Measurable Impact for Urban Development

A Report

Impact framework and project achievements

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Foreword

Hello reader
This book marks the third and final volume in a trilogy on urban development. The first two volumes introduced a manual for doughnut economics and a system for circular construction. This third book presents a report on how the manual and system have been implemented in practice through the business model and the first development project of the real estate company Home.Earth.

The trilogy represents four years of dedicated work and collaboration, resulting from contributions by a diverse group of scientists, specialists, advisors, universities, companies, and organizations involved in the built environment. This collective effort was made possible thanks to the generous support of Realdania, whose mission is to enhance quality of life through the built environment. For this, we are humbled and deeply grateful.

Unlike the first two books, which established measurable methods and tangible tools, this book focuses on practice. It provides examples of applied solutions based on the previously introduced methods, tools, and principles.

In essence, it is a practical report written to demonstrate that, despite numerous hurdles and challenges, people and planet positive urban development is both viable and achievable.

What's new
In early 2021, a group of co-founders with diverse backgrounds within the real estate and building industry started Home.Earth to change the industry from within. The vision was to build a company that proves business can put people first, respect the planet, and succeed in a competitive market – a company aligned with all its stakeholders, spanning from investors, to the team, tenants, and communities, and the surrounding climate and nature.

Throughout this book, you will find 12 case studies showing how this has been designed and put into practice – many shared for the first time. Among these are allocation models that involve tenants and communities in value creation; record-low construction targets within planetary boundaries; and business design with mission lock and purpose protection.

The book is structured into four chapters, each presenting three case studies to illustrate Home.Earth's approach to impact measurement and construction practices. The chapters are titled Social Foundation, Ecological Ceiling, Circular Construction, and Responsible Business.

Social Foundation
Home.Earth is committed to operating within the Social Foundation as outlined in the Doughnut for Urban Development. This commitment translates into initiatives such as new models for affordable housing, providing greater agency to tenants and communities, and improving housing access by eliminating deposits. Most social impact areas are tracked through internal reporting or external certifications like B Corp and DGNB Planet. However, certain aspects from the Doughnut framework – such as access to sanitation – are already well-established in Denmark and therefore not a priority area for additional innovation.

Ecoligical Ceiling
Home.Earth is committed to building and operating homes within the Ecological Ceiling as outlined in the Doughnut for Urban Development. The ecological ceiling represents the biophysical limits of the planet's ecosystems, beyond which environmental degradation becomes irreversible. The commitment includes initiatives such as the Planetary Carbon Roadmap, translating the planetary boundary for climate change into new standards for carbon footprint per m^2 using life cycle assessment.

Figure 1: The Urban Development book triology: Doughnut Economics (2023), Circular Construction (2024) and Measurable Impact (2025).

In addition, the Enhancing Biodiversity Strategy begins with biologists surveying each site to establish a biodiversity baseline, which every new development is then required to improve upon.

Circular Construction

Home.Earth has committed to translating circular principles into tangible solutions. This approach involves not only adopting established frameworks and proven methodologies but also actively pushing the boundaries of current market practices. Recognizing that the industry still faces significant barriers in embracing circular models, the following case studies illustrate how we have successfully integrated circular construction into the Nærheden project. These examples demonstrate the practical viability of circular construction and highlight its significant role in defining Home.Earth's vision and products, including initiatives such as the implementation of a circular marketplace, product platforms, and materials passports.

Responsible Business

At Home.Earth, responsible business begins with company design that aligns incentives with long-term value creation for all stakeholders. In this chapter, we share case studies on how we have structured our governance model to maintain focus on long-term value, stakeholder alignment, purpose protection, and impact management. These examples illustrate how a thoughtful business design can enable the real estate and construction industry to evolve towards a more sustainable and resilient future.

A final reflection

This final and third book presents results centered on the operational practices and business design of Home.Earth.

Yet none of this would have been possible without the scientific frameworks, practical tools, and methods developed over four years of collaborative work.

Together, we have spent countless hours in discussions and reflections – through numerous Teams meetings, in-person workshops, and writing weekend retreats.

It is the collaborative spirit and personal engagement that form the foundation of this urban development trilogy – resulting in a manual for doughnut economics, a system for circular construction, and a report on measurable impact.

A sincere thanks to the wonderful, intelligent, engaged, and inspiring experts, authors, editors, universities, and companies who contributed to this work. A special thanks goes to our three subject matter expert organizations: Doughnut Economics Action Lab, Ellen MacArthur Foundation, and the Stockholm Resilience Centre.

While this publication marks the conclusion of our trilogy, we see it as just the beginning of a longer endeavor – one now equipped with methods and tools rooted in science and practice.

It is time to start walking the talk – together!

Phillip Højberg Unger & Kasper Guldager Jensen
Copenhagen, August 2025

Nærheden Development

First development as prototype
In this book, we have used the development project of Nærheden as a test bed for applying the methods and tools we introduced in the Doughnut for Urban Development and Circular Construction for Urban development. It is also the first new-build development by Home.Earth and is therefore conceived as a prototype for a new kind of urban living, combining ambitious sustainability targets with a carefully articulated community vision. Situated in Hedehusene, within Greater Copenhagen and just an 18-minute commute from the central train station, the project occupies a strategically significant location designed to support urban connectivity and a localized community.

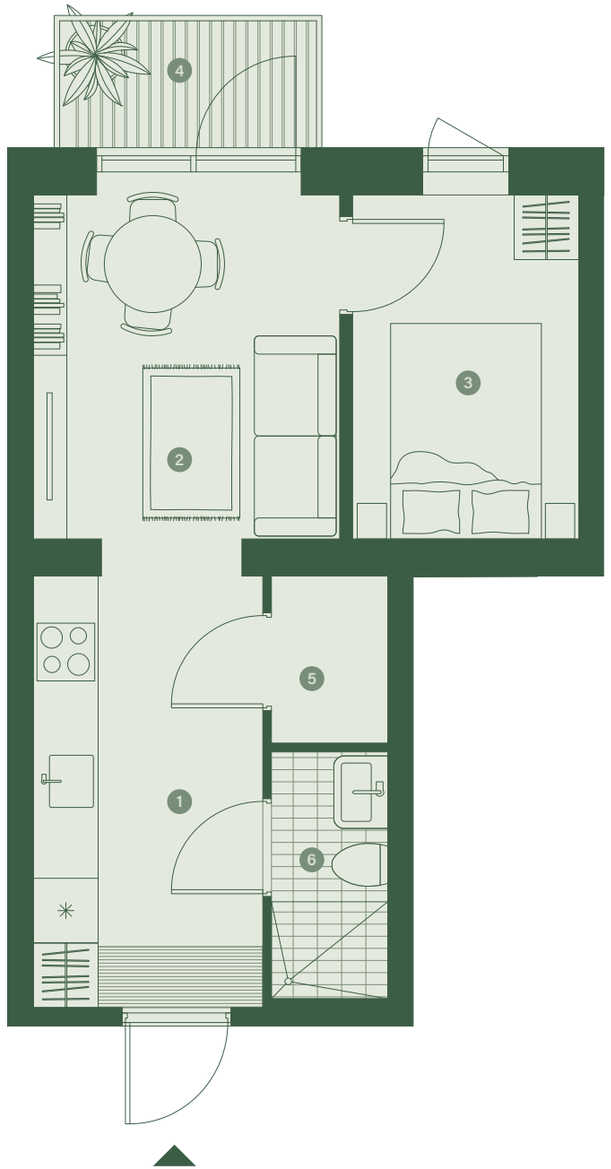
The development consists of 158 residential units, with the first phase welcoming tenants in June 2025 and the entire project scheduled for completion by October 2025. In addition, the development integrates 1,570 m^2 of commercial spaces and 300 m^2 of thoughtfully designed communal facilities. We designed these communal spaces to facilitate vibrant community interactions, foster social cohesion, and attract a diverse group of tenants – including families, retirees, young professionals, students, and individuals seeking affordable, long-term housing solutions.

Record low carbon footprint
At its core, Nærheden champions a modular construction approach, predominantly utilizing wood-based materials that make up approximately 86% of bio-based content. This innovative method significantly reduces the ecological impact, establishing a new national benchmark with a remarkably low footprint of just 4.7 $kgCO_2eq/m^2/year$ – 60% below the current Danish regulations, making it the multi-story building with the overall lowest carbon footprint in Denmark when inaugurated in 2025.

The adoption of off-site manufacturing and modular assembly practices curbs carbon emissions, optimizes efficiency, minimizes waste, and streamline construction logistics.

The residential units, diverse in size and typology, range from thoughtfully designed, high-ceilinged studio apartments to compact yet efficiently planned four-bedroom units, catering to a broad spectrum of tenant needs and lifestyles. We have meticulously curated each dwelling with an emphasis on aesthetics, materiality, and craftsmanship. Nordic Swan Ecolabel-certified materials, circular kitchens by the Danish brand Stykka, and integrated storage solutions exemplify the project's commitment to functionality, durability, and a healthy indoor climate. Private outdoor spaces in the form of balconies and access galleries further enhance individual living environments, complemented by communal amenities such as shared kitchens, expansive gathering spaces, and hospitality rooms dedicated to tenant guests.

As Home.Earth's first major project, Nærheden, serves both as a practical exploration and a visionary manifesto. The project transparently acknowledges its successes alongside its challenges, emphasizing continuous learning and iterative improvement. This publication elaborates on specific strategies and practical solutions, presenting detailed case studies that demonstrate how environmental sustainability, economic viability, and vibrant community life are not mutually exclusive but mutually reinforcing, charting a pathway for future urban developments.



Drawing 1: Floorplan of a typical 1-bedroom unit in Nærheden. The compact layout is key to sustainable and affordable living.

1. Entrance and kitchen
2. Living and dining
3. Bedroom
4. Balcony
5. Storage room
6. Bathroom

Drawing 2: Typical floorplan of Home.Earth's Nærheden development. The development comprises of several buildings, ranging in height between three and six storeys. Internal circulation areas have been minimized through the use of external accessways, promoting communality and providing external space to the apartments.

1. Circulation core
2. External accessway
3. Courtyard space
4. *Kvarterhus*
5. Row houses
6. Connection bridge

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Social Foundation

The Social Foundation

Home.Earth is committed to operating within the Social Foundation as outlined in the Doughnut for Urban Development. This commitment translates into initiatives such as new models for affordable housing, providing greater agency to tenants and communities, improving access to housing by eliminating deposits, and introducing more affordable energy solutions. Most social impact areas are tracked through internal reporting or external certifications like B Corp and DGNB Planet. However, certain aspects from the Doughnut framework – such as access to sanitation – are already well-established in Denmark and therefore are not a priority area for additional innovation.

In this chapter, we begin by recapping the Social Foundation of the Doughnut for Urban Development manual, as outlined in the green pages. We start with our guiding principles, followed by the 48 social impact areas we consider important for an impact-minded urban developer to consider when developing a new project.

The 48 impact areas are split across four categories – Responsible, Equitable, Inclusive, and Connected – and for each area, we have gathered relevant indicators, tools, and benchmarks to support practical application by industry actors.

Social Foundation
The starting point of the Doughnut for Urban Development is the original Doughnut Economics, which is emerging as an increasingly well-researched and widely known foundational framework with clear links to the UN Sustainable Development Goals.
We group the 12 social dimensions of the Doughnut into four categories that are useful to consider in an urban development context, namely: Connected, Inclusive, Equitable, and Responsible.

From there, we zoom in on cities, neighborhoods, local communities, and urban development projects, and identify 48 social impact areas that we believe are important to minimize negative impacts and maximize positive impact across a broad range of social areas, both locally and globally.

The social impact areas cover the full life cycle of urban development projects: from the extraction of raw materials to the acquisition of a land plot; from construction of a building to the operational phase where daily life unfolds; and naturally also considering the end of life for a building.

Considering global interconnections
In our experience, existing frameworks and methodologies that attempt to monitor social impact are often highly local in their scope. Few frameworks integrate the significant risks and opportunities for social impacts that take place "off-site" in the supply chain and in the surrounding community – the result is that the construction sector continues to see poor working conditions, significant safety issues, and outright human rights abuses, including modern-day slavery.

More locally, our cities are often developed with a strong focus on creating positive outcomes on each plot.
Still, the surrounding neighborhood and community are too rarely integrated into the thinking and urban development strategies. This results in a positive impact that remains unrealized and a risk of adverse outcomes due to the isolated, reductionist approach.

With The Doughnut for Urban Development, we aim to contribute a holistic framework that can aid actors in urban development to overcome these interconnected challenges and impacts. We have identified 24 global social impact areas occurring "off-site" that we should include in the scope of urban development projects.

Social impact areas
In this section, we introduce the 48 social impact areas in the Doughnut for Urban Development.
For each Social Foundation Impact Area, we considered where an actor has agency to affect change, both locally and globally, drawing on the Doughnut Four lenses methodology. The social foundation lenses are understood in terms of local aspirations and global responsibilities, asking:

The local social lens: How can all the people in this development thrive?
The global social lens: How can this development respect the well-being of all people?

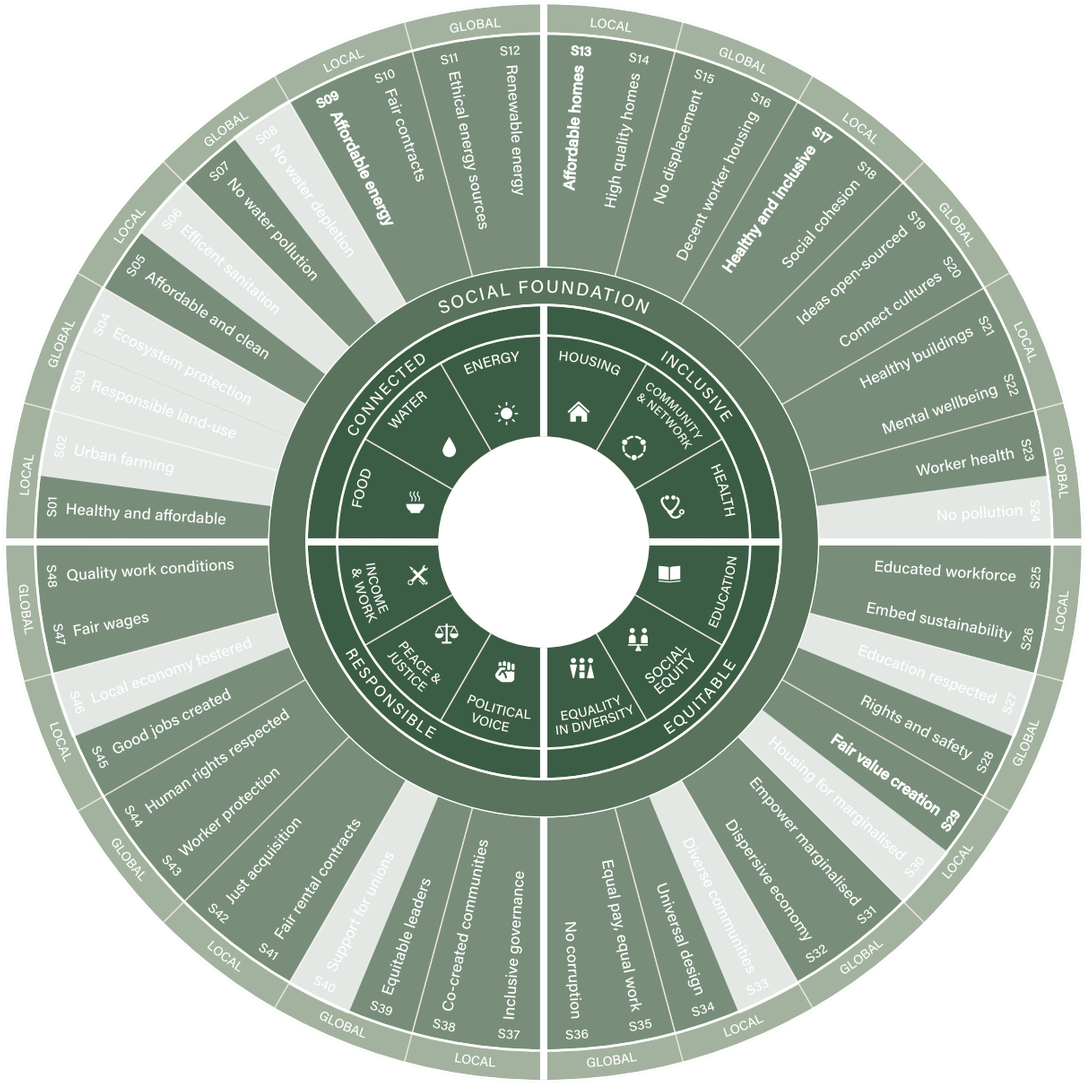
An "impact area" should be seen as an area in which an actor in the urban value chain has a risk of adverse impact or an opportunity to create positive impact if they approach the area with the right impact management strategies and tools. Under dimensions with vast impact risks and opportunities – such as Health – we have been forced to keep the impact areas at a higher level. Under dimensions where impact risks and opportunities are more limited – such as Energy – we have been able to be more specific in the impact areas. The 48 impact areas are the product of four integrated workstreams.

1. A translation of the original 12 dimensions of the Doughnut to maintain the link from the global level to the urban development level
2. Our mapping and analysis of existing frameworks to ensure that we build on top of existing best practices while making adoption accessible and aligned with ongoing work
3. Three multidisciplinary workshops with a broad group of actors in urban development – from researchers to engineers, architects, developers, and human rights experts
4. A Sounding Board process in which our drafts and ideas have been critically examined and further developed to uncover blind spots and nuance our contributions

Collectively, these four workstreams draw on a combination of existing best practices and innovative thinking to push the social impact field towards new territory.

Introducing the 48 impact areas
The Social Foundation for Urban Development details 48 impact areas across the Doughnut's original 12 dimensions. Alongside the impact areas, we have mapped and listed impact methodologies and tools, and built a database which we hope will enable the network to advance its social impact strategies and make it easier to put value on and track social impact performance.

In some areas, such as Health, the list of tools, indicators, and benchmarks found in existing work is long and impossible to capture fully. In other areas, such as Food or Political Voice, existing work is limited, and we have been challenged when developing the framework. The impact areas fall under the 12 dimensions of the Doughnut, resulting in two local and two global impact areas per dimension. We have grouped the impact areas into four categories, namely: Connected, Inclusive, Equitable, and Responsible.



● Impact area covered by Home.Earth

● Impact area not covered

Impact Area		Home.Earth's Assessment	Third-party Assessment
S01	Healthy and affordable		●
S02	Urban farming		
S03	Responsible land-use		
S04	Ecosystem protection		
S05	Affordable and clean		●
S06	Efficent sanitation		
S07	No water pollution		●
S08	No water depletion		
* S09	Affordable energy	●	
S10	Fair contracts	●	●
S11	Ethical energy sources		●
S12	Renewable energy		●
* S13	Affordable homes	●	●
S14	High quality homes		●
S15	No displacement		●
S16	Decent worker housing		●
* S17	Healthy and inclusive	●	●
S18	Social cohesion		●
S19	Ideas open-sourced		●
S20	Connect cultures		●
S21	Healthy buildings		●
S22	Mental well-being	●	
S23	Worker health		●
S24	No pollution		

Impact Area		Home.Earth's Assessment	Third-party Assessment
S25	Educated workforce		●
S26	Embed sustainability		●
S27	Education respected		
S28	Rights and safety		●
* S29	Fair value creation	●	●
S30	Housing for marginalised		
S31	Empowerment of marginalised		●
S32	Dispersive economy		●
S33	Diverse communities		
S34	Universal design		●
S35	Equal pay, equal work		●
S36	No corruption		●
S37	Inclusive governance		●
S38	Co-created communities		●
S39	Equitable leaders	●	
S40	Support for unions		
S41	Fair rental contracts	●	●
S42	Just acquisition		●
S43	Worker protection		●
S44	Human rights respected		●
S45	Good jobs created		●
S46	Local economy fostered		
S47	Fair wages		●
S48	Quality work conditions		●

* *Indicators marked with an asterisk rare unfolded as case studies in this publication.*

Home.Earth's Assessment: These areas are assessed internally by Home.Earth due to their high relevance and strategic alignment with our core mission, allowing for direct oversight and pursue of more ambitious targets, particularly where recognised external frameworks or methodologies are still lacking.

Third-party Assessment: These areas are accounted for externally by Home.Earth through internationally recognised frameworks and certifications, such as B Corp, DGNB, CRREM, SBTi and others. Our practices align with the EU Taxonomy, ensuring transparency and accountability.

The 48 Impact Areas of the Social Foundation - page 1 of 3

S01: Healthy and affordable
Developments should be near and/or provide healthy and affordable supermarkets and other necessary shops for the local community, working to mitigate food deserts and nutrient deficiencies in urban areas.
Example indicators: number of healthy and affordable supermarkets and shops within a 10-minute walk; community satisfaction with access to supermarkets

S02: Urban farming
Local communities should have access to participating in communal urban farming and/or access to purchasing affordable, locally grown produce. Such resources should be distributed in an equitable and just way.
Example indicators: % of communities with access to urban farming initiatives or local produce; community satisfaction with access to local produce

S03: Responsible land-use
Land-use issues involving food production are monitored transparently and avoided. For example, construction materials should not displace or limit access to quality food options within supply chain communities or pollute local environments.
Example indicators: number of land-use issues identified and resolved; reduced impact on land-use change monitored through LCA of materials/buildings

S04: Ecosystem protection
Adverse impacts of food production on ecosystems are monitored transparently through adequate risk assessments throughout the supply chain. Adverse consequences are monitored and eliminated.
Example indicators: % of suppliers screened for significant biodiversity impacts; reduction in ecosystem degradation

S05: Affordable and clean water
Access to clean and affordable water is a human right and should be guaranteed to the community.
Example indicators: % of community with access to affordable & clean water; risk assessment of access to improved source of drinking water

S06: Efficient sanitation
All sanitation installations are sustainable and efficient, such as "low flow" sinks and toilets. Waste handling is managed sustainably, in which nutrient-rich waters are preserved and processed on-site.
Example indicators: % of community with efficient sanitation installations; risk assessment of access to an improved source of sanitation

S07: No water pollution
Water pollution risks, related to the extraction of virgin resources and production of materials, are monitored transparently and eliminated throughout the supply chain, including end-of-life scenarios. The creation of materials in faraway places should not leave the local water supply polluted.
Example indicators: % of suppliers implementing water management practices to avoid pollution in the supply chain; transparency in water pollution monitoring

S08: No water depletion
Water depletion risks, e.g., from virgin material extraction and production of materials, are monitored transparently and eliminated throughout the supply chain, including end-of-life scenarios. The creation of materials in faraway places should not leave the local water supply depleted.
Example indicators: assessment of available water in the local area of production; % of water used that is returned to the environment sustainably

S09: Affordable energy
Local communities should have access to affordable and renewable energy. Urban development should divest from fossil fuels, where alternative energy infrastructure is in place.
Example indicators: % of community with access to affordable & renewable energy; assessment of the most climate-friendly and cost-efficient electricity and heat source for the local community

S10: Fair contracts
Prepayment practices for energy should be transparent and fair to ensure consumer protection, informed decision-making around energy usage and expenditure, avoidance of hidden costs, and promote financial inclusion by providing equitable energy services.
Example indicators: transparent and fair prepayment practices; community satisfaction with prepayment practices

S11: Ethical energy sources
Energy sourcing for building operations and supply chain activities should be ethical and monitored transparently, contributing to sustainable development, climate change mitigation, reducing reliance on fossil fuels, while protecting the environment.
Example indicators: % of energy from ethical sources; risk assessment of access to electricity

S12: Renewable energy
Supply chain activities should, wherever possible, support the renewable energy transition. Therefore, building materials must be sourced from producers that utilize renewable energy sources.
Example indicators: % of energy from ethical sources in supply chain activities; number of initiatives supporting renewable energy transition

S13: Affordable homes
Housing should be economically accessible and affordable for tenants from all parts of society. As such, developments should reflect the needs and purchasing power of the local society, including economically diverse units, such as social housing, affordable housing, student housing, and housing for the elderly.
Example indicators: % of affordable housing units; tenant satisfaction with housing affordability

S14: High-quality homes
The design and construction of housing should be sustainable, healthy, and of high material quality. As such, homes should be well-lit, properly ventilated, made of life-supporting, certified building materials, and connect tenants to natural environments and each other.
Example indicators: DGNB score; tenant satisfaction with housing quality

S15: No displacement
Supply chain activities should not lead to the displacement of local communities. The housing we create here in a European context should not lead to the displacement of people in faraway places. Issues related to displacement should be monitored and documented transparently.
Example indicators: number of displacement incidents; transparency in displacement monitoring

S16: Decent worker housing
Workers across the supply chain should have access to decent, affordable, and stable housing to ensure the mental and physical well-being and a good quality of life while upholding the dignity and respect of supply chain workers.
Example indicators: property rights of local citizens; % of suppliers with decent worker housing policy

S17: Healthy and inclusive
Create healthy and inclusive communities by including social services and opportunities to participate and integrate socially. Encourage social inclusion by fostering a sense of belonging through the integration of accessible social spaces.
Example indicators: user engagement in community

Social Foundation 2021

health and inclusion programs; tenant satisfaction with community inclusiveness

S18: Social cohesion
Create social cohesion by providing tenants and other community members with access to social infrastructure, such as schools, childcare, sports facilities, and community spaces, near their homes.
Example indicators: % of community with easy access to social infrastructure facilities; tenant satisfaction with access to social infrastructure

S19: Ideas open-sourced
Successful innovation, new knowledge, and novel ideas should be shared openly in both local communities and global networks to promote the adoption of just development practices beyond the insular building project.
Example indicators: number of open-source projects or collaborations; number of citations or downloads of open-source projects

S20: Connect cultures
Positive contributions are made in local communities, where supply chain activities take place to enhance, protect, and celebrate the local culture.
Example indicators: amount of financial and non-financial contributions to communities; B Impact Assessment Community Score

S21: Healthy buildings
Design buildings to promote the physical wellbeing of tenants. As such, buildings should have good daylight, be designed for thermal comfort throughout the year, and enable maximum natural ventilation and optimal acoustic performance.
Example indicators: number of units certified with the Nordic Swan; % time spent with a healthy indoor climate

S22: Mental well-being
Design the building to promote the mental wellbeing of tenants, including a feeling of trust and safety, culturally sensitive levels of privacy, and a sense of belonging.
Example indicators: tenant satisfaction with protection and confidentiality; number of initiatives promoting mental wellbeing

S23: Worker health
Occupational health and safety of workers on-site and across the supply chain is monitored and documented transparently.
Example indicators: number of work-related injuries on site and monitoring of supplier policy; % of suppliers complying with health and safety policy

S24: No pollution
Minimize and mitigate adverse environmental, noise, and light pollution impacts on tenants and workers across the supply chain.
Example indicators: % of suppliers implementing pollution management practices; risk assessment of "Occupational injuries and fatalities" and "Occupational toxics and hazards"

S25: Educated workforce
The workforce associated with the construction and operation of buildings should be provided with education and opportunities for up-skilling within their field, through accessible apprenticeships and traineeships.
Example indicators: number of employee training hours; % of employees receiving regular performance reviews

S26: Embed sustainability
Sustainability education is embedded in the design of buildings and spaces, e.g., through wayfinding. The design should support sustainable behavior, for example, waste management systems that encourage re-use.
Example indicators: number of sustainability features incorporated in design; tenant satisfaction with sustainability education

S27: Education respected
The human right to education should be respected throughout the supply chain, to ensure equal opportunities, social and economic development, and empowerment and human dignity of workers while working towards inclusive and responsible communities.
Example indicators: % suppliers screened for educational initiatives and respect for education; % of workforce with access to educational programs

S28: Rights and safety
Workers across the supply chain should receive adequate education about their right to occupational health and safety and be educated transparently about the short-term and long-term risks associated with their field of work.
Example indicators: % of suppliers with a rights and safety policy; % of workers with access to rights and safety training

S29: Fair value creation
Tenants, staff, and other key stakeholders should receive a meaningful share of the value created from the real estate activities concerning them through systems such as rent-sharing agreements, tenant cooperatives, or ownership models, and long-term lease incentives such as rent stabilization.
Example indicators: value creation shared with stakeholders; B Impact Assessment Community Score

S30: Housing for marginalized
Developments should provide accessible and affordable quality housing for marginalized groups through the implementation of systems such as inclusive zoning, affordable housing partnerships, subsidized housing programs, and long-term housing solutions.
Example indicators: % of affordable housing units; % of affordable housing maintained or increased

S31: Empowerment of marginalized
Marginalized groups are empowered with rights and protections across the supply chain through inclusive hiring policies, training and capacity building, fair wages and working conditions, and transparent monitoring and reporting of such conditions.
Example indicators: % suppliers screened for inclusive and empowering activities; % of marginalized workers receiving training on their rights and protections

S32: Dispersive economy
Value created from real estate activities is dispersed equitably across the supply chain through fair compensation and profit-sharing, direct community initiative support, investment in training programs, support for worker advocacy groups, and transparent and fair bidding processes.
Example indicators: distribution of financial value to stakeholders; B Impact Assessment Community Score

S33: Diverse communities
Developers should create and maintain diverse and inclusive communities through inclusive marketing and outreach, culturally sensitive and co-created development, partnerships with diverse community organizations, and fair and non-discriminatory tenant selection processes.
Example indicators: diversity of tenant population; number of complaints with selection policy and practices

S34: Universal design
Buildings should be designed after the best universal design, accessibility, and user-mobility practices, removing physical and environmental barriers, so that all tenants – regardless of age, ability, and mobility level – thrive at home.
Example indicators: compliance with universal design standards; DGNB Design for All criteria

S35: Equal pay, equal work
Equal pay for equal work is monitored across the supply chain to ensure all individuals are equally compensated, regardless of sexuality, gender, race, and ethnicity, to create a more equitable and inclusive society.
Example indicators: % suppliers compliant with equal pay policy; gender pay gap

S36: No corruption
Proper efforts are made to create transparency around and eliminate supply chain corruption, such as conducting thorough due diligence before engaging with material suppliers, creating transparent procurement processes, creating a code of conduct and ethical policies for supply chain stakeholders, and seeking third-party certifications and audits.
Example indicators: % suppliers compliant with anti-bribery and corruption policy; risk assessment of corruption

S37: Inclusive governance
Tenants and other stakeholders are empowered by and included in housing governance by way of board seats, voting rights, and transparent communication of policy matters concerning them.
Example indicators: % of stakeholder representation on governance body; number of stakeholder consultations

S38: Co-created communities
Relevant stakeholders such as tenants are given opportunities for co-creating and influencing their community through participatory decision-making processes, creation of social and cultural events, access to shared spaces and amenities, access to skill-sharing / support networks, and effective communication platforms.
Example indicators: number of co-creation initiatives; number of tenant involvement opportunities

S39: Equitable leaders
Building industry activity across the supply chain promotes and fosters equitable and non-discriminatory leadership and power structures.
Example indicators: representation of leadership diversity (gender, ethnicity, culture, age, education, and more); employee satisfaction with leadership

S40: Support for unions
Support the rights of supply chain workers to political association and unionization by making sure their rights are protected by law and upheld in practice. Engage with union representatives on matters of worker rights and safety to foster a fair and inclusive work environment that respects worker autonomy and voice.
Example indicators: % of workforce in unions; number of labor disputes

S41: Fair rental contracts
Contracts between tenants and landlords are based on fair and transparent terms, and clearly define the responsibilities and obligations of both parties, notice periods, provisions for dispute resolution, fair policies regarding security deposits, and tenant privacy rights.
Example indicators: number of contract disputes; average rental contract duration

S42: Just acquisition
Acquisition and procurement processes related to the development of urban areas, such as acquisition of land, property evaluation, purchase agreements, closing, contract management, and post-acquisition evaluations are just, ethical, and transparent.
Example indicators: % of suppliers assessed for ethical procurement; number of ethical procurement incidents

S43: Worker protection
Workers across the supply chain are granted fundamental human rights and protections of those rights. Developers should not engage directly or indirectly with organizations that benefit from forced labor.
Example indicators: risk assessment of Labor rights and decent work; % of suppliers assessed for anti-corruption

S44: Human rights respected
Fundamental human rights such as education, health, water and sanitation, gender equality, decent work, housing, food, clean energy, and peace are monitored transparently and respected across the supply chain.
Example indicators: number of human rights incidents; % of suppliers assessed for human rights

S45: Good jobs created
Urban developments must evaluate the need for mixed-use programming to foster local economic activity – such as commercial units for small businesses, co-working facilities, cultural and creative activity, and public community services.
Example indicators: % of workforce employed from local community; % of permanent vs. temporary jobs

S46: Local economy fostered
Urban developments should include mixed-use programming to foster local economic activity – such as commercial units for small businesses, co-working facilities, cultural and creative activity, and public community services.
Example indicators: amount of space for commercial, co-working, and other facilities; % of area dedicated to economic activities

S47: Fair wages
Equitable and fair wages should be secured for all employees and workers across the entire supply chain.
Example indicators: % workers in supply chain paid above minimum wage; risk that average salary is below benchmark

S48: Quality work conditions
Working conditions for workers across the supply chain should be of high quality, safe, and support well-being. Such conditions should be monitored and reported on transparently.
Example indicators: % of suppliers assessed for labor practices; B Impact Assessment Workers score

Case Study 01: Rethinking Tenancy

How we improve access, affordability, and sense of ownership

At Home.Earth, we want our homes to be accessible to as many people as possible. We strive to build financially aligned, trust-based relationships with our residents – moving beyond the traditional landlord-tenant dynamic.

To support this ambition, we have developed our Tenant Allocation Model: a unique proposition that shares part of Home.Earth's value creation with our tenants. Through this model, we aim to make our homes more affordable and foster a stronger sense of ownership, engagement, and care.

Affordability is embedded throughout our approach. In our first project in Nærheden, we are piloting a model with no deposits or prepaid rent and with low, predictable move-out costs. We also strive to lower absolute rents by building smaller, more compact homes, with more than half of our apartments being two rooms or smaller.

1.1 Value sharing with tenants

A core element of Home.Earth's mission is to rethink the relationship between landlords and tenants. Our ambition is to introduce a 'third way' in the housing market – a model that sits between conventional rental housing and owner-occupied housing. We believe this will appeal to people who see renting as a long-term choice and who want to contribute positively to the place they call home.

In short, we have developed a model that allocates 30% of a property's financial net result to tenants who have lived with us for more than 12 months. This value will be returned as a rent discount over the following year, effectively improving affordability from the second year of tenancy.

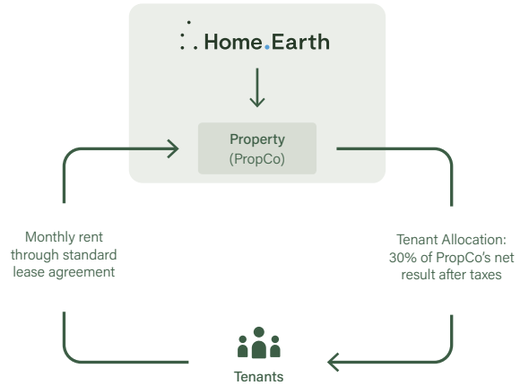
The model is designed to align interests, support long-term tenancy, and encourage active resident involvement. We expect it will lead to stronger relationships, greater loyalty, reduce churn, and a stronger foundation for long-term value creation.

From both cooperative and private housing, we know that residents who feel a sense of ownership take better care of their homes. This reduces maintenance costs and brings operational value by strengthening the day-to-day performance of our properties. The Tenant Allocation Model is pending approval by the tax authorities and is expected to be implemented in 2026.

1.2 Reducing financial entry barriers

We want to make it easier to afford a home. That is why we aim to eliminate deposits and prepaid rent.

Up until June 2025, we have tested reduced deposits on two of our existing redeveloped properties: an old film-production storage building and an old bicycle lights factory. In 2024 alone, this helped residents in these properties avoid €459,900 in upfront costs compared to industry standards.



Illustrative example	Home.Earth	Average private rental in Nærheden
Market rent	1,850 DKK/m²/year	1,850 DKK/m²/year
Average apartment size	70 m² [1]	85 m²
Annual rent	~ 130,000 DKK	~ 155,000 DKK
Tenant allocation[2]	**-11,700 DKK**	
Annual housing cost to tenant	118,300 DKK	~ 155,000 DKK
Increased disposable income with Home.Earth, including	**36,700 DKK/year or 3,048 DKK/month**	

Figure 2: 1. Average size of apartments in Nærheden is 70,9 m², which is applied in both cases to fairly compare the effect of tenant allocation. 2. Calculated as 30% of the PropCo net profit. and value appreciations. Notes: The share of PropCo net profit is allocated as a discount the subsequent year and is only in full effect once a tenant has resided in the Home.Earth unit for a full calendar year. The model is tentative, and it is sent to approval with the Danish Tax Authorities. Estimated at 9% of the rent, subject to financial performance.

From June 2025, with the leasing of our first new-build development, we are piloting a full no-deposit policy. At Nærheden, there is no deposit or prepaid rent, except a one-month deposit for residents with pets. This approach reduces upfront costs by €5,000 to €7,000 per household, depending on apartment size, significantly improving access to housing.

To ensure people can afford to live with us – and to create a good match between housing needs and household finances – all applicants undergo a thorough individual credit and financial assessment. We evaluate each applicant's housing burden and disposable income after rent, using established financial benchmarks in Denmark. This ensures that residents can sustainably afford their homes, supporting both household well-being and long-term tenancy stability. Since we do not require deposits, we carry a higher financial risk which requires our screening process to be more detailed than industry norms.

1.3 Active eviction avoidance

A better understanding of residents' financial situations also allows us to prevent evictions proactively. This is another key part of building trust-based tenant-landlord relationships.

Evictions have well-documented personal and social costs. Studies show that approximately 40 percent of those evicted report mental health challenges, 30 percent experience a relationship breakdown, and 20 percent are without a registered address one year later. When a resident falls behind on rent, we prioritize early engagement over automated reminders and enforcement, working to address challenges before they become critical. We then work with the residents to find a sustainable solution.

For Home.Earth, there is also a financial rationale for this approach. A single eviction typically costs between DKK 80,000 and DKK 130,000. By investing in early intervention and active dialogue, we protect residents' wellbeing while safeguarding our financial position.

We believe social and economic value are not in conflict. Our approach is intended to show that trust-based rental models can deliver better outcomes for all parties involved.

1.4 Low and predictable move-out costs

We design our homes to minimize move-out costs and reduce uncertainty. Our goal is to offer greater transparency and build trust in a process that is often stressful and unpredictable for tenants. We see this as an essential part of responsible tenant governance.
In our first development in Nærheden, we have made several design choices to support this: for example, we use lacquered oak skirtings and window frames that do not require repainting at move-out. This saves residents between €500 and €800 per unit. We section flooring and place doormats in entrance areas to avoid full-floor sanding, reducing turnover costs by an additional €600-1,000 per unit. We have installed high-quality kitchens with longer, more extended durability and less maintenance needs, saving residents €700–1,400 per unit over a five to ten-year period.

These strategies are supported by early and transparent dialogue with residents. We explain how they can help minimize wear and tear and involve them in the operation of the property. This creates a better understanding of maintenance needs and associated costs, encouraging a shared responsibility that will improve the property's performance. This approach is made possible by our long-term ownership strategy. Even if we were planning to sell the building after 5–10 years, these decisions would still make financial sense, but the full value of this strategy is only realized when we hold our properties for the long term, as we intend to do.

"Moving out should not come with stress or surprise expenses.
By designing for durability, we make the end of a lease more predictable and less costly for residents.
It's a simple but powerful way to reduce conflicts and build trust."

Rasmus Juul-Nyholm
Property Operations, Co-Founder, Home.Earth

Case Study 02: Affordable Renewable Energy

How tenants share locally harvested and renewable energy

Access to renewable, affordable energy aligns with social, financial, and environmental impact. In the development of the Nærheden project, an on-site energy machine was established, supplying most of the energy needs.

The idea to rethink the energy design was born out of a desire to lower the operational carbon footprint of the project as much as possible. It meant rethinking energy as something that belongs to the building itself – something generated, consumed, and shared on site.

The aim was to explore what is possible within current laws and technologies while staying within conventional cost levels. To obtain permission to disconnect from local district heating, a social and economic impact statement had to be documented and third-party verified.

The result is a system that covers most of the building's energy needs, cuts operational emissions, and opens up new ways of thinking about energy and housing together.

2.1 Local energy production

The roof at Nærheden is the first part of the building's energy cycle. It spans around 1,200 m2 and is fitted with solar panels and solar thermal collectors with a combined capacity of about 250 kWp. This system generates up to 106 MWh of electricity annually – all used directly within the building. It also includes 3,000 liters of thermal storage to maximize local use of hot water when energy is needed most.

The national grid remains available and is still needed during winter or overcast weeks, but over the course of a year, the system is expected to cover around 85% of the building's heating demand. That eases pressure on the grid and makes a significant difference.

2.2 An Energy Machine below ground

Below ground, another system is at work. The building's foundation – 388 concrete piles driven 18 meters deep into the ground – act as geothermal collectors, absorbing low-temperature energy from the earth while ensuring structural stability.

In order to achieve this, pipes are cast into every otherwise conventional concrete pile, allowing fluid to circulate and exchange heat with the surrounding ground. This effectively turns the foundation into a thermo-active battery: in winter, it draws heat from the earth; in summer, it dissipates excess warmth. A high-efficiency heat pump then transfers this energy to the building's heating systems, ensuring year-round comfort.

The roof and basement are connected: solar panels above; geothermal collectors below. The technology is not new, but the integration is deliberate and synergistic. Solar brings flexibility. The ground brings stability.

This solution was approved by Høje Taastrup Municipality after a socioeconomic analysis showed clear advantages to producing heat locally instead of connecting to district heating.

Figure 3: Nærheden's foundation uses 388 concrete 18 meter deep foundation piles that double as geothermal collectors, creating 15 kilometers of energy active tubes which turns a normally passive part of the building's structure into an active renewable energy system.

Figure 4: Close-up of the plastic tubes cast into each foundation pile at Nærheden. These tubes connect the geothermal collectors underground to the building's heat pump to generate energy year-round.

The study found a net present value saving of DKK 852,000, 17% lower lifetime costs, and 173 tons of CO_2 avoided over 20 years. On that basis, the municipality granted an exemption from mandatory district heating under section 15(2) of the Danish Heat Supply Act, allowing the building to run its renewable system.

2.3 Energy Communities

At Nærheden, all energy produced stays within the building, powering shared systems and serving every resident. This shifts energy from an individual concern to a collective asset.

Residents may not need to understand the technical details of how the system works, but they feel its effects: lower shared costs; less exposure to energy price volatility; and near-zero fossil fuel operation.

In this way, renewable energy becomes part of the shared infrastructure in the building, turning the whole building complex into an energy community that benefits both the tenants and the planet.

"As part of the green transformation we need to rethink energy as something that it produced locally as well as collectively. Intelligent power management combined with short term energy storage optimizes the production capacity and could also support the grid."

Thomas Bischoff

Project Director, Home.Earth

Case Study 03: Empowering Communities

How communities can be empowered with mandate and real agency

At Home.Earth, we want our buildings to enable connection, participation, and long-term value. Our ambition is to build communities where residents are both socially and financially engaged, and where they play an active role in shaping the place they live.

We pursue this ambition through a combination of initiatives: an economic model that providing value to resident communities, a physical design that fosters interaction, and property operations that support self-organization.

We also include the broader neighborhood in our investment process by engaging early in new areas and collaborating with local municipalities to support inclusive and exciting local development.

3.1 Community Allocation

Strong communities rarely happen by accident – they require time, shared experiences, and resources. In most rental housing, however, budgets for resident-driven initiatives are minimal or non-existent, leaving little room for meaningful investment in common spaces, activities, or local impact projects.

To address this, Home.Earth earmarks 3% of the company's total value creation to our resident communities. This allocation will provide residents economic agency, enabling projects that go beyond standard property management – such as upgrading shared spaces, organizing community events, or supporting social initiatives in the local area.

The Community Allocation will start small but grow steadily over time. If Home.Earth grows as projected, it will exceed €3,000,000 by 2030. With an estimated 3,000-4,000 homes in operations by then, this translates into a significant budget for resident-driven initiatives.

The Community Allocation reflects our goal to redefine the tenant-landlord relationship. It gives residents a material stake in the company and enables them to invest in spaces, services, and social events. In doing so, it is intended to strengthen resident connection, foster shared responsibility, and help build more resilient communities.

3.2 Design for interaction

Architectural design plays a central role in building social foundations. Our developments are deliberately designed to encourage interaction and community life through shared amenities and outdoor areas.

Home.Earth's Nærheden development includes 300 m2 of common space – including a large, shared living room, shared kitchen, and three guest apartments. These spaces are designed in collaboration with

experienced architects, and the involvement of the first residents through a participatory design process is crucial to defining their functions and future use. A community house is also provided as part of the development, with space for makers, repair shops, and various organized community activities.

Wherever possible, we integrate active ground floors into our buildings, using them to bring life to the street and strengthen the local neighborhood. In Nærheden, the project contributes 1,570 m^2 of commercial space for shops, cafés, shared facilities, and a restaurant. For a community of 8,000 residents that previously had no active commercial spaces beyond a single supermarket, this represents a significant step toward creating a vibrant local center.

3.3 Tenants boards

Our ambition to rethink the landlord-tenant relationship also includes how properties are governed. Inspired by cooperative and owner-occupied housing in Denmark, we support the establishment of Tenant Boards in our properties.

Each board operates as a formal body with a clear mandate, giving residents greater insight and influence over building operations and shared spaces. The goal is to foster shared responsibility and support a more engaged community. This creates value not just for the people living in the building, but also for the long-term financial sustainability of the property. Further, the Tenant Boards will manage an annual budget allocated by Home.Earth (Community Allocation) and serve as a representative body for the residents.

This model supports a more democratic and transparent approach to rental housing, one that balances community life with operational needs.

3.4 Regenerative communities

We are also developing new models for long-term, self-organized communities. With support from the Ramboll Foundation, and in collaboration with leading researchers and practitioners, we are developing an open-source Community Guide. The guide will focus on how to build regenerative communities in rental housing – communities able to thrive without relying on external managers or service providers.

The model will be tested in two case studies: Home. Earth's 158 homes in Nærheden and Stensdal Group's 164 homes in Helsinge. The goal is to develop a practical and scalable guide that empowers residents to develop the skills, relationships, and structures needed to sustain community life.

Across the housing sector, there is a growing trend toward hiring community managers to build engagement and support wellbeing. While this can work well in the short term, it risks creating long-term dependency. If residents rely too heavily on external staff to facilitate social life, natural neighbourly relationships may weaken, and community responsibility may erode.

Our approach is different. We aim to strengthen community resilience from within, by helping residents shape and sustain their own networks, traditions, and shared spaces.

"We believe in the value of having engaged residents and strong communities, which is why we have gone far in order to develop and ensure that financial value created in Home.Earth is shared with our tenants through our Tenant Allocation model"

Camilla Dalum

Investor Relations Lead, Home.Earth


CEMBRIT

Ecological Ceiling

The Ecological Ceiling

Home.Earth is committed to building and operating homes within Ecological Ceiling as outlined in the Doughnut for Urban Development.

The Ecological Ceiling represents the biophysical limits of the planet's ecosystems, beyond which environmental degradation becomes irreversible. The commitment includes initiatives such as the Planetary Carbon Roadmap, translating the planetary boundary for climate change into new standards for carbon footprint per m^2 using life cycle assessment.

Also, Enhancing Biodiversity Strategy begins with biologists surveying each site to establish a biodiversity baseline, which every new development is then required to improve upon.

The Earth system is on the move

The history of humans is a remarkable story of innovation and change. Our journey toward what we call home is clear evidence of that. Our homes have transformed from a patch in a forest, to a fixed cave in a mountain, or a portable tent, to round stone walls of a broch, or a rectangle of a dwelling, and to a spacious house in a town, or a small apartment in a megacity. The ability of humans to understand laws of nature and to transform nature's limited resources led to the rise of cities.

Far more importantly, in the same period, nature blessed us with an unassuming 11,000 years of stable climate – the Holocene or a Goldilocks state, which is not too hot, not too cold. During this time, reliable seasons emerged, and global air temperature did not change more than 1°C. Looking back in time, we know that such climate stability is an exception rather than the rule.

Thanks to these unique circumstances, people could develop agriculture, grow in numbers, settle in more places, learn to process materials, and eventually build homes and cities, as we know them. Along the way, we discovered global warming while being on the path of a sharp increase in human-led CO_2 emissions, CO_2 concentration, and global air temperature, beyond what Earth has ever seen.

We also discovered that the mechanism of keeping this global, ecological, self-regulating thermostat running is governed by functioning ecosystems, such as Amazonian and Boreal forests and ice sheets at the Southern and Northern poles, and their interactions. Climate stability is dependent on healthy ecosystems, and healthy ecosystems are dependent on climate stability. Currently, these ecosystems are under the threat of losing their collective capacity to regulate the global temperature. This is why we are all marching towards an uncertain and risky future on a hot and unpredictable planet, knowing that human activities are the dominant driver.

A primary human-led driver is how we build homes and live in cities. History requires us to rise to the occasion and continue our story of innovation. Yet again, transforming what we call home and how we build it – but this time, by doing so, moving the needle in the opposite direction, away from impairing climate stability and the quality of ecosystems by dumping greenhouse gases into the atmosphere, but rather to move towards a more stable, healthy future with a thriving and resilient Earth system.

The Planetary Boundaries framework is a guide

Scientists have developed a planetary boundaries framework to guide us on this new journey. The framework defines a safe operating space for humanity based on biophysical processes that are fundamental to maintaining the stability of the Earth system in a Holocene-like state. The framework includes nine interdependent and interconnected biophysical systems and processes that are modified by human actions, including urban development.

Climate change and biosphere integrity are core boundaries because once substantially transgressed, they can drive the Earth system into a new state – away from the Holocene. The other seven planetary boundaries are ocean acidification, land system change, freshwater use, stratospheric ozone depletion, aerosol loading, novel entities, and biochemical flows (nitrogen, phosphorus pollution), which when transgressed lead to deterioration in Earth system's ability to function, that can increase the risk of regional regime shifts and predispose transgression of the core boundaries.

Each planetary boundary is associated with one or more measurable control variables that need to remain below a certain threshold to avoid abrupt or harmful changes (Steffen et al., 2015). Thresholds in six of the nine planetary boundaries have already been transgressed, and we are rushing towards an increasing risk of planetary collapse. Urban development has its share in the transgression of these planetary boundaries. For example, in the EU, the construction sector accounts for 40% of all extracted materials, 40% of energy consumption, generates 40% of waste annually, and contributes to 33% of all greenhouse gas emissions, all of which carry a significant impact on the global climate and biodiversity, as well as chemical flows in global supply chains.

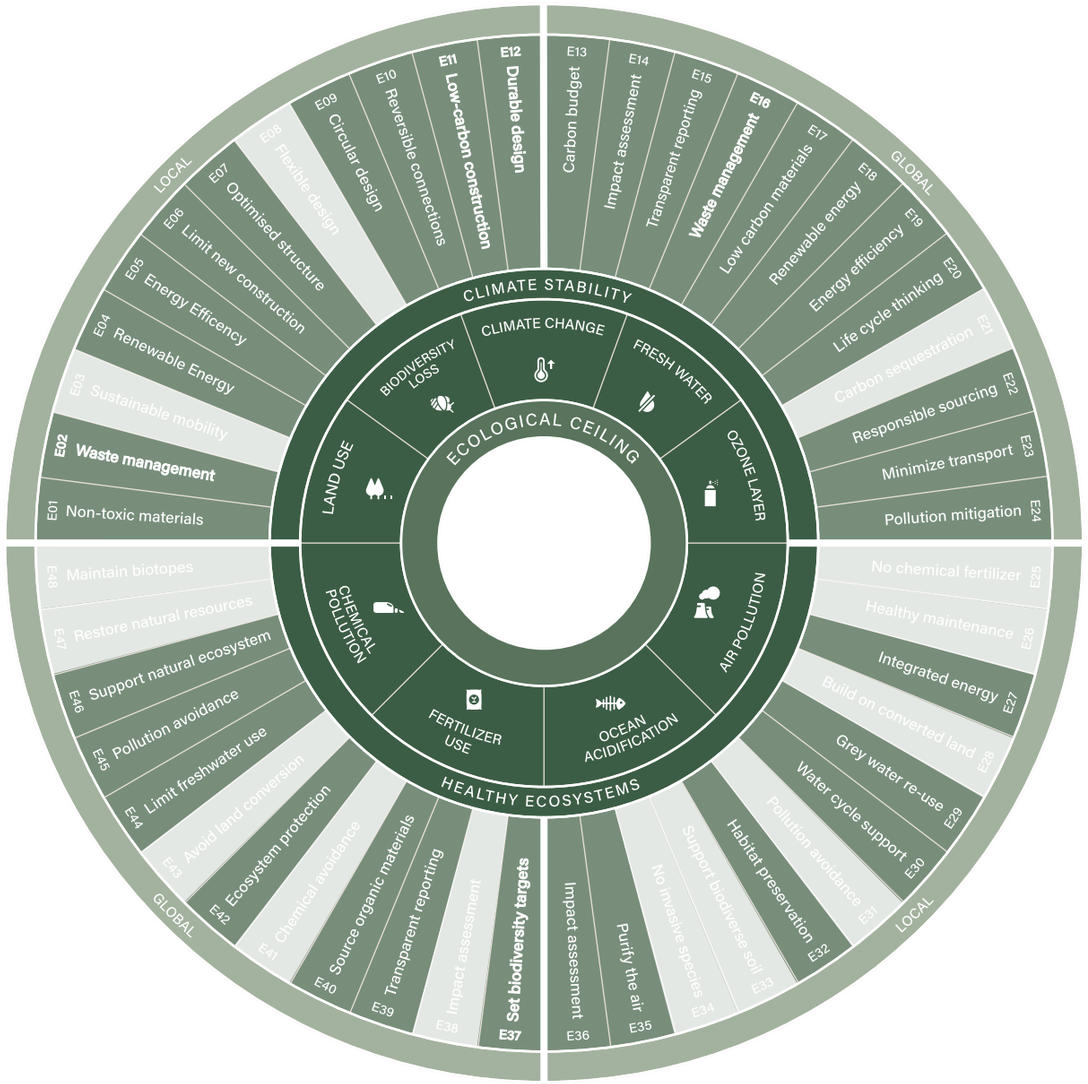
Ecological Ceiling Impact Areas

In the Doughnut for Urban Developments, the strategies for urban development within planetary boundaries were bundled into 48 Ecological Ceiling Impact Areas. For each Ecological Ceiling Impact Area, we considered where an actor has agency to affect change, both locally and globally, drawing on the Doughnut Four Lenses methodology. The ecological lenses are understood in terms of local aspirations and global responsibilities, asking:

- The local-ecological lens: how can this development restore and be inspired by its surrounding nature?
- The global-ecological lens: how can this development respect the health of the whole planet?

Ecological Ceiling Impact areas collectively cover the full life cycle, one step at a time, losing no sight of off-site impacts. This includes acquisition of land plot, extraction of raw materials, construction, operational and end of life phases.

Ecological Ceiling Impact areas collectively cover the full life cycle, one step at a time, without losing sight of off-site impacts. This includes acquisition of land plots, extraction of raw materials, construction, operational, and end-of-life phases. The Ecological Ceiling Impact Areas are not individually mapped onto nine Planetary Boundaries but instead associated with broader categories of climate stability and functioning ecosystems, which underpin the dynamics of the Holocene-like Earth system. Refraining from rigid categorization stems from the fact that all nine planetary boundaries interact with each other, and many planetary impact areas can be associated with several different boundaries simultaneously



- Impact area covered by Home.Earth
- Impact area not covered

	Impact Area		Home.Earth's Assessment	Third-party Assessment
	E01	Non-toxic materials		●
*	E02	Waste management	●	●
	E03	Sustainable mobility		
	E04	Renewable energy	●	●
	E05	Energy efficency	●	●
	E06	Limit new construction	●	
	E07	Optimised structure		●
	E08	Flexible design		
	E09	Circular design	●	
	E10	Reversible connections	●	
*	E11	Low-carbon construction	●	●
*	E12	Durable design		●
	E13	Carbon budget	●	●
	E14	Impact assessment	●	
	E15	Transparent reporting	●	●
*	E16	Waste management	●	
	E17	Low carbon materials	●	●
	E18	Renewable energy	●	●
	E19	Energy efficiency	●	●
	E20	Life cycle thinking		●
	E21	Carbon sequestration		
	E22	Responsible sourcing		●
	E23	Minimize transport		●
	E24	Pollution mitigation		●

	Impact Area		Home.Earth's Assessment	Third-party Assessment
	E25	No chemical fertilizer		
	E26	Healthy maintenance		
	E27	Integrated energy	●	●
	E28	Build on converted land		
	E29	Grey water re-use	●	●
	E30	Water cycle support	●	
	E31	Pollution avoidance		
	E32	Habitat preservation	●	
	E33	Support biodiverse soil		
	E34	No invasive species		
	E35	Purify the air		●
	S36	Impact assessment		●
*	E37	Set biodiversity targets	●	●
	E38	Impact assessment		
	E39	Transparent reporting	●	●
	E40	Source organic materials		●
	E41	Chemical avoidance		
	E42	Ecosystem protection		●
	E43	Avoid land conversion		
	E44	Limit freshwater use		●
	E45	Pollution avoidance		●
	E46	Support natural ecosystem		●
	E47	Restore natural resources		
	E48	Maintain biotopes		

* *Indicators marked with an asterisk rare unfolded as case studies in this publication.*

Home.Earth's Assessment: These areas are assessed internally by Home.Earth due to their high relevance and strategic alignment with our core mission, allowing for direct oversight and pursue of more ambitious targets, particularly where recognised external frameworks or methodologies are still lacking.

Third-party Assessment: These areas are accounted for externally by Home.Earth through internationally recognised frameworks and certifications, such as B Corp, DGNB, CRREM, SBTi and others. Our practices align with the EU Taxonomy, ensuring transparency and accountability.

The 48 Impact Areas of the Ecological Ceiling - page 1 of 3

E01: Non-toxic materials
Use non-toxic, non-harmful building materials to ensure long-term health and safety of laborers, tenants, and the natural environment. Specify low-VOC and off-gassing materials, and when possible, specify certified materials, such as Cradle to Cradle and the Swan label.
Example indicators: % of low-VOC & certified materials

E02: Waste management
Specify products that are manufactured efficiently using additive design principles. Minimize on-site construction waste by designing with standard dimensions. Design a circular construction site to ensure material reuse.
Example indicators: amount of waste leaving the site during construction

E03: Sustainable mobility
Develop building sites that are well connected to public transportation to promote sustainable mobility practices such as walking, cycling, use of public transit, and ride-share options.
Example indicators: proximity to public transportation and alternative modes

E04: Renewable energy
Connect to renewable energy infrastructure during both the construction and operational phases of buildings to reduce dependency on fossil fuels. Where it makes good sense, integrate energy production on-site. Example indicators: % of renewable energy and on-site production

E05: Energy efficiency
Reduce energy consumption in operations through design for passive heating and cooling, specify energy-efficient, motion-censored systems, and energy-saving appliances. Design an active building envelope for heat retention and energy exchange. Utilize smart systems to identify areas of inefficiency with real-time data.
Example indicators: real-time energy measurement during operations

E06: Limit new construction
Limit new construction. Reduce dependency on virgin materials and minimize carbon emissions by utilizing the existing building stock as a material bank. Maintain, preserve, and re-use culturally significant and environmentally valuable buildings, elements, and materials.
Example indicators: quantity of reused and preserved materials from existing buildings

E07: Optimized structure
Optimize structural dimensions and design to reduce material usage. Avoid over-dimensioning and structural redundancy. Design the structure to have a long life and a loose fit.
Example indicators: reduction in materials achieved through optimized design

E08: Flexible design
Optimize building design for flexible use of space to reduce the need for new construction and allow for functional changes in use over time – in both short periods (daily, weekly) through shared spaces and double programming, and more extended periods where the building's typology can change.
Example indicators: rate of building design flexibility for adaptable space

E09: Circular design
Design circular buildings to promote the preservation of material, structural, thermal, environmental, and aesthetic value. Design with a digital twin and material passports to maintain material knowledge and accurately document lifespans.
Example indicators: ratio of projects with digital twins & material passports

E10: Reversible connections
Preserve material resources by designing for disassembly using reversible connections, circular building elements, and, when possible, product service systems. When specifying technical (non-biogenic) elements, use durable, high-quality materials to ensure long lifespans.
Example indicators: % of building elements designed for disassembly and durability

E11: Low-carbon construction
Promote circular and low-carbon construction sites by designing high-quality waste handling practices, low-carbon machinery, and low-carbon construction techniques.
Example indicators: quantity of circular and low-carbon practices implemented on construction sites

E12: Durable design
Design for durability, easy maintenance, and accessible repair to reduce the need for material exchange. Use appropriate and specific levels of material durability for the given function. For example, a high-traffic entrance will need a more durable material than a tenant's living space.
Example indicators: documentation rate of building projects with material durability and repair instructions

E13: Carbon budget
Set and comply with a carbon budget to ensure that your building project is within the planetary boundary for climate change. Use measurable targets to scale your building project within planetary limits.
Example indicators: compliance rate with carbon budget targets by assessing carbon footprint

E14: Impact assessment
Comply with relevant industry standards (such as Building LCA) for impact assessment. Relevancy is dependent on local/national frameworks for benchmarking building projects. Benchmarking building projects allows for project comparison and tracking of innovation progress.
Example indicators: achievement rate from recognized impact assessment standards and frameworks

E15: Transparent reporting
Be transparent in the documentation and reporting of the building impact assessment. Open source your novel innovations and best practice cases. Stay accountable and follow through on goals to scale building activity within planetary boundaries.
Example indicators: transparency rate in impact assessments

E16: Waste management
Promote resource reuse and efficient production to minimize supply chain waste in material extraction, production, and transportation, thereby reducing negative environmental impacts.
Example indicators: quantity of reused resources and waste generated in the supply chain

E17: Low carbon materials
Source regional, low-carbon, biogenic, rapidly renewable, and regenerative building materials. Use reputable suppliers who comply with Environmental Product Declarations (EPD) standards.
Example indicators: ratio of low-carbon and renewable materials sourced from EPD-compliant suppliers

E18: Renewable energy
Specific building materials from suppliers who use renewable energy in extraction, manufacturing, and production processes across the supply chain to actively limit dependency on fossil fuels.
Example indicators: % of building materials utilizing renewable energy in the supply chain

E19: Energy efficiency
Minimize energy consumption in extraction, manufacturing, and production processes by identifying energy-intensive processes across the supply chain and optimizing them with energy-efficient equipment, efficient design processes, waste reduction, automated systems, and smart controls.
Example indicators: rate of energy consumption reduction in extraction, manufacturing, and production

E20: Life cycle thinking
Adopt a life cycle perspective from the beginning of the design process by using LCA and LCCs to enable intelligent, qualified decision-making to gain new knowledge about building design and ultimately lower building impact.
Example indicators: number of life cycle assessments and life cycle cost analysis conducted in design

E21: Carbon sequestration
Source materials with high-carbon sequestering qualities to use the building as a carbon sink, while minimizing the building's carbon footprint.
Example indicators: quantity of carbon sequestered by building materials used in construction

E22: Responsible sourcing
Source certified and reputable materials that ensure long-term planetary health by minimizing environmental impact such as deforestation, water pollution, and resource exploitation.
Example indicators: % of materials sourced from certified and reputable suppliers

E23: Minimize transport
Minimize transportation impact through extraction, manufacturing, and production processes in the supply chain by specifying regional materials and working with suppliers whose operations are locally based. Specify light-weight materials, elements, and structural systems that can be transported with electric vehicles. Example indicators: ratio of regional materials used and transportation-related emissions

E24: Pollution mitigation
Mitigate pollution by avoiding the use of materials with dangerous chemical content, thereby ensuring the long-term health of workers and natural environments across the supply chain.
Example indicators: quantity of materials used with minimized dangerous chemical content

E25: No chemical fertilizer
Avoid the use of chemical fertilizers in the maintenance of open spaces and landscapes to stop eutrophication associated with runoff, thereby protecting the health of lakes, rivers, and other natural water resources.
Example indicators: % of chemical fertilizer-free landscape maintenance practices

E26: Healthy maintenance
Avoid contaminants such as chemicals, plastics, NOx, and SOx that harm on-site biodiversity and the biosphere.
Example indicators: % of maintenance practices without contaminants harmful to on-site biodiversity

E27: Integrated energy
Avoid using land for local energy production and incorporate building-integrated renewable energy solutions, such as solar PVs, on the building's roof.
Example indicators: % on-site energy from building-integrated renewables, minimizing land use

E28: Build on converted land
Build high-density developments on already converted land. Do not develop greenfields, forests, or agricultural land suitable for natural restoration.
Example indicators: ratio of buildings on converted land vs. greenfields/agricultural land

E29: Grey water re-use
Conserve natural water resources by designing for the treatment and reuse of greywater on-site for purposes such as irrigation, toilet flushing, cooling systems, and watering non-edible plants.
Example indicators: quantity of greywater treated and reused on-site for various purposes

E30: Water cycle support
Support natural water cycles on-site by catching and cleaning water with permeable surfaces, natural cleansing systems such as reed beds, bioswales, and "living machines," and redistributing clean water to the local water reserves.
Example indicators: quantity of water captured, cleaned, and redistributed on-site through natural systems

E31: Pollution avoidance
Avoid the pollution and disturbance of the local, natural ecosystem by avoiding artificial light pollution, noise pollution, and chemical pollution surrounding the building site.
Example indicators: compliance with pollution avoidance measures (light, noise, chemicals)

E32: Habitat preservation
Preserve and support the existing natural habitats and species diversity while designing new habitats that support local biodiversity. Use nature-based solutions in infrastructure such as parking, pathways, roofs, walls, waterways, gardens, and the like.
Example indicators: % of nature-based solutions integrated into infrastructure design

E33: Support biodiverse soil
Preserve natural, biodiverse soil on-site using phytoremediation and composting. By preserving soil, you contribute to maintaining a healthy environment and functioning ecosystems.
Example indicators: ratio of preserved biodiverse soil through phytoremediation and composting

E34: No invasive species
Maintain natural green spaces and monitor for invasive species. Work to remove non-locally adapted and invasive species when necessary.
Example indicators: compliance with invasive species monitoring and removal protocols

E35: Purify the air
Use photocatalytic coatings, such as those found in trees and other nature-based solutions, to purify outdoor air quality, while improving thermal comfort and mitigating noise pollution.
Example indicators: rate of outdoor air purification using coatings and nature-based solutions

E36: Impact assessment
Engage with a qualified, local, expert ecologist to conduct standardized and reputable biodiversity impact assessments on-site.
Example indicators: number of on-site biodiversity assessments conducted by qualified ecologists

E37: Set biodiversity targets
Set and comply with a biodiversity target to ensure your building project impact is within planetary limits for biodiversity and works towards the regeneration of a healthy ecosystem.
Example indicators: compliance with biodiversity targets for ecosystem regeneration

E38: Impact assessment
Engage with a qualified, local, expert ecologist to conduct standardized and reputable biodiversity impact assessments off-site.
Example indicators: number of off-site biodiversity assessments conducted by qualified ecologists

E39: Transparent reporting
Be transparent in the documentation and reporting of the building impact assessment. Share your novel innovations and good cases.

Example indicators: transparency in impact assessments and documentation of innovative practices

E40: Source organic materials
Source organic materials that are grown without the use of chemical fertilizers in the supply chain, to minimize impact on local ecosystems.
Example indicators: % of organic materials sourced from chemical-free supply chains

E41: Chemical avoidance
Avoid pollution by limiting the use of chemicals and plastics in the production and transportation of building materials.
Example indicators: reduction in chemical and plastic usage in building material production

E42: Ecosystem protection
Reduce the extraction of virgin materials such as rock, sand, and timber for the construction of buildings and landscapes to protect natural and functioning ecosystems.
Example indicators: reduction in the extraction of virgin materials for ecosystem protection

E43: Avoid land conversion
Avoid land conversion for energy production across the supply chain. Procure energy from production sites on already converted land, from suppliers who actively work to regenerate the land.
Example indicators: ratio of energy sourced from converted land and regenerative suppliers

E44: Limit freshwater use
Reduce the reliance on groundwater and fresh surface water in the supply chain by utilizing greywater to produce building materials.
Example indicators: % reduction in freshwater consumption through greywater use

E45: Pollution avoidance
Reduce off-site artificial light, noise pollution, disturbance, and chemical pollution of surrounding natural ecosystems across the supply chain.
Example indicators: compliance with measures to minimize off-site pollution

E46: Support natural ecosystem
Source building materials that do not reduce habitat quality, genetic diversity, or functional biodiversity.
Example indicators: % of building materials sourced without compromising biodiversity and habitat quality

E47: Restore natural resources
Restore natural resources and avoid overexploitation by balancing the rate of natural material consumption with the ability of that material to regenerate at a natural rate.
Example indicators: ratio of restored resources to consumption, considering regeneration capacity

E48: Maintain biotopes
Maintaining biotopes is essential for the preservation of biodiversity, ecological balance, and the sustainable provision of virgin resources, safeguarding unique species and ecological processes that they support, while promoting sustainable land and resource management.
Example indicators: compliance with biotope maintenance practices for biodiversity preservation and land management

Case Study 04: Planetary Carbon Roadmap

How science guides towards living within the planetary boundaries

Home.Earth believes that buildings be designed within the limits of our planet. If we want to keep building homes, we must do it in a way that the earth can sustain over time.

The built environment plays a significant role in the climate crisis, being responsible for a large part of global emissions. That is a challenge, but also an opportunity to make a real difference.

Guided by climate science, we set clear boundaries for what and how we build, tracking carbon closely and reducing emissions through life cycle assessments. With each project, we refine our approach, applying lessons learned to push performance further and stay within the limits our planet can sustain.

4.1 Sufficient allocation

Home.Earth approaches carbon emissions not as a negotiable budget but as a fixed limit. Each building is assigned a fair carbon allowance, determined by what the planet can sustain and what climate science indicates is necessary, rather than by existing norms or regulatory thresholds.

This principle is explored in detail in Doughnut for Urban Development – A Manual, which presents a method for allocating carbon that begins with the 1.5°C target and the reality of planetary boundaries. Instead of referencing past emissions or industry averages, the question becomes: what is a fair share for this building, in this location, at this point in time?

This reframes the notion of responsibility. The aim is not merely to outperform current standards, nor to rely on compensation or offsets, but to remain within the true planetary limits from the outset. It requires a disciplined design process that treats the ecological ceiling as the boundary to which the project is held accountable.

The calculation of a project's carbon allowance follows a clear sequence. First, the global carbon budget is divided equally per person, applying the equal per capita principle, dividing the Earth's population into individual carbon budgets. Then we allocate a share of that budget to what a home requires, based on the principle of sufficiency, making sure everyone has access to decent living standards. Finally, we divide this amount by the total housing stock in square meters. The result is a target of 1.18 kg of CO_2 per square meter per year – equal to about 60 kg per person.

4.2 Carbon journey

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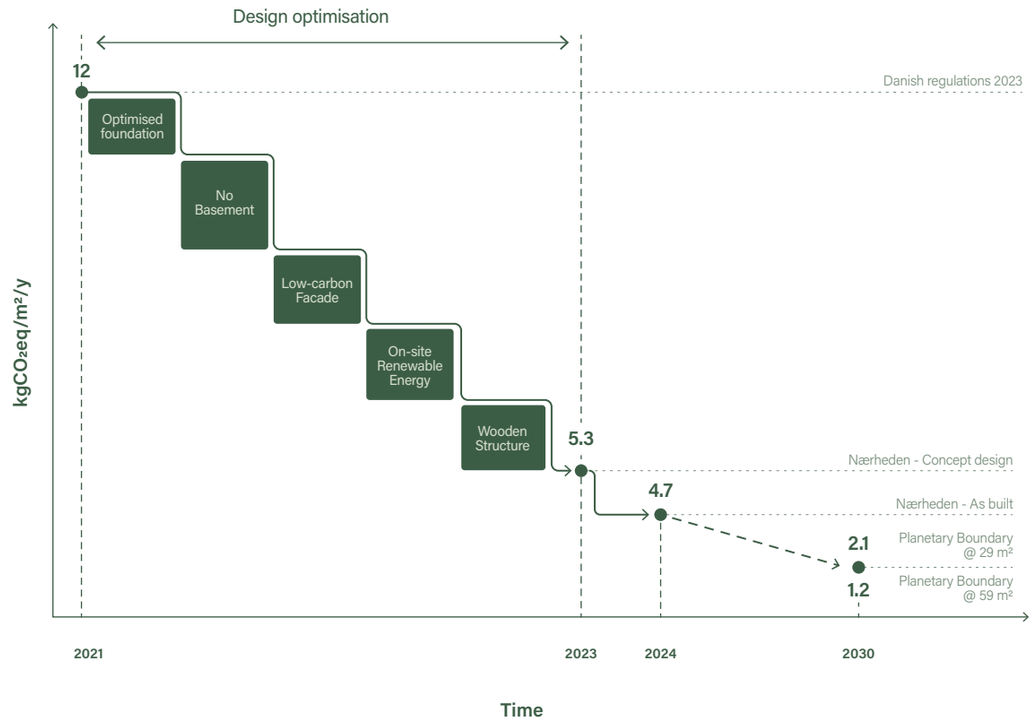

Figure 5: Roadmap illustrating how Home.Earth's design optimisations have reduced Nærheden's emissions from Denmark's regulatory baseline of 12 kg CO_2eq/m²/year to 4,7 kgCO_2eq/m²/year. By continuing this trajectory, we aim to align future projects with the planetary boundary for climate change. This boundary is defined by the space each person occupies at Home.Earth, around 29 m² per person resulting in a carbon footprint target of 2,1 kgCO_2eq/m²/y.

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- Optimized foundation and removal of the basement.
- Replacing concrete with wood-based structural system
- Choice of cladding materials: slate and wood
- Moving from off-site energy to on-site renewables.
- Minimizing secondary structures in façades and using greener concrete.
- Collaborating with solar cell suppliers to improve panel impact.

These actions are reflected in the structural systems, material choices, energy design, and supply chain optimization. Key decisions must be made early in the process, as the opportunities to reduce emissions decrease as design and construction progress.

Our carbon reduction journey will continue in future projects. We refine our approaches, reevaluate material choices, and adapt to the specific opportunities and constraints of each site, all while working within conventional building budgets and operational needs. In order to reach our 2030 goal of building within the planetary boundary, a staggeringly low level of 2.1 kg CO_2eq/m^2/year per year must be achieved. To stay on track, we have developed a roadmap for what comes next, where we outline several ways to reduce carbon even further. For example, we aim to increase direct reuse of repurposed or upcycled materials, incorporate on-site carbon capture, and continue our ongoing quest to source alternative building materials with a lower footprint.

This roadmap defines the path we follow in all new developments. Projects such as Nærheden, NEFA Fabrikken, and Høje Taastrup City are already aligned with it, demonstrating how we continuously track and lower emissions to stay on our path towards planet-positive buildings.

4.3 Framework standards

To further guide and validate our work, we align with several science-based frameworks that define what staying within planetary boundaries means in practice. This helps turn our ambitions into actions and ensures transparency in how we measure and reduce our carbon footprint.

For example, we follow the DGNB Planet standard as a key part of our approach. DGNB Planet sets strict limits for both embodied and operational carbon,

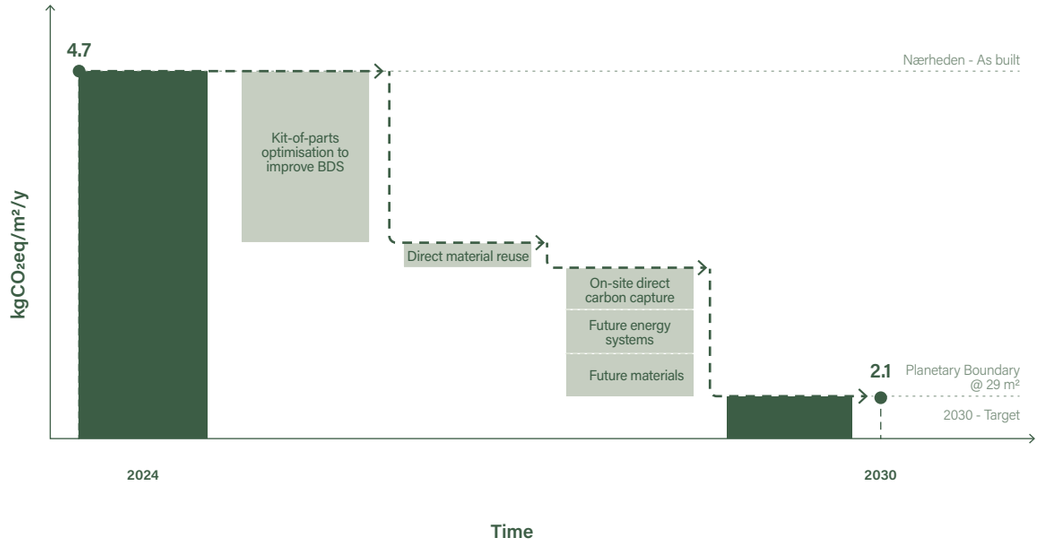


Figure 6: Roadmap showing our path from Nærheden's 4,7 CO_2eq/m^2/year today to the 2030 target of 2,1 $kgCO_2eq/m^2$/year. A core part of our strategy is built oncontinously improving from one project to the next, by focusing on:

1. Optimised building systems: Not starting from scratch but having a core repository that we build with, and as repetitive as possible. Creating more refined build-upsand reducing dimensions that gives a lower material and carbon footprint.
2. Direct reuse and upcycling: Reducing strain on virgin material fooptprint, by direct reuse of materials and repurposed industrialised upcycled material
3. Leveraging on innovation: Employing new technologies such as renewable energy systems or onsite carbon capture that have big potential
4. Engaging with north star suppliers: Working with suppliers that are committed to continously cut emissions and improving their product portfoli

requires real reductions, and includes minimum thresholds for circularity and sufficiency.

A certification with actual knock-out criteria that must be met, DGNB Planet is also aligned with the Reduction Roadmap, which outlines the maximum carbon intensity allowed each year, alongside criteria like Biodiversity Netgain and reporting on circularity.

Home.Earth also uses CRREM to manage carbon risk in real estate portfolios and reduce emissions in existing buildings. Finally, we align with the Science-Based Targets initiative (SBTi), which sets absolute targets for construction-related emissions.

Together, these frameworks help us stay accountable – not just to our own goals, but to the climate science behind them. They help keep the goal visible in every decision we make for ourselves and our investors.

"Staying close to 1.5°C means rethinking how we build – from the resources we choose to the energy we use. At Home.Earth, we are learning to do more with less, creating circular homes with the lowest footprint and showing that real estate can be done responsibly."

Dan Pham

Sustainabillity Engineer, Co-Founder Home.Earth

Case Study 05: Life Cycle Costing

How quality with higher upfront costs creates long-term value

Traditional real estate investments are often made with a short time horizon. This approach stands in contrast with the reality of buildings' lives, which, if built and operated with care, can stand for centuries.

In the construction industry, Total Cost of Ownership (TCO) refers to the assessment of all costs associated with an asset throughout its entire life cycle. This includes not only the initial capital expenditures - such as land acquisition, design, and construction - but also long-term operational, maintenance, energy, renovation, and disposal costs. TCO helps stakeholders such as developers, owners, and facility managers to make informed decisions by evaluating how design choices, material selection, and construction methods impact long-term value.

For example, choosing high-quality materials with durable finishes can minimize future repair or replacement costs. By shifting the focus from initial cost to lifetime value, TCO supports cost-effective and performance-oriented decisions, often delivering solutions that benefit not only financially but also environmentally, while providing better homes for residents.

5.1 A kitchen study

Home.Earth, in collaboration with kitchen manufacturer Stykka, has conducted a study that revealed the actual costs associated with the operation and maintenance of kitchens over 10 years. In an industry characterized by short-term economic decisions, adopting a total cost perspective helps make better long-term choices. Buildings are meant to last hundreds of years, and the kitchens and installations we put in them should ideally function for 10, 20, or even 30 years.

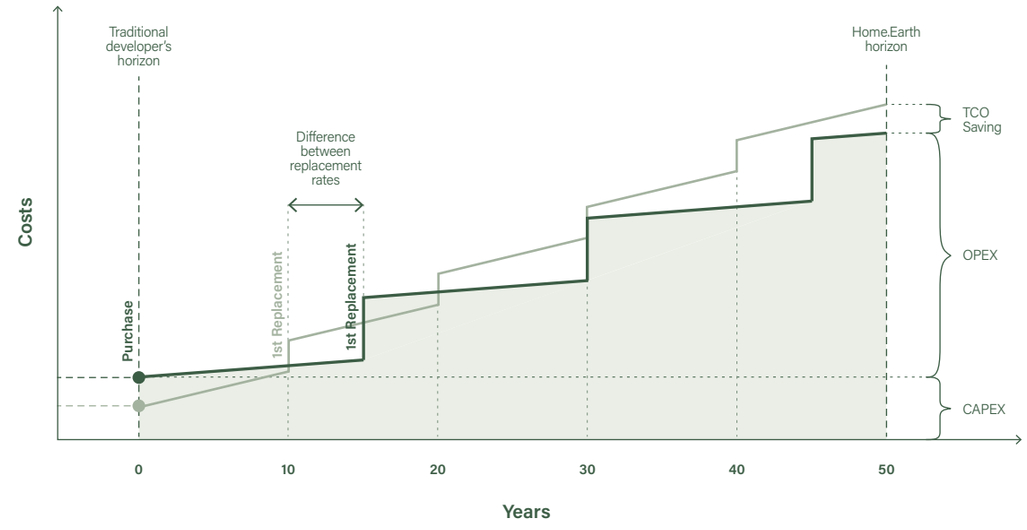
The study showed that it can make economic sense for a property owner to invest in quality and durability rather than opting for a kitchen with a low purchase price but high operating and maintenance costs.
Mapping actual operating conditions over time and estimating the Total Cost of Ownership (TCO) is essential for any long-term and ESG-focused property owner. Long-term ownership allows for long-term value creation – good business not only for property owners and investors, but also for the environment and the building's residents.

The study was the outcome of a workshop focused on operations, held with the country's leading property operators, including Cobblestone, Thylander, Deas, Jeudan, Balder, and Goldschmidt. The purpose was to investigate and understand the actual operating costs associated with kitchen selection and maintenance in rental properties.

Working with long-term horizons is crucial to optimizing operations, improving service experiences, and minimizing a building's planetary footprint. Often, these experience-based costs are not fully accounted for in projected operational budgets, leading to unpleasant surprises rather than being actively budgeted for and minimized through TCO-based investment planning.

5.2 Maintenance categories

The participating experts' experience and best practices were mapped through an overview of events in a



Baseline kitchen:
low purchase cost; high replacement rate and maintenance costs

Stykka kitchen:
high purchase cost; low replacement rate and maintenance costs

Figure 7: Total Cost of Ownership (TCO) comparison over a 50-year period between a baseline kitchen with low upfront cost and high maintenance and replacement rates, and a Stykka kitchen with higher upfront investment but significantly lower operating costs.

standard kitchen over 10 years. We hope this insight into the method will inspire others in how to structure analyses and inform decisions:

Small support tasks: these are minor maintenance tasks that typically require little time and no or very minimal material costs. Examples include adjusting cabinet or drawer fronts and waste bin fittings. Regular completion of these tasks ensures proper function and a longer product lifespan. Cost borne by the landlord. Frequency: 2 events over 10 years.

Minor maintenance: tasks that take more time and involve material costs – e.g., replacing handles on appliances or plastic drawers in fridges/freezers. These actions help extend product life and ensure functionality. Cost borne by the landlord. Frequency: 3 events over 10 years.

Preventive maintenance: tasks involving replacement of larger components, such as plinths, appliances, lighting in overhead cabinets, cabinet tops/bottoms, doors, and cabinet sides. Often necessary due to aging, damage, or malfunction, it helps maintain property value and usability. Cost borne 50% by landlord and 50% by tenant. Frequency: 3 events over 10 years.

Countertop replacement: replacing the countertop may become necessary due to aging or damage. This helps preserve property value and usability. Cost borne 1/3 by landlord, 2/3 by tenant. Frequency: 1 event over 10 years.

5.3 Quality and long term value

The results showed that a standard kitchen costing DKK 12,000 is expected to incur DKK 31,250 in operational costs over 10 years. It should also be noted that, despite these maintenance efforts, the kitchen is typically completely replaced after ten years. The total 10-year cost of providing a kitchen is therefore DKK 43,250, of which only 28% is the initial purchase cost.

Sensitivity analyses conducted as part of the study show that, while estimates may naturally vary, the core conclusion remains robust - a cost-benefit analysis in connection with Home.Earth's project at Nærheden demonstrated that investing in a higher-standard kitchen and better-quality appliances was expected to reduce service and maintenance events, reaching economic break-even after 12 years.

This led Home.Earth to procure circular kitchens designed for longevity, easy part sourcing, and simple repair and maintenance. While the kitchens had double the acquisition cost of standard market alternatives, this is a good example of a TCO business case with a 12-year payback period based on a cost perspective alone. Investing in higher-quality kitchens results in operational and maintenance savings, as well as significant ongoing savings for the tenants.

Furthermore, residents receive a higher quality product and improved experience due to fewer replacements and repairs - long-term value on multiple levels.

"As a CFO, I believe in numbers, however not only in financial terms. Carbon for example is a new currency that we need to account for with financial precision. Multiple currencies enable us to document value across multiple bottom lines."

Jakob Hermann

Chief Financial Officer, Home.Earth

Case Study 06: Enhancing Biodiversity
How every project respects and restores biodiversity

Historically, biodiversity has rarely been assigned an economic value. Yet as natural resources become scarcer, its importance - and its measurable value - continues to grow. Today, biodiversity loss ranks among the top five global risks to society, alongside climate breakdown, extreme weather, human-driven environmental damage, and infectious diseases.

Integrating biodiversity as a core consideration in housing development presents the opportunity to deliver much-desired innovation, enriched public life, environmental ambitions, and support a healthy and profitable business case.

To measure towards a net positive effect on-site and off-site, we follow a mitigation hierarchy of avoidance, minimization, on-site restoration, and off-site regeneration.

6.1 Prioritizing nature

Biodiversity is not something we work around. Nature is something we measure and treasure. We need nature close to us, because if we cannot sense or experience nature, then we are at risk of forgetting our love and care for nature.

Home.Earth were the first developer to announce a biodiversity-positive strategy. This means that we increase the quantity and quality of nature and biodiversity across all our development sites, so we can pass on green, healthy landscapes to our residents in better conditions than we received them.

In practice, every project starts with a biologist mapping and documenting the site's existing ecology. This survey establishes the baseline that the project must then enhance. By prioritizing nature from the outset, the landscape design is developed in parallel with and as equally important as the building design, ensuring that ecological value is embedded at the core of the development process.

6.2 Biodiversity on-site method

The impacts of urban development and biodiversity can be split into local impacts - occurring on and around the development site -, and remote effects occurring throughout the global supply chain – associated with, for instance, the extraction and production of construction materials.

Local impacts are easier to understand and measure because they can be made visible to the developer, project teams, and stakeholders. Because of the local scale and smaller geographical distribution, on-site impacts can often be measured directly through surveys and methods.

Home.Earth tried to actively promote local biodiversity through the Biodiversity Net Gain (BNg) approach. The method builds upon a baseline registration, where

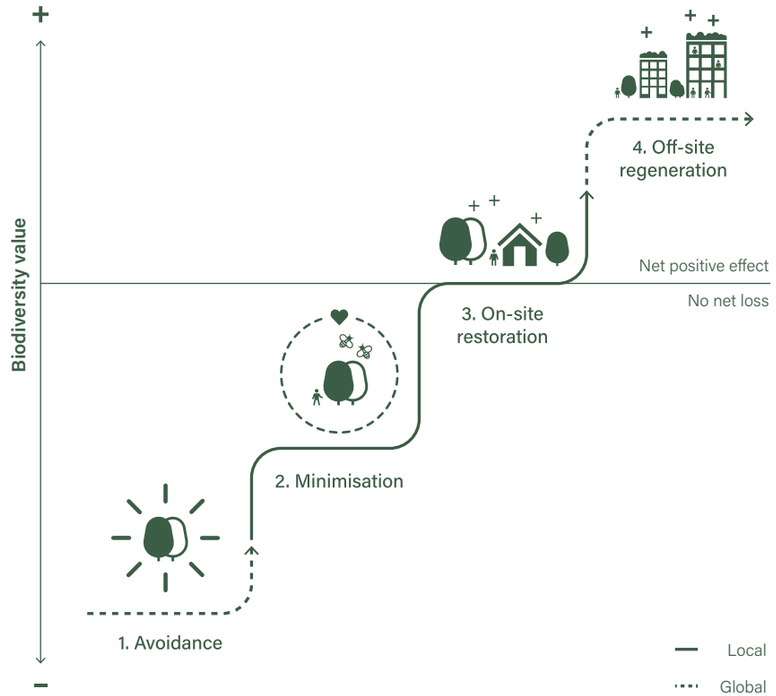


Figure 8: This diagram illustrates the 'Biodiversity Net Gain' mitigation hierarchy. Where avoidance, minimisation, onsite restoration, and off-site regeneration steer urban development towards biodiversity net gain (Original illustration inspired by SLA).

a specialized biologist maps on-site biodiversity. This baseline informs the landscape design to include elements such as trees, bushes, and other features that are often considered too late and often receive the lowest priority.

At Nærheden, we were the first in Denmark to apply the Biodiversity Netgain method. The method was used at the early stages of the development process to set a clear target: not just to map and protect biodiversity, but to enhance it on-site actively. We preserved existing old trees, secured varied habitats, and designed ecological corridors between buildings. Creating space for nature to thrive within the built environment.

The result is projected to have a +10% increase in biodiversity value, and it will be measured and verified 3 years after the inauguration of the completed building and landscape.

Going forward, we will utilize the Urban Biodiversity Score (UBS) as a measurement method, as it is specifically adapted to Danish ecology and nature registration data. The UBS is outlined in the latest DGNB 2025 manual.

6.3 Off-site biodiversity impact

As the planetary boundary for biodiversity loss has already been transgressed, the emphasis is not only on reducing negative impacts but also on implementing regeneration to introduce positive impacts.

Life Cycle Assessment can be used to account for and estimate off-site biodiversity implications – global impact that primarily takes place throughout the value chain when extracting and processing raw materials into building products.

As part of our work on the Doughnut for Urban Development, an 'off-site biodiversity tool' was developed to simplify and calculate biodiversity loss over the whole life cycle. The first staggering finding is that more than 80% of the total biodiversity impact occurs off-site. The tool is the first of its kind, still in early development; however, we have made it open source and freely available.

The top priority should be to avoid activities that damage ecosystems and minimize the impact of unavoidable activities. Then, regeneration measures, such as investments in reforestation, can be implemented to counterbalance the biodiversity loss resulting from the entire development impact.

"Biodiversity is a core planetary boundary. That is why we have decided to enhance nature in every project through on-site registrations and baseline setting, which we use as a design principle to ensure a nature-positive footprint."

Kasper Guldager Jensen

Architecture, Sustainability, Innovation, Co-Founder, Home.Earth

Circular Construction

Circular Construction

Home.Earth has committed to translating circular principles into tangible solutions. Our approach involves not only adopting established frameworks and proven methodologies but also actively pushing the boundaries of current market practices. Recognizing that the industry still faces significant barriers in fully embracing circular models, the following stories illustrate how we have successfully integrated circular construction into the Nærheden project.

These examples demonstrate the practical viability of circular construction and highlight its central role in defining Home.Earth's vision and product — for example, the implementation of a circular marketplace, product platforms, and material passports.

In the green pages to follow, this chapter attempts to contextualize circular economics in the built environment from the Circular Construction for Urban Development book. Essential principles are outlined, such as biological and technical metabolisms, the butterfly diagram, and material cascading. It also provides principles for design for disassembly and circular business models.

Why circular construction
In Europe, the built environment is the single biggest polluter and, therefore, holds significant responsibility for addressing climate change. The built environment accounts for 40% of all materials produced and about 35% of all waste generated, along with 40% of all CO_2 emissions. This presents a significant challenge because most building materials used today require large amounts of resources and energy to manufacture and are rarely recycled, neither in biological nor in technical circles. As an example, the production of cement alone consumes approximately 8% of global energy consumption.

The life cycle of a typical building material follows the linear model of Cradle to Grave, also known as take-make-waste. After the material is extracted, it is manufactured into a building component. Once the component's whole lifetime has been reached, it is either purely downcycled or ends up as building waste.

This means that both the financial and environmental value generated during extraction and production are lost. The circular economy, based on Cradle to Cradle principles developed by William McDonough and Michael Braungart, is a model that challenges the current form of production and consumption. The aim is to eliminate waste and preserve the value of the materials and products over many lifetimes. Closed material cycles lead to less building waste, less resource depletion, less biodiversity loss, and, not least, savings in CO_2 emissions.

Many recognize that the Ellen MacArthur Foundation, in 2010, was the first to combine the words 'circular' and 'economy.' Suddenly, a new term became a part of the construction vocabulary. The 'circular' approach was already known through Cradle to Cradle concepts, focusing on eliminating waste through design. What was novel was the clear focus on the 'economy' part, which broke with the prevailing sustainability discourse. With the circular economy, the economic aspect came into focus, meaning that all actors in the industry began to listen, not just those with a sole interest in the environment. Because of this, circular construction holds considerable scaling potential going forward. With accurate circular solutions, both the economy and the environment can benefit.

Financial models multiple dimensions
In the modern construction industry, the primary focus when designing a building is on the upfront construction costs. In more advanced models, the design of the building is optimized not only based on the cost of construction but also on the cost of operating and maintaining the facility over its entire lifetime. These models are termed Total Cost of Ownership (TCO) or Life Cycle Cost (LCC).

The basic idea of these concepts is that both the construction cost and the cost of operating the building over its lifetime should be considered and optimized when designing a building. Additionally, there is a third dimension, which is the financial and ecological cost of demolishing and disposing of the building through landfills or incineration. In most buildings today, these costs are not taken into consideration in current construction models because knowledge about alternatives is not extensively present in the industry.

When the principles of the circular economy are applied to all structures of a building, we can consider both the second dimension (operation and maintenance) and the third dimension (demolition and deposition) of a building's cost, and we can thereby include these economic costs in the full cost evaluation of a building. Not only can these costs be taken into consideration as the third economic cost dimension when the cost of a building is evaluated. The application of circular economic models transforms costs into revenue, providing an incentive for applying circular economy principles to the financial and ecological costs of buildings.

Designing for biological and technical cycles
Understanding and separating biological and technical cycles represent the core elements of the circular economy. The biological cycle consists of materials that can be biodegradable without polluting nature after their use. Timber is an example of a material that belongs to the biological cycle. The technical cycle consists of materials that can be separated and reused in new generations of industrial products without loss of quality. Steel is an example of a material that belongs to this cycle.

An integral part of the Cradle to Cradle framework is that materials are not just considered as components with a particular lifetime and function but also as potential nutrients for new generations of products. A prerequisite for this is that only healthy materials are used.

A game changer
Introducing a circular economic model in the construction industry can be a game-changer, potentially shifting the industry from an ownership system to one focusing on access over ownership. This transition faces barriers because it represents a significant paradigm shift. In the building sector, this could be a groundbreaking change for contractors, shifting their main business model from construction-only and design-construction to a longer design-build-operate model. New financial models prioritize the total cost of ownership, including operations and the optimization of the 'scrap value' of buildings when they no longer meet contemporary requirements for functionality, energy efficiency and operations, thus qualifying for demolition or disassembly.

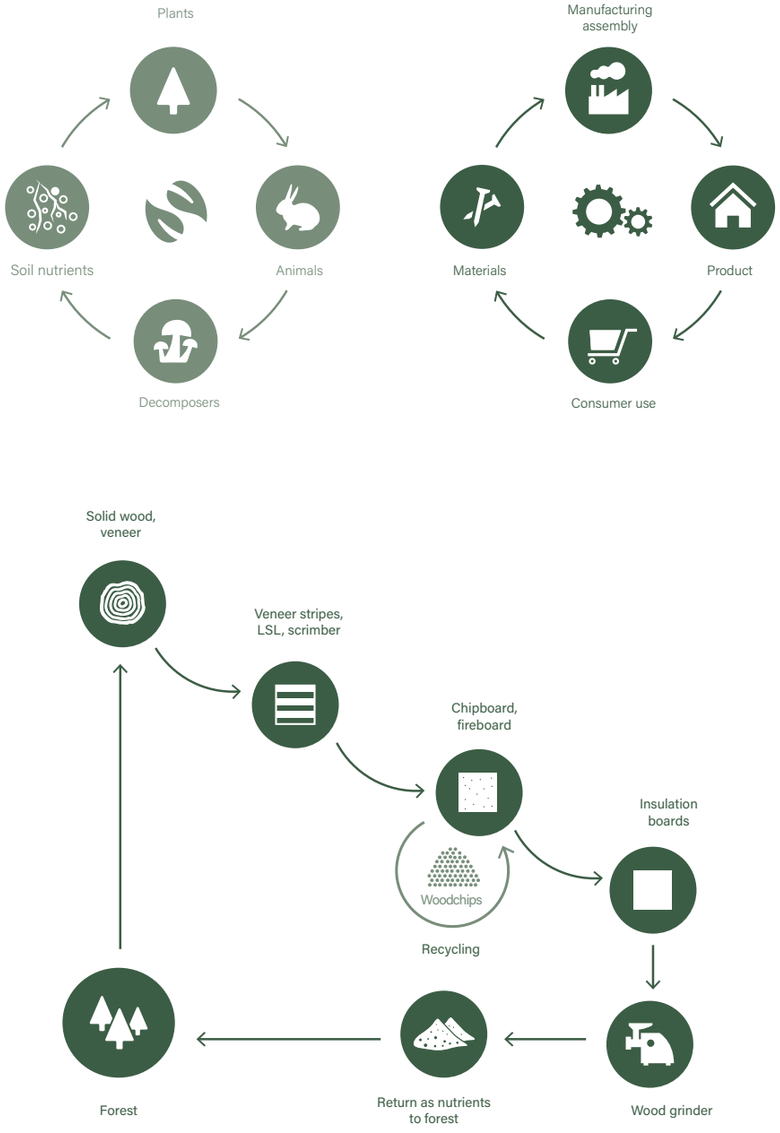


Figure 9 and 10: Cradle to Cradle cycles; materials are designed to be resources over multiple use cycles. Cascades; in Cradle to Cradle biological materials are remade to new products to keep the value as long as possible before eventually returning as nutrients to the forest.

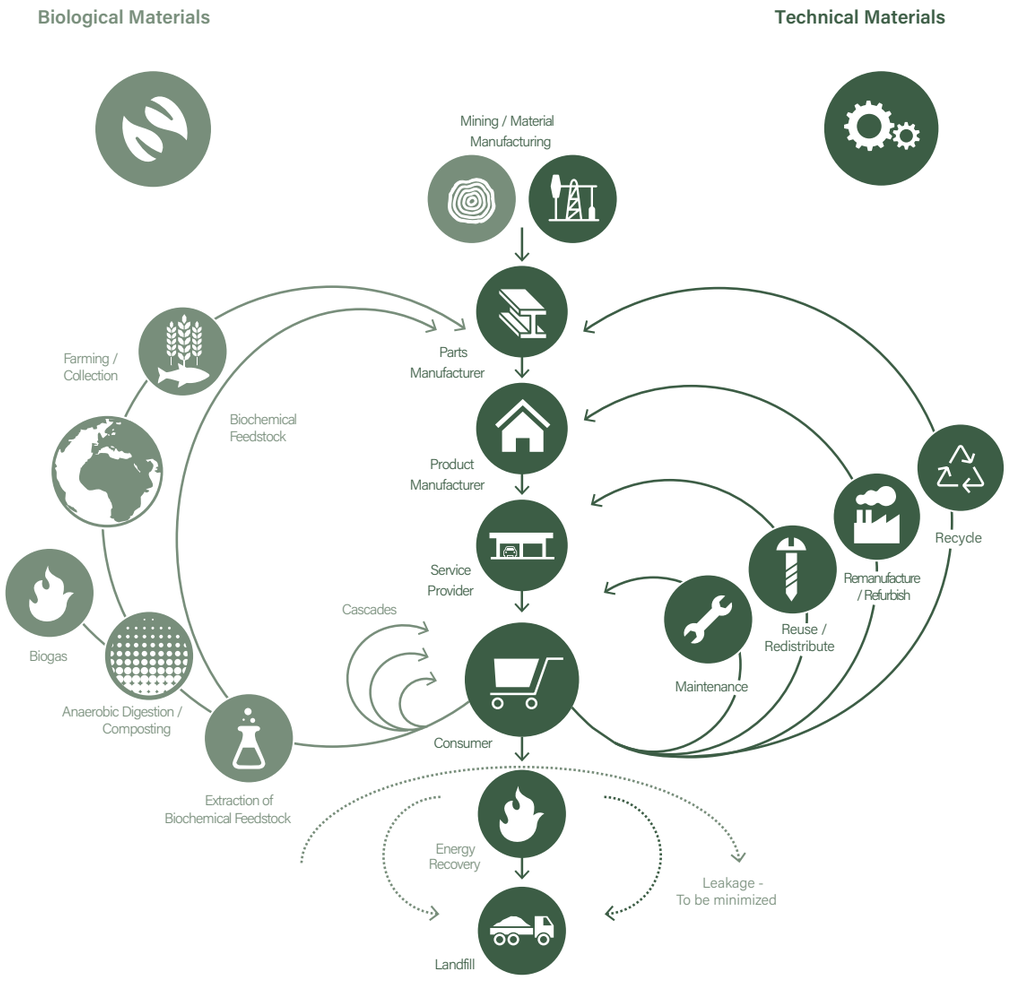


Figure 11: The system diagram illustrates the continuous flow of technical and biological materials in the value circle. There are four circles of value creation. The diagram comprises a plethora of different terms that are integral to understand the different activities that contribute to a circular economy. This diagram is an reinterpretation of an original owned by the Ellen MacArthur Foundation.

5 Principles
To consider when Designing for Disassembly

When designing a building for disassembly, it is important to see this as a new way of thinking. The new idea is that the building is not a permanent structure, but a temporary compilation of building materials.

It is important to plan how the building can be taken apart. The positive side effects are that it improves flexibility and optimizes operation and maintenance of the building over its lifetime.

Materials
Choose materials with properties that ensure they can be reused.

Quality
Use materials of a high quality that can handle several life cycles.

Healthy
Use non-toxic materials to provide a healthy environment — now and in the future.

Pure
Use as pure materials as possible, which can be recycled with ease.

Service life
Design the building with the whole lifetime of the building in mind.

Layers
Make the long lasting building elements allow for flexibility, so other elements are easily changed.

Flexibility
Make a flexible building design that allows the functions to adapt and change in the future.

Interim
Think of the building as a temporary composition of materials and design with the preservation of material value in mind.

Standards
Design a simple building that fits into a ‘larger context’ system.

Modularity
Use modular systems where elements easily can be replaced.

Prefabrication
Use prefabricated elements for a quicker and more secure assembly and disassembly.

Components
Create a component when the composition of elements becomes too complex to handle.

Connections
Choose reversible connections that tolerate repeated assembly and disassembly.

Accesible
Make the connection accessible in order to minimize assembly and disassembly time.

Mechanical
Use mechanical joints for easy assembly and disassembly without damaging the materials.

Dissolvable
Avoid binders, but, if necessary, use binders that are dissolvable.

Deconstruction
As well as creating a plan for construction, design the building for deconstruction.

Strategy
Create a simple plan for deconstruction, to ensure a quick and easy disassembly process.

Stability
Make sure that stability in the building is maintained during deconstruction.

Environment
Ensure the deconstruction plan is respectful to the nearby buildings, people and nature.

5 Principles
To consider in Material and Building Passport

When designing a material or building passport, the main challenge is how to handle and structure the huge amounts of data that are accumulated when mapping out the elements and materials in a building.

The main point is to collect all relevant information in a database where it can be easily found for different purposes, that being ongoing maintenance, technical installations, major renovations and eventually end of use.

Documentation
To ensure the quality and value of the materials and resources, documentation during all phases is crucial.

All inclusive
The documentation includes all relevant building information from material level to the entire construction system.

Accessibility
All information must be accessible for the relevant partners during the whole process.

Responsibility
The ownership, accessibility and responsibility of the information should clear.

Identification
Physical identification on the individual elements are important for finding the correct information.

ID code
Each material should have a unique label for easy identification.

Database
A database containing all relevant information about the material must be created.

Link
A link between the ID code and the database has to be established and maintained.

Maintenance
To secure the value of the materials, correct maintenance is crucial.

Physical
Guidelines for the physical maintenance of the individual building materials needs to be accessible.

Digital
The digital passport has to be updated if modifications or renovations on the building are made.

Restoration
Guidelines for how the materials can be restored back to their full value after disassembly needs to be accessible.

Safety
Provide safety procedures to handle all phases of the building's life.

Construction
Document specific safety procedures for the construction process.

Operation
Document specific safety procedures for operating and maintaining the building.

Deconstruction
Document specific safety procedures for the deconstruction process.

Interim
Provide the necessary information on how to handle materials in the interim state.

Ownership
Document who is responsible for the materials and components in the transition phase.

Transition
Direct transition of materials between buildings are preferred in order to minimize storage.

Storage
Document how materials should be handled and stored, if needed, in the interim phase.

5 Principles
To consider in Circular Business Models

Circular business models can move the industry from being an 'ownership system' to a structure focusing on 'access over ownership.' New financial models also prioritize the total cost of ownership.

Even if a new economic model does not change the ownership of buildings or materials, it can make substantial disruptions in new service models, including operations and the optimization of the intrinsic 'scrap value'.

New businesses
To complete the circle in the circular economy model, new businesses need to emerge.

Physical
New facilities are necessary to manage, handle and certify building materials and elements.

Financing
New opportunities for business investors will kickstart the circular economy.

Consultants
Intermediary consultants can bring the different parties together.

Incentive
All partners in the supply chain will have to benefit economically.

Business
It must be visible that the implementation of a circular economy is beneficial for the business.

Society
It must be visible that the implementation of a circular economy is beneficial for the society.

Environment
Implementation of the circular economy model creates a positive impact on our environment.

New models
Rather than creating products, businesses need to provide the user with a service.

Access over ownership
Get the service of the product rather than the product itself.

Leasing
Make a performance based contract where the user hands back the product after a defined period of use.

Take back
Companies should facilitate take back of products at the their end-of-life.

Partnerships
Partnerships and collaboration agreements are necessary, thus nobody can run the circular economy alone.

Interdisciplinary
Collaboration between different professions are important to cover all aspects of the circulation.

Knowledge sharing
Communication and knowledge sharing across industries is important to get high quality and integrated solutions.

Benefit
All partners involved has to benefit from the collaboration for the circular economy to work.

Circulation
The value of the products in the technical and biological cycle needs to be maintained as long as possible.

Redistribute
Products that are in good shape can be used several times.

Repair
Replace parts that need replacing and keep the product working for as long as possible.

Recycle
Materials recovered after a products end-of-life will replace the use of virgin materials.

Case Study 07: Circular Building System

How off-site manufacturing enables circular construction

Most real estate projects treat each new building as a unique object that is designed and built from scratch by a unique team of temporary partners, and with little process standardization. It is no secret that around 80% of building projects currently end with budget overruns caused by quality issues, organizational mistakes, disputes, and delays.

Home.Earth does not view buildings as unique objects, but has instead developed a Building Delivery System consisting of a series of industrialized components that can be assembled into various shapes. We have replaced traditional construction with offsite construction to regain control over our buildings' quality, economic, and environmental performance, with 75% of the work done offsite in controlled manufacturing facilities to improve the entire process and product.

Doing this will prevent many of the current problems in construction and lead to less construction waste, help increase circularity, and lower CO_2 emissions. For that reason, Home.Earth has created a limited set of standardized building components that can be configured in many ways and used to design new buildings. The following sections will introduce three cornerstones in our Building Delivery System: cumulative learning, a circular marketplace, and a product platform structure.

7.1 Cumulative learning

In conventional developments, lessons are easily lost. Design and construction follow a linear, fragmented process: from land acquisition to tenant move-in typically takes 3–5 years, involving a long succession of parties – from contractors and manufacturers to advisors – who join and leave the project at different stages. Few remain involved from start to finish. Once the building enters its operational phase, which lasts for the rest of its life and often spans multiple owners, no one connected to the original process is still in place.

In contrast to the described status quo, Home.Earth was set up to ensure cumulative learning. We stay involved throughout the entire process, and our business is evergreen - we operate our own buildings indefinitely, and therefore remain connected to our buildings from the very start and throughout their full lifetime. This allows us to capture all learnings from all phases of a development, including its operations.

The Building Delivery System is the instrument that facilitates learning and improvement, enabling us to produce varied built solutions by using the same building components, logic, and design parameters for all projects. The fixed set of prefabricated building components is directly linked to the suppliers of these, and the professional team uses their digital version to design the buildings. This results in considerable savings during the design, procurement, and construction phases of projects because most design details are readily available based on past projects.

During all project phases, including the operation of the buildings, lessons are logged and captured by the various parties involved and brought back to the Building Delivery System team. This helps optimize building components to higher standards and resolve any issues for future projects. Thus, the product is optimized by transitioning from one project to the next, reducing risk and continuously improving cost and quality.

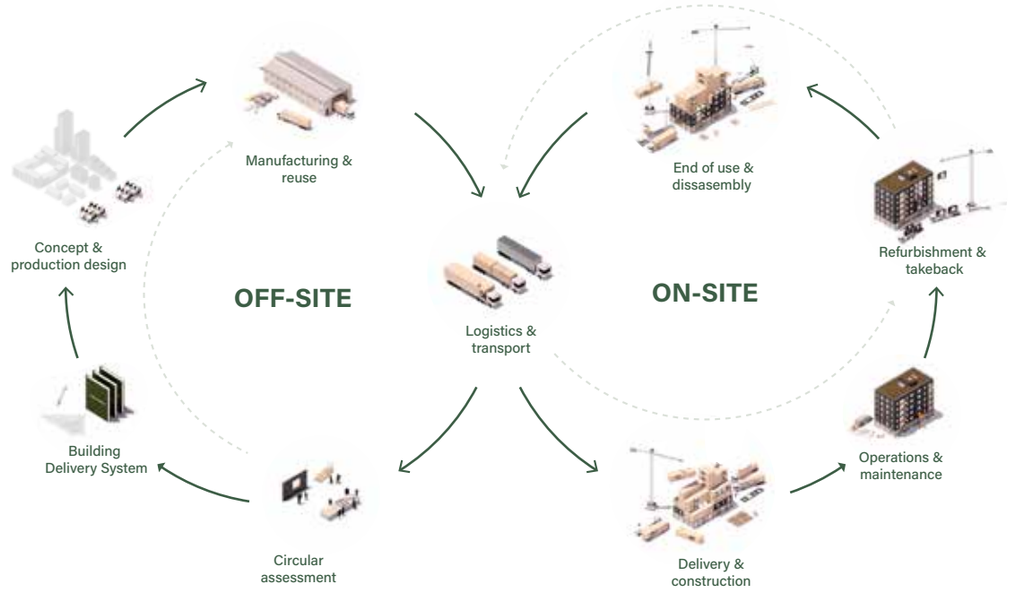


Figure 12: Home.Earth's Building Delivery System is based on off-site construction and on-site assembly providing full supply chain transparency, industrialized circular construction, enables effective operations and maintenance and allows for a future circular marketplace.

7.2 Circular marketplace

Circularity is a central ambition of the Building Delivery System. By standardising components, using digital twins, and working with long-term manufacturing partners, we create buildings designed for disassembly and reuse. This approach only works, however, if there is a functioning market for reclaimed components - one that can prove demand, ensure take-back, and make reuse commercially viable.

Two key challenges arise: identifying future buyers of circular components to strengthen the business case, and ensuring that today's components will still hold reuse value decades from now. How can we make building materials, elements, and components truly perpetual?

At Home.Earth, our system allows us to be our own future client. All elements and components are fabricated in an industrialized manner, where geometry and parts information are stored in digital twins. Also, our manufacturing partners are set up in long-term collaboration, which provides the possibility to work with takeback and remanufacturing of bits and parts that are at the end of their use. A reverse supply chain and circular marketplace are in place, ensuring the certainty of circular reuse, as future developments are based on the exact Building Delivery System.

7.3 Product platform

While the circular marketplace ensures components can be reused, the ability to design and deliver buildings efficiently over time depends on having a stable technical and organizational foundation. In Home.Earth's case, this is the product platform at the heart of the Building Delivery System.

Our deployment of industrial prefabrication production to reduce on-site construction is an essential step towards an industrialization of housing development, but it is not the only element. A product platform can be defined as "a set of subsystems and interfaces that form a common structure from which a stream of derivative products can be efficiently developed and produced." The product library constitutes the continuous technical platform for the kit of parts manufactured and delivered to the site.

Product platforms are, however, not only a basis for organizing production but also for establishing characteristic contractual relationships that deviate from traditional practice. Changing the organizational structure of the development process and the related business models could contribute significantly to fulfilling the promises of industrialization – efficiency, cost reduction, and increased quality.

In a platform structure, there are three central organizational elements: firstly, long-term relationships between participants; secondly, advanced supply chain management and logistics; and thirdly, a setup centered on learning and self-improvement.

At Home.Earth, we have organized our Building Delivery System in accordance with the logic of a core-periphery platform structure. This means a relatively capital-light system, where the Building Delivery System is in control of the digital platform and functions as the configuration tool. Around the core, the product ecology of suppliers is integrated through long-term relationships. Due to outsourcing and distribution, the business model is resilient through its relative independence - not having to insource suppliers - but also sensitive to pipeline bottlenecks.

A model set up to harvest the benefits of industrialized construction, built around long-term transparent collaborations, capturing learnings in an ever-improving product focus.

"We don't start over with every new project. We believe in product platforms through industrial offsite manufacturing which allows us to capture learnings, making our buildings circular and ever improving"

Carel van Houte

Building Deliver System Lead, Co-Founder, Home.Earth

Case Study 08: Design for Disassembly

How design for operation and disassembly enables a circular future

Our buildings are designed to stand for centuries - but this is an oversimplification. In reality, buildings consist of layers with different life spans. We need to consider what happens when parts require replacement and that is why circular thinking must be part of how we build, from the start.

Circular construction acknowledges that we are in an 'overshoot' of the Earth's resources: we extract more from the Earth than it can regenerate, and, too often, those materials end up where they no longer serve any purpose, usually incinerated as waste or left in landfills.

Design for disassembly is about more than demolition. It is about respecting the intrinsic costs of materials. Every beam, every component, every square meter of floor carries with it a potential second life and future value.

A circular approach is about keeping materials in play, preserving their value, and minimizing the need to extract more. It means seeing buildings as material banks for the future. It means making choices now that keep those materials accessible later. It means thinking beyond our projects and preparing for a circular future.

8.1 Circularity.Tool

When Home.Earth began its first development in 2021, there were no comprehensive industry standards or ready-made tools for design for disassembly. Building our own presented us with the challenge of truly understanding what design for disassembly means in practice. How do you keep materials accessible at the end of a building's life? How do you document, calculate, and track them so they can be reused?

To address these questions, we developed Circularity. Tool and applied it to our first project in Nærheden. The tool reveals where materials are unnecessarily locked in, where connection methods could allow easier disassembly, and where overall design changes can increase circularity. It provides a clear overview of material quantities, specific components, and which parts of the building can be disassembled and reused, enabling us to quantify and iteratively improve the project's disassembly rate.

We built on the work of others already exploring this field, including Scandi Byg and GXN with their open-source disassembly tool. Together, we refined the approach and tested it at Nærheden. The process took time, but it worked: it raised awareness among all stakeholders about their role in making construction more circular. The project achieved a disassembly rate of over 80%, measured across the modular parts of the building - excluding the fixed foundation and ground floor - meaning that most materials, by volume, can be removed and reused at a high value.

We also learned that circular construction works best when everyone shares responsibility, from the developer to the advisors, the suppliers, and the contractors. As developers, we cannot compromise on constructability and costs, so every solution must be tested, validated, and delivered at market rates. Setting early targets and enabling co-creation allows architects to bring creative ideas, engineers to verify technical feasibility, and contractors to ensure buildability.

Our Circularity.Tool is free for all to use. We do not believe in industry secrets and copyrights. We believe in the right to copy so that the entire industry can move forward.

8.2 New industry standards

As mentioned, there were no clear standards for design disassembly when we began working on our first project. Since then, the field has matured, and the DGNB certification system now includes a circularity index, which is assessed through a dedicated tool.

This tool evaluates whether a building is designed in a way that considers current resources used and ensures they are accessible for removal and replacement and usable in the future. At its core is the principle of passing on the knowledge of what the building contains, ensuring that future renovations or deconstruction can make the greatest possible amount of material available for reuse and recycling.

The DGNB tool focuses on four key aspects, each scored independently and combined into a single measure of a building's circular potential.

- Potential for materials: Examines whether components and materials are selected for reuse or recyclability in new contexts. This includes avoiding harmful chemicals and choosing clean materials that maintain value.

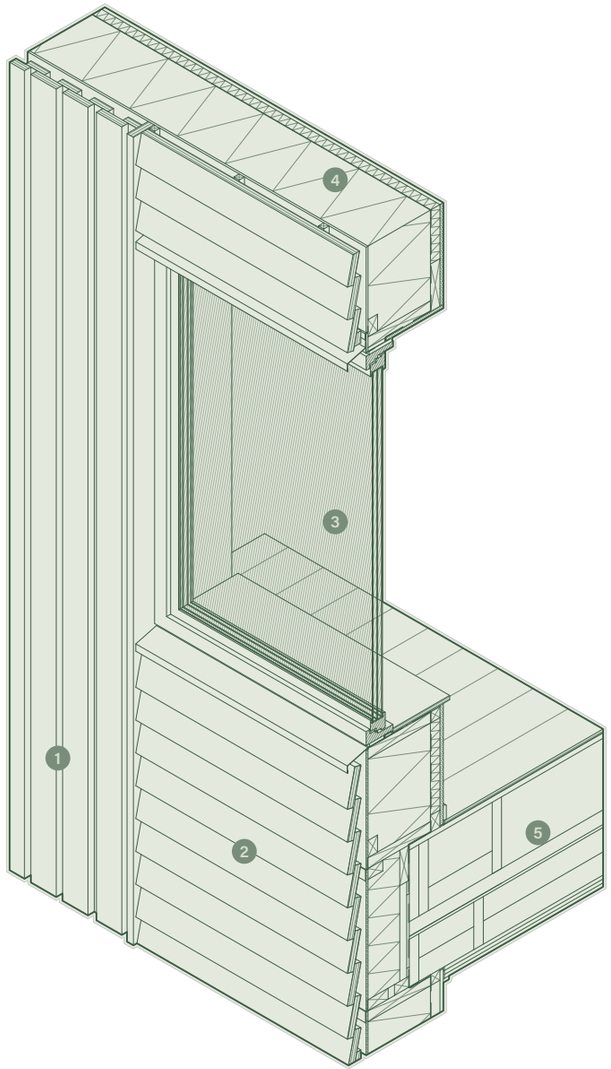
- Material compatibility: checks if materials are free of pollutants or hazardous substances that would prevent them from being reused or recycled.

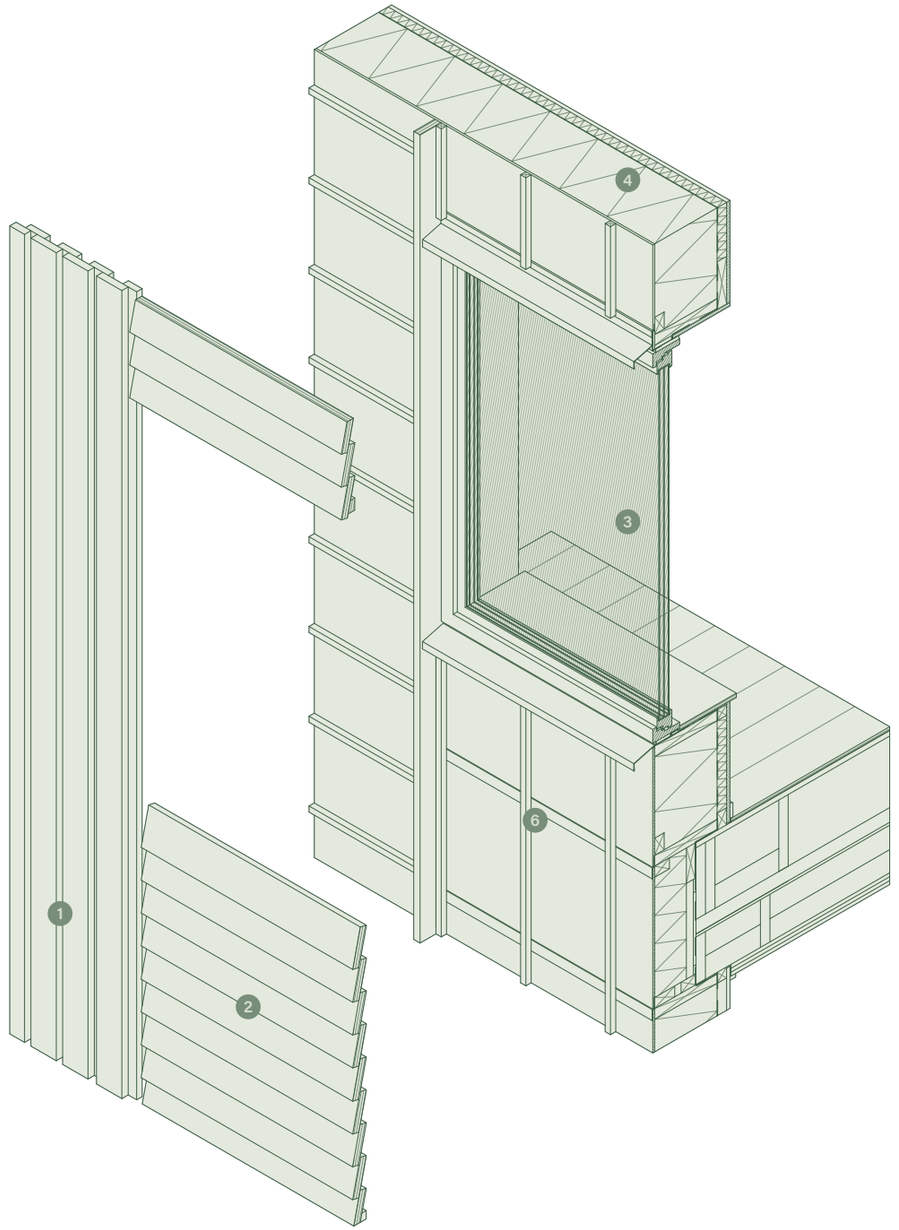
- Design for disassembly: assesses whether components can be removed without damaging themselves or surrounding materials.

- Material separation: examines how easily materials can be accessed and sorted into clean fractions during selective demolition to maintain their quality.

These criteria take a holistic view of circularity, grounded in the concept of a digital building passport that ensures that material data is structured, accessible, and properly handed over.

Home.Earth sees these standards as important progress toward a circular future. They help structure our own work and bring transparency to the industry, enabling comparisons across projects.





Drawing 3: Detail of the external wall buildup of Nærheden, designed for optimal disassembly and replacement.
All cladding elements use reversible fixings, enabling circularity in caretaking and maintenance.

1. Vertical timber cladding
2. Horizontal timber cladding
3. Window
4. Insulation
5. Module's floor buildup
6. Support structure to cladding

8.3 Top three lessons learned

Developing our Circularity.Tool and applying it in practice in our Nærheden development taught us what makes a difference when designing for disassembly. From this experience, three lessons stand out:

- Make connections reversible: permanent fixings like glue, sealants, and seams make materials hard to reuse. Screws, bolts, and click systems are easier to disassemble without damaging the whole system of construction layers.
- Track materials properly: with no clear documentation and calculation methods, the best materials are at risk of being wasted. A simple, well-maintained material passport helps future teams understand how construction layers were assembled and how to recover them.
- Involve everyone early: circularity needs buy-in from the start, with everyone sharing responsibility, so the goal becomes part of the detailed production design rather than an afterthought.

These are fundamental first steps, but they point in the right direction. Toward a future where circularity is no longer an ambition, but simply the way we build.

"We turn a building into a temporary storage of materials, instead of a disposable product"

Javier Gutierrez

Construction Architect and Civil Engineer, Co-Founder, Home.Earth

Case Study 09: Material Passport

How transparent tendering ensures healthy materials

We spend around 90% of our lives inside buildings, yet rarely know what our buildings are made of. This is a paradox: construction is the world's largest asset class, and buildings directly influence our health, comfort, and environment.

For decades, the knowledge of what goes into a building has been fragmented, incomplete, or even lost entirely. Materials are often mixed, chemical contents hidden, and critical information scattered across suppliers and contractors. We believe this needs to change.

If we want to build in a way that is truly circular and healthy, we need transparency not just for the designers and builders, but also for those who live and work inside the building, and for those who operate it for decades to come.

That is why Home.Earth uses material passports and documenting buildings through digital twins.

9.1 Material Passport

The Material Passport is a structured, accessible record of everything a building is made of, identifying the chemical content of every product, component, and material exposed to the interior environment. It also documents their circular qualities, including packaging, recyclability, and reusability, and ensures the best possible indoor climate.

Home.Earth first applied material passports in our Nærheden development, using them not only for documentation but as a guide in selecting materials during the tendering process. This approach allowed us to actively control and improve what went into the building, achieving complete chemical transparency and steering choices toward healthier, more circular products for all surfaces exposed to the indoor environment, thereby ensuring a healthy indoor climate.

All suppliers were required to deliver full chemical documentation for their products, assessed against the Nordic Swan Ecolabel's red list - a recognized industry benchmark. While we did not require full certification for every item, this screening secured complete chemical transparency and steered choices toward healthier, more circular products.

This approach made it clear what the building was made of, where each material was used, and what risks or opportunities it presented. As a developer and permanent owner, having this knowledge is essential for ensuring healthy materials for the people who live in our buildings.

It also enables better decision-making - both at handover and decades later - when materials need to be maintained, replaced, or reused. Transparency, in this sense, is not just a value; it is a practical enabler of healthier spaces and a more circular future.

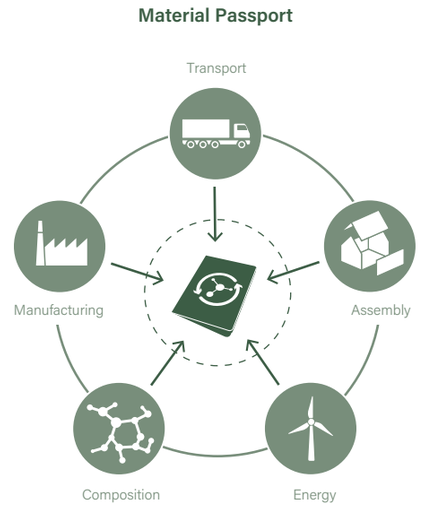


Figure 13: A material passport provides the ability to access all relevant information about a product or component that are intended for reuse. A digital twin connects all material passports at a building level.

9.2 Digital Twin

Too often, crucial building data is lost once the project is handed over to the operator. Yet the building continues to live - operated, maintained, and adapted over many years. In the transition from design to construction to operation, essential information about surfaces, materials, components, and technical installations can disappear. Even basic facts - such as which type of doors are installed or the location of specific components - may become unclear, leading to inefficiencies, errors, and wasted time during maintenance.

Home.Earth believe this can be done differently - that is why we integrate digital twins into our process from the start.

A digital twin is more than a static building information model. Its purpose is to connect the virtual, the built, and the operational, giving operators and facility managers a precise understanding of what is in the building, where it is located, what condition it is in, and what requires attention. Tasks such as creating maintenance tickets or scheduling repairs become faster and more accurate. Instead of relying on photos or guesswork, the operator can consult the digital twin to locate every component and understand its exact specifications - reducing errors and saving time.

For a digital twin to remain useful, it must be accurate and maintainable. This requires deliberate, high-quality information from contractors, along with ongoing updates as the building changes over time. In our design process, we worked closely with the operations team to define which elements needed the highest resolution in the model - particularly components that are replaced frequently or have a significant impact on maintenance and performance.

For Nærheden, this meant making deliberate choices about the model's level of detail - prioritizing operationally relevant data while avoiding a potential overload of unnecessary information. The goal was a digital twin that is detailed where it matters, easy to update, and genuinely useful throughout the building's life.

Our approach is reflected in the ICT (Information and Communication Technology) requirements, which ensure that data flows seamlessly through each stage of the project, remains accessible whenever needed, and follows a consistent structure across developments.

The digital twin gives owners and operators a way to truly understand and manage their buildings, connecting the virtual, the physical, and the operational into one continuous loop that makes buildings easier to care for, better to live in, and ready for the future

"Considering we spend 90% of our lives indoors, ensuring excellent air quality is fundamental to our wellbeing. For this reason, we adopt material passports and require complete disclosure of the chemical composition of all interior materials."

Giacomo Brusa Cattaneo

Architecture and Product Development, Home.Earth

Responsible Business

Responsible Business

At Home.Earth, responsible business begins with a company design that aligns incentives with long-term value creation for all stakeholders.

In this chapter, we share case studies on how we have structured our governance model to maintain focus on long-term value, stakeholder alignment, purpose protection, and impact management. These examples illustrate how a thoughtful business design can enable the real estate and construction industry to evolve towards a more sustainable and resilient future.

In the green pages to follow, we start this chapter by recapping the Doughnut Design for Business from the Doughnut for Urban Development manual. It emphasizes five 'deep design' aspects that organizations should consider.

Deep design of businesses

The 21st century's severe and interconnected crises – from climate change and ecological breakdown to growing social inequality – make it clear that the global economic system must be transformed.

Doughnut Economics provides a practical framework for guiding this transformation. By balancing a social foundation with the planet's ecological limits, it offers a compass for guiding economic activity towards a future that is regenerative and fair.

Applying this framework implies changes in today's industrial systems, many of which currently rely on resource-intensive and environmentally damaging processes. It also involves shifts in how economic value and opportunity are distributed among those contributing to its creation.

In a business context, the framework can be used to assess whether companies operate within social and planetary boundaries. The aim is to guide businesses to contribute positively to people's well-being and a healthy planet, while still delivering financial returns. For many companies, this starts with rethinking how products are made – for example, removing single-use plastics, designing products to last, and ensuring everyone in the supply chain earns a living wage.

Five layers of design

Rethinking product design is an essential start, but it is not sufficient for business to become not just 'more sustainable' but regenerative by design. Reaching this scale of ambition calls for transforming the design of business itself.

As described by Marjorie Kelly, a leading theorist in next-generation enterprise design, there are five key layers of design that shape what an organization can do and be in the world: Purpose. Networks. Governance. Ownership. Finance.

Innovations in the five layers of business design – through Purpose, Networks, Governance, Ownership, and Finance – are essential if business is to become regenerative and distributive in its strategies, operations, and impacts, thereby helping to be in line with the Doughnut.

Doughnut Economics is, of course, far from the only initiative calling for business transformation. Many other initiatives and approaches are underway, with many different points of focus: shifting the mindset of business leaders; promoting consumer and investor action; supporting collective action by workers, farmers, and communities; promoting democratization of business; and developing impact measurements to set better targets for businesses.

Governments have likewise introduced rules and regulations, taxes, subsidies, new alliances, and innovation programs intended to promote sustainable and social business practices, such as through ESG (environmental, social, and governance) reporting, carbon pricing, and extended producer responsibility.

These are all significant contributions to achieving the change needed in the business world, but, as this book argues, transformative change also requires transformation of business design. Design focuses on the ownership and financial structure of an enterprise; how it manages relationships with suppliers, clients, and stakeholders; how it makes and monitors key decisions; and how it sets and protects its purpose. In this sense, enterprise (re)design is foundational for many other transformations, in both business and the broader economy.

Focusing on deep design is a fast-evolving approach to transforming business. New design innovations necessary for business to become regenerative and distributive are now being created and explored; already the scope of what may be possible is emerging.

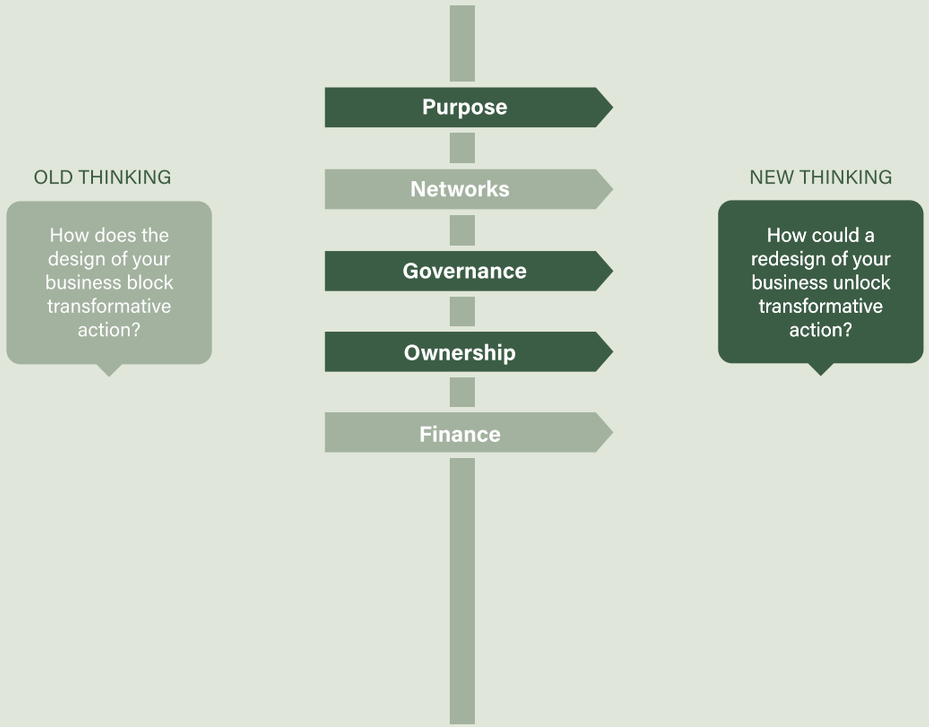


Figure 14: Deep design shapes what organisations can be and do in the worlds.

(Original concept and illustration from DEAL)

Design Layer	Summary	Examples of Design in Practice
Purpose	The purpose of a business is the fundamental reason why it exists. It is not only found in a company's words but in it's culture and operations, and across it's core products and services. It is reinforced by the broader design of the business.	▪ Mission-look through a social enterprise structure. ▪ The stated social and / or ecological purpose is embedded through other layers of the design.
Networks	Businesses create and belong to multiple networks. This includes trading networks across their supply chains, networks with commercial partners, and networks with their staff, customers and governments. Businesses also belong to networks of peers in their industry and broader association.	▪ Long-term and committed partnerships with suppliers. ▪ Long-term commitment to staff, upholding all labour rights. ▪ Part of progressive business networks.
Governance	The governance structure of a business determines how decisions are made. This covers who is represented on the board, how trade-offs are navigated, transparency of the business, what information and metrics are included in annual accounts, and the use of internal incentives to pursue the company's purpose.	▪ Mutli-stakeholder representation on the board. ▪ Mission-lock through an NGO or purpose foundation holding veto power.
Ownership	Who owns the business, and to what extent can these owners change or undermine its intended purpose? Deciding which stakeholders are represented in the ownership mix, and the expectations of owners on ecological, social, and financial performance, can be pivotal.	▪ Mutli-stakeholder representation on the board. ▪Mission-lock through an NGO or purpose foundation holding veto power.
Finance	The relationship with finance is a key determinant of a business's ability to become regenerative and distributive. Margin requirements, dividend expectations, and internal reinvestments (capital expenditure) and profit allocation rules are a key part of this. To shape financial parameters so as to enable transformative ideas, the question of a fair return for investors will also arise.	▪ Flexible margins for positive impact ideas. ▪ Dividends cap to enable internal investments in regenerative ideas.

Case Study 10: Stakeholder Aligned Business Design

How our mission stays aligned with all stakeholders

At Home.Earth, we believe that lasting positive impact starts with the right business design. From the outset, we structured the company to align financial, social, and environmental value and to ensure that impact remains central as we grow.

The business design of Home.Earth combines financial alignment between key stakeholders, mission lock, and a mandate for innovation and long-term impact. These principles are safeguarded in both our legal structure and in our day-to-day operations.

10.1 Stakeholder alignment

Home.Earth is structured on the idea that we can grow overall value creation by aligning the interests of our key stakeholders. Our governance and business models are designed to reflect this, giving key stakeholders – residents, investors, team, and society – both representation and voice.

This principle is formalized in our Stakeholder Allocation Model, in which roughly 10% of Home.Earth's long-term value creation will be allocated to our residents, ~5% to the Home.Earth Foundation, ~5% to the team, and the remaining ~80% to our investors. The aim is to ensure long-term alignment not only in principle, but in practice, with each group benefiting from the company's success.

We designed the governance to be balanced – and involve stakeholders where their influence matters most. Residents, for example, have influence on the property where they live – and their share of the value creation is based on the property's financial performance. Whereas the foundation has influence on all purpose-related decisions and receives a share of the overall value creation to support innovation and impact within the built environment.

We believe this structure creates stronger outcomes for all involved. It incentivizes us to build and operate properties that perform well over the long term, while encouraging residents to engage in the life and upkeep of their homes – contributing to the property's success and, in turn, increasing the value returned to them.

10.2 Mission lock to protect 'purpose'

Besides creating a stakeholder-oriented business, ensuring that we operate in accordance with our purpose has been central from the beginning. Home.Earth originally began as a vision by Rasmus Nørgaard: to build a real estate company that put

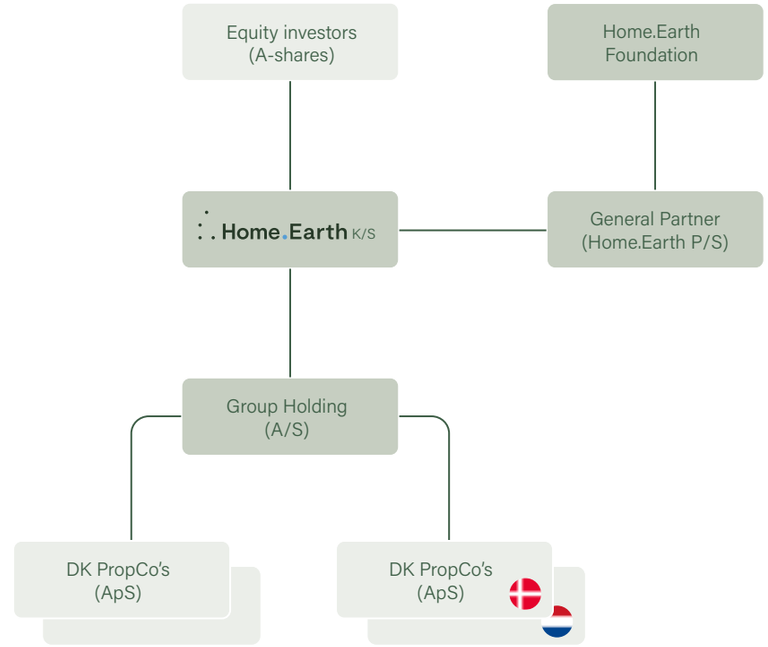


Figure 15: The business of Home.Earth structure is designed so all Equity Investors are the shareholders of the company. The Home.Earth Foundation is mandated with a mission lock to protect the purpose towards people and planet positive homes. All material decisions on the business plan are governed by the board of Home.Earth A/S. All ethical decisions on purpose are governed by the board of the Home.Earth P/S.

impact at its core while operating on market terms. Delivering on this ambition required a governance structure that maximize and protect long-term value.

Today, the purpose is clearly stated in the legal agreements with our investors, defined as promoting inclusive and sustainable urban real estate development. Several mechanisms ensure that this commitment is upheld.

A key safeguard is that Home.Earth is designed with mission lock through foundation ownership, a structure used by many of Denmark's largest companies, including Novo Nordisk, Mærsk, LEGO, and Carlsberg. The Home.Earth Foundation holds 35% of the company's voting rights and is mandated to protect and support our purpose. This is secured through veto rights on all purpose-related decisions and the Foundation's approval of our annual business plan from a purpose perspective.

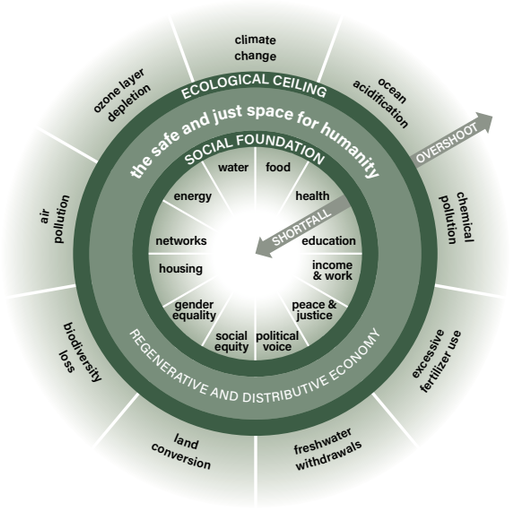
In 2024, the Home.Earth Foundation became operational with a board composed of balanced expertise and both investor, team, and donor representation, alongside two independent members: Jonathan Rose, Rasmus Nørgaard, Mikkel Bülow-Lehnsby, Elisabeth Hermann Frederiksen, and chair Morten Jensen. This structure is designed to ensure alignment across key stakeholders at the ownership-level.

10.3 Foundation supporting innovation

The Home.Earth Foundation not only protects our purpose and governance, but also channels value back to the built environment. It receives roughly 5% of the total value creation in Home.Earth, which it directs to inclusive and sustainable urban development. These funds are invested in ventures, projects, research – benefitting both Home.Earth and the broader industry's transition.

The Foundation's first grant supported the One Planet Challenge, a competition for emerging architectural firms to design within planetary boundaries. Organized with the Danish Association of Architects, it asked a simple but ambitious question: How can we create homes that are both planet-positive and socially sustainable?

The winning proposal envisioned housing with fewer private square meters but more shared spaces, designed for real living needs rather than outdated norms. These ideas were presented at a public event to inspire the wider industry, and we plan to incorporate elements of the winning team's concept into our redevelopment of a former Danish bicycle factory.



"We started Home.Earth to make the built environment part of the solution.

The Doughnut framework guides us in showing how real estate can serve both people and planet."

Rasmus Nørgaard
Founder, Home.Earth

Case Study 11: Long-Term Ownership Model

How long-term ownership creates long-term impact

Home.Earth was founded on an observation that significant long-term value – financial and societal – is lost across the real estate sector. Our founding team brings together extensive experience from construction, architecture, investment, and property management. Across these areas, we identified the same issue: short time-horizons and fragmentation in the value chain prevents the sector from reaching its potential.

At Home.Earth, we strive to address this by integrating the value chain combined with a more industrialized approach to construction. Early results show that this approach delivers tangible benefits, with our first development in Nærheden achieving a record-low carbon footprint within a conventional construction budget.

11.1 From linear to circular

The real estate sector is characterized by a fragmented value chain, leading participants to optimize for too short a time-horizon. In a typical development project, most participants – such as the architect, the engineer, the developer, and the contractor – are involved for only two to five years. Yet buildings, and the communities around them, are expected to stand for more than 100 years. Hence decisions should strive to optimize for long-term value creation and life-cycle costs.

Developers often also operate with a short-term perspective, having a strategy to sell the newly developed properties within a few years of completion. Property management is typically outsourced to external operators at the lowest cost, reinforcing misaligned incentives and lost efficiencies. Having worked across the sector, we have seen first-hand how this approach leaves long-term value potential untapped.

At Home.Earth, we are creating an integrated real estate platform focused on the long-term ownership and operations of our buildings. We combine development, construction, and property operations into a single structure and apply a product-oriented mindset to the design, delivery, and maintenance of our buildings. This enables us to embed feedback loops, improve continuously, and make informed decisions across all phases.

11.2 Nærheden as a proof of concept

This approach was applied in our first development in Nærheden. We acquired the site prior to zoning and have been actively involved in both its design and construction. Key targets – for example, on sustainability – were set up front, and advisors were assessed based on their ability to meet them.

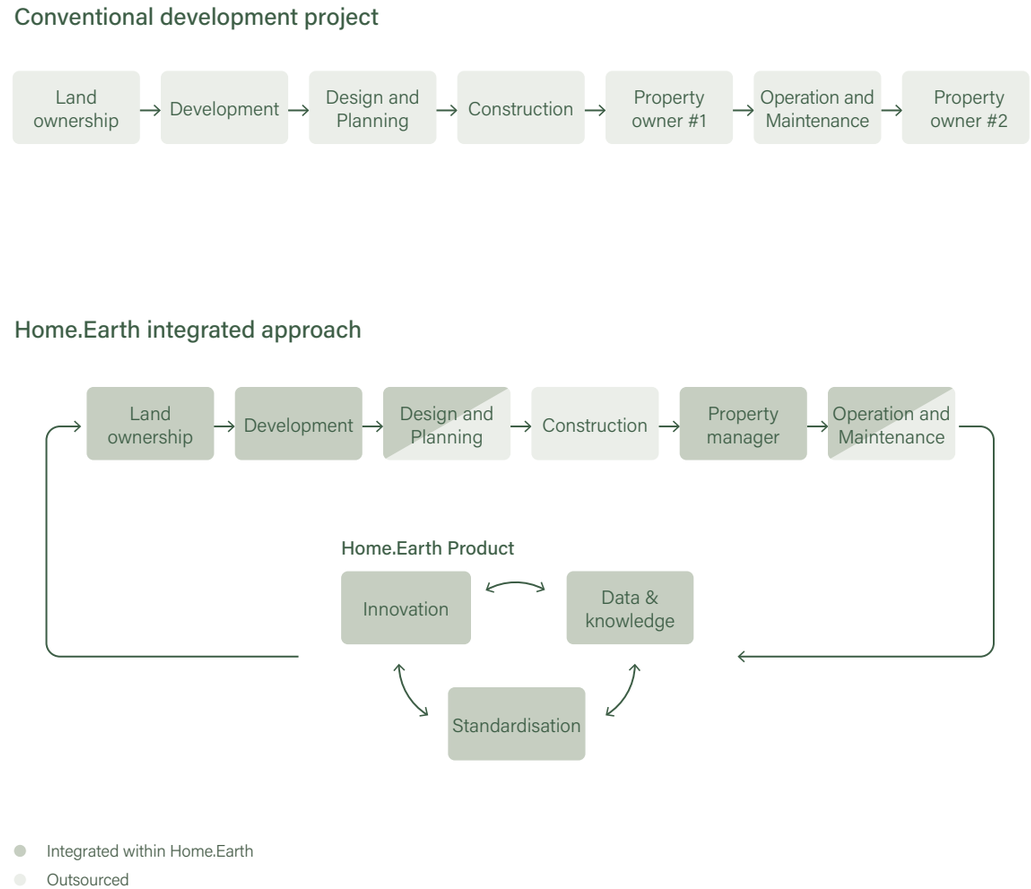


Figure 16: From a linear and fragmented approach without feedback loops leaving value at each step (above), to a circular and industrialized product approach with feedback loops (bottom).

We gathered operational insights from experienced caretakers and technical property managers, and integrated them into the design of the building. This led to an extensive memo on initiatives that reduce long-term operational costs. Examples include façade materials, access to technical installations and waste disposal, and the avoidance of loose gravel near entryways and elevators.

Applying a long-term investment perspective enables us to select materials and solutions that are more sustainable, both environmentally and financially. A good example of this is the high-quality kitchens from Stykka installed in all homes. An analysis showed that, while the initial cost is higher, a higher-quality kitchen is a sound long-term investment, as it retains its value for a longer period.

The result is a residential building with the lowest recorded carbon footprint of any multi-story project in Denmark. It is constructed using biogenic materials and designed to reduce long-term maintenance needs. Planning was based on life cycle performance, not on short-term handover.

11.3 Evergreen platform

We have structured Home.Earth to own and operate its properties in perpetuity. We see several advantages in this, but a key aspect is that it allows us to focus on long-term operational performance. Again, the high-quality kitchens in Nærheden serves as good example: because we develop with an evergreen horizon, we can invest in better materials and design, leading to higher resident satisfaction and fewer replacements over time.

Furthermore, we are structured as a real estate company, not an investment fund. This means that our investors not only own the projects we develop but also benefit from the intellectual property we create. One example is the Building Delivery System, described earlier in this publication. Another example is ENVO, a start-up we co-founded, which provides an AI-enabled platform to convert standing buildings from "brown" to "green". As co-owners of ENVO, our investors benefit from the value the company creates.

Finally, our structure means full alignment between the company, the investors, and the team. Investors simply own the platform and therefore do not pay management fees, a source of conflicts between management and investors.

"By setting up our business with an evergreen time horizon, we can optimize for long-term value creation for investors, residents, and our environment."

Phillip Højberg Unger
Managing Director, Co-Founder, Home.Earth

Case Study 12: Responsible Impact Reporting

How we measure our business impact with full transparency

To make real estate part of the solution, we must be honest about the full range of impacts we create, positive and negative. This is particularly important in the built environment, as one of the sectors with the most significant environmental and social footprint.

At Home.Earth, we believe that measurement is not simply about compliance. It is a foundation for learning and long-term value creation. Without reliable data, it is hard to contemplate meaningful progress. Today, we track and report on 300+ impact indicators across environmental, social, and governance dimensions. This depth of insight enables accountability – both internally and externally – and helps guide better solutions.

Below, we outline how our indicators are selected, how we work with them, and what they cover.

12.1 Aligned with leading frameworks

All indicators are grounded in our ESG Accounting Principles and aligned with established standards, including the Greenhouse Gas Protocol, the SFDR's Principal Adverse Impact indicators, and the Danish Real ESG Reporting Framework.

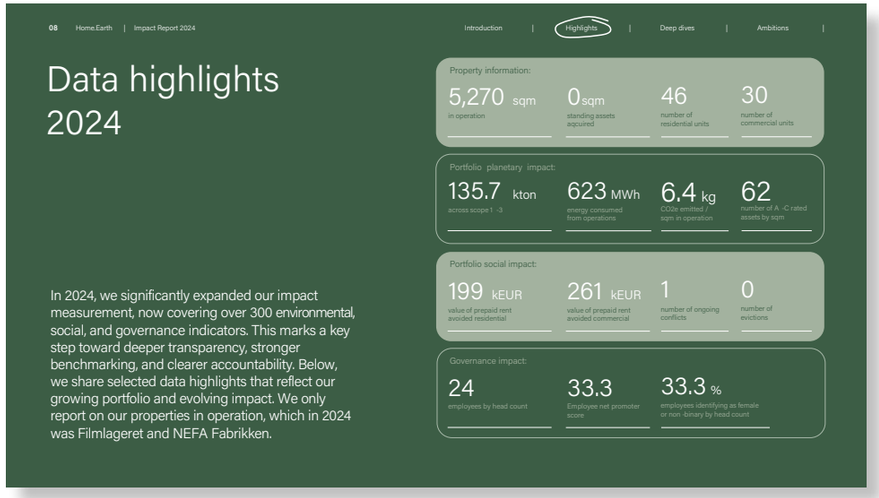
Aligning with these frameworks ensures our reporting is robust, comparable, and relevant to stakeholders. It is not a simple task, but it is essential to make our impact transparent – both for ourselves and the broader industry.

In parallel, we continue to refine our own Home.Earth Impact Framework, combining industry benchmarks with bespoke indicators that reflect our mission. While the established ESG standards provide a solid foundation, our experience has shown that they sometimes fall short in capturing the depth and nuance of the outcomes we aim to support. That is why we have developed a set of custom indicators, rooted in our mission, and designed to reflect the real-world impact we strive to create. For example, this includes adding indicators that track our no-deposit and no-evictions policies, as well as our target to be biodiversity positive when we develop a new site.

12.2 Automated and actionable

Over the past year, we have built a comprehensive impact measurement system to ensure our data is transparent, consistent, and actionable across the organization.

Through data modelling, we have automated the calculation and tracking of our impact indicators, enabling monthly monitoring, reducing manual reporting efforts, and creating a unified source of truth across the organization. All indicators are visualized in live dashboards that are accessible to all teams.



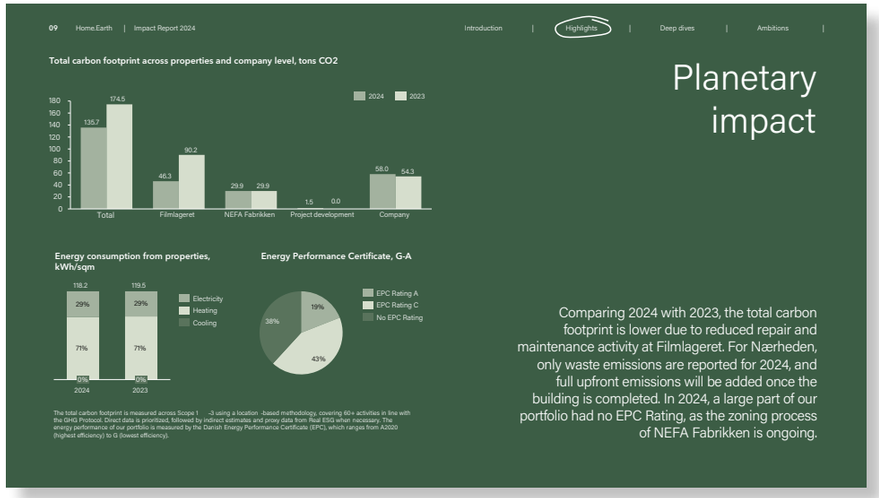


Figure 17 and 18: Overall impact highlights of the year and planetary impact illustrating selected indicators such as carbon footprint,energy consumption and energy performance rating.

For example, our property operations team can track tenant feedback, spot trends in ongoing conflicts, and monitor evictions. Our product team can access which solutions lead to better energy performance and improved resident well-being.

In this way, impact measurement becomes a tool for continuous learning, supporting long-term value creation for Home.Earth and the communities we help shape. It also ensures high-quality investor reporting, as investors can track our progress over time.

12.3 What we measure

Our indicators cover a wide range of topics – from carbon emissions and waste levels to community engagement.

Environmental impact includes indicators related to carbon impact, energy consumption, exposure to fossil fuels, and the share of non-renewable energy used. We also assess biodiversity impacts both onsite and offsite, waste generation and recycling, water usage and management, land degradation, and the use of raw materials in construction. Further, we track the energy performance of all properties and our capacity for onsite renewable energy production.

Under social impact, our data points include tenant satisfaction with the unit, trust in the landlord, and feelings of safety at home; evictions and eviction prevention; and affordability metrics, such as deposit and prepaid rent. We also assess community engagement, legal conflicts with tenants, and the extent of shared space built.

Under governance impact, we disclose the presence of key governance policies, including codes of conduct, anti-corruption frameworks, human rights policies, whistleblower protections, and health and safety standards. We also include metrics such as our B Corp Certification, team diversity, and employee satisfaction.

Our measurement framework continues to evolve. But the purpose remains constant: to provide a clear, accurate picture of our impact – and to ensure that data leads to better outcomes for the communities we serve and the planet we depend on.

"We use impact measurement to validate if we walk the talk in our mission towards people and planet positive homes; however, as importantly, we use our insights to improve our daily activities. In this way, impact measurement becomes a tool for continuous learning."

Anna Bech Nedergaard
Impact Lead, Home.Earth

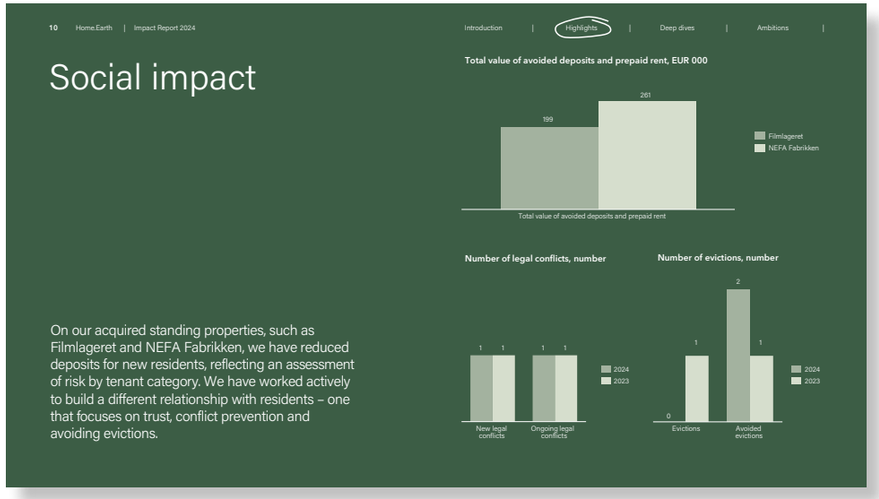


Figure 19 and 20: Social and governance impacts highlighting Home.Earth's commitment to positive tenant access, satisfactionand conflict prevention.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References & Credits

Contributing organisations: Aalborg University - BUILD, Danish Technical University, Doughnut Economic Action Lab (DEAL), Green Building Council - Denmark, EFFEKT, Realdania, Home.Earth, SLA, Sweco, Stockholm Resilience Centre and Vandkunsten.

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Brusa Cattaneo, G., Guldager, K., Kolding, C., Nedergaard, A., Pham, D., Unger, P., (2025) Measurable Impact for Urban Development. Edited by Kasper Guldager Jensen and Philip Højberg Unger. Copenhagen. The Danish Architectural Press.

This book presents the background, process, and findings of the Measurable Impact for Urban Development, which resulted from a collaborative research process involving twenty co-authors and multiple contributing organizations. It is written with the aim of providing developers and other building industry actors with the knowledge and tools necessary to support the application and practice of Measurable Impact principles in urban development.

The book consists of four main chapters: Social Foundation, Ecological Ceiling, Circular Construction, and Business Design.

Inside, you will find 96 impact areas and 12 unique impact case studies that will help you in your pursuit of applying Doughnut Economic thinking and Circular Construction practice.

To me, as an architect and part of the collaboration team, it has been a wonderful exploration to walk these steps together with Home.Earth towards a responsible building practice. Naming this last part of the trilogy 'a report' is, in my opinion, a bit too modest. With its unprecedented degree of transparency around all measurable dimensions, it reveals a fine-grained portrayal of the complex relationships between business models and the technical and environmental challenges of realization, constituting a point of reference for the entire housing industry.

Søren Nielsen
Architect, Professor Aarhus School of Architecture
Co-editor of the Circular Construction for Urban Development

The trajectory of urban development is fundamentally shifting. This trilogy captures where we are today — yet the goal remains a safe and just space for humanity. Are we there yet? Not even close. Still, this third installment marks an advancement in this transition, because "We care about what we measure, and we measure what we care about." How can we chart a course without first knowing our position? Transparent impact assessment is essential to move in the right direction — even more so, adhering to targets within planetary boundaries. As science evolves faster than policy and practice, how we respond to this moment will define our future. Kudos to Home.Earth and its network of collaborators for taking the first steps.

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