Content Research Plan

Personal Information

Name: Renger Heijnen

Student number: 4860659

Address: Jacoba van Beierenlaan 129

Postal code: 2613JD

Place of residence: Delft

Telephone number: 06 20060075

E-mail address: rheijnen@tudelft.nl

Studio

Name of studio: Architectural Engineering

Design tutor: Thomas Offermans

Research tutor: Jos de Krieger

Argumentations of choice of the studio:

I chose the Architectural Engineering studio because I believe my interests align closely with the opportunities the studio offers. I would like to contribute to solutions for societal challenges like climate change and housing, and I think that the studio offers a good fit for addressing these issues. Moreover, this studio, more than others, provides the freedom to explore and develop personal fascinations. In addition to its flexible approach to subject matter, I see it as a chance to strengthen my technical design skills. During my bachelor's, technical subjects weren't my strongest area, and while I've improved significantly in my master's, I still feel that students coming from other universities often have more advanced technical abilities. This motivated me to choose Architectural Engineering, as I believe it offers more learning opportunities in this area compared to other studios. The freedom to explore personal fascinations and the opportunity to develop my technical design skills are the main reasons for choosing the Architectural Engineering studio.

Title of Graduation Project

The essence of your project in a short title

A degrowth approach for 1960’s social housing transformation projects.

Keywords

The most relevant topics of the research, max 10 keywords.

Degrowth, Transformation, Renovation, Material flows, Reuse, 1960s social housing

General Problem Statement

The need for renovation in 1960s social housing is high. The large number of these housing projects, combined with the ongoing housing shortage, demands a lot of attention and effort to ensure good living conditions in these existing buildings.

Simultaneously, the shift towards a circular economy is becoming increasingly evident. The exploitation of new resources must be minimized, consumption reduced, waste prevented, and materials reused. Reusing and transforming buildings and their materials represent a substantial step toward adopting a more circular approach within the construction industry.

Renovation and transformation projects focused on closed-loop material reuse help limit consumption, reduce the exploitation of new resources, and minimize waste. Beyond the material aspects most 1960s social housing lacks essential social and ecological qualities. Addressing and improving these material, social, and ecological values align with the principles of degrowth theory. This theory advocates for a shift away from an economic system driven by profit toward one centered on social, ecological, and material values. Applying the principles of degrowth in architecture will lead to improved social, ecological, sustainable and material values. The 1960s housings are a good case for applying these principles as their current material, social and ecological values are lacking and because of the large number of buildings.

The growing demand for housing, combined with the need for renovations, the material challenges, and the deficiencies in social and ecological values in many 1960s housing projects, underscores the relevance of applying a degrowth approach to their renovation projects.

Overall Design Objective

The design will be a transformation project of gallery flats in Amsterdam. The transformation project will be made out of using reused products and materials. The building will be transformed into (extra) dwellings with an extra focus on shared spaces to improve social cohesion. Apart from transforming the existing structure, new parts will be added on top of the building and/or next to it. This addition includes new dwellings and possibly new functions/uses.

The overall objective will be to transform a gallery/portiekflat with reused materials into a ‘new’ housing complex with improved social and ecological values. The aim is to achieve a lively and healthy community building that has a positive impact on the (local) environment.

Overall design question / design hypothesis

How could the theory of an Architecture of Degrowth provide solutions to societal challenges like climate change and housing through the transformation of a gallery/portiekflat?

How can a gallery/portiekflat be transformed with reused materials into a ‘new’ housing complex with improved social and ecological values?

Reflection on the relevance

The design will take a more generic approach towards transforming a gallery/portiekflat with reused materials into dwellings with improved social and ecological values. The chosen chase addresses issues that are relevant to a large number of buildings in the Netherlands.

Apart from similar transformation projects, I hope that the approach to designing with the principles of Degrowth will be useful for a broader range of projects. I hope to show that an approach where social and ecological values are key objectives can lead to more liveable and healthy (housing) projects.

Thematic Research Objective

A big part of Degrowth in architecture is to stop exploiting finite resources and shift towards a circular economy. The reuse of existing buildings and materials is an important aspect when aiming for a circular economy. Not only will the exploitation of finite materials be stopped, but materials that are being thrown away will also be reused or even upcycled.

In the research, the focus will be on the transformation of a gallery flat in 'de Klipperbuurt' in Amsterdam. The material flows of a typical gallery flat will be analysed. First a material inventory will be done. Then its quality will be determined whereafter possible future uses will be addressed.

In the first part of the building process, waste, and the production and consumption of new resources will be minimised by maximising the reuse of existing materials of the building. After this phase, the design should prevent materials from becoming waste in the long term, limiting production and consumption of new resources. Aspects like maintenance, adaptability, flexibility, and design for disassembly will be addressed in the design phase of my graduation.

The research aims to find ways to minimise waste, production and consumption of new resources through an analysis of quality and potential reuse of the existing building materials. The design aims to implement the findings of the research in such a way that it prevents these materials from becoming waste in the future.

Thematic Research Question(s) / thematic research hypothesis

How can the existing materials of a Gallery flat be reused to transform the building?

Reflection on the relevance

The research dives into a strategy of reuse of the building materials of a transformation/renovation project. With carefully examining the quality of the existing materials, and with showing examples of its potential reuse, the materials will be prevented from becoming waste. Trough the conservation of these materials, the consumption and production of new resources for the transformation/renovation project will be minimised.
The strategy of limiting the production of new resources through reuse of existing components of the building is relevant for all renovation and transformation projects.
The results of the specific case will be useful and relevant for similar projects.

Thematic Research Methodology

The research will start with the choice of a specific building as a case. This building will have to be similar to others so the strategy and possible solutions can be applied to more buildings than only the chosen case. Apart from this, the building will have to be in need for renovation and not recently been through a thorough renovation.
The first step of analysis of the case will be to determine the various materials and its quantities. This will be done through the drawings of the project. After mapping these materials, the quality of the materials will be determined. This could be done in various ways. The first one is through existing knowledge of the material characteristics. What lifespan does this specific have? Has the material been renovated before? Another way of determining the quality could be to check the regulations of the 'Bouwbesluit' and see which building components must be replaced or renewed to comply with the current standards. Apart from the obligatory 'Bouwbesluit', it is also important to examine the spatial quality compared to the desired/standard qualities of new housing projects. If any components of the existing buildings are lacking spatial quality or not complying with the 'Bouwbesluit', they should be removed and repurposed. After determining the values of the existing materials, the potential use should be researched. This part will be researched through matching the existing materials with existing ways of reuse of these materials. A distinction will be made between materials that can be maintained or adjusted on site, and materials that will have to be adjusted elsewhere.

These findings will be implemented into the design phase of the project.

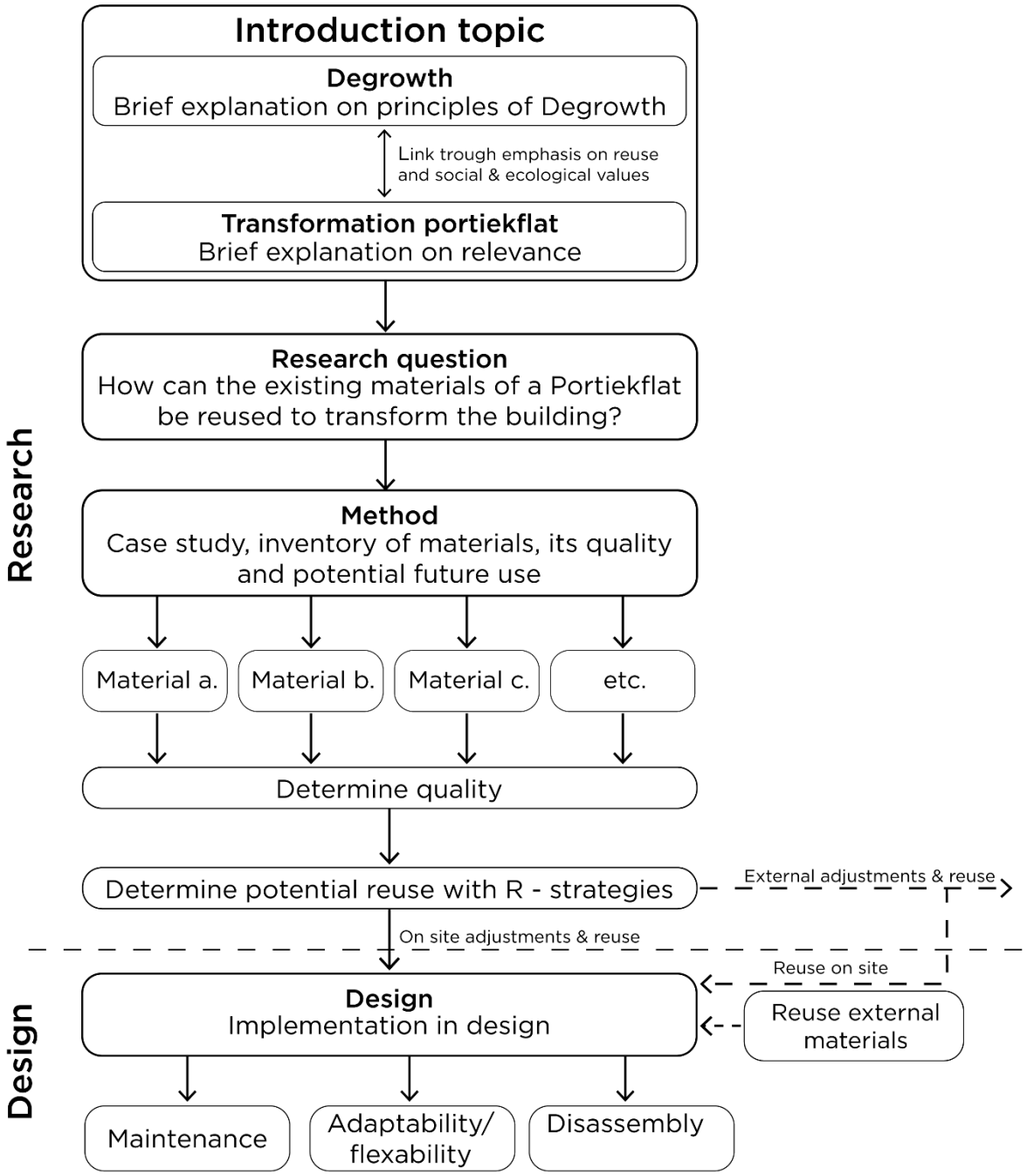
Expected results of thematic research and design implementation

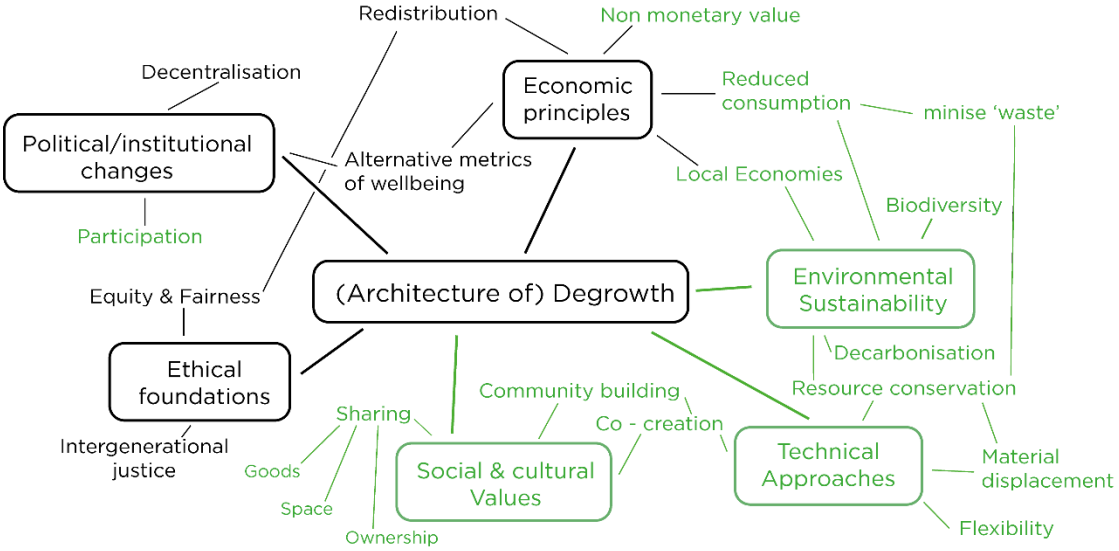
This thematic research will focus on assessing the quality and potential applications of materials from a Portiekflat. In the design phase, some of the possible ways of reuse will be integrated.

Weekly planning P2

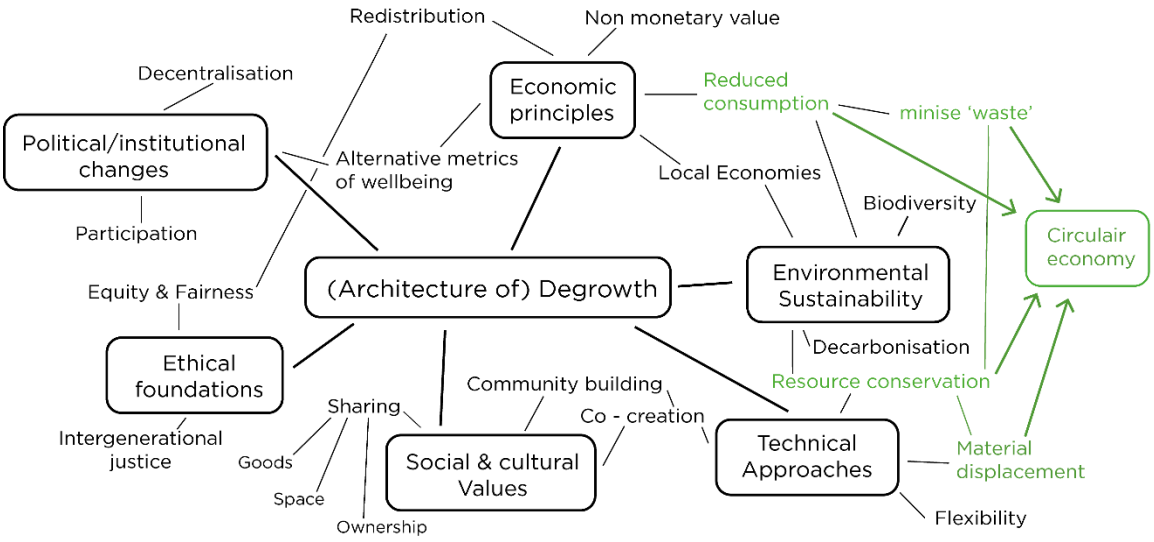
During upcoming weeks I will start the research with choosing a case study. Hereafter I will do an inventory of its materials, determine the quality of the materials and present potential uses of the materials. I aim to finish the research before the Christmas break, so that I will have enough time to make the graduation plan, start designing and prepare the presentation of P2.
The design phase starts with valuating the existing urban and architectural quality. This will be done based on a site visit, existing surveys among residents, data and drawings. After valuating the urban, architectural and material quality, general goals and ambitions are presented. The end products will consists, amongst other things, of drawings of the urban context, architectural drawings and model on the blocks and interventions, dwellings overview and technical drawings considering the use and implementation of reused materials.

Week	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
Date	11/11-15/11	18/11-22/11	25/11-29/11	02/12-06/12	09/12-13/12	16/12-20/12	06/01-10/01	13/01-17/01	21-01
Task	Choose case study	Inventory of materials	Quality of materials	Quality of materials	Potential use materials	**Finish research**	Graduation plan	Prepare presentation	**P2 presentation**


Introduction topic
Degrowth
Brief explanation on principles of Degrowth
Link trough emphasis on reuse and social & ecological values
Transformation portiekflat
Brief explanation on relevance
Research question
How can the existing materials of a Portiekflat be reused to transform the building?
Method
Case study, inventory of materials, its quality and potential future use
Material a.
Material b.
Material c.
etc.
Determine quality
Determine potential reuse with R - strategies
External adjustments & reuse
On site adjustments & reuse
Reuse on site
Design
Implementation in design
Reuse external materials
Maintenance
Adaptability/ flexability
Disassembly
Research
Design



Principles of Architecture of Degrowth - Design



Principles of Architecture of Degrowth - Research

-

Literature

Addis, B. (2006). Building with Reclaimed Components and Materials: A Design Handbook for Reuse and Recycling. Abingdon, Verenigd Koninkrijk: Taylor & Francis.

Benachio, G. L. F., Freitas, M. D. C. D., & Tavares, S. F. (2020). Circular economy in the construction industry: A systematic literature review. Journal of Cleaner Production, 260, 121046. https://doi.org/10.1016/j.jclepro.2020.121046

Bertino, G., Kisser, J., Zeilinger, J., Langergraber, G., Fischer, T., & Österreicher, D. (2021). Fundamentals of Building Deconstruction as a Circular Economy Strategy for the Reuse of Construction Materials. Applied Sciences, 11(3), 939. https://doi.org/10.3390/app11030939

Bougrain, F., & Doutreleau, M. (2022). Statistical analysis of the building elements reclamation trade in the Benelux, France, The UK and Ireland. Interreg. Interreg. Retrieved from https://www.nweurope.eu/media/16598/statistical-analysis-v15.pdf BouwhulpGroep. (2013, September).

Brand, S. (1994). How buildings learn : what happens after they're built. New York, NY: Viking.

Centre for Industriliazied Architecture Royal Danisch Academy (n.d.). Construction Material Pyramid. from https://www.materialepyramiden.dk/#

The Circular Economy and Cascading: Towards a Framework. Resources, Conservation &Amp; Recycling: X, 7, 100038. https://doi.org/10.1016/j.rcrx.2020.100038 CBS. (2012, October 22).

De Jonge, H. (2022, June 1). Duurzaam wonen voor iedereen. Retrieved December 20, 2022, from https://www.rijksoverheid.nl/regering/bewindspersonen/hugo-de-jonge/nieuws/2022/06/01/duurzaam-wonen-voo r-iedereen

EIB, & Metabolic. (2020). *Materiaalstromen, milieu-impact en energieverbruik in de woning- en utiliteitsbouw*

Ellen MacArthur Foundation. (2013). Towards the circular economy. Ellen MacArthur Foundation. Retrieved from https://emf.thirdlight.com/file/24/xTyQj3oxiYNMO1xTFs9xT5LF3C/Towards%20the%20circular%20economy%20Vol%201%3A%20an%20economic%20and%20business%20rationale%20for%20an%20accelerated%20tra nsition.pdf

Ellen MacArthur Foundation. (2015). Circularity Indicators. *An Approach to Measuring Circularity*. Retrieved from https://www.ellenmacarthurfoundation.org/assets/downloads/insight/Circularity-Indicators_Non-Technical-Case-Studies_May2015.pdf

Fifield, B., & Medkova, K. (2017). *Circular Design - Design for Circular Economy, Katerina Medkova and Brett Fifield*.

Garritzmann, U., Poiesz, P., & Snijders, K. (2015). Kansen voor de naoorlogse portiekflat. Hp Architecten. Retrieved from https://www.hparchitecten.nl/wp-content/uploads/2019/10/Kansen-voor-de-naoorlogse-portiekflat.pdf

Gorgolewski, M. (2018). *Resource salvation : the architecture of reuse*.

Gorgolewski, M., & Morettin, L. (2009). *The Process of Designing with Reused Building Components*. Paper presented at the CMS2009: Conference on Construction Material Stewardship

GXN, TU Delft, & City of Amsterdam. (2019). Upcycle Amstel. Openresearch Amsterdam. Retrieved from https://openresearch.amsterdam/nl/page/71094/upcycle-amstel---context

Icibaci, L. (2019). A+BE Architecture and the Built Environment - Re-use of Building Products in the Netherlands: The development of a metabolism based assessment approach (1st ed.). Delft, Nederland: TU Delft.

IenM & EZ. (2016, September). Nederland circulair in 2050. Rijksbreed Programma Circulaire Economie. Rijksoverheid. Retrieved from https://www.rijksoverheid.nl/onderwerpen/circulaire-economie/documenten/rapporten/2016/09/14/bijlage-1-nede rland-circulair-in-2050

Jensen, K., & Sommer, J. (2018). *Building a Circular future*. Retrieved from https://gxn.3xn.com/wp-content/uploads/sites/4/2018/09/Building-a-Circular-Future_3rd-Edition_Compressed_V2-1.pdf

Lendager Group. (2018). *A Changemaker's Guide to the Future*. Denmark: Narayana Press

Metabolic. (2021, February 2). Urban mining and circular construction – what, why and how it works. from https://www.metabolic.nl/news/urban-mining-and-circular-construction/

Ministerie van I&M, & Ministerie van EZ. (2016). Nederland circulair in 2050. Retrieved from https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2016/09/14/bijlage-1-nederland-circulair-in-2050/bijlage-1-nederland-circulair-in-2050.pdf

New Horizon. (2022). Oogstkaart. from https://www.oogstkaart.nl/

Osobajo, O. A., Oke, A., Omotayo, T., & Obi, L. I. (2020). A systematic review of circular economy research in the construction industry. Smart and Sustainable Built Environment, 11(1), 39–64. https://doi.org/10.1108/sasbe-04-2020-0034

PACE. (2022). The circularity gap. Platform for Accelerating the Circular Economy. Retrieved from https://circularity-gap.world/2022#Download-the-report

Potting, J., Hanemaaijer, A., Delahaye, R., Hoekstra, R., Ganzevles, J., & Lijzen, J. (2018). Circular economy: what we want to know and can measure (3217). PBL Netherlands Environmental Assessment Agency. PBL Publishers. Retrieved from https://www.pbl.nl/sites/default/files/downloads/pbl-2018-circular-economy-what-we-want-to-know-and-can-me asure-3217.pdf

Rakhshan, K., Morel, J. C., Alaka, H., & Charef, R. (2020). Components reuse in the building sector – A systematic review. Waste Management &Amp; Research: The Journal for a Sustainable Circular Economy, 38(4), 347–370. https://doi.org/10.1177/0734242x20910463

SuperLocal. (2021). The circular business case. SuperLocal. Retrieved from https://www.superlocal.eu/wp-content/uploads/2022/01/Circulaire-Businesscase-SUPERLOCAL-2021-NL.pdf

UNEP. (2016). Global Material Flows and Resource Productivity. UNEP. Author. Retrieved from https://www.unep.org/resources/report/global-material-flows-and-resource-productivity-assessment-report-unep

TNO. (2018). *Circulair bouwen in perspectief*: TNO

van Nunen, H. (1999). (Her)gebruikt bouwen demontage en hergebruik van geprefabriceerde betonelementen van naoorlogse (montage-)systeembouwwoningen (MA thesis). Eindhoven University of Technology.

Verhagen, T. J., Sauer, M. L., van der Voet, E., & Sprecher, B. (2021). Matching Demolition and Construction Material Flows, an Urban Mining Case Study. Sustainability, 13(2), 653. https://doi.org/10.3390/su13020653

https://www.oslotriennale.no/archive/2019#:~:text=As%20a%20response%20to%20the,and%20opportunities%20for%20our%20cities.

https://www.routledge.com/Housing-for-Degrowth-Principles-Models-Challenges-and-Opportunities/Nelson-Schneider/p/book/9781138558052

https://www.dezeen.com/2019/11/19/degrowth-architecture-oslo-architecture-triennale-2019/

https://failedarchitecture.com/degrowth-is-about-redistribution-by-design-not-by-collapse/

https://research.tudelft.nl/en/publications/circular-architecture-of-degrowth

https://journals.sagepub.com/doi/full/10.1177/00420980221148107

https://www.archdaily.com/tag/degrowth

https://julianakanishi.com/architectures-role-in-degrowth-case-studies

https://benjaminwells.eu/an-architecture-of-degrowth

https://www.ribaj.com/intelligence/post-growth-what-it-means-for-architects-cop27-climate-emergency-business#:~:text=Post%2Dgrowth%20architecture%20isn%27t,%2C%20recreation%2C%20study%20and%20learning

https://anitranelson.info/housing-for-degrowth-principle-models-challenges-and-opportunities/

https://journals.sagepub.com/doi/full/10.1177/00420980221121198

https://leanganook.org/food-for-thought/

https://www.researchgate.net/publication/327765100_Housing_for_degrowth

https://www.re-thinkingthefuture.com/architectural-styles/a12214-architecture-of-degrowth/#:~:text=The%20architecture%20of%20degrowth%20is,mounting%20economic%20and%20environmental%20challenges.

https://www.architectural-review.com/buildings/a-new-lease-of-life-18-homes-for-older-people-in-rixheim-france-by-lacaton-vassal

https://architectenweb.nl/nieuws/artikel.aspx?id=58218

https://www.ucarchitects.com/projects/the-urban-woods-from-pallets-to-palaces-cutting-edge-high-rises-built-from-waste-wood

https://www.ucarchitects.com/projects/the-urban-woods-tweemolentjeskade-delft-nl

https://www.superuse-studios.com/nl/publication/oogsten-verzamelen-hergebruiken/

https://www.dearchitect.nl/288188/mooi-lelijk-eendje-het-circulair-gebouwde-kinderdagverblijf-de-zwaan-is-een-eerbetoon-aan-recyling

https://www.dearchitect.nl/288721/superuse-boschgaard-bestaat-voor-80-procent-uit-afval-we-hebben-voor-het-hele-gebouw-maar-een-balk-gekocht

https://lendager.com/project/upcycle-house/

https://www.dezeen.com/2020/11/26/honext-recyclable-construction-material-cellulose-paper/

https://www.dezeen.com/2021/11/18/mo-de-movimiento-sustainable-restaurant-interior-lucas-munoz/

https://www.re-thinkingthefuture.com/rtf-fresh-perspectives/a1989-10-examples-of-upcycling-in-architecture/

https://www.archdaily.com/778972/the-circular-pavilion-encore-heureux-architects

https://www.archdaily.com/1006535/kamikatsu-zero-waste-center-hiroshi-nakamura-and-nap/64f9c7d57109e369a06b3ce7-kamikatsu-zero-waste-center-hiroshi-nakamura-and-nap-photo

https://inhabitat.com/zero-waste-japanese-town-builds-a-unique-building-from-abandoned-materials/

https://repository.tudelft.nl/islandora/object/uuid%3Ab3ab49a6-a7bc-41fa-ae32-0014ff9a95a1

https://repository.tudelft.nl/islandora/object/uuid%3A57b861a1-33e5-4fc7-8f2d-12d4aa8d3e4b

https://www.tudelft.nl/en/events/2023/bk/symposium-architecture-and-doughnut-economics

https://www-archdaily-com.translate.goog/997291/how-amsterdam-uses-the-doughnut-economics-model-to-create-a-balanced-strategy-for-both-the-people-and-the-environment?_x_tr_sl=en&_x_tr_tl=nl&_x_tr_hl=nl&_x_tr_pto=sc

https://doughnuteconomics.org/stories/doughnut-economics-in-planning-and-architecture

https://assemblestudio.co.uk/projects/the-cineroleum

https://www.naibooksellers.nl/upcycling-reuse-as-a-design-principle-in-architecture-wiederverwendung-als-gestaltungsprinzip-in-der-architektur.html

https://www.upcyclingarchitecture.it/map

https://www.archdaily.com/868533/wasteland-provides-a-tactile-insight-into-the-world-of-upcycling-in-architecture

https://weburbanist.com/2017/07/10/acclaim-for-the-reclaimed-14-cool-upcycled-architecture-projects/