as documented information.  | Section 2.2 shows energy baseline        |
| <b>§6.6 Planning for collection of energy data</b>  |  |
| The organization shall ensure that key characteristics of its operations affecting energy performance are identified, measured, monitored and analysed at planned intervals. The organisation shall define and implement an energy data collection plan appropriate to its size, its complexity, its resources and its measurement and monitoring equipment. The plan shall specify the data necessary to monitor the key characteristics and state how and at what frequency the data shall be collected and retained. | Reported in this document and GHG Report |
| Data to be collected (or acquired by measurement as applicable) and retained documented information shall include:  | Reported in this document and GHG Report |
| a) The relevant variables for SEUs  | -  |
| b) Energy consumption related to SEUs and to the organisation   | -  |
| c) Operational criteria related to SEUs   | -  |
| d) Static factor, if applicable   | -  |
| e) Data specified in action plans   | -  |
| The energy data collection plan shall be reviewed at defined intervals and updated as appropriate.  | Reported in this document and GHG Report |
| The organization shall ensure that the equipment used for measurement of key characteristics provides data which are accurate and repeatable. The organisation shall retain documented information on measurement, monitoring and other means of establishing accuracy and repeatability.   | Reported in this document and GHG Report |
| <b>§9 Performance evaluation – §9.1 Monitoring, measurement, analysis and evaluation of energy performance and the EnMS - §9.1.1 General</b>  |  |
| The organisation shall determine for energy performance and the EnMS:   |  |
| a) What needs to be monitored and measure, including at a minimum the following key characteristics: <ol style="list-style-type: none"> <li>1. The effectiveness of the action plans in achieving the objective and energy targets</li> <li>2. EnPI(s)</li> <li>3. Operation of SEUs</li> <li>4. Actual versus expected energy consumption</li> </ol>   | Reported in this document                |
| b) The methods for monitoring, measurement, analysis and evaluation, as appropriate, to ensure valid results  | Reported in this document                |
| c) When the monitoring and measurement shall be performed   | GHG Report                               |
| d) When the results from monitoring and measurement shall be analysed and evaluated   | Reported in this document                |
| The organisation shall evaluate its energy performance and the effectiveness of the EnMS  | Sections 3 and 1.1                       |
| Improvement in energy performance shall be evaluated by comparing EnPI value(s) against the corresponding EnB(s)  | Section 3.5                              |

|  |                   |
|--|-------------------|
| The organisation shall investigate and respond to significant deviations to energy performance. The organisation shall retain documented information on the results of the investigation and response.   | Noted             |
| The organisation shall retain appropriate documented information on the results from monitoring and measurement.   | Noted.            |
| <b>§10.1 Nonconformity and corrective action</b>   |                   |
| When a nonconformity is identified, the organization shall:  |                   |
| a) React to the nonconformity and, as applicable: <ol style="list-style-type: none"> <li>1. Take action to control and correct it;</li> <li>2. Deal with the consequences</li> </ol>   | See CAPA register |
| b) Evaluate the need for action to eliminate the cause(s) of the non-conformity, in order that it does not recur or occur elsewhere, by: <ol style="list-style-type: none"> <li>1. Reviewing the nonconformity</li> <li>2. Determining the causes of the nonconformity</li> <li>3. Determining if similar nonconformities exist, or can potentially occur</li> </ol> | See CAPA register |
| c) Implement any action needed   | See CAPA register |
| d) Review the effectiveness of any corrective action taken   | See CAPA register |
| e) Make changes to the EnMS, if necessary  | Noted             |
| Corrective actions shall be appropriate to the effects of the encountered nonconformities.   | See CAPA register |
| The organization shall retain documented information of: <ul style="list-style-type: none"> <li>- the nature of the nonconformities and subsequent actions taken;</li> <li>- The results of any corrective action</li> </ul>   | See CAPA register |

## 1.2 Organisational boundaries

The CO<sub>2</sub> Performance Ladder certification will be applicable to the firm Arup BV in the Netherlands. In 2022, Arup BV has one permanent office in Amsterdam. Prior to 2022, there was also a small office in Groningen but that office is no longer used as an Arup office. The firm operates as a consultant for the planning, design, management and research of architectural and engineering related projects, primarily in the building and infrastructure sector. There are no sub-companies operating under the control of Arup BV

In 2022, Arup BV produced a total amount of CO<sub>2</sub> emissions below 500 tons a year, classifying it as a small company according to the CO<sub>2</sub> Performance Ladder. The size classification determines the specific set of CO<sub>2</sub>-ladder certification requirements.

## 1.3 Responsibilities

The energy management team and organizational framework is introduced in the tables below. The team is also responsible for the yearly document maintenance.

**Table 3: Sustainable Development Roles**

| Role                | Name            | Tasks & Responsibilities  |
|---------------------|-----------------|---|
| Group Leader<br>and | Tudor Salusbury | Sets priorities and goals for the next 3 years<br>Reviews governance policies |

| Role  | Name               | Tasks & Responsibilities   |
|---|--------------------|--|
| Europe Region Sustainable Development Director (SDD)                                  |                    | Discusses with management team for approval of plans and implementation policies<br>Audits if new projects meet the goals set by European board<br>Yearly evaluates the goals  |
| Europe Region Net Zero Manager  | Oliver Bate        | Provides oversight and support in data collection and reporting both Regionally and on a Group Level<br>Manages organisation of emissions reporting and systems<br>Reports to SDD  |
| CO2 PL Manager<br>(with input from supported by Q&E Officer, Facilities and Finance.) | Kayley Komarnyckyj | Researches future scenarios<br>Coordinates if goals meet CO2-prestatieladder<br>Manages implementation of plans<br>Checks governance with sustainability objectives<br>Measures and monitors the effect of plans<br>Analyses measurements<br>Assists PM's of projects won with CO2-prestatieladder |

The responsible collaborators for project specific targets are:

**Table 4: Project Roles**

| Role                  | Tasks & Responsibilities   |
|-----------------------|--|
| Project Director (PD) | Includes EC review of the sustainability objectives<br>Monitors progress on the sustainability objectives  |
| Project Manager (PM)  | Implementation of project sustainability objectives<br>Measures and monitors project CO <sub>2</sub> -footprint<br>Measures and monitors the project objectives<br>Analyses non-conformances and advises PD<br>Update of sector initiatives relevant for the project |

Additional collaborators within the office are:

**Table 5: Additional Collaborators**

| Role                          | Name              | Tasks & Responsibilities   |
|-------------------------------|-------------------|--|
| Quality & Environment Officer | Marlissa Trompert | CO2 Performance Ladder Data Collection<br>Organisation of audits |
| Human Resources               | Esther de Vreugd  | Mobility plan, input for Environmental reporting                 |
| Marketing / Com.              | Hester Duijndam   | Communication strategy   |
| Facility manager              | Ineke Willems     | Facility management  |
| Finance                       | Mathijs Lammertse | Input for Environmental reporting                                |

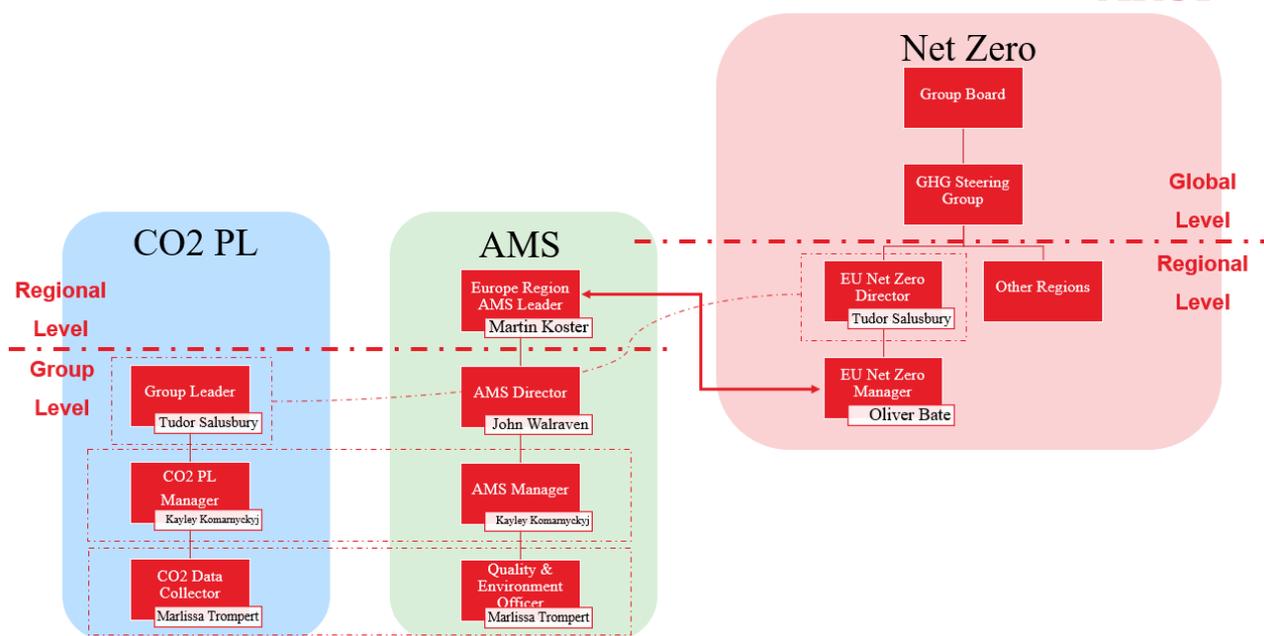


Figure 1: Environmental Management Structure

## 2. Reduction plan

In this section, the reduction strategy is outlined for emission categories associated with the operational activities of our own organization (scope 1 + scope 2 + upstream scope 3).

### 2.1 Reduction Targets

#### 2.1.1 Global and Regional Targets

Arup’s reduction targets set out in the Global Net Zero Carbon Strategy and reiterated in the Europe Region GHG Emissions Reduction Plan. A summary of these targets is provided in Table 6. The reference number provided in the table of for ease of reference to the targets within this EMP.

Table 6: Arup Reduction Targets

| Ref. No. | Source                          | Arup Area | Target  | Reduction Area   |
|----------|---------------------------------|-----------|---|--|
| G1       | Global Net Zero Carbon Strategy | Global    | We will reduce purchases such as catering, stationery and events by 50%.            | Scope 3 Category 1 – Purchases goods and services                  |
| G2       | Global Net Zero Carbon Strategy | Global    | By implementing flexible working, we aim to cut commuting by 20%.                   | Scope 3 Category 7 – Employee Commuting                            |
| G3       | Global Net Zero Carbon Strategy | Global    | Reducing business travel by 50%.  | Scope 3 Category 6 – Business Travel                               |
| G4       | Global Net Zero Carbon Strategy | Global    | Only electric cars will be used for business travel as far as practically possible. | Scope 1 – Company Vehicles<br>Scope 3 Category 6 – Business Travel |

| Ref. No. | Source                          | Arup Area | Target   | Reduction Area  |
|----------|---------------------------------|-----------|--|---|
| G5       | Global Net Zero Carbon Strategy | Global    | We are aiming to procure electricity in our offices from 100% renewable sources by 2023. | Scope 2 – Purchased electricity, steam, heating and cooling for own use |
| G6       | Global Net Zero Carbon Strategy | Global    | Reduce the emissions of goods from our top 20 suppliers by 20%.                          | Scope 3 Category 1 – Purchases goods and services                       |

### 2.1.2 Netherlands Group Targets

Group targets are set at country level and should be in line with the Group and Regional targets.

#### *Mobility Policy*

The Group Mobility Policy for Arup BV dated 2019 has the followings CO<sub>2</sub> emission reducing objectives:

- discourage the use of cars;
- reduce CO<sub>2</sub>-emissions regarding mobility (commuting and business trips) in 2022 by over 35%.

For the sake of reporting in this EMP, these targets are considered to be superseded by the Global and Regional targets which are more measurable, more ambitious and have the same intention.

#### *Remote Working*

During the pandemic, commuting and business travel dropped significantly due to Covid travel restrictions and office presence of staff was restricted and employees started to work from home. A key lesson from pandemic was the apparent effectiveness of remote working and the development of a range of online working methods. This has continued to influence travel patterns post-pandemic as online conferencing and remote working has become more accepted. However it is not realistic to think all work can be productively done online and an increase in travel and commuting post pandemic should be expected and taken into account in reduction targets.

Table 7 shows the reduction targets which were made in 2021 to be achieved in 2022.

**Table 7: Group Reduction Targets for 2022**

| Ref. No. | Source                                    | Arup Area         | Target  | Reduction Area                          |
|----------|---|-------------------|---|---|
| G7       | Energy Management Plan dated 12 July 2022 | Netherlands Group | Each FTE to work from home 1 day a week, effectively reducing commuting mileage by 20%.   | Scope 3 Category 7 – Employee Commuting |
| G8       | Energy Management Plan dated 12 July 2022 | Netherlands Group | Air travel to Arup meetings and Arup internal conferences to be reduced by 20% in 2022 compared to 2018 due to availability of online alternatives. This reduction will be continued until a 70% reduction is reached compared to 2018. | Scope 3 Category 6 – Business Travel    |

## 2.2 Baseline

Europe Region has taken 2018 as the base year for the reduction targets. The Arup BV energy data for 2018 is reported in Table 8.

**Table 8: 2018 Baseline**

| Scope   | Category  | 2018 CO2 Emissions  |
|---------|---|---|
| Scope 1 | Company facilities  | 113,728   |
| Scope 1 | Company vehicles  | 82,080  |
| Scope 2 | Purchased electricity, steam, heating and cooling for own use | 30,874 for Groningen office<br>0 for Amsterdam office (100% green energy) |
| Scope 3 | Category 1 – Purchased goods and services                     | Unknown. Not reported in 2018.  |
| Scope 3 | Category 2 – Capital goods                                    | Unknown. Not reported in 2018.  |
| Scope 3 | Category 5 – Waste generated in operations                    | Unknown. Not reported in 2018.  |
| Scope 3 | Category 6 – Business travel                                  | 362,649   |
| Scope 3 | Category 7 – Employee commuting                               | 308,863   |
|         | <b>Total</b>  | <b>945,144</b>  |

## 3. Evaluation of Emissions and Reduction Targets

### 3.1 Scope 1

#### 3.1.1 Emissions from Company Facilities

This category includes direct emissions from own installations such as own gas use (e.g. boilers, heating systems, ovens etc).

#### *Refrigerant Losses*

Refrigerant losses are reported for the first time in 2022. The Landlord, AroundTown has informed us that there were no refrigerant losses from the cooling equipment in the building. This is supported by maintenance reports.

Refrigerant losses from Arup owned equipment has not been recorded for 2022. This is an area for future improvement.

#### 3.1.2 Emissions from (Non-Electric) Company Vehicles

Company Vehicles are used by employees for commuting, business travel and personal use. Scope 1 reduction is linked to Reduction Target G4 via the reduction of the number of lease vehicles and the electrification of the lease fleet. Steps towards electrification of the lease fleet began in early 2019.

In 2020 the number of lease companies used was reduced from 6 to 3. With fewer lease companies to manage, it should be easier to acquire reliable information.

The number of non-electric lease cars is continuing to decrease. In 2015 there were no electric vehicles in the fleet and in 2022 there were 10 electric and just 2 non-electric vehicles. The remaining two non-electric vehicles are planned to be replaced with electric vehicles when their leases expire, the latest of which is 2023. This is supported by section 7 of the Mobility Policy.

Annual CO2 emissions from non-electric company vehicles is shown in Table 9. Since mid-2020, a flexible working agreement has been in place, so we expect numbers to remain lower than the baseline year of 2018 as more staff work from home. In 2022, CO2 emissions reported in Scope 1 from company vehicles has reduced by 85% compared to the baseline year of 2018. This reflects the target for the coming years is a full electrification of the lease vehicles. With the last two remaining non-electric lease vehicles expected to be removed from the fleet in 2023, we are on course to reach this target in 2023.

**Table 9: CO2 Emissions from Scope 1 (non-electric) Company Vehicles**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> ) | 2018          | 2019          | 2020          | 2021          | 2022          |
|--|---------------|---------------|---------------|---------------|---------------|
| Lease cars petrol                                  | 49 106        | 41 538        | 11 500        | 6 991         | 6 286         |
| Lease cars diesel                                  | 31 866        | 9 110         | 3 696         | 5 549         | 5 816         |
| <b>Total Scope 1</b>                               | <b>80 972</b> | <b>50 648</b> | <b>15 196</b> | <b>14 255</b> | <b>12 102</b> |
| <b>% reduction compared to baseline year 2018</b>  | -             | <b>37%</b>    | <b>81%</b>    | <b>83%</b>    | <b>85%</b>    |

### 3.1.3 Summary

An overview of all Scope 1 CO2 emissions is given in Table 10. It can be seen that overall the 2022 Scope 1 CO2 emissions have reduced by 85% since 2018. Provided the refrigerant losses remain at nil and the ambition to have a fully electric vehicle fleet is seen, our Scope 1 emissions are forecast to be 0 by 2024. See section 4.2 for further forecasting details.

**Table 10: Overall Scope 1 CO2 Emissions**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> ) | 2018          | 2019          | 2020          | 2021          | 2022          |
|--|---------------|---------------|---------------|---------------|---------------|
| Refrigerant Losses                                 | 0             | 0             | 0             | 0             | 0             |
| Non-Electric Company Vehicles                      | 80 972        | 50 648        | 15 196        | 14 255        | 12 102        |
| <b>Total</b>                                       | <b>80 972</b> | <b>50 648</b> | <b>15 196</b> | <b>14 255</b> | <b>12 102</b> |
| <b>% reduction compared to baseline year 2018</b>  | -             | <b>37%</b>    | <b>81%</b>    | <b>82%</b>    | <b>85%</b>    |

## 3.2 Scope 2

### 3.2.1 Emissions from purchased electricity, steam, heating and cooling for own use

Scope 2 emissions for Arup BV consists of:

- Emissions from generation of energy and heating used in the Amsterdam office, and
- Emissions from electricity generated to power the electric lease vehicles.

#### Electricity

Between September 2017 and July 2020, the leased Amsterdam office used 100% wind energy. However, in 2020 the building was sold to a new landlord, AroundTown, which resulted in a change to the electricity supplier. Since then, the building has been using grey electricity which is an average mix of fuels of electricity on the Dutch market. As part of the negotiations for Arup BV to resign the lease agreement in July 2021, the Arup has requested 100% green energy backed up by certification. At a meeting on 8<sup>th</sup> February 2023, AroundTown explained that they purchase certificates to “offset” the non-green energy they use. To date further details or evidence of this has not been provided although Arup BV has requested it. Therefore for reporting purposes the electricity in the Amsterdam office has been classified as “grey” electricity for the whole of 2022.

Table 11 shows a significant increase in CO<sub>2</sub> emissions since the baseline year of 2018 due to the aforementioned switch from green to grey electricity. Arup is continuing to request the landlord to switch to a 100% green energy contract. In 2018 the Scope 2 electricity related CO<sub>2</sub> emissions were entirely from the Groningen office location which is no longer in use in 2022. Despite leaving the Groningen office, CO<sub>2</sub> emissions have increased by 157% since 2018 in this category.

However, it should be noted that a global Arup Renewable Energy Certificate procurement is underway, whereby the emissions associated with the Amsterdam Office (and all other Arup offices) will be backed by third-party (RECs) - this is to align with goal G5 “to procure electricity in our offices from 100% renewable sources by 2023”. At the time of this report being written, that procurement is in progress but not yet completed.

**Table 11: CO<sub>2</sub> Emissions from Electricity**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> ) | 2018          | 2019          | 2020                    | 2021                    | 2022                    |
|--|---------------|---------------|-------------------------|-------------------------|-------------------------|
| Electricity – Amsterdam                            | 0 (100% wind) | 0 (100% wind) | 80 066                  | 111 958 <sup>3</sup>    | 79 423 <sup>4</sup>     |
| Electricity - Groningen                            | 30 874        | 23 112        | 12 300                  | 6 024                   | 0                       |
| <b>Total</b>                                       | <b>30 874</b> | <b>23 112</b> | <b>92 266</b>           | <b>117 652</b>          | <b>79 423</b>           |
| <b>% reduction compared to baseline year 2018</b>  | <b>-</b>      | <b>25%</b>    | <b>-199% (increase)</b> | <b>-281% (increase)</b> | <b>-157% (increase)</b> |

<sup>3</sup> 2021 electricity usage figures were estimated

<sup>4</sup> Electricity usage for 2022 is calculated from meter readings taken in October 2021 and December 2022, so the emissions are for 14 months rather than one calendar year.

## Heating

The Amsterdam office building is heated by the AEB incinerator which provide district heating to the whole western harbour area. No other supplier of heating possible.

Historically, heating emissions of the Groningen office appear out of line with benchmarks, presumably due to mistakes in reporting. Figures in the past seem overstated by a factor 3. Most probably connected to a correction factor linked to the floor space used. In 2022, the 2018-2020 data was reviewed and updated to more accurately reflect the floor area used by Arup. For 2021 an average calculation based on 2 credible sources (CBS & Milieubarometer) was made, since no information was received from the landlord at the time of the audit. The Groningen office was closed on 31 December 2021 and will not be reported on after 2021.

Table 12 shows the CO2 emissions from heating. Whilst closing the Groningen office in 2021, which historically accounted for the majority of the emissions due to heating, has led to a 51% increase in overall heating emissions in 2022, when looking only at the emissions of the Amsterdam office, the emissions have increased 303% since 2018. The reason for this is unclear however one hypothesis is poor building management by the landlord, leading to increased heating usage. For example, one of the main doors was broken for a longer period of time which inevitably would have lead to increased heat loss.

**Table 12: CO2 Emissions from Heating**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> ) | 2018          | 2019          | 2020                   | 2021                   | 2022                   |
|--|---------------|---------------|------------------------|------------------------|------------------------|
| District Heating - Amsterdam                       | 8 061         | 10 511        | 10 281                 | 20 424                 | 32 476                 |
| Heating - Groningen                                | 13 474        | 7 002         | 17 498                 | 15 184                 | 0                      |
| <b>Total</b>                                       | <b>21 535</b> | <b>17 513</b> | <b>27 780</b>          | <b>35 608</b>          | <b>32 476</b>          |
| <b>% reduction compared to baseline year 2018</b>  | -             | <b>19%</b>    | <b>-29% (increase)</b> | <b>-65% (increase)</b> | <b>-51% (increase)</b> |

## Electricity to Power Lease Vehicles

Arup's Scope 2 emissions also includes emissions from electricity generated to power electric lease vehicles. As discussed in section 3.1.2, these emissions are linked to reduction target G4 and the aim of making the lease vehicle fleet 100% electric.

Currently grey energy is assumed for charging of electric vehicles as the energy source is not currently known and cannot be accurately tracked at this time.

In 2015 there were no electric vehicles in the fleet and in 2022 there were 10 electric and just 2 non-electric vehicles. The remaining two non-electric vehicles are planned to be replaced with electric vehicles when their leases expire, the latest of which is 2023. This is visible in the emissions reporting where the CO2 emissions due to electricity of electric lease vehicles is increasing. However, Table 14 shows that the combined CO2 emissions from lease vehicles has reduced by 57% since 2018 through a combination of reduced travel and conversion from fossil fuel to electric vehicles.

**Table 13: CO<sub>2</sub> Emissions from Electricity to power Electric Lease Vehicles**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> ) | 2018         | 2019         | 2020                     | 2021                     | 2022                     |
|--|--------------|--------------|--------------------------|--------------------------|--------------------------|
| Lease cars fully electric                          | 1 108        | 1 640        | 12 787                   | 13 448                   | 22 970                   |
| <b>Total</b>                                       | <b>1 108</b> | <b>1 640</b> | <b>12 787</b>            | <b>13 448</b>            | <b>22 970</b>            |
| <b>% reduction compared to baseline year 2018</b>  | -            | <b>-48%</b>  | <b>-1054% (increase)</b> | <b>-1114% (increase)</b> | <b>-1973% (increase)</b> |

**Table 14: Overall CO<sub>2</sub> Emissions from Lease Vehicles (Scope 1 and 2)**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> ) | 2018          | 2019          | 2020          | 2021          | 2022          |
|--|---------------|---------------|---------------|---------------|---------------|
| Lease cars petrol                                  | 49 106        | 41 538        | 11 500        | 6 991         | 6 286         |
| Lease cars diesel                                  | 31 866        | 9 110         | 3 696         | 5 549         | 5 816         |
| Lease cars fully electric                          | 1 108         | 1 640         | 12 787        | 13 448        | 22 970        |
| <b>Total</b>                                       | <b>82 080</b> | <b>52 288</b> | <b>27 983</b> | <b>25 988</b> | <b>35 072</b> |
| <b>% reduction compared to baseline year 2018</b>  | -             | <b>36%</b>    | <b>66%</b>    | <b>68%</b>    | <b>57%</b>    |

### 3.2.2 Summary

An overview of all Scope 2 CO<sub>2</sub> emissions is given in Table 15. It can be seen that overall the 2022 Scope 2 CO<sub>2</sub> emissions have increased by 152% since 2018.

**Table 15: Overall Scope 2 CO<sub>2</sub> Emissions**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> ) | 2018          | 2019          | 2020                    | 2021                    | 2022                    |
|--|---------------|---------------|-------------------------|-------------------------|-------------------------|
| Electricity (Office)                               | 30 874        | 23 112        | 92 266                  | 117 652                 | 79 423                  |
| Heating  | 21 535        | 17 513        | 27 780                  | 35 608                  | 32 476                  |
| Electricity (Lease Vehicles)                       | 1 108         | 1 640         | 12 787                  | 13 448                  | 22 970                  |
| <b>Total</b>                                       | <b>53 517</b> | <b>42 265</b> | <b>132 833</b>          | <b>166 708</b>          | <b>134 869</b>          |
| <b>% reduction compared to baseline year 2018</b>  | -             | <b>21%</b>    | <b>-148% (increase)</b> | <b>-212% (increase)</b> | <b>-152% (increase)</b> |

### 3.3 Scope 3

### 3.3.1 Category 5 – Waste generated in operations

Waste is reported for the first time in 2022. The landlord, AroundTown, has provided a waste statement for the whole building in 2022 which shows the building produced a total of 23.28 tons of waste. Arup leases half of the building so estimated waste attributed to Arup BV operations is 11.64 tons. A breakdown of types of waste is shown in Figure 2. At the time of writing it is not known how this waste was disposed of or what the CO2 emissions resulting from it were. In 2023 the waste collector has changed with different reporting. An area of improvement is to be able to convert these waste streams and volumes into CO2 emissions.

| Bedrijf   | Aantal Ledigingen | Hergebruik (ton) | Energieterugwinning (ton) | Stort (ton) | Totaal gewicht (ton) |
|---|-------------------|------------------|---------------------------|-------------|----------------------|
| <input type="checkbox"/> Project Naritaweg 106-120 B.V. | 271               | 6,35             | 16,67                     | 0,00        | 23,28                |
| <input type="checkbox"/> Amsterdam / Naritaweg / 108    | 271               | 6,35             | 16,67                     | 0,00        | 23,28                |
| Kunststof/PMD: Kunststof                                | 30                | 0,60             | 0,00                      | 0,00        | 0,87                 |
| Overig: Glas  | 35                | 2,47             | 0,00                      | 0,00        | 2,47                 |
| Papier/Karton: Papier en Karton                         | 73                | 3,28             | 0,00                      | 0,00        | 3,28                 |
| Rest/BSA: Bedrijfsafval                                 | 100               | 0,00             | 13,04                     | 0,00        | 13,04                |
| Swill/koffie: Swill                                     | 33                | 0,00             | 3,63                      | 0,00        | 3,63                 |
| <b>Totaal</b>   | <b>271</b>        | <b>6,35</b>      | <b>16,67</b>              | <b>0,00</b> | <b>23,28</b>         |

Figure 2: Waste report provided by landlord for whole building in 2022

### 3.3.2 Category 6 – Business travel

Table 16 shows the CO<sub>2</sub> emissions from business travel since the baseline year of 2018. Overall, business travel has reduced by 71% in 2022 compared to 2018. The pandemic was a contributing factor as both government and company guidelines restricted the ability to travel. During this time the business developed improved ways of remote working which can continue to be implemented post-pandemic to maintain a lower level of emissions from business travel. From 2022 onwards however it is expected that levels of business travel will increase compared to the 2020/21 levels as travel is now possible. This is reflected in the data in Table 16. The business mobility plan encourages use of public transport, electric vehicles and international train travel in place of air travel where possible in the aim to maintain, or further reduce, lower CO<sub>2</sub> emissions.

**Table 16: CO2 Emissions from Business Travel**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> )                              | 2018           | 2019                    | 2020           | 2021           | 2022           |
|---|----------------|-------------------------|----------------|----------------|----------------|
| Business travel with private car  | 42 966         | 117 891                 | 27 243         | 14 203         | 26 684         |
| Gasoline  | <i>Unknown</i> | <i>Unknown</i>          | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Diesel  | <i>Unknown</i> | <i>Unknown</i>          | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Hybrid  | <i>Unknown</i> | <i>Unknown</i>          | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Fully electric  | <i>Unknown</i> | <i>Unknown</i>          | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Business travel with public transport   | 3 984          | 4 395                   | 1 270          | 255            | 1 139          |
| Bus   | <i>Unknown</i> | 1105                    | 356            | 145            | 298            |
| Metro   | <i>Unknown</i> | 584                     | 188            | 0              | 0              |
| Tram  | <i>Unknown</i> | 2                       | 2              | 0              | 0              |
| National train  | <i>Unknown</i> | 2249                    | 724            | 0              | 0              |
| International train   | <i>Unknown</i> | 456                     | <i>Unknown</i> | 110            | 841            |
| Business travel airplane  | 362 649        | 286 773                 | 55 369         | 17 156         | 91 727         |
| distance <700 km  | 101 908        | 79 194                  | 15 825         | 2 458          | 15 576         |
| 2500< distance >700   | 115 130        | 104 602                 | 16 839         | 5 127          | 24 152         |
| distance >2500 km   | 145 611        | 102 978                 | 22 705         | 9 571          | 51 999         |
| <b>Total</b>  | <b>409 599</b> | <b>409 061</b>          | <b>83 882</b>  | <b>31 614</b>  | <b>119 550</b> |
| <b>% reduction compared to baseline year 2018</b>                               | -              | <b>0%</b>               | <b>80%</b>     | <b>92%</b>     | <b>71%</b>     |
| <b>% reduction in private car emissions compared to baseline year 2018</b>      | -              | <b>-174% (increase)</b> | <b>37%</b>     | <b>67%</b>     | <b>38%</b>     |
| <b>% reduction in public transport emissions compared to baseline year 2018</b> | -              | <b>-10% (increase)</b>  | <b>68%</b>     | <b>94%</b>     | <b>71%</b>     |
| <b>% reduction in air travel emission compared to baseline year 2018</b>        | -              | <b>21%</b>              | <b>85%</b>     | <b>95%</b>     | <b>75%</b>     |

*Business travel with private car*

Business travel using private cars is down 38% since 2018. It is not currently possible to report the fuel type of these private cars so an emission factor of 0.193 kg CO<sub>2</sub>/km of “unknown weight and fuel” has been used. This is close to the emission factor for petrol vehicles so if personnel are using hybrid or electric vehicles the emissions will be considerably lower at 0.125 or 0.104 kg CO<sub>2</sub>/km.

### *Business travel with public transport*

The public transport numbers are strongly influenced by the energy sources of the public transport companies. Since 2021, intercity trains<sup>5</sup>, metro, train and local trains have also used 100% green electricity. This means travel on these forms of public transport result in zero CO<sub>2</sub> emissions in Well to Wheels (WtW) analysis. Only bus travel produces a limited amount of CO<sub>2</sub> emissions but even this has reduced from 2021 onwards. This is reflected in the falling CO<sub>2</sub> emissions, with a 71% reduction in emissions since 2018. It should be noted that the 95% reduction in emissions in 2021 is likely to be a result of home working and reduced travel due to the pandemic and an increase in emissions in 2022 compared to 2021 is to be expected as travel in general increased post-pandemic.

### *Business travel by air*

Air travel has historically had the largest contribution to business travel CO<sub>2</sub> emissions, in 2018 the contribution was 89%. Air travel contributed 38% to overall reported CO<sub>2</sub> emission in 2018.

Training will be increasingly held on-line. To that effect Arup University has made great strides in transforming training resource material to on-line variants.

The business mobility plan Section 3.4 states that travel between the Netherlands and Belgium, Germany, France and England will preferably be made by train.

### **3.3.3 Category 7 – Employee Commuting**

Table 17 shows the CO<sub>2</sub> emissions from commuting since the baseline year of 2018. Overall, emissions from commuting has reduced by 86% since 2018. The pandemic was a contributing factor as both government and company guidelines restricted the ability to work in the office. During this time the business developed improved ways of remote working including implementing a working from home policy. Working from home has continued post-pandemic which contributed to maintaining a lower level of emissions from commuting. From 2022 onwards however it is expected that levels of commuting will increase compared to the 2020/1 levels as travel is now possible. This is reflected in the data in Table 17. The business mobility plan encourages use of public transport where possible with the aim of maintaining, or further reducing, lower CO<sub>2</sub> emissions.

For the commuting by public transport there is little to be gained in limiting carbon emissions, since most means of public transport (tram, train and metro) are now run on 100% green energy. Only commuting with bus contributes to CO<sub>2</sub> emissions.

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<sup>5</sup> Intercity trains have used 100% green electricity since 2017 and therefore have had zero CO<sub>2</sub> emissions, but it has not been possible to differentiate between intercity and local train travel so emissions were conservatively calculated for all train travel between 2017 and 2021.

**Table 17: CO2 Emissions from Commuting**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> )                              | 2018           | 2019           | 2020           | 2021           | 2022           |
|---|----------------|----------------|----------------|----------------|----------------|
| Commuting by private car  | 308 863        | 88 798         | 25 352         | 9 723          | 41 932         |
| Gasoline  | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Diesel  | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Hybrid  | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Fully electric  | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> | <i>Unknown</i> |
| Commuting by public transport   | 3 984          | 14 179         | 4 566          | 152            | 861            |
| Bus   | 3984           | 3978           | 1281           | 152            | 861            |
| Metro   | <i>Unknown</i> | 2103           | 677            | 0              | 0              |
| Tram  | <i>Unknown</i> | 0              | 0              | 0              | 0              |
| National train  | <i>Unknown</i> | 8098           | 2608           | 0              | 0              |
| <b>Total</b>  | <b>312 847</b> | <b>102 977</b> | <b>29 918</b>  | <b>9 875</b>   | <b>42 793</b>  |
| <b>% reduction compared to baseline year 2018</b>                               | -              | <b>67%</b>     | <b>90%</b>     | <b>97%</b>     | <b>86%</b>     |
| <b>% reduction in private car emissions compared to baseline year 2018</b>      | -              | <b>71%</b>     | <b>92%</b>     | <b>97%</b>     | <b>86%</b>     |
| <b>% reduction in public transport emissions compared to baseline year 2018</b> | -              | <b>-256%</b>   | <b>-15%</b>    | <b>96%</b>     | <b>78%</b>     |

### 3.4 Overall CO<sub>2</sub> Emissions

The overall annual CO<sub>2</sub> emissions since baseline year 2018 are shown in Table 18. 2022 shows a 64% reduction in CO<sub>2</sub> emissions compared to 2018. Figure 3 shows the annual CO<sub>2</sub> emissions per FTE since 2018.

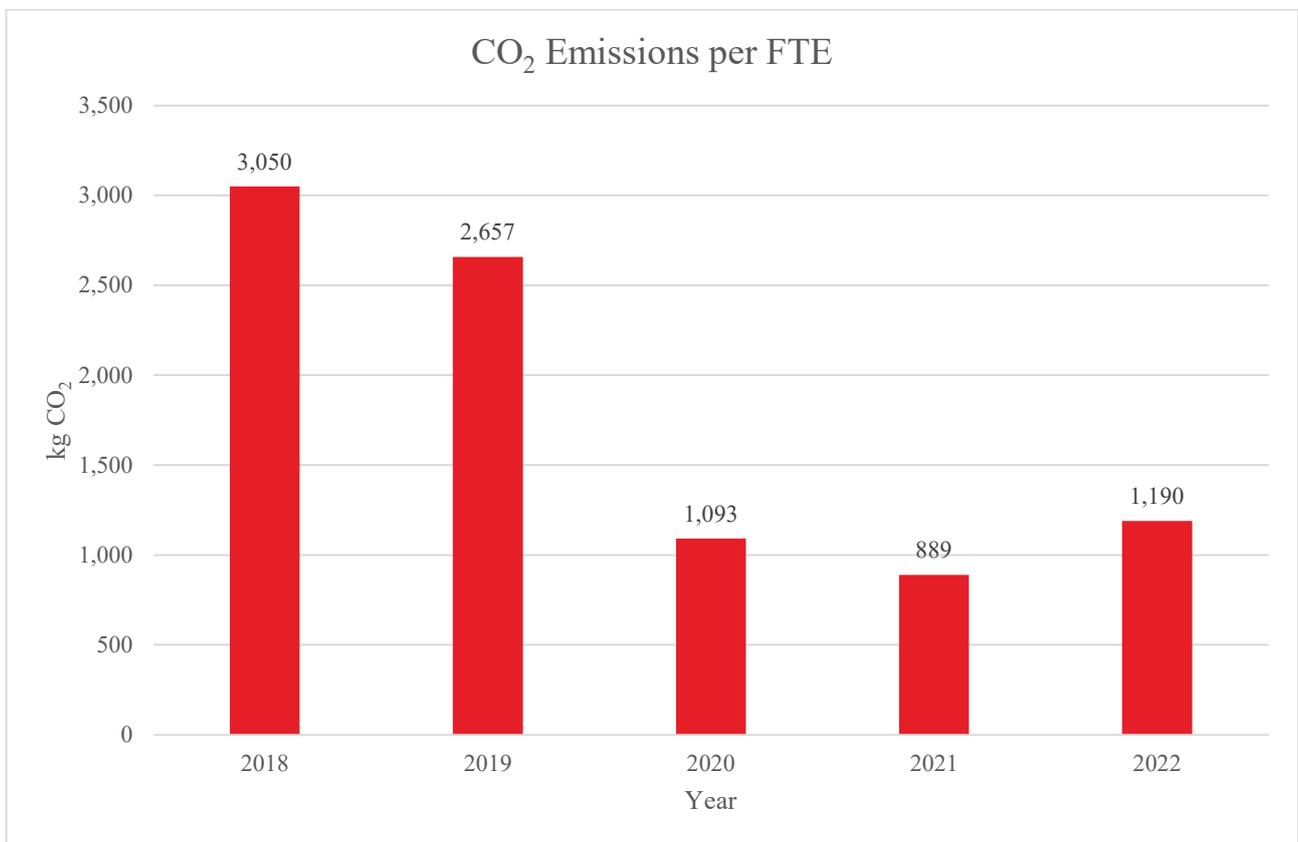
It should be noted that some items have moved scope, for example business travel was reported under Scope 1 until 2021 when it was moved to Scope 3.

The large overall reduction is due to several factors including:

- Reduced business travel, particularly by air, resulting from the pandemic and continued efforts to utilise remote working thereafter,
- Transformation of the company lease vehicles to be almost all electric, and
- Transformation of the public transport via train, tram and metro in the Netherlands to operate on 100% green energy.

**Table 18: Overall Annual CO2 Emissions**

| CO <sub>2</sub> Emissions (kg of CO <sub>2</sub> )      | 2018           | 2019           | 2020           | 2021          | 2022           |
|---|----------------|----------------|----------------|---------------|----------------|
| Scope 1   | 82,080         | 52,289         | 27,982         | 14,255        | 12,102         |
| Scope 2   | 462,008        | 449,684        | 204,028        | 167,038       | 134,869        |
| Scope 3   | 312,847        | 103,432        | 29,918         | 41,378        | 162,344        |
| <b>Total</b>  | <b>856,935</b> | <b>605,405</b> | <b>261,929</b> | <b>22,781</b> | <b>309,316</b> |
| <b>Total % reduction compared to baseline year 2018</b> | -              | <b>29%</b>     | <b>69%</b>     | <b>74%</b>    | <b>64%</b>     |



**Figure 3: Annual carbon emissions per FTE**

### 3.5 Performance Against Reduction Targets

Table 19 summarises performance against the reduction targets in 2022 compared to the baseline year 2018. Whilst section 3.4 shows that in 2022 overall CO<sub>2</sub> emissions reduced by 70% compared to 2018, this is not directly reflected in performance against reduction targets.

Targets G2, G3, G7 and G8 have been met, in fact the emissions have been reduced by more than the targeted amounts. The pandemic played a significant role in achieving this so these areas should continued to be monitored in the coming years to ensure that the reduced emissions are maintained and, if possible, further reduced.

The scope 1 aspect of target G4 is close to being met with almost all lease vehicles now being electric and the remaining two non-electric vehicles will be recommissioned or exchanged for

electric vehicles when their leases expire in the coming two years. As for the Scope 3 category 6 aspect of this target, further definition of the target is required. There is no baseline data from 2018 regarding the proportion of emissions from electric vs non-electric cars used for business travel. It is still not possible to report fuel type of private cars used for business travel. Furthermore, the current mobility policy does not restrict use of non-electric private vehicles for business travel.

Target G5 has been set globally, but in the Netherlands the energy for the office is purchased by the landlord. Whilst Arup has requested 100% green energy the landlord is not delivering this. Emissions are 224% higher in 2022 than 2018 as a result of this but Arup cannot influence it. Arup is in regular discussions with the landlord on this topic but to no avail. Within Arup at a global level, a Renewable Energy Certificate procurement is underway, whereby the emissions associated with the Amsterdam Office (and all other Arup offices) will be backed by third-party (RECs) - this is to align with goal G5 “to procure electricity in our offices from 100% renewable sources by 2023”. At the time of this report being written, that procurement is in progress but not yet completed.

**Table 19: Performance Against Reduction Targets in 2022 compared to 2018**

| Ref. No. | Target   | Reduction Area  | 2022 Performance vs 2018   |
|----------|--|---|--|
| G1       | We will reduce purchases such as catering, stationery and events by 50%                  | Scope 3 Category 1 – Purchases goods and services                       | This target needs further definition e.g. identification of areas where reductions will be made and what the 2018 baseline is.   |
| G2       | By implementing flexible working, we aim to cut commuting by 20%.                        | Scope 3 Category 7 – Employee Commuting                                 | 86% reduction  |
| G3       | Reducing business travel by 50%.   | Scope 3 Category 6 – Business Travel                                    | 71% reduction  |
| G4       | Only electric cars will be used for business travel as far as practically possible.      | Scope 1 – Company Vehicles<br>Scope 3 Category 6 – Business Travel      | Scope 1 - Emissions from company cars has reduced 85%.<br>Scope 3 Category 6 - Target needs further definition. Currently it is not possible to measure fuel type of private vehicles used for business travel. Also, the company mobility policy does not prevent employees from using non-electrical private vehicles for business travel. We will be seeking to lease only new electric vehicles from 2024 once the final lease ends. Currently only 2 vehicles in NL are non-electric. |
| G5       | We are aiming to procure electricity in our offices from 100% renewable sources by 2023. | Scope 2 – Purchased electricity, steam, heating and cooling for own use | 157% increase. The energy contract for the Amsterdam office is no longer for 100% green energy. At this rate, we will fail to meet our 2023 target.  |
| G6       | Reduce the emissions of goods from our top 20 suppliers by 20%.                          | Scope 3 Category 1 – Purchases goods and services                       | Refer to Supply Chain Analysis report.   |
| G7       | Each FTE to work from home 1 day a week, effectively reducing commuting mileage by 20%.  | Scope 3 Category 7 – Employee Commuting                                 | 86% reduction in commuting emissions. It is not possible to determine whether or to what extent the reduction is due to 1 day a week working from home.  |

| Ref. No. | Target  | Reduction Area                       | 2022 Performance vs 2018 |
|----------|---|--------------------------------------|--------------------------|
|          |   |                                      |                          |
| G8       | Air travel to Arup meetings and Arup internal conferences to be reduced by 20% in 2022 compared to 2018 due to availability of online alternatives. This reduction will be continued until a 70% reduction is reached compared to 2018. | Scope 3 Category 6 – Business Travel | 75% reduction            |

## 4. Future Plan

### 4.1 Future Reduction Strategy

The reduction targets described in section 2.1 remain going forward as Arup continues to improve in these areas. Improvement is planned in three ways; further reduction in energy use and emissions, improvements to data collection and further definition of targets to make them more SMART<sup>6</sup>. Details are given in **Error! Reference source not found.**

**Table 20: Action Plan for Reduction Targets**

| Ref. No. | Target  | Reduction Area                                    | Updates and Improvements Needed  | Proposed Action   | Action Owner  | Other Resources  | Evaluation Method   | Due By    |
|----------|---|---|--|---|---------------|--|---|-----------|
| G1       | We will reduce purchases such as catering, stationery and events by 50% | Scope 3 Category 1 – Purchases goods and services | Arup (Global and Europe Region) are currently in the process of altering this initial target for the financial year 2023/24.<br><br>Nevertheless, the largest impact of this category is emissions associated with events. As part of our improved approach to manage business travel (see below) - this is contributing to a reduction in emissions for events. | Carry our analysis of our emissions from Purchased Goods and Services in 2018 using data from finances. This will give us a 2018 baseline to work from. | CO2PL Manager | Finance to provide list of suppliers and invoiced amounts from 2018. | Success is production of baseline to measure reduction against. | Dec 2023  |
| G2       | By implementing flexible working, we aim to cut commuting by 20%.       | Scope 3 Category 7 – Employee Commuting           | Through the work-unbound policy we are seeing more staff spend less time in our offices. Due to pandemic years between the baseline and to date we are only starting to establish data on  | Request Reisbalans to report on vehicle type and bike type (electric, paddle only) to improve data collection.  | CO2PL Manager | HR to coordinate with Reisbalans                                     | Success is positive response from Reisbalans.                   | June 2023 |

<sup>6</sup> SMART = Specific, Measurable, Achievable, Relevant, and Time-Bound

| Ref. No. | Target                           | Reduction Area                       | Updates and Improvements Needed  | Proposed Action  | Action Owner                      | Other Resources | Evaluation Method   | Due By   |
|----------|----------------------------------|--------------------------------------|--|--|-----------------------------------|-----------------|---|----------|
|          |                                  |                                      | working patterns. Collection and analysis of data on working patterns will continue.   | Update target to:<br>Maintain at least an 75% reduction in commuting emissions compared to 2018 baseline emissions.  |                                   |                 |   |          |
| G3       | Reducing business travel by 50%. | Scope 3 Category 6 – Business Travel | <p>Arup is currently looking to onboard a single travel agent in the Region and a new booking process. This process will allow for the approver, ER travel team and Net Zero colleagues to have oversight as to the emissions for specific sub-categories of business travel. For example, our goal is to be able to delineate between travelling for a specific client purpose or a number of internal purposes.</p> <p>In addition, we are working to enhance our business travel policy which provides a ‘suggested’ mode of travel between certain office locations - accounting for more sustainable travel options as the priority where viable.</p> | <p>Introduce policy whereby all international travel must be booked through a centralised booking system.</p> <p>Update target to:<br/>Maintain at least a 50% reduction in business travel emissions compared to 2018 baseline emissions.</p> | Europe Region<br>Net Zero Manager | -               | Success is introduction of centralised travel booking system. | End 2024 |

| Ref. No. | Target   | Reduction Area  | Updates and Improvements Needed   | Proposed Action   | Action Owner                   | Other Resources | Evaluation Method   | Due By   |
|----------|--|---|---|---|--------------------------------|-----------------|---|----------|
| G4       | Only electric cars will be used for business travel as far as practically possible.      | Scope 1 – Company Vehicles<br>Scope 3 Category 6 – Business Travel      | <p>Currently it is not possible to measure fuel type of private vehicles used for business travel. Arup are investigating whether it is possible to collect this data via the Reisbalans system.</p> <p>We will be seeking to lease only new electric vehicles from 2023/4 once the final lease ends. Currently only 2 vehicles in NL are non-electric.</p>   | <p>For the Netherlands Group, add to this target with an additional target:</p> <p>From 2023/4, all new company vehicles will be fully electric</p> |                                |                 |   |          |
| G5       | We are aiming to procure electricity in our offices from 100% renewable sources by 2023. | Scope 2 – Purchased electricity, steam, heating and cooling for own use | <p>The delivery of this target is more appropriate to manage at Global and Regional Scales. Arup is currently progressing a programme of Energy Attribute Certificate procurement for our offices whereby we are not provided with Renewable Energy supply. This will cover the Netherlands group, and on the target of 100% renewable globally by 2023.</p> <p>An office refurbishment is planned which will target “good” Energy Use Intensity Values which will contribute to reducing energy use in the Amsterdam office.</p> | Engage with the global Arup Renewable Energy Certificate procurement which is underway.   | Europe Region Net Zero Manager | Landlord        | Certification of 100% renewable electricity in the Amsterdam office | End 2023 |

| Ref. No. | Target  | Reduction Area                                    | Updates and Improvements Needed  | Proposed Action  | Action Owner  | Other Resources  | Evaluation Method   | Due By   |
|----------|---|---|--|--|---------------|--|---|----------|
| G6       | Reduce the emissions of goods from our top 20 suppliers by 20%.   | Scope 3 Category 1 – Purchases goods and services | At a Regional level, Arup is currently going through a programme of supply chain engagement with our Top 20 suppliers in the Europe Region by spend. Based on spend, the majority of the top 20 are service providers. However we are seeking to investigate which goods suppliers are our priority for engagement over the coming year. | In the Netherlands, carry out analysis of our emissions from goods in 2018 using data from finances. This will give us a 2018 baseline to work from. | CO2PL Manager | Finance to provide list of suppliers and invoiced amounts from 2018. | Success is production of baseline to measure reduction against. | Dec 2023 |
| G7       | Each FTE to work from home 1 day a week, effectively reducing commuting mileage by 20%.   | Scope 3 Category 7 – Employee Commuting           | This target is effectively a duplicate of G2 so will be removed from future reporting.   | None.  | -             | -  | -   | -        |
| G8       | Air travel to Arup meetings and Arup internal conferences to be reduced by 20% in 2022 compared to 2018 due to availability of online alternatives. This reduction will be continued until a 70% reduction is reached compared to 2018. | Scope 3 Category 6 – Business Travel              | None   | Update target to: Maintain at least a 70% reduction in air travel compared to 2018.  | -             | -  | -   | -        |

| Ref. No. | Target                                       | Reduction Area                           | Updates and Improvements Needed             | Proposed Action   | Action Owner                                      | Other Resources | Evaluation Method   | Due By   |
|----------|--|--|---|---|---|-----------------|---|----------|
| G9       | New target: Measure CO2 emissions from waste | Scope 3 Category 5 – Waste in operations | New target to measure emissions from waste. | Obtain access to (monthly) waste reporting from the landlord.<br><br>Obtain emissions data for the waste transportation and final disposal/recycle/reuse from landlord's waste disposal contractor. | Europe Region Net Zero Manager and CO2 PL Manager | Landlord        | Success is:<br>- Access to monthly waste reporting from landlord's contractor<br>- Receipt of emissions data of waste transportation and final disposal/recycle/reuse | Dec 2023 |

#### Follow-up items:

- Scope 1 - Emissions from Company Facilities: Refrigerant losses from Arup owned equipment has not been recorded for 2022. This is an area for future improvement.
- Scope 2 – Electricity: At the time of writing, the target to have 100% renewably sourced electricity on our office by 2023 (G5) has not been met. Extra efforts should be made to ensure this is achieved by the end of December 2023.
- Scope 2 - Heating: There has been a 381% increase in emissions due to heating in the Amsterdam office since 2018. The reason for this is unknown. This should be investigated to determine what can be done to reduce these emissions.
- Scope 3 Category 6 – Business Travel: Currently the data collected for business travel may not be complete as there are multiple ways in which it can be booked including staff booking travel personally and claiming it back through expenses. In the next 1-2 years a new travel booking system will be implemented at a European Region level to better control and measure data on business travel as well allow us to see how and why people are travelling for business. Furthermore, the Europe Regions intends to provide recommended travel modes between our offices in region, to guide our non-client related travel.
- Scope 3 Category 6 – Business Travel & Category 7 – Employee Commuting: It is not currently possible to distinguish the fuel type of private vehicles used by staff for business travel and commuting. Journeys are recorded in the Reisbalans app. An improvement measure is to ask

Reisbalans whether it's possible to make it compulsory for staff to record the fuel type of the vehicle used when entering data and whether that can then be used in our reporting.

## 4.2 Future Usage

Our forecasted CO2 emissions from 2023 to 2030 is shown in Figure 4. This forecast is based on the following assumptions:

- Scope 1 – Emissions from (Non-Electric) Company Vehicles: the last two remaining non-electric lease vehicles are expected to be removed from the fleet in 2023. The exact dates are unknown, so for the purpose of forecasting, the emissions for 2023 are estimated to be 50% of those in 2022. From 2024 onwards these emissions are forecast to be 0kgCO2 as there should no longer be non-electric vehicles in the company fleet.
- Scope 2 – Electricity: At the time of writing, the Global and Europe Region target G5 to procure electricity in our offices from 100% renewable sources by 2023 has not been met. For the forecasting it is assumed that 2023 electricity usage will be an average across 2020 to 2022, and that 100% renewably sourced electricity will be in place by 2024.
- Scope 2 – Heating: It is assumed that the average energy usage from 2020 to 2022 will be maintained going forward.
- Scope 3 – Commuting: It is assumed that our proposed new target to maintain at least a 75% reduction in commuting emissions compared to 2018 baseline emissions will be achieved. Note that for the forecasting of commuting emissions from public transport, 2019 data has been used for the calculations in place of 2018 data because in 2018 only bus usage was recorded, whereas in 2019 all mode of transport were recorded.
- Scope 3 – Business travel: It is assumed that our proposed new target to maintain at least a 50% reduction in business travel emissions compared to 2018 baseline emissions will be achieved. In calculating the emissions for specific transport types, it is assumed that the kilometres travelled by air in 2022 for journeys under 700km would be made by international train going forward.

# CO2 Emissions Forecast

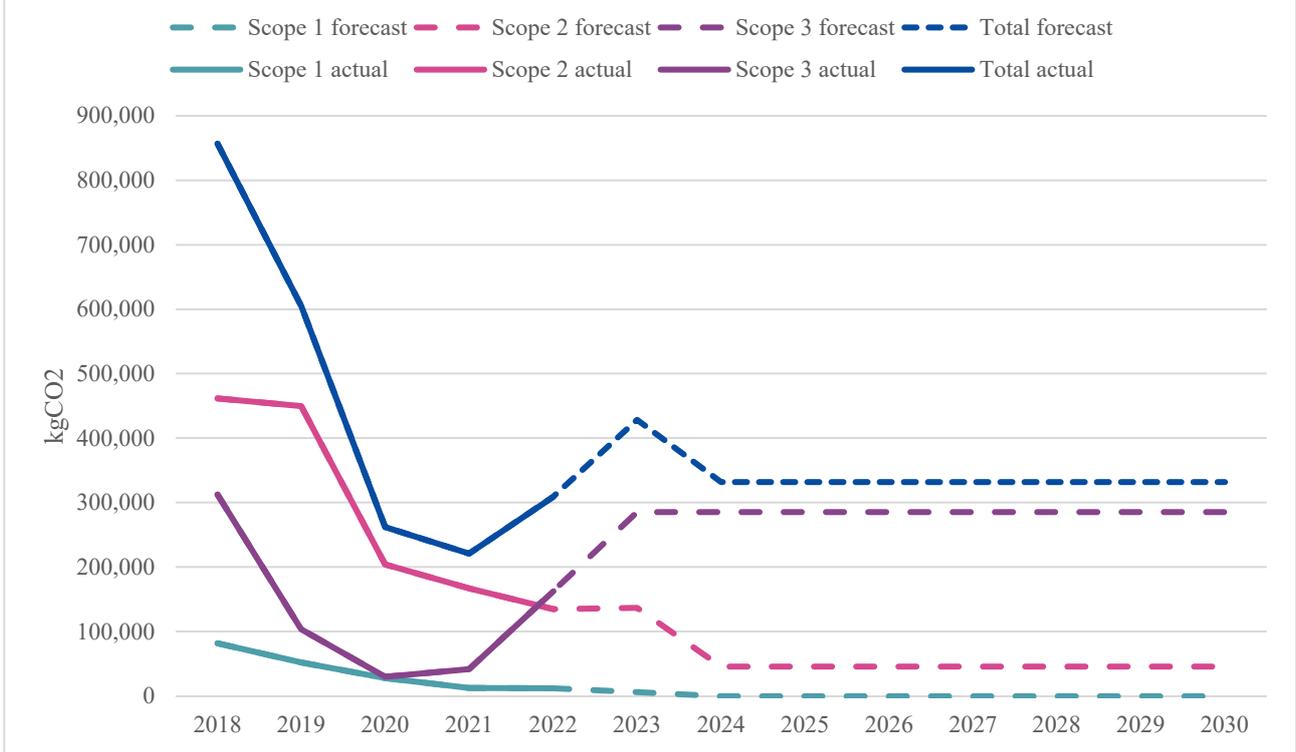


Figure 4: CO2 Emissions Forecast to 2030