

Trends in Sustainable Energy Innovation - Transition Teams for Sustainable Innovation

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Abstract

Energy transition is necessary, given that the share of fossil fuels in the total energy production ensures that we will not achieve the climate goals as set out in the Paris Agreements. Moreover, this energy transition is not only necessary because of the climate aspect, but also because of the geopolitical dependence on the supply and the easily accessible stocks of fossil fuels are in danger of being quickly exhausted. But this energy transition cannot only take place in a technological way – i.e., choice of energy source or generation – but must also be accompanied by an adapted flexibility, storage, and consumption. This can also evolve towards “energy as a service”. To successfully make this paradigm shift possible, including the adapted business models, this is best done by involving the largest possible co-creation of as many stakeholders as possible, through social innovation. For the sake of additional knowledge, but also to achieve broad support and a smooth introduction. Transition teams play a key role in this respect in the context of a Multilevel Perspective approach with both monetary and social impact. This paper illustrates the role of three transition teams in a higher education institution in Belgium, an energy producer in the Netherlands and a grassroots experiment in the Netherlands. Their first realizations in “building coalition for change” are reported, together with the growth process into a “Change Through Network”. This involves Energy as a service – including Public Civil Partnerships – and Energy Efficiency Service Companies that contribute to a smart sustainable building for a healthy human in a smart city. We show that this is a catalyst for a new corporate approach for the energy producer, a new social domain/neighborhood economy at the grassroots and a next level of pioneership for the Sustainable Development Goals within the higher education institution.

Keywords: Sustainable Development Goals (SDG); Maintenance Energy Performance Contract (MEPC); Social Transformation/Innovation; Transition Teams; New Business Models; Innovation.

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1 The Energy Problem

The world is facing major challenges regarding energy and material resources, in particular the depletion of fossil fuel reserves, geopolitical tensions, and the transformation towards a carbon low energy consumption (EU, 2018). We are witnessing a paradigm shift to meet societal needs beyond the conventional economic needs (Larosa, 2021). With the introduction of the Brundtland report

(Brundtland, 1987) and the Sustainable Development Goals by the United Nations (UN, 2020) – e.g., SDG #7 “Affordable and Clean Energy” –, organisations and companies increasingly integrate corporate, societal, and environmental resilience into their strategy. Are these 17 SDGs feasible together? Do socio-economic concerns take precedence over ecological concerns? Consequently, because there are so many opinions, a rich variety emerges of how to strive for sustainability. These 17 sustainability goals (can) lead to tension, (Hickel, 2019) but this should not lead to avoid the debate. We must debate with as many people as possible (inter- and intradisciplinary). Ultimately, it is about the world (social/economical) and planet (ecosystem and health) in which we and the next generations want to live. This particularly concerns unexpected encounters between parties with different perspectives and interests (Hickel, 2019).

Innovation is the engine that powers the global energy transition, as it is both systemic and interwoven. It provides momentum for new and formerly unexplored solutions for societal, economic, technological, and environmental challenges. A series of innovations – not only in technology – but also in market designs, system operation and business models are needed to successfully enable the power sector transformation, and ultimately the energy transition. Innovative solutions emerge from matching and leveraging synergies between various innovations across multiple components of the power system.

The necessary transition towards a zero-carbon economy is reshaping our way of living and of managing businesses and projects. Demographic growth and natural resource exploitation at increasing rates are environmental problems - a combination of heatwaves, droughts, wildfires, hurricanes, arctic vortex and the snowmageddon - that worsen social issues such as health problems, extreme poverty, and social inequality (Pérez and Frank, 2019; Trouet, 2020). Many - environmental - problems are so-called wicked problems (Rittel and Webber, 1973). Societal resilience and adaptation strategies are very important to remain competitive and be able to counter major consequences for the climate (Vince, 2019). With energy demands rising, and high levels of fossil fuel use, greenhouse gases in the earth’s atmosphere continue to increase, and CO₂ is currently at nearly 412 parts per million (ppm) and still rising. This represents a 47% increase since the beginning of the Industrial Age (World Meteorological Organization, 2019). According to the latest IPCC report (IPCC, 2021), ‘human influence has warmed the climate at an unprecedented rate’. According to the International Energy Agency (IEA), it is necessary to transform the world’s energy system, and thus the energy community must be convinced to redirect energy investments and switch to low-carbon development.

The Energy Union has adopted a first set of key targets for 2030 (EU, 2022a):

- at least 40% cuts in greenhouse gas emissions (from 1990 levels);
- at least 32% share for renewable energy;
- at least 32.5% improvement in energy efficiency.

Energy is also prominently present in the European Union’s Green Deal and is based on five pillars (EU, 2022b):

- Security.
- Solidarity and trust.
- A fully integrated energy market efficiency.
- Climate action - decarbonizing the economy.
- Research.

This paper focuses on a research gap in energy transition initiatives, more on transition teams for energy paradigm shifts in Belgium and the Netherlands. Unfortunately, Belgium is not on track for Greenhouse gas emissions while the Netherlands are not on track for primary energy

consumption and Renewable Energy System (EEA, 2021). In both countries there is need for new initiatives, possibly citizen cooperatives and local energy generation. Section 2 of the paper provides a novel approach with a conceptual framework from three different angles: a multiple-level perspective, a smart cities framework approach and a business model perspective given the ongoing evolution towards new and sustainable energy business models. Section 3 discusses the main insights from the interpretive case studies (Walsham, 2006) for Belgium and the Netherlands. It is the first time that the Multiple Level Perspective concept is applied in three different energy sectors in Belgium and the Netherlands. We can rub our hands that there are pioneers such as grass roots and cooperatives, as well as innovative firms dealing with Sustainable Business Models and energy transition. A movement has been set in motion that can/must now go into the highest gear (Cox, 2018). Section 4 provides the conclusions and limitations.

The results are in line with previous findings. Additional results and new insights for the reported cases are discussed.

2 Conceptual framework

2.1 The Multilevel Perspective

Change means an improvement in the structure, culture and working method within a system (Van Yperen and Rooda, 2017) (Loorbach et al., 2020). Besides change we need also transition (Geels and Schot, 2007) (Geels, 2011). Transition is primarily a term used for the transition of living conditions in societies. Transition is basically the shift from one equilibrium to a different equilibrium. A lot happens between those two balances, often in a jerky way. Shifts are taking place in laws, regulations, institutions, and infrastructure, in the way of thinking, the standards and values used, and in the daily way of doing things (Van Yperen and Rooda, 2017; Avelino, 2017). We need people who come up with such new solutions for the economy and society. This can be done by means of a quintuple helix (Carayannis et al., 2017). There might be (is) no central player: a transition is driven by a combination of companies, governments, civil society organizations and citizens. One or more players can initiate a process with the transition approach. Each participant/partner contributes at the same time with the same importance. When new trends - caused by transitions - involving a broader public, are initiated, there is need for a social component (Van Yperen and Rooda, 2017; Avelino, 2017). A transition is needed from one-sided driven economic models to multi-sided eco-systemic models, in other words a transition from shock-sensitive to resilient systems. From the happy few to the greater good. These should lead to a new design of our economic and social systems. The multiple level perspective offers a framework to outline the interplay.

Awareness of broader developments in the sector is important in order not only to present from the inside out, but also to link up with existing opportunities and to connect themes with one and another. A collaboration with sector organisations is therefore obvious (Loorbach et al., 2020; Avelino, 2017; Stewart, 2012). This is shown in figure 1. 1) The macro level forms the "external structure or context for interactions of actors"; oil prices, economic growth, wars, immigration, broad political coalitions, cultural norms, environmental problems, and paradigms are possible factors that determine this. 2) The meso level (regime) level can be seen as the 'rule-set or grammar' of processes, technologies, skills, corporate cultures and artefacts embedded in institutions and infrastructures. The regime tries to maintain itself and ignore the pressure from above, the macro level. 3) The microlevel. The vision of a transforming world or business context usually arises with a group of people who are strongly aware of it. Frontrunners are needed but one or more players can initiate a process. This level acts as incubation rooms and allows for

research and learning through experience. This area provides space and time essential for networks to be established. In the next stage, to increase the pressure on this regime and to become more coherent a transition team evolves via change projects to a change network (see figure 2).

This is where radical innovation will happen. Growth means that the actual project is getting bigger (turnover, share, parties, countries, ...) (Van Yperen and Rooda, 2017). This is what often is understood by upscaling, but it can also be done by broadening. Other parties are taking up the new thinking and are also adopting and mainstreaming it. The innovation becomes normal. This can of course be a result of growth and broadening, but it can also be tightened up by the legislator or higher governance levels. In this way, the parties take a clear position on where the sector must move towards, and they question the existing way of thinking and acting (Van Yperen and Rooda, 2017). In the beginning of a transition process, the change coalition functions as a platform to bundle and strengthen innovation. However, it does not have to stop there. Powerful platforms can be built both online and offline for inspiration and idea management, knowledge exchange and networking (Van Yperen and Rooda, 2017). Those involved in the change projects can include regimes in the learning process, so that the latter can pick up the new way of working and the barriers that these projects must deal with can be addressed.

2.2 The Smart Cities Framework

According to Giffinger et al. (2007), smart cities are a symbol of the use of innovations. A smart city is a smart society in which various elements such as people, environment, mobility, governance, are intertwined.

Urbanization is a challenge for the future. Densely populated areas not only provide opportunities but of course also pose many challenges, in terms of housing, mobility, planning, food, water, sanitation, hygiene, employment and formation, but also in the field of energy (Schilthuizen, 2018). SDG 11 states: make cities and human settlements inclusive, safe, resilient, and sustainable (UN,2020). Although living in a city is more energy-efficient the organic growth of the cities has negative influences in other areas (Schilthuizen, 2018). The rapid growth of the cities is causing a strong spatial expansion, at the expense of the natural environment. The bigger the city, the stronger the heat island effect; with every tenfold increase of the number of inhabitants, the temperature of the heat island will rise by three degrees Celsius. In the largest cities on earth, it can be more than twelve degrees warmer than in the surrounding countryside. In addition, the column of hot air that slowly rises above the city center ensures a constant, city-directed air flow from all directions. As the city air rises, it cools and water begins to condense around the particles of city dust in it, which in turn results in a phenomenon called urban precipitation.

In other words, some cities are so big that they generate their own climate: the wind is always blowing in their direction, and it is noticeably hotter and wetter than in the surrounding area.

Together with increasing pollution, it is important to notice that this reinforces the disruption of ecosystems, but on the other hand it also creates new biodiversity in cities (Schilthuizen, 2018).

Due to the rising purchasing power of the citizens on the one hand and automation on the other hand, lower prices made car ownership more democratic. The average citizen could now purchase a car and take mobility into their own hands (Schilthuizen, 2018), (Coudron, 2018).

This had many consequences:

- 1) changes in living culture (suburbanization and allotment frenzy).
- 2) government started to build roads.
- 3) adjustment of the traffic regulations.
- 4) dependence fossil fuels, e.g., oil
- 5) increasing mobility (at least in the beginning) also had an ecological downside,

Multi-level perspective on socio-technical transitions

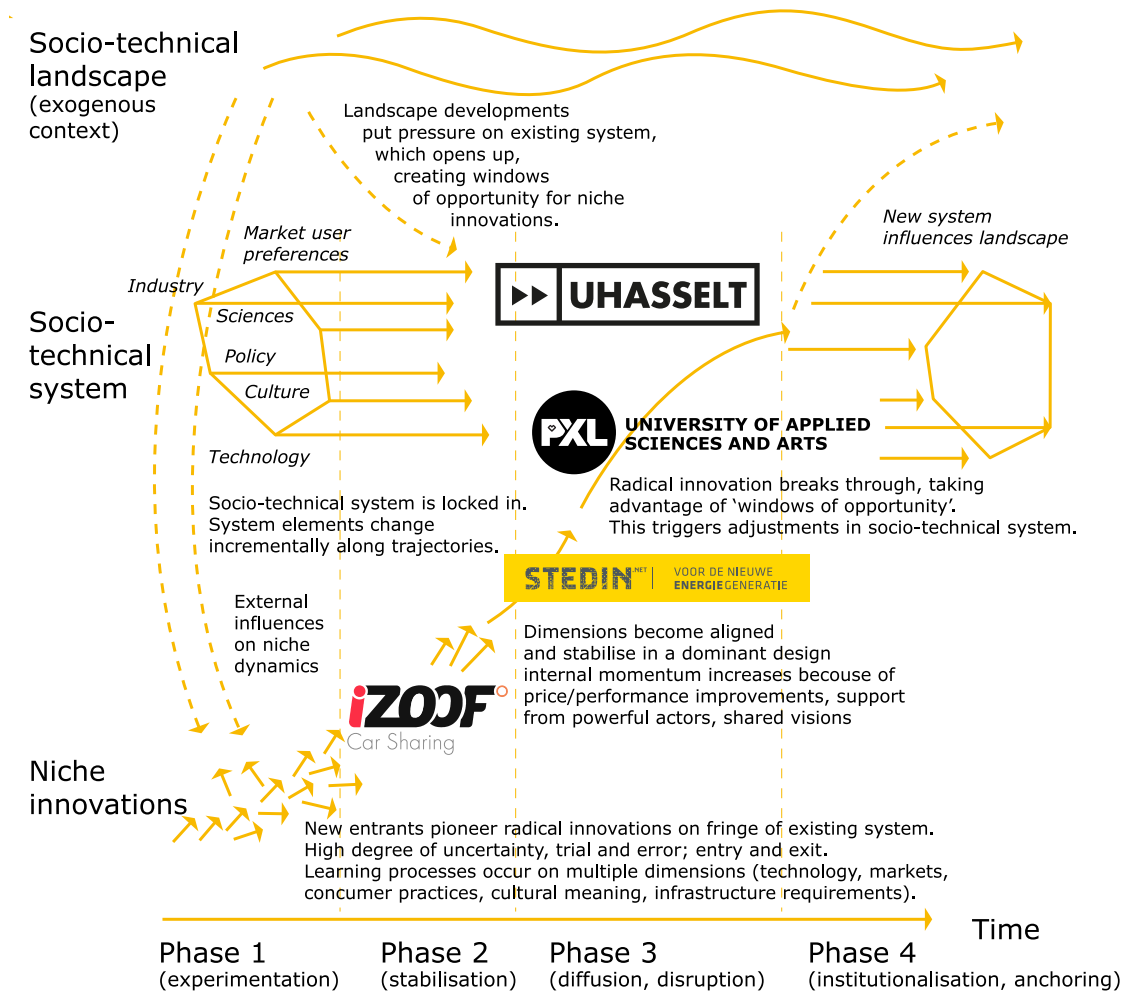


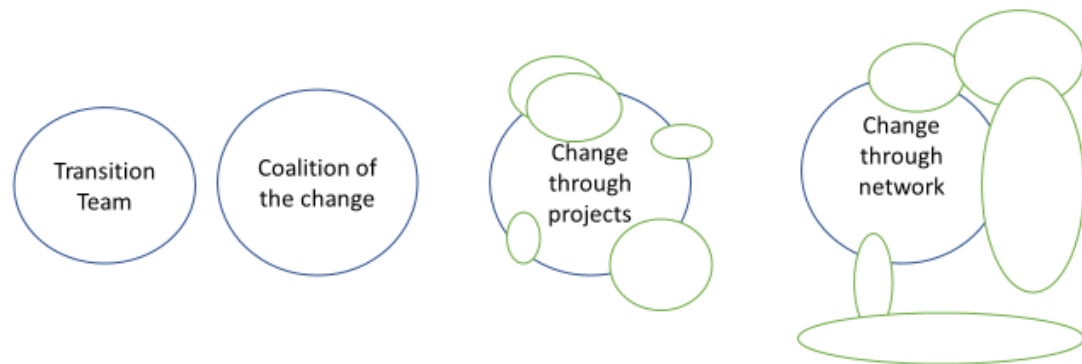
Figure 1. MLP on transition adapted by Franco (Geels and Schot, 2007)

both in terms of spatial planning and environmental pollution.

Mobility – using cars driven by fossil fuels – in and towards a city is an important issue. Alternative economic visions each try to tackle the shortcomings in the current economic system in their own way: the sharing economy, the blue economy, the biobased economy, and the circular economy. . . (Jonkers and Fabe, 2020).

A possible solution can be seen in a paradigm shift towards a completely renewed mobility, built on the sharing of human and physical assets. This involves the creation, production, distribution, trading and consumption of goods and services by different people and organizations. These systems take a variety of forms, often based on information technology to provide individuals, businesses, non-profit organizations, and government with information that enables the distribution, sharing and reuse of “overcapacity” in goods and services (Coudron, 2018). A common premise is that when information about goods is shared, it can increase the value of those goods, for the company, for individuals and for the community.

Perez (2010) describes how such a paradigm shift will happen for mobility based on her study of the previous waves. She sketches how new multifunctional technologies are at the basis of each of these revolutions, new infrastructures are built, organizational principles are developed, which



Interactive Processes Actively combining smaller and larger projects inside out and outside in.

Figure 2. Adapted by Franco from Van Yperen and Roorda (2017)

together can modernize all existing industries. For mobility, there was a shift from trains (1st industrial revolution) to cars (2nd industrial revolution) to self-driving/shared cars, drones (3rd industrial revolution). The balance between cars and soft road users will be very important.

In the context of the COVID-19 pandemic, we are curious about the further urban development. There are at least three challenges for the cities in the near future (Perez, 2010; Fokus Moderne Stad, 2021):

- smart and data-driven policies;
- agility and integration;
- a customer/citizen-oriented digital approach.

Social functions can draw people out into shared living spaces or surrounding public spaces. That reinforces the sense of community. There will also be more and more circular living in the future (Coudron, 2018; Wirth et al., 2019; De nieuwe Dokken, 2021; Buurtbatterijen, 2021; KermtStroomt, 2021). the future. Citizen participation is constantly growing, and the necessary tools are yet available (Breukers et al., 2013; Mourik et al., 2021).

In the context of the transition approach, we focus on the role of transition teams and social interactions in this study. We will apply this approach for the PXL University of Applied Sciences (PXL, 2021), in a grassroots initiative iZooF Car Sharing/Ons Buurtschap in Haarlem (2021) and in Stedin Netbeheer (Stedin, 2021), a Dutch regional Transport- and Distribution System Operator (DSO) in electricity and gas. It is interesting to mention that three authors were participants in the DRIFT (Drift, 2021) course MCVET (Masterclass Versnelling van de Energietransitie). In view of course they all prepared a transition project (which seemed to be successful) and is now the topic in this paper and in their professional life.

2.3 New Business Models

Exploring new technological trends, identifying new business opportunities to fit the business model, establishing new partnerships and alliance management are main strategic reasons for innovation. Developing new business models is a challenging endeavor for organizations and companies since it requires entirely rethinking several elements of their strategy. The concept of business models is integrated with a variety of academic disciplines (Chesbrough and Rosenbloom, 2002), such as business architecture (Gassman et al., 2014; Teece, 2010), innovation and strategy (Magretta, 2002), interconnected and interdependent activity systems (Zott et al., 2011), value generation (Osterwalder et al., 2005; Osterwalder and Pigneur, 2010), open innovation

(Vanhaverbeke and Chesbrough, 2014; Podmetina et al., 2017) and managerial and entrepreneurial analysis unit (Schaltegger et al., 2016). The large stream of research on business models (Osterwalder et al., 2005; Osterwalder and Pigneur, 2010; Wirtz et al., 2016) converges to the idea that a business model is the sum of complementary elements, which define how a company creates, delivers, and captures value.

Business models emphasize a holistic approach, looking at the broader societal perspective. According to Amit and Zott (2020), business models are opportunities for innovation and can be considered a relevant alternative for creating value for the organisation capable of bringing benefits to its customers, suppliers, and other partners (Matzembacher et al., 2020; (Freudenreich et al., 2020). Amit and Zott (2020) stress the fits between the business model, the classic strategy (strategic fit), the organization (internal fit), and the ecosystem (external fit). Scholars and practitioners are increasingly exploring how new business models can incorporate social and environmental dimensions into business architecture and design (Boons and Lüdeke-Freund, 2013; Evans et al., 2017; Lüdeke-Freund et al., 2019). Cavicchi and Vagnoni (2020) refer to the generation of “a holistic view that considers both benefits and costs for stakeholders, such as society and the environment”. The main idea is to simultaneously maintain or even increase economic prosperity by including the holistic concept of sustainability and in line with the multi-level perspective. In other words, a move from a business model focusing purely on profit, with low sustainable value, to a new business model with a high sustainable value (Matzembacher et al, 2020). Sustainable business models are viable avenues for companies to pursue corporate sustainability and shared value creation (Porter and Kramer, 2011) by improving the effectiveness and efficiency of their activities in the spheres of the natural environment, society, and the economy and still profiting from these activities (Schaltegger et al., 2016; Lüdeke-Freund et al., 2017). “Shared value results from policies and practices that contribute to competitive advantage while strengthening the communities in which a company operates” (Porter and Kramer, 2011).

The business sector has a fundamental role to play in addressing the shared goals of net-zero challenge, in tackling climate change and in implementing the sustainable development goals (Dentoni et al, 2021). This has led to a growing attention for sustainable business models, creating social and environmental value at the firm-level. The focus of the current contribution is on sustainable energy business models. We distinguish between three applicable business models:

- Mobility as a Service;
- Public Private Partnerships;
- Energy as a Service;

Mobility as a Service (MaaS)

The fundamental – user-centric - value proposition of Mobility-as-a-Service (MaaS) relies on investments in complementary offerings and access to a range of user-friendly mobility services and solutions that will augment or even replace the current, state-controlled public transportation services. MaaS can be defined as the full integration of private and public mobility services, designed to meet the objectives and requirements of a variety of stakeholders (Foulser, 2021). These include customers, mobility services providers and operators, local and city transport authorities. Disruption in mobility ecosystems (Christer and Curtis, 2008) provides the value proposition of more freedom of choice to mobility consumers. Mobility as a subscription-based service, with all-inclusive insurance coverage and factory maintenance for cars is a good example of subscription-based business models (Matzembacher et al., 2020) (Foulser, 2021). Considers three levels of MaaS with different complexities of choice:

Shared and multiple value creation (Baldassare et al., 2020) is an important feature in the MaaS business model. Porter and Kramer (2011) suggested that treating societal challenges as business opportunities is the most important new dimension of corporate strategy and the most powerful path to social progress. “Shared value results from policies and practices that contribute to competitive advantage while strengthening the communities in which a company operates”.

Public Private Partnership business model

The public private partnership (PPP) business model is increasingly deployed for the financing of projects and to speed up desired transitions. The PPP model is about building sustainable multi-stakeholder partnerships within open and connected networks. The public part (government side) of the business model is mostly about creating societal impact. The private part (business side) relates to economic issues, investor financial returns and value co-creation (Franco et al., 2018).

The grassroot experiment discussed in this paper can be seen as a specific application of PPP business model, i.e., a Public Civil Partnership (PCP), but the C can also be seen here as Common, Citizens or Community.

Energy as a Service (EaaS)

Only very recent new business models entered on the market in view of energy. EaaS business models are surfacing increasingly, where the energy ecosystem co-creates innovative new approaches towards energy transition.

Hamwi (2019) distinguishes between twenty-two Energy Business Models (EBM), clustered in eight patterns, following activity system design themes or four sources of value: novelty-oriented EBMs, lock-in oriented EBMs, complementarities-oriented EBMs and efficiency-oriented EBMs.

2.4 Transition Teams

According to De Sá Freire et al. (2021), knowledge-based organizations are “shaped by collective knowledge and the existence of teams and groups of people that are continuously developing their capacity and ability to create results”. Markovic et al. (2020) argue that updating/upgrading of employee knowledge and skills and dedicated teams are likely to bring behavioural changes and a mindset change. Key elements are:

- Adoption of strong sustainability model
- Use of systems thinking
- Adoption of a radical approach to innovation
- Adoption of a long-term period for innovation planning

Market forces are a powerful tool to accelerate transitions. By linking niche players to a potential market demand, innovations are accelerated. Sometimes however it is important for transition teams to slow down, which can lead to more insight, decisiveness, and efficiency. In addition to or arising from the setting of standards, stakeholders can make agreements that cross and connect different sectors. This can take various forms, such as covenants, round tables, green deals, and voluntary agreements. The connection can be established by an external party, acting as a facilitator.

We will focus in this contribution on energy transition through transition teams in buildings and mobility. The selected **interpretive case studies** are:

- PXL University of Applied Sciences (Belgium);
- iZoof in Haarlem (Netherlands);

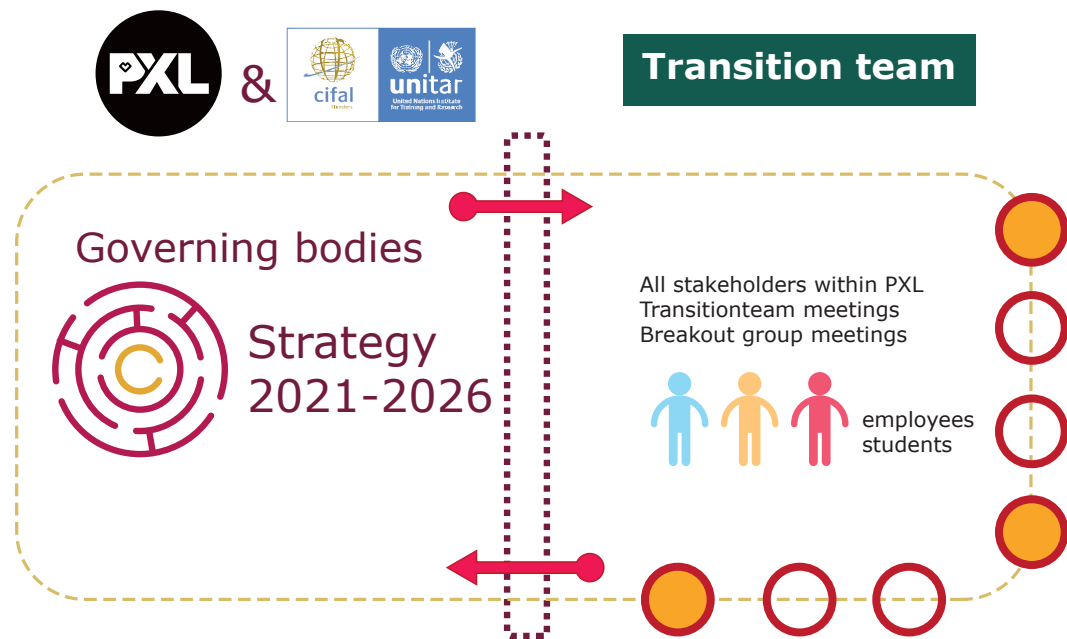


Figure 3. Position of the Transition Team in PXL UAS

- Stedin Netbeheer, Energy Distribution System Operators (Netherlands).

PXL University of Applied Sciences (PXL UAS)

Higher education institutions play an important role in the transition towards a more sustainable carbon free society in collaboration with (local) government, society and industrial partners, the so-called quadruple helix. Within PXL University of Applied Sciences a climate committee was set up in May 2019, that renamed itself as SDG@PXL. Knowledge sharing is a key element of SDG@PXL, with a prominent coaching role for the CIFAL-UNITAR officials. CIFAL-UNITAR has developed a methodology to get started with the SDGs in a company-specific way. The internationally benchmarked knowledge and inputs provided by CIFAL acted as an important lever for the implementation of the sustainable development goals within PXL and the growth path towards becoming an SDG Pioneer, i.e., phase 1 in the ongoing transition project.

All members of the SDG@PXL “change through process”-group took part in several digital (COVID-19 induced) lectures, workshops, webinars, and meetings in a close co-creation between CIFAL and PXL. The importance of facilitating continuous learning at all levels through empowering people, encouraging collaboration, and promoting open dialogue was a key feature in this process.

SDG@PXL is the transition team. Originally, this consisted of 5 members (Head of department Green & Tech, director of finance and facility management, research and education staff member and the policy advisor). When reporting these results within the policy groups, there was a spontaneous request from department heads and directors to delegate additional people in the transition team. The transition team – illustrated by Fig. 4 - grow to more than thirty employees and students and became a “coalition of the willing” and later a “coalition for change”.

The transition team is the pivotal point in the bottom up and top-down realization of (1) the new policy plan (2021-2026) in which sustainability is included in the mission and vision and (2) elaborated in the policy lines of education, research, personnel, and operational management. To realize this, (3) PXL cooperates closely together with CIFAL-UNITAR Flanders and the Limburg

Chamber of Commerce VOKA.

Ons Buurtschap

This Haarlem residents' initiative started with a pre-phase in the second half of 2017, by one person who found a system partner in 2018 in the municipal operator Spaarnelanden (2021). Environmental focus is present in their mission, and they have expertise in working on the scale of cities and influencing behaviour. In addition, they have their own garage for maintenance of shared cars. Two co-initiators from other Haarlem grassroots joined. Their activity was to inspire and activate neighbours to participate in the pilot project. At the start of the project, they built up the community in their own neighbourhood. In June 2018 these three residents started the iZoof Car Sharing pilot project with electric shared cars in collaboration with Spaarnelanden (2021).

The iZoof Car Sharing/ Ons Buurtschap grassroots grew up to 130 participants in less than six months. The number of people involved (time, network and competences) remains constant, but the participants themselves varied. Two, always the same people were the point of contact, surrounded by a core of about 10 people, who were active at the same time. In the next periphery we see about 40 people who showed above average involvement in the car-sharing app and who participated ad hoc in the project. In total, approximately 30 people contributed to the active core group (iZoof Car Sharing, 2021).

The pilot project aimed to inspire, activate, and organize the residents in an electric car-sharing service, with the intended effects:

- more space on the street;
- a more social neighbourhood;
- more agency for citizens in their own neighbourhood and cleaner air.

This shared mission has been used to convince other participants and by describing the car-sharing service as a design issue: How can we convert our own (fossil) car ownership into electric shared mobility of, for and by residents?

The collaboration with the municipal contractor made this project a special residents' initiative, as both employees of Spaarnelanden and residents worked on the development, and the financing was provided from the company's innovation budget. During this phase of the pilot project, the capacity of the company was constant - because it was budget-driven. On the other hand, the group of residents expanded (see fig. 2): by personal contacts of the participants, but also by means of a volunteer center. The project group was in (digital) direct contact by means of different apps, but they also they met in real life in the city.

In the context of a financing party, the slogan: "Who pays, decides." easily becomes a culture (although unnoticed and unintentionally). The labour of residents (see Table 1) is absorbed in the global project (by counting hours), but other aspects of contributions were not evaluated. Therefore, the decision-making process had to be organized adapted to this project, which was otherwise subject to the internal corporate hierarchy.

After some time, it seems necessary for the (participating) residents to have their own communication platform, in which they could discuss independently and lobby from the perspective of residents. An important step (mid-May 2020) therefore was the launch of the resident's association: Ons Buurtschap (2021). This was also the prelude to the entity, through which the participants of the sharing service would eventually become co-owners of a cooperative from which the pilot project would be restarted. From that moment (mid-May 2020) on, this residents' association has its own complementary parallel circuit.

The two founding members recruited people who could help facilitate the efforts of residents

in both the association and the pilot project: Together they realized a website, a virtual meeting place, (inclusive the hosting) and due to the corona measures also a self-hosted video calling functionality was also installed.

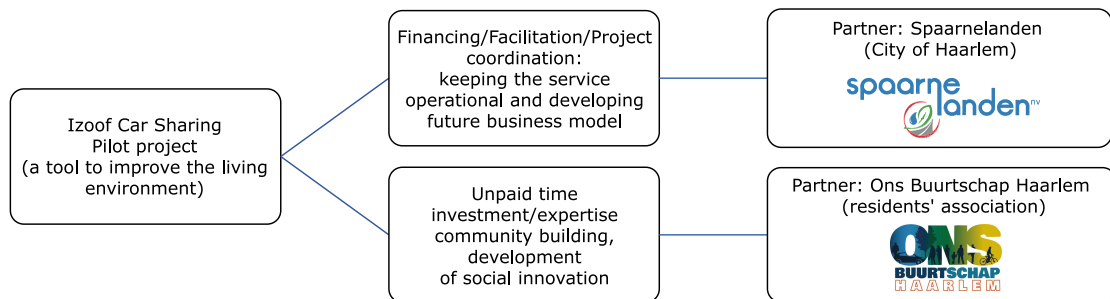


Figure 4. Structure of the Izoof grassroots

The value that residents added to the development of the pilot project is guaranteed in the association, enabling to demonstrate a formal investment in the project. The storytelling also gained strength, after the launch of this resident's association. In this way the active group grow organically. In addition, many network discussions, meetings and presentations have had a stimulating effect. A prototype of a car-sharing service was promoted, resulting in a proven concept that is ready for the scale test (Evaluatie, Pilot iZoof car Sharing, 2021).

Stedin Netbeheer

Stedin Netbeheer is one of the three regional Energy Distribution System Operators (DSO) in The Netherlands. They offer energy services, gas and electricity, to 2,2 million end users and companies in one of the most densely populated areas. This area is, with the Port of Rotterdam, a region with high economical value. The strategy of the company is focused on:

- 1) Being a reliable DSO
- 2) Acceleration of the Energy Transition in the operating area and
- 3) Sustainable and circular operations.

The hosting group (the idea started by René Herlaar (via DRIFT MCVET) consists of 4 internal white-collar employees and two external coaches.

The liberation of the energy market and the energy transition requires a major shift in the way DSO's design, operate and maintain their networks. Where technical challenges can be met through industry roadmaps and hard-core implementation plans, the way people work is often more difficult to influence. It offers a lot of potential in contributing to the acceleration of the energy transition. Hence, speeding up the DSO ability to be a real partner to consumers and in B2B services in their efforts towards a more sustainable society. In this context, the pioneering project of "Energy! In operations" has been launched in December 2018. Stedin Netbeheer High Voltage (HV) believes in the hidden power of our operational staff. The people, who are working in the field, are on call out 24h/ day, who do the actual build and maintenance of our infrastructure. They are the hands which make the network actually work. They have the in-depth knowledge of the actual history of sites, the physical infrastructure, in the ground and at the sites: The blue-collar people. In their own words: "We believe that the people at the office (white-collar) know where the company want to be in a few years. Because we understand and know the current situation better than the systems, we are well positioned to connect the past to the future systems.

If you only would allow us to.”. This group typically works in the company for many years hold a lot of experience and pride in their job.

This initiative aims to re-energize and motivate the blue-collar workers, to become the best version of themselves in the workplace. Hence, significantly improving employee satisfaction enabling the company to meet their objectives faster, safer and in a more sustainable way.

The initiative does not have specified desired outcomes. It seeks to understand what is enabling this group of people to leap into the next phase of their personal development. A better understanding offers guidance to next initiatives, enabling early adopters to build on the learnings. An open invitation was sent to about three hundred people, inviting them “to take up the challenge”. We designated the members on first respond-first in basis. Note: since these are workers doing planned work, their capacity needs to be freed up; these working hours is the most significant part of the investment in the initiative. The budget for this has been set on 8 hours/week during the running time of the project.

The hosting group (=transition team) is supporting the transition group (= a coalition for change (see fig. 2)) to overcome organizational barriers, help develop the team and building organizational capacity for future projects. Note, that the external capacity is one professional life coach, supporting the personal development and one professional coach, supporting the social transformation by designing and hosting the transformational processes with which we work. The core team initiates develop and executes their own initiatives, which really matter to them. Either individual or as a team. The initiative was kick-started by a 2,5-day event. This event was carefully designed and hosted by the hosting team. It took the group on a journey, exploring team dynamics toward self-management, team building, personal development and some work on understanding personal belief systems. A good part of time was assigned to working on the initiatives and projects. At the kickoff and the catching up gatherings, we use transformative processes (Sharman et al., 2006) Wheatly et al., 2011) to underpin that transformation is fractal: start with ourselves and from there to all levels.

3 Results and discussion of the three cases

Close inspection of recent studies (Bosmans et al., 2018; Loorbach et al., 2018; De Haan and Rotmans, 2018; Kanger, 2021; Rotmans, 2021) clearly reveals that this approach advances energy transitions practically and is particularly valuable in this area.

The following elements are indispensable to be successful in any (energy) sector:

- bringing into view the transformative challenges;
- sensitizing participants to potential disruptions and uncertainties explicating underlying assumptions;
- diversifying existing actor networks;
- changing its interactions with stakeholders, by inviting actors from other domains;
- creating space for open discussion;
- challenging if issues of interdisciplinarity and accessibility are addressed. Additional results and new insights for the cases are also discussed. Our cases clearly show that the evolution towards the “change through network” is realistic if the transition is well managed. Both are reported for each case separately. In this way the potential to contribute to the theoretical foundations of energy transitions research is confirmed.

3.1 PXL UAS

We detected and agreed which SDGs are important for PXL UAS, where we have know-how and which SDGs obtained too little attention at this moment. As a result, the following SDGs in descending order were put forward as the most important for PXL: SDG nr 4, 8, 17, 3, (9, 11, 12 ex aequo). It was also detected that PXL should pay more attention (also on a downward trend) to SDG's 12, 13, 3, 7, 10, 11 (ex aequo). In a next step, subgroups worked to cluster themes and actions within the selected SDG's and to and to make a prioritization in these themes and actions. Based on these results, SMART objectives were formulated. They formed the basis for formulating Strategic Goals. These goals are set by and for top management of the organization. These goals are made by focusing on broad general issues and are usually long-term. Moreover, we used a holistic SDG analysis whether these actions would not be contradictory.

The necessary evidence for SDG Pioneer were achieved.

- the policy advisor is the spoc and the transition team acts as a task force.
- a mission and vision which reflect a commitment to sustainable development was written.
- finally, the internal quality assurance mechanism and then ultimately assessed externally by the NVAO accreditation will be used in the PDCA cycle.

Various strategic goals were formulated, but here we mention the Strategic Goals regarding energy transition.

- PXL is transforming its campuses into green, nZEB campuses (almost energy-neutral campuses).
- PXL is committed to sustainable mobility and reduces the paved parking space with the aim of better air quality, more greenery and biodiversity.
- PXL is further transforming into inclusive campuses that contribute maximally to the social intertwining with the city and the region, equipped with the smart technologies and space for Campus life, community development and networking.

Another important (energy) project originated as well from this transition team. The PXL has been organizing the unique postgraduate program Energy Efficiency Services for years. In the trend teach what you preach, an Energy Quick Scan was carried out and it became clear that this was also economically feasible (Franco et al., 2018). But building users, want an approach that takes their personal situation into account. Non-Energy Benefits (NEB) (Cagno et al., 2019) Also play an important role and as a higher education we want a more holistic approach, not only energy efficiency projects (Breukers et al., 2013) and (Mourik et al, 2021). So, the idea was born from the living lab campus of the PXL Green & tech department to incorporate all "users" of these building (not only the facility manager) and to set up a tender in collaboration with Vlaams Energiebedrijf (2021) for new MEPC (Maintenance Energy Performing Contract) (Scharmer et al., 2006) (Bleyl et al., 2019), (Well, 2021) for a "healthy building for a healthy mind in a healthy environment". Besides E(nergy) E(fficiency) this MEPC focus also on

- realization of other sustainability aspects, such as water saving, circular renovation, waste reduction, etc.
- intensive involvement of students and teachers throughout the entire trajectory, over several academic years,
- development of KPIs, measurements and analyses (PXL-Tech as a living lab)
- stakeholder management: involving other stakeholders on the university campus in Diepenbeek (UHasselt, Vlaamse Confederatie Bouw, etc.) and
- searching for synergies at the campus level (eg. 1 central heating network for the entire

campus, which the PXL-Tech building can also use take in)

Through this approach more inclusive solutions are realized. This new MEPC should also be accompanied with a new business model. Dealing with the energy aspect of this new EMPC, MEPC, the BM will be adapted from the ESCO approach (see fig. 5) (ESCO, 2013; EPC, 2021).

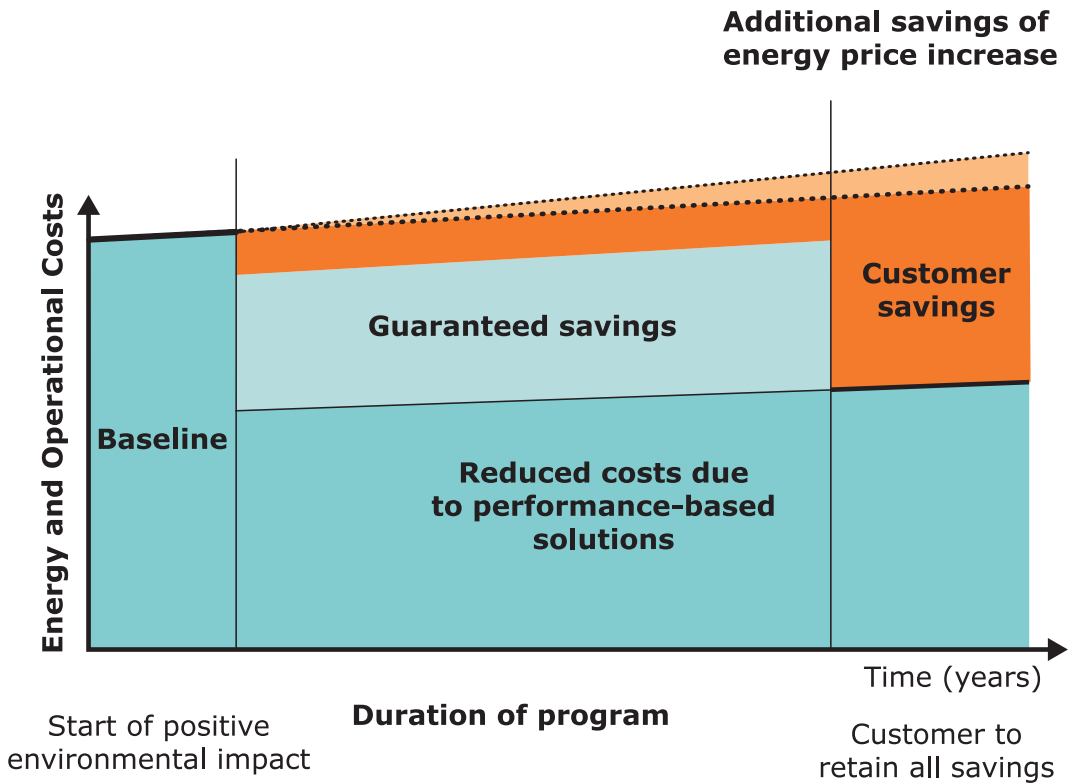


Figure 5. MEPC Scheme (EPC, 2021)

3.2 iZOOf/Ons Buurtschap

This grassroots experiment creates a community with links to the quality of life, inclusiveness, redevelopment of parking space, social cohesion and sustainable mobility. The main results are shown in the table 1 below.

Table 1. Results for the grassroot experiment iZoof.

Result	#	Context
Number of participants	130	not just “innovators or Early adopters have been reached
Fossil cars have disappeared	41 (conversion Circa 30%)	It mainly deals with the first car. 13 of the 41 cars have not been purchased precisely because of the arrival of electric shared cars. If every shared car is directly equipped with a own charging point and the residents have the certainty that this initiative will continue, the expectation is that more residents will get rid of the car and the conversion will then increase to 40%. (Other car-sharing systems have this no available measurement data.)

Result	#	Context
Participant Contribution	4 domains	<ul style="list-style-type: none"> - Support for a fixed financial contribution - Need for a differentiated model - Users experience threshold with thinking in time use versus km use - Guarantee on shared mobility is more important than price
Customer satisfaction of residents	Average 8/10	
Reduction of car use of short journeys (up to 5 km)	25%	Extrapolation
CO2 savings in grams	20.168.460	
Saving particulate matter (PM10) in gram	4.654	Extrapolation
Savings in nitrogen oxides (NOx) in grams gram	15.514	Extrapolation
Vacant space on the street	510 m2	34 cars have disappeared from the streets.
Use (occupancy rate)	40%	The measured occupancy rate fluctuates between 25% - 40% depending on the circumstances.
Deployment of volunteers	Circa 1.500 h	
Commitment to co-develop the car-sharing service and the mission in working groups	40%	
Commitment to co-develop the car-sharing service and the mission ad-hoc in meetups	60%	
Electric Vehicle (charging station)	7 (2)	

In the end, the project partners intended to set up a cooperative in which Spaarnelanden and residents' association Ons Buurtschap would have shared ownership. Although there was a willingness of the external financier to invest, what is needed to set up the company and cover the first start-up losses, the municipality of Haarlem has prevented the participation of partner Spaarnelanden (of which the municipality is the most important shareholder). The pilot has ended in December 2021.

The resident association Ons Buurtschap however still has the ambition to realize a participatory sub-concept (Public Civil Partnership) in other cities. She focuses on the development of an autonomous organization and the technology that makes scalability possible (iZOO of Car Sharing, 2021). Besides that, Ons Buurtschap also explores further development of the participatory sub-concept in other domains. Therefore, she will participate in 2022 in a project in the social

domain/neighbourhood economy in Haarlem (Schalkwijk).

3.3 Stedin Netbeheer

The trial of the “Energy! In Operations” has yield several results. Beyond change there is transformation; change is planned: it has a start and an end. It can be designed and managed as a project; transformation is an evolution. You know you have to move into another way of working, but there is no clear path, nor destiny. One has to ‘sense the field’. This requires the activation of a different skillset from the employees and the employer. The trial of the “Energy! In Operations” has yield results dealing with the strategy framework and objectives of the organization in both economical and organizational culture.

- Technical innovation takes place in a project around cooling of specific data rooms at HV sites.
- Process innovation takes place: a specific form, which was around for many years and took a lot of time of the individual to fill in and do the administration, has been adapted. A small step for the white-collar, but giant leap in motivation for hundreds of blue-collar people
- Self-confidence of the core team improves step by step; they surprise themselves: they give presentations of the initiative as a means of marketing in the organization at all levels.
- Expanding their internal networks: they meet people, which they only knew by name or from communications by phone or email. Meaningful conversations about real life topics heals lost connections in system at all levels. Office people make more regular site visits, to understand the issues even better.
- The hosting team also learns, through reflecting on their own attitudes and behavior, starting to understand the impact of their actions, learning a different language, hence a more connecting way of communicating; also, here transformation starts with self. The presence of external coaches here has been pivotal.

4 Conclusions – Limitations

4.1 PXL UAS

A point of attention is of course human behaviour and ingrained habits. A strong point to note is that our university management is dedicated to supporting the SDGs. On the other hand, our network will keep us alert and facilitates, as there are initiatives in collaboration with industrial partners to practice and implement the SDGs. We have registered us in the follow-up to SDG Champion and the transition team is again the task force. The Multiple Level Perspective method (micro, meso and macro level) is often cited to describe transition. On the one hand, we can see the university as the macro level, and the individual staff members as the micro level. But we can of course also see the institution as a micro level in the (eu)region society. We hope as the first HEI in Flanders with the SDG pioneer label to be a catalyst towards more SDGs in (higher) education on the one hand, but on the other hand that we also have a multiplier effect towards our suppliers. In addition, we are convinced that our (junior) colleagues create opportunities in their private, but also work situation.

4.2 iZoof

The municipality of Haarlem prevented the participation of partner Spaarnelanden. With the end of this PCP, the perspectives on finance, insurance, and facilities (like parking lot and EV-charging) disappeared, and the aimed model of co-ownership became impossible. However, this grassroots

experiment delivers important insights:

- A partner who invests in a sustainable way in the development of a residents' initiative is an absolute facilitator, when own money and authority of a resident group are (still) missing.
- The most important barriers to work together with the market, government, and residents on solving collective problems and the acceleration of the (mobility) transition seem to be the working method (processing) of the municipal policy level and their lack of knowledge and understanding of social innovation, the personal preferences, and relationships of (some) council members.
- Resident initiatives with a strong (transition) ambition in which the commitment of system partners is a precondition, must be organized in an autonomous entity directly from the start. It is also strongly recommended to draw up a management agreement at the start between the several partners and to agree on basic commitments.
- In addition, the sharing of data and personal data between the entities must be regulated according to GDPR guidelines. Because these data represent value, it must also be part of the cooperation agreement.
- Quite quickly, to achieve effective interaction and secure progress, it is needed (despite the fact that this seems very administrative) that everyone subscribes the necessary agreements (system partners, external stakeholders, associations, residents, ...). This requires also onboarding on the values and culture of the initiative, work facilities, and clear agreements about value creation and meeting culture.
- Moreover, it must be agreed with those who create value on a voluntary basis in such a collaboration and that the collective is the owner of the intellectual property. In cases where business or competition sensitive information is created/is shared, a non-disclosure agreement may even be required.

Recommendations:

- At the start of the collaboration, investigate if the municipality is able or willing to participate on an equal base in this Quinta helix model.
- Investigate if the municipality is prepared to co-create on facilitating (increase the numbers of delegees) if the projects cover more and more ambition (charging infrastructure, parking spaces, ...) (As a continuous, smoothly running process).
- As already mentioned sometimes it is important for transition teams to slow down, which can lead to more insight, decisiveness and efficiency. On the other hand, sometimes, the next step is necessary and urgent, so make a choice which partner in the Quinta helix should realise this. Be aware how this starting position influences the process, and keep asking: what/which step does the process asks (at this moment)?
- Choose from the start, the car-sharing software that will supports the growth ambition and work culture.

4.3 Stedin Netbeheer

The energy transition not only requires adjustments to the energy system, but also other ways of working. Continuing to do the same will not bring anything new! Many blue-collar employees see the energy transition as something far removed from them. At the same time, they are the ones who know what the situation is now, they have an opinion about how things can be done differently and the knowledge and experience to make it actually happen. The gap between professionals with knowledge in the field and technical specialists who are aware of the latest technological developments is widening. For the necessary innovations, this knowledge and expertise will have

to come together. There is much to be gained if all the knowledge, skills, and talents available within Stedin Netbeheer are used, but employees are limited in their decisiveness and autonomy by imposed rules, restrictions and planning from “above”. There is much to be gained from more and better interaction and cooperation between different teams, projects, and levels of education. Currently, performers are often not heard. This results in unhappy employees who cannot develop optimally. This is painful for employees and detrimental to the energy transition. Transition is about searching-experimenting-learning and inventing-organizing-carrying out. Space for innovation is needed to find solutions that do not yet exist. Professionals and their leadership need encouragement when it comes to self-organization at work. But in their lives, they *are* self-organizing

After this trial two new initiatives have been launched. One to focus on the blue-collar workers: a tailor-made Dragons’ Den. Any idea can be pitched, and they will be supported to realize it. Dragons are the leadership of the HV department, former participants, and invites. Dragons do not give points; they award chocolate bars. The idea with the most chocolate bars wins.

As of 2021 it became part of formal proceedings in the HV department. Two times a year a new group starts. Every initiative is supported by a professional team, helping them to prepare for pitches (confidence) and in the implementation process. Many groundbreaking ideas have already been implemented

The second is a 5-quarter program “Volle Kracht Vooruit” (Full Speed Ahead) launched in September 2020, a leadership support program to further accelerate the social transition in the middle management layer in the Stedin Netbeheer department of High Voltage. Now the management of the business

4.4 Limitations

This extensive research - three cases and at various growth levels- still has its limitations. On the other hand, it does provide the opportunity to grow further in the three cases: new corporate approach at Stedin, new social domain/neighborhood economy in the case of the grassroots and the next step at PXL with regards to MEPC and SDG Ambassador accreditation. These cases inspire other external initiatives by “change through network”.

It is very important to experiment and to consolidate the small steps. Important aspects in the continuation of this process are, always be kind and patient. There are many starting points for a transition team (it can deal with vision of a company, the language, the numbers, the remuneration system, procedures, social culture of the company,) to bring change. Indeed, look for supporters and turn the transition team/idea into a coalition of the willing. Also, the “transition” of the team can be accompanied by a certain degree of difficulty, confusion and turbulence (fear phase, battle phase, collaboration phase - closed team, integration phase - an open self-organizing team).

An open, self-organizing team can easily admit differences and deploy team members based on knowledge and intuition. This creates more and new insights and opportunities and you avoid a financial and creative lock in (so important to make a paradigm shift possible). Stay optimistic and know that every step (focus on something within your power and capabilities and stay within your initial intentions) towards more coherence at this micro level will put more pressure on the system and can be a step shorter to a paradigm shift, the energy transition (Gospel, 2021). A transition can gain momentum if several signals are green. Let us not let this moment, at which we may have accidentally reached a crossroads, pass unused by routinely returning to the economy we already had. Indeed, creating sustainability must be a collective task, just like fighting the pandemic. The axiom that we must first get the economy in order and then work on sustainability

is dangerous and misleading. The future requires a society that is geared towards sustainability, human dignity and biodiversity. One in which growth takes on new meaning (Jonker and Fabe, 2020). Given that we need urgent, rapid and effective action to transition away from fossil fuels to an ecological sustainable energy system, based on the efficient use of Renewable Sustainable Energy, which actors and sectors of society will be the prime movers for change? Individual action to improve EE in the home and reduce or adapt your mobility is necessary. But they have of course their limitations on the one hand, on the other hand these “micro” experiments can become a “network” and act as a catalyst to more profound transition.

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Anna Richt Hannema. Anna-Richt Hannema was co-initiator of citizen-led organisation Ons Buurtschap and coordinated the car-sharing pilot iZoof in the city of Haarlem. Since that project, Ons Buurtschap works on learning and experimental environments for new modes of collaboration between citizens, local authorities and businesses. While promoting active citizenship, these collaborations aim to co-create solutions for complex urban (wicked) problems in our living environment. Ons Buurtschap is committed to the necessary promotion and

strengthening of the (weak) position of residents in these partnerships, to enable their involvement to be of greater influence on the living environment. The author has expertise at the interface of the fields of communication, behaviour, transition and systems thinking. In daily life she facilitates co-creation processes, connects stakeholders on joint propositions for public value, and shares her knowledge about these processes for both professionals and residents.

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