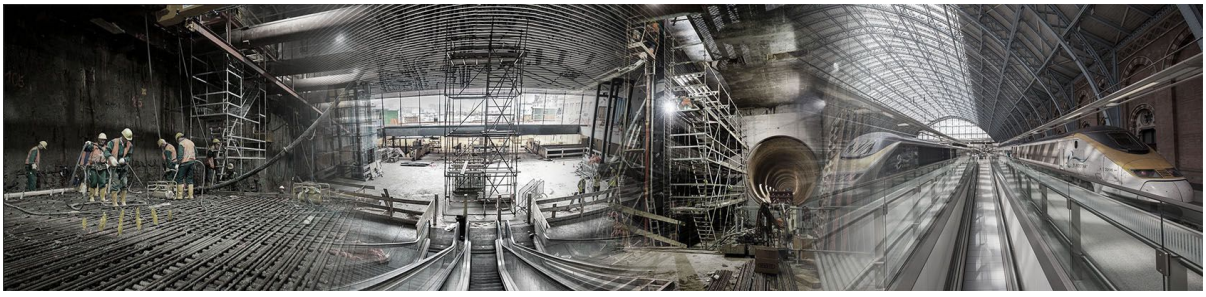
Civil 7
we feel the mission

2021

Annual carbon emissions report

Annual carbon emissions report
2023

Document ID:	C7-QTY-AC-R01 2021	Auteur:	Robin Vervoorn MSc CEng., 11/01/2022
Status:	Definitief (2.0)	Gecontroleerd:	Shanti Pednaker 12/01/2022



1 Part A - Insight

1.1 Introduction

The first part of reducing CO_2 emissions is gaining insight into where CO_2 is produced. To this end, in this chapter the scope definition is made, followed by the measured CO_2 emissions.

1.2 Scope of CO_2 system

The scope of Civil Seven activities is described in *Civil Seven Quality Guide, v6.0* and encompasses:
design and develop public transport infrastructure and underground space.

Our fields of focus are **project management, risk management & costing, geotechnical, hydrological and structural design, over tunnel construction, geothermal structural heat storage and special foundation techniques**.

Civil Seven rents one office at Stationsstraat 36A in Amersfoort, built in 1912 and renovated in 2019-2020 where it has traditional central gas heating (only scope 1 emissions) and an electric connection (scope 2), which it shares with other parties to optimise CO_2 emissions and cost.

Transportation to and from work and to and from clients is considered Civil Seven emissions and fall under the special 3A scope. Civil Seven only compensates for

Consumption of food and beverages during coffee and lunch by employees and provided as gifts to clients are considered Civil Seven scope 1 emissions.

Emmissions for third party offices and hotels for stays next to the client are considered scope 3, but they are not forgotten and adressed in proactively in Part D.

All aforementioned emissions are minor, particularly after renovating the facilities, in comparison to the projects constructed by our clients (with the exception of flights, which have been reduced to the bare minimum since 2020, for example choosing Teams or trains whenever possible.). As designers we have considerable influence on the CO_2 impact, but not as much as our clients, and as the consultants advising our clients. Because of their importance, they have been defined as scope 3 emissions, even though they are in actual fact completely out-of-scope emissions.

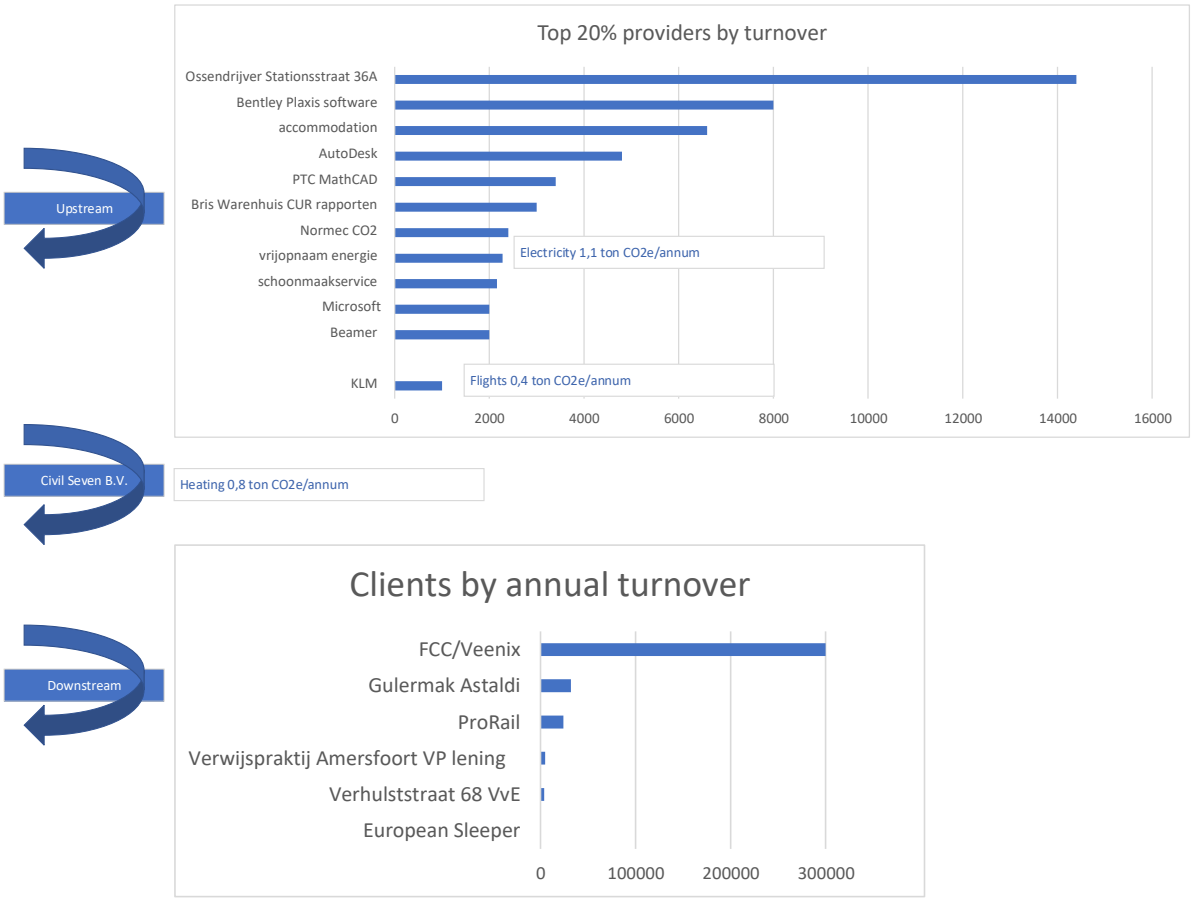
An even higher contributor, is the actual use of the infrastructure after it has been developed. Using infrastructure is a completely different CO_2 chain and is thus out of scope. In future revisions of this work, Civil Seven will expand this scope to contain life-cycle-impacts of CO_2 emissions of using the infrastructure that we have developed, but this is actually the task of the asset owner/developer (e.g. ProRail, Rijkswaterstaat). For now, this is left to them in order not to overreach.

1.3 Not taking carbon compensation into account

It is noted that some companies compensate their natural gas. Formally the CO_2 handbook 3.1 states that this is not allowed. Civil Seven does not do this.

1.4 Downstream and upstream emissions

A CO_2 pyramid has been setup to determine important CO_2 emmissions contributors throughout the design chain.



1.5 Comparison to similar companies

During measuring we have found we are less than half of the best competitive average of other Ladder 5 companies (e.g. 0,4 ton CO2e/fte/year Civil Seven vs Witteveen+Bos at 1,06 and Westnberg Ingenieurs at 0,91). This has to do mainly with sharing our office with others which is very efficient, but also insulating, control of temperatures and heating systems and using public transport and limiting flying contribute.

1.6 Analysis

The biggest steps have been taken to improve performance in the period 2017 to 2020 through double glazing and insulation, sharing workspace, setting timers, lowering the temperature and automatically disabling and turning off servers. There is very little value in further optimising scope 1 or scope 2 emissions. However, there are two big influence factors where Civil Seven has great *control* over the delivery chain, although it is not inside it:

1. Emissions during construction, by optimising materials use and construction methods
2. Emissions on completion of infrastructure during the life-cycle

Depending on the project, the annual emissions of construction (item 1) and use (item 2) can be an order of magnitude 100 and 1000 times the scope 1 and 2 emissions of Civil Seven. Therefore, strategically, all focus should be in helping our clients to control their emissions. Internal emissions are effective only as an exemplary function.

A minor issue resulting from the supplier analysis indicates that remote computing is a large part of our provider turnover. To be sure this does not affect our emissions, remote computing will be added to the scope 3 inventory from 2023 onwards.

1.6.1 Overview of past progress and analysis

Through 2019 – 2021 we have focuseed on our internal performance.

We are measuring and monitoring our internal emissions. This has led to the following guiding principles:

1. **We will continue to reduce our internal scope emissions to be an example to others**.
    a. Only compensation is given for team members with km executed by public transport or bicycle.
    b. Flights are allowed only under the following conditions: (i) only when Teams is not possible, which is in crucial startup phases and for acquisition, (ii) high-speed or overnight train before

flights, (iii) direct flights above indirect flights, (iv) meetup locations determined by CO_2 emissions.
    c. Office systems are implemented to clocks to reduce cost
    d. We follow vegetarian principles in our meetups and activities
    e. 2023-01: Take out one server
    f. 2023-04: Wake-up/sleep energy saving of servers
    g. 2023-08: Replace fridge with better insulation
    h. 2023-04: Remove the electrical backup heating from downstairs, or implement a backup circuit
2. **Innovate rail embankment renovation**
    a. Implement improved method in trial case with ProRail
    b. Optimise method by replacing Cement in mix
    c. Publish and present about this on website
3. **A9 will be the last road construction project**
    a. In 2023 we will transition to ProRail
    b. On our current project, make agreements to reduce Client (FCC) emissions in the chain
        i. Recovering materials (sheet piles)
        ii. Reducing materials
        iii. Optimising design codes with Rijkswaterstaat (super-client) to reduce materials
        iv. Less heating/cooling at the project site
    c. Present and publicize about this on website
4. **Improve out CO_2 calculation spreadsheets, in order to quickly respond to new project based client CO_2 emmission changesand then connect them to BIM**
    a. Develop database
    b. Link to Hocus Pocus Tunnel (BIM)

Significant improvements have been put in pace to reduce the impact of our physical office and share our emmissions among a greater amount of users. It is envisioned that a greater environmental impact can be acquired through reduction of climate impact through our designs. In practice emissions are reduced by design – reducing materials reduces cost and environmental impact at the same time. In 2022 the focus has been on inventorising our external scope 3 emission chains. In 2023 we will build software databases and tools to respond to client CO_2 chains on a project-by-project base more quickly.

By the end of 2024Q2 we shall have a system in place that measures the CO_2-equivalent and nitrate-equivalent emmissions of the components that produce 80% of pollution within a design project. For these components of our design we will find one or more alternative applications with a lower emission during 2024. In 2023 we already started to change our designs to reduce their footprint. Also we will address the issues of client requirements in order to remove requirements that are not needed but cause unnecessary materials use.

1.7 Annual report

2018

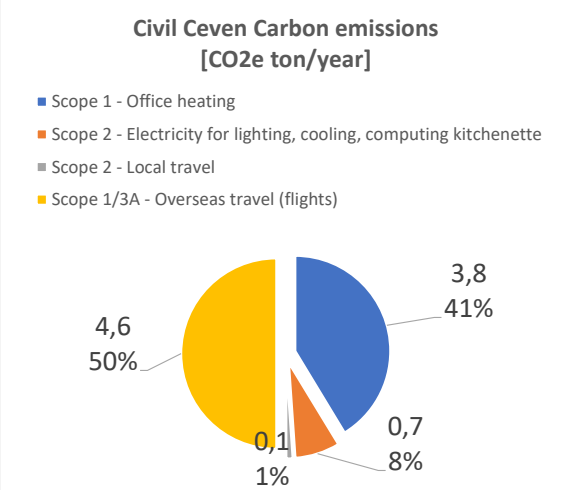
Group	Item	Subitem	CO2 Scope bo	Units used per annum	Value 1-jan	Unit	CO2/unit	Previous emmission
				[X/annum]		X	[gCO2/unit]	[ton CO2/annum]
Housing	Electricity		2	1016	1987,387	kWh	649	0,7
	Heating	Heating system	1	2004	2819	m3	1890	3,8
Personal travel	To/from office	Train	3A	1590		[km]	0	0,0
		Bike	3A	636		[km]	7	0,0
		Car	3A	500		[km]	281	0,1
	Flights	Flights @700 km to Gothenbur	2	5600		[reizkn	249	1,4
		Flights @500 km to Copenhage	2	5600		[reizkn	270	1,5
		Flights @200 km Copenhagen t	2	5600		[reizkn	297	1,7
		Flight reduction to Groningen	2					
		Amsterdam Warsaw	2					
		Gothenburg via Stockholm	2					
		Highspeed train SJ	2					
		Amsterdam Rome	2					
total								**9,2**
F.t.e.								3,4
total per fte								**4,1**

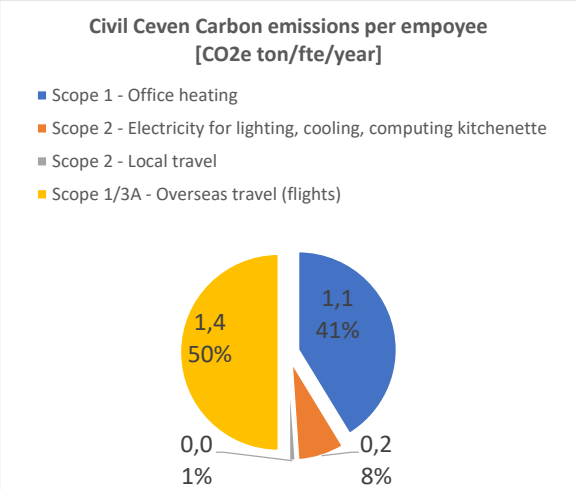
Year	2018			Achieved emmission 2018				
Group	Item	Subitem	CO2 Scope bo	Units used per annum	Value 1-jan	Unit	CO2/unit	Projected emmission
				[X/annum]		X	[gCO2/unit	[ton CO2/annum]
Housing	Electricity		2	1467	3454	kWh	649	1,0
	Heating	Heating system	1	1960	4779	m3	1890	3,7
Personal travel	To/from office	Train	3A	35616		[km]	0	0,0
		Bike	3A	636		[km]	7	0,0
		Car	3A	300		[km]	281	0,1
	Flights	Flights @700 km to Gothenbur	2	7700		[km]	249	1,9
		Flights @500 km to Copenhage	2	8000		[km]	270	2,2
		Flights @200 km Copenhagen t	2	7700		[km]	297	2,3
		Flight reduction to Groningen	2	-1350		[km]	270	-0,4
		Amsterdam Warsaw	2	2200		[km]	249	0,5
		Gothenburg via Stockholm	2	6000		[km]	270	1,6
		Highspeed train SJ	2					
		Amsterdam Rome	2	1800		[km]	249	0,4
total								**13,4**
F.t.e.								6,8
total per fte								**2,0**

2019

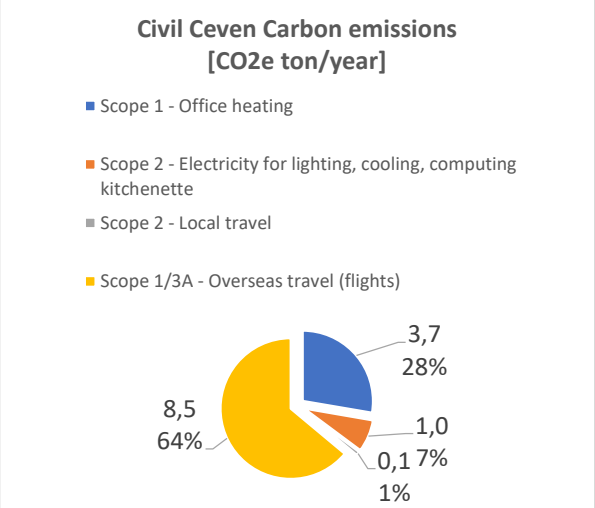
Year	2018			Achieved emission 2019				
Group	Item	Subitem	CO2 Scope be	Units used per annum	Value 1-jan	Unit	CO2/unit	Projected
				[X/annum]		X	[gCO2/uni	[ton CO2/a
Housing	Electricity		2	1840	5294,356		649	1,2
	Heating	Heating system	1	1237	6016	m3	1890	2,3
Personal travel	To/from office	Train	3A	30846		[km]	0	0,0
		Bike	3A	954		[km]	7	0,0
		Car	3A	300		[km]	281	0,1
	Flights	Flights @700 km to Gothenbur	2	14000		[km]	249	3,5
		Flights @500 km to Copenhage	2	1500		[km]	270	0,4
		Flights @200 km Copenhagen t	2	400		[km]	297	0,1
		Flight reduction to Groningen	2	0		[km]	270	0,0
		Amsterdam Warsaw	2					
		Gothenburg via Stockholm	2					
		Highspeed train SJ	2					
		Amsterdam Rome	2					
total								**7,6**
F.t.e.								7,5
total per fte								**1,0**

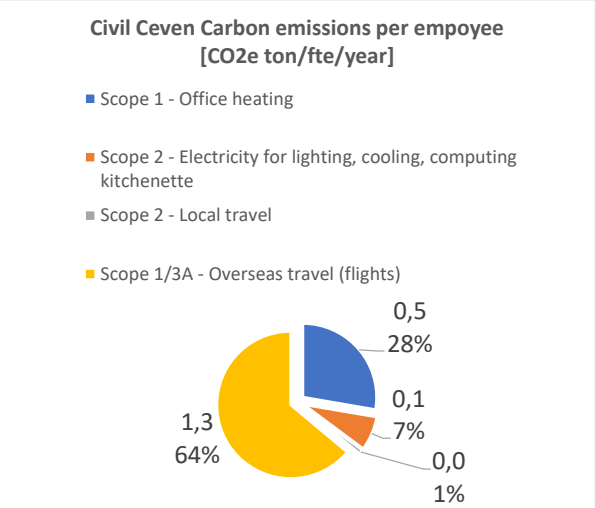
2017





2018

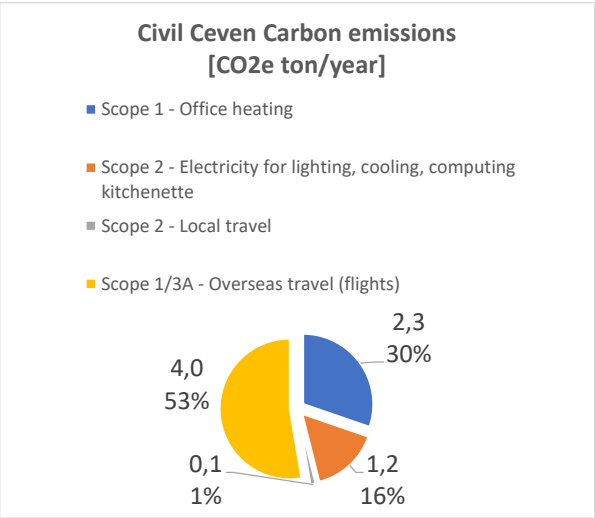


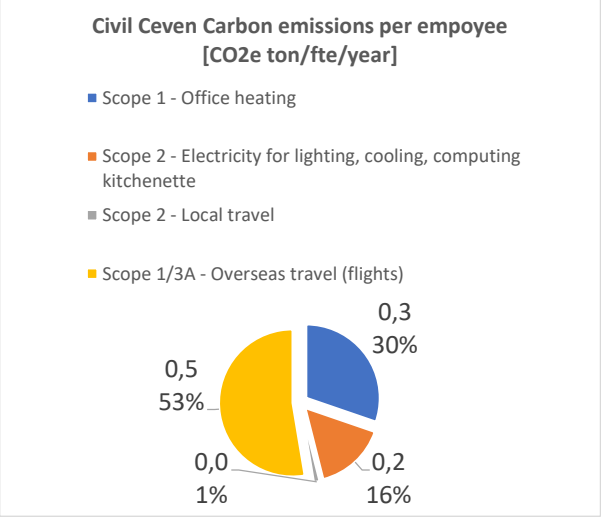


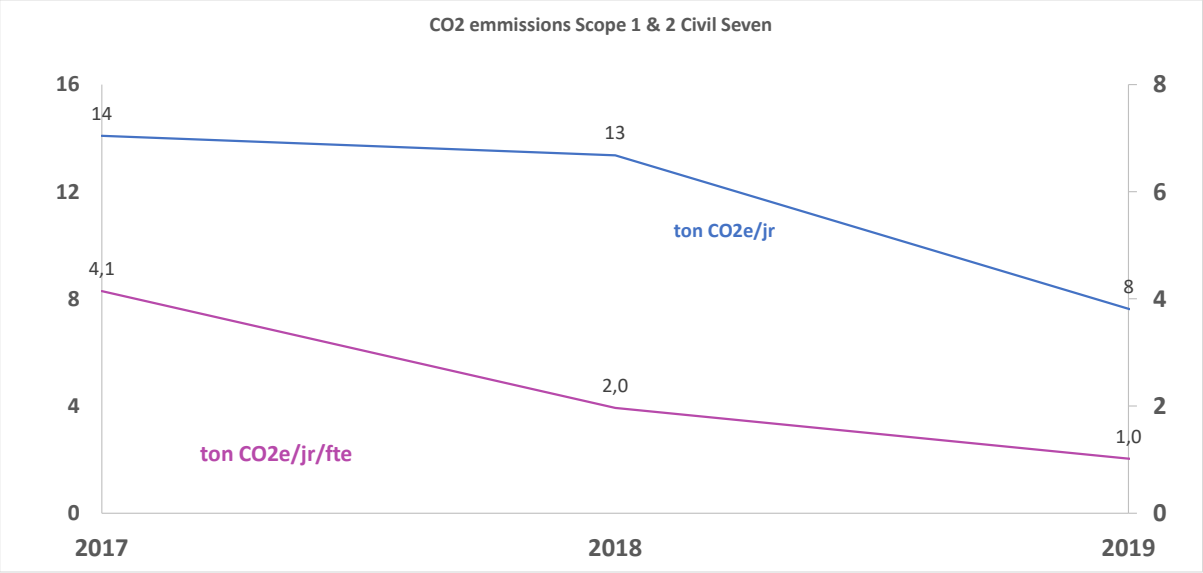
2020

Year				Achieved emission 2020				
Group	Item	Subitem	CO2 Scope be	Units used per annum	Value 1-jan	Unit	CO2/unit	Projected
				[X/annum]		X	[gCO2/uni	[ton CO2/a
Housing	Electricity		2	1756	7050		649	1,1
	Heating	Heating system	1	1084	7100	m3	1890	2,0
Personal travel	To/from office	Train	3A	4897,2		[km]	0	0,0
		Bike	3A	954		[km]	7	0,0
		Car	3A	165		[km]	281	0,0
	Flights	Flights @700 km to Gothenbur	2	0		[km]	249	0,0
		Flights @500 km to Copenhage	2	0		[km]	270	0,0
		Flights @200 km Copenhagen t	2	0		[km]	297	0,0
		Flight reduction to Groningen	2	0		[km]	270	0,0
		Thessaloniki	2					
total								**3,2**
F.t.e.								7,3
total per fte								**0,4**

2019



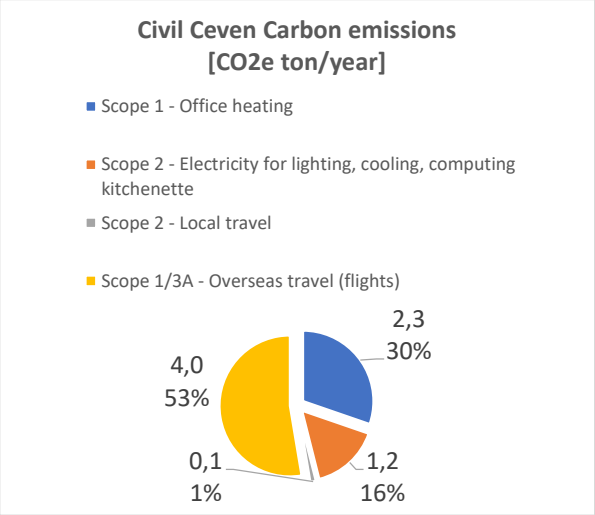


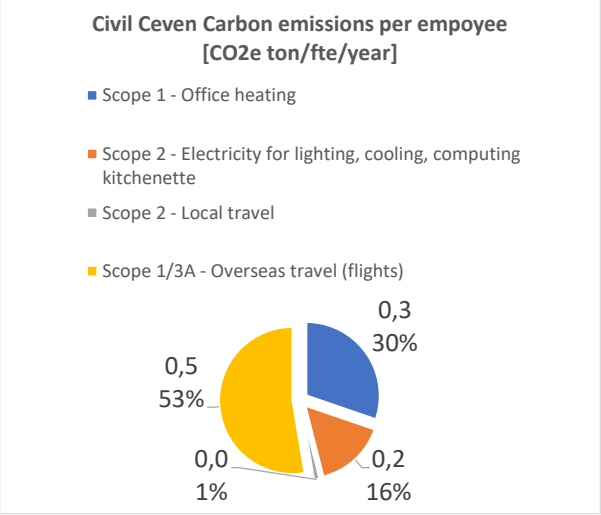


2021

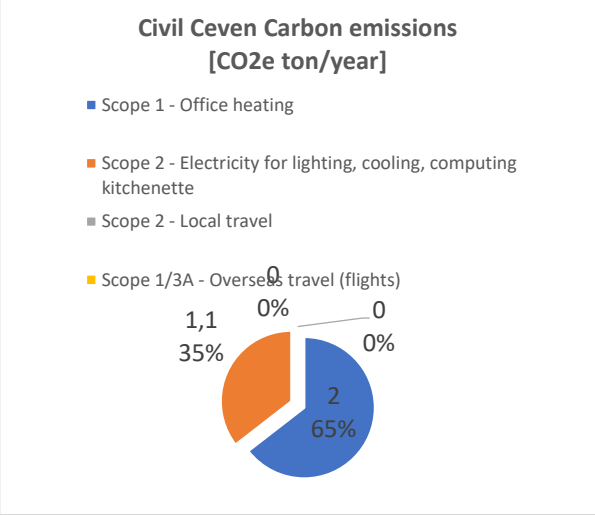
Year				Achieved emission 2020				
Group	Item	Subitem	CO2 Scope be	Units used per annum	Value 1-jan	Unit	CO2/unit	Projected
				[X/annum]		X	[gCO2/uni	[ton CO2/a
Housing	Electricity		2	1756	7050		649	1,1
	Heating	Heating system	1	1084	7100	m3	1890	2,0
Personal travel	To/from office	Train	3A	4897,2		[km]	0	0,0
		Bike	3A	954		[km]	7	0,0
		Car	3A	165		[km]	281	0,0
	Flights	Flights @700 km to Gothenbur	2	0		[km]	249	0,0
		Flights @500 km to Copenhage	2	0		[km]	270	0,0
		Flights @200 km Copenhagen t	2	0		[km]	297	0,0
		Flight reduction to Groningen	2	0		[km]	270	0,0
		Thessaloniki	2					
total								**3,2**
F.t.e.								7,3
total per fte								**0,4**

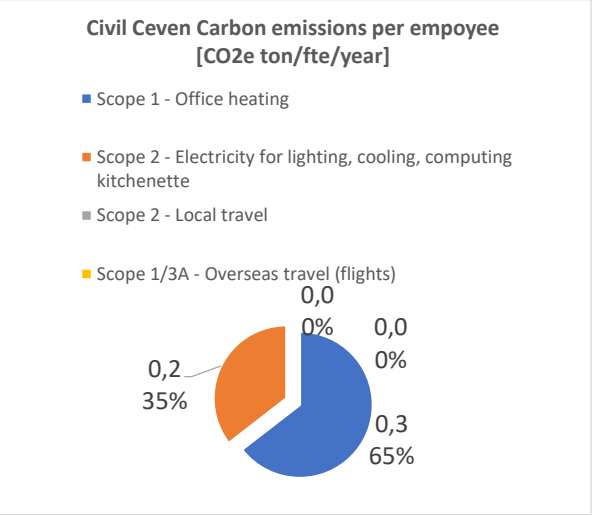
2019

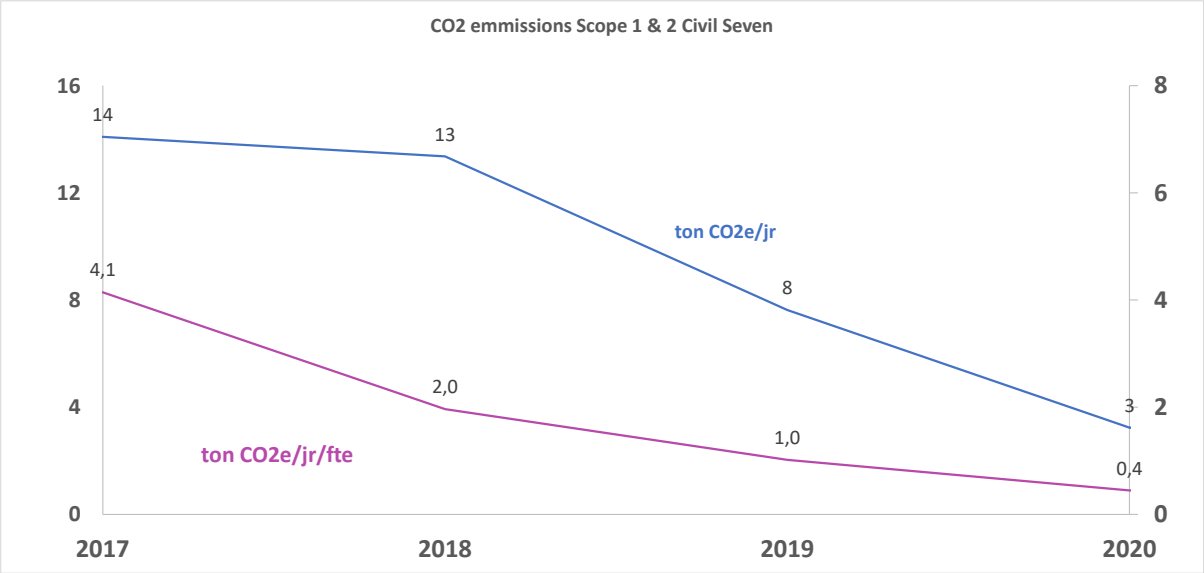




2020






CO2 emmissions Scope 1 & 2 Civil Seven
16
12
8
4
0
8
6
4
2
0
14
13
8
3
4,1
2,0
1,0
0,4
ton CO2e/jr
ton CO2e/jr/fte
2017
2018
2019
2020

2 Part B+D – Reduction & participation

2.1 Introduction

This part explains which activities Civil Seven performs to reduce the carbon footprint in Scope 1 and Scope 2 parts. Also Participation and collaboration for achieving scope 3 emissions with our suppliers and clients are presented. The participation describes how Civil Seven engages with the outside world in order to set and meet full-chain objectives

2.2 Inventory of new initiatives (committed)

2023

- **Prorail Embankment Innovation project (committed, tendered but issue Prorail side)**
  - Goal 1: Replace CO2-intensive steel sheet piles in rail embankments.
  - Goal 2: Reduce amount of cement binder for rail embankment improvement.

  Note: MKI calculation is availabile within the project, but project has been re-tendered, so this information is currently confidential till the tender has been assigned.

- **Geothermal storage in A9 tunnel (commited)**
  Within the A9 tunnel, there is empty space available for a heat storage facility. This can capture heat from the summer and return it in the winter, for newly planned buildings in the Amstelveen city centre, right next to the tunnel. Goal is to Build preliminary design and business case before June 2024. Due to the longevity (50 years or so) of this structure, the business potential is very great. This is being developed by a newly acquired student-employee.

- **Development of the Lelylijn (committed)**
  By combining loval and night traffic, this can become a competitive line to the Scandinavian area in the long run, and certainly for regional national traffic. This is a long term plan with limited influence possible from Civil Seven, but during 2024 we will actively join the operating 'stichting' and push forward the solution, including sponsoring that solution which has biggest potential to take over air traffic.

2024

- **Build preliminary design and business case for Geothermal storage in A9 tunnel (commited, pending acceptance FCC)**
  Within the A9 tunnel, there is empty space available for a heat storage facility. This can capture heat from the summer and return it in the winter, for newly planned buildings in the Amstelveen city centre, right next to the tunnel. Goal is to Build preliminary design and business case before June 2024. Due to the longevity (50 years or so) of this structure, the business potential is very great. This is being developed by a newly acquired student-employee.

- **Prorail Embankment Innovation project (committed, pending retender)**
  The tender has been restarted, and will be handed in in february 2024
  - Goal 1: Replace CO2-intensive steel sheet piles in rail embankments.
  - Goal 2: Reduce amount of cement binder for rail embankment improvement.

  Note: MKI calculation is availabile within the project, but project has been re-tendered, so this information is currently confidential till the tender has been assigned.

- **Development of the Lelylijn (committed)**
  By combining loval and night traffic, this can become a competitive line to the Scandinavian area in the long run, and certainly for regional national traffic. This is a long term plan with limited influence possible from Civil Seven, but during 2024 we will actively join the operating 'stichting' and push forward the solution, including sponsoring that solution which has biggest potential to take over air traffic.

- **More efficient Client Requirements (committed)**
  The Rijkswaterstaat ROK and ProRail OVS design codes have organising committees, which will be engaged during 2024, in order to reduce concrete and steel by reducing the strictness of requirements. A lobby has started through the A9 BaHo project, where calculations have been made to show excessive use of steel due to design code regulations compared to other tunnels

from the past. This has been combined with communications to inform Rijkswaterstaat about the situation and slowly massage opinions of safety versus economy and climate.

- **Insulate letterbox**
  An easy quick-fix.

2.3 Inventory of possible initiatives, not decided upon

- **Check the cheats (postponed: reconsider july 2024)**
  Investigations show that competitors like Arcadis, RHDHV and Witteveen+Bos use a lot of greenwashing to report better CO_2 standards than in reality. Examples abide: asking for more strict requirements than necessary causing extra construction steel, driving with non-electric vehicles when claiming they are electric and/or they are not actually charged with green electricity, leaving office lights on at night, possibly using CO_2 compensation rights which are not allowed by the CO_2 ladder, etc.
  By checking on their carbon footprint and comparing to real situations, and reporting this to them and to the SKOA authority, these parties can be put under pressure to reduce the theoretical part of their carbon emissions. Some 120 hours of labour will be put into finding these truths per year. Currently this initative is postponed: this may cause market irritability and affect the prospect of future work and thus the financial position of Civil Seven)

- **Insulate floor of meeting room to reduce moisture and heating loss (postponed: reconsider july 2024).**
  Compared to focussing on client side construction emissions, this is a distraction, and has thus been postponed.

- **Install WTW ventilation in kitchen (postponed: reconsider july 2024).**
  Compared to focussing on client side construction emissions, this is a distraction, and has thus been postponed since 2022.

2.4 Completed initiatives

2018

- Completed: Co-ordinate with supplier of office space to improve insulation
- Completed: Co-ordinate with supplier of office space to upgrade to more efficient gas boiler
- Completed: Share the office with others as co-working space (less CO_2 per f.t.e.)
- Completed: Replace halogen lighting by LED lighting
- Completed: Replace 2 traditional old school lights in toilets by LED lighting
- Completed: Change employee contracts to reimburse only public transport or bicycles to get to office

2019

- Completed: Replace 3 monitors by A+ energy saver types
- Completed: Auto on-off coffee machine
- Completed: Reduce fridge setting from 4 to 2
- Completed: Collaboration with landlord to double-glaze windows
- Completed: Collaboration with landlord to change to high-efficiency gas-heater
- Completed: Cut moisture penetration in basement (water vapour gives high heating cost)

2020

- Completed: lower cv room temperature to 20,0' C and tap water to 45' C
- Completed: Auto-off file/calculation server

2021

- Completed: lower cv room temperature to 19,5' C
- Completed: Reduce number and frequency of flights, do a leg by train if possible

2.5 Incompleted initiatives

2021

- Install WTC ventilation unit in kitchen, to preheat ventilation air. (postponed)
- Set network wake up parameters properly, so that servers can go into energy save mode but still be available. (stuck, removed one server instead for now)

2.6 Evaluation of new and ongoing initiatives

2021

2.6.1 Commitment *new*: No new highway projects (scope 3)

Although the ongoing A9 Ba-Ho project has been extended due to design delays by third parties, no new highway projects have been acquired. There is significant concern that the national rail authority ProRail has enough work compared to the available, very saturated market. Focus is thus on alternative approaches to acquire public transport projects, for example through over-tunnel construction and innovation trials.
Participation in supply chain composition RWS-ProRail

2.6.2 Commitment *new* : Develop CO_2 inventory tool with BIM for our clients

Because our internal emmissions are far outweighed by our huge client construction project emissions, Civil Seven has committed to developing CO_2 emission calculation tools that are linked to our BIM models. The goal is that by 2023 this software is capable of generating models in BIM in an automated way (90% tasks automated) by end of 2023, and including not only the cost but also the CO_2 emission impact by 2024. This allows clients to better control their CO_2 emissions, and our designers to more pro-actively design in a way that is optimal for CO_2 emissions.
Participation in supply chain with clients (contractors)

Signed,

Robin Vervoorn, MSc. CEng
Owner / Technisch Manager

3 Part C - Transparency

3.1 Introduction

This part describes which commitments Civil Seven has made, and how we determine, follow up and communicate these commitments.

3.2 Publication

Civil Seven publishes the Civil Seven Annual Carbon Emissions Report annually and an activities update halfway the year on *www.civil7.nl/carbon*