

Municipal sustainable building and living

Impact analysis and best practice
examples of sustainable building
and living



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Theoretical foundations

The factsheets are based on the theoretical model of the doughnut economy by Kate Raworth. Therefore, this sub-chapter first explains the basics of doughnut economics, especially the image of the doughnut and the doughnut principles. Subsequently, the structure of the factsheets is presented, in particular the four-field table for the socio-ecological inventory and the impact matrix. This chapter aims to explain all concepts that are important for understanding the factsheets and enable the reader to build on them for future projects.

The doughnut economy

The doughnut economy, developed by Kate Raworth, is dedicated to enabling every human being to live well within planetary boundaries, thus preserving the earth as a living planet. The doughnut serves to visualise this goal. It represents a safe and just space for humanity, in which the social foundation is secured for everyone, and the ecological limits are not exceeded. For the social foundation to be secured, a minimum standard of social needs must be guaranteed for every human being on earth. Leaving the doughnut inwards means that some people will lack essential goods and services to live well (water, food, education, etc.). Leaving the doughnut outwards means putting too much pressure on

the earth's ecological ceiling, which can affect the functioning of life-giving systems.¹ We refer to the ecological ceiling as the amount of pressure, for example in the form of emissions and pesticide use, that planet earth can withstand before the ecological systems necessary for life on earth collapse.² The ecological ceiling consists of nine planetary boundaries identified by earth system researchers.³ Doughnut economics also turns away from understanding economic growth as the goal of economic activity. Instead, it strives to navigate humanity into the safe and equitable space inside the doughnut for all humanity.⁴ The coloured marking of the social and ecological boundaries shows how pronounced the social lack or the ecological pressure currently is in Germany. The more the triangles in the middle of the doughnut and the fields outside the doughnut are filled in, the further away society is from the safe and just space of the doughnut in the corresponding area.⁵

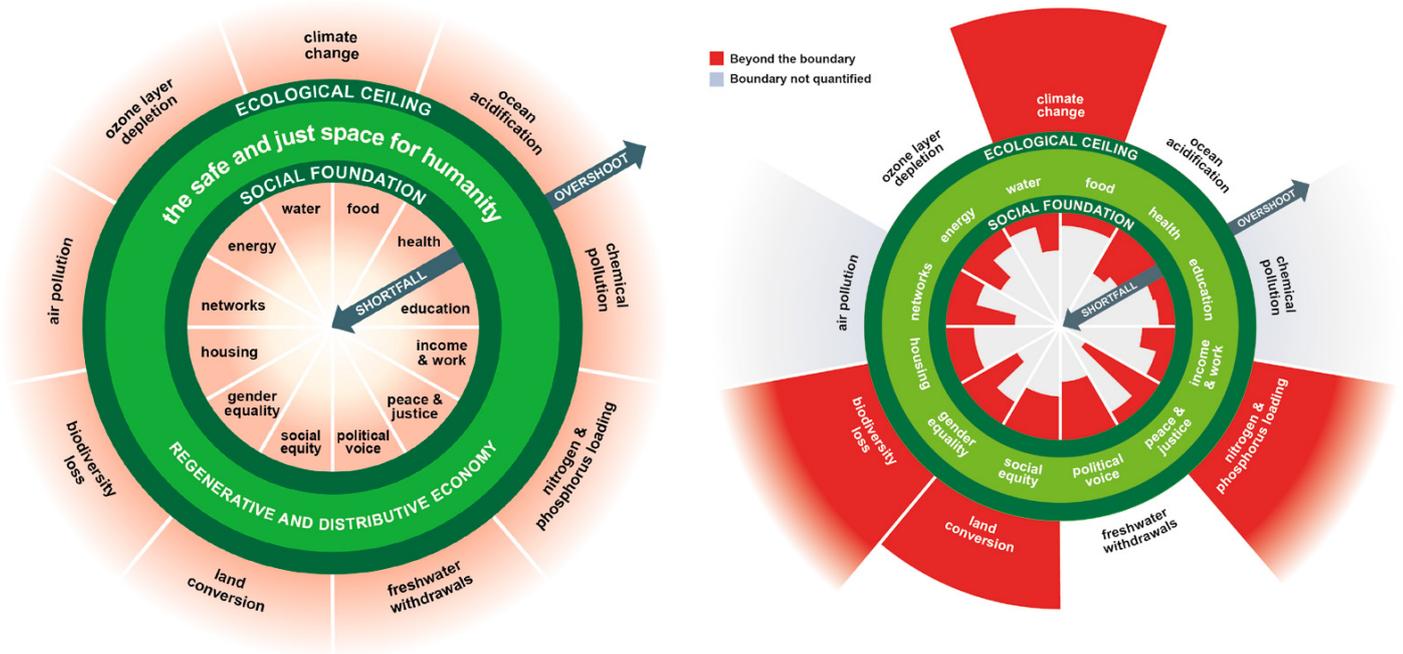


Figure 1: Doughnut Economics by Kate Raworth

The fundamentals of doughnut economics can be summarised in seven principles that clarify the ideas of this new economic thinking.⁶ In the following, the essential aspects of the principles are explained.



The first principle is to “change the goal”. The goal of the doughnut economy is not to grow the gross domestic product, but to improve the well-being of people and to get into the safe and equitable space of the doughnut.⁷



According to the second doughnut principle, it is important to grasp the big picture. The big picture means understanding the economy as part of an overall social system. It must be embedded in society and nature. So far, the role of natural resources has been neglected. Furthermore, relevant participants and aspects such as private and non-profit initiatives, commons and unpaid work are simply not considered in economic thinking. Thus, we have to take into account that the economy extends beyond the market and affects all areas of life.⁸



The third principle is “nurture and promote human nature”. This assumes that people are socially adaptive yet irrational beings, who simply pursue their self-interests, calculate benefits, and dominate nature. According to the doughnut economy’s view of human nature, people are socially inclined, have shared values, are cooperative and dependent on the living world.⁹



The fourth doughnut principle states that we humans need to learn dynamic thinking to put doughnut economics into practice.¹⁰ Thinking in systems means experimenting, adapting, evolving, and continuously striving for improvement. Furthermore, attention must be paid to dynamic effects, feedback loops and tipping points.¹¹



According to the fifth principle, distributive justice should be pursued and systematically thought through, instead of trusting the common assumption that economic growth will provide balance.¹² The aim is a distributive and decentralized economy that promotes, for example, cooperatives, neighbourhood help and open source.¹³ Distributive justice also means, for example, that the value created through work is shared with all those who have helped to create it.¹⁴



The sixth principle aims to promote the regenerative orientation of the economy. The current destruction of the environment is caused by the degenerative orientation of industry.¹⁵ Raw materials are extracted, a product is made from them, the product is used and then it is thrown away. The existing linear system is to be transformed into a circular, regenerative system in which waste materials from one process become raw materials for another. This means, for example,

that used items are repaired, reused, renovated, or recycled.¹⁶



The seventh principle calls for an agnostic attitude towards growth. In the context of doughnut economics, this means “[...] building an economic order that promotes human well-being, regardless of whether the gross domestic product rises, falls or remains at the same level¹⁷”.

The socio-ecological inventory

One form of visual representation used in the factsheets is the four-field table for the social-ecological inventory. It arises from the question of how a city can be a home for people while respecting the well-being of all and the health of the entire planet. To answer this question, the social and the ecological dimensions are considered under the principles of the doughnut economy, each of which is, in turn, also considered according to local and global scales.¹⁸ The combination of the two dimensions with the respective local and global scale results in four fields.

<p>Local Social <i>How do we manage to improve the quality of life of the people in the city together with all stakeholders?</i></p>	<p><i>How do we as a city manage to live in harmony with our natural environment?</i></p> <p>Local Ecological</p>
<p>Global Social <i>How can we promote social justice globally through our local actions?</i></p>	<p><i>How can we contribute to global environmental protection/the health of the planet through our local actions?</i></p> <p>Global Ecological</p>

Figure 2: Own figure (NELA. next economy lab)



Each of these fields answers a sub-area of the overarching question:

Local-Social: How do we manage to improve the quality of life of the people in the city together with all stakeholders?

Local-ecological: How do we as a city manage to live in harmony with our natural environment?

Global-Social: How can we promote social justice globally through our local actions?

Global-ecological: How can we contribute to global environmental protection/the health of the whole planet with our local actions?¹⁹

These four essential questions are seen as guidelines for a good assessment of whether a project contributes to achieving the balance of the doughnut.

The use of the four-field table in the factsheets aims to clarify in which of the four fields actions take place and which effects they have locally and

globally. In the following three factsheets arrows are used to represent impact logic within the four-field table. This also enables the classification and comparison of civil society and municipal sustainability efforts.

The Impact-Matrix

The impact-matrix offers the possibility to rank different options for action or local initiatives according to their impact on the one hand and their feasibility on the other. On the horizontal axis of the matrix, the potential impact of the initiative is assessed, while the vertical axis indicates the feasibility. This results in four fields (easy to implement and low impact, easy to implement and high impact, difficult to implement and low impact, difficult to implement and high impact) according to which the various initiatives in the factsheets can be classified. The assessment in the impact matrix is subject to scientific subjectivity and does not claim to be fully comprehensive.

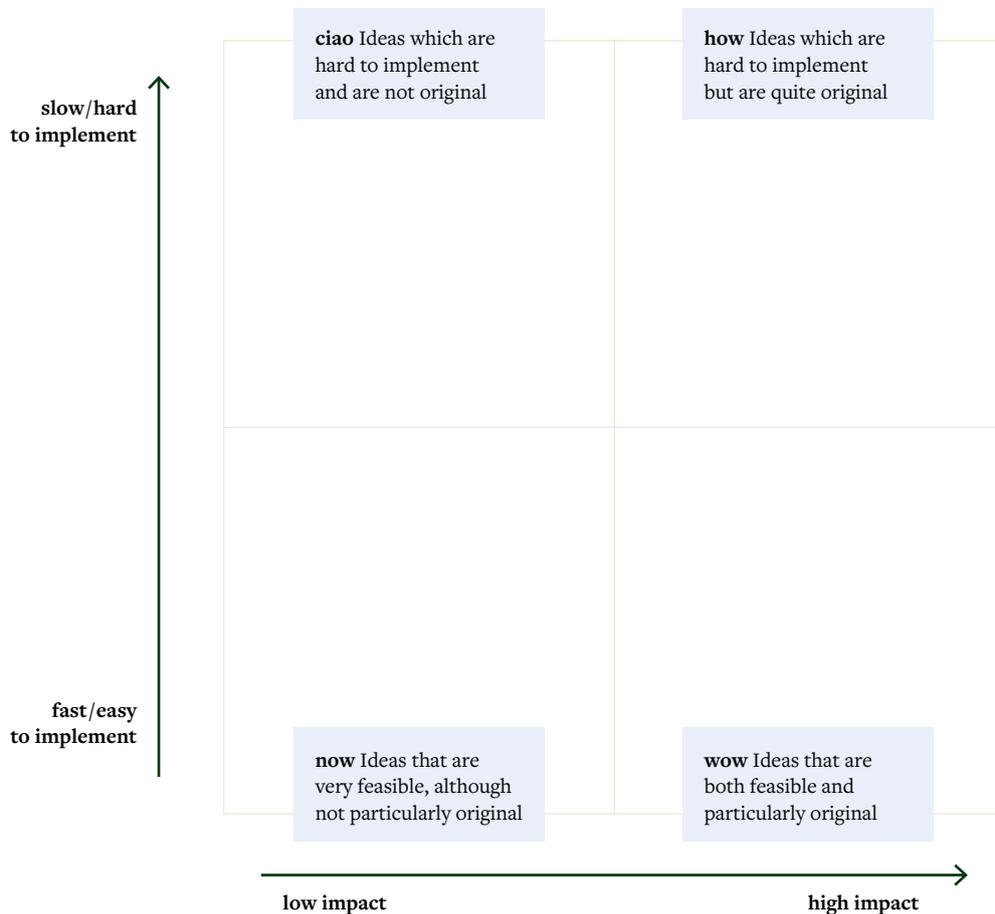


Figure 3: Own figure (NELA. next economy lab)



Introduction

The past century has been marked by global crises. Starting with the Great Depression of 1929, followed by the oil crises in 1973 and 1979, the Latin American debt crisis in 1982, the financial crisis in 2007, the euro crisis in 2010, the COVID-19 pandemic and more pressingly than ever - the climate crisis. All these crises are not completely independent of each other; indeed, it is quite the opposite: they all have the same origin. Excessive financial speculation led to the financial crisis in 2008, excessive human interference with nature led to the outbreak of the COVID-19 pandemic and excessive use and burning of fossil fuels led to the climate crisis, the effects of which are increasingly being felt globally and locally. But what is behind all these crises? The motivation to grow economically. Because that is what our current economic model and system are built on: Growth.

However, the examples above show that this economic model is flawed. Economic success in this model is not measured by how good the quality of life is for all people on earth, but simply by how fast an economy grows. Growth is seen as the ultimate solution to social and ecological problems. This seems paradoxical because while our earth is the basis for everything we do, and therefore the basis for our economies, our economies are not guided by what is best for our earth. To put it briefly: Constant economic growth without considering the question of how to create a good life for all does not work in the long run, and this is exactly what is becoming increasingly clear. What we therefore need is New Economic Thinking and with it a new economic model that changes structures in a way that brings our life on earth back into balance. This model must pursue two central goals: A) secure social justice within B) ecological limits. It needs perspectives for action at the political, civil society, economic and individual levels that contribute to solving existing causes of problems and not just the symptomatic challenges. And this is exactly what the doughnut economy according to Kate Raworth can do. The doughnut economy establishes a vision of a good life for all. To turn this vision into reality,

each and every individual has a responsibility. The doughnut model is participatory: The idea is that everyone has access to it and can participate in its design and implementation. However, the municipal policy level has a particularly important role to play. 90% of the world's population lives in municipalities, thus local challenges and opportunities can be better perceived at the municipal level than at any other policy level. The future of the planet seems to depend on the commitment of local governments. Thus, municipalities are indispensable for the spread of knowledge about meaningful action on the topic of sustainability due to their exemplary and guiding character. If we take the goal of sustainability seriously, we have to rethink our lifestyles, production methods and thus our economic system in the community. In this process, civil society represents the main actor that should actively shape the solution of the problems.

The path to a society in which economy, ecology and social aspects are equally important components of our system is going to be a long and difficult one. We are still at the very beginning of this path, and it will only succeed if everyone supports each other. That is exactly why someone is needed to get this movement going, and that is what we would like to do.

We want to contribute to the realisation of the vision of a good life for all. And because we know that municipalities play a decisive role in this process, we would like to implement the doughnut at the municipal level. After qualitative interviews with civil society and municipal actors, we have identified three sectors that have a high potential for reform following the doughnut economy approach: Agriculture & Food, Housing & Construction and Economic Development. We would like to illustrate sustainability efforts in these three sectors which seem to follow the doughnut principles. With the help of these factsheets we hope to inspire municipal and civil society actors to make changes according to the doughnut economy. We hope to inspire change in these three sectors, as well as beyond, to develop their municipalities in a more progressive and sustainable manner.



In order to make the doughnut model tangible and applicable we have conducted an analysis of the key problems of each sector. Then, we pose the question of comprehensive solution strategies for these problems and central fields of action for municipal and civil society actors. We analyse which concrete initiatives exist in these areas and take a concrete look at two effective ones. Finally, we examine what concrete measures are available for municipal politics and civil society to implement the initiatives successfully and examine which ones could be used to follow the principles of the doughnut economy. In compiling the three factsheets, we proceeded selectively. Our aim was not to provide a complete and precise description of all possibilities, but to give an orientation and to focus on central problems and initiatives. We aim to give municipal and civil society actors ideas and inspiration for further cooperation and thus initiate processes for a sustainable future.

**On the following page we can see
how the subject performs in the doughnut →**



Donut for municipalities



Social Foundation: Amsterdam Model (inner circle)

enabled

- EG: Energy
- E: Education
- J: Jobs
- I: Income

connected

- M: Mobility
- COM: Community
- CO: Connectivity
- C: Culture

empowered

- GTH: Equality in diversity
- PJ: Peace & justice
- SE: Social equity
- PV: Political Voice

healthy

- H: Health
- F: Food
- W: Water
- HO: Housing



Problem analysis

Globally, the number of people living in cities exceeded the number living in rural areas for the first time in 2007. In 2008, around 55% of people lived in cities.²⁰ This trend can also be observed in Germany. In 2020, 7.4% more people lived in German cities than in 2000. In total 77.4% of Germany's population, i.e. more than three-quarters of the total population, lives in cities.²¹ The growth of the urban population indicates one thing above all: a lack of living space. And this lack of space has been driving up the prices of residential properties and land for years. This, in turn, has resulted in complex local social conflicts, such as increasing competition in the real estate market. To expand the supply of residential space and resolve such conflicts, cities and towns are expanding geographically. But this expansion often takes place at the expense of the environment due to increasing land sealing. So, while attempts are made to meet social concerns through the creation of new housing, ecological limits are being exceeded.

Kate Raworth's model of the doughnut economy refers to these social and ecological trade-offs. Looking at the different dimensions of the social foundation (inner ring) and the ecological ceiling (outer ring) that must be present in an ideal doughnut economy, several dimensions can be identified regarding the topic of "housing and construction" that (still) need changing in Germany (see doughnut graphic). These include affordable housing for all, social justice in public spaces, climate change, increasing losses of biodiversity worldwide and greater demands on the nature surrounding cities in all its diversity. Soils and meadows that are built on and thus can no longer provide a habitat for many species or forests that are at least partially cleared are further negative effects. The expansion of towns and cities can further increase local pollution. This happens, for example, partly when new buildings are constructed, as well as when more people settle on previously uninhabited or marginally inhabited land. Finally, the expansion of towns and cities also leads to additional noise and light emissions. The construction of buildings and infrastructure also requires important non-renewable or only

partially-renewable resources: Wood, metals, sand, clay, gravel, slate, etc. These resources must be protected and saved. This requires, above all, the efficient use of already built-up areas and the responsible construction of new residential areas (see Fig. 1).

Worldwide, there are already numerous projects, initiatives and individual measures that contribute to internalising or preventively avoiding negative effects of the expansion of cities and towns. Also, many laws and government measures have been implemented in recent decades to ecologically regulate and define processes for the building sector as well as building standards. However, with the emergence of global and local initiatives, the complexity of measures is also increasing, which poses a challenge for smaller cities and municipalities that have limited resources but want to address housing and building-related issues in their community.

Therefore, in the spirit of the doughnut, we need to ask ourselves:

What are key measures and how can a comprehensive solution strategy for sustainable housing be identified that balances social and ecological concerns?

To solve the conflicting goals around the topic of building and housing, A) the lack of living space on the one hand and B) the primarily ecological problems arising from the creation of living space, on the other hand, an orientation towards the model of the doughnut economy seems useful. The doughnut economy not only suggests ensuring social justice within planetary boundaries, but also implies the realisation that economies, societies, and the rest of the living world are complex, interdependent systems. In terms of living together in communities, this means that local actors join forces with representatives of civil society and define relevant problems and goals to take those measures that are individually appropriate and at the same time contribute to more social justice and a healthier environment (see graphic "Impact logic").



The impact-matrix shows initiatives that match the fields of action.²² Care was taken to select only initiatives that meet the principles of a doughnut economy and at the same time offer potential for the municipalities to shape them in a variety of ways. They can be implemented individually or in combination with each other.

Proposed initiatives:



- Renovation and modernisation campaign of old buildings and vacant buildings as well as flats instead of only building new ones
- Greening campaign for buildings
- Urban gardening

- Zero-emission housing estates
- Environmental certification systems for buildings: e.g. DGNB certificate (nationwide award in Germany in cooperation with the Federal Ministry of Transport, Building and Urban Affairs. It assesses the overall performance of a building against 50 sustainability criteria)
- New urbanism / smart cities: digitalised, sustainable, and integrated urban development
- Emission compensation measures
- Housing cooperative
- Modular houses
- Remunicipalisation measures: social housing

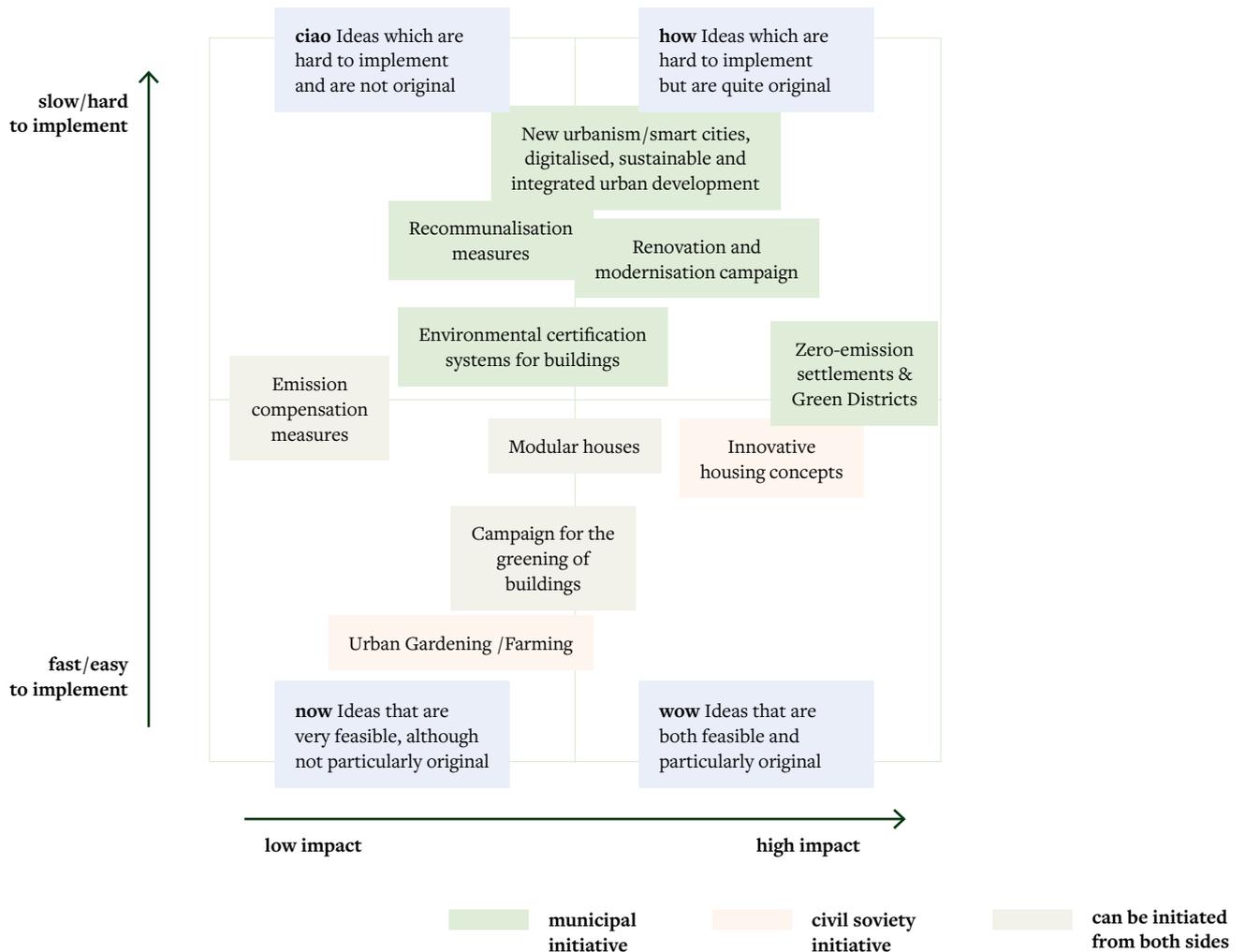


Figure 5: Own figure (NELA. next economy lab)



Ways inside the doughnut: Presentation of two initiatives

In the following, we will present two of these initiatives as examples, which address the conflicting goals that exist within the building and housing sector and at the same time correspond to the principles of the doughnut economy.

Zero-emission settlements

Zero-emission settlements are (residential) settlements whose energy demands and the CO₂ emissions caused by them are minimised by reovation work. For example, new construction for heating and electricity, and in which the remaining residual emissions are compensated by regenerative energy generation plants inside and outside the settlement in such a way that an even energy balance is achieved

Potentials

40% of global CO₂ emissions are related to the construction of buildings.²³ Through energy-efficient, resource-saving construction methods and the character of zero-emission housing estates, attempts are being made to reduce these emissions as far as possible. Energy-efficient construction includes, for example, the use of modern thermal insulation technology for walls, roofs and ceilings, as well as efficient ventilation and heating systems. At the same time, it makes sense to modernise existing, possibly vacant buildings, to minimise energy consumption and thus to use space efficiently.^{24 25}

There are several examples of such settlements in Germany. The largest zero-emission housing estate in Europe, named zero:e, is located in Hanover and comprises almost 330 houses. There, emissions are avoided primarily by significantly minimising shading caused by buildings, by orienting the main living spaces towards the south and by creating the greatest possible compactness of the building structures so that heat can also be gained from sunlight and stored efficiently. The use of passive and active solar energy is the basis for the implementation of efficient building standards. Furthermore, zero:e minimises water consumption by managing rainwater. A greening concept has also been developed, in which as little surface area as possible is sealed and the houses are covered as little as possible by shade. Zero:e is a successful example of zero-emission settlements and can be used as a benchmark for other projects. Other environmental and social measures can also be integrated into the idea.^{26 27}

As already mentioned, it would be conceivable to create a zero-emission housing estate at least partly from existing buildings and to redevelop them. According to a study by the Federal Environment Agency in 2008, the redevelopment of already built-up areas can reduce the use of unbuilt-up areas by almost 85%. Protecting unoccupied land means that no additional space is taken away from both flora and fauna and that the flourishing of biodiversity and the biosphere is promoted. At the same time, leaving soils and water bodies to nature serves as natural protection against floods, for example. More extensive clean air can also be preserved if the land consumption of localities is kept at a minimum. Most relevant, however, are the positive effects on the number of greenhouse gases emitted. According

Zero-emission settlements



Features

- o Housing estates with minimised emissions
- o Innovative, individual design



Potentials

- o Minimised emissions
- o Minimised energy and water consumption
- o Conservation of resources through refurbishment and modernisation
- o Greening of buildings
- o Integration of social initiatives



to the UBA, CO₂ emissions caused by buildings can be reduced by almost 50% if existing buildings are renovated to make them more energy-efficient. But light and sound emissions also remain concentrated in localities and are not extended further. Furthermore, the renovation of old buildings requires far fewer natural resources than the construction of new buildings. The UBA proves that the annual consumption of mineral substances is about 33% lower when vacant buildings are refurbished.²⁸ For these reasons, the redevelopment and conversion of existing buildings can be a very sensible measure when establishing a zero-emission housing estate. Instead of developing new areas and further expanding settlement areas, which can cause far reaching negative ecological effects, vacant areas are revitalised and managed without emissions. Another conceivable idea for zero-emission housing estates would be to add greenery to buildings. Greening buildings can mean greening flat roofs, balconies, and terraces as well as vertical greening on building facades and interior walls. The greening of buildings can make a

significant contribution to a liveable and healthy city and community through versatile functions and development possibilities. One important function of green spaces, for example, is the storage of precipitation water for dry periods. At the same time, this also improves the urban climate by increasing water evaporation, thus naturally cooling the surrounding area, and improving the microclimate in the urban space overall. Furthermore, hard sewage accumulation is compensated for. While plants protect the building from the heat in summer, they can make an additional contribution to thermal insulation in winter. Overall, the building's energy demand and emissions can be reduced. If the building also generates its own energy using photovoltaics, for example, the cooling effect of an underplanting enhances performance and regulates the climate at the same time. While such areas are intended to serve as recreational spaces for humans, they offer an intact habitat for insects. For these reasons, the integration of building greening into the planning of zero-emission housing estates would be another sensible measure.^{29/30}

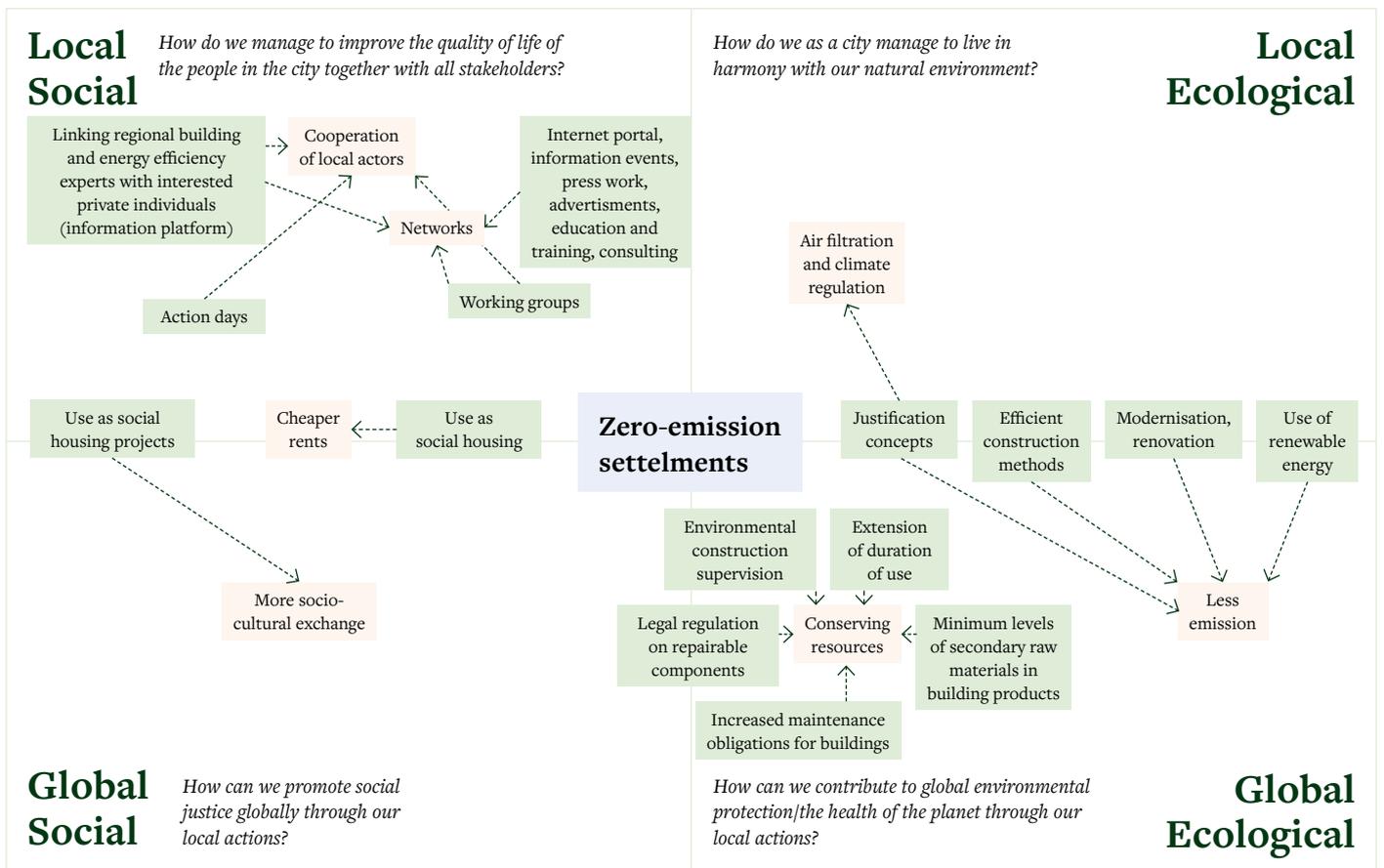


Figure 6: Own figure (NELA, next economy lab)



In conclusion, it can be said that zero-emission housing estates have great potential for creative design. Essentially, they create living space that meets both ecological and social requirements following the principles of the doughnut economy and can thus make a significant contribution to solving the housing and building problems of today.

The potentials of zero-emission settlements (red) and the measures through which these potentials can be achieved (yellow) were visualised in the four-field table and classified according to their impact level. The question was asked in which respect zero-emission settlements have an impact on a global or local level and how they affect the social and ecological spheres?

Innovative Living Concepts

The goal of the doughnut economy is to create a system that functions and flourishes within social as well as planetary boundaries. In terms of the housing and construction sector, this means not only essentially improving the energy and environmental balance of villages and cities, and at best creating a neutral or even positive climate balance, but also addressing the social deficits of communities in terms of housing supply. To create a housing supply that meets social and ecological demands at the same time and thus corresponds to the principles of the doughnut, versatile initiatives can be implemented.

Potentials

Housing cooperatives are an innovative housing concept widely used in Germany. They are to be understood as joint business enterprises and have the goal of offering their members long-term affordable and secure housing. The members are co-owners and the cooperative as a whole is the owner of the housing company. The financial basis of the business is the amount of the cooperative shares, which are sold to the members, who pay interest on them and are paid back when they leave. As every member has the same right to participate in the management of the housing company through their shareholding, housing cooperatives are a democratic concept based on self-help, self-administration, and self-responsibility. There is a board of directors that run the cooperative and are elected by the members. In principle, the cooperative's actions are geared

towards long-term success and not short-term profits, and are intended to ensure a good, safe, and socially responsible housing supply.^{31 32} Housing cooperatives hold many different potentials for doing business in the doughnut. On the one hand, they offer housing perspectives that are not only long-term but above all affordable.

Innovative living concepts



Features

- Rethinking living
- Affordable housing
- meets a wide range of needs



Potentials

- Housing cooperatives
- Conservation of resources through renovation and modernisation
- Multi-generation houses
- Social integration
- Endless design possibilities

On the other hand, this concept also offers great development potential for social exchange and enriching togetherness. Not only are very diverse constellations of people created, which reduce social polarisation through exchange and at the same time ensure more mutual understanding, but a kind of social neighbourhood can also be created: For example, through common spaces and leisure infrastructures for children and adults. But the social exchange process can also be lived by helping young families, organising community activities or festivals, or supporting older residents. There are already numerous examples of successful housing cooperatives throughout Germany and internationally. The housing cooperative Aufbau Dresden eG is the largest housing cooperative in Germany with a total of 17,007 residential units.³³ But there are also many smaller, successful implementations. For example, the “Frankfurter Familien” project



of Fundament Bauen Wohnen Leben eG, which not only offers living and communal space for families but at the same time also operates in an energy- and water-efficient manner and makes a social contribution by participating in non-profit projects. For the promotion of social exchange and community in general, there are many other initiatives besides cooperative housing. Multi-generation houses represent an increasingly popular innovative housing concept. During the Federal Government's demographic strategy from 2015, which was intended, among other things, to strengthen the social and societal cohesion of people in Germany, the construction of numerous such houses was financially supported. In May 2020, there were around 530 multi-generation houses nationwide.³⁴ Essentially, these facilities are intended to provide living space and/or meeting places for people of all ages and backgrounds. Joint activities, care services for young and old as well as a distinct enabling culture are to contribute to neighbourly togetherness in the community. In addition to the numerous offers to support families, there are often also projects addressing the successful integra-

tion of people with migration and refugee histories. This does not only create an exchange between old and young, but also a socio-cultural exchange. Housing cooperatives and multi-generation houses promote diversity, participation, cooperation, and reciprocity. Community networks and the general well-being of all participants are strengthened. These are all characteristics and goals that correspond to the principles of a doughnut economy. Therefore, both housing cooperatives and multi-generation houses can enrich our society through their potentials and positively contribute to ensuring a social foundation as envisaged by the doughnut economy. The potentials of innovative housing concepts and the measures through which these potentials can be achieved were also visualised in a four-field chart and classified according to their level of impact. As the chart shows, the initiative primarily strengthens the quality of life of people in the city, as it promotes social relationships and community. If this community decides to live ecologically, it can become a role model for all forms of housing.

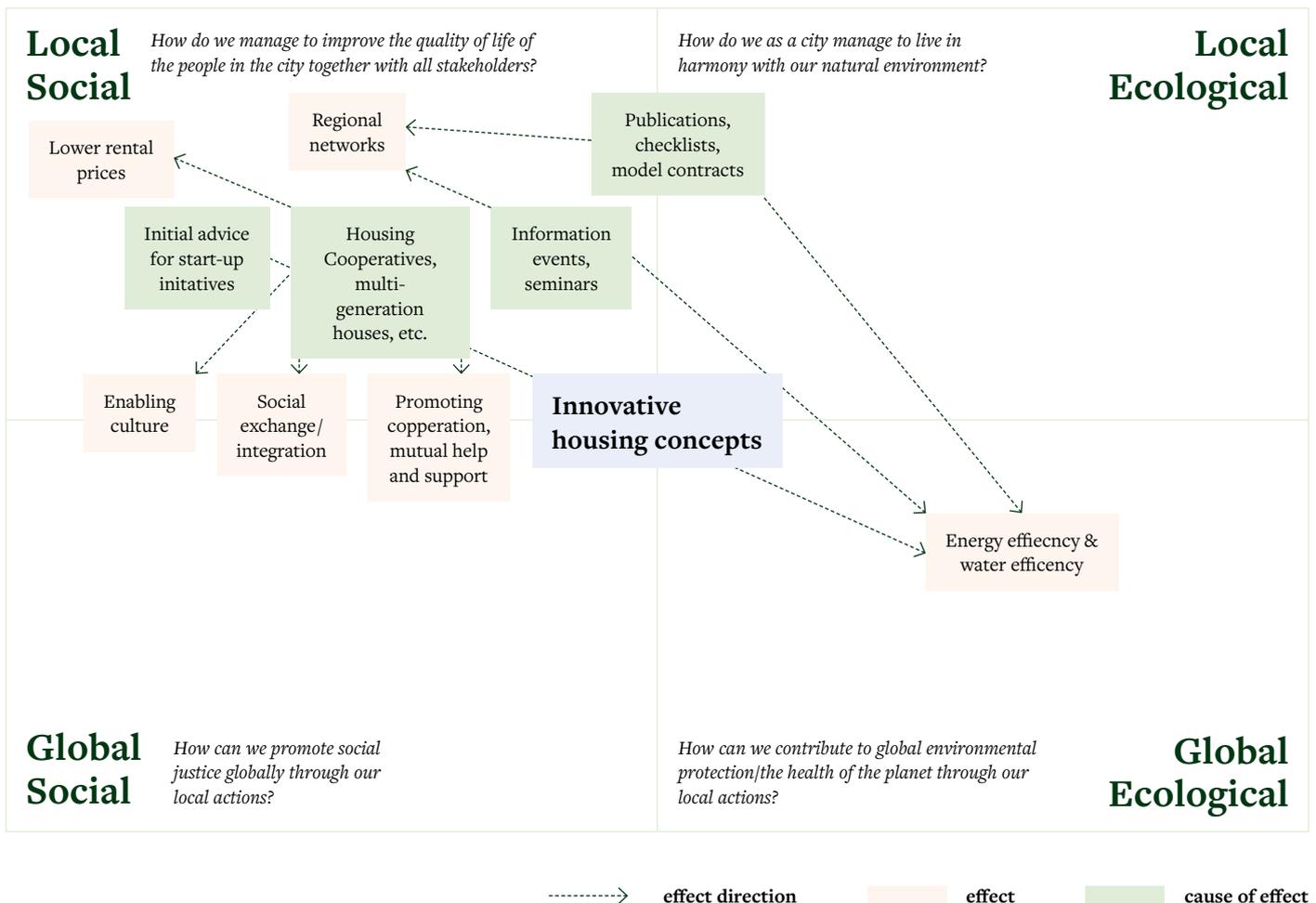


Figure 7: Own figure (NELA. next economy lab)



Perspectives

The rapidly increasing number of people living in cities poses a particular challenge to municipalities across Germany: while new housing is to be created for the growing urban population, it is at the same time becoming increasingly urgent to respect ecological limits and protect our environment. In this factsheet, several initiatives have been presented to help achieve a balance between social and environmental concerns: In particular, zero-emission housing estates and innovative housing concepts such as multi-generation houses or housing cooperatives. These concepts were selected because, on the one hand, they offer the potential for diverse own design by the municipalities and, on the other hand, they can contribute significantly to moving into the safe and equitable space of the doughnut at the municipal level. Practical examples further show that these concepts are already being successfully implemented.

As difficult as the task of rethinking the economy and creating a good future for all may seem at first, the result is full of opportunities. If municipalities succeed in rethinking building and housing structures together with civil society and develop effective concepts and initiatives, social and ecological concerns can be brought into balance. Affordable, climate-positive, and social housing can be created. At the same time, their projects and start-ups can become role models for other actors. Cooperating and learning from each other makes it possible to test new paths together and to actively shape a positive future for all.



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Endnotes

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Do you have any questions?



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