CO2 Performance Ladder

Sustainability Strategy and Energy Management Plan

Report Ref Energy Management Plan 2014-2017

Rev1 | 24 februari 2017

This report is made for internal purposes. All external communication based on the content of this document needs to be reviwed by communication office and office management. .

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1 Introduction

This document helps capturing information critical to management of the carbon footprint of Arup BV. The environmental goals set until 2017 are set in this document based on our CO_2 footprint calculated for 2013 and 2014.

2 Carbon Emission Reduction Goals

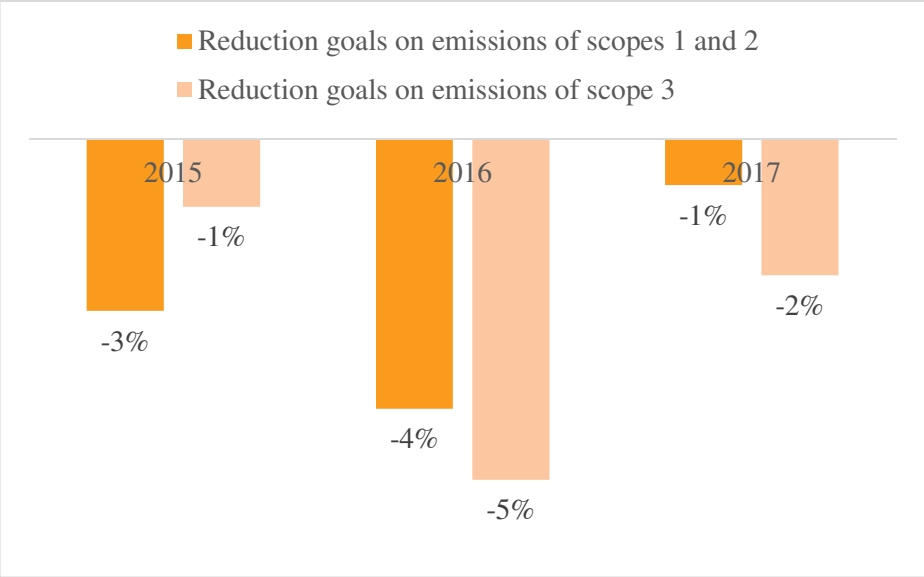
2.1 Introduction

In this section reduction goals are set per scope of emissions. The reference year for the reduction goals is 2013. The reduction goals are given per year until 2017. Unless précised otherwise, the reduction goals are given per employee. If another measure appear to be more relevant as a 'performance indicator' for our carbon emission reduction, we will report this in our 6 monthly performance review.

[Jan 2017] Reference year used is 2014 as mentioned in chapter 3.

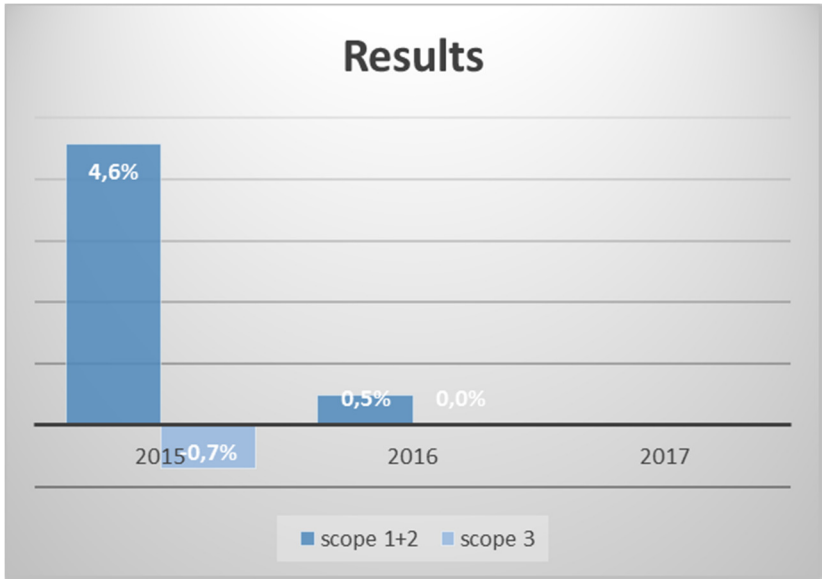
2.2 Reduction goals for scopes 1, 2 and 3 for the business

In the table below the reduction goals for the business are listed (reference year 2013). [Jan 2017] Reference year used is 2014 as mentioned in chapter 3.



Scope 3 in quantitative reduction goals concerns commuting and paper consumption. These are not a requirement under CO2 Performance ladder, but are part of the Arup Sustainability Goals for the Europe region.

[Jan 2017]



2.3 Reduction goals for scopes 1, 2 and 3 for the projects

In the table below our reduction goals for projects are listed. The reference year is 2013 [Jan 2017] Reference year used is 2014 as mentioned in chapter 3.

Scope	Source of emission	Reduction / Improvement goal	Term of realisation	[jan 2017] Result
Scope 1& 2	Business travel in general.	- 3% (related to general reduction of our business travel) - 4% (idem) - 1% (idem)	- In 2015 - In 2016 - In 2017	+4,6% +0,5% -

Scope 3	Projects	- Increasing the internal reviewing, support and financial support to project teams in setting sustainability targets for each project. **10% more projects per year will comply with this target.** [goal is replaced by the below goal in order to comply with Arup European Objectives; 50% of projects with a fee > €150k are setting sustainability objectives] - Use of sustainability assessment tools in early stage of projects identified under most influential the on cutting down carbon emissions. These are Master Planning and Transport planning services in Arup BV.	Per year until 2017	In 2016; 38 projects with fee > € 150k, 22 have indicated to have sustainability objectives, of which have 9 have actual details given in the IPP (Internet Project Plan). This is **24%**
	Projects	Obligatory for all projects that are done under '*CO_2 performance ladder*' requirements. Project specific assessment of life-cycle emissions will be done and potential reduction measures have to be communicated to the client. Tools such as SPeAR can be used. Alternative tools can be used if more relevant to the scope of the project (Dubocalc) when approved by client.	2015	No projects in 2015. In 2016; 1 project 'A16'. CO2 emissions of commute to clients office is monitored. Dubocalc is used on projects A6, A16 and N211. It was also used on a research project to investigate reduction of CO2 by using different materials on bridges.

3 Carbon Footprint Reduction Strategy

To achieve our goals in reducing carbon emission, the following strategies and measures are presented per scope and per category: for the business and the projects.

3.1 Reduction goals for scopes 1, 2 and 3 for the business

The reference year to all quantitative goals is 2014.

Scope	Source of emission	Strategy & measures	Responsible	[jan 2017] Update People
Scope 1	Lease cars	The upcoming Travel Policy in 2015 will introduce new requirements on the energy label of the cars. New incentives will be introduced to offer more flexibility to users, so that more optimal choices can be made under the idea of 'green transportation'.	**Human Resources** Gabrie Rietbergen Gabrie.Rietbergen@arup.com Emma Atkins Emma.atkins@arup.com	**HR** Tamara Gieze
Scope 2	Energy use	- The Energy Management Plan of Arup Netherlands, version 1.1 released in September 2014, defines the measures that will be taken into account to reduce our energy consumption in the facility in Amsterdam. This includes capital investments, operational savings strategies and an awareness plan.	**Office manager** Alexandra van Tintelen Alexandra.van.tintelen@arup.com	**Facility Manager** Leonie de Jong
		- It is unclear whether the current facility for the site office in Groningen will be used after 2014. (See the audit report of the site office in September 2014). Reduction of CO2 emission will be one of the criteria in choosing a new facility / upgrading the current together with health and safety and climate comfort.	**Site Office Manager Groningen** Marcel Damen Marcel.damen@arup.com	**Marcel Damen werkt niet meer voor Arup** Contact; Christha Luppens
	Business air travel	- Incentives to reduce unnecessary air travel. - Upgrading transparency and control in business travel to project leaders to assess the necessity of the travel planned. - Necessity of assessing alternatives to air travel.	Human Resources (see scope 1)	

Scope	Source of emission	Strategy & measures	Responsible	[jan 2017] Update People
		- Awareness plan trough communication of environmental impact of air travel through the future Real-time monitor in the office.		
	Business travel with private cars and public transportation	New Travel Guideline will introduce new measures in creating incentives to promote the use of public transportation for business travel and commuting. The Guideline Policy for the Europe Region will be released in 2015.	Human Resources (see scope 1)	
Scope 3	Commuting	Travel Guideline will create room for incentives to promote 'green' commuting. Encouraging travel by public transportation after analysing needs and possibilities, also to solve the parking capacity problem at the office.	Human Resources (see scope 1)	
	Paper	Introducing printing control by printing only after scan of ID, to reduce forgotten and redundant prints. Awareness campaigns on use and recycling of printing paper. Encouraging use of printed paper as scrap-paper.	Office management (see scope 1)	

3.2 Reduction goals for scopes 1, 2 and 3 for the projects

For projects, the reference year to all quantitative goals is 2014.

Scope	Source of emission	Strategy	Responsible	[jan 2017] Update People
Scope 1& 2	Business travel in general.	- Obligation for project managers to assess need for travels and to study of alternatives. - Communicating to clients our commitment in terms of reducing the travelling done for projects and looking into opportunities to find common grounds/ compromises in this aspect.	Project manager	

Scope	Source of emission	Strategy	Responsible	[jan 2017] Update People
Scope 3	Projects	- Set sustainability targets for projects. The number of projects for which sustainability targets are set, will increase yearly with 10%. - Assess needs within in Arup BV for trainings, tools and expertise to optimise the sustainability of our projects. - Use of sustainability assessment tools in early stage of projects identified under most influential on reducing carbon emissions. These are Master Planning and Transport planning services in Arup Netherlands.	- Sustainability Focus Group and Project Director - Sustainability Focus Group - Sustainability Focus Group	- Project PM and PD - Environmental PM -
	Projects	Draft sustainability reports for all projects that are procured under the 'CO_2 performance ladder'.	Project manager	

4 Energy Management Plan

4.1 Introduction

The energy management plan formalizes the thought process involved in understanding the relative magnitude of energy costs, the possible ways to reduce energy consumption, energy targets that are likely to be achievable, and other associated activities to our business that need to occur such as business travel. While stand-alone energy management projects are satisfying to complete, the energy management plan provides the "big picture" view as an ongoing framework for optimizing overall energy use and achieving success.

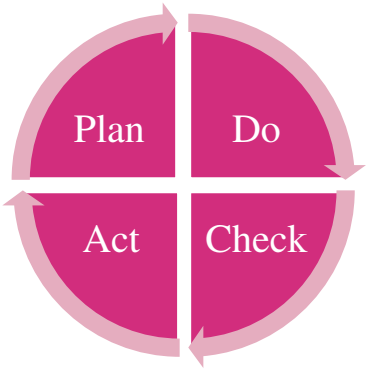
Energy management planning is intended to be a process of "continuous improvement". A closed-loop feedback approach is most effective in demonstrating results that will justify further investment in efficiency. The following diagram shows the circular steps that are recommended for adoption into the planning process:

Plan: Create the energy management plan ensuring budgets, resources, tan timelines for meeting the targets and objectives of the plan. Include tracking and monitoring processes within the plan to ensure effective reporting to management.

Do: Execute the plan by deploying the resources and budgets, preparing status reports, and implementing the communication strategy.

Check: Measure and monitor performance of projects and programs against the desired outcomes as planned and report to management with recommendations for improvements and course corrections

Act: Analyze the variances to the plan and their causes. Recommend improvements, course corrections, and modifications to the plan.



4.2 Background

4.2.1 Operational Boundaries

The energy use that falls under the operational boundaries of Arup BV are:

- Our office in Amsterdam;
- Since September 2013, a site office in Groningen. The site office is operational at the current location until December 2014. A decision will be made by the management team (of the project) whether to stay in the same location depending on the number of employees that has to be accommodated in relation to the capacity and the suitability of the currently rented facility.

For the following sections of the Energy Management plan, as part of our sustainability plan, we focused on our permanent location in Amsterdam which is definitely going to be under our operational boundaries for the coming 3 years which is also the time span of this Sustainability Plan.

Energy management requirements will be set for the site office in Groningen, depending on the progress of the project, until now under 'confidentiality' agreement.

4.2.2 Current state of energy management practice & influential factors

- Our energy management system is based on the measuring devices managed by the building owner/operator.
- HVAC system is centrally set up for the whole building.
- Multiple local/ individual control keys are made available to decrease or increase the temperature by a maximum of plus and minus 4°C.
- The lights are switched on at 06:15h in the morning and switched off at 21.00h.
- The automatic ventilation system switches off at 18.00h.
- All phone devices go on stand-by mode after 18.00h.
- The meeting rooms have sensors and timers that regulate the lighting time. No manual switches are available.
- The security is assigned to switch computers off unless requested otherwise at 21.00h.
- The monitors are not controlled. It is not noticed that a considerable number stays on when users leave the office.
- Most of computer devices are ultra-portable laptops which offer considerable energy savings compared to desktops. (Up to 70%)

- The light in the restrooms is partly centralised. Individual switches are available at each toilet space.
- The main energy consumption channels are:

  Direct:

  - HVAC (Heating, Ventilation and Air-conditioning);
  - Computers and monitors [jan 2017] and servers;
  - IT;
  - Printers;
  - Lighting full office space (light tubes in ceilings)
  - Lighting individual / controllable at desks;
  - Coffee machines;
  - Refrigerators;

  Indirect:

  - Sun /shading are controlled on the two façades with an automatic system of a brise-soleil. Other windows are individually controllable in terms of sun shading or ventilation.
- [Jan 2017] Charge station outside for Hybrid cars

4.2.3 Energy costs per month in euros

Our energy costs are shown in the figure below.

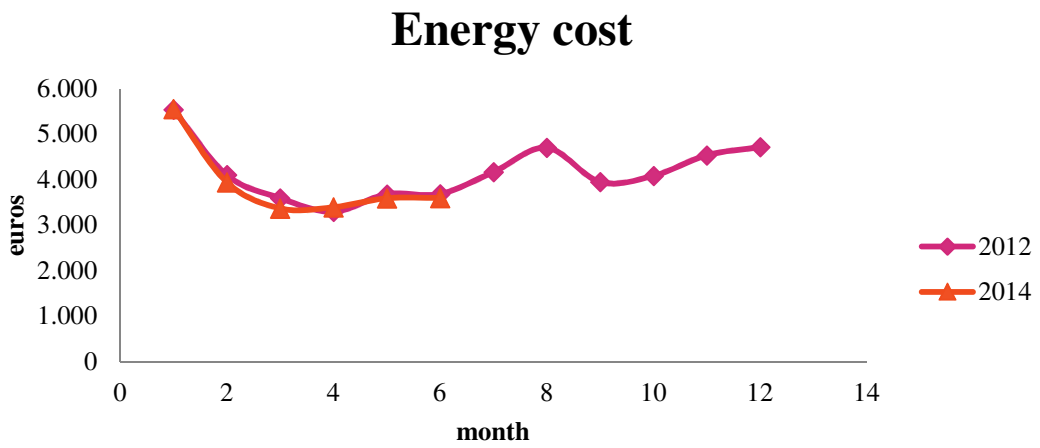


Figure 1 Energy costs

4.2.4 Physical location

The facility is split between the 3rd floor and 1st floor at Naritaweg 118 in Amsterdam. The building is divided into 3 floors plus a ground floor. Each of the floors has two office spaces. Each of the office spaces is divided into two wings.

[jan 2017] Since sept 2016 we occupy the 1st and 3rd floor, we went from 1850m2 to 3000m2.

In total Arup BV occupies:

- Ground floor: Part of the office space in the east wing. [jan 2017] 1st floor: full floor (both wings)
- 3rd floor: the full floor (both wings).

4.2.5 Energy information sources

The information on energy consumption is coming from the following sources

[jan 2017] the landlord supplies us with the energy use of the whole building and by % of occupation the Energy use for Arup is calculated.

1. **Utility invoices**
   The invoices are provided by the building owner according to the rented/ occupied space by Arup BV compared to the whole rentable area. The common space constituted by the stairs, hallways, lift and entrance are shared by all buildings tenants.
2. **Measuring / monitoring systems**
   The measuring system is assigned to each office space. The measuring device is an ABB OD4165 and is accessible by Arup staff as well.
3. **Knowledge and experience of our staff**
   Being a consulting firm in a wide range of services, we count among our staff highly qualified engineers in design of mechanical and electrical systems for buildings and building services. Also, our specialists in climate design and energy efficiency in buildings provide advice to the quality officers and management of the facility. The responsibility of monitoring the energy consumption is assigned to the office management.

4.2.6 Contact information

Office management		**Update [jan 2017]**
Mrs. Alexandra van Tintelen	Mrs. Leonie de Jong	Mrs. Leonie de Jong
Telephone Ext 71445 (internal)	Telephone Ext 71032 (internal)	Telephone Ext 71032 (internal)
IDD Telephone +31 20 752 31 45	IDD Telephone +31 20 753 31 32	IDD Telephone +31 20 753 31 32
Email Alexandra.Van-Tintelen@arup.com	Email Leonie.de-Jong@arup.com	Email Leonie.de-Jong@arup.com
Mobile +31612257351		
Address Naritaweg 118 Amsterdam	Address: Naritaweg 118 Amsterdam	Address: Naritaweg 118 Amsterdam

Advisors energy management and improvement of climate		**Update [jan 2017]**
Ms. Ilektra Kouloumpi Msc.	Mr. Peter Mensinga MSc.	Arup MEP team
Telephone Ext 71078 (internal)		

IDD Telephone +31 20 753 31 78
Email Ilektra.Kouloumpi@arup.com
Address: Naritaweg 118 Amsterdam

IDD Telephone +31 20 752 31 56
Email Peter.Mensinga@arup.com
Address: Naritaweg 118 Amsterdam

4.2.7 Key (potential) challenges and constraints to achieving energy reduction goals

- The office space was rented on temporary conditions but Arup BV decided staying in this facility for longer than planned. The initial choice was made with this thought in mind. The contract has been renewed for 5 years starting January 2014.
- Long term capital investments are difficult because of the rent conditions and term. However, further investigation of possibilities seems to be worthwhile.
- Our office is situated in a relatively deserted area, especially in in the evening and night. This increases our energy use in contrast to the low occupancy level to ensure our employees the freedom to adjust their environment in a way they feel safe. This usually leads to higher lighting levels than necessary from a pure functional point of view.
- The initial configuration of the electrical system of the building does not allow detailed measuring, and therefore the possibility to monitor specific energy use in order to identify the major consumption activities or devices, is low.
- The interaction between the central control on the HVAC-system and the windows and the locally controllable 8 °C and windows form an inefficient system for climate control in an open office space like ours.

4.3 Energy Management Policy

Arup BV will endeavour through all available means a reduction of 5% of carbon footprint due to energy use by 2017 compared to 2013.

4.4 Energy Management Team

The energy management team is introduced in the table below. The team consists of our employees who will be concerned with achieving the energy policy and reduction ambition of Arup BV. The chair of the energy management team is the infrastructure team leader.

Name	Position	Update Name [jan 2017]
Paul van Horn (chair)	Infrastructure team leader	Sabine Delrue
Alexandra van Tintelen	Office Manager	Leonie de Jong
Ilektra Kouloumpi	Electrical engineer	MEP engineer on call when needed
Peter Mensinga	Leader electrical engineering	MEP engineer on call when needed
Sustainability Focus Group	Consulting engineers of different services in Arup	Edwin Thie (Environmental Champion)
Susheela Sankaram	Lighting designer	Engineer on call when needed

A new set up is in place since mid 2016 to improve the efficiency in the governance of the organisation;

Operations

Director Environmental (DE) = Chair Energy Management Team	Mathew Vola	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 Reports to Group Leader
Environmental Champion (EC)	Edwin Thie	Researches future scenarios Coordinates if goals meet CO2-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 CO2-prestatieladder Reports to DE

Projects (won with CO2-prestatieladder)

Project Directeur	Includes the EC to review the sustainability objectives Monitors progress on the sustainability objectives
Project Manager	Implementation of sustainability objectives on projects Measures and monitors the objectives and acts accordingly

	Analyses non-conformances and advises PD Reports to EC and PD

4.5 Energy Baseline

In the table and graphs below our energy use for 2013 is explained.

Fuel Source	Total Annual Consumption	Total Annual Cost	Percentage of Total Plant Energy Cost
Electricity	429,114 [kWh]	48.517	68 %
Heating	920 [Gj]	22,650	32%

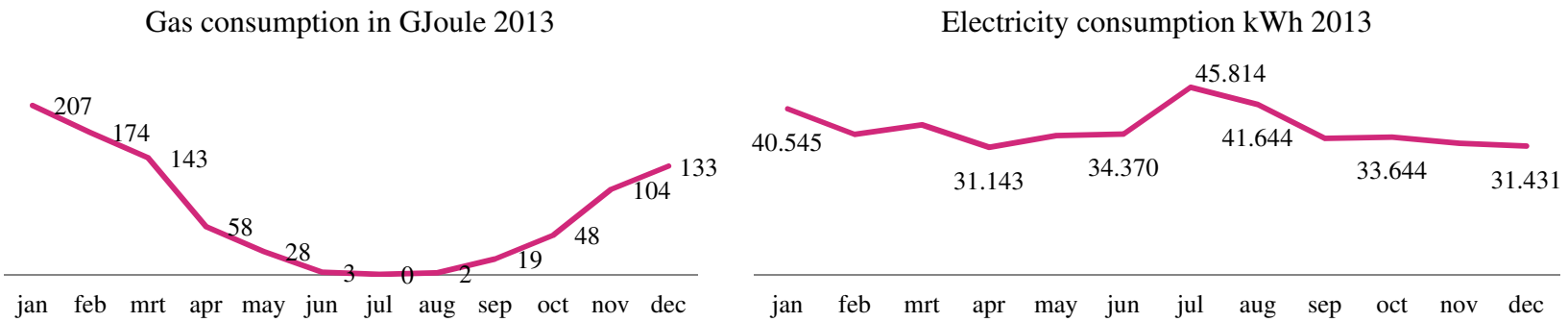


Figure 2 Gas and electricity consumption Amsterdam office

Reduction of electricity use will be targeted since it represents the highest part of our energy use.

4.6 Identified Reduction Capital Projects

System	Measure	Estimated Savings / benefit	Expected date / year implementation	Evaluation performance / extra measuring needed	Update [jan 2017]
Lighting meeting rooms	Increase controllability Change type lights	Decreased use of lighting	*2015*	Reduce use of electricity	Done
Lighting hallways (halogen lamps)	Change type lights	Decreased use of lighting	*2015*	Reduce use of electricity	Landlord doesn't agree
Lighting, desk lamps in the south wing (Philips lamps)	Change intensity to ensure a better comfort level. The lighting is experienced to be too intense.	Decrease use of lighting	*2015*	Reduce use of electricity	Done
Solar panels on roof of Beta building	Survey possibilities in collaboration with landlord.	Increase production of sustainable energy	*2017*	Reduce use of electricity	Landlord is open to collaborate and also investigate green energy
Modification control system facades of the building	Make shading controllable for each unit individually The centralised / automatic use is experienced as causing an uncomfortable climate and leads to unnecessary increase of cooling.	Less cooling necessary	*2016*	Reduce use of electricity	Landlord doesn't agree
Devices to measure use of electricity	Investigate possibilities to install more refined measuring devices	Monitor and track back possibly inefficient use of energy	*2015*	Reduce use of electricity	Has been investigated. The meters in the building are not smart meters, hence not possible.
Lighting in day-light poor areas in the office.	Investigate possibilities to introduce day-light in day-light poor areas in the office.	*Reduce need for lighting*	*2016*	Reduce of use of electricity	Investigated, but Landlord does not accept making holes in the roof.

4.7 Operational Savings and Employee Awareness Plan

4.7.1 Operational savings

Measure	Action	By	Year	Update [jan 2017]
Stimulate staff to switch of lights in meeting rooms and quiet rooms (if no automatic light switch on / off available)	- Attaching posters to wall near door in meeting rooms. - Inform by emails - Inform in group meetings	Office management Energy management team chair Group leader	2015	Email has been sent
Monitors will be switched off by security (unless requested)	- Inform staff - Instruct security	Energy management team chair Office manager	2015	Security informed
Apply minimal limits for office occupancy to avoid redundant energy use	Investigate how to implement.	Office manager	2016	Investigated, but no implementation actions set
Repeat 2014 travel survey	Prepare survey	Office manager	2016	Moved to 2017
More energy efficient company cars, by preference hybrid cars. (+25 % compared to 2013)	Lease car contract renewal based on incentives of new Travel Guideline in combination with company benefit package to relevant grades.	HR / Energy team chair	2015	In 2013; 2 hybrids In 2016; 9 hybrids = +450% Extra charging stations installed
Achieve more use of public transportation for business travel purposes	Find out possible car lease/ business train card possibilities with lease companies, NS- offers in accordance to the Travel Guideline and company benefit package.	HR / Energy team chair	2015	Investigated, but no implementation actions set.

4.7.2 Awareness plan

To increase the awareness of employees the following actions will be taken.

Action	When	By	Update [jan2017]

Employees will be informed on reduction goals, measures, savings and other results (like results of investigations)	In monthly group meeting Ongoing until improved	Group leader	Quarterly update on TV screens in both offices
Switch off monitors in lunch breaks	In monthly group meeting Ongoing until improved	Group leader	Not implemented
Operational saving measures will be announced	2014	Energy team chair	Not implemented
Real-time monitor of daily use of energy will be installed near reception desk	2015	Office manager	Quarterly update on TV screens in both offices

4.8 Action Plan

[jan 2017] see paragraph 4.6 for update

Action	Responsible	Start	Review action progress	Advise / follow-up
Modify lighting of meeting rooms: controllability and type of light	Susheela Sankaram	*Started*	Every two months until end 2015.	Paul van Horn Paul Coughlan
Modify lighting hallways (halogen lamps)	Susheela Sankaram	*Started*	Every two months until end 2015.	Paul van Horn Paul Coughlan
Investigate alternative for desk lamps in the south wing (Philips lamps). Realise higher efficiency.	Susheela Sankaram	*Started*	*Every two months until end 2015.*	Paul van Horn Paul Coughlan
Investigate possibilities of installation of solar panels on roof with landlord.	Alexandra van Tintelen	*2016*	*Every 3 months until July 2016*	Paul van Horn Paul Coughlan
Make the shading controllable for each unit / room individually. The centralised / automatic use is experienced cause uncomfortable climate, which results in unnecessary cooling.	Alexandra van Tintelen	*2016*	*Every 3 months from January 1st 2016 until end of 2016*	Paul van Horn Paul Coughlan

Investigate possibilities for more refined measuring devices to monitor and track-back possible inefficient energy consumption by category of equipment/ use.	Ilektra Kouloumpi	*2015*	*Every 3 months until July 2016*	Paul van Horn Paul Coughlan
Investigating possibilities to introduce day-light in day-light poor areas in the office.	Siegrid Siderius	*2016*	*Every 3 months from January 1st 2016 until end of 2016*	Paul van Horn Paul Coughlan
Survey the comfort experience in the office in terms of lighting, temperature and sun/ day-light. Identify the point of improvement from a comfort point of view	Alexandra van Tintelen / Leonie de Jong	*2015*	*Every two months until end 2015.*	Paul van Horn Paul Coughlan
Analyse results of survey and find possible energy saving targets and measures that match the comfort aspects to motivate collective actions and to view energy management as a pleasant experience instead of a limiting set of rules.	Peter Mensinga / Ouiam Rhersellah	*2015*	*Every two months until end 2015.*	Paul van Horn Paul Coughlan
Investigate how the energy label-improvement can be carried out for lease cars. The personal lease cars, can be improved by use of incentives. However, the main target is the project/ company cars. The renewal of lease contract to low carbon cars is a priority. The request/ measure should be communicated to Finances/ HR in appropriate term before end of current lease contracts.	Paul van Horn	*2015*	*January/ February 2015*	Emma Atkins Paul Coughlan
Find out possible car lease/ business train card possibilities with lease companies, NS- offers in accordance to the Travel Guideline and company benefit package. Communicate these findings to the relevant users of these benefits and services.	Paul van Horn	*2015*	*January/ February 2015*	Emma Atkins Paul Coughlan
Communication of business travel reduction goals to project managers.	Paul van Horn	*2015*	*November 2014*	Paul Coughlan

4.9 Energy Management Education and Training

The Energy Management Team chair and the office manager will follow a one day course on the CO_2 performance ladder or another CO_2 reduction program.

The other members of our energy management team are specialists in their field of expertise. They will be trained as part of their individual training program as determined in the yearly appraisals.

4.10 Expected Results and feasibility reduction goals

4.10.1 Expected feasible outcome of the implemented measures

Based on the measures taken to achieve the defined reduction goals, a study was made based on the reported numbers of 2013 and 2014 on business travel mileage, the records of used transport modes and the energy performance of the available lease cars to estimate the necessary modification for each emission category. The feasibility of the resulting number was discussed some of the Energy Team members to assess the feasibility of the carbon reduction goals, translated into modification of energy consumption aspects/ mileage for business travel.

To achieve the carbon reduction, the following scenario is predicted based on a progressive implementation of the measures mentioned in this report:

The first 3 % reduction on carbon emissions in 2015 is realisable by:

- 10% more of the business travel will be made by public transportation instead of cars.
- By the energy management measures for the office that are expected to realise 3% less energy per capita:
    - The lighting related measures are expected to achieve 2 % on the reduction of energy consumption.
    - Operational savings such occupancy of building and monitor switch off are expected to reduce 1% on the energy consumption per capita.

The second 4 % in 2016/2017 reduction on carbon emissions in 2015 is realisable by:

- Increasing the share of energy efficient cars, assumed herein to be hybrid, by 25% compared to 2013.
- Making the trips Amsterdan-London by train were found not have a large influence on the total footprint. However, a 2 % increase of the trips made de London by train is going to be promoted as part of raising awareness. The feasibility of our reduction goals is not depended on this specific interpretation/ solution for ‘green’ travelling.

At last, the last 1 % reduction on our footprint in 2017 is realisable by:

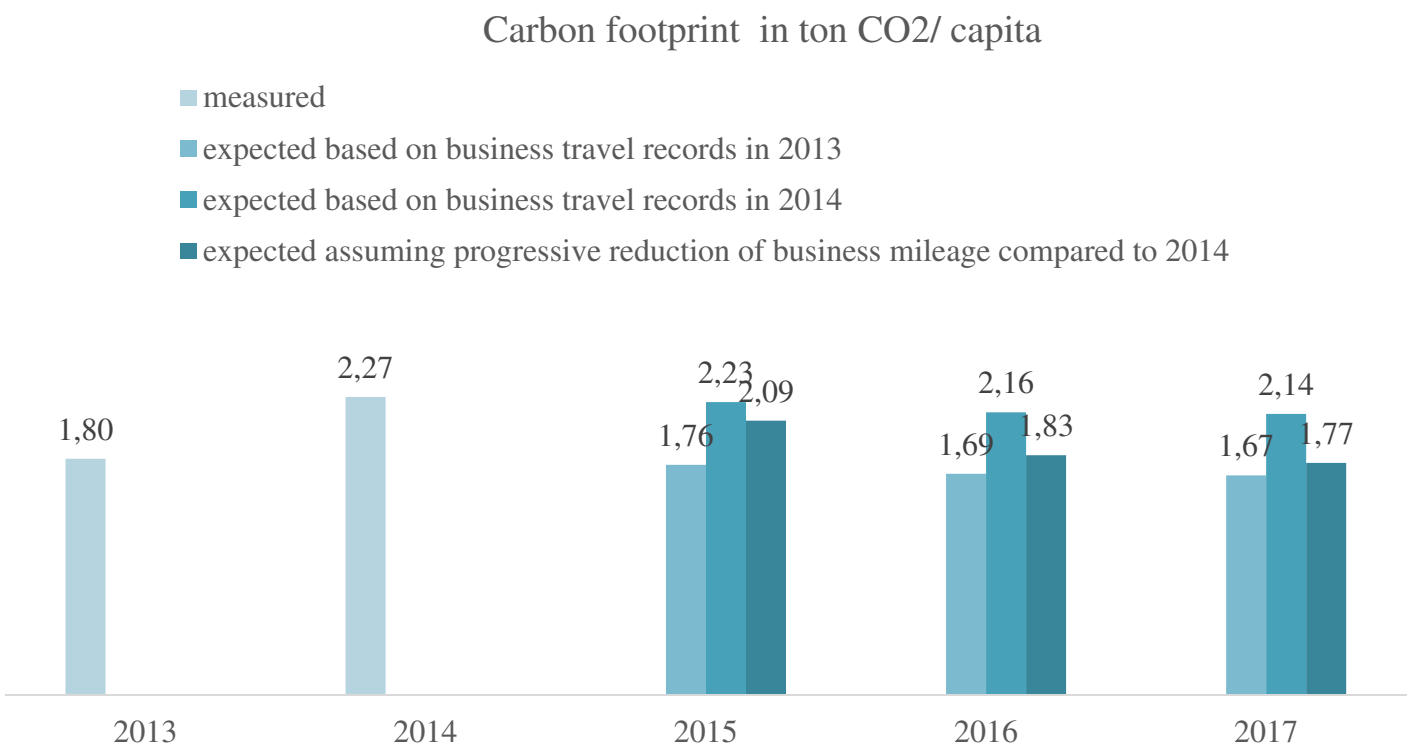
- Having 5% less air travel on the short distance category (700 [km]). The reduction of air travel seems not to be extendable to medium- and long distances since the business benefit and need for it are expected to be already well founded.

The reduction goals on scope 3 emissions of the business, considering paper consumption and commuting, are based on:

- The effect of higher efficiency cars as company/ lease cars. The same outcome of 25 % increase of energy efficient cars is expected to influence the commuting footprint positively.
- A 10% increase on use of public transportation of commuting is expected to be the outcome of increase of multi-mode transport possibilities within the Travel Guideline and the overview of company benefits.

4.10.2 Expected results on global footprint quantities

The results of the measures introduced in this energy management plan, are studies based on two different reference years. We want to be set ambitious goals for our firm, however it seemed difficult to estimate the baseline of our carbon footprint according to which these goals can be set. In 2014, the firm experienced a quick and large growth which has influenced our carbon footprint and specifically the business travel. We expect that the carbon footprint / capita will change after 2014 and converge to ones recorded in 2013 due to decrease in need for site inspection and business travel. Therefore it seemed unrealistic to based our reduction measures based on this year. As a solution, the goals are to achieve a decreasing trend in our carbon footprint over the coming years with the given reduction goals to achieve a 1,8 ton CO_2/ capita by 2017, which is constitutes an ambitious targets for our sector of practice. The Arup Global Sustainability target of 3 ton/ employee (including commuting) seems still out of reach in 2017. Arup Global has set the target to be met in April 2019.



[jan 2017] update; scope 1+2;

Correction on reference year in 2014, due to change in CO2 conversion factors by date 1-6-2016 and correction on heating in Groningen office;

2014 = 2,40 tCO2/employee

Target based on reduction goals;

2015 = -3% = 2,33 tCO2/employee

2016 = -4% = 2,23 tCO2/employee

2017 = -1% = 2.21 tCO2/employee

Actual:

2015 = 2,51 tCO2/employee (= + 4,6% on 2014 and + 7,7 on target)

2016 = 2,52 tCO2/employee (= + 0,4% on 2015 and +13,0% on target)

Mainly due to the internal move to more m2 per employee our electricity use has gone up compared to the original target.

The Arup goal of 3,0 tCO2/employee, including commuting (scope 3);

2014 = 3,54 tCO2/employee (including correction for new CO2 ladder version 3.0 and adjustment on heating for Groningen office)

2015 = 3,51 tCO2/employee (= + 17,0% on target Arup)

2016 = 3,47 tCO2/employee (= + 15,7% on target Arup)

To meet the targets set in this report, some rigorous actions need to be taken in 2017. See 'Management actions to reach operational CO2 targets_ Q1 2017 v0.1.docx' for further actions.

4.11 Energy Management Plan Document Maintenance

This energy management plan will be maintained by the energy management team [jan 2017] Environmental Champion under responsibility of the team chair [jan 2017] Environmental Champion. The plan will be evaluated yearly and updated if necessary.

[jan 2017] see updates throughout the plan in this format (Pink, with [date]). See 'Management actions to reach operational CO2 targets_ Q1 2017 v0.1.docx' for further actions in 2017. A new plan will be drafted in 2017 for the goals in period 2018-2020.

4.12 Project savings

We have identified the following project measurement that will result in a CO2 reduction downstream in our scope 3, these comply with the Arup Europe goals;

Measure	Action	By	Year
In at least 50% of the projects with a fee > € 150k there are sustainability objectives set	Monitor through IPP	Project PM	April 2019
Staff sustainability training is 2hr/employee/year	Identify standard training packages for staff	Group leader	April 2019