

**Pop-up consultancy centres as an instrumental policy means. Evaluation report
Triple-A: Stimulating the Adoption of low-carbon technologies by homeowners through
increased Awareness and easy Access, Deliverable 3.4.1**

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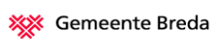
Pop-up consultancy centres as an instrumental policy means: evaluation report

Triple-A: Stimulating the Adoption of low-carbon technologies by homeowners through increased Awareness and easy Access

Deliverable 3.4.1

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Preface

Abstract

Local authorities engaged in the Interreg 2 Seas project Triple-A aim to achieve an acceleration of the market in the owner-occupied single-family home renovation sector by increasing awareness of – and enabling access to – energy-saving technologies. This report describes local authorities' experiences of developing and using pop-up consultancy centres in target areas to increase awareness and access. The main research question is *What are the key factors for local authorities to develop pop-up consultancy centres to create awareness and provide easy access of low-carbon technologies to homeowners?*

Chapter 2 presents the local policy context and illustrates types of pop-up consultancy centres developed by seven local authorities in the 2 Seas Region (covering specific coastal parts of Flanders, Northern France, Western Netherlands and England). The pop-ups are further classified into two types: short-term mobile and long term fixed-location pop-up centres. Chapter 3 describes developed pop-up centres and types. In Chapter 4, local authorities' development of pop-up consultancy centres is explained based on the business model development scheme and criteria. Besides, qualitative data are analysed to evaluate the functional and financial effectiveness of the pop-up centres. Chapter 5 reflects practical requirements during pop-up development and suggests recommendations for practitioners from other local authorities. Chapter 6 draws conclusions and specifies limitations of this project.

The study thus elaborates recommendations which are derived from and for local authorities wishing to pursue pop-up development in their region or city.

Keywords: pop-up consultancy centre, home renovation, short-term mobile pop-up, fixed-location pop-up, co-creation, instrumental policy means, customer segments, homeowner motivation, business models, low-carbon technologies

Terminology

Effectiveness: the capability of producing the desired result or the ability to produce the desired output. In this report, it is whether local authorities achieved what they wanted to do through the use of the pop-up centres.

LA: local authority, for example municipality or county

Long-term fixed-location pop-up: a longer-term, fixed model making use of existing public services, shops or vacant buildings

Low-carbon technology: means and methods for low-carbon or carbon-free renovation measures

Pop-up consultancy centres: short-term consultancy spaces that last for days to weeks before closing down, often to support temporary needs. In this project, practitioners from LAs consult about home renovation in the pop-up

Renovation journey: the decision process a person passes through in various stages before he or she adopts renovation measures

Short-term mobile pop-up: a movable, flexible, short term (<1 week) pop-up with mobile information desks or stands, mobile centres and easy to (dis)assemble constructions.

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1. Introduction

With increasing local awareness and easy access for housing retrofit, Local Authorities (LAs) want to encourage homeowners to adopt various low-carbon technologies to support energy saving. Especially, single-family houses are important for the local energy retrofitting programme (Gram-Hanssen et al., 2018). With their easy availability, adaptability, refurbishing and possible mobility, pop-up centres can provide an additional local outreach, particularly in neighbourhoods that are targeted for upgrading and renovating homes (Meijer et al., 2018a).

Although pop-up stores are commonly used for marketing products and commercial services, their use for promoting energy-saving technologies is less explored. Usually pop-ups are identified as "shops" that open in a temporary location and that are intended to operate for a short period of time (Haas and Schmidt, 2016). Pop-up stores display products or services in a surprising way to attract consumers (Hutter, 2013).

Regarding the adoption of low-carbon solutions by private homeowners, one of the significant barriers is that the supply side is very fragmented. Similarly, there are numerous actors - such as energy distribution net managers, regional innovation developers, individual market actors - consulting homeowners regarding energy renovation and application of low-carbon technologies. This leaves a single-family homeowner with a lot to deal with during the renovation process. The homeowner has to take up the role of a project manager while often having only limited energy and project management competencies and knowledge (Haavik et al., 2012). Besides that, it appears to be problematic for the homeowner to find (experienced) actors that offer advice for their specific building and home situation, or for realising faster and more efficient construction processes, including quality assurance and better communication with homeowners. When approaching homeowners, it is also better that they are targeted with "neutral" information and access to solutions from highly trusted actors. Typically, "neutral" actors can be local authorities, non-profit organisations, local energy distribution grid managers, and so on.

In the Triple-A project, we therefore consider that the pop-up centres do not necessarily "sell" solutions but mainly allow informing and engaging homeowners locally through "neutral" consultants and demonstration in target areas. In-house events, display of solutions, follow-up consultancy and locally available demonstration projects can further support reaching adoption of renovation measures by homeowners. For example, a staffed pop-up can be used for providing consultancy and for stimulating the local application of low-carbon technologies, including smart meters and related home energy monitoring systems, to make homeowners more aware about their energy use. Overall, pop-up consultancy centres can support and reinforce LA actions to provide awareness, easy access and adoption of low-carbon technologies by homeowners.

In practice, such pop-ups need to be developed by LAs or other actors or collaborations of stakeholders. It is expected that a consultancy centre managed by LAs can help overcome information barriers to better access financing for renovating buildings (Roscini et al., 2020). A LA is also often considered by homeowners as a trusted information source. One of the main challenges for LAs is the development of a marketing plan for such a (in future self-supporting) pop-up centre for local use. Also, collaboration with private and civic actors needs to be carefully developed, tested and evaluated within budgetary constraints.

In this report we explore the *question 'What are the key factors for local authorities to develop pop-up consultancy centres to create awareness and provide easy access of low-carbon technologies to homeowners?'* The sub-questions answered in this report are:

- ① How can LAs attract and help homeowner customer segments in their renovation journey, especially by using a pop-up consultancy centre?
- ② How can other stakeholders contribute to the pop-up development?
- ③ How can LAs match the needed input with the expected output?

To answer this question, practical experiences from local authorities are analysed and compared to give an insight into the possibility of pop-up centres as a novel local policy instrument.

This report describes pop-up development cases, using a reflection on the basis of the steps of a homeowner renovation journey model (Kwon and Mlecnik, 2020). In all cases, pop-up consultancy centres aim to address homeowners who are looking for information, advice and support on their journey to make their dwelling more energy-efficient and more comfortable. For this report, we look at the experiences of local authorities developing consultancy centres and pop-ups that support this quest. Existing and on-going initiatives are being described in the light of the main ingredients of a homeowner renovation journey model and a business model (Osterwalder and Pigneur, 2010).

Chapter 2 presents the local policy context and illustrates types of pop-up consultancy centres developed by seven local authorities in the 2 Seas Region (covering specific coastal parts of Flanders, Northern France, Western Netherlands and England). The pop-ups are further classified into two types: short-term mobile and long term fixed-location pop-up centres. Chapter 3 describes developed pop-up centres and types. In Chapter 4, local authorities' development of pop-up consultancy centres is explained based on the business model development scheme and criteria. Besides, qualitative data are analysed to evaluate the functional and financial effectiveness of the pop-up centres. Chapter 5 reflects practical requirements during pop-up development and suggests recommendations for practitioners from other local authorities. Chapter 6 draws conclusions and specifies limitations of this project.

This report thus evaluates two pop-up consultancy centre concepts from a management perspective, mainly addressing functional and financial effectiveness. It is not the intention to evaluate the local policy or policy implementation itself. It is expected that this report will help other local authorities to develop their pop-up consultancy centres for encouraging home renovation.

2. Development of pop-ups

2.1 Local policy context

The European Green Deal (EuropeanCommission, 2019) includes an action plan to use resources more efficiently by making the transition to a clean, circular economy and to restore biodiversity and reduce pollution. In 2050, Europe wants to be climate neutral. For this all, economic sectors need to invest in clean technology, decarbonise the energy sector and ensure greater energy efficiency in buildings. In Europe, only 1 per cent of all buildings have planned an energy-efficient renovation every year. To achieve the Europe climate-neutral goal by 2050, the European Commission published a new strategy called 'a renovation wave for Europe'– greening building, creating jobs, improving lives' to boost the renovation of the existing building stock - aims to double the annual energy renovation rates in the next ten years ¹. Particularly, 'New European Bauhaus' as one of the initiatives aims to bring the European Green Deal closer to citizens in an attractive and human-centred way. Within the Green Deal initiative all kinds of stakeholders, including local authorities, will play an important role (BPIE, 2020).

Nevertheless, there are many barriers to renovation. Financial barriers are often mentioned, but access to knowledge and sufficient information, and individual motivations also affect renovation decisions (Esser et al., 2019; Stieß et al., 2010). To tackle these human-oriented barriers, public authorities and local governments have identified a need for a neighbourhood-oriented approach, and for an increase of the capacity of LAs and competencies of staff. We illustrate the LA policy situation in four European areas: Flanders in Belgium, Picardie in France, Kent in the UK, and the Netherlands.

On a local level, most Flemish LA's signed the Covenant of Mayors². LA's developed local climate plans with climate and energy actions to reduce CO₂-emissions. On a Flemish level, the Renovation pact 2050³ states that every existing house and apartment has to have the same energetic performance as newly constructed buildings. The Flemish Energy and Climate Agency (VEKA) is responsible for the development of a diverse mix of instruments to reach these goals. A project called 'The roadmap of my energy retrofit' aims to present a building stock renovation scenario and establish a road map as a long-term strategy. Some cities, like the city of Antwerp, recently launched a new local climate action plan based on the Green Deal.

In France, there is a growing involvement of local authorities in the energy renovation of housing. France's commitment to reducing its energy consumption and greenhouse gas emissions led to a commitment of regional departments to innovative and develop ambitious systems for the energy renovation of housing, thus encouraging the creation of local jobs in this sector by mobilising all the actors in the sector. In this sense, a hundred territorial platforms for energy renovation are already operational in France. The region of Picardy was a frontrunner in the development of related public services.

Initiated at the end of 2013 by the former Picardy region, the Regional Public Service for Energy Efficiency (SPEE Picardie) was the first French public operator dedicated to the energy renovation of individual and collective housing. The Regional Council of Picardy (France) started facilitating thermal renovation in buildings ⁴. To encourage people to take action, Picardie Pass Rénovation was established to focus on a key service, combining full technical support and a suitable financing

¹ <https://www.buildup.eu/en/news/press-release-renovation-wave-doubling-renovation-rate-cut-emissions-boost-recovery-and-reduce>

² <https://www.covenantofmayors.eu/news-and-events/news/1218-province-of-flemish-brabant-57-municipalities-jointly-sign-the-covenant-of-mayors.html>

³ <https://www.energiesparen.be/renovatiepact>

⁴ <https://www.fedarene.org/picardie-pass-renovation-11059>

solution as a trusted third party. For SPEE, home energy retrofit in a rural setting is a significant imperative due to the information vulnerability. The renovation projects include thermal insulation, installation of new windows, and the upgrade of heating and ventilation systems. SPEE is now part of the Hauts-de-France Region which also embraces the previously developed activities.

In the Netherlands, each region and municipality should establish an energy counter for homeowners⁵. Besides that, alliances should be formed between building and installation companies, energy cooperatives and local or municipal authorities. The main goal of these alliances would be to 'unburden' the homeowner as much as possible. From 2015 on the Dutch Association of Municipalities (VNG) has set up a 'structure' to support the 29 Dutch regions (and 390 municipalities) realising these goals.

Furthermore, a natural gas-free neighbourhoods program was launched in the Netherlands⁶. Each municipality indicates how many homes and other buildings will be insulated and/or made gas-free during that period. LAs thus have a responsibility to make and execute plans per district, taking into account for example housing typologies, citizen segments and the availability of infrastructure in the district such as heat grids and renewable energy. The ambition from the Climate Agreement is to make at least 1.5 million homes and other buildings more sustainable by 2030 (Klimaatakkoord, 2019).

In Kent, there is a distinct gap in energy policy relating to consultancy and energy advice. Under the Home Energy Conservation Act 1995, all English authorities with housing responsibilities were required to prepare a report by 31 March 2013 setting out the energy conservation measures. The authority considers practicable, cost-effective energy conservation measures and likely to result in significant improvement in the energy efficiency of residential accommodation in its area (Jones et al., 2000).

At the county level (Kent Green Action at Home⁷), there were different considerations of identifying target areas, addressing vulnerable target groups and the responsibilities of different tiers of council. For example, the statutory duty of housing in the UK mainly sits with districts and boroughs so the involvement of the county council in housing is mainly around climate change and carbon emissions.

Geographically, there are also differences between boroughs/districts within the county. Each district or borough will have very different housing archetypes (albeit with some crossover) and different demographics and budgets. This can mean the messaging needs to be changed a lot between boroughs. For the policy context, the county develops an overarching environment policy, such as strategies, and districts can sign up to agree to implement these. Districts can also have their own policy such as action plans and local plans. Many local policies are link into the county policy.

To stimulate low-carbon renovations, LAs use a mix of policy instruments. Some LAs use property charges to create awareness. Larger LAs who have the budget for it consider developing incentives, communication and organisation of local activation.

Many incentives are already organised nationally or on a higher level. LAs take a responsibility for promoting these incentives locally, and possibly adding their own incentives to stimulate renovation and/or renewable energy measures. For example, Flanders offers an energy loan for financially vulnerable homeowners or for associations of co-owners of an apartment building with a zero percent interest rate; local authorities like Mechelen introduced an additional energy loan with a one percent rate interest for homeowners who don't meet the conditions for the zero percent interest rate energy loan.

The low-carbon measures that are typically supported are related to installing thermal insulation, providing building airtightness, efficient HVAC systems, lighting, renewable energy production and green roofs. Incentives for using integrated renovation concepts or battery storage are emerging in

⁵ <https://business.gov.nl/regulation/taking-measures-to-save-energy/>

⁶ <https://aardgasvrijewijken.nl/default.aspx>

⁷ <https://www.warmerhomes.org.uk/>

some regions. In Hauts-de-France, Antwerp, and Mechelen, consultant is offered for the whole renovation journey, from first contact and advice to execution and energy monitoring.

Furthermore, LAs experiment with specific incentives for upscaling the renovation market. For example, in Flanders, groups of homeowners (or 'neighbours') can request 'energy or BENOvation coach'. The coach receives a subsidy of Fluvius (Flemish grid operator) for the coaching of these homeowners. Premiums are offered via the energy distribution net managers or the Flemish government. Also, some LAs (e.g. initiatives of the Province of Antwerp and EOS Ostend) facilitate group buying of renovation measures, such as for the installation of PV panels. Dutch municipalities also experiment with developing 'living-cost neutral' renovation offers, particularly for assemblies of homeowners.

Overall, LAs realise that sticks and carrots are not sufficient to make the homeowners and the renovation market move. Therefore, they invest in developing specific actions for creating awareness and easy access. When looking at the policy development in the four areas previously discussed, it can be observed that all local authorities find it important to inform, incentivise, and support homeowners to adopt low-carbon technologies and home renovations. For achieving their goals, they need to find collaborations with other public, private and civic actors. Such actors should play a role to motivate and possibly (convince homeowners to) carry out energy-efficient measures in their dwellings. Market parties that are mentioned frequently are contractors, energy consultants, architects, local demands side networks, citizens, energy cooperatives, and renovation stores or one-stop-shops.

Some LA's in the four regions discussed above have established new consultancy centres and pop-ups, which is also addressed in another report (Meijer et al., 2018b). Pop-up centres serve as a physical point of contact where residents can get neutral and tailor-made advice when they are considering to retrofit their house.

The multiple purposes of pop-ups are to:

- Raise awareness about energy efficiency and low-carbon technologies
- Provide information on home energy renovation measures
- Provide information on recent low-carbon technologies, energy loan(s) and subsidies
- Grant access to recent low-carbon technologies
- Extend and support the role of communities in informing the public
- Provide easy access to difficult to reach citizens

Within the Triple-A project, two different types of pop-up models were developed and tested according to the (longer) duration of their use in the same target area on a fixed location, or their mobility within a larger area. A short-term mobile unit can either be an independent unit that can be easily installed outdoors, or be developed for integration in a fixed location, for example as an exhibit in a library or office building. Furthermore, one can distinguish a staffed or a non-staffed version of each type.

2.2. Previous pop-up centres

The idea of having a pop-up consultancy centre in target areas for the adoption of energy efficiency is not new. It was already previously explored, for example with the Kyotomobile and Woon+bus in Belgium, Reimarkt initiatives and the WoonWijzerWagen in the Netherlands, and the Energy Caravan in Germany.

The **Energy Caravan**⁸ was one of the first mobile pop-ups, developed for the Rhein-Neckar metropolitan region in Germany. The project focuses on free and neutral energy advice by certified

⁸ <https://www.klimaschutz.de/projekt/energiekarawane-gegen-den-sanierungsstau>

experts. They analyse the energy saving potential and make specific recommendations. The targeted residential buildings were from the 1950s to 1970s. The energy caravan adopted the principle that an energy advisor comes closer to neighbourhoods instead of waiting for interested homeowners to visit an advice centre. The form of the caravan was often enough to attract homeowners and get attention to know the energy caravan. Moreover, easy mobility helped to visit through district and city to city.

Kyotomobiel⁹ in Belgium was a mobile vehicle unit developed by a non-profit organisation that targeted awareness raising of citizens about the Kyoto targets and the development of joint investment in renewable energies in the region Pajottenland. It inspired the development of a similar initiative, the **Woon+bus**, that targeted all residents living in six municipalities that have questions or plans to undertake energy-saving actions in their dwellings. A consultant provides information about the possible financial benefits (e.g. subsidies) to make renovations easier and cheaper. The precise location of the mobile unit is determined together with the municipalities. Generally, the following factors are taken into account:

- Visibility and number of passers-by (possible influx of people).
- Possibility to easily and safely reach the mobile unit.
- Proximity of certain neighbourhoods and centres.

On average, the mobile unit was present around five weeks per municipality spread over a project period of 3 years. The pop-up centre was promoted via notices, flyers, banners, articles and press releases in local newspapers and on municipal and provincial websites. The permanent staff were the key resources of the centre, and key partners were the municipalities involved in the project.

The Kyotomobile and the Woon+bus are now combined in a mobile 'energy house'. The lead actor 3WPlus is an inter-municipal partnership that is working on the development of the Halle-Vilvoorde region in the areas of living, working and well-being. Within 3WPlus, this project was strongly related to the housing policy department, the energy department, and to workshops for installation of roof and attic floor insulation. In addition to the six local governments and the province of Flemish Brabant, there is also a collaboration with network organisations that are active in fields such as the labour movement, the realisation of an ecological and sustainable society and sustainable waste and material management.

⁹ <http://ww5.kyotoinhetpajottenland.be/>



IMAGE 1 KYOTO MOBIEL (https://m.standaard.be/cnt/dmf20151009_01911943)

Ecohuis (<https://www.antwerpen.be/nl/overzicht/ecohuis-antwerpen/nieuws>) is a permanent consultancy centre in the centre of Antwerp. The EcoHuis operates as a supporting point for citizens of Antwerp. Since 2019 all services from the Belgian grid operator Fluvius, formerly known as Eandis (who is responsible for the electricity and natural gas distribution network in 239 Flemish municipalities), Eenergy House Antwerp and Housing Office (Woonkantoor) are bundled in one location at the EcoHuis. This is a first step in the development of a one-stop-shop where citizens have access to all information about advice, loans and subsidies and low-carbon technologies. For advice in the EcoHuis with an energy advisor, a renovation consultant ('Ecohuis-dokter') or a technical advisor of the Housing office (Woonkantoor) an appointment has to be made for a certain day and hour. There are 5 Housing Offices spread over the city. The Housing offices also offer advice for tenants and landlords and about several topics like subsidies and grants, moisture and mold problems. Citizens who want to have tailor made advice can get coaching from a renovation coach. For big apartments (more than 20 living units), we also offer VME-coaching.

All citizens, but with a focus on certain groups (low income or socially vulnerable) could get advice about their water and/or energy bill free of charge. There is also a close collaboration with local welfare centres (OCMW's) to detect households living in energy poverty. Furthermore, the Flemish Region supports so called 'energy scanners' ('energiescanners' in Dutch) that can give advice and install small interventions (for example change lighting bulbs) in the homes of vulnerable households. Since 2021 we also offer coaching for vulnerable groups for certain low-carbon technologies like roof insulation, wall cavity insulation, new glazing and heating boiler.



IMAGE 2 ECOHUIS ([HTTPS://WWW.ANTWERPEN.BE](https://www.antwerpen.be))

In Lille, France, a similar initiative is hosted in the Maison Régionale Environnement et Solidarités in Wazemmes, although this location has a wider scope of interests and activities.

In the Netherlands, **WoonWijzerWagen** was developed by the Innovation Centre Sustainable Construction (ICDUBO in Rotterdam) as a short-term mobile vehicle that can be positioned in target areas. It tours through the region and pops up from time to time in the various municipalities that are part of the Haaglanden and Rotterdam regions. The WoonWijzerWagen in Rotterdam-The Hague region is placed on locations that can easily be reached. Homeowners who are interested in or have plans to undertake energy saving measures for their house can visit this mobile pop-up and can ask practical questions. A team of 'independent knowledge managers' is responsible to provide targeted answers on the questions. The consultants also try to couple the homeowners with appropriate construction or installation companies related to the needs and questions the homeowners have. Most visitors are also referred to visit a fixed location (WoonWijzerWinkel) in the more difficult to reach harbour area in Rotterdam, which displays various solutions in a large exhibition hall.



IMAGE 4 WOONWIJZERWAGEN ([HTTPS://WWW.WOONWIJZERWINKEL.NL/WOONWIJZERWAGEN](https://www.woonwijzerwinkel.nl/woonwijzerwagen))

WoonWijzerWinkel¹⁰ is a fixed-location consultancy centre. The region Haaglanden has established a digital counter for energy saving (www.woonwijzerwinkel.nl) combined with a permanent information and consultancy centre (*Innovatie Centrum Duurzaam Bouwen = ICDuBo*) and *WoonWijzerWinkel*. ICDuBo links between government, education institutions and industry and forms a central platform with a permanent exhibition of all possible sustainable, innovative building products. Manufacturers are able to present their sustainable products and to conduct experiments in the ICDuBo. The municipalities in these regions try together with ICDuBo to create an open marketplace via the *WoonWijzerWinkel* where demand for supply is linked with added value for both customers (the homeowners) as construction and installation companies. Construction and installation professionals are asked to join the *WoonWijzerWinkel*.



IMAGE 5 WOONWIJZERWINKEL ([HTTPS://WWW.WOONWIJZERWINKEL.NL](https://www.woonwijzerwinkel.nl))

In Flanders, a similar exhibition space exists, *Centrum Duurzaam Bouwen (CeDuBo)* in Heusden-Zolder. However, this center is often too far to reach for homeowners in the 2 Seas area.

¹⁰ www.woonwijzerwinkel.nl

The above examples show that local authorities previously already developed a multitude of pop-up initiatives, from short-term to long-term, either independently or in collaboration with other actors, typically non-profit organisations or other authorities. We noted that private actors also tend to become more important players in providing a link with executing measures.

For example, in the Netherlands, private actor **Reimarkt** now also aims at speeding up housing renovation by collaboration of owner-occupiers, tenants, housing associations, municipalities and suppliers. Initially, they focussed on the social rental sector, but nowadays, a shift has been made towards the owner-occupied sector. The value proposition for homeowners is to be completely 'unburdened' during the renovation journey. In order to scale-up the approach and to make the product range more uniform (with respect to price and quality), an originally project-based approach was changed to a product-and service-oriented approach. At this moment, products and system solutions are available in their stores and databases that can be implemented in most dwelling types that can be found in the Netherlands. These products and services can be delivered at various scales: from building elements, to renovation packages and complete renovations.

In collaboration with a municipality, Reimarkt can for example set up a local 'store'. Each store has one team with about five persons staff. Openings times can be fixed or restricted to private appointments that can be made with the Reimarkt advisors. A photo-app enables to give personal advice to the clients of in the store. The store provides ready-to-go solutions for every home, from solar panels, wall, window, roof and floor isolation up to solutions that lead to zero-on-the-meter-houses. Customers can get customised offers, including an overview of the costs and the savings. Pop-ups are used to enable visitors of their website to see with their own eyes what energy-saving measures are possible and what savings can be realised. Reimarkt defines a pop-up as a temporary opening of a renovated house (an open house).



IMAGE 6 REIMARKT (<https://reimarkt-acceptatie.nl/klantenservice/winkels>)

This 'one-stop-shop' idea has previously also been embraced in the revision of the European Performance of Buildings Directive as a point of attention for further local development. Originating from the ERACOBUILD-project 'One-stop-shop' and the Intelligent Energy Europe project 'COHERENO', new collaborations are now being established to provide one-stop-shops for renovations (Mlecnik et al., 2019). Key stakeholders and 'business owners' of such one-stop-shops can vary from public authorities to private and civic actors, or any combination thereof.

From the experiences of all the above, initiatives the following tips are already derived for pop-up development.

- Use trusted persons as ambassadors;
- Involve local partners;

- Use standardised service packages;
- Choose the right neighbourhood;
- Ensure that homeowners are approached competently by trained advisors;
- Keep an eye on the framework conditions.

We now look deeper into the experiences of more recent developments of pop-up consultancy centres, as exemplified by the LAs engaged in the Triple-A project.



3. Development of the pop-up centre




LAs planned to develop short-term mobile and long-term fixed location pop-up consultancy centres. Some of them were non-staffed, and the majority of pop-up centres were operated by staffs (detailed information is described in Table 2).

3.1 Short-term mobile consultancy pop-ups

The mobile pop-up centres developed in the framework of the Triple-A project were almost all considered as staffed with first-line consultants and stayed for about one week at a specific location in targeted neighbourhoods. The units varied in composition from simple information booths to representing a sustainable building by itself. All developments included mobile information desks or stands and easy to (dis)assemble constructions, so it is easy to move the unit to various target areas. We can identify two general types of mobile pop-ups. One type is a movable object, as exemplified in Table 1 with a little greenhouse, Greenhopper, Renovatiemobiel, Laure, Fabrik Elentrik, and the Energiehuis pop-up. These units are usually staffed with advisors of the LAs and (external) energy consultants. The Green Action at Home Pop Up was developed as a non-staffed pop-up that can be placed during a short period in an existing building (e.g. a library or office building). This type is in itself portable and can be placed in multiple public buildings (fixed-location) for the short-term. Visitors can pick up brochures from a pop-up banner or information stand.

TABLE 1 SHORT-TERM MOBILE POP-UPS

Short-term mobile consultancy pop-up example	Location (name of the pop-up)
	<p data-bbox="762 1173 1102 1205">Antwerp (Little greenhouse)</p> <p data-bbox="762 1249 1433 1487">The city of Antwerp developed a flexible pop-up in the form of a greenhouse to promote services such as an energy coaching trajectory and to get closer to homeowners in target areas and on events. The pop-up was developed with a relatively small effort by a search on the internet, meeting with different colleagues, and input from the company who developed the pop-up.</p>
	<p data-bbox="762 1529 1023 1561">Breda (Greenhopper)</p> <p data-bbox="762 1576 1433 1895">The Greenhopper is elaborately designed as a tiny house, meant to look attractive and to make people curious. For that purpose, it is placed 2 – 3 weeks on various locations. Passer-by's are free to look inside if they want to and are welcomed by a host. The pop-up is preferably placed in the Breda city region on a central square or close to supermarkets in a specific neighbourhood, or related to local events. The Greenhopper model was already copied by another Dutch municipality Meierijstad and an NGO de Groene Groei.</p>

	<p>Kent (Green action at home)</p> <p>This low-cost pop-up idea was developed to be portable and small enough to place inside libraries and council buildings. This enables reaching out to more residents. The selected locations are the libraries with the highest footfall and borrower numbers, though the information may also be sent to the other 77 Kent libraries. (Non-staffed)</p>
	<p>Mechelen (Renovatiemobiel)</p> <p>The "Renovatiemobiel" is the mobile information counter of the city of Mechelen for home energy renovations. Citizens get information about energy-savings measures for their home and can obtain tailored advice, and explore options and steps to take first and the expected costs and benefits.</p> <p>Like the Greenhopper, the Renovatiemobiel tickles the curiosity of outsiders, inviting them to enter. Solar panels and wooden cladding refer to their sustainable nature. A ramp makes it accessible for disabled people or young families with baby carriages. Locations are selected according to target area characteristics and related events. Also neighbouring municipalities have used the unit.</p>
	<p>PSEE (Laure)</p> <p>The pop-up centre allows access to all to get information, assistance and supporting devices related to home renovation. Locations in the Hauts-de-France region are selected according to somewhat larger events taking place during a few days. The consultants simplify it for the visitors to get connected to the right people. The homeowner's request is analysed, and a personalised support is proposed, referring to follow-up partners (ANAH, PSEE, Energy Information Desks, etc.) to be sure that the request is well treated.</p>
	<p>Ostend (Energiehuis)</p> <p>The pop-up Energiehuis is a portable container that has been fitted and equipped as a mobile office. It is fitted with several demo modules and information panels, that give information on solar PV, insulation, HEMS/smart thermostats, led lighting, smart meters (in collaboration with energy distribution net manager Fluvius). The pop-up Energiehuis visits the different neighbourhoods in the city of Ostend and stays there for +/- 1 week. People can visit without making an appointment and get advice from an experienced staff member. Depending on the time of year, they can as well subscribe to the group purchase for solar PV or insulation.</p>



Hoogstraten (Fabrik Elentrik)




Fabrik Elentrik aims to inform different neighbourhoods about energy saving and retrofitting in an accessible way. In advance, Hoogstraten selected neighbourhoods to visit. The local residents were invited in advance by the municipality for a drink and advice if they wanted. The advice was about low-carbon technologies, e.g., solar panels, how to live in a gas-free neighbourhood, but they could also get advice about other low-carbon technologies. In 2018, citizens received a thermal photo of the front of their house.

3.2 Long-term fixed-location consultancy pop-ups

The long-term pop-up centres are located in fixed flexible locations, such as vacant shops. The pop-up is installed and furnished for a longer term, making use of or connecting to (extending) existing public services. The fixed, long-term pop-up centre examples in this project were installed for maximum 1 to 2 years in existing public service centres (libraries, cultural centres, schools, community buildings) or temporary vacant buildings. This model was developed and tested by Rotterdam, Breda and EOS Ostend. The related consultancy covered different stages of a homeowner's renovation journey, trying to establish a personal contact, coach homeowners and convince them to take action. Raising awareness and providing access to information was delivered by both dedicated staff and non-staffed installations (e.g. a brochure wall). The launched pop-up centres are listed in Table 2.

TABLE 2 LONG-TERM FIXED-LOCATION POP-UPS

Long-term fixed location pop-up example	Location (name)
	<p>Breda (Groenplein)_Pop</p> <p>The long term pop-up in the city of Breda was situated in the central library. It was most of the time not staffed and connected to the online platform Groenplein, which was initiated by the city of Breda and executed by local partners Pakhuis B and Bres. The pop-up displayed some general information about the opportunities for renovating homes and also about other sustainability issues such as the circular economy, food issues, etc. The pop-up was staffed for two hours per week by the energy coaches of BRES. The pop-up existed from October 2017 until March 2019 and was cancelled due to limited success.</p>
	<p>Rotterdam (Ommoord)</p> <p>This pop-up was located in a vacant commercial room in a local shopping centre in the target area Prins Alexander in the period March 1 – December 31 2017. Visitors' first questions were answered, and some (10-15) examples of sustainable solutions were on display. For more detailed advice, people were referred to the WoonWijzerWinkel (a regional energy counter) which was also commissioned to manage the pop-up shop, to take care of informing and advising visitors.</p>

	<p>Rotterdam (Duurzaamheidswinkel)</p> <p>The Duurzaamheidswinkel was developed as a follow-up of the Ommoord initiative. It was also situated in a shopping mall, in the IJsselmonde district on Rotterdam's south bank. The location ensured a constant stream of pedestrians passing by. The shop was more developed as an anchor point from where the surrounding homeowners were approached to get to know the city's sustainability initiatives, and to engage visitors to start thinking about renovating their home or applying low-carbon technologies. The shop does provide not only information on energy efficiency but also other sustainable topics. By serving different purposes and organising multiple events on the location, Rotterdam attracted people with a diversity of interests. Visitors who decide to implement measures in their home, can get further information and a coaching support.</p>
	<p>Ostend (Demoruimte EOS-Fluivus)</p> <p>The long-term pop-up in the waiting area of the EOS/Eandis (now Fluivus) office offers a number of interactive modules to raise awareness on energy consumption, as well as an interactive information desk to inform visitors on the services offered by EOS/Energiehuis Oostende. An additional module shows different types of insulation materials and graphics + tips & tricks on good insulation.</p>
	<p>Ostend (Loket EOS)</p> <p>In the 'Pop-up Loket', homeowners from the Ostend region could make an appointment to check how well their roof was insulated. During a one-on-one consultancy session, an experienced staff member showed the homeowners' roof on the thermographic map of the city of Ostend. In the case of poor roof insulation, people received advice on how to improve the insulation of their roof. They could as well subscribe to a group purchase for thermal insulation, organised by EOS Ostend, or request an energy loan to finance insulation works for their roof.</p>

4. Evaluation of pop-up consultancy centres

Chapter 4 aims to investigate the development of the above listed pop-up consultancy centres. Local target area analysis was done first to examine the potential of using pop-ups in certain districts. The pop-up centres were then developed by reflecting on their business model development. Triple-A partners applied the business development model during a workshop with stakeholders for discussing the pop-up consultancy centre development. The nine aspects of the business model canvas (see Figure 1) are analysed to evaluate the process of pop-up development and implementation. We also discuss available data about the perceived effectiveness of the pop-ups.

4.1 Target area

The main approach in Triple-A is to create awareness and easy access for different customer/homeowner segments, by using various activities and sources. LAs choose **target areas** where they intended to set up a local consultancy centre based on specific customer values, building, location and/or environmental or energy criteria. LAs thus included multiple criteria to analyse the target areas, also beyond the pure 'customer segment'. Table 3 illustrates that these criteria differed per pop-up and local authority. As commonalities we observe that, when deciding about a target area, LAs usually assess the following combined characteristics:

- Degree of individual homeownership in the area
- Commonalities in house characteristics: a certain standardisation of communication can be developed in such cases;
- Demographics in the area: to assess expected motivation of households;
- Building quality and previous renovation activity in the area: to assess the need or dynamics for additional measures;
- Energy use in the area: a relatively high energy use can lead to higher CO₂ savings after renovation or reduction of fuel poverty;
- Availability of demo exemplars, political support and/or civic support in the area.

TABLE 3 CRITERIA USED FOR TARGET AREA ANALYSIS

Local authorities	Local authorities	Criteria used for analysis
Mobile pop-ups	Antwerp	<p>The 7 selection criteria</p> <ul style="list-style-type: none"> • Only neighbourhoods situated in the 20th century belt • The moving intensity • A "bel-etage" neighbourhood • The number of unsuitable or uninhabitable living units • The number of citizens living in rental houses • The number of renovated houses after 2006 • Planned rebuilding of the public space in the near future <p>The 5 exclusion criteria</p> <ul style="list-style-type: none"> • Recent rebuilding of the public space • Ownership: the aim is to convince homeowners to participate in a collective renovation project • Houses younger than 30 years • The subsidy policy for certain neighbourhoods • On the heritage inventory: limited options for renovation
	Breda	<ul style="list-style-type: none"> • Period of building • Availability of repetitive terraced or (semi)detached housing suitable for repetitive renovation • Availability of privately owned houses • CO₂ emission / reduction • Use of electricity / natural gas • Possibility of individual approach of customer journey ("warm acquisition") • Possibility of enhancement of existing initiative
	Hauts-de-France	<ul style="list-style-type: none"> • Local representatives are sensitive to home renovation • Typical architectural typologies of Hauts-de-France • Competent thermal rehabilitation companies are present and can carry out the works • Situations of fuel poverty are strongly represented • Areas where taken some actions in favour of energy renovation or has already displayed its desire to undertake actions
	Kent	<ul style="list-style-type: none"> • Household energy use • Index of multiple deprivation data • Additional data on existing PV installations and primary energy use, and tenure type • Household characteristics • Evidence of political support • Statement of engagement • Commitment to provide resources to support this pilot
	Mechelen	<ul style="list-style-type: none"> • Owners • Type of construction • Presence or absence central heating system. • Year construction • Year last construction changes • Useful ground area • Built ground area • Quality of the construction • Listing of possible areas for collective renovation from earlier research in 2014
Fixed-location pop-ups	Ostend	<ul style="list-style-type: none"> • Integrated neighbourhood approach via an office • Neighbourhoods with a lower average income group
	Rotterdam	<ul style="list-style-type: none"> • >1 terraced house • >80% owner-occupied • building period before 1990+ • >50% of residents are between 15 and 65 years old • >50% of households are larger than 1 person

4.2 Business model development

For initiating new pop-up centres, seven LAs (Antwerp, Breda, Kent County Council, Mechelen, Ostend, Rotterdam, SPEE Haut-de-France) considered the development of business models that include public-private co-creation and cooperation. The business model development canvas developed by Osterwalder and Pigneur (2010) gave a practical instrument to reflect on the needed customer segments, their values, communication channels, the expected relations with customers and partners, the needed resources and revenues, and so on.

The business development model illustrated in Figure 1 shows how the model was applied to the development of pop-up consultancy centre using nine blocks (see also Meijer et al., 2018b). Value propositions are the key arguments that create value for a specific customer segment, in this case the homeowners in specific target areas. Channels are interpreted as the means of how a LA or other key stakeholder communicates with and reaches its customer segments (citizens in target areas) to deliver a value proposition. Customer relationships can be interpreted as the types of relationships the consultant or initiative can establish and maintain with specific customer segments. Key activities and key resources are the most important activities the LA or public-private collaboration has to perform and are the assets of the LA or other key stakeholder (physical, financial, knowledge, human). With key partners, a reference is made to the needed network of suppliers and partnerships, that are not part of the LA or consortium itself.

8. Key partners Defines who will contribute to the pop-up development and promotion without being directly involved in providing the daily services	6. Key activities Defines what services will be delivered in the pop-up	2. Customer Values Defines what added value you bring with the pop-up to the customer segment	4. Customer Relationships Defines how you will keep the relation with the customer ongoing after visit	1. Customer Segment Defines the expected customers for the pop-up
	7. Key resources Defines who should daily deliver the services and with what means		3. Customer Channels Defines how you will inform the customer about the pop-up	
9. Cost structure Estimates the expected yearly costs to run the pop-up and its service		5. Revenue Stream Defines how the pop-up will sustain its costs in the future, preferentially create its own revenues		

FIGURE 1 BUSINESS DEVELOPMENT MODEL (BASED ON OSTERWALDER & PIGNEUR, 2010; MEIJER ET AL., 2018A; MEIJER ET AL., 2018B)

In private initiatives – but also for LAs to assess their own policy instrument - the revenue streams and cost structure also have to be carefully examined. A revenue stream can for example be based upon fees for delivered products and all kinds of services. The cost structure can be based upon salaries, tools/equipment and material costs, marketing costs including exhibition, website, concept development, rent, financing and insurance costs, costs related to warranties and claims, and so on. Also, fees to partners and rewards for customers could be part of the cost structure.

4.2.1 Customer segments

The "Customer segments" business model building block focuses on questions like "What types of homeowners will be addressed in the pop-up centres?". For example, young families are potentially high energy users who may be receptive to piloting technologies that could save them energy and money. Fuel poor citizens struggle to pay their energy bills and may be vulnerable to the effects of living in a cold and possibly damp, unhealthy home as a result. Figure 2 shows the targeted customer segments by seven LAs. It illustrates how customer segments were reached in practice by mobile

and fixed-location pop-up centres. The thickness of the bar indicates the number of LAs who have included the customer groups.

The mobile pop-up could reach diverse homeowner groups also outside of the city centre. Fixed-location pop-ups planned to target all homeowners in a target area. However, LAs could not reach diverse groups instead limited segments were approached because of the physical condition of the centre (no mobility). This limited the way LAs could approach target groups: LAs often had to wait until homeowners visit the pop-up centre. LAs executed the fixed-location pop-up centre, assuming that the empty nester group (with children who have recently left home) want to renovate their existing home and have some savings to make the property more comfortable. However, it could not be confirmed if specific target groups were effectively reached, as the LAs did not collect data about the visitor profile.



FIGURE 2 TARGETED CUSTOMER SEGMENTS

- **Young families:** Potentially high energy users who may be receptive to piloting technologies that could save them energy and money
- **Empty nesters:** With children who have recently left home, these homeowners may want to renovate their existing home and may have some savings to make the property more comfortable. Alternatively, these homeowners may want to move to a new home and make energy upgrades during this process
- **Existing adopters:** These homeowners have already adopted one low-carbon technology and may be willing to try other technologies. These homeowners may be early adopters of technologies
- **Major life changes:** These homeowners are experiencing change, for example, moving home due to a new job or looking to sell their property due to a change in circumstance. These homeowners may be receptive to emotional messages
- **Highly educated, financially successful:** These homeowners may have some disposable income to invest in and may be more willing to take a risk. These homeowners may also be more environmentally conscious and willing to trial technologies for their environmental benefits
- **Fuel Poor:** These homeowners struggle to pay their energy bills and may be vulnerable to the effects of living in a cold home as a result

Antwerp did not focus on reaching different customer segments. They selected ten neighbourhoods to set up the pop-up and to inform citizens about low-carbon technologies. The criteria for selecting the neighbourhoods were focused on the typology of the houses and behaviour of the neighbours rather than the different segments of customers. Coming to a neighbourhood with a pop-up, you reach a big part of the citizens living in that neighbourhood. Whereas in the EcoHuis, which is a fixed pop-up, visitors were attracted who live close to the EcoHuis and not so many citizens from the other districts visited because of the distance.

Breda experienced that in the more traditional information sessions, mainly empty nesters and highly educated, financially successful groups were reached. We saw that these groups were still reached with the mobile pop-up, but there was also a shift to young people who have just bought their first home. Also, students were reached who were interested in the concept of a tiny sustainable house. People with young children visited the pop-up, curious to see such a small house. Although Breda did not register the quantities of other target groups, it was estimated that around 40% of visitors were from outside the regular segments. It is estimated that approximately 30% of the total visitors who requested a follow-up originated from outside the common segment groups.

Mechelen was able to target neighbourhoods and offered a more accessible way to reach them (not only via their online website or their counter in the city centre). No specific data were collected on customer segments.

Ostend targeted a low-income group that needs knowledge about energy saving. They advertised the pop-up centre through local newspapers and a leaflet published by the city of Ostend, posted flyers in the district, and promotion via neighbourhood meeting centres.

Rotterdam used different customer segments and approaches and did an extensive study on customer segments. More information is presented in Appendix 2 as best-practice example.

Hauts-de-France

PSEE Hauts-de-France targeted:

- Young families : These are the customer segments which were the easiest to reach. The goal was to communicate on the notion of a “New beginning”. They were perceived as a category in which there is the highest possibility of either starting a life together after marriage, or welcoming newborns and buying a house which they want to design according to their own tastes and needs.
- Empty Nesters : similar motivation as the “young families” category. Enhance the notion of New Beginning.
- People with a major life change : similar motivation.
- Households living in fuel poverty : the house is so poorly insulated and the equipment consumes so much energy (because of low efficiency) that the financial resources the households have are not enough to compensate for it. They need big changes.

The four categories above are the ones in which the families need a real, thorough (targeting a long term) advice on renovation that can be given through punctual communication action (for example using thermography pictures) about the benefit of energy renovation. These communications would preferably be held in short term pop-up centres.

- Existing adopters : Work and communicate on the new technologies in order to constantly improve the knowledge they already have.
- Highly educated, financially successful families: Those are the families who are most likely to already have an energy-efficient house. They would need advice about small actions that can improve a house that does not need a lot of improvement.
- Fuel poverty : sometimes a family, despite the available financial aid, is not able to finance big renovation measures.

Those three categories need day-to-day advice on what small improvements they can do, not specifically in a certain moment but when they feel the need to. These communication actions would preferably be held in long term pop-up centres.

The above descriptions per LA show there is no one-size-fits-all approach regarding customer segmentation. The choice of customer segments can be influenced, amongst other, by local vision and strategies, political focus and available resources.

4.2.2 Value propositions

Value propositions deal with what added value that the centre brings to the customer segment. LAs set objectives such as increasing awareness, providing information and easy access, and demonstrating low-carbon technologies up to accompanying the homeowner during their customer journey. Regardless of the pop-up types, every LA self-reported similar objectives:

- Provide easy access to homeowners in their own neighbourhood
- Raise awareness and provide information on recent low-carbon energy technologies and showcase them
- Raise awareness and provide information about a possible personal roadmap to renovate
- Provide information on financial schemes and subsidies
- Better LA connection with the neighbourhood
- Unburden home renovation processes

The value propositions were mainly reported from the viewpoint of key activities that LAs had in mind to achieve the goals.

Antwerp did not use separate or differentiate actions per customer segment or building typology. The consultants acted depending on the need and questions of the homeowner. Every homeowner could request coaching from a renovation coach. Antwerp informed homeowners about energy loans and other financing possibilities, subsidies, and different low-carbon technologies in this coaching trajectory.

Breda offered the information in the pop-up as the same for all customer segments. However, different segments were attracted by other triggers. For example, most empty nesters were mainly interested in measures that give them short term financial benefits, for example they were more interested in PV-panels. In contrast, younger people were more often interested in deep renovation (nearly CO₂-neutral). People with lower incomes were often looking for subsidies. So the conversation and use of materials in the pop-up were different for all these customer segments. Breda depended heavily on the staff to determine which message was given and which materials were used to inform the customer.

Kent's objectives were not targeted at any particular group as the information packs included all of the different information. This shows that non-staffed pop-ups rely on the visitor to take what is interesting for them. Kent confirmed the need to take into account specific values per customer segment for future activities during a workshop.

Mechelen did not really differentiate per customer segment or building typology, this was a point of attention in the future. Mechelen developed its website to try to connect better with the homeowner renovation journey.

Rotterdam analysed customer values per segment and trained consultants to use this information (see Appendix 2).

Hauts-de-France defined a communication strategy combining some customer segments (see 4.2.1).

Ostend experienced very diverse audiences besides their target groups, such as tenants, higher incomes, and homeowners who already planned home renovation. The LA reported tailored, and personalised advice and coaching, covering different home renovation journey stages would help to run the pop-up centre.

LAs thus did not consider a clear differentiation between value propositions for different customer segments at first, but they gradually became aware of the need to do so. Pop-up consultants became gradually aware of various values and information needs for various customer segments and tried to use this to steer conversations and advice.

4.2.3 Communication channels

Through which channels are pop-up centre(s) and their activities promoted, and which tool(s) are used to attract homeowners? (e.g., websites, social media, emails, letters, ambassadors, trusted persons etc.)

We interpreted the channels from two aspects. One is the selection of pop-up locations, and another is promotion tools that LAs used to attract people.

The **mobile pop-ups** were placed

- Near or on the parking space of shopping centres, supermarkets or DIY stores

- On public areas like a natural meeting place for residents of the district, a central square, sports accommodation etc. where many people were passing by with a high visibility and facilities nearby (water, electricity, toilets), possibly addressing a preferred customer segment with children, usually more concerned about sustainability and/or security. When the pop-up is closed, there are still passer-byes.
- Near a neighbourhood or community centre
- Within existing information centres or offices, for example within LA service buildings
- As a stand-alone exhibition element, for example as part of an exposition event or a fair about low-carbon technologies or the urban environment
- In front of a school or on a school playground
- Country-side in front of a place that people often see when they walk around the city or village

LAs usually selected the locations or neighbourhoods where citizens may need to get information about renovation measures in crowded places such as central squares or close to markets in every neighbourhood.

The idea of a mobile pop-up was to visit homeowners instead of waiting for homeowners to come. However, it required extra planning for selecting places and organising urban permissions. It also needed careful scheduling. During pop-up opening times, LAs mentioned many visitors compared to a relatively small number of consultants or advisors. Hence, visitors needed to wait for a while or left.

The **fixed-location pop-ups** were located within

- Strategic sites central to an expected area of influence, in less than 10 minutes walking time away from the residences
- A shopping centre within the target districts

LAs rented a vacant place in the city centre to improve easy accessibility. Some LAs promoted home renovation measures through events such as an information evening. Despite their effort, organising events in fixed pop-up locations was insufficient to reach various homeowners or citizens. For example, a fixed-location pop-up centre in the city centre of Rotterdam had the challenge to bring homeowners to the consultancy centre before the Triple-A project because of the low attractiveness of the pop-up centre and the choice of the location with not many passer-byes (see also Appendix 2). A pop-up in the city centre did not get enough attention from people because pedestrians in the city centre have different purposes. The long-term pop-ups in shopping malls near the target areas worked better. The LA explained that it is better to be closer to homes. The selection of place for long-term fixed-location pop-ups is more crucial than mobile pop-ups since changing location takes a longer time.

In terms of the **communication** of the project, LAs have developed different types of a promotion materials and channels such as post cards, digital newsletter and local newspaper, leaflets in the neighbourhood, other events, social network, and their own web portal. For the public, LAs focused on creating media attention through local press releases and local municipal newspapers. Printed publications (posters and leaflets) were brought on location in local service centres, neighbourhood houses, local shops, at residences of active inhabitants, in sports centres, etc.

Antwerp used different communication means in a specific neighbourhood; printed and digital. They used social media to announce the pop-up or information session, printed invitations, a brochure in public spaces like the library, Hoprl (a neighbourhood Facebook), and a collaboration with neighbourhood committee if this existed. In one neighbourhood, they also used an existing Whatsapp group. This worked well because the communication came from a neighbour itself. They did not focus on one communication channel; instead, they used several ones to reach as many citizens as they could.

Breda sent mails and posted letters to 1.000-1.500 households in the neighbourhood of the location to advertise the presence and availability of a mobile pop-up centre (Greenhopper). The letter

contained general information on home renovation and a leaflet with the location and opening hours of the Greenhopper. Locations and opening hours were also published on the LA web portal.

Hauts-de-France used mobile pop-up centres in places where they were most likely to meet people, but it turned out that they were not the places where they would be the most successful. For their pop-up centres, they mainly used printed supports rather than social media (local press or other leaflets). The areas were mostly rural areas where word of mouth and active communication was better than passive communication (internet).

Rotterdam: a variety of communication channels was used. See Appendix 2.

Kent reported that information packs were the most used form of communication in its (non-staffed) pop-up.

Mechelen mentioned that communication channels tended to vary per neighbourhood or event. Best practice was to plan communication activities well beforehand and use a mix of channels.

Ostend basically used a regional newspaper as a communication channel. For fixed-location pop-up, employees from the local energy distribution grid manager Fluvius performed referral. The LA also actively used a web-based registration tool so that homeowners can drop by the office for their reservation.

4.2.4 Customer relationships

How are the relations with customers kept during and after they have visited the centre? (e.g., follow-up calls, offering tailor-made or free solutions, invitations to attend demonstration projects or visit demo houses, etc.).

In case of staffed pop-ups, the staff was trained to assess the customer profile by asking a few introduction questions about their needs. The visitors was then gradually introduced to the topic and the staff put effort into building a trust relationship and/or expert advice.

After the visits, some LAs offered advice by an energy cooperation through a kitchen table visit (Breda with BRES), others introduced renovation guiding (Mechelen and Antwerp) for their citizens. Rotterdam worked together with the Woonwijzerwinkel for advice and price offer requests. Picardie did the follow-up by themselves. Ostend organised group purchases to unburden citizens to retrofit. Flemish LAs could rely on Bond Beter Leefmilieu Vlaanderen, an assembly of ngo's who organises a yearly big open home event (Ecobouwers) for the Flemish part of Belgium: LAs could ask their citizens to participate and open their house as a demo. In the longer term, some LAs also tried to bond homeowners as neighbourhood ambassadors for more effective peer-to-peer communication.

LAs highlighted the importance of providing personalised or tailor-made support/advice to visitors. When the information was highly related to their current condition, they tended to be more interested in the home renovation and low-carbon technology measures. The visitors could register for follow-up consultancy if they had further questions and needed advice in the pop-up centre. Whereas the LAs thus all confirmed the need to establish and maintain customer relationships and developed various strategies accordingly, they also experienced difficulties to do this in practice. This could for example be related to data restrictions (privacy issues) or a lack of suitable IT infrastructure, such as a specific customer relationship management (CRM) system.

4.2.5 Key activities

What concrete services (or products) are available or delivered in the pop-up centre? (e.g. informing, demonstrating, advising, selling specific measures aimed at, for instance, insulation of roofs or glazing, showing technologies and products, offering tailor-made financing schemes, etc.).

LAs conducted various activities such as "energy breakfasts", open house events, an energy saving market, workshops. Promotional activities were done through newsletters, website, social media, flyers, e-mails, and so on.

Promotional activities to all pop-ups

- Organising and participating in events, workshops, and local fairs, social media (all partners)
- Developing and/or disseminating brochures (all partners)
- Combining communication with an online platform (all partners)

Promotional activities related to the mobile pop-up centres

- Distributing leaflets in the neighbourhood, town halls, etc. (all partners)
- Providing on-site advice (all partners) particularly for households who need big changes and need time to know all the dimensions of energy renovation (energy coaches or energy experts)
- Serving coffee and tea (Breda, Antwerp)
- Visiting all targeted districts, sometimes twice
- Door-to door letters (Breda)
- Staffing with well-trained and knowledgeable energy coaches (Antwerp, Rotterdam, Hauts-de-France)
- Sending invitation, flyer with contact detail to homeowners (all partners)
- Developing communication skills (all partners)
- Establishing working methods with an adviser or energy coach (staffed pop-ups)
- Establishing collaboration with neighbourhood ambassador (Hauts-de-France)
- Distinguishing and managing temporary and permanent activities
- Providing personalised support (all partners)

Promotional activities related to the fixed-location pop-up centres

- Developing and hosting activities for visitors (all partners)
- Managing an internal team (Rotterdam)
- Developing communication skills (Rotterdam, Ostend)

Some LAs also reported thermographic mapping as a specific activity. For example, the use of thermographic photos of roofs showing how well the roof of the house was insulated was reported as one of the most attractive way to get the homeowners' attention. The following additional remarks can be made about the activities per LA.

Antwerp tried to use digital and printed communication ways to reach all type of homeowners. The LA never studied if a certain communication method works well for a certain customer segment. They used some communication activities only for vulnerable customers, but this was not reported as a part of this project.

Breda emphasized its use of SolarScan showing people on an aerial photograph how well their roof is situated for PV panelling, including an indication of investments costs and return on investment. As activities they also reported offering advice at home ("kitchen table talks") to guarantee a follow-up of the visit to the pop-up.

Rotterdam reported training its pop-up consultants as a specific activity.

Hauts-de-France supported neighbourhood ambassadors with leaflets, and other LAs with an online platform, brochures, sending invitation and flyers, and providing personalised support. Ref. the LA organised meetings with energy coaches or experts through on-site advice.

Kent focused on disseminating information packs at all locations. They provided the stands at those locations that had room for a pop-up and where they had decent food traffic during the day to maximise engagement.

Mechelen aimed for a collaboration with local stakeholders to align communication and planned activities supporting local events and communication channels. Furthermore, they also developed specific activities to progress collaboration with stakeholders to develop the pop-up, this was something they reported they want to exploit more in the future.

Ostend also tried to find a good coupling with other ongoing promotional activities such as the promotion of group purchases of solar panels or using the pop-up also for other communication purposes beyond the Triple-A project.

4.2.6 Key resources

Who is going to deliver the daily services, and with what means? (E.g. professional and independent advisors/coaches, with specific hardware and software tools like energy calculation tools, cost tools, financial tools/schemes, etc.).

Overall, daily services only occurred at staffed pop-ups; the means are directly related to the established activities (see previous section):

- Staffed pop-ups

In the preparation phase, LAs needed to organise an internal management team that could only focus on the pop-up centre. Breda and Hauts-de-France found that staffing well-trained and knowledgeable energy coaches could enhance homeowners' trust. Having good communication skills also helped to advertise the necessity of home renovation to increase homeowner's awareness.

In general, people from LAs noticed that they needed much knowledge to deliver relevant information to residents. Lack of expert knowledge also made people who worked in the pop-up centre feel insecure about offering information. Therefore, LAs organised training courses for energy coaching. These coaches do not necessarily have to answer everything by themselves, but need to be able to refer the residents to the right person or organisations.

- Non-staffed pop-ups

In these pop-ups there was no staff needed (only for setting up and breaking down the pop-up and for regularly supplying printed materials). The pop-up mainly relies on brochures and banners and in some cases the refurbishing of a (waiting or entrance) room with a touch screen or console (EOS Ostend).

All LAs needed similar information resources regardless of the types of pop-up centre.

- Information on low-carbon technologies (brochures)
- Information on financial schemes: Energy loan and subsidies (brochures and website)
- Information and possibility to subscribe to a group purchase
- Information on how to obtain in-home advice by energy specialist(s)/consultants or the possibility to book a kitchen table conversation at home
- Display materials or demo models on low-carbon technologies; e.g. to explain a heat-pump; solar panel, HEMS, digital meter, and so on.
- Information about neighbourhood events close to the pop-up
- Thermographic photos (Antwerp, Mechelen, Picardie, Hoogstraten, Ostend) on screens
- Workshops and information sessions
- Displays of, or referral to, successful examples, information about demonstration houses, open door days, and so on
- A registration system for managing visitors

Various LAs reported that homeowners also often asked for a list of 'trusted' local supply side actors, but the LAs cannot provide such a list as they need to avoid unfair competition. Instead for this issue the LAs relied on referral to demo houses, expert centres, non-profit organisations and cooperatives.

4.2.7 Key partners

What actors can contribute to the development, promotion and continuation of the pop-up centre(s)? (e.g., local authorities or municipal departments, banks, non-profit organisations, builders and installers, etc.).

In terms of **Partnerships**, LAs had partnerships listed in the stakeholder overview in Table 5. Most pop-up centres didn't strive for explicit partnerships with supply-side actors, as this was difficult to do within the rules of public procurement. If specific companies were involved, it was for example for providing demonstration equipment (without showing the company name) for consultation in the development and/or sustaining phase. However, LAs tried to establish partnerships with other actors, such as intermediaries, NGO's, cooperatives, federations, public bodies, and so on. For example, SPEE had a collaboration with the Regional confederation of craftsmen and small enterprises of the building sector instead of individual companies, thereby avoiding a legislation issue. SMEs or supply-side were involved later in the implementation and installation stages.

TABLE 4 TYPES OF STAKEHOLDERS INVOLVED IN POP-UP DEVELOPMENT

Public actors	Civic actors	Private actors
National authorities	Local ambassadors	SMEs/Suppliers
Local authorities	Neighbourhood committees	Local contractors
Public welfare	Schools	Energy advisors
Energy agencies	Students of a technical school	Installers
Social affairs		Non-private actors
Grid operator		Energy-net manager
Other city departments		Communication experts

LAs used e-tendering to search partners within different actor groups. Below is explained how LAs experienced the collaboration with different actors.

Antwerp did not work with other partners to create the pop-up but had a partnership to provide communication and informative material and supply-side to deliver the smart meters and activate local climate ambassadors.

- **Local ambassador:** for example, in one Antwerp neighbourhood, there was one homeowner who was very active. She informed her neighbours by using Whatsapp or ringing at their door and opened her house to receive the other neighbours during meetings. The collective renovation in this neighbourhood was successful because of the effort of this neighbour. So collaboration with a local ambassador was experienced positive, and also with a neighbourhood committee.
- **National authorities, grid operator and regional energy agency:** mixed experiences. Negative experiences, because most legislation was decided over the heads of Antwerp without the involvement of local authorities. The local authority mainly got the task to inform citizens, which is perceived as a more passive collaboration with higher authorities. Positive was perceived that these actors developed different tools like the thermographic scan, an online subsidy module, a "test your EPC"-tool, the "building passport" (in Dutch "woingpas"), solar maps, and so on. The LA could use these tools for free.
- **Other city departments:** the collaboration was not always considered effective. The LA worked together with the city departments who deliver the building permits and with the city departments responsible for heritage for the coaching. These departments' goals are different and sometimes counteract climate goals (CO₂-reduction and energy saving). Nevertheless, the LA also depended on these city departments for advice and permission to execute certain low-carbon technologies.
- **Energy advisors:** positive experience. They were the missing link to convince homeowners to install low-carbon technologies. While the LA gave advice, some homeowners needed coaching. By unburdening the homeowners, coaches could accelerate the retrofits and made sure that the retrofit was future-proof.

- SME's, suppliers, installers: positive experience. If they did a good job, stakeholders could direct them a lot of new clients. But this could also be counterproductive. Too many new clients also led to longer waiting lists. Negative: in cases where the recommended party did not execute the installation or work correctly, the homeowner was not satisfied.
- Public welfare: collaboration was positive in case of reaching out to vulnerable citizens. Customers trusted this type of actor.
- Communication expert: positive collaboration because they had the knowledge and skills to create different communication tools or use different communication channels. For their last communication (a poster and post card), Antwerp also worked with a copywriter, and this was a positive collaboration.

Breda worked together with the energy cooperative BRES for developing the pop-up. The LA took the lead in creating the pop-up centre by finding a supplier and contracting BRES. BRES organised a meeting with several trusted local and regional suppliers to interest them in the concept and ask them to sponsor the project with their products. The city of Breda thus indirectly collaborated with ten of these suppliers, who sponsored them with products (i.e. solar panels, infra-red heat panels, heat pump, low-temperature radiator, etc.) and delivered leaflets and other information. These were all displayed in the pop-up centre.

Kent County Council opened non-staffed short-term pop-up consultancy centres in the local libraries. They collaborated with local authorities, energy companies, contractors and water companies to get input into what should be included, especially relating to local information. Kent found that working with the libraries was very useful as they provided insight into where to place the stand and leaflets for maximal engagement and advise which locations would be good to man. In addition, the water companies were helpful to speak to and to share resources, and the only cons were that the LA had to work with different water companies for the same district, so it could be difficult to ensure residents would get the right information.

Mechelen worked together with the following partners for the following activities.

- Staffing of the Renovatiemobiel was ensured by Kamp C, a regional support centre for sustainable construction, and NZEB-coaches during the trade fair Wonen.
- Providing information material in the Renovatiemobiel was ensured by Logo Mechelen, Flemish Energy Agency (VEA), Fluvius, Kamp C.
- For planning and communication Mechelen worked together with neighbourhood workers, neighbourhood initiatives and local partners (neighbourhood committees, schools, motivated citizens, etc.)

As the regional reference hub, **SPEE Hauts-de-France** technically accompanied the promotion and the organisation for all LAs and a fortiori for the pop-up centre. They worked together with various actors:

- National authorities: brought in more resources than any other groups. However, they had no direct contact with homeowners.
- Local authorities: they were the closest institution to homeowners.
- Energy agencies: they brought in good information about the energy consumption that could help for energy policy development. However, the information might be coloured by their financial ambition and the LA perceived a possible lack of objectivity.
- Grid operator: could help for energy policy, but they also had a financial ambition and they were not entirely objective.
- Other city departments: LA aimed to combine energy efficiency with other political issues such as health. However, the various departments never shared the same objectives.
- Civic actors: Homeowners trusted local ambassadors. On the other hand, homeowners did not trust young ambassadors.
- Private actors: they were valued for their knowledge about the reality in practice, but the collaboration might be at risk due to their financial ambition leading to not entirely being objective. Energy advisors were also unconsciously biased because of their preferences. Non-private actors knew multiple solutions in different fields. Communication experts were limited in a discussion or in giving advice.

Rotterdam opened a fixed-location pop-up centre called Duurzaamheidswinkel. It was locally embedded in multiple networks through co-creation. Buurkracht helped set up community networks with residents who want to create a more sustainable environment in their neighbourhood. Klimaatroute provided energy advice, thus contributing to the orientation phase. WoonWijzerWinkel helped in getting quotes and in selecting suppliers and contractors.

The local authorities who planned to run the mobile pop-up collaborated with EOS Ostend and third parties. **Ostend** did co-creation with a technical school in Ostend for the fittings (flooring, lighting, desk, painting, information module insulation) and with a high school for the development of the interactive PV module, as well as cooperation with the Graphical/Communication Department of the city for stickering and information panels. The LAs cooperated with suppliers of demonstration materials as well (HEMS, smart meter, insulation). This co-creation reduced the costs and was an excellent opportunity for the schools to train students "on the job" with a real-life and publicly visible project. During the co-creation, extra control was needed by the LA to adjust and redo to get some issues right.

Hoogstraten collaborated with its public welfare department.

For all LAs, workshops regarding the business model development were useful to clarify the need for customer-oriented approaches and partnerships. Overall, most LAs collaborated with the supply-side and contractors to develop practical information and independent advice for larger homeowners groups. In the pop-up centre, LAs placed brochures of products such as infra-red panels, heat pump, green roof, water-saving toilet and showerheads, thermostatic radiator cranes, low-temperature radiator, smart meters, insulation materials, insulating paint, electric car share. LAs mentioned collaborating with SMEs was a challenge because LAs as a neutral actor, could not recommend specific supply-sides. For this reason, LAs sometimes collaborated with other parties.

The co-creation processes helped local authorities with accelerating home energy renovation and spurring participation of SME's and other parties. LAs perceived that there is still potential for more robust collaborations with other city departments on the one hand, and well-organized supply-side actor collaborations on the other hand. This will undoubtedly have priority in the near future.

4.2.8 Cost structure

What is the yearly cost to run the pop-up and its services? (e.g., with attention to cost items like personnel, promotion and communication, technologies, products, ICT, maintenance etc.).

The cost structure includes investment and operation costs. LAs aimed to keep the cost as low as possible and to provide information in a variety of ways, for example face-to-face using their own staff, videos, and leaflets. Visitors could get information in the pop-up centre free of charge. Table 4 shows how pop-up centre costs varied per initiative.

TABLE 5 POP-UP CENTRE COSTS (€)

Types	Mobile pop-ups						Fixed-location pop-ups		
	Antwerp, Little green-house	Breda, Green-hopper	Kent, Green action at home	Mechelen, Renovatie-mobiel	Picardie, Laure	Ostend, Energiehuis	Rotterdam Ommoord	Rotterdam, Duurzaamheidswinkel	Ostend, Office EOS
LAs									
Investment	15.000	62.500	4.065	57.000	101.790	40.000	1.000	60.000	30.000
Operating cost	54.980	85.650	17.912	49.260	11.250	23.429	33.000	246.310	6.435
Total cost	69.980	148.150	21.977	106.260	113.040	63.429	34.000	306.310	36.435

Financial effectiveness is analysed based on the total opening hours, investment, operating, and total costs. Other accounting items which do not correspond to actual investment and operating costs are disregarded. Figure 3 shows the total cost for the pop-up consultancy centre. The range of investment and exploitation costs varies since pop-up running hours, staffing cost, size of pop-up centres are different for each centre. Therefore, the cost-effectiveness analysis is carried out considering hourly-based cost. The minimum investment cost was about € 4.000 for a non-staffed, short-term mobile pop-up centre in local libraries. The maximum investment cost was around € 101.000 for a staffed, short-term automobile type, pop-up centre. On average, € 40.000 were invested in starting up the pop-up centre. Regarding exploitation cost, the range of the price was wide from € 1.500 to € 300.000, on average € 69,000.

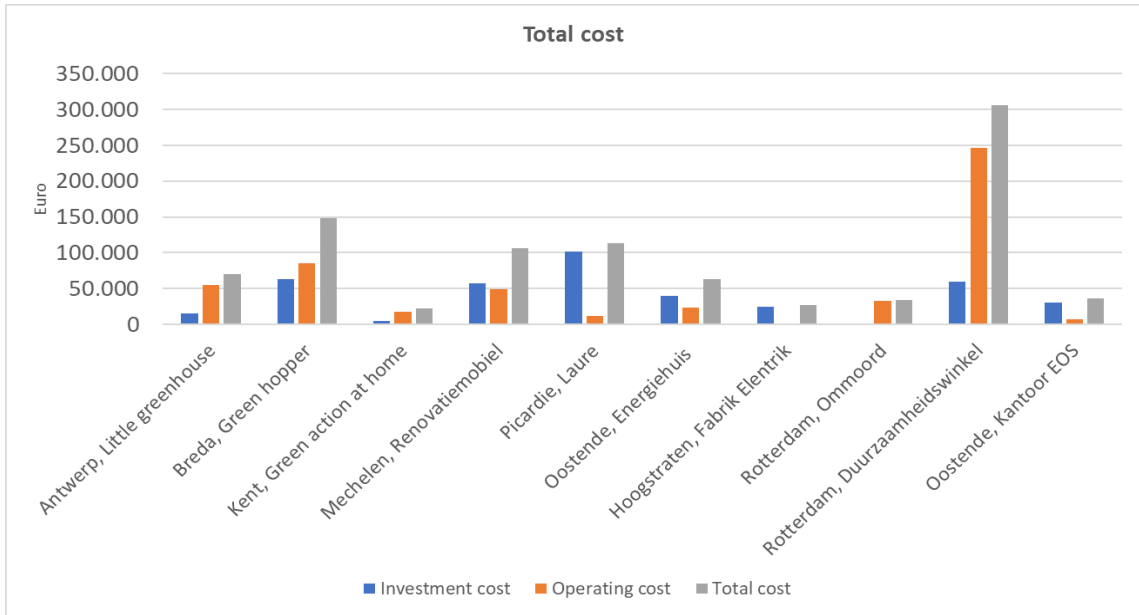


FIGURE 3 TOTAL COST FOR POP-UP CONSULTANCY CENTRE

Same as functional effectiveness, the total cost is significantly different according to the pop-up opening hours. Overall, the long-term fixed location pop-up centres costed relatively less initially per hour but had a higher operational cost. The mobile pop-ups showed a higher initial cost but lower operating costs. Opening mobile pop-up consultancy in an existing office (Ostend) and a public library (Kent) were shown the most cost-effective approaches to run pop-up consultancy centre. However, these pop-ups had no staff so their functional effectiveness could not be controlled. Of the staffed initiatives, the Hoogstraten pop-up showed the best operating cost-effectiveness, and the Ostend Energiehuis had the lowest total cost per hour.

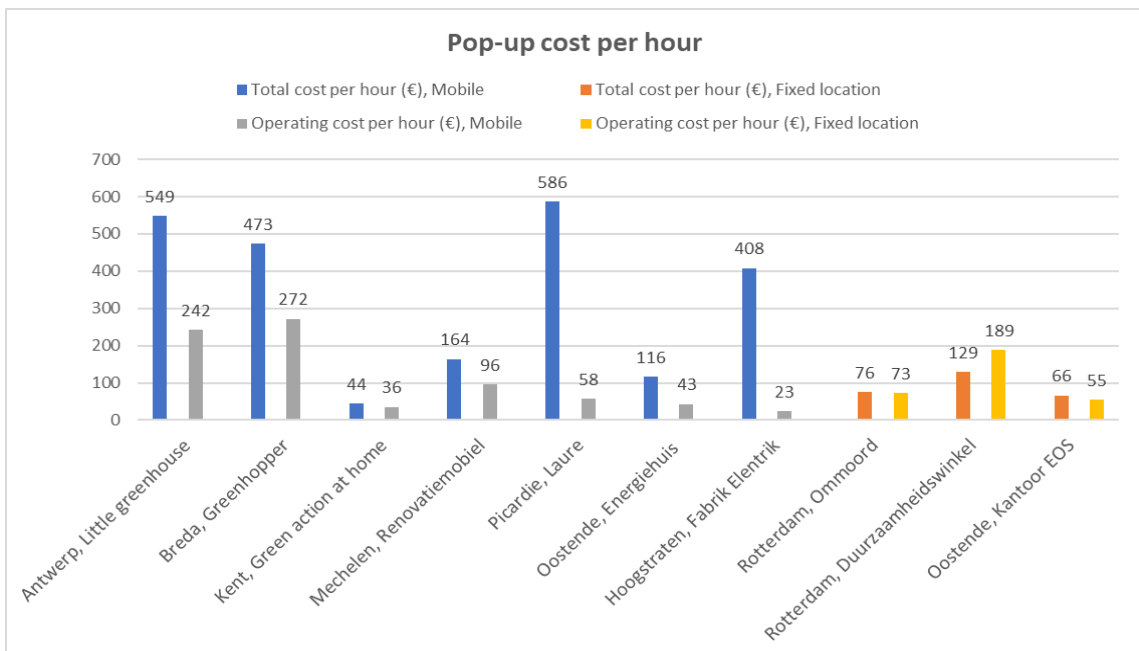


FIGURE 4 POP-UP COST PER HOUR

Despite the relatively high cost of developing and sustaining the pop-up centres, Triple-A partners were subsidised 60% of the total cost by the Triple A project's funds. LAs sometimes reported that the staffing and operating cost of the pop-up centre was higher than what they planned. For financial

management, keeping investment cost and operating cost low was essential. To keep the costs low, LAs planned long-term use of pop-up consultancy centre rather than mono-functional use. LAs reported that it is possible to reduce exploitation cost by integrating other events and using a stand provided by other event organisers.

4.2.9 Revenue streams

How will the pop-up sustain its costs and create its revenues? (e.g., paid advice and consultancy activities for homeowners, a fee for suppliers of low-carbon technologies or services, lease or rental of the pop-up, government contributions, etc.).

Most of the displayed information (like flyers and brochures, online tools like the thermographic map etc) in the pop-up is made available for free for LAs to use. Some LAs also got free demo materials (insulation samples, demo HEMS etc) from SME's.

Antwerp and Mechelen experienced that local energy or citizens cooperations like Klimaan and Zuidtrant are collaborating with LAs to inform and coach citizens with advice and group purchases of led lighting or solar panels, creating energy communities combined with electric shared mobility. Flemish LAs like Mechelen and Antwerp, offer the possibility to get coaching from an energy consultant, free of charge. They bear the full cost together with Fluvius, the grid operator who pays a subsidy to the energy consultant (www.fluvius.be/nl/thema/benoveren/gratisadvies).

(more information www.antwerpen.be/renovatiebegeleiding and <https://klimaatneutraal.mechelen.be/benovatiecoach>)

Breda collaborates with BRES, an energy cooperative. Citizens can request an energy coach at home. BRES asks a small fee of 25 euros for the house visit from the homeowner.

Rotterdam collaborates with the WoonWijzerWinkel (WWW) for advice and requests of price offers for homeowners. Rotterdam has a contract with the WWW for their services. Rotterdam sees that Groene Groei, a Dutch NGO created their own pop-up. In Rotterdam, local citizens' initiatives are popping-up in several neighbourhoods to inform neighbours.

After free first-line consultancy, Hauts-de-France asks for a contribution of 1.200 euro for technical advice and coaching or 1.860 euro for technical and financial advice. They also do a follow-up of the homeowners' energy consumption for 3 years.

Some LAs offer their services for free for their citizens and pay the total cost with an extra subsidy from the grid operator, and other LAs reclaim a part of the cost from citizens.

Overall, the pop-ups seem only to be able to continue with funding by the LA or another organisation or higher government. If the city council does not foresee an own budget combined with external funding, then most of the pop-ups will cease to exist. Alternatively, a citizens community, NGO, citizen cooperative, public body or public-private partnership could continue the pop-up or pick-up its method and create their own pop-up.

4.3 Matching the needed input with the expected output

In this chapter, qualitative data are analysed to discuss the effectiveness of the pop-up centre. All LAs used a similar business model development approach including target area analysis and identification of customer segments. The number of pop-up visitors highly depended on the location of the pop-up centre, marketing, the number of promotional campaigns and opening hours. Table 6 shows the type of pop-up consultancy centres based on the opening period, form, and staffing, and the number of pop-up visitors for seven LAs. The number of visitors depends on the size of the city, the number of centre opening times and hours. Therefore, it is incomparable to check the effectiveness of this data.

TABLE 6 NUMBER OF POP-UP VISITORS

LA	Name pop-up	Pop-up type	Form	Pop-up staffing	No. visitors
Antwerp	Little greenhouse	Short-term mobile	Movable object	Staffed	1113
Breda	Greenhopper	Short-term mobile	Movable object	Staffed	1962
Breda	Groenplein	Long-term fixed	Placed in an existing building	Non-staffed/staffed	310
Kent	Green action at home	Short-term mobile	Placed in an existing building	Non-staffed	201
Mechelen	Renovatiemobiel	Short-term mobile	Movable object	Staffed	1727
PSEE	Laure	Short-term mobile	Automobile	Staffed	423
Hoogstraten	Fabrik Elenrik	Short-term mobile	Automobile	Staffed	349
Ostend	Demoruimte EOS-Fluvius	Long-term fixed	placed in an existing building	Non-staffed	not traced
Ostend	Semi-permanent (office EOS)	Long-term fixed	placed in an existing building	Staffed	101
Ostend	Energiehuis	Short-term mobile	Movable container	Staffed	312
Rotterdam	Ommoord	Long-term fixed	Placed in an existing building	Staffed	2695
Rotterdam	Duurzaamheidswinkel	Long-term fixed	placed in an existing building	Staffed	5001

Two indicators were applied to evaluate functional effectiveness. One is the percentage of the registered people for follow-up consultancy compared to the total number of visitors (see Figure 5). The other is defined as a comparison of the number of registered person for follow-up consultancy per opening hour (see Figure 6). It is therefore important to collect the number of registered persons in the evaluation of functional effectiveness.

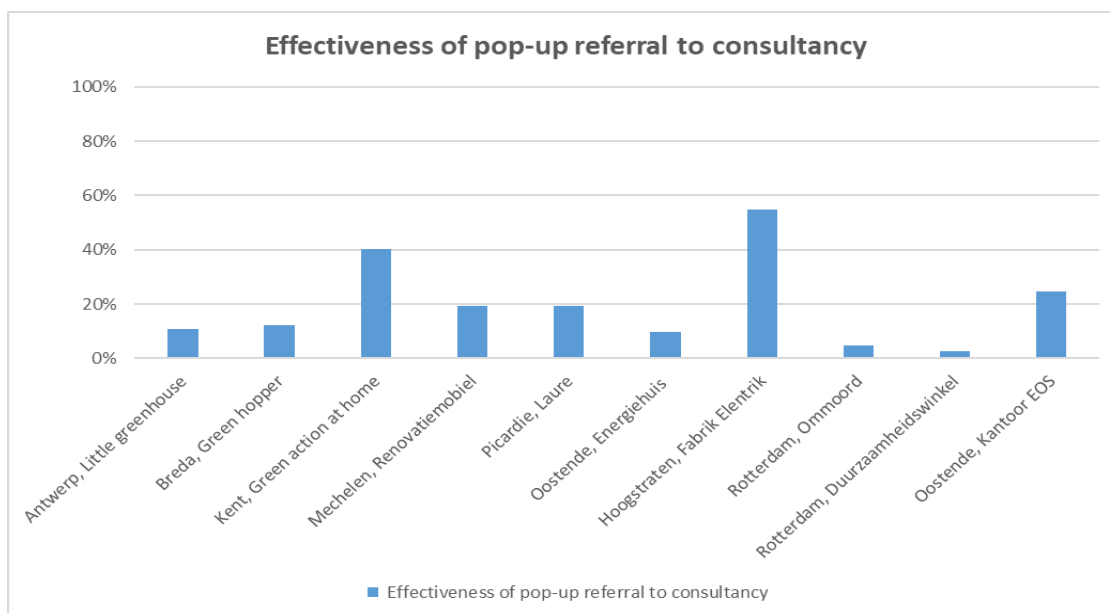


FIGURE 5 EFFECTIVENESS OF POP-UP REFERRAL TO CONSULTANCY

In Figure 5, There were no significant differences regarding the functional effectiveness of mobile and fixed pop-up location centres.

$$Effectiveness\ of\ pop - up\ referral = \frac{No.\ Amount\ of\ visitors\ who\ indicated\ to\ have\ plans\ for\ investments}{Total\ No.\ visitors}$$

Hoogstraten, Fabrik Elentrik had more than 50% visitors registered to follow up with a consultancy. This is followed by Kent, Green action at home and Ostend, Kantoor EOS. For non-staffed pop-up centre, the number of booklets were counted and Kent could figure out the number of registered people for follow-up consultation. In Kent, relatively less number of people visited portable pop-up centre (the Library), but 81 people planned for investment or adopting low-carbon technologies. Therefore, the effectiveness was relatively high. We see the limitation in the comparison between the total number of visitors and No. Amount of inhabitants who have plans for investments. However, the figure does not consider the opening hours of the pop-up consultancy centre. Thus, an hourly-based comparison should be conducted as in Figure 6.

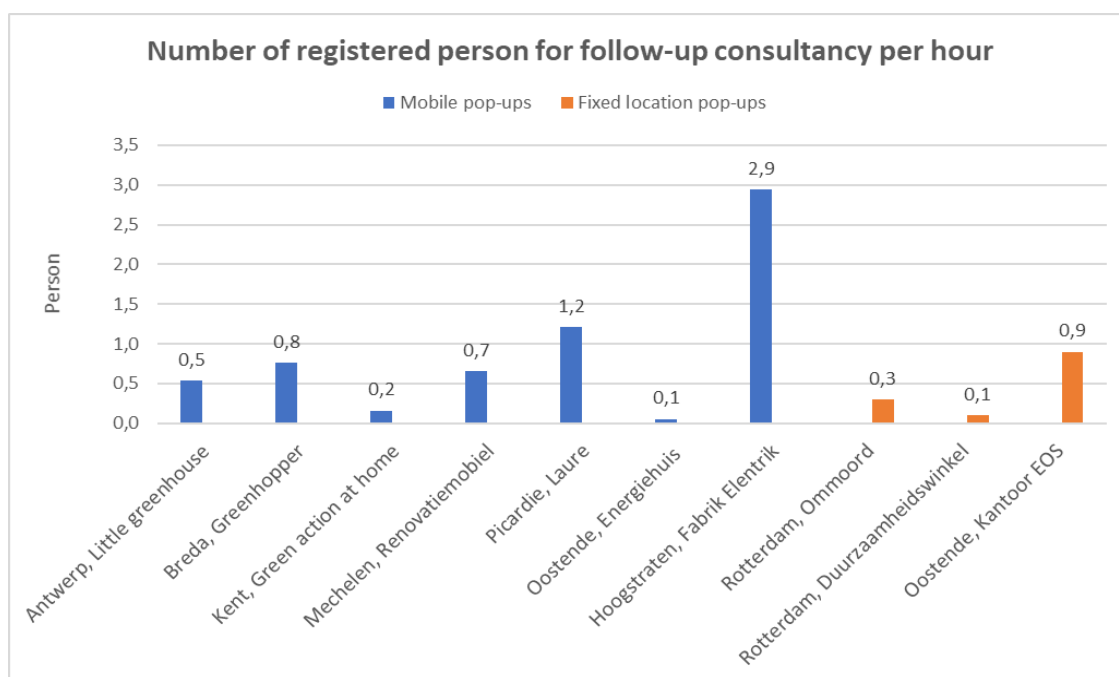


FIGURE 6 NUMBER OF REGISTERED PERSON FOR FOLLOW-UP CONSULTANCY PER HOUR

From Figure 6, it can be observed that mobile and short-term pop-up centres tend to be relatively more useful; they tend to have about 50% more registered homeowners per hour than fixed-location pop-up centres.

$$\text{No. pop-up referral per hour} = \frac{\text{No. Amount of visitors who indicated to have plans for investments}}{\text{Opening hours}}$$

In case of Kantoor EOS, the consultancy desk aimed to help people to register for the group purchase of roof insulation or solar panels. Visitors had a clear aim to come to the office (for group purchases). Similarly, Hoogstraten also offered a clear aim to come to the pop-up, e.g. direct personal explanations based on a heat scan of the façade of their own home. It is thus expected that the movable pop-up centre can be more effective if it brings specific information to the neighbourhood directly and personally, thus getting more attention from people. In case of Kent, it would take 5 hours to have on registered person, but we can assume that this is because the pop-up is non-staffed one.

Overall, Fabrik Elentrik was the most effective pop-up consultancy centre in this condition. Around three people were registered for follow-up consultancy per hour. Although there were many pop-up visitors, on average it took about 1.5 hours to register one person for follow-up consultancy on average.

The investment, operational (and transaction) costs should match the expected revenues and CO₂ saving objectives. Overall the figures above lead to a discussion whether a top-down pop-up development specifically for local target areas makes sense, and whether developed pop-up initiatives can be sustained in future. The mobile pop-ups appear to be more flexible to suit temporary information and consultancy needs, while the fixed ones appear to have the potential to develop more as an LA hub outside of a central location engaging in multiple sustainability objectives at the same time.

LAs will need to find creative ways to reuse or change existing pop-ups to reduce costs, and to assure continuation of consultancy. This will need deeper engagement of other public bodies, public-private partnerships, cooperatives, and possibly actors that can assure action after follow-up consultancy. A future strategy might therefore be to develop local renovation hubs, and to assess what bottom-up initiatives in target areas can be supported using the already developed pop-up using local participation and/or home renovation deployment.

5. Barriers and opportunities in pop-up operation

Practical recommendations indicate the physical preparation to develop the pop-up and implementation activities for pop-up centres, such as designing and constructing a pop-up centre, storing and organising the pop-up before and after use. In this section, we listed specific issues LAs have encountered to launch mobile and fixed-location pop-ups.

5.1 Mobile pop-up centre

The shape of the short-term mobile pop-ups was a free-standing object and transformed into a caravan. LAs Antwerp, Breda, Kent, Picardie, and Hoogstraten mentioned that it was relatively easy to choose good locations and they easily experimented with various types of locations such as remoted neighbourhoods. A mobile pop-up centre can attract many visitors and get attention from citizens in the visited neighbourhood. The LAs who had larger mobile pop-ups struggled with the big size and the massive weight of the pop-up centre as it had to be transported and stored when not in use. LAs recommended that the size and weight of the pop-up should not be too big for easy mobility.

BARRIERS

- Large size and weight of pop-up centre
- LAs need to define the different objectives of involved actors well to reach the collective goals
- Connecting with other municipal activities can be difficult due to the different plans and activities within the same organisation
- Co-creation with third parties (for organising SMEs and contractors) is sometimes a challenge; LAs have to take up a role for leading a co-creation of the pop-up consultancy centre
- Short opening periods
- Permissions needed for placing a mobile pop-up
- Schedule management (e.g., reservation system needed)

Need for (vehicle) insurance and taxation

OPPORTUNITIES

- Easy to experiment with various types of locations
- Attractive form of pop-ups (Antwerp, Breda, Mechelen)
- Easy accessibility (Picardie, Hoogstraten)
- Easy mobility (Antwerp, Breda, Mechelen, Hoogstraten)
- Re-using the pop-up for other purposes (Antwerp)
- Easy to store mobile pop-ups (Antwerp)
- High-impact locations can be chosen (Antwerp, Breda, Kent, Picardie, Hoogstraten)

5.2 Fixed-location pop-up centre

Advantages of fixed-location pop-up centre are that people can visit the pop-up whenever they have time to visit. Visitors can stay longer and get consultants and individual advice in a quiet atmosphere. This type of pop-up can also be used as an office for registered visitors for follow-up consultancy or personalised building diagnosis instead of solely the purpose of the promotion and referral to consultancy.

BARRIERS

- A possibly unbalanced number between visitors and consultants
- Non-target groups of visitors might be attracted, visitors might expect other purposes (for example other council services, civic consultation)
- LAs can carefully select locations that are the best place for a pop-up
- Need for insurance (fire safety,..) and possibly space rental agreements

Long-term agreements: a poor location choice sometimes has to be sustained

OPPORTUNITIES

- Easy accessibility for homeowners from the district (Rotterdam, Ostend)
- Sharing space with other shops (Rotterdam: shop-in-shop concept, see Appendix)
- A good location choice will increase results (Rotterdam)
- Long-term presence leads to trusted relations (Rotterdam)

Re-using the pop-up for other purposes (Ostend)

There are also very practical issues that LAs should consider when developing and sustaining a pop-up consultancy centre.

short-term mobile pop-up centres.

- Is it reasonable size and weight to transport and store after use?
- Does the shape of pop-up attract enough to visitors?
- Is there a place to store the pop-up after use?
- Is the pop-up insured?
- Does the mobile pop-up need permission to be placed in a target area?
- Is there a possibility to hook up on the electricity and access to water?
- Is there a possibility for re-using the pop-up for other purposes?
- How does the pop-up manage the scheduling for visiting target areas and multi-purpose uses?

long-term fixed-location pop-up centres

- Is the pop-up located in the place where people can easily find it?
- Which marketing strategies can be used and combined to be more successful?
- How can the pop-up approach various group of people?
- Does the pop-up have knowledgeable advisors or experts for personalised follow-up consultancy?

6. Conclusion

We evaluated the process of local authorities (LAs) developing pop-up consultancy centres using a business model development perspective. The main research question was 'What are the key factors for local authorities to develop pop-up consultancy centres?' Nine factors from the business model canvas were used for analysing the development and performance of the LAs' pop-up centre. The key factors for LAs are:

- selecting the target area for the pop-up location based on detailed analysis;
- identifying appropriate customer segments in this area and values per customer segment;
- using the right communication channels and building typology related information to reach out to homeowners in the district;
- using pop-up staff to build up relations with citizens in the district and visitors;
- determining appropriate activities and resources;
- developing partnerships; and
- balancing costs and revenues.

First, LAs used the business model development canvas as a practical instrument to assess their own ideas. The business model canvas helped LAs to discuss an integrated proposal with partners, including setting target groups, key activities, collaboration, and cost structure. The customer segments were decided by analysing the target areas. The following target customers were considered – although not by all LAs in such detail -: **young families, young couples, fuel poor households, families, existing adopters, highly educated and financially successful groups, empty nesters, and all homeowners** in general. For mobile pop-ups, the LAs particularly, targeted homeowners outside of the city centre thanks to the mobility of the short-term mobile pop-up. **Mobile pop-ups could reach diverse customer segments, while fixed-location pop-ups were limited to reach different customer segments.**

We found that **LAs need to collaborate with different parties in different stages of pop-up development.** During the preparation stage, LAs can collaborate with SMEs, contractors, schools, and energy cooperatives. For pop-up consultation, local-based organisations, preceding pop-up centres, public welfare, and consulting companies and energy coaches are key partners. **Inviting local ambassadors encouraged the engagement of local parties. Training staff to deliver correct energy advice was essential for them to become trusted.**

Second, we can consider tactics. We noticed that diverse promotion activities helped to get attention from homeowners, and visitors would register when they trusted actors who gave personalised support and advice. Regarding this, local authorities have to make sure their communication is **tailored to the specific characteristics of the area** (see chapter 4.2) and address residents' expectations. Thus, a pop-up centre aimed at convincing homeowners through **personal advice will require experienced staff and be much more resource-intensive.** We also observed the **importance of monitoring visitors after the pop-up visits.** LAs often could not keep the customer relationship after the homeowners' visit. It was a challenge to figure out whether the pop-up consultancy centre affects homeowners' awareness and whether they are willing to adopt home renovation measures. Therefore, **LAs need to think about how they can maintain the homeowner-LA relationship to increase home renovations.**

Furthermore, **Selecting good locations has a significant impact on the success of the pop-up centre.** Central areas very close to a shopping centre, supermarket or other frequently visited places such as a vicinity centre work best due to the easy accessibility. Linking with neighbourhood events is a good way to increase the number of possible visitors and attract different profiles. A pop-up centre located in the city centre does not guarantee success.

Last, LAs need to plan a budget and/or search subsidy or funding. The LAs highlighted **the need for an internal organisation team for scheduling pop-up activities, including management of events and administration**. From effectiveness analysis, we found that the investment and exploitation costs' **effectiveness depends on the frequency of pop-up centre use and opening hours**. For example, using a stand or location provided by others can reduce exploitation cost of a mobile pop-up. Although we could not track how thriving a non-staffed pop-up centre was, **a non-staffed pop-up centre with a brochure stand and banner in a public space can be easily developed at a relatively low cost**.

There were some limitations in this research. **Local authorities could not track or keep advising registered visitors due to GDPR restrictions**. Local authorities needed to wait until homeowners contacted them. **The biggest obstacle of the pop-ups was their ability to follow the homeowners' renovation journey**. Particularly, **non-staffed pop-ups cannot be assessed** as contacts are not registered for follow-up. Nevertheless, we hope that our results will inspire and support other local authorities in developing a pop-up consultancy centre for creating Awareness and easy Access for homeowners to adopt low-carbon technologies in home renovation.

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Appendix 1. Analysed documents

Document nr.	Title
D.3.3.1	Description pop-up centre_Antwerp
D.3.3.2	Description pop-up centre_Breda
D.3.3.3	Description pop-up centre_Kent
D.3.3.4	Description pop-up centre_Mechelen
D.3.3.5	Description pop-up centre_PSEE Hauts-de-France
D.3.3.6	Description pop-up centre_Rotterdam
D.3.3.7	Description pop-up centre_Ostend
D.3.2.2	Marketing plan for pop-up centre models
D.3.2.3	Implementation plan for pop-ups
	7 reports about feedback workshops from 7 LAs
	Workshop presentations

Appendix 2. Case study for customer segments (Rotterdam)

As a best-practice example for the development of a pop-up we illustrate in detail the customer perspective part of the business model for the pop-up development in Rotterdam.

Rotterdam used its own approach and customer segments groups. The information below was referenced from a report entitled "Engagement strategies City of Rotterdam" written by Rotterdam. Rotterdam set up five customer groups based on (Wijburg, Houtkamp & De Groot, 2017). There are four distinctive moments in residents' lives during which they are more receptive to an energy-saving message, and they are more inclined to carry out measures: buying another house, renovating their house, deciding to rent out part of the house, and selling the house. The report also identifies motives to take or not take measures and needs for information, but it lacks linking those to different kinds of residents with different values and lifestyles.

Information in the mentioned reports (and other reports) was considered in setting up a strategy, but the 'five shades of green' segments, derived from the original Mentality Model, are leading. The five value are responsible ones, dutiful ones, structure seekers, status conscious ones, self-developer.

RESPONSIBLE ONES: socially engaged, politically interested people; critical but cooperative towards authorities; well informed; tolerant; international orientation; more often higher education, income above average; environmentally responsible, are willing to pay more for more sustainable products. Communication should focus on providing substantial and transparent information; offering different options.

Value proposition

The responsible ones need to be offered an all-encompassing story, the larger goals that even small measures contribute to. Information and advice offered need to be impartial and in-depth. It should be clear what the effects of various measures are, in terms of both environmental impact and personal comfort improvement. Residents want to take part in deciding what set of solutions is best for their situation, and they can be interested in a step-by-step plan (including financial planning with a calculation tool) for long term home improvement. Taking energy saving measures makes them feel good. Moreover, they consider energy saving measures as beneficial to the future value of their home. They are interested in collective purchase of materials and services with their neighbors, as their individual motivations can inspire collective action when they see that they save costs. This is the group that needs only a little nudge to start improving their homes. They may even be able to persuade and help their (elderly) neighbor in going along and implementing measures in his/her home as well, and they are the kind of people who will enthusiastically tell their friends about the measures they have taken. Because they are busy people, once they have chosen what they want, they would like to have everything taken care of without too much hassle for them. They probably can afford it too.

Customer relationships

Responsible people need to be talked to on an equal level. Some will have at least as much knowledge on the subject of energy saving measures (and the bigger picture around it) as the energy advisor coming to their homes. The relationship then becomes professional, one between experts. When the responsible person is convinced of the advisor's knowledge and honesty, they can build a solid relationship. Therefore, it is important that there is one contact person during the entire process. The responsible ones can become ambassadors in their neighborhood and among their family and friends.

Channels

Responsible ones use the internet a lot, because they can do it when they have time, which might well be out of office hours. They will look for impartial information on energy saving measures, but basic information on their homes should also be available on the internet. They also like to make appointments online. WhatsApp is another favorite communication channel. Door to door campaigns can be successful, as long as information (flyers, folders) are left behind, and the responsible one is not pressured to take immediate decisions. WoonWijzerWinkel (and a pop up store) might also attract

responsible ones. Examples of measures taken in similar homes can be interesting; this can be shown through videos on YouTube, but also in the 'have a peek at your sustainable neighbors' ('*gluren bij de duurzame burenen*') bike tour, a yearly event in Rotterdam.

Responsible ones are open to collective action. To bring like-minded people together, brainstorm sessions can be organized in the neighborhood, or activities around sustainable living can be organized to exchange knowledge and ideas. Maybe there are local networks that can be linked on to. Providing schools with educational material on climate change and energy saving can turn responsible ones' children into change agents at home.

DUTIFUL ONES: very socially engaged, especially when it concerns their own living environment; traditional norms and beliefs, a conservative, strong sense of duty; peaceful and harmonious lives; have trouble understanding society's complexity; respect for authorities; often older people, lower educated, average income; sober and frugal lifestyle, avoiding damage to the earth, believe we use up too many resources. Messages should be simple and clear, directed towards their personal context.

Value proposition

Dutiful people can be triggered to take action by calling upon their sense of duty, by framing energy saving as a social issue and putting it in the context of a future free of natural gas. Avoiding waste of energy is another argument that will strike a chord. Present policy aims for people to stay in their homes for as long as possible, which means that even a 70-year old might still be living in the same house for another 20 years. Therefore, it is important to keep their homes comfortable, healthy, and safe. Home improvement helps retaining the value of their home, can reduce future maintenance costs (e.g. plastic instead of wooden window frames) and makes it easier to sell if they ever need to move out (or when their children inherit the house and need to sell it). It can also be possible to link individual purchases to a fund for small improvements of the neighborhood's public space.

Dutiful people need someone, preferably from the local government, to be in charge of the entire process of installing energy saving measures. This process of unburdening the resident includes arranging discounts through collective purchase, the purchase itself, and overseeing the execution of the works. Collective purchase can resonate well with their sense of duty and solidarity. These people should be presented a limited number of clear options or packages that show the impacts on the house's energy label. This should come with an energy performance warranty. These people might want to start with something small, and if it works out right (which is also a matter of building trust), they can move to something bigger. High (non-recurring) costs should be avoided, so a solid financial arrangement is necessary.

Customer relationships

Trust is key to building a good relationship with a dutiful person. After all, not all dutiful people are skillful internet users, so they might not be able to find much information on different measures and have to rely on the information provided by the person knocking on their door. It is important to have a single contact person who can maintain the relationship over a long period of time. Multiple visits are probably needed before a dutiful person decides to take a measure. Since elderly people are sometime afraid to open the door to strangers, the first visit to their home should be announced by a letter from the government. Questions like 'What do you like about your house? What does it need for you to enjoy living here for another ten years?' Dutiful people might want to talk about the neighborhood too, because in their perspective, they are talking to someone from the government, so they can bring up other issues as well. This should not be cut off, but considered useful information on how residents feel about their neighborhood.

Channels

Communication with dutiful people should be on a small scale: one-on-one and small neighborhood meetings. Information should be provided 'offline': easy to understand information leaflets and personal communication. The sender of the information is City of Rotterdam. Existing networks and channels in the neighborhood can also be used (posters and leaflets in local supermarkets, at the hairdresser's, community centers). Organizing an activity in a community center, such as a 'sustainable bingo' or 'sustainable wheel of fortune' where sustainable prizes can be won (led lamps, radiator foil) can be a fun way to introduce the subject of energy saving to residents and announce the campaign. Offering an excursion to the WoonWijzerWinkel can be a nice social activity that can be organized. Once a dutiful person has implemented measures, he/she can organize a sort of 'tupperware party' to show the neighbors the benefits of the measures.

STRUCTURE SEEKERS: these people feel underestimated in society, they strive for social recognition; they feel left out, don't have much faith in authorities; conformist, risk-avoiding; own family and friends come first; materialistic people, focus on pleasure; lower or average education, lower-income; sustainability and climate change are not interesting; regard effects of their own behaviour only on the short term; costs are important. Communication focusing on increasing knowledge and influencing values is not effective. Messages brought by charismatic (famous) persons might come across better.

Value proposition

In order to make energy saving measures sound attractive to structure seekers, there must be direct financial gains, by providing subsidies, strongly reduced investment costs by collective purchase, or by showing that present losses are avoided. Offers must be very clear (preferably visualized) and not too difficult to realize. The difference between gas and electricity consumption might have to be explained. Because these people are risk averse, an energy performance warranty has to be included in the offer. Risk aversion can also be used to point out that not having service contracts or regular inspections for certain devices (especially gas boilers) can lead to refusal of insurance pay in case of fire. The moment a device needs to be replaced is when advice on more sustainable solutions might come across.

Structure seekers are convinced by quick wins; long term plans probably won't resonate much with them. Pointing out the costs of energy consumption of an old fridge in the barn (that is on all year while it is only really needed for cooling drinks in summer), for example, may make them aware of easy ways to save money (and energy).

Customer relationships

The relationship with a structure seeker should be on an equal level. Difficult language has to be avoided, Rotterdam humor can help building a bond. Trust is important; there should be one contact person during the process.

Channels

Local shops and communities can be places to meet and reach structure seekers, such as the home depot, church/mosque, sports club, or allotment. Structure seekers can be receptive to messages when these are delivered by charismatic people, especially famous persons (singers, actors, soccer players) in Rotterdam. Neighborhood campaigns can be playful and include street parties, games, and stamp collecting for small prizes such as led lamps. Shop keepers' associations might be of use in the latter. District networkers (government employees) can help to get in touch with the right people and organizations. '*Buurt bestuurt*' ('the neighborhood manages') is a platform where residents can discuss issues in their neighborhood. This offers a possibility of promoting energy savings and collective purchase. A pop up shop in a good location, such as a local shopping street, with an attractive name and shop window, and preferably in combination with neighborhood campaigns, can draw in structure seekers. Because of their distrust of the government, it is better to communicate through external advisors (e.g. WoonWijzerWinkel, Klimaatroute, Buurkracht) and not use logos of Rotterdam or the European Union.

STATUS CONSCIOUS ONES: individualistic people: their own interest is more important than public interest; hard workers, striving for success and a good career; seek status and recognition; they are big and impulsive consumers, materialistic, throw away a lot, hurried living, impulsive, adventurous; new technologies, hip brands, and nicely designed gadgets are interesting; mostly young people, different educations and incomes; knowledge on sustainability is present, but they don't feel responsible; sustainability is only relevant when it brings personal advantages. They are sensitive to others' opinions. Communication should refer to their consumptive and impulsive lifestyle and focus on contemporaneity.

Value proposition

Propositions offered to status conscious people should focus on the 'cool & sexy' aspects of energy saving measures. Comfort framed as 'gain', 'profit', or 'carefree living' will sound more attractive than 'saving' or 'avoiding waste', as well as 'pay-time' (*verdiëntijd*), 'investment', and 'returns' in stead of 'pay back time' (*terugverdiëntijd*). Installing PV panels (with tax advantages!) and becoming an entrepreneur, the owner of one's own energy producing company, will probably sound very attractive, especially as PV panels are visible to others and give more status than, for example, insulation. Taking it as far as getting 'off the grid' (don't use terms like 'nearly zero carbon') and

being independent from energy suppliers (and not paying taxes on energy consumption) might be achievable for some status conscious people. Similarly, driving an electric car means you're independent from the oil industry and it avoids paying high taxes on gasoline.

The offer to status conscious ones has to be clear, concrete, and 'all inclusive': very easy and completely hassle-free. The direct gains and profits need to be clear, because a status conscious person will not take measures if they cost too much money. Package deals can make good deals when they include the unburdening of the home owner in the purchase and installation process.

Customer relationships

Status conscious people are impulsive buyers, so it is important to address the home owner well during the first contact; they may take the decision to take a measure faster than expected. Not a government employee must deliver the message, but a more commercial party that the status conscious man or woman recognize as 'one of us'. It would be best if one of their own business partners or a friend's company make the offer, or when they get a presentation at a business club. In communicating with a status conscious person there are many words that have to be avoided, such as 'sustainable', 'energy saving', 'climate', 'responsibility', 'carbon emission', and 'environment'.

Channels

It is best to approach status conscious people by one of 'their own kind', such as business partners or at trade fairs or their own business or sports clubs. Producers of solar panels may be good at promoting their own business and organizing local actions. Neighbors are not necessarily the best people to convince them. The business club can be invited to have an excursion and barbecue at WoonWijzerWinkel. They base their opinions on trade journals, glossy magazines or newspapers like Het Financieele Dagblad. Influencing status conscious people's opinion and desires can be tried through those media, or through specific groups/pages/profiles on social media.

SELF-DEVELOPERS: socially engaged, want to be free, independent, and different; adventurous and impulsive, not materialistic, work is not the most important thing; critical towards society and government, don't want to be patronised; more young people, different educations and incomes; sustainability is not interesting, they don't feel responsible; they do live sustainably however because they are not materialistic. Communication aimed at value transformation is not effective. Sustainability should be easy and correspond to self-development.

Value proposition

Offers made to self-developers have to be without obligations and must play upon their need for freedom. No reference should be made to rules of responsibilities. Experience is more important than money (freedom is more important than a convincing business case), although the offer must be financially feasible. Becoming self-sufficient (autarkic) may sound attractive to self-developers, as well as participating in an energy cooperation.

Customer relationships

It will be difficult to build a relationship. Once a self-developer is interested in taking a measure, he (she) will probably want to take care of everything himself. In any case, a person approaching a self-developer should not be from the government, but is ideally from an organization that the self-developers associates himself with.

Channels

The best way to personally reach self-developers is through their own communities and through people who are similar to them. 'Chance encounters' (planned or not) or presence at events of festivals that attract self-developers may lead to inspiring conversations that trigger them to take measures. Otherwise, ideas presented at home depots or DIY YouTube videos may stimulate them to consider certain measures.

Table 7 gives an overview of possible engagement methods and how successful they are expected to be for the different lifestyle segments, based on the descriptions in paragraph 3.2.

The table shows which channels will serve which segments best. It can serve to tailor the engagement strategy to specific neighborhoods, based on the presence of segments in that particular area. This will be developed in a next stage by Rotterdam.

TABLE 7 APPLICABILITY OF ENGAGEMENT METHODS TO DIFFERENT LIFESTYLE SEGMENTS (MOST PROMISING METHODS HIGHLIGHTED)

Engagement method	Responsible ones	Dutiful ones	Structure seekers	Status conscious ones	Self-developers
Face to face					
Home visits	++	++	++	++	++
Meetings	++	++	+++	+	++
<i>Pop up shops</i>	++	++	++	+	++
WoonWijzerWinkel	+++	++	+	+	+++
Using existing networks	+++	++	+++	++	+++
Neighborhood/street events (incl. games)	++	++	+++	+	+
<i>Demonstration homes</i>	+++	++	+++	++	++
Through service men	+++	+++	+++	++	++
Printed media					
Newspapers	+	+++	+	++	++
Local newsletters	+	++	++	+	++
Advertisements	+	++	++	+	+
Letters	++	+++	+	+	+
Leaflets	++	+++	++	+	++
Posters	+	++	++	+	+
Digital media					
<i>Website</i>	+++	+	++	+	+++
Social media	++	+	+++	+++	++
YouTube	++	+	+++	++	++
WhatsApp	+++	+	++	++	++
E-mail	+++	+	+	++	++
Other					
Radio	+	++	++	++	+
Saving campaigns in coll. with local shops	+	+++	+++	++	+
Educational programs in schools	+++	+	++	+	+
Recruit ambassadors among homeowners	+++	+	++	+	+++
Employing a famous Rotterdammer	+	++	+++	++	+
Stand at local shops and organisations	++	+++	+++	+++	++

Appendix 3. EEE2021 CONFERENCE PAPER

This paper was presented by Triple-A partners at the Energy Evaluation Europe conference 2021 on 15 March 2021 and is retrieved from <https://energy-evaluation.org/resources/>. You can also see the presentation on <https://www.youtube.com/watch?v=5QZ0Y8vMCNA>.

Neighbourhood consultancy centres for the adoption of low-carbon technologies by homeowners: experiences from Dutch initiatives

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ABSTRACT

Frontrunner local authorities aim to achieve a market acceleration in the owner-occupied single-family home renovation sector by increasing awareness of – and enabling access to – low-carbon technologies in residential target areas. With their easy availability, adaptability, and possible mobility, pop-up consultancy desks can provide local outreach in target areas for achieving home renovation measures.

This research looks into the adoption, use and effectiveness of fixed or mobile energy consultancy desks in target areas organized by local authorities. Local authority initiatives are described, compared and evaluated regarding various parameters. For two local authorities in the Netherlands, Rotterdam and Breda, pop-up initiatives are elaborated upon, examining number of visitors, needed resources and experienced barriers and opportunities.

The results show that both longer-term fixed and short-term mobile consultancy pop-ups can be suitable for providing energy awareness and consultancy in target areas, and for stimulating the local adoption of low carbon technologies. The results clarify pros and cons of both approaches and ingredients of business models that can be used by other local authorities.

Recommendations for business models for self-supporting consultancy in target areas and guidelines for local authorities are planned. For sustaining the pop-ups, collaboration is recommended with other partners.

Keywords: Renovation; housing; low-carbon; energy consultancy; local authorities; policy instruments.

1. Introduction

Local authorities want to achieve a market acceleration in the owner-occupied single-family home renovation sector by increasing awareness of – and enabling access to – energy saving technologies. Local authorities are urged (or voluntary agree) to set up a physical place to inform and consult citizens locally regarding for example: energy efficiency, renewable energies and sustainability measures for home renovation. Operational activities of such an energy or sustainability desk can be related to awareness raising, providing coaching and easy access, facilitating citizen initiatives, activating demonstration projects, assisting group purchases, supporting citizen contests to compete in saving energy, and so on.

With respect to the private housing sector, the Dutch National Energy Agreement (“Energieakkoord”, dated 2013)¹¹ urged local authorities to regionally install a physical or virtual energy consultancy desk for homeowners, supported with local alliances between for instance building and installation

¹¹ For more information (in Dutch) see: <https://www.rvo.nl/onderwerpen/duurzaam-ondernemen/energieakkoord>.

companies, energy cooperatives and local authorities (Meijer, Straub and Mlecnik 2018a). The main goal of these alliances would be to 'unburden' the homeowner as much as possible from information gathering to consulting, contracting and execution of measures. From 2015 on the Dutch Association of Municipalities (VNG) supported the 29 Dutch regions (and 390 municipalities) realising these goals, involving actors in learning networks in order to gain knowledge and expertise and to get the policy on track. It was the intention that from 2016 on every municipality or region would have their own energy desk. Until now, still not all Dutch municipalities have an energy desk and many are still searching for the right format regarding effective guidance for covering the whole home renovation journey.

For example, in the city of Rotterdam in the Netherlands there was already a business-to-business innovation centre for sustainable construction (ICDuBo) where citizens can see and experience retrofit solutions. In the adjacent business-to-customer "WoonWijzerWinkel", supported by the city of Rotterdam, citizens can also get renovation advice. However, this centre is relatively far from the city in the harbour area and people have to go there intentionally to get detailed advice or see the technology exhibition. Rotterdam thus experienced a high need to also use temporary fixed or mobile consultancy centres to attract citizens in specific target areas to create awareness locally.

Various local authorities are considering using such pop-up consultancy centres as policy instruments to reach their CO₂ reduction goals and to create a stronger impact in specific target areas where homes are in great need of refurbishment or renovation. However, not much is known about the performance of such initiatives. This paper illustrates the start-up and use experiences and detected opportunities of some frontrunner models of pop-up consultancy centres in Rotterdam and Breda.

2. Research approach

This research is done in the framework of the Interreg 2 Seas project "Triple-A: stimulating the Adoption of low-carbon technologies by homeowners through Awareness and easy Access" (<http://www.triple-a-interreg.eu/>) funded by the European Fund for Regional Development and the Province of South Holland and in collaboration with the IEA EBC Annex 75 Cost-effective Building Renovation at District Level Combining Energy Efficiency & Renewables (<http://annex75.iea-ebc.org/>).

Through the Triple-A project, seven local authorities - City of Antwerp, City of Mechelen, EOS in the City of Ostend, Service Public de l'Efficacité Énergétique Picardie in Hauts de France, City of Rotterdam, City of Breda and Kent County Council - are testing business concepts for pop-up centres for strengthening local authority communication and consultancy for homeowners who want to renovate. With increasing local awareness and easy access for housing retrofit, the local authorities want to encourage homeowners to adopt various low-carbon technologies to support energy saving. With their easy availability, adaptability, refurbishing and possible mobility, pop-up centres are created and tested to provide an additional local outreach, particularly in neighbourhoods that are targeted for upgrading and renovation.

In this paper Dutch examples of two main pop-up models (longer-term on fixed location and short-term mobile) are briefly introduced to illustrate two main approaches of possible pop-up concepts. Secondly, specific parameters are assessed such as the needed resources, the reach-out to citizens and the expected turnover into renovation measures. Finally, the local authorities assessed barriers and opportunities related to the current and future use of the delivered consultation centres and pop-ups.

3. Pop-up centre initiatives

Short-term mobile or longer-term fixed pop-ups

Local authorities regard pop-up consultancy centres in target areas as an additional policy instrument that they can use for communicating their mix of incentives and organisational instruments. The pop-up centres allow to inform homeowners in specific target areas in combination with specific neighbourhood activities and campaigns. They are used for providing consultancy and for stimulating the local application of low carbon technologies, including renovation measures such as: thermal insulation, window replacement, better ventilation, improving building airtightness, placing renewable energy systems, adopting smart meters and related home energy monitoring systems, making homeowners more aware about their energy use. Energy consultancy in pop-up centres often does not stand on its own, it can be expected to support and reinforce virtual energy consultancy on the local authority web site, local area development, improving citizen participation and "ambassadorship", implementation of other sustainability measures, facilitation of group buying

initiatives, and so on. In the following sub sections the start-up and testing of pop-ups is described in two local authorities.

City of Rotterdam, the Netherlands

The City of Rotterdam has high ambitions regarding waste reduction, energy saving, reduction of CO₂ emissions, and climate change adaptation, and acknowledges the role that citizens play in meeting those ambitions. Therefore they set up multiple pop-up experiments to try to engage homeowners to save energy with renovation measures.

After its experience of setting up a pop-up in an existing book shop in 2016 (“Donner”), Rotterdam experimented with an own pop-up shop in 2016 in the city centre of Rotterdam. The idea was that a centrally located shop on a major city shopping axis (“Koopgoot”) would serve all homeowners in the city.

The next pop-up shop was opened in a neighbourhood shopping centre in the Ommoord area in 2017, closer to people’s homes. This shop was run by a private actor, WoonWijzerWinkel, whose consultants could help people to choose measures and materials.

The observed need for a more permanent pop-up led Rotterdam to develop and open the “Duurzaamheidswinkel” (Sustainability Shop) in November 2018. The Sustainability Shop is situated in a shopping mall in the IJsselmonde district on Rotterdam’s south bank. Here the municipality plays a larger role. The municipality opted for broadening the scope of the shop beyond energy efficiency, as citizens tend to regard different issues regarding their living environment as closely interwoven. They reasoned that each measure can also be sparked by providing an entry for talking from a broader perspective.

Figure 1 shows the main appearance of three pop-up consultancy centres. Although visually and content-wise they do not differ a lot, the relative success depends on other factors.



Figure 1. Three pop-up consultancy centres in Rotterdam. From left to right: Koopgoot in 2016, Ommoord in 2017, IJsselmonde in 2019. *Source:* City of Rotterdam, Triple-A.

When opened, there are always one or two persons present. The shopkeeper lures visitors and passers-by into the subject of sustainability and advises them what they can do at home. Once citizens are inside, they are engaged to discuss measures they can implement in their home. As a follow-up visitors are referred to go to WoonWijzerWinkel for specific advice. WoonWijzerWinkel registers visitors formally and manages a Client Relationship Management systems to follow-up on homeowner decisions and actions.

Compared to the Ommoord pop-up, the experiences in the IJsselmonde pop-up are more positive as the municipality coaches informed and directed the visitors. The local authority is more regarded as an independent and objective source of information. It is therefore best suited for awareness raising, whereas the WoonWijzerWinkel is better placed for providing easy access and adoption of renovation measures.

City of Breda, the Netherlands

The city of Breda wants to be free of carbon emissions by the year 2044. One essential part to be able to achieve this goal is to renovate the majority of existing homes to be more energy efficient. For that purpose they want to engage homeowners. The main idea of their pop-up was to create a mobile unit, to be able to get close to people’s homes.

The ideas stem from previous experiences. In the past years the city of Breda organized information nights in central locations and those were evaluated to be ineffective to reach enough people.

Therefore the idea came up to temporarily place a travelling pop-up during two to three weeks on a central square or close to super markets in every neighbourhood.

The pop-up named “Greenhopper” was designed and produced in 2018 as an attractive mobile “tiny house” made of renewable and natural materials, to make citizens curious. The interior was furnished with circular and recyclable materials. The pop-up is not open all the time, but it is easily accessible (not surrounded by a fence). The windows are not blocked with curtains, so people can look inside if they want to, and come back when it is open. The pop-up displays different sustainable techniques, which can also be used in real homes, for example: infrared heat panels, LED-lighting, thermal insulation solutions, a demo heat pump, thermally insulated glass, and so on.

When opened, there are always two persons present: one coach from the local energy cooperative Bres and one staff member from the city of Breda. They advise people on what to do at home. As a follow-up visitors also have the opportunity for an energy coach to make a home visit for more specific advice. Greenhopper does not provide installation of measures. But the energy cooperative Bres initiated two collective initiatives for installation of solar panels in 2019 (in Prinsenbeek and Brabantpark), following a visit from the Greenhopper, attracting around 75 homeowners.



Figure 2. Pop-up consultancy centre Greenhopper in Breda. *Source:* City of Breda, Triple-A.

4. Evaluation of parameters

Number of visitors

The following Table 1 gives an overview of the key performance indicators that were followed up in the previously introduced pop-up initiatives. Most of the “registered” visitors have the intention to execute at least one renovation measure.

Table 1. Key Performance Indicators of the Rotterdam fixed longer-term pop-up initiatives

Pop-up initiative and location	Testing period	Estimated total number of visitors	Average number of visitors per hour	Number of visitors registered for follow-up	“Turnover” of registered visitors per total number of visitors (%)
Book shop Donner, city center, Rotterdam	open February-June 2016, 43 hours/week	> 1000	1	150	15 %
Koopgoot, city center (Beurstraverse), Rotterdam	open October-November 2016, 55 hours/week	≥ 1000	2	75	7,5 %
Shopping center Binnenhof, Ommoord, Rotterdam	open March-June and September-December 2017, 12 hours/week	ca. 800	2	150	19 %
Sustainability Shop, Shopping center Keizerswaard, IJsselmonde, Rotterdam	From November 2018 – December 2019 (35 hours/week, later 20 hours/week)	ca. 1400	1	1200	86 %

Source: City of Rotterdam (Triple-A project).

The city of Rotterdam observed that visitors came to the city centre initiatives for different purposes, but often went on when noticing the shop was about sustainability. The pop-ups Donner and Koopgoot thus showed that ensuring a constant stream of passers-by is not necessarily helpful if the target group is not sensitive to the sustainability message, especially in a setting where citizens are focused on other activities.

Approximately 800 people visited the pop-up shop in Ommoord. Different activities needed to be organized to generate traffic to the shop. The most effective of these was an invitation sent to 3,500 homeowners to come and see an infrared photograph of their home, which attracted circa 550-600 visitors (Snoo et al., 2018). Meetings for residents' associations attracted 45 people and chance passer-by's numbered about 100 (Snoo et al., 2018). In total Rotterdam's partner WoonWijzerWinkel had 470 citizen registrations from the Ommoord target area (Prins Alexander) in 2017. 146 of those were added in the period March 1 – December 31, 2017, of which 95 came through the pop-up shop Ommoord (Snoo et al., 2018). A low estimate calculates 197 advices on thermal insulation and sustainable energy production and 45 implemented measures in this Rotterdam target area for residents (Snoo et al., 2018). In the Ommoord case, Rotterdam thus learnt that they needed to organize events to attract people to the shop and that opening the shop for only a few months was too short to build a network in the neighbourhood and to obtain results and homeowner decisions. WoonWijzerWinkel focused mainly on easy access and adoption, whereas many people still needed to be convinced of the need for energy saving measures. Consequently, the shop in Ommoord was only partially successful.

At first sight, it appears the Sustainability Shop did not attract as many people per hour as the other shops. It is situated in a more difficult neighbourhood compared to Ommoord, and residents are less aware and informed about sustainability issues, and not that easily activated. Secondly, the Sustainability Shop has a higher focus on building good relationships with the visitors and building a community around the shop, which is important to obtain lasting results and a self-supporting community of residents. In terms of number of registered visitors (which can be considered a measure of quality), the Sustainability Shop clearly surpasses the previous pop-up shops.

The impact of all the shops, in terms of CO₂-reduction, is not known for the shops, but it is now being traced for visitors to the shop in IJsselmonde.

Table 2 shows that although the city of Breda estimated to use the Greenhopper during 2 to 3 weeks, in practice the number of opening hours was limited to shorter time spans. Some events attracted many people but produced little "turnover" when it comes to "registered" people adopting measures. Some events were coupled with specific incentives, such as the opportunity to subscribe for a group buying of solar panels.

The mobile pop-up reached an average turnover of 13% of visitors (with extremes of 1% and 32%) asking for a follow-up of the initiative. The results vary a lot between different neighbourhoods. For example the Kasteelplein area is not close to housing and attracted mainly coincidental passers-by, thus leading to low "turnover". In the areas Ginneken and Ulvenhout the homeowners are generally more affluent and higher educated, thus reaching higher "turnover". The Belcrum area was a higher success than expected: near the station there is an influx of new young homeowners who are usually more concerned with climate and greening initiatives.

In total, the City of Breda registered 209 homeowners who asked for a follow-up visit at home by one of the energy consultants. The energy cooperative Bres follows up each home visit by at least one telephone call after six months, in order to find out which actions have been taken by the homeowners. These data for 2019 are not available yet.

Table 2. Key Performance Indicators of the Breda short-term mobile pop-up initiatives

Pop-up initiative and location of the Greenhopper in Breda	Testing period	Estimated total number of visitors	Average number of visitors per hour	Number of visitors registered for follow-up	"Turnover" of registered visitors per total number of visitors (%)
Grote Markt	Opening 10/10/2018; 6,5 hours	131	20,15	2	2
Kasteelplein	2018; 14 hours	160	11,43	9	6
Ijpelaar	2018; 19 hours	127	6,68	15	12

Pop-up initiative and location of the Greenhopper in Breda	Testing period	Estimated total number of visitors	Average number of visitors per hour	Number of visitors registered for follow-up	"Turnover" of registered visitors per total number of visitors (%)
Ulvenhout	2018; 22 hours	121	5,50	37	31
Boerderij Wolfslaar	2018; 18 hours	141	7,83	18	13
Teteringen	2019; 20 hours	83	4,15	7	8
Brabantpark	2019; 16 hours	60	3,75	7	12
Hoge Vught	2019; 18,5 hours	103	5,57	6	6
Prinsenbeek	2019; 18 hours	119	6,61	22	18
Koepelgevangenis	2019; 7 hours	25	3,57	2	8
Belcrum	2019; 17 hours	60	3,53	13	22
Centrum	2019; 17 hours	92	5,41	6	7
Wolfslaar	2019; 15 hours	78	5,20	8	10
Bavel	2019; 16,5 hours	57	3,45	7	12
Ginniken	2019; 19 hours	107	5,63	34	32
Kasteelplein	2019; 15,5 hours	113	7,29	1	1
Heksenwiel	2019; 16 hours	90	5,63	15	17
Breda: TOTAL 2018	2018; 79,5 hours	680	8,55	81	12
Breda: TOTAL 2019	2019; 195,5 hours	987	5,05	128	13
Breda: TOTAL	2018-2019; 275 hours	1667	6,06	209	13

Source: City of Breda (Triple-A project).

Needed resources

The estimated resources needed to establish and run the Rotterdam sustainability shop and the Breda mobile pop-up are given in Table 3.

Table 3. Resources used for the Rotterdam fixed longer-term pop-up and the Breda mobile short-term pop-up. The costs include subsidies from European and regional funding.

Pop-up initiative and location	Sustainability Shop, Rotterdam (for a 1 year period)	Greenhopper, Breda
Staff (incl. municipal employees)	€ 120.000	€ 25.000 (Bres) + € 33.700 (municipality)
Facilities and exploitation	€ 50.000	€ 85.000 (including € 55.000 development costs)
Programming/activities and materials for specific activities	€ 12.000	€ 7.500
Interior material for the shop and communication	€ 10.000	€ 7.500
Training	€ 3.000	Not applicable
TOTAL	€ 195.000	€ 158.700

Sources: City of Rotterdam and City of Breda (Triple-A project).

In both cases the staff costs are the main part of the needed budget. The Rotterdam case needs a dedicated space in a good spot which increases the needed budget for rent and facilities. The Breda case includes a higher facility development cost to produce the tiny house on wheels. Both pop-ups use resources to support storytelling (posters, leaflets, demos) and the organisation of events and specific activities. In the Rotterdam case staff training was needed.

For the Sustainability Shop, the City of Rotterdam is in the lead and in charge to manage and organise activities. A full-time area manager for energy efficiency is also in charge of the Sustainability Shop. Most of the other staff are employees of the city, working in morning or afternoon day parts. The Shop is open during the opening hours of the shopping centre (Tuesday-Friday 9:30-16:30; Saturday 12:00-16:30), and available for gatherings on Saturdays, Mondays, and sometimes Fridays. In

practice from June till December the shop was only open for the public in the afternoon leaving room for other activities in the morning. In addition, parts of the shifts in the afternoons were only supported by one instead of two staff members. In the Rotterdam case material and staff collaboration was achieved with internal partners contributing in the framework of neighbourhood programs for phasing out natural gas or for management of public space. After the start-up, costs were covered by the municipality (until June 2019 partly through Triple-A), and the province of South-Holland.

Communication included the use of a newsletter, website, social media, flyers, emails, information in the shop, and word of mouth. Especially if a prominent resident with a large group of followers shares information on social media, this has a large impact. Supporting activities included for example "energy breakfasts", open house events, energy savings market, competitions, infrared scans of homes, workshops training sessions, a Santa Claus event, an action for people to get there a yes/no sticker for publicity in the post box, and so on.

For the Breda pop-up the building costs of the pop-up amounted to € 55.000 with an extra € 7.500 spent for the interior. The pop-up was especially designed in compliance with Breda's specific needs and requests, within the size parameters for a trailer. The yearly exploitation is about € 30.000 including maintenance, communication, logistics and other costs. The local authority staff spent 650 hours. This includes coordination, communication, transport and administration. For € 25.000 the energy cooperative Bres delivered energy coaches and professionals for coordination, administration and communication.

Breda used various media to attract visitors, such as two advertisements in a local newspaper, local Facebook push advertisement and door-to-door letters distributed by Bres to homeowners. An average of around 1.500 letters was reached per neighbourhood. For some occasion synergies were found to place the Greenhopper at events or activities of other sections of the city of Breda, for example: the Kids Climate Conference, the winter market of Boerderij Wolfslaar, and so on.

5. Observed strengths, weaknesses, opportunities and threats

The cities of Rotterdam and Breda were asked to do a self-evaluation of what they considered to be the most important barriers and opportunities related to their pop-up development and how they perceived strengths and weaknesses of their organisation to manage the pop-up.

City of Rotterdam, the Netherlands

On the one hand, the city of Rotterdam considers its Sustainability Shop as the best pop-up despite its relatively lower number of visitors. This success is related to the Sustainability Shop integrating multiple objectives beyond energy and developing a social anchor point and neighbourhood network in a 'difficult' neighbourhood of residents with a lot of doubts and questions. From the previous pop-up shops they learnt that a tight interaction between the shop, neighbourhood campaigns, and general programs from the municipality is necessary. The Sustainability Shop anchors and links with other activities in the neighbourhoods. In that sense Rotterdam is experimenting with the shop as a neighbourhood centre of actions towards energy efficiency.

During the development of the pop-ups Rotterdam learnt a lot about how to address the customer journey, using for example lifestyle segmentation. They realize now that it is important to not only focus on the typologies of the houses (technical and economic), but also on the characteristics of the residents (demographic and social), and their interrelations and interactions. This is helpful to assess visitors' view towards sustainability and how to best approach and inform them according to their values and beliefs. For financially vulnerable residents, there are special initiatives.

Short internships, work experience, and skills training aim to create ambassadors in the neighbourhood for the shop and for sustainability messages. Rotterdam also values the creation of learning and job opportunities by working together with schools and educational centres and activating residents to be active in those networks by offering support. The created tool kits around small subjects make knowledge easily transferable.

The Sustainability Shop has succeeded to get support of various municipal programmes and departments. Working together better and collaborating more efficiently helped improve the service for the residents. The Sustainability Shop also fosters good collaboration with external partners and initiatives. In neighbourhood campaigns Rotterdam worked with private intermediaries that engage in civic awareness raising and activation. These include WoonWijzerWinkel for further consultancy and easy access; Klimaatroute for going door to door to offer free energy advice and referring to the

Sustainability Shop and WoonWijzerWinkel; Buurkracht for engaging neighbours to do joint actions; and VVE010 for targeting assemblies of homeowners. Also for campaigns energy actors, like Stedin and NUON, were involved.

On the other hand, the City of Rotterdam experienced it to be difficult to staff the shop due to insufficient staff capacity of the municipality. The setting up of the shop requires a flexible and fast response, but the internal procedures sometimes hamper quick action and getting the desired results. For example, the City's procurement rules and strict privacy rule checks make quick action regarding hiring external people difficult, while this is necessary for flexibility and reliability. Motivated individuals have to do a lot themselves. Involving other people may also take some time as not all persons realize that working in the shop is much more encompassing than providing information to visitors. Accordingly, budgets need to be more flexible so the Shop can improvise more.

The staff is also sometimes insecure about having a good conversation – they are concerned that they don't know enough about all sustainability issues. Visitors expect staff to know about all municipal programs and projects in the neighbourhood – after all for them the 'municipality' is one entity. Next to providing basic information on possible solutions and local issues this asks for some training, particularly on storytelling (sharing own experiences), listening and giving feedback, and coaching. Rotterdam tries to connect with all other municipal activities in the same neighbourhood, but not everybody in the internal organization is open for collaboration (for different reasons).

The city of Rotterdam also finds it difficult to monitor the steps people take in their customer journey, because visitors do not always like to leave their contact details, and in the end not everybody tells about the outcomes of the visit. This is partially solved by Klimaatroute and WoonWijzerWinkel doing a follow-up; Rotterdam is working on combining the different monitoring documents to get a better understanding of the customer journey and measures taken. They acknowledge that, especially in the neighbourhoods around the Sustainability Shop, it takes some time and effort to nudge citizens: the shop needs to be around for some more time before expected results in terms of concrete CO₂ reduction will be reached.

To sustain the concept of the Sustainability Shop, Rotterdam explores options with other organizations or local authorities. Rotterdam notices that it is important to relate to possibly changing expectations of the local residents. It is seeking for ways to get better feedback to evaluate the effectivity of the shop so that it can be optimized regarding use and effectiveness.

City of Breda, the Netherlands

On the one hand, the city of Breda is convinced that the mobile pop-up concept works well. People are interested in the concept of a tiny house and their curiosity drives them to go inside. The attractive appearance of the Greenhopper also attracts more diverse visitors compared to the previously organized neighbourhood information sessions. From the beginning Breda worked together with Bres. At first they put them in the lead to create the pop-up, but this was no success. Afterwards, the city of Breda took the lead in finding a supplier for the mobile unit and contracting Bres. The construction of the mobile unit was considered relatively easy to obtain on demand. A constructor of tiny houses was found on the internet. No tendering was necessary, because the city of Breda has a framework agreement with a regional supplier for trailers, where the contract was placed.

On the other hand, the logistics of moving the pop-up around in the city and finding the correct spots was more challenging than expected. Mainly the size and weight of the unit made it complex to reach possible locations. In retrospect, Breda would consider downsizing the pop-up a little bit. An appropriate vehicle and licensed driver are needed to move the pop-up and the module is subject to taxation of mobile units, permits for installation, availability of electricity hook-ups and other material such as traffic signs. It also needs a location to place when the pop-up is not in use.

Furthermore, the energy coaches from Bres became more motivated since they are also present in the Greenhopper. Although it claims more of their time, Bres gave the City of Breda positive feedback about this experience: they are 'proud' to be part of the effort and enjoy being a host in the pop-up. The benefit of involving Bres was experienced positive as Bres could involve suppliers. They organized a meeting with a number of trusted local and regional players and invited them to supply their products. In return the city of Breda gave suppliers the opportunity to place a brochure in the pop-up (with a disclaimer from the city of Breda). Thus the pop-up was successful in interesting 8-10 suppliers to demonstrate products in the pop-up, such as: infrared panels, a heat pump, a green roof model, a water saving toilet and shower heads, thermostatic radiator cranes, a low temperature radiator, insulation materials, an electric car share connection. The relative success has a downside: The capacity of Bres to join Breda every time the pop-up is opened was limited. Also the energy

coaches had difficulty to cope with all the requested house visits. Bres aims to recruit more coaches in 2020.

In November 2019 the Greenhopper was moved to the city of Eindhoven, where the Province of North Brabant organized a first Energy Festival. The city of Breda attracted a lot of attention there from other local authorities who are now also interested to use the Greenhopper.

6. Summary

Table 4 provides an overview of the observed factors in both initiatives, including internal Strengths and Weaknesses, and external Opportunities and Threats (SWOT-analysis).

Table 4. Strengths, Weaknesses, Opportunities and Threats for the Rotterdam fixed longer-term pop-up and the Breda mobile short-term pop-up, as perceived by the municipalities.

Pop-up initiative	Strengths	Weaknesses
Fixed longer-term pop-up Sustainability Shop Rotterdam	<ul style="list-style-type: none"> * Pop-up provides learning and collaboration between internal municipal programmes and departments * Collaboration with private/public intermediaries achieved to cover detailed advice, implementation and customer relations * Development of communication skills * Anchor of the Municipal neighbourhood approach towards the energy transition 	<ul style="list-style-type: none"> * Need for staffing by the municipality * Internal procedures can slow down needed fast response * Not all municipal neighbourhood activities join the initiative * Relatively high investment in staff and facilities
Mobile short-term pop-up Greenhopper Breda	<ul style="list-style-type: none"> * Appearance of the pop-up and concept of the tiny house attracts visitors * Collaboration with energy cooperative and suppliers achieved to cover detailed advice, implementation and customer relations 	<ul style="list-style-type: none"> * Need for extra energy coaches due to unexpected success
Pop-up initiative	Opportunities	Threats
Fixed longer-term pop-up Sustainability Shop Rotterdam	<ul style="list-style-type: none"> * Approach sustainability from multiple angles using events * Develop a neighbourhood anchor and local network * Activate local “ambassadors” * Toolkits for specific customer segments * Long term presence in the neighbourhood can lead to building networks and activating citizens * different organisations might integrate their actions and customer relationship management to provide a smoother customer journey 	<ul style="list-style-type: none"> * Lack of integrated follow-up of visitors * Neighbourhood includes homeowners with limited financial means * Proposed and executed measures are often ‘quick wins’, e.g. installing led bulbs, airtightness strips, and so on
Mobile short-term pop-up Greenhopper Breda	<ul style="list-style-type: none"> * Mobile concept allows the pop-up to be used in many locations, including other municipalities 	<ul style="list-style-type: none"> * It is challenging to move the pop-up: the mobile concept needs additional resources for reaching locations and on locations

Source: City of Rotterdam and City of Breda (Triple-A project).

Overall both pop-up initiatives took off quickly. Rotterdam just started and took small steps at a time. Breda ordered a unit in a relatively short period. Both pop-ups improve constantly through a process of ‘learning by doing’. The most important function of the pop-ups is to create attractive local triggers for the residents to start changing their lifestyle or their home. The ideal pop-up manager is both socially capable in order to connect with people and to build meaningful networks, and technically competent as a consultant or designer.

7. Discussion

It appears to be problematic for the homeowner to find the right independent advice and (experienced) contractors that offer solutions based on this advice. Various European projects (One Stop Shop 2012; COHERENO 2016; Meijer, Straub and Mlecnik 2018b; Mlecnik, Straub and Haavik 2019; STUNNING 2019) consequently pointed out that it should be made easier for homeowners to find trusted independent consultants and reliable and trusted local suppliers and that local business models should be developed to support the whole customer journey of homeowners who want to renovate. Public-private and public-civic cooperation resulting from the development of consultancy centres and pop-ups can be a stimulus to improve communication, coordination, local actions, and integrated follow-up of each step of the customer journey.

Both exemplified initiatives show possible public-private collaboration for running energy consultancy pop-ups. Suitable collaborators trigger citizens and the local area, providing information, consultancy, door to door actions, social collaboration, energy cooperation, special assistance for vulnerable people, and so on. It is this collaboration that makes it possible to guide homeowners in their customer journey from one step to the next; from awareness raising to providing easy access and resulting adoption. For example, for awareness raising in Rotterdam the Sustainability Shop provides general information and coaching, while Buurkracht helps set up community networks with residents who want to work together in creating a more sustainable environment in their neighbourhood. Both are actively nudging residents in the first steps of the customer journey. Next, Klimaatroute provides energy advice, thus contributing to the orientation phase. WoonWijzerWinkel helps in getting quotes, and in selecting suppliers and contractors. This collaboration for successive guidance in the renovation journey needs to be nurtured to make sure that pop-up initiatives can also sustain once the initial funding is gone. In our cases, the development of the pop-ups was supported by the European Fund for Regional Development in the framework of the Interreg 2 Seas project 'Triple-A'.

For the next periods, the cities are developing business models to maintain the pop-ups, exploring possible public-private and public-civic collaborations. The Sustainability Shop will work more closely with schools and local organizations, such as: a civic-business intermediary that supports children in disadvantaged environments offering internships (JINC); an organization that trains volunteers to help low-income households to save energy costs (Energiebank); and an organization that supports mentally disadvantaged people with to find workspace learning jobs (Pameijer). By working together with these partners and investing in these connections, the Sustainability Shop also wants to become socially embedded in long-term networks. In addition citizens groups might take over and open a Sustainability Shop in their own neighbourhoods.

An important characteristic of pop-up consultancy centres can be that they can function as an anchor point from where residents in the surrounding neighbourhoods are approached to start (thinking about) retrofitting their homes. The shop manager creates a local reciprocal network, addressing different topics and targeting specific customer segments with events and small incentives. Thus, besides showing information panels and handing out leaflets, a pop-up should offer a wide range of activities such as consultancy, meeting and campaigns, workshops, excursions, training, to help make it visible, shareable and replicable.

The Triple-A project offers many more examples of pop-up consultancy centres, also in Belgium, France and the UK. All experiences are currently being analysed. Also, a perspective is being elaborated on possible business models that can be used for the development and implementation of pop-up consultancy centres. Currently, further data are gathered and adapted business models are tested for sustaining consultancy pop-up models. The research will finally result in recommendations for business models for self-supporting consultancy in target areas and guidelines for local authorities.

8. Conclusion

This research looked into the adoption, use and effectiveness of fixed or mobile energy consultancy desks in target areas organized by local authorities. Local authority initiatives from the cities of Rotterdam and Breda were described, compared and evaluated regarding various parameters such as number of visitors, needed resources and experienced barriers and opportunities.

There is no "one size fits all". The results show that both longer-term fixed and short-term mobile consultancy pop-ups can be suitable for providing energy awareness and consultancy in target areas, and for stimulating the local adoption of low carbon technologies. The analysis shows that a neighborhood pop-up center can be a very effective communicative policy instrument to reach residents, particularly in housing areas matching the right customer segment. They allow visitors experiencing, seeing and freely asking about issues related to their renovation journey. Pop-ups can

even be more successful if they combine their activity with neighborhood actions to attract people, for example using infrared photographs and collaborating with local ‘ambassadors’. Pop-ups work best as a local node of awareness raising. The staff’s task is to motivate and guide homeowners and citizens to adopt further consultancy or sustainable choices. Independent communication and personal coaching are needed, tailored to match personal values, to lead to effective adoption. Collaboration with local partners is recommended to address the next steps in the renovation journey.

The local authorities perceive positive effects and numerous opportunities to develop consultancy pop-ups and even to sustain them once they are developed. This sheds a new light on the need for local authority policy instruments to target specific residential areas using appropriate incentives, resources and partnerships. The results are useful for local authorities to identify (ingredients of) business models that can be translated locally in custom-made pop-up centre models fitting the own local strategies, goals and financial capabilities.

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