POCITYF
Factsheets for solutions adopted in Alkmaar

INTRODUCTION

These factsheets have been developed within **Alkmaar ecosystem**, one of the Lighthouse Cities of POCITYF. These **multidisciplinary and complementary integrated solutions** focus on **reducing the impact of electro-mobility on the energy system, increasing the penetration of electric vehicles utilizing renewable energy sources (RES), promoting decarbonisation of mobility sector and reducing citizen's mobility costs.**.

In the factsheets you will find **key technical information** to replicate these solutions as well as **cultural heritage-related considerations** and the **impact on community**. The ambition is to make Europe the leading continent in the realization of a **self-sustainable, environmental-friendly and citizen-centred living environment in urban districts.**

Find more at https://pocityf.eu/solutions

ETT1

ETT2

ETT3

ETT4

ENERGY TRANSITION TRACK #3

- EV charging with AC lighting
- Hydrogen powered HD vehicles
- Smart Solar Charging (SSC)
- Solar Energy Producing Noise Screen
- Intelligent and optimal control algorithm
- V2G & EV sharing

EV charging with AC lighting

DESCRIPTION

It is favorable to reduce the amount of objects within the monumental street view in the city center of Alkmaar. Nowadays, several infrastructural objects are present in the narrow monumental streets of the beautiful city center of Alkmaar:

- Electrical charging station for cars
- Electrical charging station for boats, incl. electrical feeding (connection) box
- Regular lampposts

Besides the disturbing view of these objects in the proximity of the monumental buildings, the separate objects take up space in the narrow streets and thus reducing the available parking space and/or public space in the streets. By applying a combined charging lamppost there will be one object instead of three different objects. An existing “monumental looking” lamppost will be cut in half: the LED Lumiere and the reused slender pole compose the top part, and the bottom part will be a modified charging station.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

N.A.

Already demonstrated in Lighthouse cities

No

Cultural heritage compliance

Yes

PERFORMANCE

1 charging point for both boats and cars.

COST

+- 6.500 euro

DIMENSION

Similar to an existing lamppost

TIME

Q1 2022: Certification complete

Q1 2023: Installation

SAFETY

Compliant with all safety requirements

SUSTAINABILITY

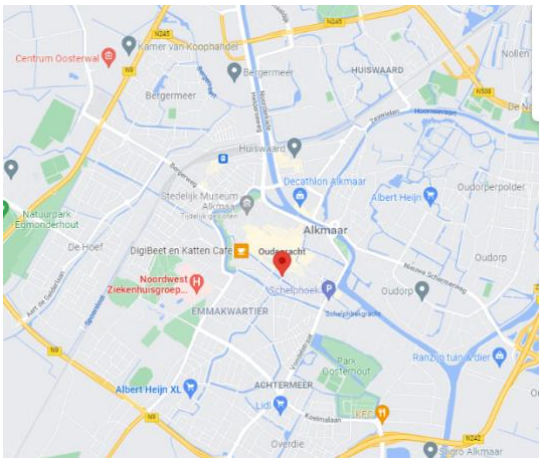
Charging point for electric cars/boats

Less materials required, since three elements are combined into one

KEY REQUIREMENT

The lamppost needs to comply with all regulations that are in place for both the lamppost and charging functions, additionally this specific lamppost needs to be placed at a location where both cars and boats can be parked while charging.

ENVISAGED DEMONSTRATION IN POCITYF



LOCATION

The area of implementation is the Alkmaar City Centre at the street “Oudegracht”. Since the location is outside the PED, an official change document has been approved. The location is in the replication area of lighthouse city Alkmaar.

TIMELINE

The lamppost has been installed in Q1 of 2023

DETAILS

An existing lamppost in the city of Alkmaar has been modified in order to fit the charging elements into the structure.

TARGETED OUTPUT

The output of this innovative element is a multifunctional lamppost, with a charging point for electric vehicles and boats. The integrated lamppost has a similar design compared to the existing lampposts in the centre of Alkmaar. By combining these functionalities the total number of objects in the streets can be reduced, freeing up valuable space on the streets.

IMPACT ON COMMUNITY

The community will benefit from the realisation of a charging point for both cars and boats. Since it is a combined charging station and lamppost only 1 obstacle has to be installed in the street instead of three separate installations. Therefor there is more room in the streetscape for other funtionalitities such as street parking and greenery. There will be some disruption during the installation of the solution, however since it is a combined solution the disruption is shorter then if all three instalations had to be implemented seperatly.

CULTURAL HERITAGE BUILDINGS COMPLIANT

The combined charging and lighting stations means that less disturbance (charging boxes, electrical boxes etc.) are visible in the streets, maintaining the quality of cultural heritage buildings and streetview. Additionally the lamppost will be in the same style as existing lamppost that are currently present in the historical inner city of Alkmaar. This makes the solutions compliant with historical inner cities with a minimal impact on the streetscape.

OTHER COMMENTS - OPEN CONSIDERATIONS

Since the lamppost had to be realized in public space within a historical city centre, many challenges with regards to regulations were encountered. Additionally the technical installation for the charging points was quite large, therefor not fitting in the existing historical lampposts. The lamppost had to be redesigned in order to fit all technical aspects within the pole. The final design has 1 charging point which is suited for both EV’s and boats.

Hydrogen powered HD vehicles

DESCRIPTION

The use of hydrogen as a fuel for commercial vehicles is not a common practice. NXT Mobility in Alkmaar has purchased three hydrogen powered vans in order to gain experience about the operability of hydrogen vehicles. The vans will be commercially used by two local companies in a pilot phase. The knowledge will be spread during and after the pilot phase in order to see if further commercial use is possible.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

N.A.

Already demonstrated in Lighthouse cities **No**

Cultural heritage compliance **Yes**

PERFORMANCE

30 kW fuel cell

57 kW PEM electric motor

Range: up to 400km

COST

N.A.

DIMENSION

L x B x H: 3225 x 2070 x 2850 mm

Wheel base: 3433 mm

TIME

Refuelling time: 5 mins.

SAFETY

N.A.

SUSTAINABILITY

Hydrogen trucks are CO2 neutral when green hydrogen is used, this replaces the diesel emissions from the current fleet.

KEY REQUIREMENTS

The key requirements for the H2 vans are to have sufficient range and payload capacity since they need to be operational during the day. Another requirement is the proximity of hydrogen refuel stations, which need to be in the Alkmaar region.

ENVISAGED DEMONSTRATION IN POCITYF

LOCATION

The hydrogen vehicles will be used by 2 local companies based in Alkmaar. The main refuelling station will be NXT Mobility, located at the Boekelermeer.

TIMELINE

The purchase agreement for the three hydrogen vans has been signed on the World Hydrogen Summit in Rotterdam that took place between 9 and 11 May 2023.

DETAILS

Three Renault Master H2-TECHs will be used for the demonstration of this innovative element. The Renault Master H2 Tech is the hydrogen versions of the regular Renault Master van. The truck has an integrated hydrogen fuel cell of 30 kW, 4 hydrogen tanks integrated in the roof to store 6,4 kgs of hydrogen at 700 bar and a 33 kWh 400v battery fuelling a 57KW electrical engine. Hydrogen is being converted by the hydrogen fuel cell into electricity which can be stored in the battery before going to the electrical engine. The Renault Master can function as an electrical vehicle with limited range in case hydrogen is not available, thereby only using its battery and eMotor.

TARGETED OUTPUT

The output will be three hydrogen powered vans being fully commercially operational. Additionally experience about using hydrogen vehicles will be gained, which will be shared with other interest parties.

IMPACT ON COMMUNITY

Although there are only 3 hydrogen powered vehicles, they fulfil an important exemplary role in the Alkmaar region: they contribute to locally emission-free (and quieter) driving, which benefits the environment in the region. In addition, they contribute to the realization of a positive business case for the NXT hydrogen filling station in Alkmaar, which naturally requires market demand.

CULTURAL HERITAGE BUILDINGS COMPLIANT

The use of commercially hydrogen powered vehicles is not related to cultural heritage buildings. However it contributes to a more sustianable urban ecosystem where logistical processes are becoming more sustainable. The solution is viable in cities with and without cultural heritage buildings.

OTHER COMMENTS - OPEN CONSIDERATIONS

Initially the municipality of Alkmaar aimed to utilize sustainable vehicles for the collection of waste. The use of battery electric vehicles (BEVs) is not suitable for such vehicles as the required battery pack will be extremely heavy. Instead, fuel cell electric vehicles (FCEVs) are more suitable for heavy transport because of the lower weight and longer driving ranges.

A DAF CF FAN (6x2 truck) was proposed to be used for the demonstration of this innovative element. Hyzon Motors would transform this diesel fuelled truck into a hydrogen powered heavy duty (HD) vehicle. The diesel fuel engine would be replaced by a 40-kW proton exchange membrane (PEM) fuel cell, 150 kW PEM electric motor and a 15 kg hydrogen storage tank to move the HD vehicle. Besides these components a 136-kWh fuel pack would serve as a small buffer. However due to several problems the hydrogen waste collection truck proved not to be feasible to implement during the proposed timeline. Therefor an alternative solution being the 3 H2 vans has been proposed.

Smart Solar Charging (SSC)

DESCRIPTION

Within Sportscomplex de Meent the goal is to replace the fossil source (natural gas) with a renewable source. Residual heat from the ice rink and heat-cold storage will be used to warm up the building, which results in CO_2 reduction. Electricity though is still needed; this is generated locally with solar panels. The solar panels and e-charging points will be connected to a battery to create a smart electrical grid. The goal of the smart grid is to achieve an efficient and flexible use and control over the supply and demand of electricity. The result is:

- Minimal grid stress and curtailment due to power peaks in supply (solar) or demand (electric vehicles)
- Maximum profit of the installed interconnected energy, mobility and ICT infrastructures.

It is not a vehicle 2 grid solution but a PV to battery - battery to vehicle solution. PV will be used directly at the charging points using converters (DC/AC and AC/DC).

At the plot two smart solar roof carports are being realized: one car port for cars, one car for bikes.

INDICATORS

Due to double land use, optimalisation of generation of electricity.

Flexibility is added with the installation of chargin stations

Already demonstrated in Lighthouse cities N

Cultural heritage compliance **Context dependent**

PERFORMANCE

Charging points: PublicLine 3P 16A 2xT2

Total power capacity of PV panels: 475 kwP

150 kW PEM electric motor

COST

€425.000,-

DIMENSION

Solar panels: 15000 m^2

16 charging points and 20 charging stations for bicycles

TIME

Carport realised December 2020

Bike port realised June 2021

SAFETY

Safety inspection/maintenance for the heat pumps is once a year.

SUSTAINABILITY

Solar panels as a solution for energy generation

Batteries as a solution for intermittency of renewable energy.

KEY REQUIREMENTS

For the implementation of a Carport Solar Roof, space is required.

ENVISAGED DEMONSTRATION IN POCITYF

LOCATION

The smart solar charging is demonstrated at the Sport Complex de Meent. The picture to the right shows the serveral solar locations: The charging points for cars have been demonstrated at area 1, the charging points for bikes have been demonstrated at area 4.

TIMELINE

Q4 2019: Start of preparation phase.
January 2020: Tender published.
June 2020: Tender has been awarded.
December 2020: Realisation of carport including charging points.
June 2021: Realisation bike port including charging points.

DETAILS

Further engineering & development of a smart electrical grid (and smart thermal grid) is ongoing.

TARGETED OUTPUT

This IE includes 8 charging stations for cars with 2 charging points each (= 16 charging points) and 20 charging stations for bicycles. The model charging point is Public Line 3P 16A 2xT2. The solar panels have a 355-Watt peak power per panel and a positive power tolerance between 0 and +10W. In total the power capacity is 475kwP. The charging stations for bicycles will not be connected to the smart grid due to the low supply and demand. The bike port has 72 bifacial solar panels.

IMPACT ON COMMUNITY

During the construction of the bike and car ports users of the Meent were facing some parking issues. However there with sufficient parking facilities remaining, the nuisance was kept to a minimum. The users of De Meent can now charge their electrical cars and bikes at the covered parking spaces. By doing so they will charge their vehicle with green electricity while it is also parked safely protected from the elements. The covered parking facilities do also benefit non-electrical car and bike users, since the roof covers large sections of the parking facilities.

CULTURAL HERITAGE BUILDINGS COMPLIANT

The smart solar charging are not installed within or connected to cultural heritage buildings. However they influence the electricity grid, potentially preventing other interventions in cultural heritage buildings.

The charging points also impact their surroundings. By placing the charging points strategically the disruptions in the landscape can be minimalised. The placing of the battery and pv panels should also be placed strategically in order to prevent large disruptions in the landscape, which may impact the cultural heritage.

OTHER COMMENTS – OPEN CONSIDERATIONS

Ownership, management, maintenance, and operation of the solar roof and charging poles are separated. This was complex in the realization of this IE due to some confusion of whom is doing what.

Solar Energy Producing Noise Screen

DESCRIPTION

The municipality of Alkmaar commissioned the construction of a so called 'Energieleverend Geluidsscherm' which can be defined as solar energy producing noise barrier ('PV noise barrier') on the side of a road. The barrier has two goals:

1. Mitigation of noise pollution for residents living in the vicinity of the road.
2. Production of renewable energy to create a more sustainable energy system.

The technology is scalable. The municipality of Alkmaar aims to support the realisation at least 10 PV noise barriers in the upcoming years.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

To be defined

Already demonstrated in Lighthouse cities **N**

Cultural heritage compliance **Y**

PERFORMANCE

Electricity production: sufficient for 420 households (+/- 1.000 MWh/year)

Revenue: €85.000 per year

Reduced level of noise pollution: >55 dB

COST

Investment cost: € 8,4 million

Partly subsidised through EFRO and SDE++

DIMENSION

Size: 2,4 km length x 6 m high

Total number of solar panels: 4.400

TIME

Construction start: Q1 2023

Construction is expected to be finalized in Q4 2023

SAFETY

Potential safety concerns that must be kept in mind in preparation of the solution are:

- Potential damages to the frame structure and solar panels in case of traffic accidents
- Fire hazard (in case of traffic accidents)

SUSTAINABILITY

The technology increases renewable energy sources (RES) and diminishes noise pollution. The reduced noise levels create a more peaceful and silent environment for citizens, animals and nature. Finally, initially 100 trees were estimated to be removed to construct the screen, this number has now been reduced to 70 and will be replanted at another location.

KEY REQUIREMENTS

The IE is highly replicable for fellow cities. Besides the need for sound reduction in adjacent residential areas next to a road, this solution provides to additional opportunity to produce renewable energy if there is sufficient room for the construction (without harming nature), and if there is sufficient irradiation of the sun.

Another key requirement is the opportunity to feed-in the produced renewable electricity into the electricity grid.

Other factors that have to be taken into account are 1) the potential impact on flora & fauna, 2) law & regulations, 3) rigidness of the frame construction and solar panels, and 4) fire hazards.

ENVISAGED DEMONSTRATION IN POCITYF

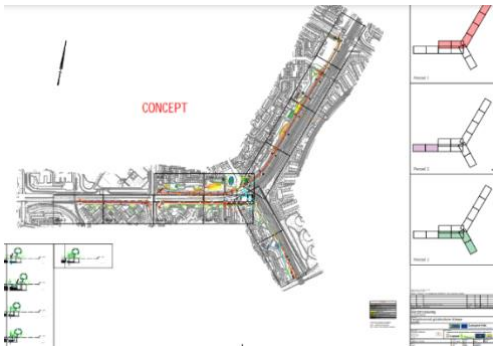
LOCATION

The first PV noise barrier with 4.400 solar panels is constructed alongside the Schagerweg (N245), Huiswaarderweg (N245) and Nollenweg (N508).

The location of these innovative solar screens are outside PED area; they are located in the area north of Alkmaar, next to the PED area, but within the Alkmaar city boundaries.

TIMELINE

Construction started Q1 2023 and is expected to be finalized in Q4 of 2023.



DETAILS

Approx. 420 households can be supplied with solar power.

TARGETED OUTPUT

The targeted output of this to be demonstrated solutions are electricity production, avoided CO2 emissions and reduced noise pollution:

- Electricity production: >1.000 MWh/y (1,875 MW - sufficient for 420 households)
- Avoided CO2 emissions: 200.000 kgCO2
- Reduced noise pollutions: > 55 dB

IMPACT ON COMMUNITY

Reduced noise pollution has a positive impact on the mental wellbeing of people, animals and nature. Secondly, the technology increases the share of renewables in the total energy mix. It is also of importance to mention that the participation of residents is guaranteed through spokespersons/representatives and an advisory board. As a result, the implemented innovative element has a strong support base in the community.

CULTURAL HERITAGE BUILDINGS COMPLIANT

Despite the fact that the solution is not directly connected to buildings, the PV noise barrier is compliant with cultural heritage and historic buildings. Next to finding innovative ways to generate renewable energy at the historic buildings, which of course is one of the topics of this project, another solution lies in shifting the RES towards more suitable areas.

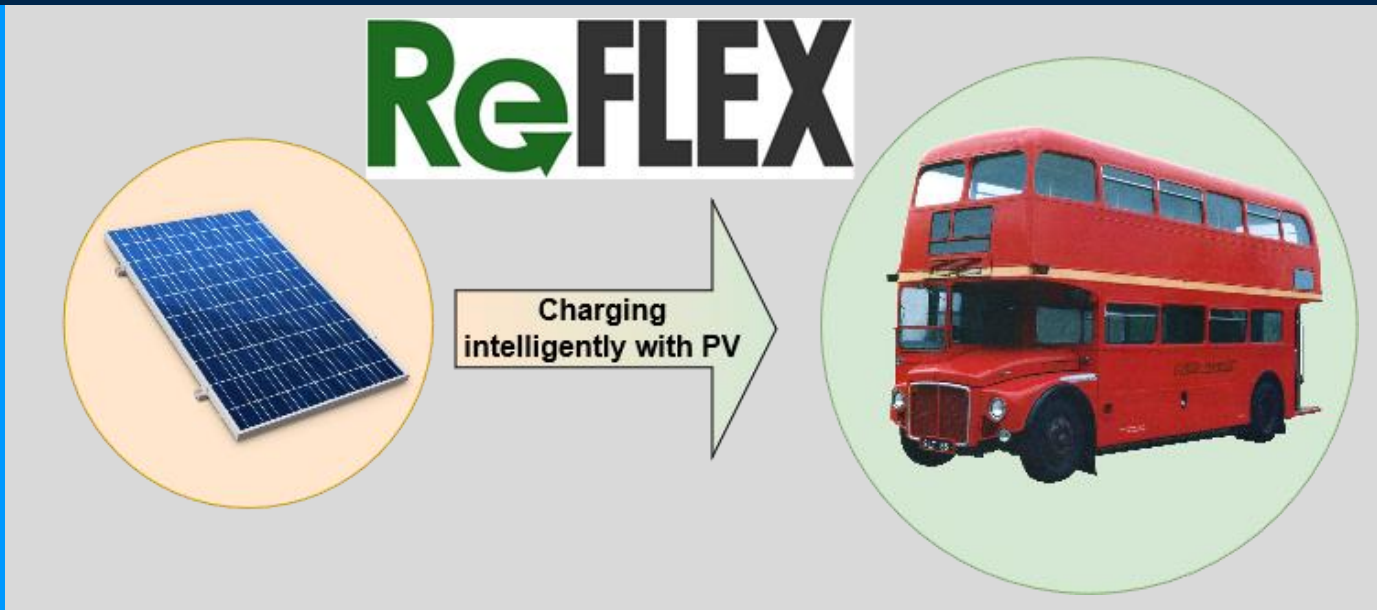
OTHER COMMENTS – OPEN CONSIDERATIONS

The advantages of the solar screens are:

- Minimal pollution of the landscape, which is the case with large fields of solar panels. Some citizens object to this “sight” pollution.
- Solar screens have a noise reduction function for neighbouring districts, which offers advantages for the citizens.
- High visibility of this innovative element, emphasizing the effort which is done towards the goal of an energy neutral Europe by the Dutch government and European Union.

Financial participation of the citizens in the surrounding neighbourhoods was not feasible at the start of this project. It should be considered though, since it depends on the amount of solar energy produced and administrative costs.

Intelligent and optimal control algorithm



DESCRIPTION

Public transport buses are increasingly being electrified to increase their sustainability. In Alkmaar, Connexxion is managing the electrical bus fleet and its charging infrastructure. To enhance the sustainability even further, the energy needed for charging will be matched in real time with a nearby PV installation to use as much renewable energy as possible.

The primary goal of developing the Intelligent and Optimal Control Algorithm is to take into consideration the production peaks of solar panels as well as the charging demand peaks for EV buses. Self-consumption is increased, and peak power demands decreased by changing when the buses charge to better match the consumption by buses to the production profile of the solar panels. Public transport buses are increasingly being electrified to increase their sustainability.

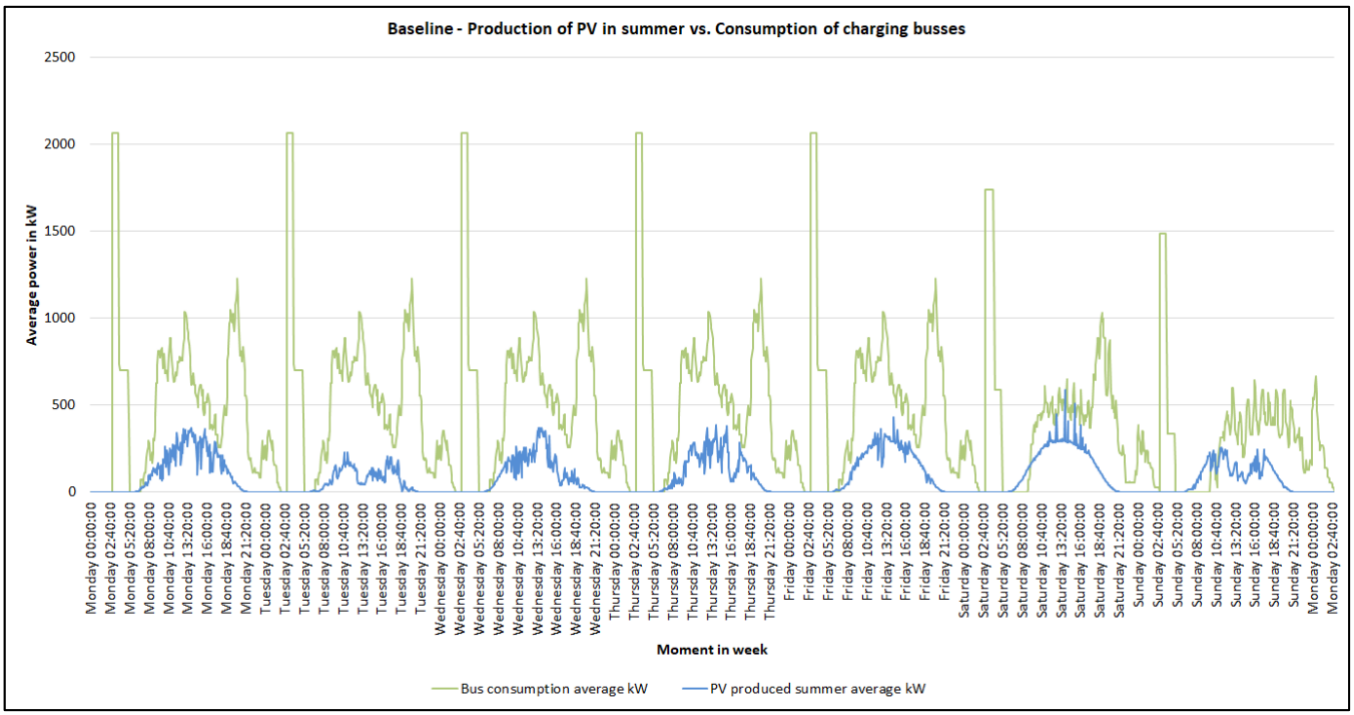
At TNO we have developed the intelligent supply & demand matcher called ReFlex. The advantage of ReFlex is that it enables the utilization of energy flexibility in a cluster of devices while optimizing towards an energy target or using the current electricity prices. ReFlex allows to both analyze the amount of energy flexibility through simulation while also creating plans in a real-time, operational setting. For this work, we have used the simulation mode of ReFlex which is called ReFlex Insights.

To provide a solution for the task posed, the tool ReFlex Insights has been used to show how much electricity from the PV installation may be utilized when the available energy flexibility in the EV bus charging sessions is used through simulation. To determine if ReFlex Insights improves the matching, it was necessary to establish a baseline of how well the consumption and production matches. The baseline consists of the amount of electricity produced by the PV installation matched against the consumption of the EV buses without changing the charging behavior. By comparing the optimized results versus the baseline results it is possible to determine how much improvement is gained by utilizing energy flexibility.

The location of the Meent consists of many facilities including an ice rink and multiple gymnasiums. It facilitates a bike port and car port for visitors respectively park their bike and car. ‘De Meent’ has implemented multiple sustainability measures including 646 PV panels on the roof of the gymnasiums (deployed March 2016), 1080 PV panels on the roof of the ice rink (deployed March 2021), 60 PV panels on top of the bike port (deployed August 2021) and 852 PV panels on top of the carport (deployed February 2021).

Top-down view of 'De Meent' sports center

Due to a lack of clean data, only the PV panels on the roof of the gymnasiums and the ice rink were considered. This is a total of 1726 PV panels with 275pW each. The PV installations on the roof of the carport and the bike port had significant gaps in the data due to maintenance and installation difficulties during which the installations did not record any data. Therefore, we have chosen to only use the PV panels on the roof of the gymnasiums and the ice rink.



Baseline production of PV in summer vs consumption of charging busses

To use ReFlex Insights, both the PV production and the Connexxion EV buses were modelled as a cluster of devices. ReFlex Insights created a plan which will schedule all EV bus charging sessions while utilizing the available energy flexibility. The PV production is non-flexible but still accounted for in the plan. ReFlex Insights will optimize the plan, so the EV bus charging sessions use as much of the PV production as possible.

The result of this simulation found that energy produced by the PV installation of De Meent matches fully with the demand of the Connexxion Alkmaar EV buses, but the demand of the EV buses matches poorly with the production of the PV installation. More types of renewable energy sources need to be added to the mix to satisfy the demand of the EV buses when the PV production is low and so improve self-consumption.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

Due to the high amount of PV produced energy that is already matched to the demand of the EV buses with default behaviour and the minimal amount of energy flexibility available in the EV bus charging schedule, the energy flexibility available is minimal.

Already demonstrated in Lighthouse cities Yes

Cultural heritage compliance N/A

PERFORMANCE

During the winter the PV production is low to nil, similar to summer evenings, night and mornings, leading to PV production to be significant only during summer daytime. The night demand of EV buses will not be satisfied by the existing PV production.

COST

N/A

DIMENSION

The algorithm developed and the simulations executed show how energy flexibility may be utilized to optimize towards a target or KPI such as self-consumption.

TIME

Demonstration of the algorithm has been completed. A simulation was developed and performed using summer (July 2020) and winter (January 2020) of PV data and the winter Connexxion charging schedule for Alkmaar 2021.

Q4 2022 - reporting has been concluded

SAFETY

N/A

SUSTAINABILITY

Increasing the possibility of self-consumption and decrease peak power demands.

ENVISAGED DEMONSTRATION IN POCITYF

If applicable, here you can describe one or more real world use cases of your solution.

LOCATION

Innovative Element simulated at De Meent and with Connexxion busses.

TIMELINE

Q4 2021 – Q2 2022

DETAILS

Using ReFlex to explore the potential of optimizing the electrical bus fleet of Connexxion with PV produced at De Meent.

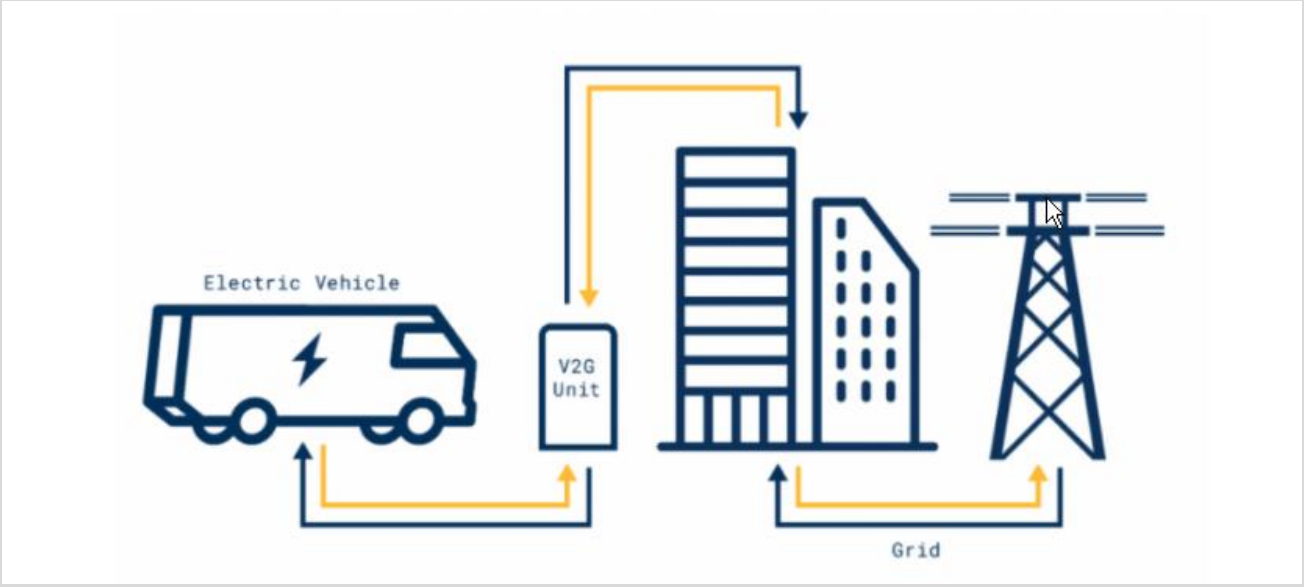
TARGETED OUTPUT

2 Questions were explored:

1. How much energy produced by De Meent PV can be used for charging the Connexxion busses?
2. How much energy produced by De Meent PV can be used for charging the Connexxion busses while charging is handled intelligently by ReFlex?

Results showed that the current PV installation should be scaled, however this would only cover the day consumption pattern. This is due to a large part of charging happens during evening/night when PV does not produce energy. Also by scaling PV production the results show it to be a poor match for the bus charging consumption pattern.

V2G & EV sharing



DESCRIPTION

The use of Vehicle 2 Grid (and bidirectional charging posts) allows for a storage of electricity generated to be used at the time there is a need for more electricity than is being generated at that specific moment in time. The electric vehicles are in effect used as batteries and can be both charged as well as emptied depending on the demand and supply of energy. This enables us to not only charge and discharge the vehicle batteries but also to balance the energy demand and supply. This creates a flexible storage capacity which can relieve the electricity grid and store energy for when the supply of durable energy is lower.

The IE works by connecting the energy generating components (like solar panels) with electric vehicles through a proprietary solar station which consists of a bidirectional charging station. The (technological) specifications of the two bi-directional charging stations and of the two electric shared cars are yet to be determined. It has already been agreed that this is a direct current (DC) bi-directional charging station that supports V2G via both CCS Combo and CHADEMO. At the moment, DC V2G functionalities without any required changes to the electric vehicles are only supported by the Nissan LEAF.

The charging stations can act as a hub for EV-sharing. Two electric vehicles will be purchased/leased and made available for the residents to share.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

N.A.

Already demonstrated in Lighthouse cities

N

Cultural heritage compliance

Y

PERFORMANCE

To be determined

COST

Expected investment cost: €22.000 (excl. installation work/cabling)

DIMENSION

2 parking spots reserved for EV cars

Bidirectional charger

TIME

Expected realisation May/June 2023

SAFETY

To be determined

SUSTAINABILITY

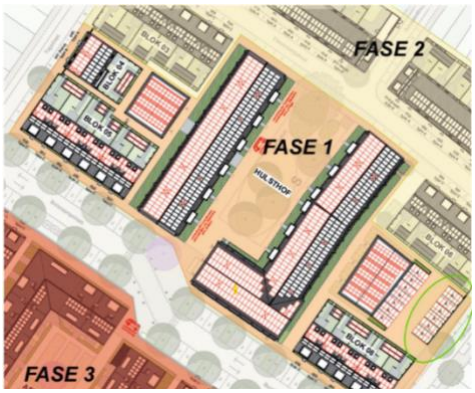
V2G: Balances the grid by charging/delivering energy at certain moments

EV Sharing: Provides sustainable mode of transport, reduces the need for private vehicles.

KEY REQUIREMENTS

This combined IE requires the technical ability of the charger and EV to be bidirectional. Additionally sufficient green electricity is required to make the IE sustainable. The EV sharing requires a reservation system, preferably in the form of an app which allows users to reserve and use the cars. Sufficient potential users are also required in order to make the EV sharing a success.

ENVISAGED DEMONSTRATION IN POCITYF



LOCATION

Strategic location within Bloemwijk (encircled area in picture)

TIMELINE

Expected realisation around May/June 2023

DETAILS

The challenge that occurs within Bloemwijk and its dwellings is that there will be an electrical peak power production of around 400 kW on the roofs of 55 dwelling, and that this power cannot always be fed into the local electricity network due to congestion on the grid.

The use of V2G (and bidirectional charging posts) allows for a storage of electricity generated to be used at the time there is a need for more electricity than is being generated at that specific moment in time. The electric vehicles are in effect used as batteries and can be both charged as well as emptied depending on the demand and supply of energy. This enables to not only charge and discharge the vehicle batteries but also to balance the energy demand and supply. This creates a flexible storage capacity which can relieve the electricity grid.

The IE works by connecting the energy generating components (like solar panels) with electric vehicles through a proprietary solar station which consists of a bidirectional charging station). The exact (technological) specifications of the two bi-directional charging stations will be determined at a later date. It has already been agreed that this is a direct current (DC) bi-directional charging station that supports V2G via both CCS Combo and CHADEMO. The (technological) specifications of the two electric shared cars are yet to be determined. This also depends on the participating electric car-sharing operator. At the moment, DC V2G functionalities without any required changes to the electric vehicles are only supported by the Nissan LEAF. However, due to the rapid developments in technology, this may be different in a few years.

TARGETED OUTPUT

Two bi-directional charging stations and two electric shared cars equipped with V2G technology.

IMPACT ON COMMUNITY

The two bi-directional charging stations will be located in Bloemwijk, where housing association Van Alckmaer owns the apartments and ground-level houses. The combination of bi-directional chargers and 2 EV's allow for balancing of the electricity grid, increasing the efficiency and use of the electricity that is being produced in Bloemwijk by the solar panels on the houses and apartments. Additionally the EV's are available for residents of Bloemwijk to use, thereby providing a sustainable mode of transport and reducing the need for owning a private car, thereby making the neighbourhood more sustainable and potentially leaving more (public) space, since there are less cars on the street.

CULTURAL HERITAGE BUILDINGS COMPLIANT

The bi-directional chargers and EV's are not installed within or connected to cultural heritage buildings. However they influence the electricity grid, potentially preventing other interventions in cultural heritage buildings. Additionally the EV sharing could reduce the need for private vehicles, decreasing the total amount of cars on the road and parking spaces, leaving more space for other uses. These solutions are therefor part of a bigger solution that can be carried out in historic city centers.

OTHER COMMENTS – OPEN CONSIDERATIONS

Financial specifications:

- Fluctis has drawn up an indicative business case for the sub-project containing the expected investment costs, operating costs and revenues,

- A budget of €23,251.70 has been made available from POCITYF (including 'indirect costs') for the demonstration of this sub-project. This budget covers (largely) the expected investment costs of the bi-directional charging stations of €22.000,-(excluding VAT). These investment costs include the installation and commissioning of the charging stations, and exclude the installation work in the meter cupboard and cabling from the meter cupboard to the charging stations,
- The Van Alckmaer management team has agreed to cover the operating costs (up to a maximum of €9,000,- including VAT) during the term of one year.