

**Arup BV**

## CO2 Performance Ladder

Energy Management Plan 2021-2030

Reference: CO2-portfolio\_Energymanagementplan

Final | 12 July 2022

**REDACTED**

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 074764-56

**Arup B.V.**  
Beta Building Naritaweg 118  
1043 CA  
Amsterdam  
Netherlands  
[arup.com](http://arup.com)

## Document Verification

**Project title** CO2 Performance Ladder  
**Document title** Energy Management Plan 2021-2030  
**Job number** 074764-56  
**Document ref** CO2-portfolio\_Energymanagementplan  
**File reference** CO2-portfolio\_Energymanagementplan\_2022

Revision	Date	Filename	CO2-portfolio_EnergyManagementplan_2022		
Draft	21 March 2022	<b>Description</b>	Yearly update		
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Marlissa Trompert	Paul van Horn	Tudor Salusbury
		<b>Signature</b>	MTro		
Draft	05 May 2022	<b>Filename</b>	CO2-portfolio_EnergyManagementplan_2022		
		<b>Description</b>	Yearly update		
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Marlissa Trompert	Paul van Horn	Tudor Salusbury
		<b>Signature</b>	MTro		
Final	12 July 2022	<b>Filename</b>	CO2-portfolio_EnergyManagementplan_2022		
		<b>Description</b>	Yearly update		
			<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
		<b>Name</b>	Marlissa Trompert	Paul van Horn	Tudor Salusbury
		<b>Signature</b>	MTro		

Issue Document Verification with Document



## Contents

<b>1.</b>	<b>Introduction.....</b>	<b>5</b>
1.1	Organizational boundaries .....	6
1.2	Responsibilities .....	6
<b>2.</b>	<b>Reduction plan own organization.....</b>	<b>7</b>
2.1	Evaluation reduction targets .....	7
2.2	Reduction strategy .....	13
2.3	Reduction targets .....	14
2.4	Potential reduction measures .....	15
<b>3.</b>	<b>Reduction for projects downstream scope 3.....</b>	<b>17</b>
3.1	Reduction strategy .....	17
3.2	Reduction targets .....	19
3.3	Reduction measures .....	19

## 1. Introduction

At Arup we aim to contribute towards a more sustainable future. Arup in the Netherlands have 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 the Arup global Net Zero Carbon Strategy released in 2020.

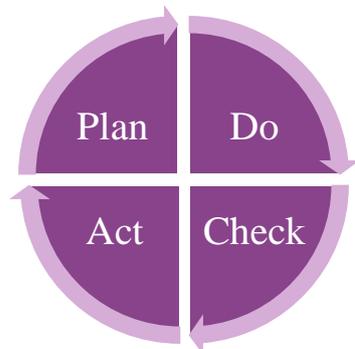
This Energy Management Plan combines our global company aims and strategies to reduce CO<sub>2</sub>-emissions and the local CO<sub>2</sub> performance ladder aims. Reduction targets and measures are set-up for emissions of scopes 1, 2 and 3 on the basis of the insight gained through the documents: GHG-inventory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

Due to the abnormal business conditions in 2020 and 2021 and the uncertainty of business conditions in 2022, this plan will have an intermediate status. For most of 2020 and 2021 the Arup offices have been closed except for business-critical reasons. In the Netherlands this has meant a very limited office presence of staff. Reception services continued during this period and regular lighting and heating in the office was provided.

The plan is set for the period from 2021 to 2030, with an update by the end of 2021. The present assumption is that in the second half of 2022, business as usual will slowly start to resume. In the rest of the plan we will discuss the post-COVID measures we aim to take in order to achieve our carbon reduction goals. The present COVID-induced carbon reduction is assumed to be temporary. The plan is written according to the ISO 50001 standard, as to comply to the CO<sub>2</sub>-ladder certification.

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 Organizational boundaries

The CO<sub>2</sub>-ladder certification will be applicable to the firm Arup B.V. in the Netherlands. Arup B.V. has a permanent facility in Amsterdam and a temporary facility in Groningen. The Groningen facility is no longer in use from 31-12-2021. 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 B.V.

Arup B.V. produced in 2021 a total amount of CO<sub>2</sub> emissions below 500 tons a year classifies as a small company. The size classification determines the specific set of CO<sub>2</sub>-ladder certification requirements.

## 1.2 Responsibilities

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

Role	Name	Tasks
Sustainable Development Director (SDD)	Tudor Salusbury	Sets priorities and goals for the next 3 years Reviews governance policies Discusses with management team for approval of plans and implementation policies Audits if new projects meet the goals set by European board Yearly evaluates the goals
Sustainable Development Manager (SDM)	Paul van Horn, supported by Kayley Komarnyckyj, AMSFacilities, AMSFinance and junior PM.	Researches future scenarios Coordinates if goals meet CO <sub>2</sub> -prestatieladder Manages implementation of plans Checks governance with sustainability objectives Measures and monitors the effect of plans Analyses measurements Assists PM's of projects won with CO <sub>2</sub> -prestatieladder Reports to SDD

The responsible collaborators for project specific targets are:

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

Additional collaborators within the office are:

Role	Name	Tasks
Quality control	Kayley Komarnyckyj	Organisation audits
Human Resources	Esther de Vreugd	Mobility plan, input for Environmental reporting
Marketing / Com.	Hester Duijndam	Communication strategy
Facility manager	Diede van Graas/Robin Langelaar	Facility management
Finance	Mathijs Lammertse	Input for Environmental reporting

## **2. Reduction plan own organization**

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). The main areas of influence are defined in GHG-inventory report.

### **2.1 Evaluation reduction targets**

#### **2.1.1 Scope 1**

The scope reduction is linked to the reduction of number of lease vehicles and the electrification of the lease fleet. These measures were put in place in early 2019 with an evaluation of these measures set for early 2021.

First item to note is the reduction in lease companies from 6 to 3, this will make it easier to produce reliable information.

Second trend is the one towards electrification of the vehicle fleet, from 0 in 2015 to 12 in 2020. Note that the amount of lease vehicles spikes in 2020 due to some temporary contracts (< 3 months) for the Groningen office. These were included in the totals. For 2021 the number of non-electrical lease contracts is 3.

Per 2021, Scope 1 only entails non-electric lease cars. Electric lease care are measured in scope 2.

Scope 1 [kg CO2]	2018	2019	2020	2021	2022	2023	2024
Business travel							
Lease cars gasoline	49 106	41 538	11 500	507	4 392	4 392	4 392
Lease cars diesel	31 866	9 110	3 696	299	2 086	2 086	2 086
Lease cars hybrid							
Lease cars fully electric	1 108	1 640	12 787	Moved to scope 2			
Total carbon lease cars	82 080	52 289	27 982	806	6 478	6 478	6 478
Total Scope 1	82 080	52 289	27 982	806	6 478	6 478	6 478

[Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

The numbers from 2020 and 2021 might give a distorted view, there was limited travel due to covid restrictions. For 2022 and onwards a flexible working agreement is in place, so we expect numbers to remain lower than in 2019.

The target for the coming years is a full electrification of the leave vehicles and a reduction in lease vehicles. This is reflected in the targets, with a total of 12 fully electric lease vehicles being used for forecasting. The current lease contracts for non-electrical vehicles will expire in the coming years, with the last one in 2023. The target for 2024 is the target for a fully electric lease vehicle fleet. After 2024 the only way to reduce carbon in our vehicle use is to ensure 100% renewable energy for charging and/or reduction of number of lease vehicles.

## 2.1.2 Scope 2

### Electricity buildings Amsterdam and Groningen:

With the sale of the Arup office building the electricity supplier has changed as well. From 100% wind energy between September 2017 and July 2020, Arup is since July 2020 using grey electricity (average mix of fuels of electricity on the Dutch market). Negotiations are underway to revert to green electricity. The Groningen office is closed per 31-12-2021.

Scope 2 [kg CO2]		2017	2018	2019	2020	2021	2022
Electricity							
AMS Building	Grey	47 866			80 066	111 958	84 682
AMS Building	Wind	0	0	0	0	0	0
Total carbon AMS building Electricity		47 866	-	-	80 066	111 958	84 682

[Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

The estimated reduction of carbon emissions in 2021 and beyond are estimated at 168 tons yearly.

Scope 2 [kg CO2]		2017	2018	2019	2020	2021	2022
Electricity							
GRO Building	Grey	17 308	30 874	23 112	12 300	6 024	0
Total carbon AMS building Electricity		17 308	30 874	23 112	12 300	6 024	-

[Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

The Groningen office is currently using grey electricity. Switching to green electricity could reduce carbon emissions by 20 tons yearly. The office was closed per 31-12-2021, so this will be the last year reporting.

### Heating buildings Amsterdam and Groningen:

The Amsterdam building is heated by the AEB incinerator providing the whole western harbour area. No other supplier of heating possible.

The Groningen building is heated by using natural gas. The exact amount for our own office is not known, the costs are included in the service-costs. In 2021 the Groningen office space is closed, no reporting to be expected for 2022.

In general there is not much gain to be had in reduction of heating because it's adjustable per office section, only in reduction in the amount of space leased. This will affect the heating requirements directly. An assessment of space requirements is presently undertaken for the Amsterdam office.

Heating	2018	2019	2020	2021	2022
AMS Building	8 061	10 511	10 281	20 424	10 281
GRO Building	105 667	79 398	104 990	15 184	0
Total carbon Heating AMS and GRO	113 728	89 909	115 272	35 608	10 281

Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

### Lease cars (electric):

Per 2021, Scope 1 only entails non-electric lease cars. Electric lease care are measured in scope 2.

Scope 2 [kg CO2]	2018	2019	2020	2021	2022	2023	2024
Business travel							
Lease cars fully electric	1 108	1 640	12 787	13 448	14 793	14 793	14 793
Total carbon lease cars	1 108	1 640	12 787	13 448	14 793	14 793	14 793

[Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

### Business travel with private car:

The numbers on the use of a private car for business travel (not commuting) vary over the years and are assumed to be mainly influenced by the P500 project in Groningen. Staff from Groningen regularly visited Amsterdam and vice versa. Changes in the operational setup have changed the mileage claimed, showing a decline in 2019. The mobility plan aims to have business travel done by public transport.

Business travel with private car	2017	2018	2019	2020	2021
Gasoline					
Diesel					
Hybrid					
Fully electric					
Total carbon business travel with private car	44 062	42 966	117 891	27 243	14 203

Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

### Business travel with public transport:

The mobility plan aims to have business travel done as much as possible by public transport of by using electric lease vehicles.

The public transport numbers are strongly influenced by the energy sources of the public transport companies. With effect from 2021 all public transport companies use 100% green electricity in their operations. This means travel on public transport in WtW analysis means zero emissions. This is



distance <700 km		55 170	73 340	126 797	101 908	79 194	15 825	2 458	71 336	61 145	50 954	40 763	2 458	
2500< distance >700		93 792	71 145	108 524	115 130	104 602	16 839	5 127	80 591	69 078	57 565	46 052	5 127	
distance >2500 km		109 144	91 738	125 938	145 611	102 978	22 705	9571	101 928	87 367	72 806	58 244	9 571	
Total carbon [kg]	80 914	215 426	258 106	236 224	361 260	362 649	286 773	55 369	17 156	253 855	217 590	181 325	145 060	17 156

Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

### 2.1.3 Scope 3

In 2021 Business travel is moved from scope 2 to scope 3 by SKAO.

Commuting private car	2014	2015	2016	2017	2018	2019	2020	2021	2022
Fuel and Weight unknown						88 798	25 352	9 723	37 927
Diesel							0	0	0
Hybrid							0	0	0
Fully electric							0	0	0
<b>Total carbon commuting private car</b>	262 733	259 500	259 427	332 271	308 863	88 798	25 352	9 723	37 927

Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

Commuting public transport	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bus						3 978	1 281	152	1 340
Metro						2 103	677	0	0
Tram						0	0	0	0
Train						8 098	2 608	0	1 269
<b>Total carbon commuting public transport</b>						14 178	4 567	152	2 609

Source: Carbon per FTE tab in Environmentaldata 20220413 v7.2 xl sheet]

The scope 3 figures are almost all related to commuting. The amount of commuting has been difficult to establish because in earlier years there was no distinction between private car and public transport. The advent of Reisbalans now allows for more accuracy.

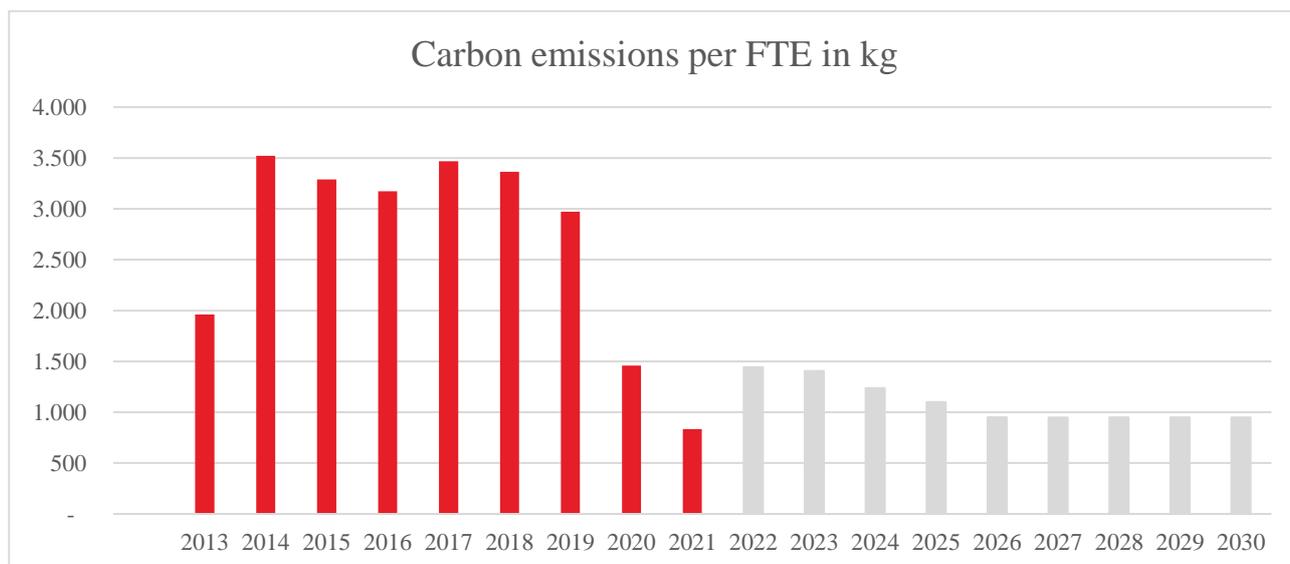
For 2020 and 2021 the amount of commuting was limited due to the COVID19 restrictions. These conditions will continue well into 2021. With regular business conditions expected to open up in the 2<sup>nd</sup> quarter of 2022, commuting will likely bounce back to almost pre-COVID19 levels.

Home-working in 2020 has shown that productivity doesn't necessarily suffer. This has made it more realistic to introduce regular home-working as a way to push down commuting, either by public transport or private car. The aim for 2022 is 20% less commuting per FTE than in 2018.

For the commuting by public transport there is little to be gained in limiting carbon emissions, since all means of public transport are now run on sustainable energy. All commuting miles with public transport are basically zero emission.

Another possible outcome could be the re-evaluation of office size. With a 20% less attendance in the office, there is scope for hotdesking and reducing the amount of office space. This will have a positive impact on the energy use per FTE. The effects are now being studied, but are not expected to be the same 20%.

**Figure 1 Yearly carbon emissions per FTE in kg**



[source Analysis 2020 tab Environmentaldata 20220413 v7.2]

## 2.2 Reduction strategy

The focus of the carbon emissions reduction strategy for the period 1-4-2018 – 1-4-2021 has been to reduce the impact of 2 main emission drivers:

- air travel;
- commuting by fossil fuel driven cars.

The Arup mobility policy was adopted in early 2019, designed to tackle the issue of air travel and commuting.

### Arup Mobility Policy 2019

The policy had the explicitly stated goal to steer towards more sustainable travel behaviour, both in business travel and in commuting.

Topics covered were:

// Commuting arrangement // Business trips arrangement // Cycling arrangement // Relocation arrangement // Parking policy // Leasing policy

The aim of the policy was to achieve a 35% reduction in carbon emissions. This goal has been met, but not through the sole application of the policies. [see figure 1].

Emission reductions compared to 2018 were 36% reduction in 2019 and 56% reduction in 2020 compared to 2018. These figures are hard to replicate in non-COVID times because they imply a total absence of travel. This is not realistic.

### **2.3 Reduction targets**

In the past years (2020-2021) air travel has literally dropped to zero due to Covid-induced travel restrictions. Commuter travel has dropped significantly from March 2020 onwards as office presence of staff became restricted and employees started to work from home.

As stated before, the current Covid travel restrictions make it very hard to set realistic targets. Generally speaking most of 2021 has shown the same restricted travel patterns as 2020. After that travel is projected to gradually pick up and be fully possible in 2022, most probably not reaching pre-2020 levels.

One of the main lessons from the Covid lockdown was the apparent effectiveness of remote working and online working. Whereas before this was never considered a viable option, it has now become a daily reality.

This will also affect travel patterns in the future as online conferencing and remote working will become more accepted. It is not realistic to think all work can be productively done online. The targets for reduction below take this into account.

Reduction targets for 2021 will be greatly affected by the low levels of travel and commuting in 2021. Realistically speaking any reduction target should only start in 2022.

For this reason we take the reduction target for 2022 to be the following:

1. Each FTE to work from home 1 day a week, effectively reducing commuting mileage by 20%. This will bring commuting emissions lower if public transport is used. From 2021 onwards all public transport (except busses) has zero emissions.
2. 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. Arup internal travel assumed to be 50% of all business flights. This reduction will be continued until a 70% reduction is reached compared to 2018. This will bring Arup bv close to net zero in 2026, assuming the compensation of flight with offsetting certificates.

Taking these two targets into account the 2022 reduction will be:

Scope	Source of emission	CO <sub>2</sub> -emission [kg CO <sub>2</sub> /FTE]	Reduction Ambition	
			2022	2022 target
		2018		
<b>Scope 1</b>	Lease cars (non-electric, business travel)	292	50%	117
<b>Scope 2</b>	Electricity	110	Equal	81*
	Heating	433	Equal	489
<b>Scope 3</b>	Commuting	1 099	80%	59**
	Business travel: private cars	153	Equal	158
	Business travel: public transport	14	70%	4
	Air travel	1 291	20%	1055
<b>Total</b>				
<b>Scope 1,2 en 3</b>		3 391	22 %	2.661

[Source Carbon per FTE tab Environmentaldata 20220413 v7.2]

\* Assumes green power for Amsterdam office, if not the total for Amsterdam and Groningen will be 781 tons per year per FTE.

\*\* Figures look distorted. Need to improve measurements of commuting.

## 2.4 Potential reduction measures

The following definitive set of reduction measures were implemented as part of the new mobility plan, effective as per January 1<sup>st</sup>, 2019. The assumed changes in work patterns as discussed above have also been included.

Category	Measure	Potential % total emissions	Progress	Responsible
Scope 1: Self assessment energy audit.	Use the toolkit of InfoMill <a href="http://www.infomil.nl/kantoren">http://www.infomil.nl/kantoren</a> to identify possible office energy saving measures.	Estimated 1% of Scope 2. Done mainly to verify completeness of measures identified	● ● ●	SDM
Scope 1: Office energy use	Office energy audit by Main Energy, identifying potential areas of saving.	Estimated 1% of Scope 2. Done mainly to verify completeness of measures identified	● ●	SDM

Scope 2:  
Business travel – air



Incentives setup in Net Zero Carbon plan.  
Training move on-line.  
Incentives for train set up in new mobility plan  
Provide alternative travel guideline: Our travel agency is instructed to provide travel by train as the first option for travelling within the EU (Germany, Belgium, UK or France).  
For flights to/from these destinations, an additional supervisor approval will be needed.

▼ 20% in 2022 compared to 2018

● ● ● SDM

Scope 3:  
Commuting



Incentives in new mobility plan  
Use of Reisbalans  
OV business cards/ mobility cards  
Free OV bike to and from train station  
Aim for 1 day home-working  
Reduction of number of lease vehicles from 12

▼ 20% reduction compared to 2018

● ● ● SDD

Besides focussing on the main reduction measures of scope 1,2, and 3 to decrease the CO2 emissions of our operations, Arup as a company has put effort into increasing awareness amongst employees.

Category	Measure	Potential %	Progress	Responsible
Awareness	Sustainable development Learning path	Tbd	● ● ●	SDM



### 3. Reduction for projects downstream scope 3

In this section, the reduction strategy is outlined for emission categories associated to our projects, downstream scope 3. The main areas of influence are defined in the downstream scope 3 analysis and the chain analyses.

#### 3.1 Reduction strategy

Through our design and consultancy practice we stimulate sustainable decisions in the design process. To assist project managers in setting sustainability objectives a tool will be developed to give insight in the driver for sustainability and help them set and monitor objectives in projects. A focus on energy targets in projects is priority.

The objectives are recorded in the Arup internet Project Plan (IPP)



Figure 2 UNSDGs (Source: United Nations)

Both in the CRM system and the IPP project plan system data on sustainability is captured but up to now without follow up action.

Starting in 2021 there is a Power BI dashboard capturing all projects that have environmental aspects. In the course of 2021 the actions that will spring from this dashboard will be defined and set in motion. The most obvious would be to have an environmental audit of the project to assess the potential for sustainability measures to be taken into account, carbon emissions reduction being one of them.

**REDACTED**

Further work will follow on outlining example projects and project-level interventions and suggestions to lower carbon emissions.

In 2021 work will begin on tracking the carbon emission performance of our suppliers. Initial work will be done in identifying the main suppliers and setting up a questionnaire on their carbon emissions, possibly offering to do a carbon analysis of their operations.

### 3.2 Reduction targets

In compliance with Arup European Objectives:

50% of projects with a fee > €150k are setting sustainability objectives.

Performance 2018/19: 34% achieved. Goal 1-4-2021: 50%

### 3.3 Reduction measures

Target	Category	Measure	Progress	Responsible
1 	Projects – Objectives	Sustainability objectives in projects > €150k fee are recorded in the IPP	● ● ○	PM
2 	Projects – Objectives	Development of Sustainability objectives tool	● ● ○	SDM
2 	Projects – design - Energy	Verify if projects comply with Dutch regulation in relation to the ‘Energieprestatie’ of a building. (EPC)	● ● ○	PM
3 	Projects – design - Materials	Verify if projects comply with Dutch regulation in relation to the ‘Milieuprestatie’ of a building. (MPG)	● ○ ○	PM
4 	Projects - Communication	Each year a selection of our projects will be presented in the ‘How We Shape a Better World’ report	● ● ●	SDM