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TERRITORIAL ANALYSIS OF DECENTRALISED ENERGY MARKETS //

DuCoop cvba

Ghent (BE)

Case Study // November 2024

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DuCoop cvba, Ghent (BE)

Relevant Local Practice: Community Distribution

Community Distribution is a local practice in which distribution networks, such as local electricity grids or small-scale district heating and biogas networks, are community (co-)owned and or managed. Thus, rather than relying on centralised utilities, local energy communities manage the allocation of energy within their own networks. This practice can include peer-to-peer energy sharing through their own community network, where excess energy produced by one member is distributed through a community network to others who may need it, or it can involve collective ownership of energy distribution infrastructure, with profits or savings reinvested into the community. Community distribution fosters energy autonomy, reduces reliance on external suppliers, and promotes sustainability by ensuring that the benefits of clean energy generation remain within the local community.

Executive Summary

DuCoop cvba is an energy community located in the North of Ghent (Belgium) and has been supplying district heating and wastewater collection services to the newly developed neighbourhood *De Nieuwe Dokken* (engl.: The New Docks) since 2020. In this environment, DuCoop is a key player as it is the sole heat supplier for the 400 houses that will form the neighbourhood of *De Nieuwe Dokken.* This is done through their own community-owned district heating network and with residual heat from a neighbourhood factory.

Setting up an energy community in a newly urbanised area following a tendering procedure by the city of Ghent allowed them to become the sole district heating supplier in the new neighbourhood. Every owner or tenant of one of the houses automatically becomes not only a customer of DuCoop's services but also a member of the cooperative. This approach allowed the energy community to diversify the membership base, also reaching residents with limited initial interest in energy communities. This was also made possible as the community offers energy prices following tariffs set by the city of Ghent. Moreover, DuCoop's low entrance hurdles – both in financial terms and in time commitment – allow individuals to join the energy community with a minimal upfront cost (a minor investment accompanying the one made to buy a whole apartment) and gave DuCoop a broad and solid membership base from the outset.

1. Key characteristics and context

DuCoop was founded in the context of a newly developed neighbourhood. Hereafter, this context is elaborated, including on the founding actors, the technology mix applied by DuCoop, and the national framework and policies in which the energy community was able to start operations.

DuCoop operates in *De Nieuwe Dokken* (engl.: The New Docks), a neighbourhood located in the North of Ghent (Belgium). *De Nieuwe Dokken* is an old harbour that was transformed into a large and sustainable housing project in the north of Ghent. This project is part of a recently rehabilitated land of the Oude Dokken (the industrial port of the City of Ghent), which was turned into a modern, ecological neighbourhood with approximately 400 apartments and houses, pleasant parks, a school building and office spaces for entrepreneurs. The entire district is home to various pilots of different nature that test different components to ensure a sustainable lifestyle.

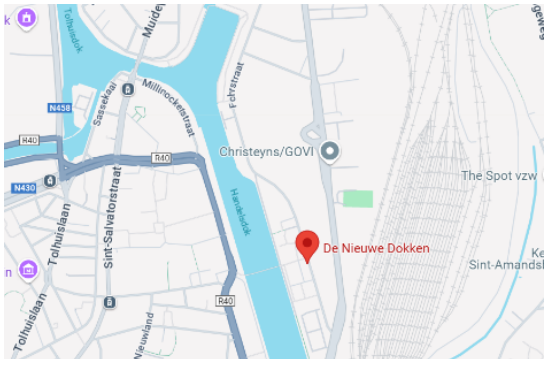

Figure 1: De Nieuwe Dokken neighbourhood in the North of Ghent. Source: Map data ©2024 Google

The energy community operates in all *De Nieuwe Dokken's* buildings, currently around 400 residential houses. Besides those, they also manage the energy of one public building with offices, a school and different services. This creates a small but dense operational area for the energy community.

1.1. Foundation & history

DuCoop was officially established as a Belgian cooperative in 2014 as part of a project named *De Nieuwe Dokken*, that was developed by the City of Ghent and aimed to revitalise an industrial area in a sustainable and innovative way. The City of Ghent decided to choose a single heat supplier (see 1.3) for the whole neighbourhood and initiated a procurement process. Having applied to this process and ultimately getting approval from the city, DuCoop was created by the

Nieuwe Dokken's project developer, *Schipperskaai Development*, in collaboration with the water company *Farys* and *Clean Energy Innovative Projects*. Later, DuCoop expanded this circle to include more SMEs and, from 2019 onwards, also the residents of the neighbourhood.

Farys[1] is a Flemish organisation owned by the local municipality and active as a supplier of water, infrastructure, public services and more. It is the key supplier of Water Sanitation services in *De Nieuwe Dokken*, operating in a similar way to DuCoop. As *Farys* was already a mature and well-known publicly-led supplier, its collaboration helped DuCoop to gain the confidence from investors and consumers.

In addition, *Clean Energy Innovative Projects*[2] supported DuCoop with their business design and the required investments in its early stages, as their CEO was a firm believer in the potential of DuCoop. This combination of key players helped DuCoop to gain a good reputation, and slowly manage to be perceived as the most innovative alternative for accessing the grid in a new way.

During the procurement process, DuCoop's experience was influenced by the enhanced credibility they acquired through positive results from the municipality's *Sustainable Barometer*[3] initiative, which measures sustainability and impacts of project proposals. This indicator is meant to guide citizens to better assess projects through objective indicators that evaluate how sustainable entities operate. Energy communities tend to be perceived as a risky investment, which is why having credible results from the city tool was instrumental for their evolution.

Figure 2: Visualisation of *De Nieuwe Dokken*[4]

1.2.Energy technologies applied

DuCoop offers a variety of services to *De Nieuwe Dokken* residents, including heating systems, wastewater treatment, and electric vehicle charging.

The cooperative's main service is **district heating**. All homes are connected to one unique heating network that was built by DuCoop and is about one kilometre long. Residents have a heat exchanger that extracts heat from that collective pipe. The heat itself is obtained from residual heat from the *Christeyns* factory and from wastewater. As a result, there is no need to burn natural gas and hence a significant amount of CO_2 emissions is avoided.

Together with their partner *Farys*, the DuCoop is also in charge of collecting and purifying **wastewater** in the district. For example, toilet water is separated and collected via a vacuum sewer system.

DuCoop produces **renewable electricity** thanks to solar panel installations in the building roofs, allowing the cooperative to indirectly offer consumers electricity, mainly for their electric vehicles and the powering of the district level assets (waste water treatment) and (when available) the district-level heating pumps. The electricity surplus from the panels is stored in batteries.

The energy community is also a key player in the district's **waste management** system. Residents can dispose of their kitchen waste in central food waste shredders, where DuCoop processes the leftovers together with the wastewater, turning it into biogas and fertiliser that is later reused locally.

DuCoop explains it's services through the acronym ZAWENT (Zero Waste Water with Energy and Nutrient Recovery). As per Figure 3, green energy is produced through the combination of wastewater collected by *Farys* and combined

[1] https://www.farys.be/

[2] https://www.cleanenergyinvest.be/

[3] https://publicaties.vlaanderen.be/view-file/56702

[4] https://ducoop.be/assets/files/imager/assets/files/general/49/131104-DOK9000-Overzicht_ZW_e20638fa7f41f6b3ec56dc3ae3fba028.jpg

with wasteheat from *Christeyns*. Through this mechanism, DuCoop ensures that the heating system is circular and carbon neutral.

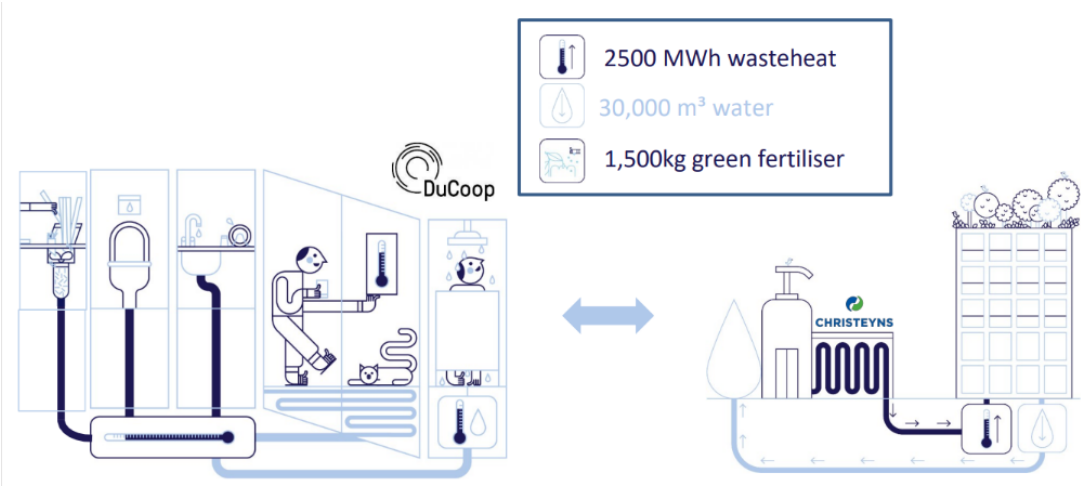

Figure 3: ZAWENT Explained[5]

1.3. National/regional enabling frameworks and policies

DuCoop was able to profit from the Belgian regulatory framework on district heating, which did not require DuCoop to follow complex rules, for example, in the case of permits. The flexibility of the regulatory framework provided DuCoop with the opportunity to deploy their project without many barriers and with quick processes that allowed the cooperative to start within their time plan.

The energy community, moreover, benefitted from the City of Ghent's efforts to map and classify sustainable organisations through the *Sustainability Baromenter*. The positive results they obtained in the *Sustainability Barometer* was crucial to gain credibility. Public procurement authorities used the results from this barometer as a benchmark, giving DuCoop a good position against competitors in the public tendering process to serve as supplier for the neighbourhood.

2. Governance and internal organisation

DuCoop operates in an environment characterised by a multitude of actors and stakeholders, both within the cooperative itself and beyond. This chapter elaborates how the energy community's governance is organised, including its owners and members, the decision-making processes, and the key stakeholders for DuCoop's operations. This is followed by an elaboration of the applied business model and funding sources, which indicate its financial operations.

2.1. Governance model

Ownership and legal model

DuCoop cvba is organised as a cooperative under Belgian law[6]. It is composed of multiple entities that act as shareholders, including several other cooperatives, private companies and since 2019 also all residents of *De Nieuwe Dokken* – both owners and tenants. When purchasing or renting a home, residents sign a connection and supply agreement with DuCoop that covers wastewater for purification and heat supply via the district heating network. Moreover, by purchasing or renting a space in *De Nieuwe Dokken*, residents automatically acquire 1 'A-share' with a nominal value of €10. This entitles them to rebates on the energy bills if the Ducoop makes a profit of more than 6%, subject to a decision by the general assembly. On top of that, residents (both natural persons and legal entities) may also invest in the cooperative by buying 'B-shares'. These have a nominal value of €250 and all residents are limited to purchase a maximum of 20 shares (€5,000).

Decision-making

When DuCoop was first established, the city of Ghent had a high influence on its initial decisions. Based on a procurement procedure by the city of Ghent, DuCoop became the monopoly for heat supply in *De Nieuwe Dokken*.

[5] Source: *Toelichting oplevering appartementen De Nieuwe Dokken* (2023)

[6] Cvba: Coöperatieve vennootschap met beperkte aansprakelijkheid; engl.: limited liability cooperative company

Hence, the city created binding formulas for energy prices to protect consumers from drastic changes, ensuring that accessing district heating did not alter citizens' costs. The establishment of these tariffs required discussions but, as DuCoop's end goal was not making profits but rather invest in the sustainable development of the region, negotiations did not take a long time. The result of these negotiations was a transparent cost-distribution scheme that provides consumers with tariffs that are almost the same as in other places in the city.

Since then, DuCoop's governance scheme operates as every other cooperative, where the management of the company is undertaken by a collegiate management body in the form of a Board of Directors, who are elected by the cooperative's general assembly. This Board of Directors includes a chairperson and a vice-chairperson, which are elected by the board and lead the day-to-day management of the energy community.

2.2.Key actors and stakeholders

As an energy community, DuCoop's experience was determined by the collaboration of stakeholders of different nature, which contributed to the establishment of the cooperative in a variety of ways at different stages. Overall, the municipality's support, paired with alliances with strategic partners and a pre-established network in the frame of the De Nieuwe Dokken project delineate their establishment in the district.

The city of Ghent[7] was a key actor that contributed to the fast-paced development of DuCoop. The overall project to renovate the neighbourhood and create the so-called *De Nieuwe dokken*[8] was initiated by the city and allowed the cooperative to access an extensive network of partners focused on promoting sustainable housing, contributing to the design and realisation of this circular district in Flanders. As a result, during the early stages of DuCoop's deployment, multiple stakeholders contributed to the design of the heating system for the new neighbourhood. *Van Roey* and *Artes* were the construction companies that realised the indoor technology connecting the houses to the heating network. Other key players involved in this process include *E-Ster* (realised the engineering concept of the heating network and the initial cost-benefit analysis), *Ingenium* (engineering of the heating and electrical network), *Callens* (boiler room and residual heat supply), *Pantarein* (water purification design) and *Roediger* (vacuum network design), Moreover, due to the complexity of the shared electricity market, *Rebel* supported DuCoop in the development of its financial modelling.

On a regular basis, some partners play a pivotal role in the services supplied in the district. Even if DuCoop is the sole supplier operating in the district, the varied set of services that it offers results from the collaboration of cooperatives. For instance, *Farys* organises greywater transport and ICT network for monitoring. In the same vein, *Christeyns* leads the decoupling of residual heat from production processes. The combination of both systems allows district heating to function (see Figure 3).

2.3.Administration

The most challenging part of administering the community was the management of construction the heating networks, particularly around the sole public building in the neighbourhood, which includes other amenities such as a school and offices, requiring a more complex pipe network. Due to this and the costs of building and maintaining a district heat network throughout the neighbourhood, administrative costs for sharing energy are high, limiting the opportunities for expansion with more local actors.

2.4.Business model

DuCoop is a legally recognised cooperative society whose purpose is to raise financial resources to invest and provide sustainable services to *De Nieuwe Dokken*'s residents. The energy community generates revenue by charging the residents (customers) for its services. This is done per service and through the following channels:

- Water consumption and wastewater – through *Farys*
  Farys sends an interim invoice every 3 months and settles the actual consumption once a year. This includes the cost of the drinking water consumed (fixed charge + price per m^3) and the municipal contribution for the collection and purification of wastewater (fixed fee + price per m^3) which is directly paid from *Farys* to DuCoop given that the cooperative carries out this activity.
- Kitchen Waste- through *Ivago*
  The Kitchen Waste is charged at the contribution rate as for other residents of the city of Ghent and payment is organised through Ivago, the municipal waste management association. However, given that DuCoop is

[7] https://stad.gent/nl/oude-dokken

[8] https://denieuwedokken.be/duurzaamheid

the entity that processes the food waste, the customer pays the fee to Ivago, but then it is Ivago that remunerates directly DuCoop for the processed amount of waste.

- Heat network supply
  This payment is organised directly by DuCoop. Customers are charged monthly for their expected consumption with a yearly settlement based on the actual consumption. Residents can benefit from a reduced rate if the cooperative turns a profit.

Additional services can be accessed at an additional cost, such as electric charging of bicycles or cars. It is also possible for residents to participate voluntary in a group purchase for green energy (photovoltaic).

The revenue and profits that DuCoop makes through these services is used to maintain operations, reinvested into the community for further development of sustainable housing alternatives in the neighbourhood and technological improvements, or given back to the residents in the form of rebates on the energy bills.

2.5. Grid connection

DuCoop built its own district heating network that is not connected to the rest of the city. Moreover, it maintains one single grid connection for the electricity used by the heat pumps and water sanitation plants, which is centrally managed by DuCoop and combines the utilisation of its own solar electricity, the battery storage and connection to the grid.

2.6. Access to finance

DuCoop managed to access funding thanks to its recognised founding partners. As of 2017 – before residents became shareholders – the equity capital distribution looked as follows:

	Total capital	Total shares	% shares
CEIP	80.000 €	320 E shares	22,22%
Schipperskaai Development	67.500 €	270 E shares	18,75%
Farys Solar	67.500 €	270 D-shares	18,75%
Trividend	50.000 €	200 E shares	13,89%
Human Capital	50.000 €	200 E shares	13,89%
Pete Colruyt	5.000 €	20 E-shares	1,39%
EnerGent	20.000 €	80 C shares	5,56%
Oya Seed	20.000 €	80 E-shares	5,56%
Total	360.000 €	1440 shares	100%

Source: Financieel-participeren-in-ducoop-cvba (2019)

Moreover, DuCoop has repeatedly received funding from research projects that are active in the larger area around the pilot neighbourhood *De Nieuwe Dokken.*

- InterConnect [October 2019 - March 2024]- European Horizon 2020 programme
- Bright [November 2020 - October 2023]- European Horizon 2020 programme
- RENergetic [November 2020 - April 2024]- European Horizon 2020 programme
- Anchor [currently running] – INTERREG North Sea programme[9]
- LOGES [currently running] – INTERREG Vlaanderen-Nederland[10]

3. Impact and Analysis

The development and activities of DuCoop result in a variety of impacts on the local community. This chapter identifies the key social, environmental, and economic impacts, followed by an analysis of the energy community's inclusiveness as well as the key drivers. This includes an identification of the key impacts of the case study (social, environmental and economic), a reflection of its innovativeness and inclusiveness and an understanding of its main drivers for success, key takeaways and potential for replication and transfer. A specific focus is on the local practice of community distribution.

[9] More information available here: https://www.interregnorthsea.eu/anchor

[10] More information available here: https://interregvlaned.eu/loges/over-ons

3.1.Social, environmental, and economic impacts

Social impacts

DuCoop supports the development of a sustainable and circular community in the neighbourhood. Through the cooperative structure with common ownership of the district heating network and shared decision-making, the sense of community is strengthened. Beyond that Ducoop does not currently have or envision social benefits to be distributed amongst its members. Its activities provide all resident of the *De Nieuwe Dokken* neighbourhood with access to local sustainable energy, though it does not extend that potential to other parts of the city.

Environmental impacts

DuCoop contributes to a sustainable and circular lifestyle in different ways. Water treatment reduces the quantity of water wasted, extending the life of water by purifying waste streams such as toilet water and kitchen waste, wastewater from kitchen, showers and washing machines. Purified water is given a second life at neighbouring *Christeyns* factory.

Likewise, its whole structure is more efficient, as collective heat production and distribution is considerably more efficient than individual alternatives. In addition, distributing residual heat from the neighbourhood's waste streams and neighbouring company *Christeyns* ensures that its production is 100% climate-friendly, thanks to the circular approach.

Economic impacts

DuCoop offers its services at a competitive price, allowing consumers to consume sustainable energy and apply a circular model with no extra costs. If the cooperative turns a profit, this will, moreover, be passed on to customers through rebates on their energy bills. Moreover, DuCoop cooperates with a number of local SMEs (see chapter 2.2) contributing to the local economy with its activities.

3.2.Innovativeness

The innovative approach of a cooperative makes every resident a member and shareholder, creating a sense of belonging and ownership of the technologies used. DuCoop operates in a unique innovation ecosystem, where residents live, work and relax in a conscious way. This is also attracting other entrepreneurs. For instance, key early-stage start-ups are already present on the site, including Zelda & Zorro (modern shared living room concept), STOOK EN KEET (graphic & motion design), Saskia Faelens (pilates & energetic healing), Thomas Soete (book & graphic design), Blue Lines (translation agency), Bosh & Bordon (collective in B2B communication) and Bureau (co-working).

3.3.Inclusiveness

The city of Ghent is committed to fostering inclusiveness in its energy initiatives by protecting consumers from escalating costs, ensuring that tariffs remain consistent with those of natural gas suppliers in the broader region. This dedication to affordability is complemented by the opportunity for residents of the *De Nieuwe Dokken* district to seamlessly join the DuCoop energy cooperative, facilitating easy access to community energy resources. A key aspect of this inclusive approach is that all property owners and tenants within the district possess voting rights, empowering them to actively participate in decision-making processes that affect their energy community. However, it is important to note that DuCoop's services are exclusively available to residents of *De Nieuwe Dokken*, thereby concentrating the benefits on the socioeconomic groups within this specific area. The energy community does not have or foresee any activities that would broaden the group of beneficiaries beyond the neighbourhood.

3.4.Key drivers for success

The study of DuCoop highlights a few factors that were central to the successful emergence of the energy community. Firstly, **political will** and **credibility** were crucial for the cooperative's successful start. This can be seen in Ghent's considerations of energy communities in urban planning priorities as well as in their efforts to provide **clear criteria for sustainability measurement** through the sustainability barometer, giving DuCoop the credibility both in the city's procurement process as well as in front of investors and residents. Without these conditions, DuCoop's emergence would have been considerably more challenging or even impossible.

Second, the result of this **procurement process** was a **monopolistic position** of DuCoop as the sole energy provider in the neighbourhood, making investments into the district heating network financially feasible due to the guaranteed number of consumers, while also diversifying the membership base beyond those residents with a strong interest in energy communities.

This aspect is closely related with, lastly, the **low entrance hurdles** and the **competitive pricing**, which ensured that DuCoop's sustainability efforts would not be regarded as an additional cost to residents but rather as additional sustainability at the same price of other energy providers.

In combination, these three aspects provided the base for DuCoop's successful establishment, including the search for partners, the positive result from the procurement process, and the support from residents.

3.5.Replicability and transferability

The DuCoop case provides a number of elements that allow for replication and transfer to different places and situations nationally and across Europe. It is particularly promising for newly established neighbourhoods, where the infrastructure for renewable energy systems can be integrated from the outset and organised through an energy community system.

In the Belgian context, the establishment of community heating practices could be perceived as feasible based on the current legal flexibility that simplifies this process. This practice is particularly relevant in the context of integrating an energy community into innovative building projects, where residents are directly involved in decision making processes. DuCoop's model could be replicated in newly established neighbourhoods, as other Belgian municipalities could follow lessons learnt from the city of Ghent's administration.

A remarkable practice with replication potential across Europe is the use of benchmarking indicators that can helped to build credibility and trust within the community, ensuring a solid foundation for growth and engagement. Ghent's Sustainability Barometer gave DuCoop the credibility for its successful establishment.

Moreover, DuCoop's model with low entry-fees allows for a diverse mix of participants, including both natural persons and legal entities, further enhancing its scalability and adaptability to different contexts. As such, this energy community model can be replicated in similar urban or suburban settings both in Belgium and across Europe, where a combination of ease of entry, legal flexibility, and municipal backing makes it a viable option for fostering local, sustainable energy solutions.

3.6.Main takeaways and recommendations

Takeaways and recommendations on the local practice of community distribution

The case study highlights several takeaways on the impact of community distribution for the success of the energy community.

Becoming the neighbourhood's main supplier to diversify the membership base

In particular, DuCoop can be seen as a good example for how its role as a main supplier in a neighbourhood allowed the energy community to diversify their membership base, also reaching residents with limited initial interest in energy communities. In fact, through the public tender of the city – which ensured fair prices by the energy community - DuCoop became the default heating provider for this neighbourhood. As such, the energy community was able to integrate consumers and give them an ownership stake and the a voice in the energy supply without requiring them to take additional actions compared to other energy suppliers.

Ensuring low entrance hurdles

The previous point was enabled and strengthened by the energy community's **low entrance hurdles** and competitive energy prices —individuals can join the community with a minimum mandatory investment (10 EUR) and energy prices are comparable to other suppliers. This low-cost entry point, with a minimal upfront cost, both in financial terms and in time commitment, renders the energy community accessible to a wide range of potential members.

As a combined result of these approaches, the energy community was able to expand its membership beyond people with a specific interest in energy generation and also reaching those that are primarily interested in a cost-efficient energy supply and introducing them to a cooperative ownership model. This ensured a broad and solid membership base from the outset.

Other takeaways and recommendations

The takeaways and recommendations from the case study highlight several additional critical factors for successful implementation and scalability.

Political will and clear procurement with sustainability criteria

At baseline of DuCoop's success stands the procurement by the city of Ghent, which specifically favoured projects with a proven positive sustainability impact. The case emphasises that alignment with government priorities and the inclusion of energy communities in urban planning priorities are a way to achieve successful operations.In combination with Ghent's sustainability barometer, which proves DuCoops sustainability claims, these clear criteria gave the energy community and its community-based model an advantage and allowed them to secure the spot as a main heat supplier to the new neighbourhood.

Addressing consumer information gaps and clear measurements sustainability

Addressing consumer information gaps is crucial for the acceptance of the novel model in the neighbourhood, as many potential members lack access to clear, objective information about sustainable housing options, and the complexity of the technical details often hinders their decision-making. This is made worse if there is a lack of clear criteria that can guide consumers in assessing the sustainability claims of housing projects. The sustainability barometer of the city of Ghent alleviated both of these limits by aiding both consumers and investors to credibly measure the energy community's sustainability impact and enable more informed, fact-based choices.

These lessons suggest that a combination of public support, consumer education and accessible membership models is key to the success of energy communities.

This case study was developed as part of the project Territorial Analysis of Decentralised Energy Markets conducted for ESPON EGTC. It is based on information that is publicly available online, on the energy community's own webpage, as well as on information collected through a semi-structured interview with representatives of the energy community. The reviewed documents include**:**

- Duurzaam leven in de nieuwe dokken (2024), DuCoop
- Ducoop cvba – uw duurzaamheidspartner in de nieuwe dokken (2016), DuCoop
- Financieel-participeren-in-ducoop-cvba (2021), DuCoop
- Onderwerping aan het nieuw vennootschapsrecht - vaststelling nieuwe tekst statuten (2023), DuCoop

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