EMPOWER
EMPOWERING a reduction in use of conventionally fuelled vehicles using positive policy measures

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A Summary

This End-user Application documentation (D4.2) describes the end-user applications within EMPOWER, and is a deliverable in Work Package 4 of the EMPOWER Project. It is aligned with D4.1 (Back-end/Mobility Services Infrastructure). Deliverable D4.2 describes the value adding, personal, mobile ICT services (apps) that utilize mechanisms to distribute personalized incentives to encourage positive behavioural change and travel decision support for everyday travel. Together with the back-end service, this is the backbone for delivering services in the Living Labs and Take-Up Cities/Organisations.

The project EMPOWER is about rewarding change in sustainable mobility. EMPOWER researches how positive incentives via the use of ICT can encourage citizens to reconsider their travel choices and reduce the extent to which they travel using conventionally fuelled vehicles (CFV). In this context, the overall goal of work package 4 is to utilize innovative mobility services to support positive policy measures, designed to reduce CFV use in cities. WP4 delivers:

- An architecture as a conceptual framework that helps to logically cluster services, features and technology components that can be used as tools to achieve and support CFV reduction; (D4.1)
- A Mobility Services Infrastructure (MSI) that provides broad capabilities to support use cases based on the architecture; (D 4.1)
- Front-end solutions (Apps) and interfaces between EMPOWER tools existing within the EMPOWER consortium. (D4.2)

A view on the EMPOWER Front-end service as part of the flexible architecture is shown in Figure 1. There are two existing front-end solutions already in place. Furthermore, EMPOWER will develop a Lean Incentive Scheme to be able to offer an easy start when, for example, a Take-Up City doesn’t have any ICT tools in place and will look at the development for other use cases.

![Figure 1: Front-end solutions as part of the EMPOWER open Architecture](image)

In the upcoming period we will integrate the existing backend and frontend tiers of Commute Greener and Move Smarter into existing Front-end solutions as well as connect to new EMPOWER or 3rd party solutions. The main challenge in this is on the one hand, to have the right tools in place on time, and on the other hand, be flexible to support the Living Labs and Take-Up Cities in...
the upcoming work. This challenge will be met as part of T4.3: providing operational management services to the Living Labs and Take-Up Cities and Organisations.

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2 Abstract

This document describes the end-user applications of EMPOWER and is a deliverable in Work Package 4 (WP4) of the EMPOWER Project. It is aligned with the back-end document of Mobility Services Infrastructure (D4.1) and the concept framework of the Living Lab implementations as described in this document.

3 Relation to other WPs

WP1 The (review) work in WP 1 is relevant to WP4 as the value proposition and incentives are partly described there.

WP2 WP4 (and especially Commute Greener) provides a tool using social media components and therefor a relevant show case for WP2.

WP3 The business models consist of different parts, such as value propositions and communication channels to users, which are all relevant for the work in WP4. T3.1 provides insights to WP4 on important components of successful business models.
WP5  has provided requirements from lead cities and also needs to ensure a smooth utilization of WP4 infrastructure and tools in Living Labs

WP6  Provision of city data and the analysis/monitoring engine to be leveraged by WP6

WP7  WP7 needs to understand and present technical capabilities of WP4 to take up cities and on the Empower website.

4  Challenges and Risks

The largest challenge and risk reside within the parallel progress needed among work packages in order to reach synergies, whilst at the same time as being pragmatic about the need to achieve impact with deliverables for research and innovation actions. Specifically the requirements from the Living Labs and Take-Up cities are not always that clear yet, while at the same time the development of the Services need to be developed in order to be ready for the first trials and experiments.

5  Deviations from the proposal (positive and negative)

None

6  Dissemination Activities - proposed or actual

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1. Introduction

1.1 General

The scope of this document is focused on describing end-user applications and is a deliverable in Work Package 4 (WP4) of the EMPOWER Project. It is aligned with the back-end document of Mobility Services Infrastructure (Deliverable D4.1) which focused on back-end capabilities and this focuses on front-end aspects. The research and innovation actions EMPOWER is about rewarding change in sustainable mobility. An overall objective is to encourage citizens to reconsider their travel choices and reduce the extent to which they travel using conventionally fuelled vehicles (CFV).

EMPOWER does this by providing value adding, personal, mobile ICT services (apps) that utilize mechanisms (incentive management services) to distribute personalized incentives to encourage positive behavioural change and travel decision support for everyday travel. Additionally, these incentive management services provide urban stakeholders like cities, transport and 3rd party service providers, large employers and local shopkeepers with new tools to enable mobility monitoring (floating people data), to stimulate and achieve sustainable travel behaviour towards their target groups, to stimulate a healthier way of travelling: in general it will help them to achieve their company and/or policy objectives. And finally it can attract new business. WP4 consists of three tasks. Task 4.1 provides mobility services, back-end implementations and interfaces. Task 4.2 designs and provides end-user applications. Task 4.3 provides operational management services to the Living Labs (WP5) and deals with test, maintenance and support for the Living Labs as well as the Take-Up Cities and Organisations.

After the introduction in this Chapter 1, the second Chapter in this document will provide a view of the current status of the Living Labs application scenarios that Empower is going to support. This Living Lab check illustrates aspects of/for an Empower toolbox, with an emphasis on end-user application interactions, in order to increase alignment between the EMPOWER service and the desired Living Lab implementations, while also addressing differences, similarities, current gaps (between offered EMPOWER service and Living Lab wishes) and implications.

The third chapter focuses on describing end-user applications, so called front-end. Two in-depth implementations are presented first, namely SMART and Commute Greener. SMART gives insights into how the Mobidot MoveSmarter back-end can be applied. There is also a section of the so called SMART2.0 based on plans by City of Enschede, that might also be used in other Living Labs. Commute Greener is being described through a specific Facebook application context providing richer insights into alternative end-user experiences and front-end implementations. The chapter is concluded with a draft lean scheme end-user application.

The fourth and final chapter of this deliverable document provides conclusions in relation to the Empower objectives and research and innovation actions are defined which deliver real impact.
1.2 Starting point with EMPOWER back-end services

In D4.1 we described the back-end services of EMPOWER. These back-end services provide the main capabilities (software engines) to incentivize people towards behavioural change. These back-end services, the so called Mobility Service Infrastructure (MSI) are the backbone for the front-end services that are available within EMPOWER and that provide the main interaction interface with end-users. Moreover the MSI enables integration or coupling to existing or new 3rd party applications. Below we describe in short the basis of this MSI in order to set the framework for the front-end services.

The Architecture and infrastructure of MSI inherit the character of loosely coupled services and interfaces as the underlying frameworks, whilst the technology components are reused from two existing innovative systems leveraging behavioural change in travel: Commute Greener and Move Smarter.

A view of the EMPOWER MSI below illustrates the open, flexible architecture that can integrate the existing backend and frontend tiers of Commute Greener and Move Smarter (note that SMART as frontend is for now owned and used by the Living Lab City of Enschede only):

![Diagram of EMPOWER open architecture and MSI framework]

Both Commute Greener and Move Smarter are positioned in the EMPOWER MSI
- Commute Greener is described as an example of an end-to-end Mobility Service infrastructure into a specific Facebook application context.
- Move Smarter is described as an example of a backend Mobility Service infrastructure which can be used with 3rd party development of a frontend.
The MSI can be utilized to provide and customize existing tools for the EMPOWER consortium lead cities and Take-Up Cities/Communities/Corporations and integrate 3rd-party tools via APIs where suitable. Therefor this is the starting point for the front-end services.

1.3 What’s happening around us: 3rd party Apps

This section presents some third-party apps that are available “around us” when it comes to influencing (mobility) behaviour. These are apps, external to the EMPOWER project, but inspiring enough to be considered within the context of this project. Even though we have not taken a structured scientific approach to gather these apps, they are quite well known apps and some of their features can potentially be used to inspire the development of the EMPOWER front end service. That said, the list of third-party apps below is mostly a source of inspiration instead of a checklist for our future services.

1. **Changers CO2** ([www.changers.com/en/](http://www.changers.com/en/)): it supports companies to encourage employees to seek more sustainable modes of transport in a gamified manner. Teams (e.g., departments) can engage in a friendly competition and be rewarded with redeeming points.

2. **RingRing** ([www.ring-ring.nu](http://www.ring-ring.nu)): it encourages people to cycle more. It uses a point system for each kilometer rode on a bike, namely FKm. The FKms can be exchanged by tangible products. It also employs a system to rank users in order to compare one another.

3. **Bitwalking** ([www.bitwalking.com](http://www.bitwalking.com)): it encourages people to reduce vehicle use and walk more instead. Users are rewarded with Bitwalking dollars (BW$) — a digital currency similar to Bitcoins — which can be exchanged by tangible products.

4. **CleanSpace** ([our.clean.space](http://our.clean.space)): it provides information about how clean the air around the user is. It also calculates how clean users’ journeys are and it rewards them with redeeming points.

5. **Pact** ([www.pactapp.com](http://www.pactapp.com)): it employs behavioral economics principles (e.g., loss aversion) to keep users committed to their pacts. Users who successfully change their behaviour (e.g., exercise more) earn real money, paid by users who break their pacts.

6. **Google Maps** ([maps.google.com](http://maps.google.com)) / **Rome2Rio** ([www.rome2rio.com](http://www.rome2rio.com)) / **Citymapper** ([www.citymapper.com](http://www.citymapper.com)) / **Ally** ([www.allyapp.com](http://www.allyapp.com)) / **RideScout** ([www.ridescoutapp.com](http://www.ridescoutapp.com)): these are all-in-one transport planners. They provide information (e.g., duration, costs, schedules, transport modes) about how to get users from point A to point B. Some of them also provide real time transit data.

7. **Moves** ([www.moves-app.com](http://www.moves-app.com)): it is a self-tracking app that displays statistical data (e.g., calories burned) of any walking, cycling, and running activity one may do. It envisages leading users to healthy habits. Moreover, it also integrates activity data from many other related apps.

8. **RunKeeper** ([www.runkeeper.com](http://www.runkeeper.com)) / **Endomondo** ([www.endomondo.com](http://www.endomondo.com)) / **Strava** ([www.strava.com](http://www.strava.com)) / **Google Fit** ([www.fit.google.com](http://www.fit.google.com)) / **7 minutes** ([www.7minworkoutapp.net](http://www.7minworkoutapp.net)) / **Fitocracy** ([www.fitocracy.com](http://www.fitocracy.com)) / **Sports Tracker** ([www.sports-tracker.com](http://www.sports-tracker.com)): these fitness-tracking apps envisage motivating people to get and stay active (e.g., running, cycling, working out). Some motivational methods used are social networking, performance feedback, encouragements (e.g., rewards or praises) and personal training programs.
9. Lyft (www.lyft.com) / UberPool (get.uber.com/cl/uberpool/) / Carma Carpool (www.carmacarpool.com) / BlaBlaCar (www.blablacar.com) / Ridescout (www.ridescout.com) / UbiGo Switchh (www.switchh.de) / UbiGo (www.ubigo.se): these apps exploit the ubiquity of the smartphone to enable people to better organize carpooling and ridesharing. Users can pinpoint exactly where they would like to be picked up and they can visualize where their ride is at the moment. Novel attempts also exist to combine different modes of transport and incentivize their combinations, such as the project of UbiGo on the Commute Greener platform.

10. Burn Fat Not Fuel (www.burnfatnotfuel.nl): it encourages commuting to work by (e-)bike while rewarding behavioural change by providing a financial incentive as well as by giving feedback on health improvement, cost reduction and sustainability.

11. Love to Ride (www.lovetoride.org): it envisages encouraging people to cycle more by means of promoting local cycling initiatives as well as information about the benefits of cycling. Users can track their rides, receive positive messages or information on routes to be taken.

12. Moet Ik Rennen? (www.moetikrennen.nl): a Dutch spin-off app that informs whether or not to start running to catch any public transport (e.g., bus or tram).

13. WeerMeister (www.weermeister.nl): a discontinued Dutch spin-off that informs whether it will rain on one’s regular routes.

14. Ingress (www.ingress.com): a successful GPS-based game that transforms the real world into a virtual landscape for a global game competition. Players have to physically move around to perform certain actions at different places.

15. Calendar 42 (site.calendar42.com): it suggests appropriate departure times for scheduled appointments based on up-to-date traffic conditions.

16. Metropia (www.metropia.com): is a mobile app system that rewards commuters for choosing better routes to help reduce and eliminate traffic congestion.

17. Varärbussen? (www.vasttrafik.se): an alternative way of light travel planner as it shows real-time where current buses are and where they are going, therefore providing travellers with easier choices.

18. Aurat kartalla (www.auratkartalla.com) / Moovel (http://www.moovel.com): examples of real-time information that helps people to plan and choose their travel mode, including suggestions about what cycling pathways have been cleared of snow, for instance, and when.

These apps are looking to change behaviour in some way or another. Some common ways to do so are by raising awareness, such as by comparing other modes of transportation with driving the car alone; providing personalized feedback, such as the impacts (e.g., costs, CO2 emission, amongst others) of choosing a certain mode of transportation; and stimulating social interaction, which provide cues of what actions are socially preferred and, therefore, has the power to influence people’s decisions.
2. Living Lab check

2.1 Introduction

Cities that want to reduce the number of Conventionally Fuelled Vehicles (CFV) in order to improve the liveability in their city are the core of the project. City authorities involved in the EMPOWER Living Labs include: Manchester, UK; Enschede, NL; Helsinki, FI; and Gothenburg region, SE. Each of the cities has objectives that are concerned with a reduction in the use of CFV to increase liveability and to meet the national Government targets on internationally agreed targets (UNFCCC, 2015) on carbon emissions and minimization of impact on climate change.

The four EMPOWER Living Labs cities are working within local policy frameworks which specify targets, ideals and principles for the management of the transport sector. The specific policy context for each of the cities is given in a complex framework of plans covering the local transport system, regional integration of the transport systems, economic development of the city and often the region and land use development. In the UK living lab the Manchester Local Transport Policy (GMTA, 2011, Greater Manchester’s Third Local Transport Plan (2011/12-2015/16) specifies five core objectives as:

- to ensure that the transport network supports the Greater Manchester economy
- to improve the life chances of residents and the success of business;
- to ensure that carbon emissions from transport are reduced in line with UK Government targets in order to minimise the impact of climate change;
- to ensure that the transport system facilitates active, healthy lifestyles and a reduction in the number of casualties and that other adverse health impacts are minimised;
- to ensure that the design and maintenance of the transport network and provision of services supports sustainable neighbourhoods and public spaces and provides equality of transport opportunities;
- to maximise value for money in the provision and maintenance of transport.

It can be seen that specific to the Gothenburg transport context (CoG, 2014, Gothenburg 2035, Transport Strategy for a close-knit city) is the emphasis on the integration of Gothenburg city and Gothenburg region. The outcome of this is a focus on the accessibility of Gothenburg from outlying areas and the necessity for Gothenburg to be an accessible regional centre. As a result the transport strategy’s three main objectives include the creation of:

- an easily accessible regional centre within a context of Sustainable Growth;
- attractive urban space and a vibrant urban life;
- and Scandinavia’s Logistics Centre.

The Gothenburg region has a strong focus on creating a sustainable liveable city region where public transportation is a very important mode in the transportation system. The K2020 plan outlining the public transportation ambitions formulates its ambition as: “The Gothenburg Region will be developed as a strong, distinct growth region that is attractive to reside, work and live in. Public transport is an important means of achieving sustainable development. One of the goals
of the Gothenburg Region is that at least 40 per cent of journeys should be by public transport in 2025, which entails doubling travel by public transport." Parts of the public transportation ambitions are operationalized within the West Swedish Agreement. In this political agreement funding is organised for large infrastructure investments in the Gothenburg region where revenues of the congestion-charging scheme are a large part of the funding.

Within the Helsinki city context it can be seen that there is a mix of the both Manchester and Gothenburg city perspectives but with an emphasis on travellers experiences on public transport. Helsinki Regional Transport Plan: (HRTA, 2015, HSL Moves us all) specifies as goals; Smooth journeys: The customers’ travel chain is based on the public transport trunk network and efficient feeder services; Clear services: We provide our customers with up-to-date information before and during their journeys as well as clear, easy-to-use and reasonably priced tickets; Compact and attractive region: A transport system based on rail services creates a more compact urban structure and makes the region more attractive; Increasing the use of public transport: We direct the increase in traffic to public transport, walking and cycling; Fewer emissions: We increase the share of low-emission public transport; Effective finances: We make public transport more cost-effective and strengthen the funding base of the entire transport system.

Finally within the Enschede city context there is a strong focus on cycling. This includes both the construction of new (dedicated) infrastructure as well as behavioural campaigns. This fits within the generals aims of the city: Increased accessibility of the main economic areas from without the city, increased use of sustainable modes for trips within the city, increase the attractiveness of the city centre (liveability), and increased traffic safety. The Cycling Vision adds goals in line with this, specifically for cycling: from 34% to 40% mode share for inner-city trips, less bicycle theft, more parking spaces, high level of cycling corridors realised, and in general more focus in bicycle: during construction, in maintenance, and in promotional campaigns.

Based on these policies and also taking into account the workshops that were conducted as part of WP3, specifically on D3.3 (Lead city specific business models), it is clear that the implementations of the living labs differ. This chapter describes the plans and local implementation initiatives for each of the Living Labs with the corresponding functionality (End-user application) primarily required from a traveller’s perspective. Matched to the existing services, this will indicate the need for front-end development planning and implementation. The following use cases are currently in a design phase:

- Manchester
  - Young people + mode choice
  - Quality bus corridor as an attractor
  - Employer + sustainable travel
- Gothenburg
  - Sustainable Transit Connected Communities
  - Employer + sustainable travel
- Helsinki
  - Sustainability scheme with MaaS-provider
  - Employer + sustainable travel
Enschede
- Extend existing bicycle scheme
- Elderly + bus promotion
- Employer + sustainable travel

Aligning EMPOWER effort with local actions is beneficial in term of recruitment, marketing, political support, etc. Next to differences in use cases, localisation is one particular aspect that should be taken into account.

In the next paragraphs we will describe more in detail the, at the moment, foreseen Living Lab implementations and link this to the Front-end functionalities. It shows that the functionalities connect to a combination of the existing Front-end solutions and the Back-end components.

2.2 Manchester

In Manchester we have initiated collaboration in order to work together with a fully commercial public transport operator, First Bus, on three cases related to the promotion of bus use. One focussing on a young people as a target group, the other on a new (to be opened) bus corridor as a target area. The third is based around promotion of public transport and other forms of active travel. This will be in collaboration with employers to stimulate the use of sustainable modes for commuting to and from the workplace and on business trips.

2.2.1 Young people + mode choice

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The aim is to attract new 16-18 year olds to travel by bus and to retain existing 16-18 year old bus users. Currently there is an increase in bus fare at the age of 16 from half price to full fare. This scheme would attempt to retain 16-18 year old bus users through the barrier of the doubling of the ticket fare payable. The scheme would support and integrate with an existing incentive scheme to provide a reduced weekly fare ticket through the introduction of additional incentives for bus travel. This use case will be operated in close cooperation with First Bus.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrate with an existing app to distribute rewards based on bus ticket purchase.</td>
<td>As API into mTicket app</td>
</tr>
<tr>
<td>Distribute rewards based on other purchase</td>
<td></td>
</tr>
<tr>
<td>Intensification offered to those who are inactive users</td>
<td></td>
</tr>
<tr>
<td>Detect use of bus ticket</td>
<td></td>
</tr>
</tbody>
</table>

2.2.2 L-S-M Busway: Quality bus corridor as an attractor

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce an incentive scheme with the introduction of a new quality bus corridor. This incentive scheme will be based on an existing digital loyalty points scheme associated with a major food supermarket.</td>
</tr>
</tbody>
</table>
The scheme is designed to attract new users to the Quality Bus corridor. This use case is operated in close cooperation with First Bus.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrate with an existing app to distribute Nectar Points based on bus ticket purchase.</td>
<td>As API into mTicket app</td>
</tr>
<tr>
<td>Detect off peak use in order to double the points.</td>
<td></td>
</tr>
<tr>
<td>Detect off peak use in order to double the points.</td>
<td></td>
</tr>
<tr>
<td>Detect use of bus ticket</td>
<td></td>
</tr>
<tr>
<td>Integration with email for additional communication</td>
<td></td>
</tr>
<tr>
<td>Integration with Facebook for additional communication and to indicate progress in rewards</td>
<td></td>
</tr>
</tbody>
</table>

2.2.3 Employer + sustainable travel

Description

Co-harness institutional endorsement and positive incentives to encourage a range of travel choices outside single use conventionally used car. For this we work together with employers who will function as a proxy organisation.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking of trips, focus on mode detection</td>
<td>Using Mobidot &amp; Pocketweb technology</td>
</tr>
<tr>
<td>Share mobility profile with friends</td>
<td>Using Facebook as an interface.</td>
</tr>
<tr>
<td>Challenge travellers to behave in a certain way</td>
<td></td>
</tr>
<tr>
<td>Reward based on challenges</td>
<td></td>
</tr>
<tr>
<td>Convert reward into tangible items</td>
<td></td>
</tr>
<tr>
<td>Link with bus ticketing system in order to use discount travel as a reward</td>
<td></td>
</tr>
</tbody>
</table>

2.2.4 Using existing mTicket app in Manchester.

In the UK Living Lab we have initiated a work on executive level together with First Bus, who are one of the main commercial public transport providers in the UK, and with Transport for Greater

Figure 3: mTicket and First Bus app and Example of Ticket types and menu Route Tickets
Manchester, who are the public body overseeing the development, management and operation of transport services for the Greater Manchester region. The result of this close collaboration has been three different schemes that are aligned to the core business of each of the stakeholders and a substantial commitment to the implementation schemes. This has meant that we are exploring the possibility of using an existing First Group app, mTicket to deliver the EMPOWER digital services. The existing app ‘mTicket’ is an app that First Group uses for the sale of bus tickets in the UK. It currently has 50,000+ users throughout the UK and is linked to First Group app ‘First’ (see figure 1), which gives bus times and timetable and route information. mTicket in Manchester offers a choice of tickets including a 16-18 Young Persons ticket and ‘Route Tickets’ (see figure 2).

At present when selecting ‘Route Tickets’ the mTicket app provides just one choice, the FirstWeek SUPERSAVER to Bolton. The EMPOWER project could, by reaching an agreement, help to enable that the existing menu structure is maintained while adding the Quality Bus corridor as a ‘Route ticket’ choice with a positive incentive scheme.

In this illustrative example we have stuck quite rigidly to the layout and style that is used in the existing mTicket app. Additional information is indicated about the incentive, which is the ‘NECTAR’ points that can be collected with the purchase and use of this ticket. The EMPOWER project intends to suggest an integration with email and Facebook notifications to provide additional information that reinforces, supports and substantiates the message about the incentive scheme.

Figure 4: Mock-up screen showing additional EMPOWER incentive for the Quality Bus Corridor L-S-M busway

2.3 Gothenburg

In Gothenburg, the focus is on two cases: working with large employers to increase use of sustainable modes in commuting and working with a local community where mobility providers want to increase the use of sustainable alternatives instead of the conventionally fuelled car.

2.3.1 Employer + sustainable travel

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees have different transportation needs for performing the work they are expected to deliver. Focus is on client satisfaction and economic performance, but the environmental burden and especially our contribution to emissions on green house gases may come at a third place.</td>
</tr>
</tbody>
</table>

The use of less CO2 emitting modes of transport will strengthen the business as we contribute to a solution for curbing global warming. In order for employees to have easy access to
alternative modes, and to incentivise the use of them, an IT platform will help create a situational awareness of the actual CO2 consumption per person or group and provide CO2 reduction challenges/targets.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking of trips, focus on mode and travel-purpose detection</td>
<td>Using Mobidot and Pocketweb technology (opt-in for active tracking with premium options), specific attention for local ‘rules’ for mode detection, link in with available existing travel booking suppliers, detect/reward non-travel meetings using Skype for Business and similar videoconferencing solutions.</td>
</tr>
<tr>
<td>Share mobility profile with friends</td>
<td>Using Intranet and potentially Facebook as an interface.</td>
</tr>
<tr>
<td>Challenge travellers to behave in a certain way</td>
<td>Using app and intranet solutions</td>
</tr>
<tr>
<td>Reward based on challenges</td>
<td>Using app and intranet solutions</td>
</tr>
<tr>
<td>Convert reward into tangible items</td>
<td>Private personal discounts earned by making business trips.</td>
</tr>
<tr>
<td>Detect use of specific local electric taxi</td>
<td>Connect to booking database</td>
</tr>
<tr>
<td>Export trips to companies trip registration system</td>
<td></td>
</tr>
</tbody>
</table>

### 2.3.2 Sustainable Transit Connected Communities

#### Description

Car tends to be the primary mode of transportation in the communities oriented towards Gothenburg even if these are connected to transit facilities.

Using new transportation offers including reward schemes these habitual users can be persuaded to change behaviour and new habit may be established. The change is needed in order to transfer the suburbs into sustainable communities reducing CO2 emissions.
This use case will be designed in close cooperation with STCC-project and one or more frontend applications will be developed by the STCC project. Within the STCC consortium there exist different actors that have a client base and apps that could be a base for the frontend development for the Empower Living Lab.

ICA for example has a health app that works in conjunction with Runkeeper. Discounts on health products can be earned for exercise activities.

The Lerum collective shop owners have a loyalty program card where discounts are given for shopping in Lerum.

Västtrafik (the public transportation authority) has a travel planner app with ticket buying capabilities.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking of trips, focus on mode detection</td>
<td>Using Mobidot and Pocketweb technology, specific attention for local ‘rules’ for mode detection</td>
</tr>
<tr>
<td>Challenge travellers to behave in a certain way</td>
<td>As API to integrate in other apps</td>
</tr>
<tr>
<td>Reward based on challenges</td>
<td>As API to integrate in other apps</td>
</tr>
<tr>
<td>Convert reward into tangible items</td>
<td>As API to integrate in other apps</td>
</tr>
</tbody>
</table>

### 2.4 Helsinki

Helsinki aims to reduce private car ownership and promote Mobility-as-a-Service (MaaS) concept provided on commercial basis as the means to support and facilitate that development. The use cases focus on different aspects of this concept: one on the integration with 3rd party user
interfaces, specifically the service of a MaaS-provider and alternatively Helsinki region's next gen trip planner, the other on an increased use of bicycle as mode for commuting.

### 2.4.1 Sustainability scheme with MaaS-provider / 3rd parties

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>As predicted people will in future prioritize using just one user interface to plan and manage their travel, which is strongly supported by MaaS concept. Therefore incentives should be visible in that interface, seamlessly integrated in the portfolio of travel alternatives to choose from.</td>
</tr>
</tbody>
</table>

Helsinki pilot will work with an existing MaaS-provider (e.g. Tuup.fi) and HSL’s next gen trip planner (digitransit.fi, beta version out Feb 2016) to reward the use of specific modes in their service provision.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking of trips, focus on mode detection</td>
<td>As API to integrate in other app</td>
</tr>
<tr>
<td>Challenge travellers to behave in a certain way</td>
<td>As API to integrate in other app</td>
</tr>
<tr>
<td>Reward based on challenges</td>
<td>As API to integrate in other app</td>
</tr>
<tr>
<td>Convert reward into tangible items</td>
<td>As API to integrate in other app</td>
</tr>
</tbody>
</table>

### 2.4.2 Employer + sustainable travel

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work with a large employer to reduce the number of commuting as well as business trips by car, by substitution with more sustainable travel modes, specifically bicycle trips. This use case links to many on-going and upcoming activities, namely HSL sustainable travel campaign targeting employers, Helsinki’s upcoming citybike –scheme, Helsinki region cycling promotion strategy (Jan 2016) and spring 2016 cycling promotion campaigns and e-bike pilots by 3rd parties (e.g. retail chain Alepa).</td>
</tr>
</tbody>
</table>

In the background this use case will integrate 3rd party (Trafix) model for employers to manage employees’ travel choice scheme.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking of trips, focus on mode detection</td>
<td>Also linking to HSL upcoming trials</td>
</tr>
<tr>
<td>Share mobility profile with friends</td>
<td>Using Facebook as an interface.</td>
</tr>
<tr>
<td>Challenge travellers to behave in a certain way</td>
<td>Campaigning together with main stakeholders</td>
</tr>
<tr>
<td>Reward based on challenges</td>
<td>By several stakeholders: Public sector, employers, 3rd parties</td>
</tr>
<tr>
<td>Convert reward into tangible items</td>
<td>3rd party cooperation</td>
</tr>
<tr>
<td>Link system to local MaaS operators</td>
<td>Tuup.fi as primary partner, possibly 2-3 others to be partly integrated</td>
</tr>
</tbody>
</table>
2.4.3 Integrating EMPOWER incentives to 3rd party user interfaces

Current trend is towards mobility transforming into a service rather than ownership-based. The spearhead of this paradigm change is Mobility as a Service –concept. This means that people tend to plan and manage all their travel choices with one interface that integrates all possible alternatives in a personalized manner. Naturally the incentives need to be visible and integrated in that interface. This is the focus of Helsinki pilot, as it is globally the main city of development and demonstration of the Mobility as a Service –concept. Helsinki pilot is targeting two different interfaces to integrate with, with possible quick trials with other providers.

MaaS-operators

Finland is leading the development of the Mobility as a Service –concept, which brings a new player in the value chain: a “MaaS-operator” who user has a contract with – in a similar manner as with mobile operator – and who in turn provides an extensive portfolio of travel choice to choose from via one interface, including payment when necessary and not taken care of already as part of the contract. For incentives this new approach open new possibilities, and at the same time raises up challenges due to changing playing field; new key player in a value chain calls for re-evaluation of roles and responsibilities, contractual issues etc. regarding the incentive schemes. This will be investigated as part of the Helsinki pilot.

Tuup.fi is one of the first wave MaaS-operators, with one special feature that derives from earlier cooperation with City of Helsinki: it targets employers as one of its primary focus groups. Tuup has built-in features for collecting and reporting back users’ travel behaviour and choices, and has had possible incentives as one of their design principles, which makes it the best suited MaaS -platform for Empower piloting.

Other alternative user interfaces may be other MaaS-operators, of which Finland seems to have three during H1/2016. Also there’s been interest from ridesharing providers, and other similar stakeholders that provide somewhat simpler user interface in terms of travel choices, but still fit perfectly Empower’s target of reducing use of CFVs.

Journey planners / trip planners
Every city has its own, and there are nationwide planners, some with multimodal features. Google, Here as well as likes of Citymapper are trying to provide universal planners that work everywhere. People use them extensively, from seasoned commuters to tourists in a strange city. Latest development demonstrates more complex multimodal planning, comprising e.g. city bikes or car sharing. Hence there is a clear ‘market’ for even the old trusted journey planner to start showing carrots when they are available related to one’s query.

Helsinki region is developing a next generation, open source journey planner Digitransit.fi which will simultaneously become nationwide planner, and driven by Helsinki-Tallinn twin city –initiative also making cross-border planning possible. Current development phase, open source approach, and the fact that the development is done in-house in HSL with very enthusiastic creators, are perfect setting to trial how public transport –focused journey planners may incorporate public as well as commercial incentives in future.

2.5 Enschede

The city of Enschede has the SMART project in place, which functions as the starting point for the use cases. With EMPOWER, SMART will be taken to a next lever where the aim is to get to sustainable business models for implementing this service. The first two use cases work with employers, the third focuses on elderly.

2.5.1 Employer + sustainable travel

<table>
<thead>
<tr>
<th>Description</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>The local mobility management network Twente Mobiel is working on an area approach, where the city centre businesses are the current focus. Together with these employers, we will work on a reward scheme where the commute gets more sustainable and the employer wins in terms of reduce sick leave (by increase use of active modes) and reduced need for parking spaces.</td>
<td>Using SMART technology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking of trips, focus on mode detection</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Share mobility profile with friends</td>
<td>Using Facebook as an interface.</td>
</tr>
<tr>
<td>Challenge travellers to behave in a certain way</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Reward based on challenges</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Convert reward into tangible items</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Distinguish between general SMART points and company specific rewards</td>
<td></td>
</tr>
</tbody>
</table>

2.5.2 Extend existing bicycle scheme

<table>
<thead>
<tr>
<th>Description</th>
<th></th>
</tr>
</thead>
</table>

The hospital in Enschede has an existing cycling promotion scheme, which rewards people who cycle to work. The automated tracking makes this system easier to use, without the investment in a chip on the bicycle. Also, using SMART technology, use of PT can be included in the reward scheme as well as non-commute trips.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking of trips, focus on mode detection</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Challenge travellers to behave in a certain way</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Reward based on challenges</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Convert reward into tangible items</td>
<td>Using SMART technology</td>
</tr>
<tr>
<td>Export commute trips to current scheme operator</td>
<td></td>
</tr>
</tbody>
</table>

### 2.5.3 Elderly + bus promotion

**Description**

In order to increase accessibility of elderly, the municipality aims to make bus use more convenient. In recent years, investments have been done in raising bus stop curbs and using low-level entry buses. Also, a scheme is in place that allows elderly (65+) to travel for reduced rates (or even free).

In line with these actions, we aim for a service that focuses on a peer-to-peer system where people help each other with bus travel. Facilities are in place and of good quality, but use of the facilities is not living up to expectations. This needs a function where elderly can connect to experienced bus users in order to help them overcome the hurdle of a first time bus traveller. The initial focus is on trips from home to the city centre.

In this use case, we will work together with bus operator Syntus as well as the municipal project team for the reduced fares scheme.

<table>
<thead>
<tr>
<th>Functionality</th>
<th>Proposed technology / remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buddy recruitment</td>
<td>Using trip records in SMART</td>
</tr>
<tr>
<td>System to apply for a buddy</td>
<td>Using a human as a proxy to a (web based) administration s</td>
</tr>
<tr>
<td>Buddy matchmaker based on home location.</td>
<td></td>
</tr>
<tr>
<td>Detect accompaniment to reward buddy.</td>
<td>Mainly based on report by user.</td>
</tr>
<tr>
<td>Channel for communication between user and buddy</td>
<td>Maybe use existing systems (Phone, SMS, WhatsApp, Facebook, etc....)</td>
</tr>
</tbody>
</table>

### 2.5.4 Using SMART app in Enschede

In paragraph 0 there is a full description of the current SMART functionalities as well as some further foreseen development that will be used within EMPOWER.
2.6 Combined functional needs

In the preceding sections, the different strategies, plans and local implementation initiatives for each of the Living Labs are described with a focus on the corresponding functionality required from primarily an end-user (traveller) application perspective.

From this end-user perspective and given the overall approach of EMPOWER that leverages on the ubiquitous and human-centric nature of Smartphone technology, we seek for effective interaction mechanisms and functionality that can help and stimulate the traveller in its individual change process towards the more sustainable travel choice.

In the table below the required functionalities from the Living Lab perspective are combined and matched to common main functional front-end components and non-functional technical requirements. The resulting building blocks are then translatable towards the existing services described in the next chapter. Moreover this match & translate process uncovers the area(s) where there is need for additional front-end development, planning and implementation.

Based on the current use case design, the following common interface building blocks are distinguished:

<table>
<thead>
<tr>
<th>Living Lab required or envisioned functionality</th>
<th>LL Source</th>
<th>Front-end building blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Functional components</td>
</tr>
<tr>
<td>Detect travel behaviour</td>
<td>Manchester Gothenburg Helsinki Enschede</td>
<td>▪ Multimodal Tracker ▪ Logbook input</td>
</tr>
<tr>
<td>Distinguish target groups (employers, travellers)</td>
<td>Manchester Gothenburg Helsinki Enschede</td>
<td>▪ Registration, consent and login ▪ Group management</td>
</tr>
<tr>
<td>Challenge target groups</td>
<td>Manchester Helsinki Enschede</td>
<td>▪ Baseline determination ▪ Show (sponsored) challenges ▪ Show improvements</td>
</tr>
<tr>
<td>Distribute incentives</td>
<td>Manchester Gothenburg Helsinki Enschede</td>
<td>▪ Incentive overview ▪ Messaging</td>
</tr>
<tr>
<td>Rewarding</td>
<td>Manchester Gothenburg Helsinki Enschede</td>
<td>▪ Shop ▪ My achievements</td>
</tr>
<tr>
<td>Tangible reward conversion</td>
<td>Manchester Gothenburg Helsinki Enschede</td>
<td>▪ Voucher system</td>
</tr>
<tr>
<td>Localisation</td>
<td>Manchester</td>
<td>▪ Tracker</td>
</tr>
<tr>
<td>Buddy matching</td>
<td>Enschede</td>
<td>▪ Find ride share partners</td>
</tr>
</tbody>
</table>
| End-user interaction | Manchester  
Enschede | ▪ What & how  
▪ About |
|----------------------|-----------------|----------------------------------|
| Social media integration | Gothenburg  
Enschede | ▪ Invite friends  
▪ Share results  
▪ Share challenges |
| Mobility profiling | Gothenburg  
Enschede | ▪ Foot printing  
▪ Trip overview  
▪ Personal impact |
| Journey planning | Helsinki | ▪ MaaS approach |
| Service availability | Manchester  
Gothenburg  
Helsinki  
Enschede | ▪ MaaS approach |
| Look&feel flexibility | Enschede | ▪ Settings  
▪ MaaS approach  
▪ Configurability |
| External coupling | Manchester  
Gothenburg  
Helsinki | ▪ Data exchange  
▪ Loosely coupled  
▪ Internet standards |

In the next chapter we will go in more detail on the functional components and non-functional aspects of the current front-end services available to EMPOWER.
3. End-user application documentation overview

3.1 Introduction

This chapter describes the value adding, personal, mobile ICT Front-end services (apps) that utilize mechanisms to distribute personalized incentives to encourage positive behavioural change and travel decision support for everyday travel and are, together with the back-end service, the backbone for delivering the services in the Living Labs and Take-Up Cities/Organisations as drafted in the preceding chapter.

A view on the EMPOWER Front-end service is shown below as part of the flexible architecture that leverages on the existing tiers of the Commute Greener and Move Smarter solutions in relation to a bigger world where also 3rd party solutions and data exists.

![Scope of this chapter](image)

Figure 6: Scope of EMPOWER front-end solutions

In the following two sections we describe the SMART and CommuteGreener Front-end solution set in more detail. Although this description is mostly focussed on the functional components (see also paragraph 2.6), the existing and described technical building block made available by the WP4 partners capture and provide valuable experience and know-how on organisational, methodological and technical aspects of traffic and mobility initiatives featuring innovative information and communication technologies, applications and services.

As both SMART and CommuteGreener provide an advanced and rich approach towards stimulating behavioural change, within EMPOWER we will also work towards developing a state-of-the-art, yet simple and quickly deployable Front-end service that can serve as a step-in model to SMART or Commute Greener. This new Front-end service (that is described in more detail in paragraph 3.4) will leverage a lean incentive scheme approach. Since the Living Lab implementations as well as the Take-Up Cities and Organisations are still being further developed,
it is a flexible approach so that the needs of the Living Labs and Take-Up Cities and Organisations can be met.

3.2 SMART

3.2.1 introduction

SMART (Self-Motivated And Rewarded Travelling) is a free App for iOS and Android phones. SMART helps users to travel smarter and more environmentally aware. For example, by avoiding traffic jams or by choosing a different mode of transport. SMART focuses on optimising travel behaviour in a human-centred approach. The target groups that SMART covers include commuters, city visitors, event visitors and shoppers. SMART offers for these target groups:

- Insight into personal travel behaviour
- Personalised transport options
- Support for ‘good’ travel decisions
- Rewarding of ‘good’ behaviour

The main objective with SMART is to reach a win-win situation between individual life styles and associated travel behaviour, and societal challenges and city goals. Therefore SMART registers and analyses the travel behaviour of the SMART user in a 24x7, multimodal way and responds to the user with personalised advice, challenges and rewards. To deliver these capabilities, SMART is supported on the one hand by the MoveSmarter sensing engine, which is integrated in the App and provides travel behaviour (GPS based track-and-trace) measurement functionality and on the other hand by the MoveSmarter mobility services infrastructure, which provides analysis, feedback and rewarding functionalities. The interaction between the frontend App and this back-end infrastructure is described later on in this section. Complementarily, the components and set-up of the MoveSmarter mobility services infrastructure is described in more detail in D4.1.

Figure 7: SMART Use case in a commuter scenario
SMART informs, makes travellers aware and nudge them to choose the better travel option. A typical commuter oriented use case scenario is illustrated in the following figure. In the use case the commuter shows habitual behaviour using the car to get to work although the commuter is aware that a traffic jam situation is likely to happen during rush hour travel.

### 3.2.2 Current SMART App implementation

SMART version 1.5 is a running service to end-user travellers available as an App from Google Play and Apple Appstore. Currently SMART only supports the Dutch language. Therefore the screenshots shown in this section are in Dutch.

#### 3.2.2.1 Registration, consent and login

As SMART is a personal solution for smarter travel it uses privacy sensitive information in this process. Therefore the App is for personal use only. That means that users have to follow a registration procedure before they can use the App. The registration procedure is kept as lightweight as possible as an extensive registration procedure creates a barrier for users. In principle no personal information like name and address are necessary from a functional point of view.

In the registration process one step is included that allows for a rough categorisation of the interest of a user. In that step users are asked to check their fervour (multiple checks allowed) from the following list:

1. Travel cost optimisation
2. Sustainability
3. Travel time optimisation
4. Health

A free to choose username and a personal password are sufficient (‘start a trial’ option). In order to provide support or to deliver rewards however, it is necessary that at least an e-mail address of the user is known. To ease the registration further, users have the option to use their existing Facebook credentials to create a SMART account and be able to log-in.
Before the registration process is concluded and users can start using the App, users are forced to provide consent (via an opt-in button) to the terms of use and the SMART privacy code of conduct.

SMART works predominantly as a background process on the Smartphone of the user. That means that no user interaction is necessary to record the day-to-day door-to-door travel behaviour of the user. If users do not want their travel displacements measured, they can either pause the App or logout. There is no message then that warns the user that this affects the measurements. In the latter case people have to login again to be able to use the App again.

3.2.2.2 Home screen and menu

The SMART App Home screen acts as the central interaction screen with the end-user and provides access to a menu with more functionalities. The Home screen provides a quick view to the user of the latest status with respect to:

- Measured last travel route
- Personal modal split (travel time and distance)
- Personal impact (based on interests given at registration and changeable via menu | settings)
- Rewards earned to date
- Messages received
- Running Challenges

The challenge/reward system consists of a points-based incentive scheme. Citizens can collect points by taking up challenges and complete these challenges in terms of actual travel behaviour as measured by SMART. Points can be redeemed via a voucher mechanism in local shops (via menu | shop). Examples of challenges include:

- Travel this week at least three times by bicycle to your work and earn 150 points
- The city centre is crowded on Saturday. Take the bus and earn 100 points
- Don’t get stuck in traffic before the football game of FC Twente. Take the train to Drienerlo station and earn 100 points.
Additionally, a menu (top-left home screen) provides access to:

- **My mobility** chronologically listing all automatically measured travels
- A **multimodal route planner** (optional to EMPOWER, only Dutch application)
- All **challenges**
- Real-time **traffic heat map** (optional to EMPOWER, only Dutch application)
- **Shop** to redeem rewards
- An **About** where users can re-read the why and how of the App
- **Settings**
- A **Log out** possibility
3.2.2.3 My mobility

The My mobility area in the App provides the user detailed insight into a user’s own travel history (diary function). Unique element of the App is that this chronological listing is created fully automatically by the sensing capabilities and analysis functionality of the underlying MoveSmarter service infrastructure. As such the diary provides a multimodal, 24x7 overview of individual travel to the user. For each trip, the user has the possibility to drill down on that trip, receiving access to travel specifics and zoom in possibilities on the measured route travelled.

Figure 13: SMART My Mobility overview
3.2.2.4 Challenges and points

The lifecycle of challenges is determined in the MoveSmarter service infrastructure. Via a web-based management portal city administrators have access to functionality to define, create and manage challenges, the conditions on which the challenges work and the target groups the challenges apply to. Administrators can also define what kind of reward scheme (for example points) is coupled to the challenge portfolio. The service infrastructure then uses the measured travel behaviour of the user to calculate progress on the challenges applicable after each travel made and brings this to the user via the user interface. When a challenge is won, the number of collected points is added to the point total of the user. Via the home screen a user can drill down on its point total and see from which challenge, which amount of points he or she has earned.

Because the challenges can be defined and activated dynamically, the system remains interesting and dynamic to the user. An example is the capability to ask quiz-type questions to the users.

3.2.2.5 Rewarding and Shop

Points are of less value to users when they cannot be redeemed in something valuable to that user.

SMART incorporates a shop concept with a range of free products, vouchers or discounts from local retailers, events or musea, which users can select in exchange of (some of) their points. In this way local industry can be involved in sustainable travel.

A redemption process withdraws the associated amount of points from the user's account.

Figure 14: Overview of the rewarded SMART
Figure 15: Insight in won and lost challenges
Figure 16: SMART rewarding and shop
total of the user. Depending on the chosen tangible reward, the user receives its reward via postal services or in a digital way.

3.2.2.6 Messages
Finally, SMART has the functionality to inform users with informational messages. For example, currently SMART users are informed on local road works or are informed when a new local sponsoring partner has become involved in SMART.

![Figure 17: SMART message centre](image)

3.2.3 SMART 2.0
The current 1.5 release of SMART will be replaced by a new release of SMART (SMART 2.0), spring or summer 2016, and will be available for use within EMPOWER. In this new release a number of drawbacks of the current system will be solved, but more importantly the App architecture will be revisited and the code base will be re-implemented to achieve more flexibility in the front-end concept. For example multi-lingual support will then become possible. SMART 2.0 will then evolve from a single App concept to a portfolio concept where functionality and the codebase of the App can be heavily reused. The new architecture is depicted in the figure below.
This new release will bring a further flexibility in the way citizens can effectively be equipped with Apps fulfilling their specific need. Moreover new functionality is envisioned in SMART2.0

A first mock up of this new functionality shows the possibility to share your performance on Facebook. Either on a trip detail page (left) you can share a specific trip you made. Or you can click on the statistics on the home page to get to a more detailed page, where different parameters can be set and the current statistics can be shared as a picture on Facebook as well.

Preferable, settings can be applied in such a way that as limited personal data as possible has to be shared. Currently, the only information needed is the fact whether or not a user commuted by bike for each day of the week.
Finally, a second mock up shows how distinction between the regular SMART points (purple/yellow) and a company specific reward scheme in a different value (in this case €) can be implemented, as discussed in Section 2.5.1. Also, then in the list of challenges there is a distinction between the two different systems.

3.3 Commute Greener

Commute Greener is a free Facebook app for Desktop, iOS and Android running on the EMPOWER mobility services infrastructure and tapping into the Facebook community as potential users (with 1.5 billion active users in November 2015).

Since 2009 Commute Greener captures and provides valuable experience and know-how on organisational, methodological and technical aspects of traffic and mobility initiatives featuring innovative information and communication technologies, applications and services. Its apps have been utilized by major global cities, communities and cooperations to create awareness and ignite behavioural change amongst citizens, employees and other user groups. Partners and customers include cities like Gothenburg or Mexico City, communities like WWF and European Mobility Week or corporations such as Keolis and Vattenfall.

The general idea of Commute Greener is to enter your normal commuting pattern as a baseline and then to make improvements against your baseline. Commute Greener does thus not make use of automated tracking and improvements need to be manually reported by the user once they occur:

- By making improvements the user
  - gains incentive points
  - contributes to sponsored challenges
  - raises his/her social reputation by sharing with other users
  - becomes aware of the impact his/her improvements make (CO2 reduction and other indicators)
- By making use of his/her commuting routes the app can also suggest
  - ride share partners
  - public transport alternatives (time tables)
  - traffic information
Figure 21: Screenshot from a Facebook Appcenter page with Commute Greener.

The following subchapters illustrate the mobile usage of Commute Greener – the Desktop version works in a similar way.

3.3.1 **Find, understand and register for Commute Greener**

Commute Greener can be found via its website [www.CommuteGreener.com](http://www.CommuteGreener.com) or the iTunes, Google Play and Facebook app stores. However, most of the time users will find it in Facebook posts of other users.

As shown in Figure 22 users can then inform themselves via the website, app descriptions or a tutorial about Commute Greener. They can then register via Facebook connect accepting the Commute Greener terms and conditions.
Figure 22: Find, understand and register for Commute Greener

Figure 23 gives an impression of the Commute Greener desktop version homepage.

Figure 23: Commute Greener homepage desktop version
3.3.2 Enter the commuting baseline and initiate change
To get going a user is asked to enter his commuting baseline. Figure 24 shows the steps from where to where, at what time, on which days and with which modes of transport. To make things easy for the user Commute Greener assumes a similar commuting pattern every weekday, but the user can also individually adjust this.

As a result the user is presented with his current commuting footprint: distance travelled, time spent and CO2 emitted.

![Figure 24: Enter the commuting baseline](image)

3.3.3 Joint sponsored challenges and sustain change
To make improvements the user is motivated by top 10 lists of other users. Another means of motivation are sponsored challenges that sponsors can set up with specific goals, regions, dates and incentives. As shown in Figure 25 a user can simply sign up to one or more challenges, compete with others or reach a joint goal.

![Figure 25](image)
3.3.4 Make improvements

The main use case is then to make improvements: the user is being reminded that every day it is his chance to make a change by improving his commuting behaviour. As shown in Figure 26 and Figure 27 the user can adjust the mode of transport of his upcoming trip. The bigger the CO2 impact of his improvement the more points he will get.

Figure 25: Join sponsored challenges

Figure 26: Make improvements using the app

Figure 26: Make improvements using the app
3.3.5 Analyse and get motivated

In the performance section the user can see his impact over time. Additionally the user also earns badges for repeated positive commuting behaviour. As shown in Figure 28 the user can also compare with connected friends via top 10 lists.

Figure 27: Make improvements using the desktop version

Figure 28: Analyse and get motivated
3.3.6 Find ride share partners

To find ride share partners a user can use displayed trips of other users or actively search for ride share partners that match his commuting pattern (as illustrated in Figure 30).

Figure 30: Find ride share partners
3.3.7 Invite friends and build the community

Leveraging the Facebook community users can easily invite their friends to Commute Greener (illustrated in Figure 31).

![Inviting friends](image)

Figure 31: Inviting friends

3.4 Empower App ‘Lean incentive scheme support’

3.4.1 Background and objectives

The existing and described technical building block made available by the WP4 partners capture and provide valuable experience and knowledge on organisational, methodological and technical aspects of traffic and mobility initiatives featuring innovative information and communication technologies, applications and services. However, with their breadth of features and specific approaches such solutions also require some effort for each city or organization to align their objectives and initiatives in order to get a seamless user experience across incentives, tools, services and schemes being used.

During the requirements specification process it has become evident that cities or organisations do not always have the time or resources to introduce such powerful and somewhat complex tools. In many cases it just takes a tool for the user to document and report his usage of certain modes of transport without further use case integration, alignment with actual service operations or incentive redemption. For these cases WP4 will provide a lean scheme support tool that allows cities or organisations to set up their scheme and give their target group an app to report their travel behaviour against this scheme. The tool will be based on the mobility services infrastructure described in D 4.1, with adjustments where appropriate.
Since this tool represents an extension to the existing building blocks of EMPOWER and hence will be developed within the next months it will only be described using draft illustrations (actual design and development have only been started during the preparation of this report and work towards a launch in M12). Following the requirements discussion during the initial Empower project phase, development will follow a systematic process including wire framing, design, development, testing and deployment. Also, the name of the tool is currently under development (hence the working title "lean incentive Scheme support" tool).

Process-wise, the Lean Incentive Scheme will be developed in cooperation with the Living Labs as well as the selected Take-Up Cities and Organisations.

3.4.2 Overview
The lean scheme support tool will comprise of several building blocks as shown in Figure 32:
- (1) Self-service Web front end for cities and organisations to set up their incentive schemes
- (2) App for users to report their travel behaviour against this scheme
- (3) Existing EMPOWER services infrastructure to compute travel behaviour
- (4) EMPOWER services infrastructure extension to administrate clients (cities or organisations) and their schemes

To make the adoption “lean” for cities or organisations the tool will not be connected or integrated with actual mobility services or their supporting IT systems or with solutions to redeem incentive points or coupons. Cities or organisations will get a regular report of “their” users and the points or distances those have collected. It is then up to the cities or organisations to manage or redeem incentive points or distances.

Figure 32: The lean incentive scheme support tool frontend and backend
3.4.3 Self service web frontend for cities and organizations

Cities and organizations can register and provide incentives as part of their scheme in only a few simple steps. Features and use cases may include:

- Registration / Login
- List of "My incentive schemes"
- Set up new incentive scheme
- Edit (only if incentive scheme is not yet active)
- Manage (start/stop of making incentive active)
- Incentive scheme report (users and incentive status)

Of course this 'basic' tool doesn't cover all possible and maybe desired functionalities, but provides a step-in tool. In the development together with the Living Labs and Take-Up Cities and Organisations this will be further discussed.

Figure 33 shows a simplified draft for the set up of an incentive scheme.

![Illustrative set up of incentive scheme](image)

Cities can then promote their incentive scheme to their target group including the code and app name via classic means of marketing (posters, brochures, websites etc.). Once incentive points have been redeemed they can delete incentive points in the system (per user or for all users of the scheme).

3.4.4 App for incentivised travellers

Target group users will learn about the scheme and app via promotion from the issuing city or organisation (including a way how incentive points or distances will be redeemed). They can download the app and sign up to the scheme via the code promoted.

Features and use cases include:

- Registration / Login
- Enter code
- Select scheme (if several schemes are signed up to)
- Report/document usage of supported mode of transport
- View history
- View number of incentive points or distances collected and redeemed

Figure 34 shows a simplified draft of selected app screens.
4. Overall conclusions

With the already existing and available front-end services, with adjustments and extensions, and by building on the EMPOWER mobility services infrastructure (D. 4.1), EMPOWER will offer a stable and proven basis for operations in the Living Labs and Take up Cities. Combined with 3rd party solutions and local solutions in each city, EMPOWER provides a portfolio of end-user applications that cover a broad range of relevant use cases and also address different complexity and maturity levels of local services and ambitions.

Still, we are aware of the challenges of operating in a dynamic situation with a lot of different stakeholders. We cooperate with travellers, public authorities, researches, and incentive providers. And we have apps and tools that are already in use, new to develop functionalities and integration with other tools. And that not just in one city, but in 4 Living Labs and 7 Take-Up Cities where the EMPOWER project will introduce the EMPOWER approach tailored by WP5 and WP7.

Figure 35: Front-end solutions as part of the EMPOWER open Architecture

However, with the loosely coupled architecture approach (see Figure 34) EMPOWER will ensure enough flexibility to address these challenges.

We expect that besides the EMPOWER Front-end solutions (existing and to develop), the Empower Front- and Back-end components provided features that can and will be deployed via different external user interfaces. This means we don’t develop tailored solution to each use case, but we accommodate the to build upon the EMPOWER architecture.

The WP4 deliverables D 4.1 (mobility services infrastructure) and D 4.2 are now the basis for Task 4.3. This task will provide operational IT management services to the Living Labs and to the Take-
up Cities who can allocate EMPOWER budgets for local integration (25,000 Euros per Take up City), but might also have own funding for IT development.
## Appendix A: EMPOWER Review Form

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Final Checks

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