FROM THE STATE OF DEGENERATION TO REGENERATION: IMPROVING HEALTH AND WELLBEING WITHIN ARCHITECTURAL IMPLEMENTATIONS

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ABSTRACT

FROM THE STATE OF DEGENERATION TO REGENERATION: IMPROVING HEALTH AND WELLBEING WITHIN ARCHITECTURAL IMPLEMENTATIONS

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The notions of health and well-being, which are now entrapped within degenerative systems, are inseparable components of the built environment which creates a need for it to be re-established. Within degenerative patterns of the built environment, there is a dependence on outer resources in which people rely upon as well whereas the planet earth requires systems that operates with health-wise positive impacts on both people and the environment. Regenerative development, on the other hand, not only offers a holistic thinking through circular systems that aims to eliminate or even reverse degeneration but also helps it to regain its state of 'regenesis' within built environment. It is argued in this thesis that the precautions taken for degeneration are not enough to cope with the *extremes*, and regenerative development is able to offer solutions as it centers human health and wellbeing as much as planetary wellbeing, therefore, aims to analyze the wellbeing component in relation to physical, intellectual and emotional dimension within architectural implementations in order to shed light to regenerative potentials in an effort to support wellbeing nourishment. As a result of the investigation of several research projects, a derivative wellness correlation chart is formed from biophilic patterns and Well Certfication in order to define parameters for health and wellbeing improvement. Derived

methodology is explained by its application on selected two case studies from Turkey so as to demonstrate health and wellbeing nourishment can be achieved through several elements of which also improve livability of environment.

Keywords: Regenerative development, wellbeing, degeneration, regeneration, livability

ÖZ

DEJENERASYON DURUMUNDAN REJENERASYONA: SAĞLIĞIN VE ESENLİĞİN MİMARİ UYGULAMALAR İÇERİSİNDE GELİŞTİRİLMESİ

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Artık yozlaşan sistemlerin içine hapsolmuş olan sağlık ve esenlik kavramları, yapılı çevrenin ayrılmaz bir parçası olup, yeniden kurulması ihtiyacını doğurmaktadır. Yapılı çevrenin dejeneratif modellerinde, insanların bel bağladıkları dış kaynaklara bağımlılık söz konusuyken, dünya hem insanlar hem de çevre üzerinde sağlık açısından olumlu etkilerle çalışan sistemlere gereksinim duymaktadır. Rejeneratif gelişim ise, yozlaşmayı ortadan kaldırmayı ve hatta tersine çevirmeyi amaçlayan döngüsel sistemler aracılığıyla bütüncül bir düşünce sunmakla kalmaz, aynı zamanda İnsan Yapılı Çevre Etkileşimi açısından 'yenilenme' durumunun yeniden kazanmasına yardımcı olur. Bu tezde, yozlaşma için alınan önlemlerin aşırılıklar ile başa çıkmak için yeterli olmadığı ve rejeneratif gelişimin, insan sağlığını ve refahını olduğu kadar gezegensel refahı da merkeze alarak çözümler sunabildiği için önplana çıkarılması gereği savunulmaktadır; bunu yaparken esenliğin mimari uygulamanın içindeki yerinin fiziksel, entelektüel ve duygusal boyutlarda araştırılması hedeflenmektedir. Araştırma projelerinin incelenmesinin bir sonucu olarak, sağlık ve esenlik iyileştirme parametrelerini tanımlamak için biyofilik kalıplardan ve Well Sertifikasyonundan türetilmiş bir esenlik korelasyon çizelgesi oluşturulmuştur. Türetilmiş metodoloji, sağlık ve esenlik gelisiminin çevrenin yaşanabilirliğini de iyileştiren çeşitli unsurlarla sağlanabileceğini göstermek için Türkiye'den seçilen iki vaka çalışması üzerinde uygulanmasıyla açıklanmaktadır.

Anahtar Kelimeler: Rejeneratif gelişim, esenlik, dejenerasyon, rejenerasyon, yaşanabilirlik

Dedicated to whom are in the search of their true wellbeing,

now it is time to open our eyes to the valuable one

.

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In the end, it is my greatest aim for this research to a least shed some light to the structures to become *architecture* which holds the possibilities to touch its users' life and experience. The world is at the crossroads that the decisions we make determines the future way of life; and *the X Factor* should not be undermined.

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LIST OF ABBREVIATIONS

ABBREVIATIONS

HBI: Human Built Environment Interaction

UN SDGs: United Nations Sustainable Development Goals

LST: Living Systems Thinking

CHAPTER 1

INTRODUCTION

1.1 Problem Definition

Energy consumption, production and transformation are the basis of any living system such as communuties, cities, ecosystems, human body as well as our world which is a living being consisting of this energy cycles. This depletion and production of energy forms the basis of daily life in numerous ecosystems on earth. Ecosystem can be defined as "the interdisciplinary scientific study of the living conditions of organisms in interaction with each other and with the surroundings, organic as well as inorganic"[1]. The relationships within any ecosystem is reliant on energy transition. However, our earth cannot meet the needs of the daily energy consumption, therefore, the equlibrium is compramised. Manmade structures such as big cities or a small cotage house are located within an ecosystem, of which they become a part; their relationship starts. Nevertheless, this relationship is not always at its best. The flow of energy differs between systems due to the circumstances such as external conditions, interaction level and daily action's requirement.

As the equlibrium has been failled, severe problems started to occur due to lack of substitution of resources. In other words, missusage of world's resources has degenerated ecosystems and led to serious problems. The terms global warming and climate change has become not only a part of everybody's life but also they are

[1] Mang, Pamela, and Bill Reed. "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.

acknowledged as crucial threats to the world. NASA explains global warming as "long-term heating of Earth's surface observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere"[2] and climate change as "a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates"[3]. As the problems grew, the World come to an understanding that systems cannot continue as they are. Because when the bigger picture is taken into consideration, there are severe consequences ahead of mankind.

The process of any system on our world can be tracked with the flow of energy. In the case of the world, which can be perceived as a living organism breathing day by day as seasons come and go, the energy consumption can be determined according to the amount of oxygen usage and carbon dioxide emission altering throughout the year as the world rotate around the sun. The summation of referred usage and emission defines the level of yearly carbon emission of the world[4]. The increase in carbon emissions are considered as the main cause of global warming and climate change. Therefore, worldwide initiatives are started so as to limit these emissions and decrease them.

Manmade structures, developments such as cities and industrial activities are the main resources of carbon emission and they are not coherent with the existing natural ecosystems. "Throughout the life cycle of buildings – from raw material extraction, processing, construction, building operation and maintenance, through to demolition, the impacts on the environment result from pollutants, energy and water use, land degradation and use, resource use, waste production and loss of biodiversity."[5] And this is the main cause of the imbalance in the life cycle of energy due to degeneration. In other words, artificial developments and overcrowds, which

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[2] Nasa, Global Warming and climate change. https://climate.nasa.gov/global-warming-vs-climate-change/
[3] Ibid.
[4] Al Gore an inconvenient truth. https://youtu.be/Jxi-OlkmxZ4
[5] Towards a sustainable development - New Zealand Report, 2009.

are the main components of mega cities, are a burden on nature who is compromised to fullfill the requested. Thus, these artificial settlements face with inefficiencies of resources and energy. Since, the energy cycle not only merely focused on consumption but it also is dependent on linear systems[6]. "Huge urban centers is a world-wide trend which will inevitably have profound environmental and social consequences" and they have already being seen. Cities has begun to function inadequately because they are unable to be self-sufficient. Due to overcrowds being combined with inadequate infrastructure, the condition of our cities are getting worse with the constant expantion. To sum up, when the overcrowd is combined with finite resources results in an increase in the amounth of consumption, which already has severe environmental results.

The current situation of the planet is no longer able to tolerate the way people live. This is a known fact which triggered the initiation of the sustainable paradigm. In the beginning, **sustainability has been useful in order to** raise an awareness among people and change the ways people think and operate. This paradigm's main focus started and continued to a great extend as to **do less harm**. Nevertheless, the research in the last decades indicates that it is not enough anymore. The planet needs alteration that can provide solutions for the whole inconveniencies rather than patch fixes so that the systems could operate with zero harm or **even with positive effects**. As James Erlich[7] states in his speech in TEDxKlaghenfurt 2017, a smart house within a dumb neighbourhood makes absolutely no sense[8]. In other words, he explains that the change should be within an all together approach and coherant with its surroundings. Since, the more environmental problems proceed, the more **existing systems and patch solutions**[9] become in adequate.

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[6] Linear systems are composed from one way source to sink approach. The resource is processed and directed to the sink where it is used and produce waste then the cycle ends. This kind of systems are defined as degenerative systems by John T. Lyle, who is one of the pioneers of regenerative movement.

[7] A practitioner of regenerative design, a member of Stanford University, who is the main developer of regen villages and design initiatives.

[8] https://youtu.be/QdNAEbAkThA

[9] Is mentioned as sustainable movement's approach is to improve or repair the existing systems with additional implementations rather than replacing with alternative systems.



Figure 1-1: Core diagram of definition in sustainability, restorative and regenerative by Restore Working Group 1 directly quoted[10].

The concepts of degeneration and regeneration comes into surface within the process of these developments. On one hand, **conventional** systems are considered as **degenerative approaches** with mechanistic design qualities and reductionist thinking. They **rely on outter sources for energy and materials**, and they are formed from linear systems which start with source and ends **with waste**, which forms **dependencies**. On the other hand, regenerative concepts considred to be the alternative solutions, which creates a misperception as if they are secondary in order. ***Regenerative systems*** require **wholistinc thinking** and consideration of existing patterns in their design process[11] so as to define flows coherent with present. To explain, John Tillman Lyle[12] defines **regenerative design as the replacement of linear systems**, **which will provide "continuous replacement, through (their) own functional processes, for the energy and materials used in their**

[10] Brown, M., et. al. (2018). Sustainability, Restorative to Regenerative. COST Action CA16114 RESTORE, Working Group One Report: Restorative Sustainability
[11] This basic information is paraphrased from RESTORE Groups first book *Sustainability, Restorative to Regenerative*, chapter of circular economy and the argument of conventional versus alternative is added from John Litmann's Thesis on Regenerative design.
[12] Who is the founding father of regenerative Design and development who is going to be mentioned in regenerative design chapter in detail.

operation"[13]. Regenerative systems offers **circular approaches** and cares for the life cycle of both the system and its used materials. Nevertheless, the distinction about conventional and alternative in people's mind, puts regenerative or sustainable systems in the second place. The dicotamy of conventional and alternative is one of the main problems in front of the change towards a sustainable future and there is a need for a transformation towards regenerative systems, which can offer solutions for the problems mentioned above and more.



Figure 1-2: Representation diagram of core problem concerned in this thesis: Degenerative systems and their transition to Regenerative ones, drawn by the author.

In addition, **the built environment and construction sector** has a big role to play for this change as they are form a vast part of people's lives. Throughout the day, people spent their times within the built environment. This can easily be perceived as an opportunity. Because, they can be used a medium for regenerative development and its goals. Furthermore, "in regenerative development, the built environment becomes a conduit for producing resources and energy, improving physical and psychological health, remedying past pollution, and transforming and filtering waste into new resources."[14] Although, most existing regenerative examples are at small scale detached environments, with all things mentioned above, this kind

[13] Mang, Pamela, and Bill Reed. "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[14] Towards a sustainable development - New Zealand Report, 2009.

of fundamental rethinking of architecture is a promising pathway towards regenerative development of new initiatives as well as regeneration of existing built environment. Since, there is a need for transformation of existing structures for health and wellbeing of people as well as environment's.

To sum up, as the world come to understand the problems in the last decades, as pointed out, many practitioners advocate the necesity of a regenerative approach. The problems are coherent throughout the world and there is a severe need to proceed towards a positive outcome industry. The nZEB Romania Group defines the hinderance against positive outcome as a cycle that blocks the development process. **First step of the cycle is the lack of awareness of the severity of the situation** and the low speed of process of development. Secondly, there are not enough **skilled professionals** that are knowledgable with practices for this sudden transition to positive outcome. As the remaining steps of the cycle, lack of adaquate instruments to meet the needs to practices, lack of enthusiasm towards these practices and lack of coherant legislation in order this system to evolve into something mandatory or desired is stated[15]. Moreover, with further research is conducted and problems keeps piling up, the ambiguity of Human Built Environment Interaction (HBI) should be further studied in order to offer an understanding of resilient and restorative relationships within the built environment as a part of regenerative paradigm.

1.2 Aim of the Thesis

There is a need for developmental approaches rather than singular problem solving in order to understand HBI and so as to solve existing problems caused by *extremes*. To do so, existing degenerative systems should be replaced with regenerative systems. In the current system of thinking, all systems are engineered around energy transmission, production and consumption within sustainable paradigm. Nevertheless, there are more than one perspective that should be taken into

[15] https://www.yesilbinadergisi.com/edergi/21/57/55/index.html#zoom=z pg.55

consideration while aiming for fully sustainable outcomes. Therefore, rather than engineered decision making, health and wellbeing of people as well as the ecosystem they live in, should be taken into account. Any regenerative or sustainable systems consist of three main topics, which are explained above, environmental, economic and social aspects. Social sustainability is fundamentally related to people; in architecture, this concept is directly related to life quality, livability and equity.[16] For this thesis' purposes, HBI is going to be regarded as the social variable of regenerative development so as to research the possibilities of livable healthy environments that is nurturing human wellbeing. Therefore, an invstigation of regenerative design in order to find offered strategies for wellbeing nourishment is done.

While the practitioners, who are working on regenerative development, focus on architecture, they are concerned about both nature and human components at the center of their designs; and regard their co-evolutionary state. Health and wellbeing is one of the important keys in their design and the main threats are caused by human induced linear patterns. Thus, this thesis searches the keywords and key approaches about health and wellbeing used in recent research projects, which can be used to determine the regenesis capacity of the projects, which provides for wellbeing nourishment and have capacity to be applied in other projects.

In this thesis, the steps towards the regenerative development by refering several research projects as from United States, Europe and New Zealand, is addressed; and a critical evalation in order to discover indicators of wellbeing improving factors are investigated. As regenerative development prioritize HBI, how the research projects handle health and wellbeing concepts within its social dimension is reserched; and the methodology towards refurbishment of health and wellbeing in the current architectural implementations are derived with their correlation to wellness dimensions.

[16] McArthur and Powell, 2020; Herd-Smith and Fewings, 2008; Dillard et al., 2009.

There are 3 main research questions that are guiding this study thesis.

1. What are the collective actions such as international agreements towards the existing ecological crisis and how can regenerative development correlate with them? How a sudden move to a positive impact model on overall systems can be implemented?
2. How can the transition period operate from degenerative systems to regenerative systems? What are the existing guides for this process?
3. What the recent studies suggest on people's health and well-being' correlation to the extremes such as Covid 19 pandemic and climate crisis with regard to its relation with architectural implementation? Can regenerative development strategies offer solution?

By an investigatigation of the current era towards a solution to previously mentioned the problems, firstly, a critical evaluation of international research projects concerning a paradigm shift towards regenerative development is made in terms of their aims, findings and initiatives in order to find the relevance of heatlh and wellbeing nourishment in the built environment. Then, with the foundings from these projects, how health and wellbeing is correlated with the built environment is going to be researched; and if/how this relationship can be supported by tangible variables is investigated. Regarding the results of this process, as case studies, Nefes Assos and EcoHouse Gaziantep are going to be evaluated in terms of their capacity to nourish health and wellbeing.

1.3 Boundary and Significance of the Thesis

As it is previously stated, the world rely on degenerative linear systems. However, there is a need for a drastic change into regenerative thinking. The world is processing a state which requires sudden changes in the existing patterns. Regenerative development is a multi-dimentional topic that requires multi-disciplinary approaches correlated with engineering, ecology, management, psychology, etc. Besides, regenerative development is a new field of study that the borders are vague due to its comprehensive structure. Altough, there are theorethical

foundations of the subject, the practice is still very limited. Therefore, there is not enough awareness about the topic in terms of even if its applicable. Therefore, this thesis aims to research for a set of applicable strategies with regard to relative existing theories in terms of their connection of health and wellbeing nourishment in architectural implementations.

1.4 Methodology and Structure of the Thesis

As methodology, a critical evaluation of research projects with the intention of a radical change towards regenerative development for net positive effects, which are by Regensis Group, Restore group and New Zealand Government, is made from the perspective of HBI in terms of health and wellbeing. With the acquired data, the possibilities towards health and wellbeing nourishment is correlated with existing concepts in order to define the criteria towards further applications.

The thesis consists of 4 chapters. Chapter 2 gives the status of the world in terms of state of mind and existing conditions of extremes with the collective precautions around the world. An introduction of the state of current world is given with the universal aggrements, Paris Agreement and United Natşons Sustainable Development Goals, and their correlation with extremes such as climate crisis, Covid 19 pandemic and Ukrain war. Further parts in the chapter, the existing concepts and notions in sustability that guides the transition to regenerative development are explained.

In Chapter 3, the need for a sudden change towards regenerative development is explained and a critical evaluation of research projects, Regenesis Group, Regen Villages, New Zealand Governmental Reports and Restore Group, with the intention of regenerative development and its relation to health and wellbeing nourishment in architectural implementations is made.

In chapter 4, a compilation of determined strategies for wellbeing improvement is made and strategies or certification systems are individually explained. With, the objectives of these research projects a methodology for an

increase in health an wellbeing is determined to be offered in coordination of several concepts, which are biophilic patterns and well certification as indicators. Then, these derived indicators are correlated with wellbeing's three dimensions in order to form the Wellness Correlation Chart. As case studies, Gaziantep Ecological Building and Nefes Assos are assessed with the Wellness Correlation Chart in terms of their level of supportiveness in health and wellbeing nourishment within architectural implementations.

CHAPTER 2

LITERATURE REVIEW: URBAN DEPENDENCIES IN THE CURRENT PARADIGM: HEALTH AND WELLBEING WITHIN SYSTEMS

2.1 World View: Current Situation in Human Interaction

> "Our planet is a living system, shaping and shaped by the life that it supports. This aliveness is inherently creative and unpredictable"[17].

The world faces various changes at the same time. Because, the way of people's lives does not work with the world anymore. After the modern paradigm and modernization, both practice and theoretical grounds flourished with enhancements. However, as these developments have brought some more problems, new concerns have risen. **In the last half of 20th century, sustainable paradigm come to fore in order to recreate the connection with humans and our planet.** Moreover, it aimed to decrease the damages that are being done by humans to the world. Numerous fields have appeared so as to provide solutions against the degeneration of our planet. With the **sustainable and green paradigms**, by and with designers and practitioners have drawn attention to subjects such as **resource management, waste management, energy consumption.** Although, sustainability has worked well for its purpose to raise awareness, it has created solutions can be classified as instant fix or short-termed, as its main **motto was to do less harm.**

[17] The book, Regenerative, Development and Design: A Framework for Evolving Sustainability by Regenesis Group explains how there is not a clear understanding of living systems work as a recipe.

In the last decades, degeneration of our planet started to show severe red flags due to the population increase, resources depletion and our world cannot meet the needs of its inhabitants no more. **Although, there is a decrease of harmful impacts up to a degree, there is also a need for not only net-zero impact but also net positive impact systems for permanent enhancements.** The built environment is a huge part of daily life and construction sector has a big share in the existing problems such as degeneration and pollution. Moreover, the thin line between differentiation of architecture and buildings become vague. Because, the intangible values that define the architectural objects have weaken. Nevertheless, the world has come to realize that there must be a change in the things as they were; and there is a need for a shift in the mind set which contains already existing structures and systems as well as new ones.

2.1.1 Universal Agreements throughout a Changing World: Proof of Globalization

From the 1959, emission levels are started to be measured and recorded. In the mid 1980's the world have come to understand the big issue caused by the industrialization, mass production, etc. that the energy of world's usage is based on the finite resources. Moreover, their life process are causing serious imbalances in daily lifecycle of the world. Because, the daily input of carbon dioxide cannot be equally processed, some of it remains and adds up on daily bases. However, only in the last decades, there are initiatives to understand, explain and solve this core problem of dependency on non-renewable resources, which forms basis of our energy production and consumption.

The world has comprehend this idea of finiteness, as sustainable and green paradigm come in sight in order to do less harm and limit our impact on earth. It has become evident that this act cannot be narrowed down to projects, villages or countries but it has to be universally acknowledged and the precautions should be taken in global scale. Thus, after numerous publications and projects of NGO's, the

governments step forth for a global action with conferences, action plans, global protocols and international agreements.

In Al Gore's Tedx speech about An Inconvenient Truth, he defines the problem as a **moral issue than a political one** so as to point out that it is on common grounds. Various organizations have emerged to point out the necessity of **global plans**. Within the scope of this thesis, four of many agreements and protocols are going to be mentioned in terms of their significance, **involvement of Turkey and timeline of alterations for adaptation of emergent circumstances[18].**

As the first significant attempt "due to being undersigned by 197 parties (196 states and European Union), as well as being the first convention and practice undersigned universally, **Montreal Protocol** is recognized as an extraordinary example of international collaboration".[19] In Turkey's case as a developing country, with the location and mission as the bridge between Europe and Asia, **its involvement in agreements is significant. Firstly, in 1991**,

> "Turkey became a party to Vienna Convention and Montreal Protocol for the Protection of the Ozone Layer. Accepting four Amendments of Montreal Protocol, including London, Copenhagen, Montreal and Pekin Amendments up until Kigali Amendment, **Turkey become one of the states conducting the requirements of the protocol successfully.** Being among the developing countries within the scope of Montreal Protocol, our country will manage to keep the hydrofluocarbon[20] consumption at a reference value in **2024,** thus performing the first reduction in **2029**".[21]

Secondly, in 24th March 2004, Turkey has become the 189th party to UNFCOCC[22] which

> "aims at decreasing the greenhouse gas emission, encouraging the technological cooperation, and protecting the greenhouse sinks (forests, oceans, etc.) caused by

[18] Emergent circumstances and urgency of new occurred problems will be explained in detail in the pandemic chapter.
[19] "General Directorate of European Union and Foreign Relations." https://ab.csb.gov.tr/en/agreements-i-100215
[20] One of fluoro greenhouse gasses, which has quite a powerful impact on Ozone layer.
[21] "General Directorate of European Union and Foreign Relations." https://ab.csb.gov.tr/en/agreements-i-100215
[22] With the law no.: 4990 dated as 16.10.2003, which was published in the Official Gazette no.: 25266, dated as 21.10.2003.

> the **negative impacts of global warming** on the climate. UNFCOCC adopts the principle of 'mutual yet differentiated responsibilities and relative skills'. Therefore, it sets equal and qualitative targets for each party involved, taking the development levels, historical responsibilities, development priorities and special conditions of the parties into consideration for achieving such objectives."

Thirdly, although being signed in 1997, Kyoto Protocol is validated in 2005. With this contract, "the parties listed in UNFCOCC have been given digitized emission reduction targets. **Turkey became a party to Kyoto Protocol in 26th August, 2009** by presenting the participation instrument to the United Nations."[23] However, due to Turkey's position in UNFCOCC, **"Turkey does not bear a liability of digitized emission reduction undertaken within the scope of the Protocol"[24].**

As the latest intervention, **Paris Convention** is held in **2015**. It is

> "basically grounded on the United Nations Framework Convention on Climate Change, and it aims at regulating the regime of fighting against climate change after 2020, which is the expiry date of Kyoto Protocol. **Turkey undersigned** and became a party to Paris Convention, displaying a sincere determination in terms of **fighting against climate change**"[25].

In 2021, although the agreement dates back to 2015, Turkey republic has published the presidential decree[26] for the approval[27] of International Paris agreement. As many countries do, Turkey has come to an understanding for this agreement's terms about **reducing carbon footprint and decreasing global temperature rise.**

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[23] after the acceptance of the law no.: 5386 by Turkish Grand National Assembly in 5th February, 2009, and the Cabinet decree no.: 2009/14979 dated as 13th May, 2009.
[24] "General Directorate of European Union and Foreign Relations." https://ab.csb.gov.tr/en/agreements-i-100215
[25] "General Directorate of European Union and Foreign Relations." https://ab.csb.gov.tr/en/agreements-i-100215
[26] Presidential decree; in the line of hierarchy stands under the constitution, laws, legislations and regulations; upper than directives and rules. In the case of an international agreement, it constitutes the dual structure of approval method.
[27] Any international agreement are approved by the President of Republic of Turkey undergo several bureaucratic procedures. Firstly, after its approval, it re-arranged in order to be presented to Grand National Assembly of Turkey (GNAT). The Assembly gathers to analyze the international agreement; if they ratify, it goes back to the presidency to be published in the Official Newspaper (Resmi Gazete) as presidential decree. Therefore, it becomes permanent.

2.1.1.1 Paris Agreement and its Scope

Paris agreement aims to cope with the existing climate crisis by providing common grounds for 197 countries in order them to cooperate. The international agreement aims to limit the global temperature increase up to **2 degrees Celsius or 1.5 degrees** Celsius if possible. Because, even 0.5 degree Celsius temperature change results in tremendous negative consequences on agriculture, drought, etc. The countries that sign the agreement are required to decrease **their greenhouse emissions** in a defined time interval. They decide the time interval and amount of emission decrease commitment by themselves with five year national contribution statements. Then, in every five year they are expected to improve their contribution as they excel at their goals.

There are 4 classification in the agreement. *Absolute reduction* by reference to the emission level in a given year (ex: 2000), reducing emissions in the target year below this level. The countries defining a *ceiling emission year*, determine a year in which national emissions are at the highest level (ceiling) and after that level, they are going to reduce emissions from that year and on. *Mitigation from the baseline scenario* stands for countries accepting the amount of greenhouse gases they will emit with their current policies of the year as a reference scenario, then lowering it below the scenario level. *One Emissions intensity target* is what countries produce per unit of economic output that emissions will not exceed a certain level or that this intensity will be reduced. As many countries do, Turkey has come to an understanding for this agreement's terms about reducing carbon footprint and decreasing the temperature rise. In 2021, although the agreement dates back to 2015, **Turkey republic has published the presidential decree for the approval of International Paris agreement[28].**

[28] https://ab.csb.gov.tr/anlasmalar-i-98915 , http://unsdsn.boun.edu.tr/sdr2021/ , http://unsdsn.boun.edu.tr/2022-surdurulebilir-kalkinma-raporu/ , https://www.sdgindex.org

As a fast-developing country, Turkey is a state with high potential on the emission reduction, yet experiencing problems in terms of financial, technological mechanisms and capacity building aspects. Turkey is classified under the *mitigation from the baseline scenario.* When Turkey sign the agreement, there was not any numeric commitment for emission levels but promised for precautions to be taken in order to decrease the emission increase up to 21 percent. This commitment to decrease in the increase in carbon emissions until **2030**, stands for the base line scenario for Turkey.

Unfortunately, the agreement is not widely and accurately known in terms of economic aspects. Turkey is dependent on the outer resources for energy production, natural gas and soil. However, if there is more investment in renewable energy resources in Turkey, not only our carbon emission decrease, but the outer dependence and its economic weight will also be reduced.

Paris agreement is an important step to define global roles and define everybody's mission in order to take action for climate crises. However, the goals of the agreement should be taken more seriously by countries and significant changes on existing systems should be executed. The first step to achieve this is the party countries to make **more ambitious commitments** and foresee beyond those goals. The European Union is targeting a 55 percent decrease in greenhouse gas emissions until 2030, and to become carbon neutral until the year 2050[29].

[29] Nevertheless, as it is explained in the extremes chapter and mentioned in UN Sustainable development goals. This aim is far from being real due to the negative consequences of pandemic and especially because of the war.

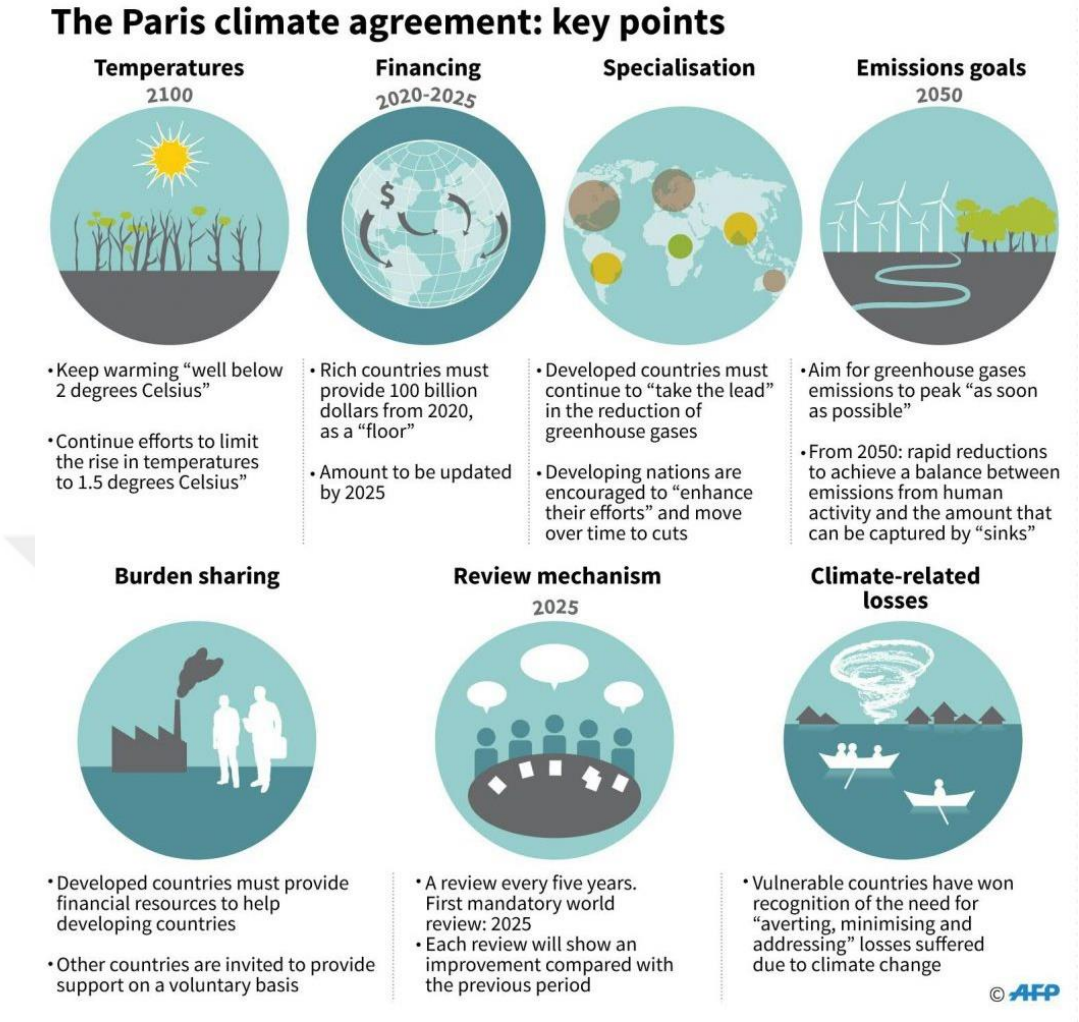


Figure 2-1: Key concepts of Paris Agreement. Source: Infographic by Jonathan Storey/AFP

In terms of building sector, as it is responsible for %36 of energy consumption, %38 of the CO2 emission and %50 of resource consumption, in order to reduce the footprint **to achieve the goals of Paris Agreement, which is to limit the temperature rise to 1.5 degrees Celsius, there is a need to build and conduct projects with better strategies**[30]. How any building is designed from scratch or renewed has a vast impact on the consumption and emissions. Therefore, there must

[30] This part is paraphrased from the initiatives of World Green Council' Advancing Net Zero presentation, which can be checked from www.worldgbc.org . the road map https://viewer.ipaper.io/worldgbc/eu-roadmap/?page=20

be a critical thinking process for conscious design involving environmental, economic and social perspectives. As the short term goal, worldwide initiatives offer the new building stock to be net carbon zero and with the adaptation of existing building stock to have %40 carbon reduction in their life cycles[31]. **Nevertheless, regarding projects only from energy and carbon footprint perspective is no longer sufficient** and there is a need for collaborative solutions including intangible variables such as health and wellbeing of people as well as ecosystems at once.

2.1.1.2 Scale Matters: The Change in Methodologies of Organizations, Governments and Individuals to UN Sustainable Development Goals

European countries set their initiative as the Paris agreement by taking sustainability paradigm into account and defined a set of goals. However, as a result, they come to understand that the foreseen precautions and initiatives are inadequate for meeting the needs of Paris agreement until 2030. In order to raise an awareness about these shortcomings of sustainability, they declared that there should be a rapid severe change in the systems, in which sustainable development is considered as just the start point as initial precautions; and the long term goals have yet to be defined.

For future developments, although there is a wide spread understanding of sustainability in terms of ecological point of view, there are greater aspects that are **co-effected by the climate change within social and economic dimensions**. These require a more comprehensive approach that offers *systems thinking*[32]. With the acceleration of Paris Agreement, transition from less bad towards net zero impact become clearer. Furthermore, this shift in thinking carried a developmental perspective into the picture in order to meet the need to be comprehensive. Therefore, the links between ecology, economy and social dimensions become prominent for a mass improvement. The most important overall developmental approach within sustainable paradigm is the UN 2015 Sustainable Development Goals, which United

[31] These concepts will be explained in terms of system's terminology in regenerative design chapter.
[32] Living systems thinking is going to be elaborated in the following chapters.

Nations published for net-zero development in 2015, which are no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production climate action, life below water, life on land, places, justice and strong institutions and partnership for the goals[33].



Figure 2-2: UN SDGs all shown together to demonstrate their comprehensiveness.

Source: https://www.un.org/development/desa/disabilities/envision2030.html

These goals state the core aim of broad interdisciplinary problems of the anthropocentric world[34], in which built environment can be regarded as the conduit[35]. "Since, architecture relates with the environment, it is therefore important that the protection of such environment should be paramount in the conceptual developments of the architect"[36]. Therefore, architecture is used as the actualizing medium of these goals as well as creating grounds for their incorporation; and the architect to identify

[33] Charts - https://www.un.org/development/desa/disabilities/envision2030.html
[34] Anthropocentric environment meaning human centered systems.
[35] Towards a sustainable development - New Zealand Report, 2009.
[36] Sustainable Development through Architecture: A Reflection by Oladeinde Boluwatife, 2013.

and characterize the development type as a translating agent. “UN Sustainable Development Goals offer a more comprehensive framework to respond to the needs while also envisioning collaboration among professionals, academicians and relevant stakeholders”[37]. Although, “attention is shifting away from mere consideration of singular property of a building material to its sustainable value with the focus of recyclable, environmentally-friendly materials with low embodied energy and zero carbon”[38], the goals have very limitedly been correlated with a more extensive context that includes principles and benefits for social and economic aspects as well as ecological considerations yet. When all these strategies and goals are used incorporation with built environment with respect to its architectural qualities, nourishing outcomes serving to the goals occur continuously as long as the element exists or alters.

As it is stated above the main goal of these 17 initiative is to raise awareness for a wider understanding of sustainability, which enables further developments towards a more holistic view in which **regenerative thinking** is able to offer. In order to achieve this, HBI that provides health and wellbeing improvement is for occupants/ users should become prominent in developments as well as ecological and economic gains. In spite of the progress, which have been made through the implementation of UN Sustainable goals[39], due to **extreme** conditions, a huge malfunction occurred in the operation of these goals. In 2020, there has been a global pandemic, which altered the way of life; and recently in 2022, as another extreme situation concerning the world and related to Paris Agreement, Donbas Crisis, which is Russia’s invasion of Ukraine’s Donbas region occured. These extreme situations affected several of these goals in terms of social, ecological and economic aspects, which are closely related to HBI in terms of health and wellbeing of people and the environment.

[37] Sustainable Development through Architecture: A Reflection by Oladeinde Boluwatife, 2013.
[38] Sustainable Development through Architecture: A Reflection by Oladeinde Boluwatife, 2013.
[39] The information about the goals can be found in https://sdgs.un.org/goals

To explain, Goal 1, *end poverty in all its forms everywhere,* is seriously effected as unemployment arose during pandemic. Poverty conditions got serious as Covid-19 spread and disaster related deaths increased. Moreover, with Donbas Crisis, there is an increase in the number of refugees which should not be neglected. "As poverty increases so do the inequalities in the distribution of wealth and natural resources. This extraordinary context means it is no longer good enough to talk about sustaining a broken system, instead a focus on regenerating the social, economic and ecosystems upon which we depend is now critical"[40].

Goal 2, *End hunger, achieve food security and improved nutrition and promote sustainable agriculture,* have had a setback as agriculture is interrupted during the pandemic and war. As a result, food prices increased and inequalities among society due to the food shortage or expensive prices is spread; and 1 in 3 people does not have adequate food supply according to latest numbers[41].

Goal 3, *Ensure healthy lives and promote well-being for all at all ages*, is perhaps the most severely affected one due to Covid 19 virus breakdown and war. As over 500 million people are infected, which led to over 15 million deaths, also effecting essential health care systems around the world as the hospitals could not only meet the needs of infected people in terms of their facilities but also coping with the virus was a real problem. As another aspect, some of the basic precautions for Covid 19 such as quarantines, had serious influence on people's wellbeing. Because, anxiety and depression arose due to illness as it interrupted social connections. Also, for the frontline healthcare workers, there was a severe risk of getting infected or being the transmitter for their families, which again increased the levels of stress and had psychological damages. Moreover, with the war in addition to pandemic, there is a huge increase in the number of refugees who are at risk with limited access to any kind of healthcare system or decent living environment.

[40] https://www.sustaineurope.com/the-regenerative-revolution-20210101.html
[41] All information and numeric data is referenced to UN Sustainable Goal 2021 report.

For Goal 4, *Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*, as the pandemic interrupted in-person education, inequalities in reaching adequate education with needed technological tools for online education and everybody was not able to supply the equipment.

Goal 5, *Achieve gender equality and empower all women and girls*, still needs progress, however, it is one of goals that did not directly affected by the pandemic and had positive outcomes. Equity is one of the notions that is associated with wellbeing. The equity is taken into consideration with respect to culture and existing social structures. Therefore, there is a long way towards an ideal gender equal society in Turkey. Nevertheless, there is an increase of women employees or women business owners since the last decade[42].

Goal 6, *Ensure availability and sustainable management of water and sanitation for all,* as the World's water related ecosystems has been degenerated at an alarming rate until now and over %85 of planet's wetlands have been lost, meeting the needs of drinking water, sanitation and hygiene target by 2030 need to speed up. Unfortunately, this goals proceedings not only affected by the pandemic and war, but also the problems of sanitation and inadequate hygiene made pandemic's influence event more severe than it already is, especially in poor neighborhoods and on refugees. In the areas that have insufficient infrastructure or resources to reach clean water, the infection rate of Covid 19 pandemic increased so fast that it resulted in piling up within the insufficient healthcare systems.

In terms of Goal 7, *Ensure access to affordable, reliable, sustainable and modern energy for all,* has slowed down due to pandemic as a decrease in increase. Nevertheless, the effects of war is more severe in terms of this goal. For EU and Turkey, Russia is one of the main providers of natural gas which the countries generate their energy from. However, during the crisis the EU governments declared that they are not going to limit their purchase of natural gas from Russia unless a

[42] UN Sustainable development report, 2021.

reconsideration of the invasion takes place. Thus, a serious crisis of energy resource among European countries emerged upon 2022 fall and winter. This directed EU countries to reconsider coil as their primary source of energy, which have much higher emission levels then natural gas when being processed. This **extreme** condition is expected to put severe setbacks to the EU countries' Paris Agreement commitments until 2030. Moreover, due to the war conditions, Russia declared that there is going to be fewer exportation of energy resources. Thus, Turkey's dependency in this specific case, puts us in jeopardy.

These kinds of situations of **extremes** are the reasons for the necessity of flexible adaptive systems with resilient features. In the further chapters of this thesis, the literature review of current sustainable paradigm with its related sub-elements are going to be given. As these extremes occur, it becomes more prominent that the current paradigms and measure are not enough and doing less harm is not an option any more with countries dependent features. Because, when a stop in demand and supply chain compromised, the goals of the bigger picture is damaged as in the example of natural gas supply. **Dependency is not the only problem of in the way of countries to decrease carbon emission levels, nevertheless, it makes their long term sustainable goals as the first option that they are willing to sacrifice.**

Goal 8, *Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*, this goals progress has been damaged by the pandemic as well because of rising inflation, supply chain disruptions, policy uncertainties, labor market challenges and new waves of Covid 19 virus.

With Goal 9, *Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*, as the existing structure of industrial development was not resilient, there are serious setbacks as in 1 in 3 manufacturers are negatively impacted by the extremes. Nevertheless, as the industry cope with pandemic, they were forced to evolve to a more resilient state. This can be perceived as the half full part of the glass, which is valid for the high-tech industries which were able to cope with. Nevertheless, low-tech industries and small business owners

affected by economic problems and mostly, could not keep up with the changes and they diminished.

Goal 10, *Reduce inequality within and among countries*, pandemic and the war arose the problems in terms of economic inequalities among communities as well as increasing the severity of spreading disease among refugees, who were defenseless and unable to reach any sanitation.

Goal 11, *Make cities and human settlements inclusive, safe, resilient and sustainable,*[43] actually stopped its proceedings as pandemic occurred. Nevertheless, the hazards posed by the existing built environment towards human health and wellbeing such as polluted air, slum areas, and solid waste keeps getting worse by day[44]. These hazards also impact the **livability** of existing settlements, which" is another notion concerning wellbeing.

Goal 12, *Ensure sustainable consumption and production patterns,* is an important goal for defining the root cause of unsustainable patterns, as it emphasizes the waste methods and conscious consumption strategies. Redefining these, can create flourishing solutions, as there is a need to lower people's reliance to nature. This awareness varies through the life cycle of any material, system or circulated energy from where they came and going in terms of their circular motion. In other words, source to sink, circular or ecosystem level life cycles must be considered, while determining the course of any project.

Goal 13, *Take urgent action to combat climate change and its impacts*, there are many initiatives coherent with this goal such as global agreements which are explained earlier in this study. Especially, Paris Agreement is a huge step towards

[43] From this thesis' point of view, this is the important goal which will provide the incorporation with the rest; and as the summation of the existing recent studies and strategies towards a resilient and regenerative future is at the core of this thesis, regenerative implementation should be more included with the goals agenda. Moreover, from the perspective of human built environment interaction, health and wellbeing of people is going to be explained more incorporated with this goal.

[44] The shift towards Regenerative Paradigm is one of the main supportive ideologies that supports this goal. As the concept is explained through the following chapter, the connections of topics are going to be supported.

making progress in this path. However, the outcomes are not sufficient and as this research reflects, there is a need to proceed to positive impact systems in our combat with climate change[45]. The severity of climate change is underemphasized among other extremes and the initiatives are being neglected. Nevertheless, there is a need for an urgent action inserted to the daily agendas.

Goal 14, *Conserve and sustainably use the oceans, seas and marine resources for sustainable development*, is significant in terms of increased waste, ocean warming, eutrophication and acidification is threatening marine life and limiting the oceans capacity to moderate climate change, is an important setback as oceans absorb one quarter of annual carbon dioxide emissions.

Goal 15, *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss,* is one of the most important goal in terms of biodiversity recovery and restoration. Because, the population growth and misusage of the land is leading deforestation for agricultural expansion and this leads degeneration of indigenous ecosystems all over the world. Nevertheless, this goal is also effected by Pandemic as the funds for biodiversity reconstruction is spent on Covid 19 recovery initiatives.

Goal 16, *Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective*, is directly related with health and wellbeing of the society as encouraging sustainable social relations are at the base of them by accountable and inclusive institutions at all levels. This goal is directly related with the notion of **livability** as well, in terms of supporting societies to a certain level that they can be at a **livable** in terms of the quality of life. Although, there are positive outcomes such as a decrease in the global homicide rates, this goal

[45] Due to the problems about the slow process of Paris Agreement in the previous chapters, this goal is going to be mentioned in the following chapters about its correlation with regeneration, as regenerative development through regenerative systems and thinking is going to be explained in the further chapters of this thesis.

is vastly influenced by the pandemic due to the hindrance of social relations, which are explained in detail in the following chapters, and the increase in refuge number.

For Goal 17, *strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development*, recovery after pandemic is a real problem. Because, the economic burdens on developing countries leading an increase in inflation, therefore the sustainable goals become the secondary agenda. Nevertheless, as the online connections and digital partnerships enhanced a great deal during the pandemic, they pose many opportunities for interactive digital collaborations.

All of the goals are interrelated with HBI[46] up to some dimension. For instance, "Goal 11 connected directly with smart cities and communities and Goal 3 good health and wellbeing, as well as Goal 6 clean water and sanitation as the form and shape of the built environment determine the living conditions of urban dwellers"[47]. Moreover, Goal 3, 9, 11, 12, 13 and 16 should be emphasized in terms of this thesis's purpose because of their aspect of enhancing health and wellbeing of society. As, the pandemic have had effects on all the goals whether directly or indirectly, it is clear that in the time of a crises, extremes accelerate the process; and most situations seems to get worse at the first glimpse. However, unexpected solutions are promoted as well. In this sense, with the consideration of all development goals' existing situation, there is a need for a positive outcome industry and a transformation of the existing built environment into a supportive state, which can support the positive effects[48]. Therefore, the interaction between architecture and pandemic should be explored with respect to their relationships with development goals.

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[46] Human built environment interaction is going to be related with the following chapters of this thesis.

[47] Reith, A., Brajković, J. Scale Jumping: Regenerative Systems Thinking within the Built Environment. A guidebook for regenerative implementation: Interactions, tools, platforms, metrics, practice. COST Action CA16114 RESTORE. (2021).

[48] The shift towards positive outcomes rather than doing less bad, which come to fore within the process of these development in order to achieve a sort of acceleration, is emphasized by regenerative practitioners in the last decades. As it is explained in the Paris agreement chapter, the paradigm shift towards regenerative development is crucial to achieve desired improvement as soon as possible.

2.1.2 Extreme: Pandemic's Relationship with Architecture

As the world was taking global action and determined strategies and defined goals, in March 2020, there is a contagious virus break down classified as *global pandemic*. As mentioned in UN Sustainable Development goals, it has changed the way people perceive the world as it altered the way they live. Architecture is one of the main component of life style, thus, the extreme conditions directly reflect on the HBI. Thorough childhood to adulthood, **patterns shape people's lives.** Since, the pandemic limited the variables of time, place, connectedness, communication and more, it has changed the dynamic relations in one's life into static. In other words, pandemic's sudden and urgent circumstances such as social distance, which changed the working conditions by limiting the locations, socializing paused and turned into a static state, and they created spatial problems which requires an architectural perspective.

The relationship between pandemic and architecture has multiple dimensions. Firstly, the pandemic requires people to be detached at any scale from small family to cities. This is provided with social distancing and lockdowns in bigger scale. Therefore, individuals end up locked in their houses with their families into a limited space. As a result, many people living in cities did not have neither enough space nor connection to outside or nature while in lockdown. This situation had serious impacts on overall health and wellbeing of people. At this point, the notion of a healthy house[49] comes to the forefront[50] in order to provide healthy indoor environments, building qualities, connection to nature, increased air quality, etc., as they are some of the essential qualities of built environments for a healthy HBI. Nevertheless, as these qualities cannot be offered to the majority, serious malfunctions in the systems occurred in terms of wellbeing.

[49] The explanation of a healthy house can be referred in many academic sources. However, for the sake if this study, it will be explained in the further chapter of 2.2.3.1 Health, Well-being and Life Quality.

[50] Although the pandemic ends at any time, it has altered the way how numerous mechanism operate.

Secondly, in social dimension, socialization is limited to some extent with the precautions of the pandemic. Due to this restriction, numerous areas have effected from the new circumstances. To exemplify, the work places were not only for business but they also provide social encounters. However, as one of the pandemic measures, the crowded work environments are suspended in lockdowns and people forced to stay at their homes. Because of this alteration, many new necessities emerged in social relations as the interruption in interaction leading detachedness and this have had effects on well-being of people. Moreover, due to this situation, new ways of socialization occurred that embrace digital mediums. These indirect encounters are supplied by Zoom conferences, skype, and social media such as Instagram, mails or even interactive games lead to the virtual environment to enhance and up to some level replace the built environment. Although, this adjustment has positive aspects, there are negative outcomes from it such as technological waste and psychological problems occurring with the absence of face to face interactions.

There are numerous unexpected outcomes with various spontaneous solutions of extremes and most of them have effect on HBI. As it has been mentioned in the previous parts, the main principle of sustainability as doing less harm is not enough. A transition towards net zero or positive impact should be the goal of further studies, projects, etc. and built environment is the agent for this shift.

> "It was Winston Churchill who famously said we shape our buildings and our buildings shape us. However, this was a zeitgeist statement of its time, and it no longer holds true. It is nature and ecosystems that will shape us and our built environment, our wellbeing and happiness, our cultures and spirituality, productivity and thrivability as we work, play and live in our structures"[51] (Scale Jumping, Restore Group, 2021)

This perspective should not be ignored in order the current developments to be successful. Because, the already existing infrastructure, once again, is unable to meet

[51] As it is exemplified with Winston Churchill's quote in Scale Jumping book of Restore group, there is an important change in perspective is needed towards seeing nature as the coworker and co-designer to any system or development for the ecosystem state.

the needs of the current society, and HBI is compromised. According to many researchers, a paradigm change is crucial towards positive outcome industries which regenerative design and development offer[52].

2.1.2.1 Extremes Towards Paradigm Shift: Adaptation of Daily life and Adaptation of Urban Structure

There has been several paradigm shifts throughout the history in architecture. Many of them are a rise up to the already existing systems and directly connected to defects of previous applications. However, many of these great changes also related with the circumstances of the era. In other words, the environment changes and daily life evolves around it. There has been many articles on Covid 19 pandemic and how it affected the social structure of urban life throughout the world. From this thesis's point of view, the article named "An Effort to hold on to life"[53], Pandemic and Unforeseeable Architecture is going to be referred as it points out the similarities in their *extremes* between the beginning of modernist paradigm and our current circumstances.

In the 1918, there has been a paradigm shift, the modernist paradigm took over. The world was out of the World War One and there was a new war ahead. Modernism is not only supported by the invention of new materials, the newly emerging, structural systems, etc., but also due to the need of new structural infrastructure instead of the diminished by the long lasting World War 1, World War 2, there were *extreme* conditions requiring an altered world view. As many urban settlements were destroyed and people were torn down by theirs effects, there were

[52] Especially, Bill Reed and Pamela Mang's early works on Regenerative design and development is concerned about this subject.

[53] This is one of the many articles I have encountered, however, it has inspired me for the connection of all the subjects that has been and will be mentioned in this thesis. It enabled me to make sense of the changes and connections of both eras. Moreover, it offered a future understanding of how many variable can effects the way of architecture and the relationship of sustainable paradigm. Therefore, in the future chapters, a paradigm change in regeneration will be explained and will be supported with ideas of many researchers, designers and practitioners.

inadequate social and spatial structures creating unhealthy environments which required urgent attention. Thus, there was a need of speed construction as well as healthy environments.

In addition, as a less-known feature, there was one other variable that shaped modernism into its many characteristics: The Spanish Flue[54]. The societies were recently out of war and there were inadequate living units with unhealthy conditions, which resulted in crowds living in very small places at the same time interval. As the disease were spreading rapidly, the thought of fast construction and modular units is triggered, and the characteristic needs of these units defined as livable areas for minimal, simplistic and clean environments. Thus, the circumstances of modernist era is very relatable to today's conditions from various perspectives. In addition, the world is facing several global threats in addition to environmental challenges. Even though, this acknowledged fact of environmental challenges are being researched and studied with respect to various fields such as engineering, architecture or medicine, when the pandemic taken into consideration, threats have become more severe and precautions become insufficient. Because, it have brought out the fact that, our living systems and structures turned into overpopulated areas with unconscious decision mechanism[55] and this is unacceptable in order to sustain any level of livable environment in the future in terms of health and wellbeing of our world and us. As it is stated by Zari M. Peterson in her conference paper *Factor X – Wellbeing as a key component of regeneration of green buildings,* "human well-being and planetary well-being are intricately interwoven"[56].

[54] In the article, "An Effort to hold on to life", Pandemic and Unforeseeable Architecture, Lerzan Aras tells an inquiry about how was the circumstances and needs of post war modernist era and its relation with Spanish flue as it becomes the main accelerator and necessity for architectural redesigns.
[55] The adequate rules or regulations applied in terms of existence of any healthy environment.
[56] John B. Storey and Zari M. Petersan, Factor X – Wellbeing as a key component of regeneration of green buildings. *Proc.* Of the Rethinking Sustainable Construction '06 Conference, Sarasota, Florida, USA, 2006.

2.2 Literature Review of Urban Dependencies: Through a Socio-ecological Perspective

> "The global climate emergency has put the responsibility of the architect in clearer terms than ever before. Continuing to practice "business as usual" will literally threaten the continuation of our civilization and cause all too predictable human and environmental costs. We must change practice".
>
> Peter Duckworth-Pilkington[57]

This is where the regenerative development come to fore. However, it is crucial to understand the previous paradigmatic developments in order it to be built upon. As the change in the world view cannot be done in a glimpse, transformation of the existing systems by dwelling on existing phenomena seems to be the most logical way towards the shift. The developments so far concerning sustainable paradigm in both theory and practice, are insufficient to collectively adress the issues in terms of environmental, economic and socio cultural variables. As a result, most settlements are still mainly dependent on the outer resources and main concerns that are subject to UN Sustainable Development Goals, are affecting the life quality and life span of both cities and their inhabitants. There have been many initiatives in order to enhance the existing built environment in terms of their resiliency over their dependency for the health and wellbeing of both our world and people. In order to understand the shift towards regeneration, the existing structure of knowledge and development style must be understood. Since, regenerative design and development is correlated with many of the existing detailed design methodologies and their paradigms such as ecosophy, living systems thinking, resiliency, cradle by cradle, etc. and in order to build upon the knowledge so as to ingrate our current systems to regeneration, the

[57] The sustainable design coordinator at HDR, which is an employee-owned design firm specializing in engineering, architecture, environmental and construction services.

use of existing paradigms and methodologies for the process of transformation is logical.

2.2.1 Socio-ecological Context: Ordering Systems within Existing Built Environment Discourse

To begin with, the environmental variable of ordering systems is sustainability paradigm's the mile stone, which have raised long lasting environmental consciousness in the sixty years. It has developed incorporation with diverse paradigms so as to discover solutions for the problems mentioned the previous chapters mainly concerning the degeneration of our ecosystems. From an architectural perspective, building sector has huge influence on the environment from various perspectives such as ecological effects, economic inputs, economic outputs and socio-cultural effects, which are interwoven with any systems' operations. Ecological sustainability and technological sustainability is defined as primary keys[58] in the developments so far. Nevertheless, socio cultural aspects concerning HBI are accepted as secondary in the bussiness as usual practices. Therefore, there is a need for a shift towards positive outcome systems, which Regenerative development is offering.

[58] de Jong, Martin, Simon Joss, Daan Schraven, Changjie Zhan, and Margot Weijnen. "Sustainable–Smart–Resilient–Low Carbon–ECO–Knowledge Cities; Making Sense of a Multitude of Concepts Promoting Sustainable Urbanization." Journal of Cleaner Production 109 (2015).

Table 2-1: The timeline of concepts within sustainable paradigm where they overlap and transform into regenerative paradigm are demonstrated chronologically, drawn by the author.[59]



Under the ordering systems chapter, the term ecosystem by Arthur Transley, Ecosophy or Deep ecology by Arne Næss, Living systems thinking and Biophilia by Edward O. Wilson are going to be explained discursively in terms of understanding the early roots of regenerative development.

As initiation point, the term ecology should be understood as the first guide. "In 1935, Arthur Tansley proposed a new concept, **the ecosystem**, which provided a unified framework within which both plant and animal communities are being regarded together in terms of their interactions with inorganic nature, and their interrelations with human communities"[60]. Moreover, he defined **ecosystem** as the "integration of the biotic community and its physical environment as a fundamental unit of ecology, within a hierarchy of physical systems that span the range from atom

[59] The relations of wellbeing dimensions with concepts are to be explained in the following chapters. Nevertheless, it should be mentioned here that all concepts have indicators and supports of all three levels of wellbeing dimensions; physical, intellectual and emotional wellbeing.
[60] A. Holland, in Encyclopedia of Applied Ethics (Second Edition), 1998.

to universe"[61]. Therefore, the concept of ecosystem come to the fore. With further researches, ecosystems are defined to include the social structure of human interrelations and built environment such as buildings and infrastructure. The more ecological problems occur, the more concepts that are aiming to understand nature and co evolve come to the fore.

2.2.1.1 Ecology/ ecosophy

Ecosophy or Deep Ecology is a term firstly used by Norwegian philosopher Arne Næss in 1973[62]. As he continued to his research, Næss "published a number of articles on the matter in influential journals in 1984, 1986, 1988 and in 1989 he published an ecological palimpsest *Ecology, Community, and Lifestyle*. He explains "ecosophy as a paradigm for ecological reasoning anchored in a genuine philosophical framework directed toward practical action, both through political engagement and everyday action (the two combined constituting a lifestyle)"[63]. In order to achieve the greater influence over our surroundings, Næss advocates for a lesser impact on the environment, so there will be a greater sustainability of human communities among nature.

Later between 1985 and 1992, French semiotician and psychiatrist Félix Guattari also develops upon the concept of ecosophy. From his point of view, ecosophy stand for an empowering framework in opposition to the capitalist lifestyle, an integrated paradigm taking into account the three ecologies – environmental, social and mental ecologies.[64]

> "The word 'ecosophy' combines the Greek 'oikos' and 'sophia': 'household' and 'wisdom'. As with 'ecology', the meaning of 'eco-' (oikos) refers to something

[61] Timothy D. Schowalter, in Insect Ecology (Fifth Edition), 2022
[62] In his pioneering paper The Shallow and the Deep, Long-Range Ecology Movement: A Summary was published in Oslo (reprint: Næss 2008).
[63] Levesque, Simon. "Two Versions of Ecosophy: Arne Næss, Félix Guattari, and Their Connection with Semiotics." Sign Systems Studies 44, no. 4 (2016).
[64] Bateson 2000 quoted in Simon Levesque. "Two Versions of Ecosophy: Arne Næss, Félix Guattari, and Their Connection with Semiotics."

> larger than a mere household understood in a domestic sense. From the ecosophical perspective, our oikos is the Earth taken as a whole, as we inhabit it. Thus, an ecosophy is a philosophical worldview or a system inspired by our living conditions in the ecosphere. Both Næss and Guattari suggest that an ecosophy is more than a mere abstract system of thought. Indeed, it calls for **a radical change in views and beliefs, challenging long established anthropocentric models ruling over the nature/culture dichotomy,** the notion of dominance and property over other species, and ultimate premises of life"[65].

The ideas of antropo-centric formations have been dominant in architecture and design since after the scientific discoveries demonstrate that nature is not something that people should be afraid of. Nevertheless, as more and more artificial environments induced to nature, the basic systems that are vital for people's health and wellbeing are undermined. **Therefore, there is a need for the change for perceiving ecologies as abstract systems that are around into one that people need to understand and dwell collaboratively.** With this philosophy, health and wellbeing of both ecology and humans is emphasized; and it became one of the guides towards regeneration.

2.2.1.2 Whole Systems Approach / Living Systems

With the works of biologist and systems theoretician Ludwig von Bertalanffy, *General System Theory: Foundations, Development, Applications*, it is emphasized that the overall reductionist structure of development is not sufficient to provide for adequate systems due to its linear flows. However, a more complex thinking of ecosystems are required to be able to depict the problems and offer solutions. Therefore, *Living Systems Thinking*[66] is built upon by Charles Krone[67],

> "as a developmental technology for consciously improving systems thinking capacity, whose purpose was to create an understanding of businesses, communities

[65] Levesque, Simon. "Two Versions of Ecosophy: Arne Næss, Félix Guattari, and Their Connection with Semiotics." Sign Systems Studies 44, no. 4 (2016).
[66] In 1935,Arthur Tansley, "The Use and Abuse of Vegetational Concepts and Terms." In Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[67] who is a Systems theorist and architect of organizational processes and structures, in the 1960s-70s

and nature as living systems, and to build the consciousness required to create reciprocally beneficial relationships through better integration of industrial, community and natural processes"[68].

He defines 4 orders[69] of living systems that are significant in terms of figuring potential and existence, which are regenerate, improve, maintain and operate. Later with the development of Systems thinking, an understanding with its famous metaphor of *iceberg of systems thinking* enables "complexity of the observed behavior of a system is to analyze the patterns of its configuration"[70].

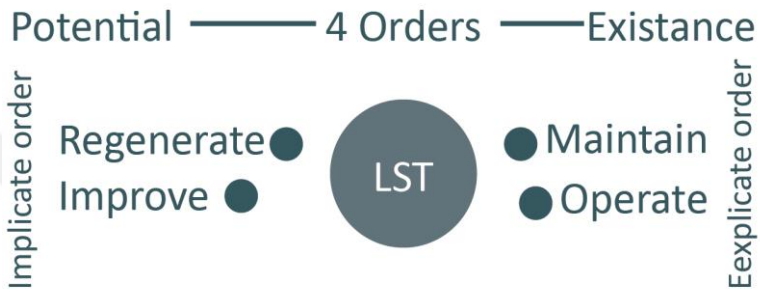


Figure 2-3: Four orders of LST interpreted by Mang and Reed in *Regenerative Development Regenerative Development and Design,* 2012 redrawn by the author.

[68] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[69] That are going to be correlated to regenerative development. By Mang and Reed in their articles in terms of the basic framework.
[70] Restore Group, Scale jumping, pg. 25, 2021.

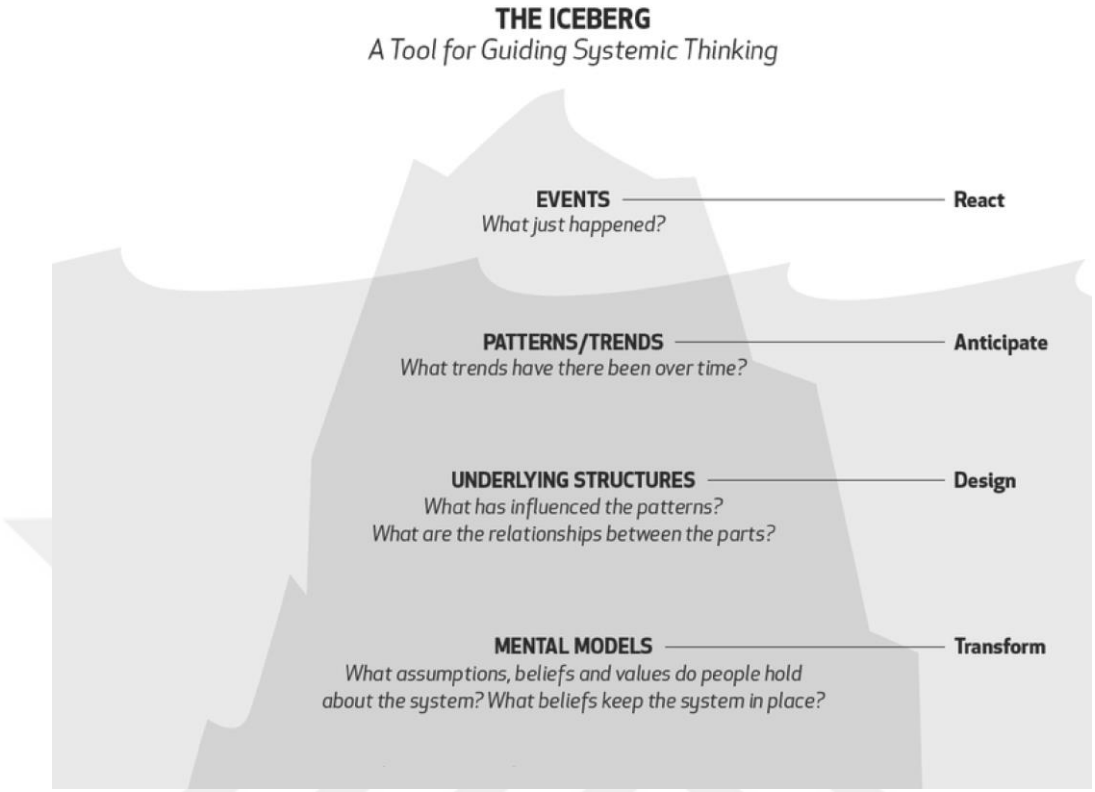


Figure 2-4: Iceberg model of systems thinking explaining the reasoning of evolution of systems.

Source: https://ecochallenge.org/iceberg-model/

Later, *Permaculture*, as in permanent agriculture and permanent culture, is first mentioned by Bill Mollison[71] and David Holmgren. *Permaculture* stands for "an ecological design system to promote design of human habitats and food production systems based on the relationships and processes found in natural ecological communities"[72]. They are an "integration of human and natural environments, but they also developed design technologies and practices for increasingly self-sufficient human communities with food production systems by creating **man-made ecosystems**. Permaculture firstly demonstrated how to provide for a host of human

[71] Published *Permaculture: a designers' manual* in 1988.
[72] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.

needs while reducing dependence on environmentally destructive industrial practices"[73]. Permaculture settlements are regarded as the first regenerative systems that offered a set of restorative effects in built environment with ecological benefits. Bill Mollison, in his book, *Permaculture: a designers' manual,* set a framework to evaluate projects' potential in terms of regenerative, generative and degenerative. Lastly, the principles of permaculture is helpful in terms of determining land use and infrastructure strategies in terms of structuring both nature and human patterns by interpreting the pattern of the site and its place[74].

Literally meaning of *Biophilia* is 'love of nature'. "Biophilic design is the theory, the science and the practice of bringing buildings 'alive', recognizing and improving bonds with nature. It is a response to the human desire to re-establish our contact with nature within built environments"[75]. This principle is particularly important for this thesis because, the biophilic principles promotes the health and wellbeing within HBI.

> "Biophilic design promotes specific principles and patterns of nature-based parameters for the built environment that support health and wellbeing, by either mitigating common stressors or by enhancing certain qualities such creativity, memory, focus, relaxation etc. Biophilic design, pro-actively support health rather than only interfering to treat illnesses by using the connection with nature."[76]

Moreover, this ability of biophilia to connect with nature, enables the usage of this concept within existing built environment as well as Living Systems Thinking. As it is going to be explained in the following chapters the principles of biophilia and Living Systems Thinking creates a foundation to regenerative practices. By adding upon the existing biophilic discourse, regenerative development aims to improve health and wellbeing qualities.

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[73] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[74] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[75] Restore 1. Book of definitions.
[76] Kellert, et al., (2008). 14 *Patterns of Biophilic Design*. New York: Terrapin Bright Green, LLC cited in scale jumping

> "Good biophilic design draws from influential perspectives – health conditions, socio-cultural norms and expectations, past experiences, frequency and duration of the user experience, the many speeds at which it may be encountered, and user perception and processing of the experience – to create spaces that are inspirational, restorative, and healthy, as well as integrative with the functionality of the place and the (urban) ecosystem to which it is applied."[77]

Besides, the urban green and blue space is degenerating by the current development strategies, therefore, future building environment is going to be responsible for providing such ecosystems as well[78]. Therefore, future design premises should include the principles that are coworkers with nature in terms of ecological perspectives as well as health and wellbeing, of which biophilic design is able to guide[79].



Figure 2-5: Mogan Lake recreational area located in Ankara, given as an example of an urban wetland.

Source: https://www.ankara.bel.tr/galeriler/goster/mogan-park

[77] Terrapin Bright Green (2014). 14 Patterns of Biophilic Design. Retrieved from https://www.terrapinbrightgreen.com/reports/14-patterns/#biophilia-in-context quoted in Restore's first book of definitions.
[78] Zari M. Petersan, Biodivercities, 2019.
[79] This emphasis is especially made as regenerative development initiatives employ the main principles of biophilic thinking.

As another concept, "*cradle-to-cradle* aims to restore the health of water, soil and the atmosphere by design. It eliminates the idea of waste by proposing that waste can equal food"[80]. Within the built environment applications the approach proposes "products and building components to be 100 per cent biodegradable or 100 per cent recyclable to avoid cross-contamination of the waste and resource streams"[81]. As this is a challenging perspective to ideally realize, this approach holds many beneficial mindsets within. On the contrary to mentioned principles, this approach is originated by the cradle-to-grave approach which is linear degenerative patterns in use, not the idea of understanding nature; and cradle-to-cradle offers the circular flow of materials and resources to be replaced with the old systems.[82] This concept employs Systems Thinking while designing the built environment in order to create a wholistic consideration. Furthermore, as an interesting aspect of within cradle-to-cradle approach, the "population growth is considered as a benefit not a burden, because of the opportunity for cradle-to-cradle consumption,"[83] in which social, ecological and economic prosperity to be encouraged.

Cradle to Cradle Development – the Hannover Principles which is developed by William McDonough for World EXPO 2000, held in Hannover, Germany (McDonough, 1992), emphasize firstly to insist on rights of humanity and nature to co-exist, then recognize interdependence, thirdly respect relationships between spirit and matter, fourthly, accept responsibility for the consequences of design, fifthly, create safe objects of long-term value, sixthly, eliminate the concept of waste,

[80] New Zealand report, *Rethinking Our Built Environment Towards Regenerative Development*, 2009.
[81] New Zealand report, *Rethinking Our Built Environment Towards Regenerative Development*, 2009.
[82] New Zealand report, *Rethinking Our Built Environment Towards Regenerative Development*, 2009.
[83] New Zealand report, *Rethinking Our Built Environment Towards Regenerative Development*, 2009.

seventhly, rely on natural energy flows, eightly, understand the limitations of design and lastly, seek constant improvement by the sharing of knowledge.

At last, *restorative design* should be mentioned within the concepts guiding towards regeneration. Its main idea is to restore social and ecological systems to a healthy state.[84] "Restorative and cradle-to-cradle strategies seek to improve ecosystem health through active human management, while regenerative strategies seek to repair the capacity of ecosystems to function at optimum levels without ongoing human intervention."[85] Both systems put emphasis on long term consequences.[86] These two approaches also promote an increased HBI and even more they offer collaborative design process, in which stakeholders, owners and contractors – the users can participate.

2.2.1.3 The Phenomena of Sustainability within Cities

In addition to discursive strategies, which offers an understanding of degeneration of existing systems and propose methods to understand their operation, a series of reports and declarations are published. The first big report of sustainable development, which emphasized future is in danger, *Our Common Future*[87]*, was* published in 1983. It was not a declaration of increasing environmental decay and poverty in our highly polluted world. Rather, the main purpose of report was "to find ways to recognize and protect the rights of present and future generations to an environment adequate for their health and well-being"[88]. After this report, "In 2003, the United Nations warned that if current patterns did not change, the expansion of

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[84] Brown, M., et. al., Sustainability, Restorative to Regenerative. COST Action CA16114 RESTORE, Working Group One Report: Restorative Sustainability, (2018).
[85] Yang, Yang J, Brandon PS, Sidwell AC. 2005. *Introduction – bridging the gaps in smart and sustainable built environments* quoted in New Zealand report *Rethinking Our Built Environment Towards Regenerative Development*, 2009.
[86] Yang, Yang J, Brandon PS, Sidwell AC. 2005. *Introduction – bridging the gaps in smart and sustainable built environments* quoted in New Zealand report *Rethinking Our Built Environment Towards Regenerative Development*, 2009.
[87] which is also known as Brundtland Report.
[88] Our common future.

the built environment would destroy or disturb natural habitats and wildlife on more than 70 per cent of the Earth's land surface by 2032 and in 2005, the Millennium Ecosystem Assessment warned that human activity was putting such a strain on the natural functions of the Earth that the ability of the planet's ecosystems to sustain future generations could no longer be taken for granted"[89].

Although, there has been almost three decades from these publications, most of the original problems still remains in spite of the efforts. The current attempts are offering only a decrease in their increase in this regeneration process. Nevertheless, there has been many improvements in terms of the creation and preservation of healthy environments even with just this decrease, as the technology has rapidly enhanced in the last two decades. Therefore, there are more inclusive attempts for solutions concerning our world. "UNEP sees the building and construction sector as having more potential to contribute to achieving sustainability than any other sector"[90].

> As "the impacts on the environment result from pollutants, energy and water use, land degradation and use, resource use, waste production and loss of biodiversity, occurring throughout the life cycle of buildings – from raw material extraction, processing, construction, building operation and maintenance, through to demolition, UNEP (2007) sees the building and construction sector as having more potential to contribute to achieving sustainability than any other sector"[91].

Moreover, the relationship between people and the city diminished because city and nature lose their qualities due to generalization, globalization, intensive usage and misstructuring, etc. As "Cities' systems evolve in human, nature and built environment nexus, without intervention, based on the flows of resources and energy to and from the local and global environments"[92], of which junctions form the

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[89] (UNEP Industry and Environment, 2003), (MEA, Living Beyond Our Means, 2005)
[90] UNEP 2007.
[91] This quotation from New Zealand Government report states the very essence of *degeneration* problem and its very connection to architecture in the simplest way. Yet, it is very superficial to think that the problems can be solved at an instant. The details of this problems requires a deep understanding of how the sector can respond with answers, at this point *regeneration* gets involved.
[92] de Jong, Martin, et al. "Sustainable–Smart–Resilient–Low Carbon–ECO–Knowledge Cities; Making Sense of a Multitude of Concepts Promoting Sustainable Urbanization." Journal of Cleaner Production 109 (2015): 25–38.

"leverage points and the acupuncture points"[93], they are the places at the most problems. Although, as the city became the main focus of dense deterioration and illconnections, "many urbanists perceive urban centers to be the opportunity to create the reconnection of human beings with the earth again. On one hand they are the motive and irregularity to create the distinction with the nature and human. One the other hand, they are the main focus of cause. Thus, they are the locations of the solution"[94].

Thus, many theories address the solutions focused on the city, have offered several directions to progress incorporation with diverse topics such as technology, resiliency to offer solutions in development scale. The article, *Sustainable–Smart–Resilient–Low Carbon–ECO–Knowledge Cities; Making Sense of a Multitude of Concepts Promoting Sustainable Urbanization, 2015*, makes a clear definitions of these concepts hovering around "city", which is one of the core elements within HBI, by mapping academic literature within the titles of Sustainable City, Eco City, Low Carbon City, Smart City, Knowledge City and Resilient City. Understanding these concepts enables the previous theoretical explanations of ecosystem, living systems thinking, and sustainable patterns to be intertwined with the built environment. The article points out that the connections and the distinctions between the selected city categories as "they are not inter-changeable; rather, the research findings demonstrates important conceptual differences among them"[95]. Therefore, they should be used simultaneously not interchangeably.



[93] de Jong, Martin, et al. (2015): 25–38.
[94] de Jong, Martin, et al. (2015): 25–38.
[95] de Jong, Martin, et al. (2015): 25–38.

Figure 2-6: As the city concepts are going to be mentioned, it should be kept in mind[96] that they all display benefits and qualities which should be used collaboratively. Drawn by the author.

Initially, the study offers sustainable city as the umbrella term because of its co-occurrence and its capability of addressing several topics at once with the pillars of *sustainable design*[97]. The *sustainable city* and development is associated with Our Common Future and its premises, while "adopting a socio-economic interpretation, where social equity alongside a greener living environment"[98]. As s*ustainable city* concept is very broad, there are many sub-concepts within. One of them is ecological modernization, which "allows economic growth and social stability to occur alongside ecological preservation by generating higher eco-efficiency in the economic value chain"[99]. Another one is "green urbanism, which is a conceptual model for zero emission and zero-waste urban design, promoting compact energy-efficient urban development, and seeking to transform and re-engineer existing city districts and regenerate the post-industrial city center"[100]. Net-zero initiatives are widely acknowledged and are set as short term goals[101]. "Identifying three common features to of sustainable development as another an addition to three pillars are 'environment' which refers to the preservation of local and global ecosystems to sustain all life; 'public participation' which acknowledges the need for all people to participate in positive change; and 'equity' which refers to a fair sharing of global resources for both human and non-human life"[102].

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[96] Also, this table display the wellbeing dimensions and their indicators in the concepts, which are going to be mentioned in the following chapters.
[97]The three pillars of sustainability are environmental protection, economic viability and social equity.
[98] de Jong, Martin, et al. (2015): 25–38.
[99] de Jong, Martin, et al. (2015): 25–38.
[100] de Jong, Martin, et al. (2015): 25–38.
[101] Especially, for Turley's current initiatives are in net zero emission course. There is a national net zero waste policy as well as net zero emission targets supported by government.
[102] Curwell and Cooper (1998). *Introduction – bridging the gaps in smart and sustainable built environments* quoted in New Zealand report *Rethinking Our Built Environment Towards Regenerative Development*, 2009.

Secondly, *Eco-city* "is building according to the principles of living within the means of the environment; that is, with its population and the artifacts produced and used remaining within the ecological carrying capacity of the city's bioregion"[103]. This concept regards deep ecology and living systems thinking premises and refer to "a life-style in harmony with nature" as the goal.

Further studies about Eco-cities include a reinterpretation of the concept in terms of economy and World Bank (2010) publication, offered the term 'eco2 city', which is an ecologically healthy and economically stable model. Eco-city planning "emphasizes combining urban planning concepts with the provision of a next generation of infrastructures and environmental friendly buildings"[104]. This approach is also widely acknowledged as well in terms of offering a baseline for new items of built environment. With "the adoption of it by mainstream policy and economic organizations", its capability promote strict ecological enhancements is negotiated due to achieving collective positive outcome.

Thirdly, "the 'low carbon city' essentially represents a subset of the 'sustainable city' category of concepts "can be seen as a direct response to climate change debate and the related role of cities, however, the focus in the academic literature concerning 'low carbon city' tends to be more on energy issues and shows more rapport with engineering and economic thought."

Fourthly, the concept of smart city forms "when investment in human and social capital, coupled with investment in traditional (transport) and modern information and telecommunication infrastructure, generates sustainable economic development and a high quality of life while promoting prudent management of natural resources"[105]. Smart city includes internet, connectedness and information at the center of all its formations, which makes it a distinct category amongst the others.

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[103] de Jong, Martin, et al. (2015): 25–38.
[104] de Jong, Martin, et al. (2015): 25–38.
[105] according to Caragliu et al. (2011), quoted in de Jong, Martin, et al. (2015): 25–38.

The smart city offers six subcategories which are smart economy[106], smart mobility[107], a smart environment[108], smart people[109], smart living[110] and smart governance[111] [112]. The smart city emphasize enabling infrastructure and access to information, in which feedbacks are one source of information towards constant development. Within this concept wellbeing is not specifically emphasized, however, by adapting this approach to cities, empirical data harvest is offered as a possible scenario for regeneration.

As the fifth concept, knowledge city refers to information and knowledge-intensive production without high environmental impact. "the concept of 'knowledge city' not only focuses on the knowledge economy and industrial structure, but also stresses enriched human capital, a vibrant and diverse socio cultural environment, conservation of the natural environment, a high-quality built environment, accessibility, tolerance and acceptance of multiculturalism, and social equity"[113]. Although this is a very important concept, smart city and eco-city are more prominent as they are specified and within this concept wellbeing is emphasized in terms of equity.

As the last concept resilient city, "resilience means the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including the preservation and restoration of its essential basic structures and functions"[114]. There

[106] improving administrative and economic efficiency and enabling the development of culture and society by utilizing networked infrastructures
[107] paying close attention to the function of social and relational capital in city development
[108] taking social and environmental sustainability as an important aspect of smart city development
[109] a strong focus on the goal of realizing the social inclusion of different kinds of urban residents in public services
[110] emphasizing the significant role of high-tech and creative industries in long-term growth
[111] an underlying emphasis on business oriented urban development
[112] All explanations of subcategories of smart city are taken from the Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[113] Florida, 2005; Van Winden et al., 2007, Yigitcanlar et al. 2008 quoted in
[114] de Jong, Martin, et al. (2015): 25–38.

are several aspects as primary consideration. "Resilient cities[115] are cities that have the ability to absorb, recover and prepare for future shocks (economic, environmental, social & institutional)"[116], in which sustainable development, **well-being and inclusive growth** is encouraged. Resiliency concept have four interrelated components, which are economy, society, environment and governance, when applied to urban systems in order to measure the level of resilience. Nevertheless, an ideal resilient settlement is very difficult to achieve, **rather having resilient abilities up to a certain level is considered successful.** "Whether this approach will eventually contribute positively to sustainable urban development will depend primarily on its interpretation as being at least partly about mitigation, in addition to adaptation, in relation to urban development"[117]. Understanding resilience can be the first step of regenerative design and development, as all of the ordering systems ends up in degeneration. Since, any resilient system or structure cannot be thought apart its renewing and adapting capacities.

All of these city concepts that are mentioned above **offers exclusive solutions to the problems raised in UN sustainable development goals**; and they **guide the way towards regenerative development** for an altogether solution for ecological, economic and socio cultural benefits. Although, these approaches are regarded in terms of development scale, their outcomes lack either social or economic variable. Because, in the end, all these concepts takes the subjects into consideration from a certain point of view, which makes it difficult to handle various perspectives at once. Therefore, they are prejudicially constructed. This poses the great problematic of sustainable paradigm that its main goal is to do less bad and try to maintain the status quo, while, the systems keep moving towards their expiration date. Nevertheless, these concepts within existing paradigm hold infrastructural

[115] So as to obtain further information about how to investigate a city's resiliency, a case study of Antalya by OECD can be analyzed. https://www.oecd.org/cfe/regionaldevelopment/resilient-cities-antalya.pdf
[116] https://www.oecd.org/cfe/resilient-cities.htm
[117] de Jong, Martin, et al. (2015): 25–38.

qualities of moving forward. They all pose different solutions and **replacements to *degenerative systems*** concerning their perspectives.

To give brief information about economic premises, economic ordering system stands for the cost related analysis to material preferences or the choices of location or even to the design of any architectural system. Main types of economy can be stated as capitalist economy, mixed economy and socialist economy. All these sub-specifications, are concerned economic growth from a singular perspective of ownership and its flow chain in terms of economic growth. This type of economic structures are classified as linear economic systems. Nevertheless, in terms of economic ordering system of concerning sustainability, rather than ownership of means of production, distribution and marketing, the chain between them is significant. Thus, a sustainable thinking of economics, circular economy models are promoted by European Union. Since, it is developed as a part of UN's "Sustainable Development Goals".

> "The transition to a circular economy is based on three pillars: environmental benefits, especially in terms of limiting its impact and reducing the use of resources; saving costs from reduced natural resource needs; and the creation of new markets that provide additional economic benefits from circular practices, for example, in terms of job creation or improvement of well-being"[118].

Conventional economic systems are concerned with maximizing profits and efficiency. However, circular economy considers the social dimension as well. From this thesis' point of view, economic ordering system is going to be regarded only in terms of prosperity that encourages health and wellbeing. Within the developments and sustainable paradigm, economic stability promotes wellbeing.

Socio cultural ordering system stands for the understanding of social and humane dimensions of any project, system or service. When social sustainability is googled the first two basic encountered definitions are "Social sustainability occurs when systems; structures; and relationships actively support the capacity of current

[118]Brown, M., et. al. (2018). Sustainability, Restorative to Regenerative. COST Action CA16114 RESTORE, Working Group One Report: Restorative Sustainability.

and future generations to create **healthy** and **livable** communities, which are equitable, diverse, connected and democratic and provide a **good quality of life**" by *Western Australia Council of Social Services* and "Social sustainability is a process for creating sustainable successful places that promote wellbeing, by understanding what people need from the places they live and work and creating infrastructure to support social and cultural life, systems for citizen engagement, and space for people and places to evolve" by *Social Life's*[119]. From both definitions, it can be inferred that the aim for being socially sustainable is a healthy, livable community with supporting elements and places that promotes well-being of its inhabitants.

To explain in detail, social dimensions that create the healthy environment that supports people's wellbeing, are derived from individual- specific needs[120] and appropriated to common grounds. In Burak Bican's article *Spatial Interventions Towards Sustainability in Social Housing Regeneration*, he explains that the theoretical information around about social sustainability is interwoven through two phenomena; **livability that is strongly related with quality of life and equity that corresponds with social justice that are the two parameters of common grounds.** In addition to these two phenomena, Bican puts emphasis on the cultural component of this equation. Since, it is an inseparable component of communities, in which livability and equity operates. As "communities co-create, and are fed by, their common culture which manifests their social existence"[121], the notion of equity is directly related with cultural norms; and livability is interwoven with cultural patterns.

To connect these social concepts to the mentioned discourses, social and cultural elements corresponds for the intangible aspects of both degenerative and regenerative systems. In other words, it stands for the "human" in the Human Built Environment Interaction (HBI). The notion of livability is connected to the place

[119] a UK based social enterprise specializing in place based innovation
[120] Godschalk 2004 in Burak Bican artice, *Spatial Interventions Towards Sustainability in Social Housing Regeneration*
[121] Chiu, 2004 in Burak Bican 2020/2 METU Journal

making and ‘architecture’. The livability of any structure is interconnected with its health and wellbeing promoting capacities in terms of both its users and the structures themselves.

2.2.1.4 Health, Well-being and Livability: Life Quality within Architecture

Health and well-being two very important components of any living system. There are many studies that are concerning the relationship of architecture and well-being of people. This link starts at the instant when a building becomes an architectural object, at which interaction between occupants and buildings begin. Whereas this important relationship is mostly compromised. Because, architecture sector is prioritizing quantitative factors over qualitative ones[122] with incomplete reasoning. The precedence of technical issues over **livable** and relatable environments, creates unhealthy environments in which people are detached and left distant. As a result, they do not want to spent time in those environments. Nevertheless, when people experience belonging and the desire to be in that particular place, that linkage is what makes a building an object of architecture. One of the forefront regenerative practitioners Maibritt Pedersen Zari and her colleague John B Storey, defines this situation of being subjected to desirability as *the X factor*.

> “that makes some places a delight to be in where people feel alive, vibrant, stimulated, refreshed and, where absent, makes other places others unpleasant, disturbing, disquieting, where people feel unhappy or uncomfortable while others generates no feelings at all. Places that create feelings of negativity or indifference diminish us as human beings and demonstrate a crucial failure on the part of the design team. Factor ‘X’ is about creating environments that enhance a user’s holistic sense of well-being”[123].

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[122] John B. Storey and Zari M. Petersan, Factor X – Wellbeing as a key component of regeneration of green buildings. *Proc.* Of the Rethinking Sustainable Construction ’06 Conference, Sarasota, Florida, USA, 2006.
[123] John B. Storey and Zari M. Petersan, Factor X – Wellbeing as a key component of regeneration of green buildings. *Proc.* Of the Rethinking Sustainable Construction ’06 Conference, Sarasota, Florida, USA, 2006.

This awareness faded while utopian dreams of the architects began to override their designs and the design process began to be singular rather than collaborative. In the last decades, there were massive projects designed with latest technological breakthroughs by starkitects[124], becoming either the large scale detached structure or the decorated shell[125], despite the fact that they are designed with the best intentions as a master piece. Yet, due to lacking the X Factor, the users are not fully able to comprehend the projects. While the projects of starchitects started to fail to establish this certain connection between the occupant and structure, they become monuments for their designers; and the users took matter of their lives into their hands and reject existing system or got stuck within this alienated state. Either perspective suggests the unhealthy environment system is effecting the *well-being* of people.

Moreover, "repeating the mistakes of the 20th century by continuing to create soulless, brutalizing, emotionally degrading built environments to live and work in the 21st century"[126] is not an option with existing ecological and social crises. Even though, there are rapid precautions such as global actions and plans, the progress of these developments are very slow due to our unforeseen *extremes* such as pandemic or war. There are still very few attempts in the current practice of architectural design and development that incorporates with wellbeing as a factor, which is directly related with the establishment of X Factor and, therefore, livability. Creating connected environments with a sense of the place and cooperative with its users increase the life quality of both the structure and humans; and by which it improves **livability**.

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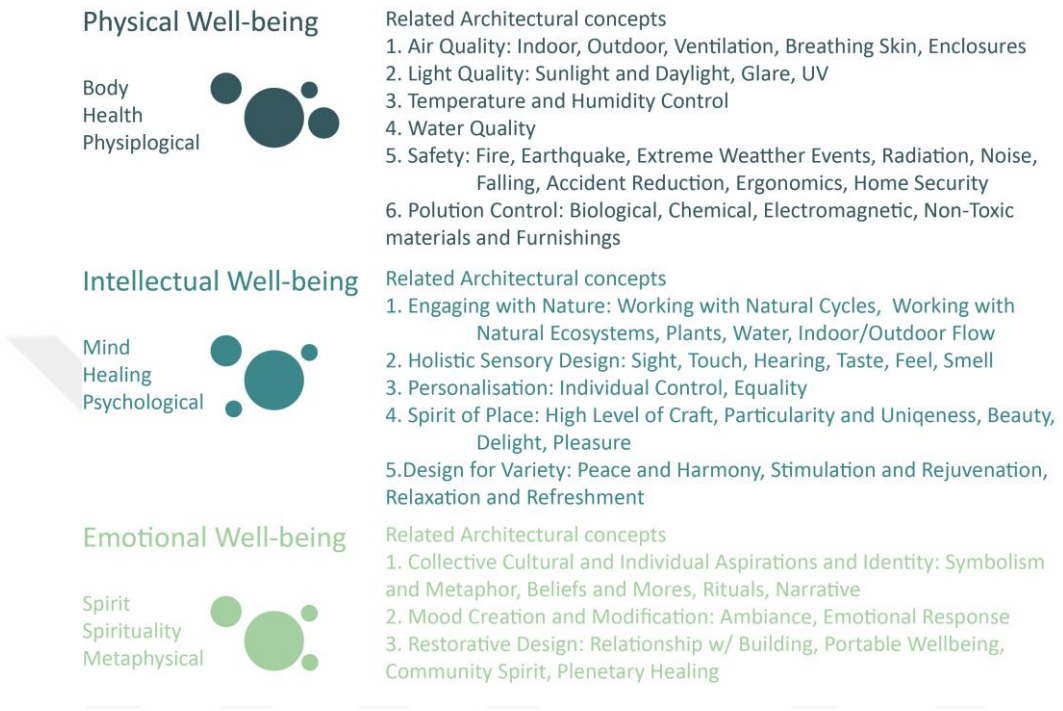
[124] Starkitect is a term that is used for star architect. These people are the well-known, pacemaker designers who are willing to excel what they are doing with the usage of latest technologies, programs; and they are known for their massive projects such as Zaha Hadid, and Rem Koolhaas. however, it is discussable that their projects are not always fully directed for the best intentions for their users.
[125] A notion that is used Robert Venturi and Denise Scott Brown in Learning from Las Vegas in order to explain that people are deceived by the initial façade rather than the complex ordering of inside.
[126] John B. Storey and Zari M. Petersan, Factor X – Wellbeing as a key component of regeneration of green buildings. *Proc.* Of the Rethinking Sustainable Construction '06 Conference, Sarasota, Florida, USA, 2006.

As the latest attempt of net-zero emission plans put the health and decreasing the degeneration of the environment forward, nevertheless, the correlation of people and built environment is still secondary. This situation forms a part of a bigger problem of vague understanding of human *well-being* and its connections to architecture. Zari M. Petersan and John B. Storey explains the relationship of wellbeing and architecture within 3 dimensions, which are physical wellbeing, intellectual wellbeing and emotional wellbeing as shown in the following table. The X Factor and human interaction within developing projects should be reestablished in order to create fully healthy projects resulting livable environments concerning not also pre-occupancy period or construction but also post-occupancy user feedbacks.

Prioritizing this approach ensures increased life quality in order to create nourishing built environment that can be considered as architecture. The healthier environments are designed, the more wellbeing becomes prominent. As the base line, healing ecosystems and re-creating healthy natural and build environments does not specifically ensure an increase in overall wellbeing. These three dimension of wellbeing is the main component of HBI and the subject to be supported in order to achieve overall health. As it is stated in the previous chapters, pandemic has had destructive effects on all people psychological if not physical. Therefore, not only there is a need for physical improvement of existing built environment but also the restoration and refurbishment of HBI is the key to recovery from *extremes.* Therefore, a consideration of physical wellbeing within built environments could only be really successful if supported with intellectual and emotional wellbeing.

Table 2-2: Zari's Wellbeing indicators chart redrawn by author.

Reference: Wellbeing ideas and concepts adopted from John B. Storey and Zari M. Petersan, Factor X – Wellbeing as a key component of regeneration of green buildings.



To explain the dimensions of wellbeing, physical wellbeing is related with materialistic matters such as lighting, clean air quality, temperature and humidity, in other words it regards the physical comfort level and it has effects on decreasing stress levels and health refurbishment. Intellectual wellbeing is related with senses with which people interact to their surroundings and have sensual feedback such as personalization of their environment, sensory engagements like smells, textures, or connection to nature. Lastly, emotional wellbeing is regarded with the concept of spirituality and deep connections with place such as cultural connections, harmonization with nature, metaphors, beliefs and moral norms.

2.2.2 Mapping the timeline: Urban Dependencies within Context

The correlation between ecologic concepts, prominent city theories and social aspects of current developmental course is explained discursively in order to reveal

the ques that can guide to regenerative means. The concerns about sustainability have now worn off for a while in the practices and the world embraced the fact that there is a severe need to pay attention to environment and ecology. Nevertheless, the need for a holistic approach, concerning the spiritual aspects of environmental decay is yet widely invalid. Therefore, in the last decades, there have been enormous initiatives to emphasize social aspects of any development. Since, even the transition to the term development is an indicator of a systems approach, of which the previously acknowledged carbon and energy centered sustainability standpoint leaves its place to multi perspective approaches. The realities of today's world requires a rapid change to not even net zero effect but a positive impact on both social and environmental system with a collaborative thinking strategy. The easiest example of this transition process of UN SDGs which cares about the systems, flows and connection by requiring complex outcomes rather than just require a decrease in the carbon or emission levels.

From an ecosophical perspective, health and wellbeing is an inseparable part of any developmental approach. Because, connection to nature and co-existing is at the core of designing a healthy system displaying ecosystem capabilities. Yet, it is not highlighted enough in the mentioned paradigms until last decades. With the perspective of the need for healing the environment to sustain rather than just replacing broken parts, health and wellbeing is brought to attention to make the changes permanent. Therefore, a systems approach, regarding health and wellbeing as the collaborator in its design approaches, has become prominent stressing the existing social component in sustainable thinking, which is strongly related to the X Factor. Within concepts and notions mentioned above, from ecological, socio-cultural or economical perspectives, the key for the system to survive from any degeneration or deterioration is by either healing or evolving into something else, which can be defined as thriving. In order to do so, the concept of wellbeing should be further explored within any scale of development and design so as to reestablish the human, built environment connection; and therefore, the natural and built environment can be livable again.

Most of the city concepts of sustainable development indicates certain improvements and considerations in each of them towards a decreased environmental impact, which will result as an enhancement in the physical wellbeing. More specifically, the more ecological wellbeing is preserved and promoted, the more health will be nourished. Nevertheless, few of them indicate social connection at their core. Thus, a step forward in order to connect with intellectual and emotional wellbeing is required. That is why regenerative design and development has become prominent in the last decades, as it puts emphasis on the human wellbeing as much as planetary wellbeing.

CHAPTER 3

THE STATE OF REGENESIS AND REGENREATIVE DEVELOPMENT STRATEGIES EXAMINED: METHODOLOGY EXTRACTION

> "Sustainability in architecture is thought in terms of resource efficiency, polution reduction, and mitigating impact on natural ecosystems. It can be argued however that human well-being and planetary well-being are intricately interwoven."[127]
>
> Zari M. Peterson

3.1 Regenerative Development towards a Paradigm Shift

As it is explained in the **extremes** chapter, the pandemic altered the life style and diverse needs brought up to light; thus, "2020 has altered the scope of sustainability and the built environment. As, for a while the whole of humanity came to a standstill, It has become known as the anthro-pause"[128]. Within many researches concerning sustainability in recent years, the connection to the question of *how much nature* become prominent. People were stocked. Moreover, as the pandemic proceed, societies encountered the fact that they have to co-exist with the virus and people come face to face with the circumstances of the **extreme**.

> "For many, the Covid crisis has prompted us to turn our attention to elements of the nature around us, opening new insights about our human, non-human and built environment relationships and has allowed us to glimpse new ways of being. We

[127] John B. Storey and Zari M. Petersan, Factor X – Wellbeing as a key component of regeneration of green buildings. *Proc.* Of the Rethinking Sustainable Construction '06 Conference, Sarasota, Florida, USA, 2006.
[128] Cost, Restore book of *Rethinking Sustainability, Towards a Regenerative Economy*.

had seen a preview of what the world could be like, with clear skies, fresh air, low emissions, quietness and peace"[129]. (Restore Group, 2015)



Figure 3-1 Beijing's post pandemic and pre pandemic air quality have become the topic of many news and point out the fact that the problems are indeed anthropocentric[130].

[129] In the book of Cost Action, Restore Group's *Rethinking Sustainability, Towards a Regenerative Economy*, especially, Healing the Future subchapter explains the reality that everybody faced during the pandemic and people's genuine reactions was grief and pain in the lockdown. However, they say that also it opened people eyes towards the nature due to the elimination of such concepts such as going to work and being concealed in the house made people realize what they really have in their life and the fact that how most people just sleep in their house not really live.

[130] https://www.bostonglobe.com/news/science/2018/10/18/harvard-researchers-say-they-may-have-solved-mystery-beijing-air-pollution-woes/o42Mw9OJptk8d3N14av8mO/story.html

As, the daily mass circulation patterns are altered and new connections occurred, Human Build Environment Interaction has become a key factor. Because, the set ups of our usual settlements are ineffective to provide adequate correlation to our daily lives; and with post pandemic circumstances people are forced to stay poor quality indoor environments; and this was just one example. There is a severe need for socially and ecologically positive impact systems.

As it has been explained in the previous chapters, the studies offer a sudden paradigm shift to a net-positive approaches with regard to wellbeing of both humans and nature. As, by "emulating ecosystems and their functions using an ecosystem services framework, and through incorporating biophilic design principles, a regenerative design practice may provide for positive impacts on socio-ecological systems from a health and wellbeing perspective"[131]. In this chapter, regenerative design and development is going to be explained discursively and several research projects proposing a paradigm shift towards Regenerative Development are going to be investigated through their reasoning and offered methodology in order to provide health and wellbeing.

3.1.1 Definitions: Regeneration versus Degeneration

As the initial step to understand Regenerative development and design, the basic definition of regenerative and degenerative should be elaborated. Cambridge dictionary defines the verb *regenerate* as "to improve a place or system, especially by making it more active or successful"[132]. Britannica Dictionary states that, *regenerate* "has two definition; first one in terms of biology: to grow again after being lost, damaged, etc., second is the formal one: to give new life to (something);

[131] Maibritt Pedersen Zari. "Biodiver_cities: An Exploration of How Architecture and Urban Design Can Regenerate Ecosystem Services.", 2020.
[132] "Regenerate." REGENERATE | Cambridge English Dictionary Meaning. Accessed July 8, 2022. https://dictionary.cambridge.org/tr/s%C3%B6zl%C3%BCk/ingilizce/regenerate.

renew or revive"[133]. As the third definition comes up in research, The Macmillan Dictionary defines regenerate as "to develop something again, or to bring it back to its original state"[134]. Regenerative practitioner Maja Tampe[135], talks about regeneration processes of all kind and as an example, she tells about the regeneration of a polip. Since, they are the master of regeneration by which they can grow the exact part that is removed. As this type of regeneration resembles with its healing capacities, it not just heal back to a past state, but it also holds the capacity to thrive and evolve. The concept of regeneration is paralel with the concept of degeneration; and while occurenace, both these two concepts define complicated relationships with their surroundings, which creates systematic relationships. Therefore, in order to understand the complex cennections of and within regenerative systems, at first degenerative systems should be understood.

After, Krone's Living Systems approach defined nature as a complex network of systems that are all about cycling and recycling materials and energy, which constantly evolving and thriving; **John Tillman Lyle defined the existing reductionist systems within industrial one way flows as degenerative systems[136].** Moreover, he believed that these degenerative systems as finite and one that the systems no longer be available to maintain themselves; and the sustainable systems that are in use are concerned about limiting the impact, which is not enough for both the environmental and social decay.

From the perspective of architecture, unfortunatelly, the built environment mostly consists of degenerative systems, which also are reponsible from the decay of existing natural ecosystems and their evolutionary capacities of existing flora and fauna. Therefore, the urban ecosystems end up with operating on degenerative

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[133] Encyclopædia Britannica. Encyclopædia Britannica, inc. Accessed July 8, 2022. https://www.britannica.com/dictionary/regenerate.
[134] "Regenerate (Verb) Definition and Synonyms: Macmillan Dictionary." REGENERATE (verb) definition and synonyms | Macmillan Dictionary. Accessed July 8, 2022. https://www.macmillandictionary.com/dictionary/british/regenerate.
[135] https://www.ted.com/talks/maja_tampe_sustainability_is_dead_long_live_regeneration
[136] John Tillman Lyle, *Regenerative Design for Sustainable Development, the regenerative thinking strategies,* 1994.

systems, which forms the underlying problems of the mulfunctions in our current world that are being tried to defined and solved by the previously mentioned agreements and development strategies. Besides, these degenerative systems not only hinder the nature's capabilities and diminish its connection to people, but also HBI is compromised. The social structure is strongly connected to the architecture, as life occur within built environment. Nevertheless, as it is stated before in terms of the X factor, due to degenerative systems and negligence built environment fell short to become elements of architecture. This connection in between encourages the livability in places and promote healthy HBI. Therefore, sitimulate intellectual and emotional wellbeing and connect people to the place. Nevertheless, most degenerative systems lack the social connections and fail to establish an X factor. Thus, there is not only a threat to the health and wellbeing of the natural environments but the human health and wellbeing is also at risk in terms of both physical and psychological aspects. Therefore, a change of degenerative systems into regenerative ones is needed to re-establish the relationships so as to be healthy again.

In order to do so, a wholistic vision, in which the previous theorethical concepts such as Living Systems thinking, biophilia, etc., included, should come to fore in order to create regenerative posibilities[137]. As, regenerative systems stand for the capability of evolution, creation and transformation of the existing systems through their working process and they offer a comprehensive approach, they are difficult to suddenly impose. In other words, they require a process of transformation with a comprehensive thinking process. Therefore, the shift towards regenerative systems is offered in terms of regenerative design and development.

[137] Reith, A., Brajković, J. Scale Jumping: Regenerative Systems Thinking within the Built Environment. A guidebook for regenerative implementation: Interactions, tools, platforms, metrics, practice. COST Action CA16114 RESTORE. (2021).

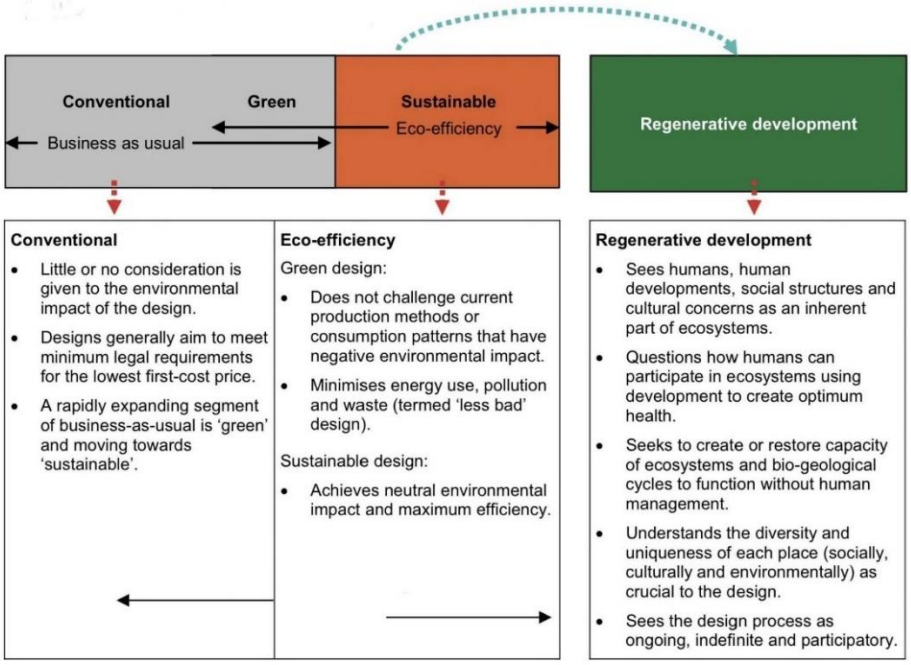


Figure 3-2: Business as usual to regenerative development comparison chart towards a regenerative future, directly quoted from New Zealand Governmental report, 2009.

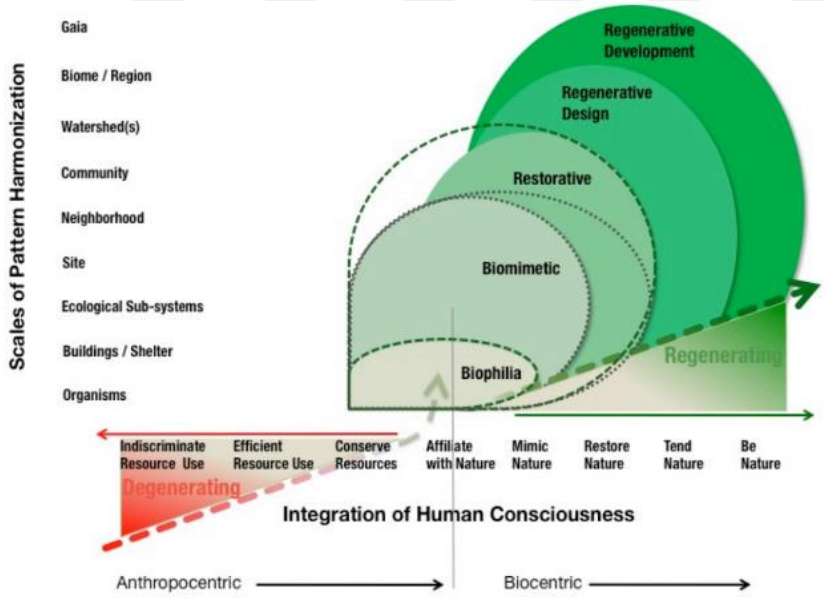


Figure 3-3: Levels of ecological strategies by Regenesis Group

Directly quoted from Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.

3.1.2 Regenerative Development through Regenerative Design

"John Tillman Lyle defines regenerative design as the replacement of linear systems of throughput flows with 'cyclical flows at sources, consumption centers, and sinks"[138] and the plain definition of regenerative design can be given as to create with the intentions to restore environmental decay and seek the ways for positive outcomes instead of less impact and considering systems as a whole in terms of human's wellbeing and health as well as nature's, therefore aiming a co-existence with co-evolutionary systems. Lyle points out regeneration instead of degeneration in order to achieve continuous operating systems in their own functional process without any extra effort. Moreover,

> "regenerative design offers a system of technologies and strategies based on an understanding of the inner working of ecosystems that design solutions regenerate rather than deplete underlying life support systems. Resources are grown from the uniqueness of place, and work to integrate the flows and structures of the built and natural world at a multiple level of scale"[139].

The transformation of degenerative systems into regenerative systems are at the core of regenerative design, which offers to redefine both new and existing developments to a co-evolutionary state that humans and nature live in symbiotic relationship. With successful implementation of **regenerative design**, in order to achieve more comprehensive outcomes, in order to work on multiple scales, **regenerative development** is proposed. It can be basically define as a collaborative thinking process that involves human communities to engage in symbiotic relationships with the existing natural environment for the self-renewal processes. Bill Reed explains this human nature relationship as to be mutualistic; and gives the example of exclusion of one from the other. As the humans are excluded from natural environment, the health issues starts as so with maintenance issues and as nature is excluded from humans, wilderness starts to take over. Neither of these are nor useful

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[138] Lyle, John Tillman. Regenerative Design for Sustainable Development. 1994.
[139] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.

or beneficial. Because, their potentials are prohibited. Many studies indicate that nature is at its best when in human collaboration nurturing and vice versa.

Proceeding from this relationship, the potentials of the specific places is one of the key factor in regenerative development and following the energy is another one. John Tillman Lyle structures regenerative development strategies, in his book, *Regenerative Design for Sustainable Development, the regenerative thinking strategies* by introducing ecosystem and its **ordering systems**; structural, functional orders with respect to locational **patterns**. Then, he offers a set of regenerative strategies. First one is letting the nature do the work in terms of conversion, assimilation and filtration. Secondly, he offers to accept the nature as both mode and the context, therefore, the continuity of the system flow is achieved by application and adaptation of natural patterns. Thirdly, rather than isolation he suggests **a system of aggregation**, which actually means the 'w**holistic system' approach**. All orders within the design or system should be considered with their relationship with each other. As separately designed parts would not be as efficient or operational. Fourthly, he is in favor of optimum levels. He defends that neither the maximum levels nor the minimum levels are beneficial as they create inequalities. Fifth one is to match the technology to need. He explains that technology has a tendency to over design and aim the maximum, however, this damages the supporting system. Therefore, when the maximum is not needed, the optimum level is enough. Sixth one is to using information to avoid the extensive usage of power, and **emphasize feedbacks from the systems**. Seventh one is to create multiple pathways for similar jobs as the scale changes it can alter according to that and become more efficient. Eigth one is in system parts the same pathway of conversion, consumption, assimilation and storage idea is applied. However, they can have different problems, as the main subject differs. Since, there can be a common solution to solve these various problems according to the pathway. Ninth is storage is the key to sustainability and "returning the supplements to useful circulation"[140]. Tenth is to **shape the design according to**

[140] Lyle, John Tillman. Regenerative Design for Sustainable Development. 1994.

flow of sources energy and material. Eleventh is to shape forms to manifest process. This means to integrate the systems with the surrounding so that they become less alien such as overdesigned technological items. He suggests to disguise within the design and be an inseparable part internally. Twelfth and the last one is to prioritize sustainability[141]. As, this book is published in 1994, regenerative applications were out of reach. However, with the developments in sustainability, enhancements in technology and raised awareness about wholistic system approaches, regenerative design principles are able to be applied currently and these directives still from the main frame of regenerative principles.

On top of those, Pamela Mang and Bill Reed defines the role of regenerative development as firstly "to determine the right phenomena to work on, or to give form to, in order to inform and provide direction for regenerative design solutions that can realize the greatest systemic potential"[142]; and then in order to encourage collaborative thinking and working environment, they advise "to build a field of commitment and caring in which stakeholders step forward as co-creators and ongoing stewards of those solutions"[143]. For instance, the natural decay in urban areas causes green and blue ecosystems to be compromised. This situation is referred in the UN SDGs as well. As the solution, with regenerative design can "facilitate the creation of urban ecosystem services through the medium of architecture in addition to surrounding urban green/blue space"[144].

The more concepts dwell on regenerative development, the more new aspects are driven from correlations. As in Living Systems Thinking,

> "regenerative development acknowledges humans, as well as their developments, social structures and cultural concerns, as an inherent and indivisible part of

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[141] Lyle, John Tillman. Regenerative Design for Sustainable Development. 1994.
[142] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[143] Ibid.
[144] Maibritt Pedersen Zari. "Biodiver_cities: An Exploration of How Architecture and Urban Design Can Regenerate Ecosystem Services." Revisiting the Role of Architecture for 'Surviving' Development. 53rd International Conference of the Architectural Science Association, November 24, 2020.

> ecosystems (in both natural and urban). It sees human development as a means to create optimum health in ecosystems. Understanding the unique and diverse human and non-human elements of each place is a crucial part of regenerative development".[145]

Furthermore, gaining restorative abilities are considered the primary step towards regenerative abilities for systems in order to transform in the short term. Therefore, any kind of maintanance becomes restored till some other improvement takes over. This applies for all aspects of the development considering built ecological, social and economic initiatives. The concept of regenerative economic are improving slowly as the pandemic has arisen and altered the existing process flows. Therefore, new approaches such as regenerative economy on behalf of our existing fragile economic systems have great potential. As the changes in the recent decades in economic are towards circular economy and creating circular flows, the initiation towards regenerative economy has already begun. Nonetheless, due to this study's scope, economic ordering systems is going to be regarded in terms of its relationship with the regenerative development and health and wellbeing. In the most basic sense, regenerative economy[146] puts forward the prosperity to encourage the health and wellbeing. The initiatives emphasize that economic premises are a necessity in order to create a just and equal society.

[145] Cole, et al, 2006; Reed, 2007. - Journal

[146] Of course economy is a very important aspect of regenerative development paradigm. However, the concepts are not going to be explained in detail. Nevertheless, it is one of the significant outcome of research projects, which are mentioned in the following chapters, that economic ordering system is not sufficiently explored. Restore Group specifically states in their research that there was not enough researchers from the field of economics. Therefore, their research was unable to conclude with ideal solutions.

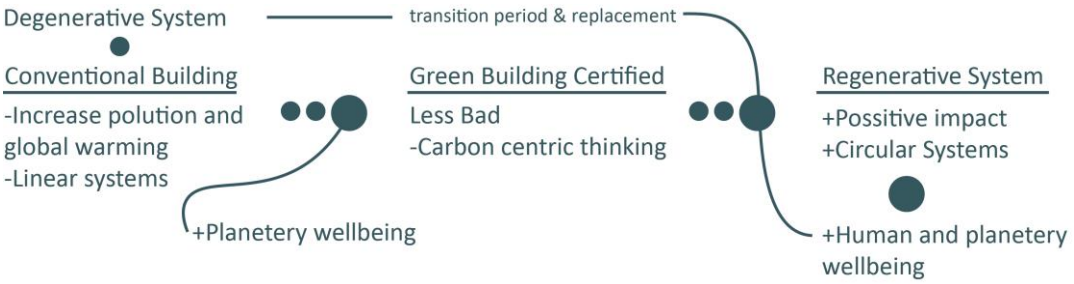


Figure 3-4: The story telling diagram of the purpose of this thesis explaining with regard to the architectural implications; degenerative systems and their transition towards regenerative systems. The gradual purpose differs and evolves into human and planetary wellbeing[147].

While the shift towards regenerative development occurs, a shift in mindsets is required as well. Nevertheless, this is a very difficult transformation from business as usual and requires effort. **"In the absence of tangible regenerative design concepts, the intersections in bio-inspired design, which seeks to improve both the ecological and psychological suitability of the built environment, could be a crucial component of creating comprehensive regenerative architecture"[148].** In the following exemplary research projects, it is going to be emphasized that so as to achieve regenerative outcomes within our building environments, ecosystem thinking and biophilic principles become primary approaches. In addition, it is derived that as start point, the baseline should be green buildings. Because, the sudden shift towards regenerative development cannot be done in urban scale at once. Nevertheless, as it is indicated in New Zealand report, a building by building, development by development approach is crucial. As building scale is the initiation point, with healthy infrastructure, the development will be healthy as well. The studies also point out that there should be a kind of connection between these

[147] The idea of certified green buildings to become the conduter in the transition period idea in *Importance of Regenerative Systems in Architecture for Climate Change* by Gautami Prabhakar Bura1, Dr. Parag Govardhan Narkhede, (2021), pg. 2216 is reinterpreted regard to the purpose of this thesis and redrawn by author.
[148] M. Pedersen Zari. "An Architectural Love of the Living: Bio-Inspired Design in the Pursuit of Ecological Regeneration and Psychological Wellbeing.", 2009. https://doi.org/10.2495/sdp090291.

regeneratively designed buildings and their surrounding islands as a sort of communication.

3.2 'Projects' with Regenerative Design Principles around the World

As regenerative design and development is explained in the previous part, the World has taken action to produce further developments within a regenerative approach. In this chapter, several of the pioneers of this movement and the researches of practitioners, who are guiding regenerative principles, are going to be stated. **America, EU programs, New Zealand and Australia as the primary developers**, made long term goals to observe the development of implications of regenerative systems.

These studies and reports suggest regenerative development can become an integral part of each project either it is brand new or adaptation. Especially, adaptation projects are pointed out as enhancement projects[149]. The research projects, that are going to be mentioned, are currently active and they reflect current status of involvement to regenerative movement.

3.2.1 Continent 1: Amerika – Regenesis Group, Regen Villages

In the previous part in which Regenerative development and design is explained, Regenesis group's main world view are parallel, as Regenesis is one of the priors firms in regenerative development field. In this part their methodology on appropriating regenerative development is going to be explained. They embrace "an approach to land use, community development, and the built environment"[150] whose goal is to sustain life as process of becoming. To elaborate**, features of sustainability are generic, industrial and limited to understanding of green that**

[149] The methodologies include winter garden as it creates a conditioned environment.
[150] https://regenesisgroup.com/team

are creating fragile systems between each other by both natural and anthropogenic means. Nevertheless, characteristics of regenerative goals includes place specificity, evolving beyond current systematic performances, going beyond not only functional performance goals but also creating a spiritual relationship with the inhabitants[151]. Therefore, people recognize the place and are able to establish co-evolving relationships with the land and define its potential.

Regenerative potential "is defined as the ability to leverage human interventions to achieve greater systemic health through time for the place they occupy and depend on"[152], and it can only be at its maximum potential through an understanding of "the unique dynamics of a place which is critical to regenerative development"[153]. The potential of place, can be understood with the unique relationships in between the unique energy flows. By means of energy, Regenesis group does not only consider physical flow but also they refer to the spiritual energy of the place driven by it potential causing the unique social relations and culture within.

> "Regenerative project goals are defined by the potentials that must be developed and locally embedded to support ongoing co-evolution—of the built, cultural and natural environments, and the humans who utilize and tend to them toward higher (more complex, diverse and generative) levels of order for all their constituent members as well as for the larger systems they are a part of and depend on."[154]

All of Regenesis projects begin by "developing a Story of Place: a research-based understanding of how a place works and what it strives to contribute to the world with its unique set of dynamics"[155]. In other words, they are aiming for the understanding of the particular ecosystem in order to discover the ecological patterns

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[151] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[152] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[153] https://regenesisgroup.com/team
[154] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[155] https://regenesisgroup.com/team

with respect to hydrology[156] and geology[157], as the pre-evaluation process so as to discover the identity of place. Furthermore, in this phase, the reason why local initiatives plays a big role as "each and every place on earth is characterized by a unique set of cultural, social, and political dynamics"[158]. This situation puts emphasize on the fact that each of this variables can either hinder or encourage project's scope of impact and the dynamics of the place is crucial in the design process in order to provide for regenerative development, which starts with understanding relationships and restoring the ecological subsystems.

Ben Hogard, from Regenesis group, depicts the missing point of sustainability as the source of health which gets lost on the way of distinction of one place to another[159]. As the place varies in terms of its dynamic relationship with how people dwell on[160] that particular place and how nature is communicating with this relationship creates the flows, the culture, social relations, and then built environment shapes around them.

> "Flora and fauna–that gave rise to the cultural patterns live in the place deeply. In scientific data, historical records, ancient legends, regional arts, and kitchen-table conversations, are the patterns that reveal the timeless essence of a place and its whole living community"[161].

Bill Reed and Pamela Mang from Regenesis group[162] defines the methods of regenerative approaches embedded in three tier approach. Understanding and

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[156] Hydrology: the branch of science concerned with the properties of the earth's water, and especially its movement in relation to land. (Oxford dictionary)
[157] Geology: the science which deals with the physical structure and substance of the earth, their history, and the processes which act on them. (Oxford dictionary)
[158] https://regenesisgroup.com/how-we-work/
[159] Also Bill Reed from Regenesis, states "LEED and Bream is not bad they are just insufficient." Like the other research projects, Regenesis also supports sustainable systems, however, there should be a more collaborative strategy to really reach to what is desired such as restoration, evolution and regeneration.
[160] By dwell on, the relationship of the community (people) and the land (soil, landscape, nature etc.) is refered.
[161] https://regenesisgroup.com/how-we-work/
[162] "Regenesis supports this work through client services—providing the foundational thinking and management support needed to engage in regenerative projects and community development initiatives worldwide—as well as through education programs for practitioners of architecture, planning and community development"

conceptualizing right relationship to place and discovering the potentials is given as the initial step. They state that "starting with understanding the evolutionary dynamics of a place in order to identify the potential"[163] is crucial for any attempt for a regenerative system.

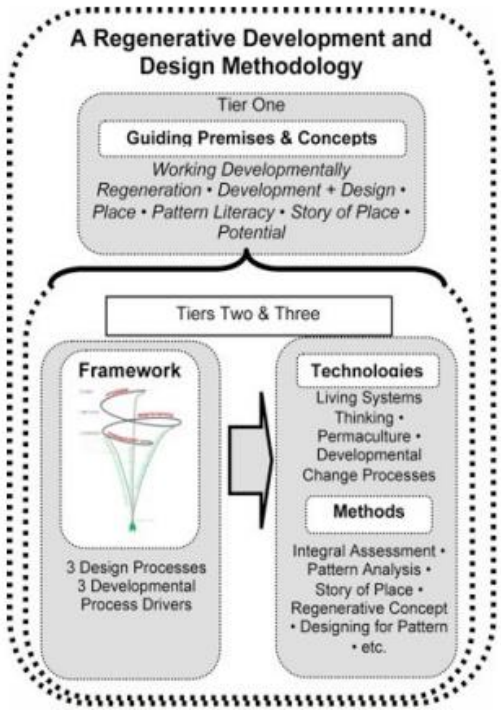


Figure 3-5: A Regenerative Development and Design Methodology (Mang & Reed, 2012, 25)

Secondly, by inventing place appropriate practices, they also promote integrative design process, which is helpful for "integration of many complex streams of work that must be engaged in simultaneously and synergistically to create a truly regenerative impact" [164]. As the third premise, Pamela Mang and Bill Reed

[163] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[164] https://regenesisgroup.com/how-we-work/

offer to switch to "work in partnership with a place and its processes"[165], in other words a partner - gardener approach rather than a controlling builder[166]. They offer the whole systems approach in the progress of harmonization. Regenerative approaches seek to catalyze a process of continually increasing the pattern harmony between human and natural systems, and require indicators and metrics that can track dynamic, wholistic and evolving processes[167].

The group have been specialized in two kind of projects. First one is "legacy Projects in which the clients come with a strong aspiration to create a project with a truly transformational impact on its surrounding community with multiple challenges in the messy dynamics of complex local systems. Story of Place helps the clients to discern how their community yearns to transform and how their project can be an effective catalyst–building authentic, reliable stakeholder investment along the way"[168]. Second one is "Community Planning whose efforts require increased levels of complexity with unprecedented levels of ambition. Without ways to collectively understand and talk about complex systems, even the most ambitious efforts may fall victim to fragmentation, divisiveness, and abstraction. In the creation of a Story of Place, Regenesis works with a project's myriad diverse stakeholders to develop a common language, shared understanding"[169].

Regenesis group define three key determining factors in their projects, which are applying whole systems thinking, manage integration and harmonization between disciplines, team members and stakeholders and grow stakeholders who understand the essence and potential of place with respect to new potential that is being offered. While doing so, they encourage ecological health developing into

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[165] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[166] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[167] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.
[168] https://regenesisgroup.com/how-we-work/
[169] https://regenesisgroup.com/how-we-work/

social health and economic health in order by inspiring, nourishing, growing habitat, value adding/ partnering, appreciating culture and evolving vocation[170].

They also offer *permaculture* in order to understand the relationship of place as *Patterns as Process.* Within their thought of *whole system planning*, there are three interconnected phenomena as defining the systems and patterns of place, developing the right mind and value adding process by recreating the community through communication and reorganization. Under the systems and patterns of place, ecological, social and cultural initiatives play significant role and they regard wellness in the culture subdivision in correlation with psychology, values and beliefs. The founders of Regenesis group[171], offer wellness based checklist for Design and Construction (SBSE) by Malcolm Wells, which provides a basic check list for determining wellness level of a development, which is going to be used to determine the wellness and regenerative capacities' methodology in this thesis.

[170] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012. – essential living process framework/ figure 8

[171] Pamela Mang and Bill Reed, who are leading Regenerative practitioners mentions the checklist in their encyclopedia of regen.

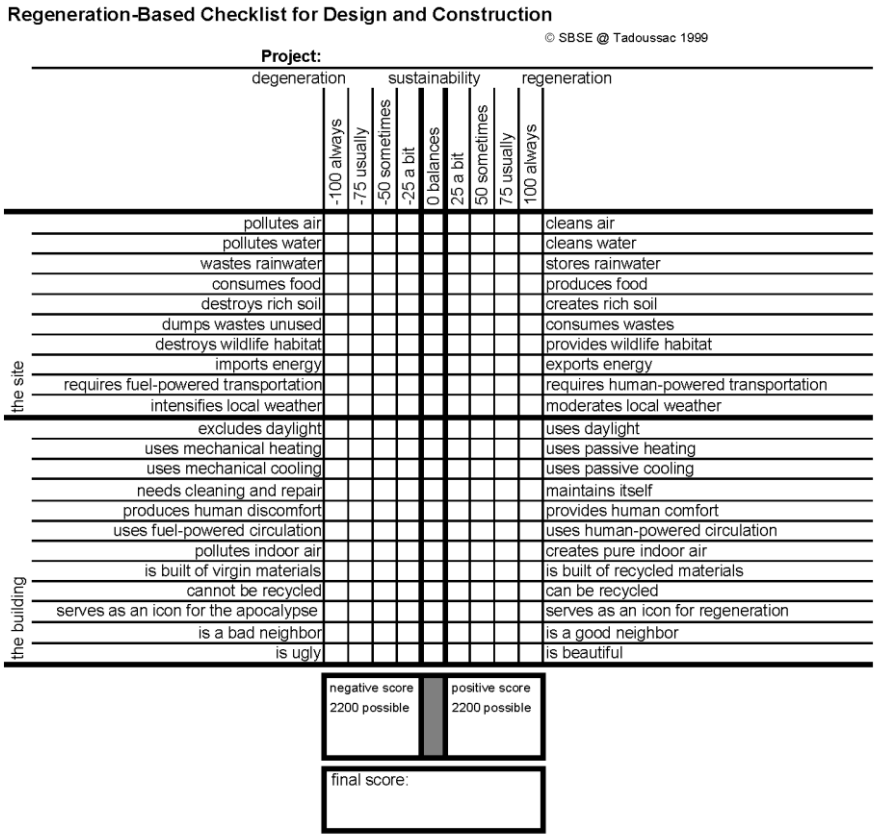


Figure 3-6: wellness based checklist for Design and Construction (SBSE) by Malcolm Wells.

Source: https://www.sbse.org/resources/regeneration-based-checklist-design-and-construction

Other than Regenesis group, there are many other progress towards regeneration concerning practice. **For the content of this thesis, REGEN Villages is going to be mentioned as the first case study.** This project resonates with *Smart cities* and *Eco-cities* as well as *Resilient cities*. Its aim is to define a software program, VillageOS™, operating system in order to create regenerative and resilient neighborhoods. James Ehrlich is founder of ReGen Villages, "a Stanford University spin-off company, realizing the future of living in regenerative and resilient communities, with critical life support of organic food, clean water, renewable

energy and circular nutritional flows at the neighborhood scale"[172], designed a prototype with Danish firm Effekt Architects.

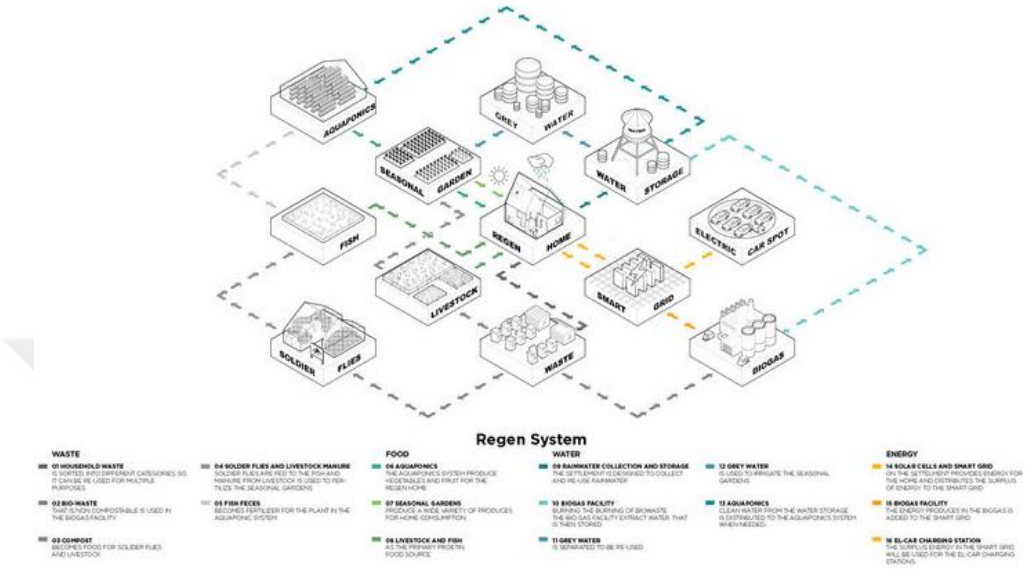


Figure 3-7: Regen Villages regenerative infrastructure diagram.

Source: https://www.effekt.dk/regenvillages

This project promotes health and wellbeing of the people by community engagement, neighborhood permaculture, biodynamic agriculture, VillageOS™ infrastructure and social and affordable housing accessibility.

[172] James Ehrlich - Experts - Singularity (su.org)



Figure 3-8: Regen Vilalges site plan view of an example settlement.

Source: https://www.effekt.dk/regenvillages

By the design, the project offers biodiversity improvement with accessible green and blue infrastructure. This exemplary project offers biophilic thinking in order to support HBI by connection to nature, thermal and air qualities, light adjustments, sensory stimulus, complexity and order as well as individual greenhouse areas. Also as the project is fully designed in accordance to the living systems thinking, it display several biophilic patterns as well as permaculture qualities, all of which endorse health and wellbeing of both people and nature. As the apparent features within Regen Villages, the winter gardens that are induced to all housing units and aeroponic, hydraponic structures enables the nourishment. Nevertheless, one major problem about the project is that it does not have a constructed example, which makes it out of reach. The studies and developments towards its realization still continues and it holds a variety of foundations support along this process.



Figure 3-9: Frontal view of Regen Villages Settlement displaying ecological qualities.

Source: https://www.effekt.dk/regenvillages

3.2.2 Continent 2: Australia – New Zeeland and Australia

Action plans of New Zeeland Government is originated in 2009 and expresses very clear approaches towards a restorative and regenerative future. The reports initially explains the current situation and business as usual approach specific to country. Govt3 organizations in New Zealand[173] decided for a sustainable future, the buildings should provide a certain level of necessary features, which can be supported by "The Ministry and the New Zealand Green Building Council to ensure Green Star rating tools are available to meet the New Zealand Energy Efficiency and Conservation Strategy (2007) targeting minimum five star rating in systems"[174].

[173] Towards a sustainable development - New Zealand Report, 2009.
[174] Towards a sustainable development - New Zealand Report, 2009.

Nevertheless, the reports reveal the fact that this *business as usual* applications, which ensures the least level of green features, are no longer sufficient.

To elaborate, "*Business-as-usual* in the New Zealand built environment has included conventional approaches to building design, and green or high performance building design, termed here as eco-efficiency,"[175] which is directly related to *low carbon city* and *eco-cities*. As *business as usual* proceed from eco-efficient practices to *net-zero impacts*, the report stated that *net-zero* will be indifferent from previous approaches if not supported or even transformed into positive outcome systems. Thus, New Zealand Government prepared development plans that emphasizes the need for a change towards regenerative practices as "the current move to eco-efficiency practices is an important first step towards achieving a short-term sustainable built environment, but it is not sustainable in the long term."[176] The reports offer a three stage transition towards regenerative development emphasizing, eco-efficient, restorative and regenerative approaches in order to provide transition in short term, midterm and long terms goals.

As the medium, the built environment is offered towards this shift, as "central and local governments are responsible for approximately 30 per cent of all construction in New Zealand"[177] concerning schools, public building, etc. The built environment generally refers to the "[human] made surroundings that provide the setting for human activity, ranging from the large-scale civic surroundings to the personal places"[178] and "given the current rate of building and demolition in New Zealand, the existing building stock in 2008 will mostly still be in place in 50 years' time."[179] Impacts of New Zealand buildings has been estimated that the building stock is responsible for 45 per cent of the electricity use, 17 per cent of carbon

[175] Towards a sustainable development - New Zealand Report, 2009.
[176] Towards a sustainable development - New Zealand Report, 2009.
[177] Ibid.
[178] Moffatt, et al, 2008 quoted in Towards a sustainable development - New Zealand Report.
[179] Towards a sustainable development - New Zealand Report

dioxide emissions and 50 per cent of waste[180]. Therefore, the use of built environment by means of this shift is logical. **As the challenge and solution, Reports offer a re-definition of existing structures. Rather than seeing buildings as individual objects, excepting them as "parts of larger systems, allowing complex and mutually beneficial interactions to occur between the built environment, the living world and human inhabitants, which ensures a constantly dynamic, responsive and resilient built environment evolves over time."[181]** Furthermore, one of the research questions that New Zealand government report seeks is whether "redesigning New Zealand's built environments using different development approaches would lead to greater benefits"[182]. This enables a better understanding of how everything is a piece of the ecosystem with their coevolving nature, therefore, the way towards regenerative thinking.

The Report state that "the only benefit regenerative development does not deliver is that it works outside the current mode of thinking on design, and economic and legal frameworks." Therefore, there is a need for further exploration and explanation of how the regenerative system will work in people's best interest to the public. While more work needs to be done to measure the existing environmental damage, "wide ranging negative environmental impacts, including impacts associated with air quality, water and energy consumption, transport accessibility, materials use and management of waste"[183] and the report also states that a research concerning "quantify the environmental impacts associated with raw material extraction, manufacture and transport"[184] is also needed to be conducted.

The reports indicate 3 key phases. First one is addressing elements that are forming the city/settlements, which are buildings, transport and infrastructure, as a

[180] 45 per cent of total electricity use – 22 per cent commercial, 23 per cent residential, 17 per cent of total carbon dioxide emissions – 8 per cent commercial, 9 per cent Residential, 50 per cent of waste (construction and demolition waste going to landfill and cleanfill).
[181] Towards a sustainable development - New Zealand Report, 2009.
[182] Towards a sustainable development - New Zealand Report, 2009.
[183] Ibid.
[184] Ibid.

whole by combining *cradle to cradle, restorative and regenerative systems*. Second point is that *cradle to cradle approach* is the one that is easy to adjust as it adapts and direct current and conventional processes of creating and maintaining the built environment. Third outcome is that *regenerative* world view needs a shift in thinking and adjustments to existing systems. **As the last key point, a combined approach of all those systems is required in order to achieve all environmental, economic and socio-cultural benefits.**

Initial plan is short-term, 5 year plan which is concluded in 2013, **"*Regenerative development* may be applied to individual projects to eventually transform the built environment in a building-by-building or development-by-development way"[185]** and "concepts could be applied to neighborhoods, larger developments, sections of cities or new towns to more effectively demonstrate the benefits of *regenerative development."*[186] The medium term plan is for 40 years, until 2048, it suggests a reconsideration of built environment with the help of "increased legislation and changing social expectations requiring the use of energy sources and building materials with environmental benefits."[187] **The long term plan, until and so forth 2088, is creating an integrated built environment like ecosystem, which may even reverse or repair "environmental damage from current and past human patterns of living."[188]** In addition to the goals of these steps, there should be a reconsideration and re-evaluation of existing building stock, as it is assumed to be still in place in the following 50 years[189]. As the conclusion, both reports emphasize that "Regenerative development requires a dramatic shift in current thinking and a more in depth understanding by the *users*[190]"[191]; **and because of the difficulty of imposing such a sudden shift, the report offers to employ the**

[185] Towards a sustainable development - New Zealand Report, 2009.
[186] Ibid.
[187] Ibid.
[188] Ibid.
[189] Ibid.
[190] Architects, practitioners, policy makers, researchers, public, citizens, etc. as it should be integrated to numerous parts of life.
[191] Towards a sustainable development - New Zealand Report, 2009.

existing theoretical frame work and mindsets which can work with and support *regenerative development.* At this point, *Living Systems thinking* and B*iophilic design principles* are emphasized as methodology towards this shift.

There are many problems on the way of these steps. Yet, the most significant one is "the current lack of an integrated approach to government development resulting in few real-life examples to provide quantifiable evidence of its benefits". **Moreover, as an interesting disclosure in the document is that the vast problem in front of place based thinking is the current practice of land's division into parcels.** This application creates detached pieces of land that does not cooperate due to loopholes in the legislations which enables them to be closed formations. Third, important problem is the choice of short-term benefits over long-term effects over the price of further *degeneration*. The investment of regenerative premises are for infrastructure of future development, which will reveal itself in the form of positive impacts or even evolution to self-sustaining systems. Since, the components will complete one another. The method for this kind of enhancements are based on planning for the bigger picture. The report offers three stage based transition period for the *investments* - the tangible and intangible effects of regenerative development are going to be perceived in the future.

To measure any kind of success, "improvements in the health and well-being of humans, other living beings and ecosystems"[192] as a whole is aimed. As the purpose, Regenerative development can deliver these improvements. It aims for positive ecological and social outcomes "where the built environment becomes a conduit for producing resources and energy, improving physical and psychological health, remedying past pollution, and transforming and filtering waste into new resources."[193] Moreover, as these reports are operating on a developmental scale, they strongly encourage physical wellbeing in terms of providing for basic indoor and outdoor improvements such as green and blue infrastructure development,

[192] Towards a sustainable development - New Zealand Report, 2009.
[193] Towards a sustainable development - New Zealand Report, 2009.

indoor light quality, and air quality as well as intellectual and emotional wellbeing in terms of restorative design, community engagement, engaging in with nature, etc.

Another organization can be emphasized in the case of New Zealand is Living building challenge[194]. The initiatives of the organization dwells on UN SDGs from their development frame and employ biophilic thinking to achieve more. As their strategy, they offer climate resilience capabilities in terms of the notion equality, healthy buildings, clean and accessible water and urban agriculture to endorse physical wellbeing, ecosystem health and sustainable economies in order to support and create meaningful connections with intellectual emotional wellbeing. The certification of Living Future challenge endorse physical wellbeing futures that is similar to Well Building certification[195]. The institute works on redefining sustainability in terms of 4 technical areas in order to support the shift towards Regenerative paradigm, which are Zero Carbon Buildings, Regenerative Procurement, Social Justice and Diversity in the building industry and Biophilic design[196]. Notably, they also work on "launching and maintaining two key educational resources, a freely accessible Biophilic Design Toolkit as well as a first of its kind Foundations of Biophilic Design Certificate"[197] in order to create health living environments as well as thriving communities.

3.2.3 Continent 3: Europe - Cost Action's RESTORE Group

"COST (European Cooperation in Science and Technology)[198] is a funding organization for research and innovation networks, who's "actions help connect

[194] https://living-future.org/strategic-plan/ - Nevertheless, the contents of Living Future Institute is mostly restricted from usage in terms of their criteria
[195] Which is going to be explained in the following chapters.
[196] https://living-future.org/wp-content/uploads/2022/05/ILFI_StrategicPlan_2022.pdf
[197] https://living-future.org/wp-content/uploads/2022/05/ILFI_StrategicPlan_2022.pdf
[198] The action is formed by many countries from all over the word in order to create a total actin. "The 40 COST Members are: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Republic of Moldova, Montenegro, The Netherlands, The Republic of North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, and United Kingdom. "

research initiatives across Europe and beyond and enable researchers and innovators to grow their ideas in any science and technology field by sharing them with their peers"[199]. Cost action executed 2 projects mainly about the need to shift to Regenerative Paradigm and its scope in terms of shaping the solutions to today's requirements. The first project, RESTORE structured into "five consecutive Work Groups (WG) in such a way that each WG was to start after the completion of the previous one, and inheriting the results from it, in an internal customer analogy"[200]. This main topic is "redefining the sustainability framework for the whole built-environment sector".

> "WG setting the bases and terminology for a new concept of sustainability (WG1. Restorative Sustainability), and then the following on the design process (WG2. Restorative Design), construction and operations (WG3. Restorative Building and Operations), solutions and building products (WG4. Rethinking Technology), finally to scale up from the building level to the district and city level (WG5. Scale jumping)".[201]

At the end of each work group process, the conducted research is gathered in a book[202].

[199] https://www.eurestore.eu
[200] RESTORE, Restory book, 2021.
[201] RESTORE, Restory book, 2021.
[202] As the conclusory review of project RESTORE, Restory booklet emphasize one missed out aspect that the research group suggests there must be further studies considering economy. Since, there were not enough economic experts in the research team. The outcomes of project are extensive



Figure 3-10: Restore Group published books cover pages collage by the author.

This recent research is crucial due to its circumstances and adaptability conditions. To explain, RESTORE started in 2018 and published the first booklet, Sustainability, Restorative to Regenerative, which is focused on creating the needed terminology of regenerative practices by WG1. One of the many outcomes of RESTORE project all together was their consensus of inefficiency experts in the area of research. In other words, as well as there is not adequate defined knowledge in regenerative development for an altogether transition, there is even fewer experts in the field; and the existing practitioners were working detached places. By means of this project, within Europe, the related researchers and practitioners have had the chance to work in cooperation[203].

[203] in terms of environmental and socio-cultural aspects due to their technical and empirical investigations by means of explanation and comparison.

As the second important objective, which also defined WP3's research, is to train professionals in order to form a group that understand regenerative thinking strategies and objectives by mentoring and teaching. Even more about the project, with the pandemic breakout, the WGs continued their projects during the *extreme* conditions by the help of technology for the distant working conditions. This was a great step towards enlarging the limits of healing and communication increasing connectedness,

As the summary of researches and published materials of Restore group, most basically, a connection to nature with the use of biophilic premises by creating a sense of place that is locally active, culturally rich and ecological environments is proposed[204], in combination with economic approaches. Also, the process is defined between these regenerative understandings in 3 dimensions that are environmental, economic and social aspects. To explain, the Working group's tasks and finding towards the way of regenerative development, several initiatives they propose is going to be explained.

Working Group 1 studied on the means of a paradigm shift from sustainability towards restorative and regenerative sustainability. **WP1 aims to inspire education to integrate regenerative approaches by examining key components of the existing sustainability approach.** From redefining the language of sustainability to repositioning human engagement within processes to ensure wellbeing through participation. The aimed outcome of **WP1 is proposed as the shifting paradigm towards regenerative thinking with design, construction, operation and maintenance of buildings while combating extremes.** Because, the built environment is a huge deal of people's lives which makes it a convenient catalyst for this change as well a big contributor to the shift[205].

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[204] Restore Group. "Sustainability, Restorative to Regenerative.". https://youtu.be/xojay-R-zXs?list=PLoZR4NiAAX-nrcPG3HJwpzMcnYY7ItT8J.

[205] WP1 also defines circular economy as the first goal, then with limited growth towards regenerative economies, resilient and positive impact can be achieved form an economic perspective.

Working Group 2 defined that there is a need for a shift towards regenerative paradigm with restorative design practice. In order to achieve this change, an **understanding of *ecosystem thinking* is significant to work and exist collaboratively with nature**, providing a connection between humans and nature. **WP2 offers built environment as the catalyst to mitigate climate change**. Although, buildings are usually considered in terms of their energy performance, they are a great opportunity for creation of local microclimates, which is a key for climate resilience. They are offering methods which can ensure a more stable climatic environment for both indoors and outdoors, by a reinterpretation of insulation, shading and façade configurations of built environment, which endorse an improved physical, intellectual and emotional wellbeing. In other words, **WP2 offers to transform buildings to regenerative objects that are a part of nature.** Thus, the connection with architecture become prominent.

Working Group 3 focusses on restorative building and operations in order them to be designed, constructed and maintained in a regenerative manner. Due to the fact that very few buildings owns sustainable and regenerative qualities, a transformation towards positive impact strategies are needed. WP3 defines the transition in 3 areas in building and real estate industry. Firstly, moving from degenerative construction strategies to positive impact. Secondly, switching from one building planning strategies to urban facilities management[206]. Thirdly, **application of regenerative building strategies to existing building stock and historic areas rather than just creating detached self-sufficient settlements.** These are the key elements of life cycle approach that is defined by Restore, in which WP1 forms the concept, WP2 offers the design by the principles and methodology and WP3 put emphasize on the whole life cycle processes by taking into account procurement, construction from

[206] This problematic situation is mentioned several times in this thesis. However, here it is important to remember that this is a wide spread issue which is associated with governments' parsellation regulations. This approach divides and separated small scale urban islands and detaches them from their surroundings, which in most of the cases, forms the close gate communities. Therefore, for any further improvements an urban planning approach that forces and bind parcels to be more coherent, codependent and interrelated is required.

preparation to management in site, commissioning through operation and maintenance all the building, and lastly, future life of the building after these processes during its existence[207]. Therefore, the built environment provides for healthy environments.

Working Group 4 defined 5 indoor qualities for a regenerative environment that nourishes human health and wellbeing[208], which are air quality, hydro-thermal environment, visual environment, acoustic environment and human values (such as connection to nature) as specific key performer indicators. Most of these indicator resonate with *biophilic design* principles. **This study promotes a post occupant evaluation as a must for regenerative environment.** In other words subjective assessments for user satisfaction is a significant feedback for shaping the environment. The WP4 also emphasized these key premises are used in the assessments in order to measure the initiatives.

Working group 5[209] is the conclusive part of restore action, who investigate the human, nature and built environment relationship by the use of *ecological thinking* with respect to pattern analysis in human- nature- built environment nexus[210]. WP5 gathered all information through their analysis into the book of Scale Jumping, which sums up a great deal of all problems mentioned above. Moreover, the book offers methodologies in order to create a criteria for future research to transition path for regenerative development. WP5 also analyze systems such as *Smart cities*, big data that enables HBI to reach a *regenerative* state and technologies that helps to create a *regenerative environment*, smart grids, pollution absorbing bricks, smart windows etc. Besides, WP5 also investigate design and assessment tools that can contribute to

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[207] Restore Group. "Restorative Building and Operations." https://youtu.be/RHFTzfA2Xzk?list=PLoZR4NiAAX-nrcPG3HJwpzMcnYY7ItT8J.
[208] Restore Group. "Rethinking Technology." https://youtu.be/w56FI6s9ZFg?list=PLoZR4NiAAX-nrcPG3HJwpzMcnYY7ItT8J.
[209] Reith, A., Brajković, J. Scale Jumping: Regenerative Systems Thinking within the Built Environment. A guidebook for regenerative implementation: Interactions, tools, platforms, metrics, practice. COST Action CA16114 RESTORE. (2021).
[210] Restore Group "Scale Jumping." https://youtu.be/U1My4jn8Jf4?list=PLoZR4NiAAX-nrcPG3HJwpzMcnYY7ItT8J.

collaborative processes that encourages regenerative outcomes; and for the assessment of wellbeing several certification systems as well as mindsets are offered. Therefore, as the widely acknowledged example, Well certification is mentioned.

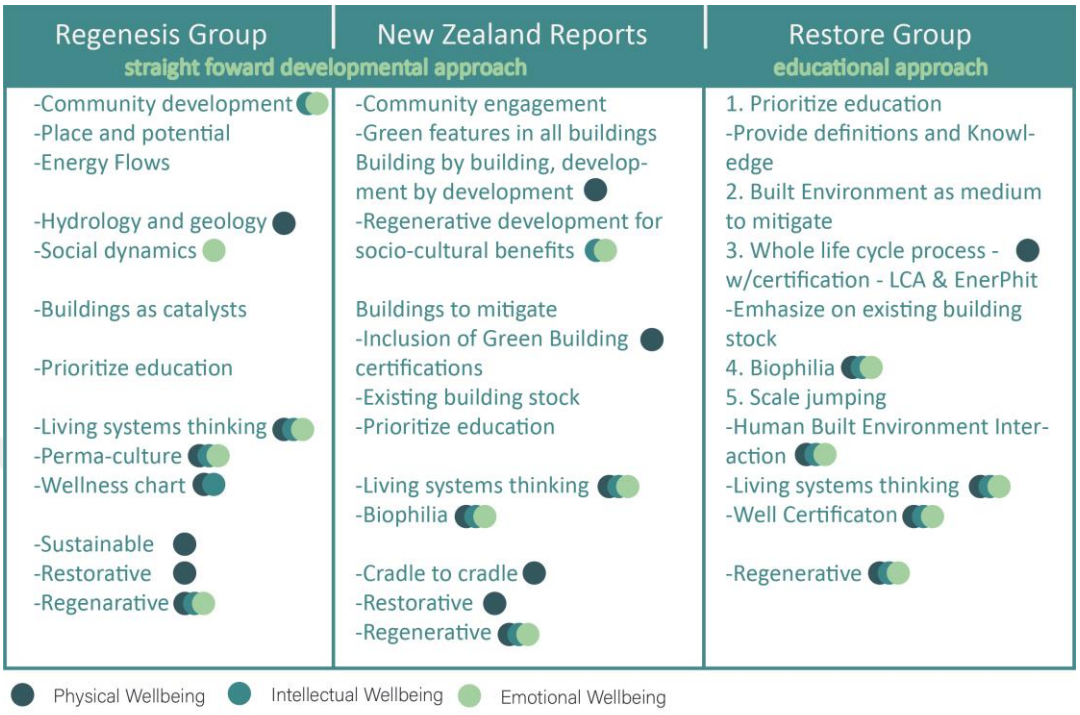
As the main aim of all WGs, refurbishing and nourishing existing spaces with this approaches are offered as the new state of mind for further developmental guidelines for urban agenda of Europe; and all initiatives that are derived from Cost Restore Action groups aim to increase health and wellbeing of people.

3.2.4 The State of Regenesis and Regenerative Design in Architecture towards Wellbeing

"The design of a project does not end with the delivery of the final drawings and approvals, or even with construction of a project' but design responsibilities include taking responsibility of the place"[211]. Therefore, the idea of a continuous 'regenesis' become prominent. Regenesis means 'renewal' or 'rebirth'. For this thesis' purposes, it defines the state of healed continuous, nourishing condition of any systems with health flows. **The state of Regenesis** is regarded as the flourishing capacity of improving health and wellbeing to their ideal state. From the perspective of this thesis, by means of examination of the research projects, several approaches that endorse the state of regenesis is derived, which are regenerative design principles, systems thinking and biophilic patterns as well as existing sustainable development approach including certifications for buildings. For the current state of the world, due to the extremes, Pandemic and war, there is a great need for implementing wellbeing encouragements. **How to transform the existing infrastructure in order to support health and wellbeing is one of the main research questions of this thesis.**

[211] Mang, Pamela, and Ben Haggard. Regenerative Development and Design: a Framework for Evolving Sustainability. Hoboken, NJ: Wiley, 2016.

Table 3-1: The methodological summation of aforementioned research projects drawn by the author.



To sum up the research projects, Regenesis Group and Restore Group aims to define a frame for regenerative development in terms of its operation and application as well as to provide educational data for interested designers and practitioners. New Zealand governmental reports emphasize their plan towards a large scale application, including short term, midterm and long term models for a gradual application of regenerative mindset. From all the information gathered from researches and projects, there are several common conclusions, which aims to promote health and wellbeing embedded in Regenerative development.

Firstly, in order to encourage regenerative development, there should be a change in the mindsets. Although, this shift should be immediately, it cannot happen suddenly. **Therefore, dwelling on existing business as usual approaches such as green building initiatives is proposed in order to proceed during transition. From this perspective, the existing green certified building stock becomes the**

primary database to look for regenerative possibilities as well as indicators of increased health and wellbeing for both environment and people. Since, all projects offer to promote the HBI for increased health and wellbeing.

As another point derived from methodologies from the action plans and organizations is their future strategies, which include to recruit and educate more, also define specific policy to evaluate and guide the projects or members according to their principles[212]. As, the aims of Paris Agreement and UN SDGs as in decreasing current level of *degeneration*, *regenerative development* should be promoted. Nevertheless, there is very limited number of people who are able to provide information for this transformation.

Thirdly, New Zealand governmental reports both decides that **the *business as usual models* are now at the edge of being indifferent.** Since, they have minimal progress compared to needs and correspondence to the *extremes*. All research groups agree that a kind of green evaluation tool or system should be employed for any kind of future development in order to keep degeneration minimal. United States and European research groups also concludes that there should be careful considerations in the decision making process concerning empirical studies as well as qualitative and quantitative assessment strategies. Therefore, the usage of multiple assessment methods in order to reach net-zero impact with emphasize on quality is encouraged. Also, for the increase of health and wellbeing of not only the environment but also humans should become one of the primary concerns in order to guide towards the way to *the state of regenesis* in the choosen assessment strategies.

The world has set its direction towards *regenerative development* which is more articulated than just any checklist based assessment. Because, certified buildings only insure "minimum standards for utilization"[213] which is enough for

[212] This specific part is summed up from all action plans, researches mentioned and projects referred as their future methodology. Also some institutes and organizations that have not been mentioned in this chapter have adopt the same objectives such as Living Future Institute with its Living Future Challenge (https://living-future.org/lbc/), World Green Council with its Carbon Road Map

[213] Pamela Mang and Bill Reed's "Regenerative Development Regenerative Development and Design." Encyclopedia of Sustainability Science and Technology, 2012.

doing less good, however, but not for further steps; and regenerative systems restore biodiversity, which enables positive outcomes in terms of ecosystems as well as economic and socio-cultural profits. Moreover, if "every building could regenerate at least one system, climate and earth would heal soon"[214]. Furthermore, multiple evaluations and plans at once with the help of employing distinct design approaches can offer regenerative solutions; and as UN SDGs defines the main frame problems, it is evident that they are large scale. There is a need for positive outcome development strategies in order to support the existing systems and solve the dependencies. At last, all research projects and groups point out several existing thinking strategies, which are systems thinking, permaculture and biophilia concepts, in order to define regenerative development and its aim so as to be used as foundations for the development and implementation of regeneration for an increased health and wellbeing.

To conclude this thesis regards regenerative development and design from health and wellbeing point of view. Therefore, concept of wellbeing in terms of it components physical, intellectual and emotional aspects from Zari's The X Factor Wellbeing table are going to be correlated with three evaluation mechanism driven from the research projects, which are Wellness Chart, Well Certificate and Biophilic Design Principles in order to offer a system to read regenerative possibilities. Moreover, this study emphasize the use of biophilic principles in the path through regenerative development for its ability to promote proven wellbeing benefits. The core ideas of regenerative development dwell on health and wellbeing of both humans and nature.

[214] Importance of Regenerative Systems in Architecture for Climate Change by Gautami Prabhakar Bura1, Dr. Parag Govardhan Narkhede

CHAPTER 4

EXAMINATION AND COMPARION OF METHODOLOGY WITHIN REGENERATIVE DEVELOPMENT: TOWARDS A WELLBEING NOURISHMENT

In the following chapter of this research, architectural examples with a type of sustainable certification is going to regarded as the base point database in order to investigate the regenesis possibility in Turkey by proposing two case studies. The methodologies from research projects are derived as wellness chart, Well certificate's initiatives and biophilic patterns in terms of their significance by providing an improved health and wellbeing to people.

4.1 Highlight of Datum: Largely acknowledged Certifications and their Combination to Wellbeing

In this part, there is going to be brief explanations of the assessment methods that are mentioned in the previous chapters. To give the basic frame of mentioned quantitative Certification systems such as LCA and Enerphit and qualitative certifications such as Well Certification, Leed and Breeam, a limited portion of basic framework standards for the built environment projects is going to be represented.

4.1.1 Quantitative assessment Methods for Health

4.1.1.1 Life Cycle Assessment

LCA is a quantitative assessment method which evaluates and tracks the carbon emission levels as well as environmental impacts by taking account every aspect of the life cycle of any given product, system or service. The method analyzes greenhouse emissions in order to calculate carbon footprint throughout whole life cycle from source to end of life/ recycle phase. LCA is regarded with simplified

versions, which distinguish different elements, such as energy, impact or CO2; and proceeds with the analysis in that variable's perspective. One of these simplified analysis is LCEA (Life Cycle Energy Analysis). This version of the evaluation considers "all energy inputs required to produce components, materials and services needed to for the manufacturing processes."[215] LCCO2A (Life Cycle CO2 Analysis) assesses the product, system or service throughout its whole life cycle in term of its CO2 emissions, which does not only effect cost progress but also helps reduced the whole carbon footprint throughout process. RESTORE action offers Life Cycle Analysis method in order to control the carbon emission in new projects.

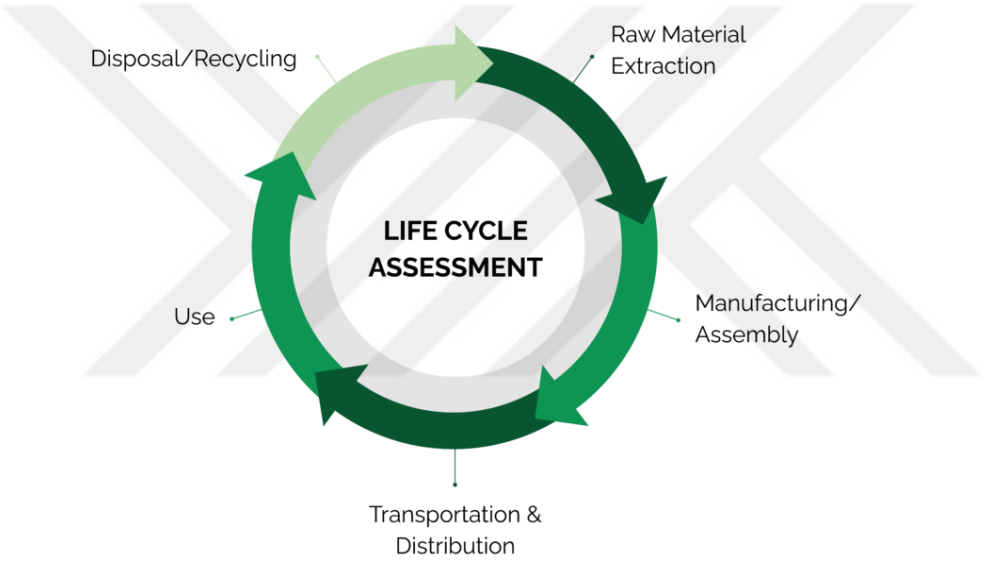


Figure 4-1: Life Cycle Assessment explained by Sustainability Tools in Cultural.

Source: Heritage (STiCH) is a life cycle assessment (LCA) Carbon Calculator and Library of Case Studies and Information Sheets can be found in their database. (Directly used from https://stich.culturalheritage.org/life-cycle-assessment-explained/)

[215] Kundu, Varnika. "Life Cycle Assessment Explained." STiCH, September 25, 2022. https://stich.culturalheritage.org/life-cycle-assessment-explained/.

Nevertheless, as LCA's quantitative analysis strategy is dependent on the founding's features such as used units, references, the aim alters the result's characteristics for future utilization, this evaluation system only includes improvement possibilities for *physical wellbeing*. As the second phase, life cycle inventory stage focusses on the flows of each service or system. "The LCI consists of lists of all flows of resource inputs and emission outputs that occur producing the reference flow of each product option."[216]

4.1.1.2 EnerPhit

EnerPHit[217] is a passive house certification system, which is proposed in order to assess and regulate the existing building stock's energy lay out for the short term process of transition towards regenerative development. So as to briefly explain the criteria, it is centered on yearly energy consumption for heating, cooling and humidifying, hot water, house waste disposal to be below certain respective[218] kWh/m2 values; and airtightness value[219] under pressure[220]; and it can work incorporation with the existing heat and insulation regulations in Turkey.

The certification system consists of two methodological approaches which can be applied to the existing built environment. First method is the assessment in terms of the U coefficient[221] in the construction elements and the second one is to proceed through energy demand chain. The criteria of certification system differs

[216] Sutton, S. "Life Cycle Assessment Explained." STiCH, September 25, 2022. https://stich.culturalheritage.org/life-cycle-assessment-explained/.
[217] A certification method whose criteria defined by the Passive House Institute, which is founded in 1996 in Damstadt and has being applied in different climatic regions since 2013, for already existing buildings.
[218] Below 15 kWh/m2, 15 kWh/m2 and 120 kWh/m2 respectively.
[219] It should be below 0,6 under 50 Pa pressure.
[220] Ahunur Aşıkoğlu (2021). Pasif EV Sertifika Sisteminin Mevcut Binalarda uygulanması: Enerphit Sertifika Sistemi. Afyon Kocatepe University Journal of Sciences and Engineering, 21(5), 1146–1156.
[221] Heat conductivity coefficient. It is different for any material.

among the climate regions[222]. In the same direction with UN development goals and Restore Groups project this certification is depicted in order to transform the existing built environment basically. The approaches *EnerPhit* certificate is offering can be implemented in existing building stock in order to achieve minimum level of physical wellbeing. There are different path ways that can be pursued in order to decrease emissions to achieve solutions for UN SDGs. To exemplify, the existing building stock is a massive weight in terms of energy consumption and carbon emission. The more regulations about energy transmissions in existing buildings are acknowledged, the more significantly emission levels decreases. So as to offer solutions to UN SDGs in the path towards regenesis, RESTORE action offers *EnerPhit directives* in order to decrease the carbon emission in existing projects.

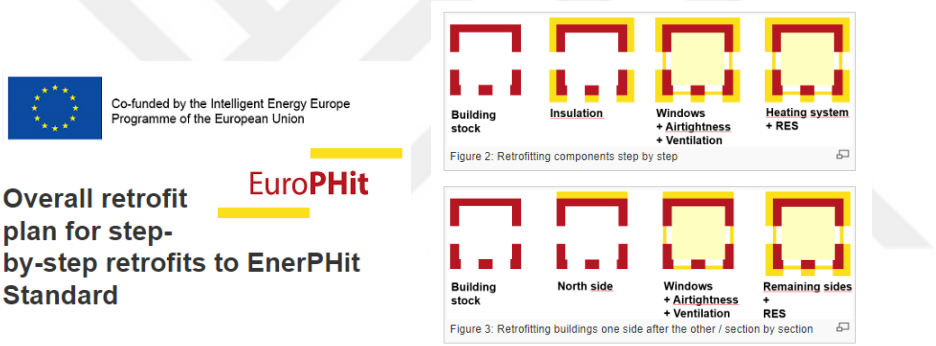


Figure 4-2: Diagram concerning the key elements of passive design.

Source:https://passipedia.org/planning/refurbishment_with_passive_house_components/overall_retrofit_plan_for_step-by-step_retrofits_to_enerphit_standard

[222] Ahunur Aşıkoğlu (2021). Pasif EV Sertifika Sisteminin Mevcut Binalarda uygulanması: Enerphit Sertifika Sistemi. Afyon Kocatepe University Journal of Sciences and Engineering, 21(5), 1146–1156.

4.1.2 Qualitative Assessment Methods to Support Existing Quantitative Approaches: Intangibility of Wellbeing

In decision phase of qualitative or quantitative analysis of any project, the assessment process is valued in terms of certification by the stakeholders, designers or constructers; and every scenario goes down to certifications' economic profits. Since, last decision is mostly the stakeholder's or contractors'. **Therefore, one certificate prioritizing economic gains becomes a deception instead of real sustainable goals.** Nonetheless, there should be an understanding of the investments towards a better world. As social and economic systems support each other by improving one another, the gains are able to be collective. For example, if quantitative certification such as LCA results are taken into consideration in any given certified project, the certificate tends to improve in qualitative certifications as well such as a BREEAM Excellent project becoming a BREEAM Outstanding level[223]. Furthermore, Passive House standards also adds up to these improvements in terms of existing building stock applications.

From a *regenerative development* perspective, not only one system is enough, but also the usage of multiple systems is necessary. Since, most aspects of these certification systems are short in terms of quality assessment resulting in the intangible concepts such as wellbeing. To elaborate, it can be inferred that building certification systems comprehensively integrate different divisions of sustainability into their evaluation[224] and the result is calculated as a percentage of earned credit points. In general, key characteristics of the systems can be categorized as environmental benefits concerning resources such as energy, materials, water, and land; economic dimensions related to cost monitoring, economic efficiency calculations, and the life cycle cost analysis; regulations including building certification, national and international building regulations and codes; and social

[223] The same relationship of improvement also applies for both LEED and DGNB certification systems as well.
[224] From *Importance of Regenerative Systems in Architecture for Climate Change* by Gautami Prabhakar Bura1, Dr. Parag Govardhan Narkhede.

dimensions as in promoting physical health with material choices, thermal considerations etc., in which building certification systems have to rigorously implement. Nevertheless, wide spread qualitative certification systems such as Leed, Breeam cannot deeply incorporate with every social aspect in their evaluation. **When creating regenerative systems, more than one evaluation medium is required in order to procure the results diversely. This thesis regards health and wellbeing component of regenerative systems and derives methodological preferences from world wide research projects in order to achieve refurbished designs by the implementation a combination of patterns of Biophilic Desgin, Well Certification and Project Based Wellness Chart.**

4.1.2.1 Wellness based checklist for Design and Construction (SBSE) by Malcolm Wells

Initially, Wellness based checklist for Design and Construction (SBSE) by Malcolm Wells is going to be used without any graphical alteration in order to reflect its simplicity in its own way. The criteria from the chart matches with the variables of Well Certification and Biophilic patterns and offers a percentage based evaluation towards how much is that variable is implemented. The ones concerning the site are serving for physical wellbeing and several of them relates to intellectual wellbeing, while the variables of the building section are related with intellectual and emotional wellbeing. This chart is a very basic combination of simple concerns in order to provide a product that ensures HBI within architectural implementations concerning wellbeing nourishment. Also, it includes the basic concepts of certifications that are mentioned in both previous and sequent chapters such as passive house systems, thermal comfort levels and providing for natural elements.

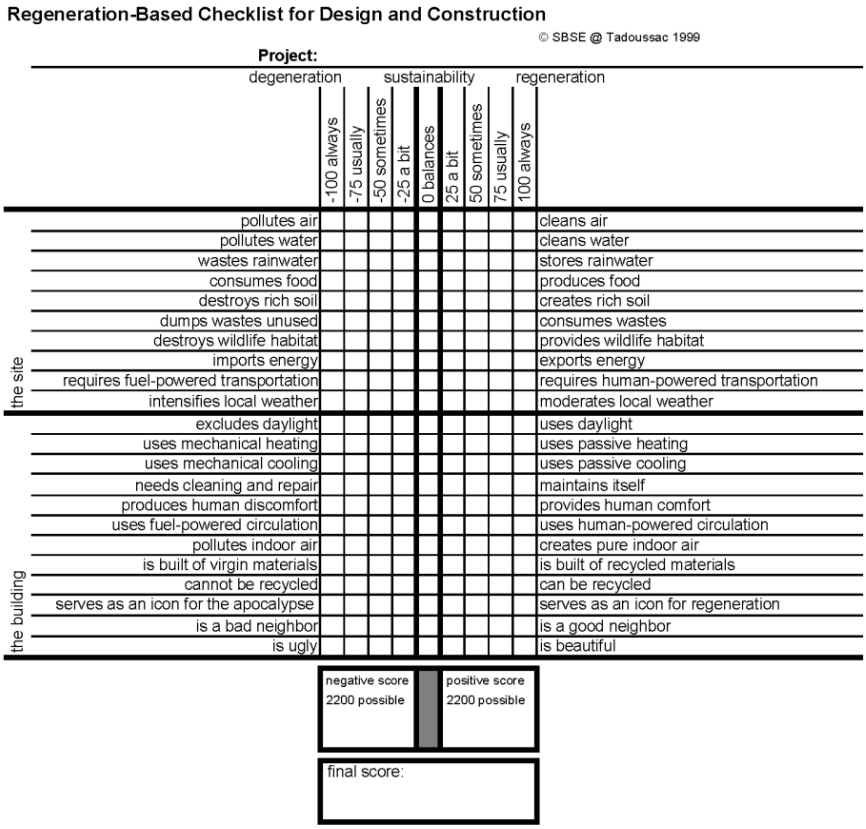


Figure 4-3: One of the methods offered as the assessment strategy by Regenesis.

Source: https://www.sbse.org/resources/regeneration-based-checklist-design-and-construction

4.1.2.2 Well Certificate

The certificate consist of eleven variables and their components. The variables are air, water, nourishment, light, movement, thermal comfort, sound, materials, mind, community and innovation. In terms of Well certificate, the selected projects in Turkey are going to be evaluated with the correlation chart – Wellness Table with Biophilic patterns so as to discover if they indicate any possibility for these variables or not.

As the first variable, **Air** is regarded in terms of quality, smoke free environment, ventilation design, construction pollution management, enhanced air quality, enhanced ventilation design, operable windows, air quality monitoring and awareness, pollution infiltration management, combustion minimization, source separation, air filtration, enhanced air supply and microbe and mold control. **Air is directly related with *physical wellbeing*.**

As the second variable, **Water** is going to be evaluated in terms of quality indicators, drinking water quality, basic water management, enhanced water quality, moisture management, hygiene support and onsite non-portable water reuse. **Water is directly related with both physical and intellectual wellbeing.**

As the third variable, **Nourishment** consists of fruits and vegetables, nutritional transparency, refined ingredients, food advertising, artificial ingredients, portion sizes, nutrition education, mindful eating, special diets, food preparation, responsible food sourcing, food production, local food environment and red and processed meats. **Nourishment is directly related to physical wellbeing and intellectual wellbeing in terms of engaging with nature and holistic sensory design.**

As the forth variable, **Light** is evaluated in terms of exposure, lighting design, circadian lighting design, electric light glare control, daylight design, visual balance, electric light quality and occupant lighting control. **Light is directly related to physical wellbeing.**

As the fifth variable, **Movement** consists of active building and communities, ergonomic workstation design, circulation network, facilities for active occupants, site planning and selection, physical activity opportunities, active furnishing, physical activity spaces and equipment, physical activity promotion, self-monitoring and ergonomics programming. Movement is directly related with physical wellbeing, intellectual wellbeing and emotional wellbeing in terms of collective cultural and individual aspirations as well as mood creation and modification.

As the sixth variable, **Thermal Comfort**, is evaluated in terms of thermal performance, verified thermal comfort, thermal zoning, individual thermal control,

radiant thermal comfort, thermal comfort monitoring, humidity control, enhanced operable windows and outdoor thermal comfort. **Thermal comfort is directly related with physical wellbeing and intellectual wellbeing.**

As the seventh variable, **Sound** consists of sound mapping, maximum noise levels, sound barriers, reverberation time, sound reducing surfaces, minimum background sound, impact noise management, enhanced audio devices and hearing health conservation. **Sound is directly related with physical wellbeing and intellectual wellbeing.**

As the eighth variable, **Materials** is regarded in terms of material restrictions, interior hazardous material management, CCA and Lead management, site remediation, enhanced material restrictions, volatile organic compounds restrictions, material transparency, material optimization, waste management, pest management and pesticide use, cleaning products and protocols and contact reduction. **Materials is directly related with physical wellbeing, intellectual wellbeing and emotional wellbeing in terms of ambiance and symbolism.**

As the ninth variable, **Mind** consists of mental health promotion, nature and place, mental health services, mental health education, stress management, restorative opportunities, restorative spaces, restorative programming, enhanced access to nature, tobacco cessation and substance use services. **Mind is directly related with physical wellbeing, intellectual wellbeing in terms of sensory design and emotional wellbeing.**

As the tenth variable, **Community** is regarded as health and wellbeing promotion, integrative design, emergency survey, enhanced occupant survey, health services and benefits, enhanced health and wellbeing promotion, new parent support, new mother spot, family support, civic management, diversity and inclusion, accessibility and universal design, emergency resource, emergency resilience and recovery, housing equity, responsible labor practices and support for victims of domestic violence. **Community is directly related with physical wellbeing in terms of safety, intellectual wellbeing and emotional wellbeing.**

As the eleventh variable, **Innovation** consists of innovate WELL, WELL accredited professional, experienced Well certification, gateways to wellbeing, green building rating systems and carbon disclosure and reduction. **Innovation is directly related with emotional wellbeing in terms of restorative design.**

4.1.2.3 14 Biophilic Patterns of Terrapin Bright Green' conceptual explanation

Terrapin Bright Green is an environmental consulting company which has conducted extensive interdisciplinary research and used empirical evidence to create the "14 Biophilic Patterns"[225], which serve for improving health and wellbeing. There are three classifications and 14 patterns within. First classification is Nature in Space. It defines 7 patterns; which are Visual connection to nature, Non-visual connections with nature, Non-Rhythmic Sensory Stimuli, Thermal & Airflow Variability, Presence of Water, Dynamic & Diffuse Light and Connection with Natural Systems. Second classification is Nature Analogues and it consists of 3 patterns which are Biomorphic Forms & Patterns, Material Connection with Nature and Complexity & Order. Third classification is Nature of the Space. It is defined with 3 patterns which are Prospect, Refuge, Mystery and Risk/Peril as an identifiable threat coupled with a reliable safeguard[226].

Biophilic principles incorporation with health and wellbeing dwell on three stages thinking in terms of applying rules of nature to human systems; feeling in terms of cultivating a different set of qualities internally; and connecting in terms of Working together to weave a new culture of progress into the world[227]. These criteria

[225] "14 Patterns of Biophilic Design." Terrapin Home - Terrapin Bright Green, September 12, 2014. https://www.terrapinbrightgreen.com/reports/14-patterns/#nature-in-the-space.
[226] "14 Patterns of Biophilic Design." Terrapin Home - Terrapin Bright Green, September 12, 2014. https://www.terrapinbrightgreen.com/reports/14-patterns/#nature-in-the-space.
[227] Regenerative Mindsets (Plaut and Amedée, 2018)

offer a series of spiritual connection directly to the wellbeing. To explain, the data[228] from Biophilic Design Patterns and Biological Responses table[229] is going to be elaborated. The patterns are directly correlated with three biological responses, which are Stress Reduction in terms of physical wellbeing, Cognitive Performance in terms of intellectual wellbeing and Emotion, Mood and Preference in terms of emotional wellbeing.

As the first pattern, **Visual connection with nature** enables lowered blood pressure and heart rate in Stress Reduction, improved mental engagement and attentiveness in Cognitive Performance and positively impacted attitude and overall happiness in Emotion, Mood and Preference.



Figure 4-4: Peter Zumthor's Therme Vals open pool area displaying several biophilic patterns.

[228] To state here, all datum are taken from Terrapin Bright Green' Biophilic Design Patterns and Biological Responses table which indicates all variables and responses with their related empirical studies.

[229] Table 1 explaining the biological responses with biophilic patterns; all responses that are stated in the chart are derived from empirical studies that are referred at the specific section of Table 1 from the source of referred table 1: https://www.terrapinbrightgreen.com/reports/14-patterns/#nature-in-the-space

The second pattern, **Non-Visual connection with nature** provides for reduced systolic blood pressure and stress hormones in Stress Reduction, positive impact in Cognitive Performance and improved in mental health and tranquility in Emotion, Mood and Preference.

The third pattern, **Non- Rhythmic Sensory Stimuli** with nature positively impacted heart rate, systolic blood pressure and sympathetic nervous system activity in Stress Reduction, quantified behavioral measures of attention and exploration in Cognitive Performance and improved in mental health and tranquility in Emotion, Mood and Preference.

The forth pattern, **Thermal & Airflow Variability** with nature positively impacted comfort, well-being and productivity in Stress Reduction, helps concentration in Cognitive Performance and improved perception of temporal and spatial pleasure in Emotion, Mood and Preference.



Figure 4-5: Thermal and airflow pattern and presence of water.

The fifth pattern, **Presence of Water** help to reduced stress, increases feelings of tranquility, lower heart rate and blood pressure in Stress Reduction, improves concentration and memory restoration in Cognitive Performance and indicate preferences and positive emotional responses in Emotion, Mood and Preference.

The sixth pattern, **Dynamic & Diffuse Light** positively impact circadian system functioning and increase visual comfort in Stress Reduction.

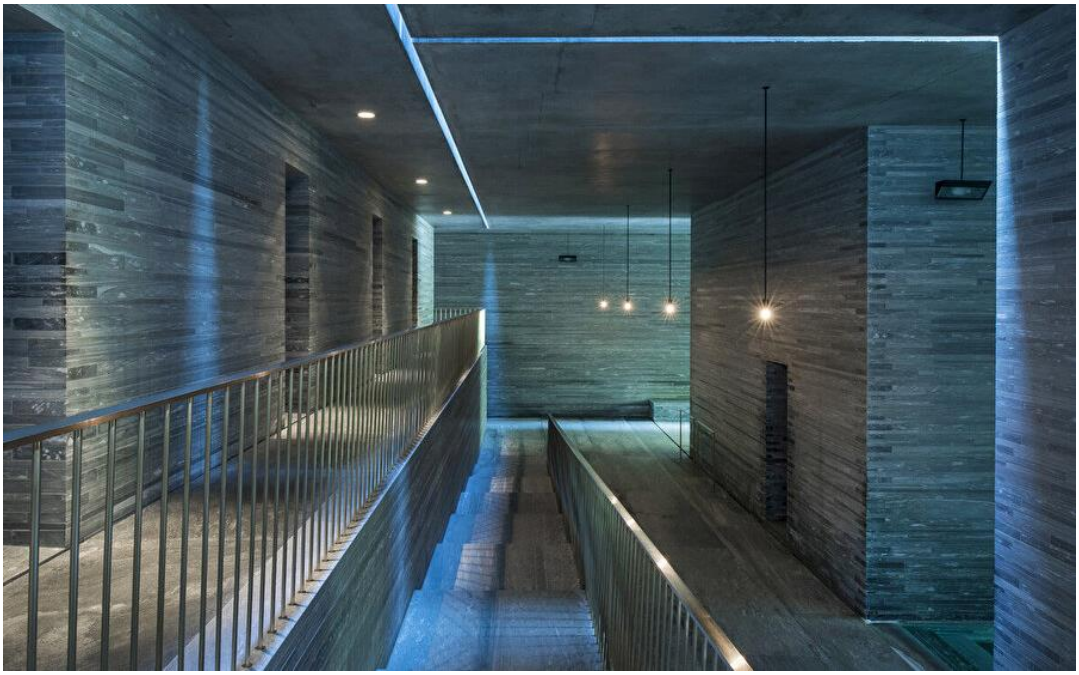


Figure 4-6: Interior space of circulatory space within the building displaying light and shades.

The seventh pattern, **Connection with Natural Systems** enhances positive health responses; Shifted perception of environment in Emotion, Mood and Preference.

The eighth pattern, **Biomorphic Forms & Patterns** increased view preference is observed in Emotion, Mood and Preference.

The ninth pattern, **Material Connection with Nature** decreases diastolic blood pressure and improved creative performance in Cognitive Performance and improves comfort in Emotion, Mood and Preference.

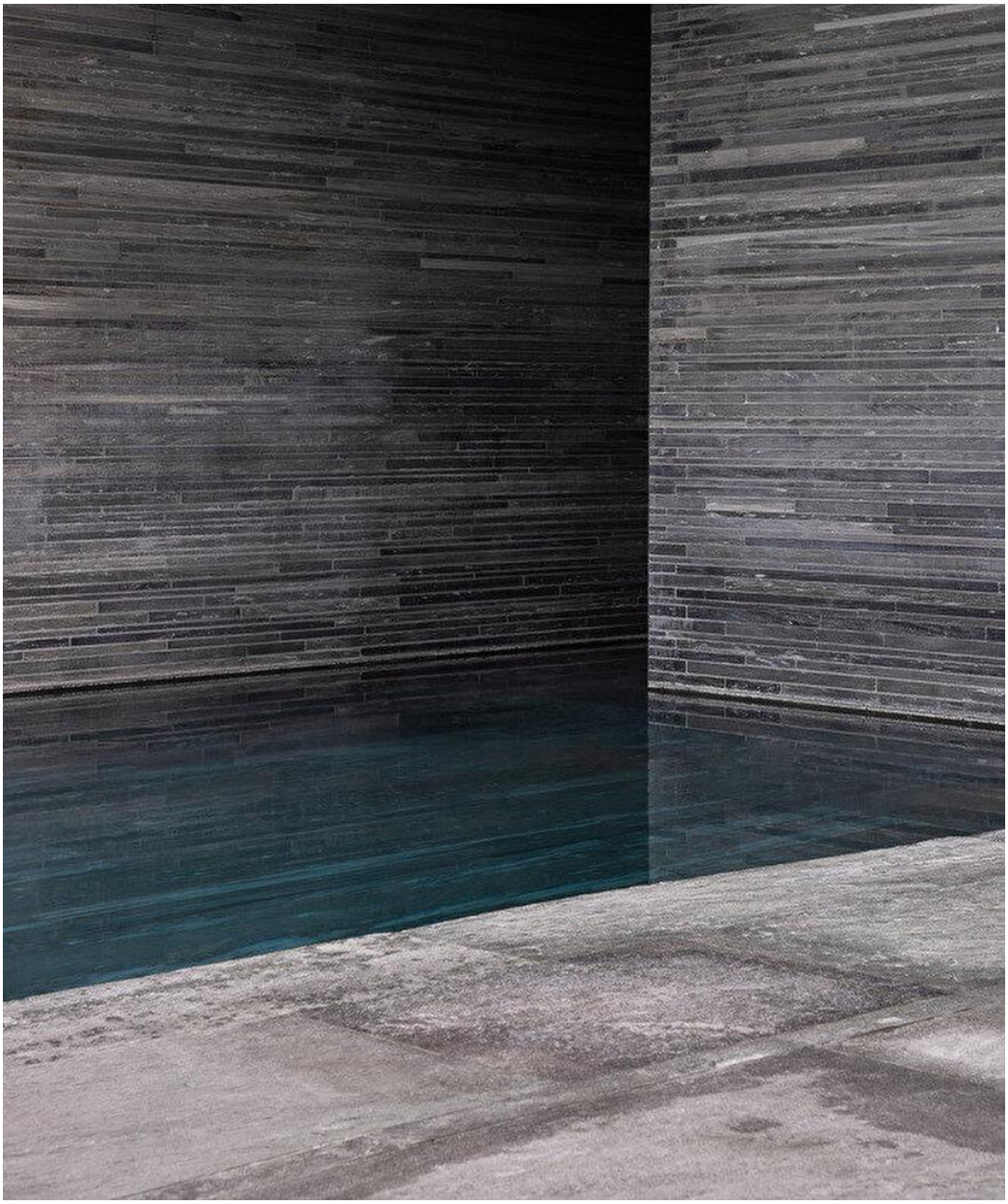


Figure 4-7: Displaying texture of materials in their own composition referencing both complexity and materials of nature.

The tenth pattern, **Complexity & Order Positively** impact perceptual and physiological stress responses in Stress Reduction and observe view preference in Emotion, Mood and Preference.

The eleventh pattern, **Prospect** stands for "evolution from research on visual preference and spatial habitat responses, as well as cultural anthropology, evolutionary psychology and architectural analysis"[230]. It reduce stress in Stress Reduction, reduce boredom, irritation, fatigue in Cognitive Performance and improve comfort and perceived safety in Emotion, Mood and Preference.



Figure 4-8: Therme Vals outer view displaying prospect pattern

[230] "14 Patterns of Biophilic Design." Terrapin Home - Terrapin Bright Green, September 12, 2014. https://www.terrapinbrightgreen.com/reports/14-patterns/#prospect

The twelfth pattern, **Refuge** stands for "is a place for withdrawal, from environmental conditions or the main flow of activity, in which the individual is protected"[231], improves concentration, attention and perception of safety in Cognitive Performance.

The thirteenth pattern, **Mystery** implies to raise interest in order one to "further investigate the space"[232]. It induce strong pleasure response in Emotion, Mood and Preference.



Figure 4-9: Interior of the hotel displaying Prospect, Mystery and Refuge patterns.

[231] "14 Patterns of Biophilic Design." Terrapin Home - Terrapin Bright Green, September 12, 2014. https://www.terrapinbrightgreen.com/reports/14-patterns/#refuge
[232] "14 Patterns of Biophilic Design." Terrapin Home - Terrapin Bright Green, September 12, 2014. https://www.terrapinbrightgreen.com/reports/14-patterns/#mystery

The fourteenth pattern, **Risk and Peril** stand for an implication of "a kind of threat that makes one explore more about it almost irresistibly"[233]. It results in strong dopamine or pleasure responses in Emotion, Mood and Preference.

To exemplify these Biophilic patterns within an existing structure, Peter Zumthor's Therme Vals[234] is given in between the pattern explanations. To give some information, it is a hotel project, which is accompanied with thermal spas, located in Graubunden Katarakn Thermal pools in Switzerland. The structure embraces stone from the surrounding mountains as its main material and emphasize natural textures while offer a holistic sensory experience to its visitors.

The architectural design of the project also enables multiple Biophilic patterns to be perceived within the same places as several of them stated in Figures 4-9 and 4-10. It can be whether the green balconies of Bosco Verticalle (1) or the Alle of Salt Institute (9), it is evident in the given examples that Biophilic features enables the livelihood and instant feel of interaction within architecture, which prompts the X Factor. As "new research supports measureable, positive impacts of biophilic design on health, strengthening the empirical evidence for the human-nature connection"[235], with regard to the research projects, it is obvious that the usage of Biophilia in daily structures can be embraced to create meaningful connections; thus for them to become architecture. To improve health and wellbeing, Biophilia is regarded as one of the solid paths to consider as it has wide limits of application such as implementations in landscapes, interiors or even in art objects.

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[233] "14 Patterns of Biophilic Design." Terrapin Home - Terrapin Bright Green, September 12, 2014. https://www.terrapinbrightgreen.com/reports/14-patterns/#riskandperil.

[234] All images are used from https://www.gzt.com/arkitekt/duyulara-hitap-eden-mimar-peter-zumthor-3563817 website, a Turkish architectural news formation, Arkitekt's introductory article of the architect, Peter Zumthor.

[235] "14 Patterns of Biophilic Design." Terrapin Home - Terrapin Bright Green, September 12, 2014. https://www.terrapinbrightgreen.com/reports/14-patterns/#riskandperil.

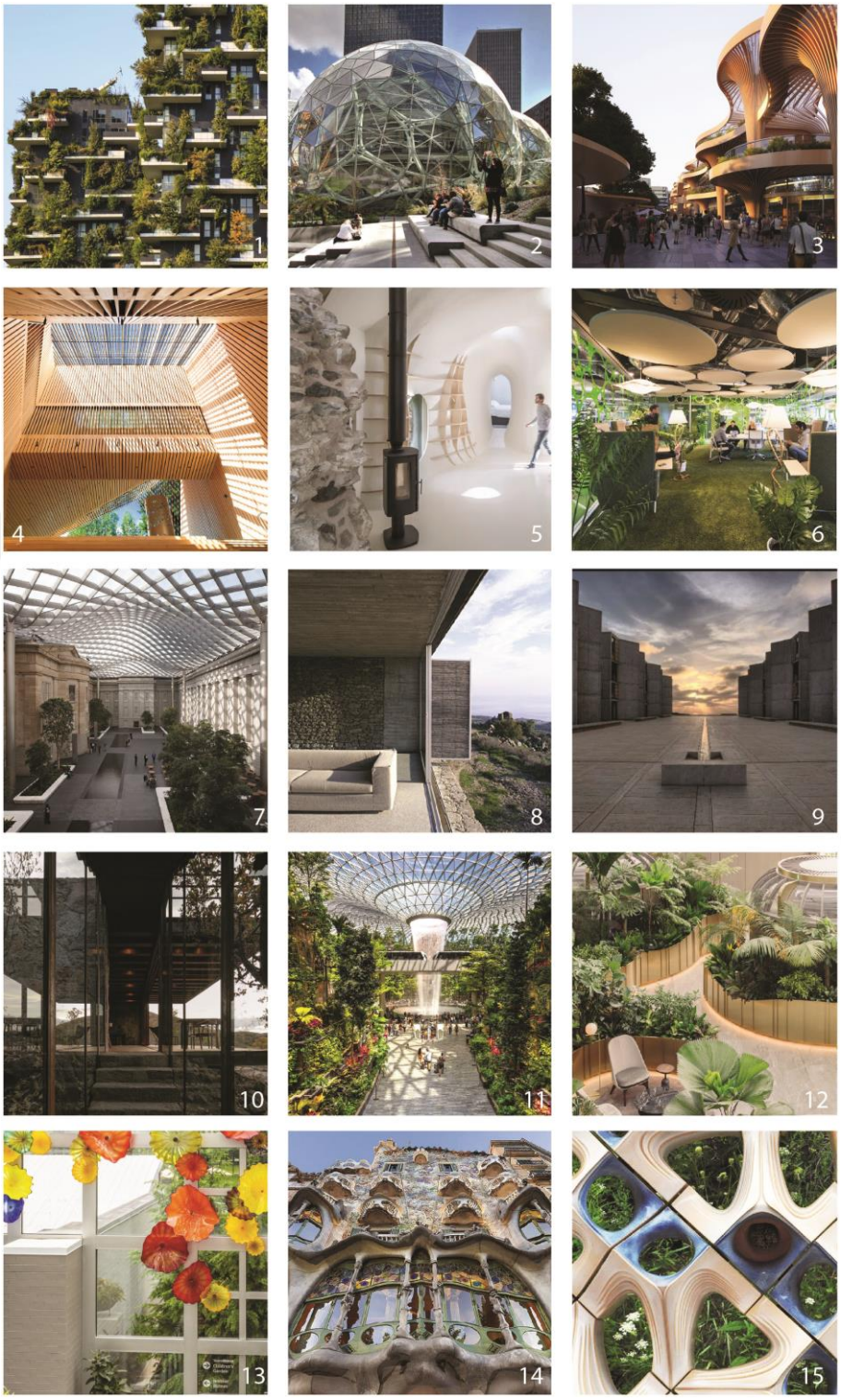


Figure 4-10: Biophilic patterns that can be openly perceived in projects all around the world, illustrated to emphasize interior and exterior applications, (for reference see pg. 160).

4.1.3 New Collective Methodology for 3 Dimensions of Wellbeing

The table is based on the keywords gathered from Wellness definition of Zari in the X Factor referring Physical, Intellectual and Emotional in terms of the key variables of Wellness Chart and Patterns of Biphilic design. It sums up the keywords driven from patterns and certification by re-interpreting their correlation whether they serve for physical wellbeing, intellectual wellbeing or emotional wellbeing with a direct or indirect relationship. It is aimed to give the collective information of which type of improvement or consideration reflects on which level of wellbeing. For example, the thermal comfort, air flow and light quality variables are directly related with physical wellbeing. Whereas, light quality is also directly related with both intellectual and emotional wellbeing.

Table 4-1: Wellness concepts by Zari re-mentioned to demonstrate its details in relation to Well Certification variables and Biophilic patterns. (Redrawn by the author.)

Physical Well-being Body Health Physiplogical	Related Architectural concepts 1. Air Quality: Indoor, Outdoor, Ventilation, Breathing Skin, Enclosures 2. Light Quality: Sunlight and Daylight, Glare, UV 3. Temperature and Humidity Control 4. Water Quality 5. Safety: Fire, Earthquake, Extreme Weatther Events, Radiation, Noise, Falling, Accident Reduction, Ergonomics, Home Security 6. Polution Control: Biological, Chemical, Electromagnetic, Non-Toxic materials and Furnishings
Intellectual Well-being Mind Healing Psychological	Related Architectural concepts 1. Engaging with Nature: Working with Natural Cycles, Working with Natural Ecosystems, Plants, Water, Indoor/Outdoor Flow 2. Holistic Sensory Design: Sight, Touch, Hearing, Taste, Feel, Smell 3. Personalisation: Individual Control, Equality 4. Spirit of Place: High Level of Craft, Particularity and Uniqeness, Beauty, Delight, Pleasure 5.Design for Variety: Peace and Harmony, Stimulation and Rejuvenation, Relaxation and Refreshment
Emotional Well-being Spirit Spirituality Metaphysical	Related Architectural concepts 1. Collective Cultural and Individual Aspirations and Identity: Symbolism and Metaphor, Beliefs and Mores, Rituals, Narrative 2. Mood Creation and Modification: Ambiance, Emotional Response 3. Restorative Design: Relationship w/ Building, Portable Wellbeing, Community Spirit, Plenetary Healing

Table 4-2: Wellness Correlation Chart combining Well Certificate's variables, Biophilic patterns and 3 dimension of wellbeing, redrawn by author.



For the purpose of this study, the data that are going to be interpreted from this chart are not going to be point based. Rather, type of wellbeing nourishment is considered.

4.2 Bridge in between: Turkey's Regenerative Possibilities

There are many projects that are being implemented with business as usual methodologies in terms of sustainable development of Turkey. Most of the objectives and initiatives that are in action, aim a transition towards Net Zero approaches in Turkey until 2030, which can be regarded as the short term goal. Even though, there is a need for a more comprehensive world view and strategies, existing green building infrastructure is promising. There are 498 certified buildings in Turkey, which are listed individually under the list of ÇEDBİK and more others that are not officially listed with great regenerative possibilities. As the regulations for applications of real life projects with net zero emission or positive outcome in Turkey is still vague in terms of management, construction processes and regulations[236], it is very important to point out wellbeing nourishments for an early inclusion along the enhancements - especially for existing building stock. As New Zealand report states, most part of the building stock is still going to be suitable for usage in the next 50 years, there is no reason why this should not be Turkey's case either. Therefore, with adjustments in existing building stock, they can become efficient providers for wellbeing nourishment as well as new designs adopting systems in order to endorse wellbeing.

4.3 Mapping the Initiatives: Turkey's Case

In March 2022 EcoİklimConference took place in Ankara, Turkey. Konya Metropolitan Municipality Chairman, Uğur İbrahim Altay, attended as a delegate in

[236] Yeşil Bina Dergisi - https://www.yesilbinadergisi.com/edergi/21/57/54/index.html#zoom=z pg.54

the panel named “Green transformation in Metropotitan areas”[237], as Konya is one of the pilot areas in Net Zero goal application cities[238]. He explained the precaution action plans and initiatives such as Konya Climate change action plan, CO2 Emission Decrease Plan, Zero Waste Plan, Bike Masterplan, Circular Economy plan[239]. This indicates development concerned systems thinking strategies have already started to be implemented.

As a second demonstrator, Turkish Republic has published its firt national green certification system YES TR, which is similar to New Zealand Green Building Rating system. When the certification is analyzed, it is seen that the initiatives are alike with existing international quantitative assessment strategies. This is a very positive development in terms of increasing posibility of regeneration. Nevertheless, this should be supported with systems that can ensure wellbeing and alike intengible qualities as well. As elaborated in this research, health and wellbeing strategies should be taken into consideration for a all together recovery. Therefore, the case studies that are selected reflects more than one certificate in order to demonstrate the collaboration capasity of existing structures from wellbeing nourishment perspective by a reconsideration with the Wellness Correlation Chart displaying wellbeing types.

4.3.1 Database for Regenerative Infrastructure: ÇEDBİK

ÇEDBİK datum on the list of certificated buildings around Turkey. There are limited ways to map and evaluate sustainable buildings in terms of their regenerative features or mind sets. Initially, the buildings with sustainable mind set, which are determined through certificated can be a data pool in terms of the construction industry. By examining the list, the high performanse buildings are going to be selected in order

[237] Konya Municipality web page: https://www.konya.bel.tr/haberbasin.php?haberID=8479&hDurum=METIN
[238] Konya and Gaziantep are two pilot cities for net zero goals, which is granted by Cost action in order developments towards a sustainable future to take place.
[239]Konya Municipality web page: https://www.konya.bel.tr/haberbasin.php?haberID=8479&hDurum=METIN

to be evaluated in terms of their regenerative possibilities to determine Turkey's condition on the way to a regenerative future / net zero future on the sustainable goals. An ideal regenerative project should include a complex realtionship to health and wellbeing of both humane and planetary, however, it is very difficult to achieve; therefore projects displaying a certain level of wellness refurbishment and nourishment are going to be investigated as examples. Therefore, two award winning projects with multple certifications are evaluated in terms of their health and wellbeing possibilities.

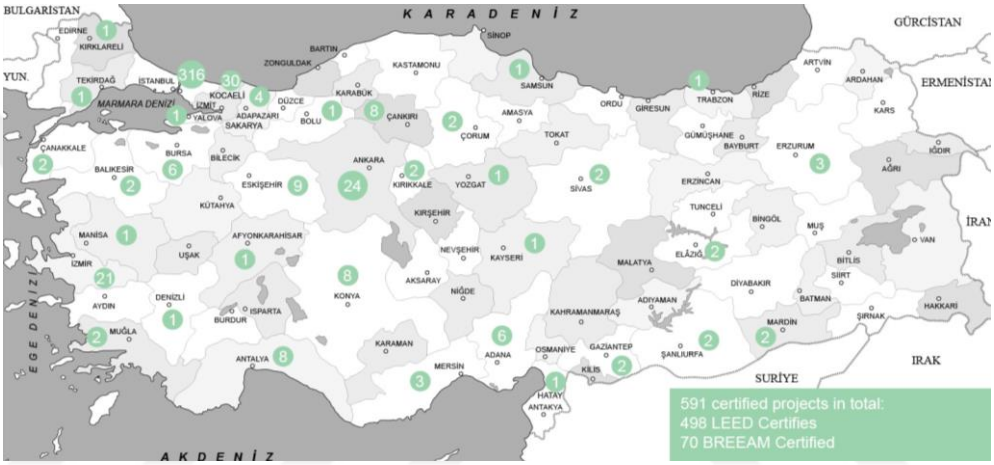


Figure 4-11: Mapping of Çedbik Database's information of green building infrastructure of Turkey, most of which are industrial facilities.

4.3.1.1 Ecological Building – Gaziantep Municipality

Ecologic house by Gaziantep Municipality[240] is a promotional and informational building providing public services, which is used for activities related to energy criteria and energy efficiency. The building also has LEED Platinum certification and Enerphit certification in 2015.

> "Envisaged in compliance with the PassivHaus and LEED Platinium criteria and regarded as the first in Turkey with a PassivHaus certicate, the Gaziantep

[240] Passive House Database ID is 4976 and the main frame information of characteristics of project can be found in this video https://youtu.be/wAjE8AvEewY .

> Ecological Building represents an exemplary structure which generates a minimum amount of carbon emissions and utilizes sustainable energy systems. Undertaken through the joint studies of Gaziantep University and the Gaziantep Metropolitan Municipality, also supported by Ipekyolu Development Agency grant, the building operates as Human Resources Center and serves as a center where renewable energy technologies are introduced to citizens. At this time this building services as plus energy house."[241]

Main features of the building includes **green roof, and water collecting systems** as well as pv panels located on the parking site with which building harvests more electricity than its using[242]. Therefore, exes energy is distributed to the city's electrical system. Building envelop is mainly a closed concrete shell which is supported by insulation and isolation layers in order to achieve maximum passive reliance. With the greenroof implementation, roof thermal insulation is provided. Thus, the more green features building has, the more features can provide for thermal capasities. The used windows have insulated framesystems as well as a three layer glass envelope PVC windows provide for **natural lighting**.

As an interesting method related to the project, it is common to use shading features on the southtern sides of the hot climate regions and Gaziantep has a high sun exposure as it is located in the southern anatolia region of Turkey. Nevertheless, building designers decided to create a **surrounding garden with existing trees** in order to supply the required shading rather than an extra structure. Besides, the project uses endemic plants in order to support and preserve biodiversity in the area.

The building employs Canadian Well system design in order to supply for heat recovery and clean air feature with a sustainable system upto %85. Therefore, there is a clean air circulation in the building for 24 hours and 7 day with high thermal comfort. Moreover, the building has a greywater treatment system and rainwater storage system. Soil-based ventilation, heat balance system and water-based cooling system. Indoor climating is provided by water source electrical heat pump. Compact

[241] https://passivehouse-database.org/index.php?lang=en#d_4976
[242] building provides for 30.000 kwh but only uses 20.000 kwh.

architectural design enables adjacent public transport and pedestrian transport paths to be used.



Figure 4-12: Gaziantep Ecologic Building aerial view.

Source:https://www.cekulvakfi.org.tr/makale/gaziantepte-nefes-alan-bir-bina-ekolojik-bina

Ecological Building serves for public usage, which limits the time interval that the building is being used to day time. Therefore, the building interacts with its users in morning, noon and afternoon but no necessarily the night time. As it can be inferred from the Figure 4-10, the surrounding of the building is designed to offer diverse experiences such as natural path ways to explore, refuge places to calmly spent time, planting areas to interact with nature and a parking lot including photovoltaic shading panels.

Also, the interior of Ecological Building offer a thermally comfort space with mechanized airflows within buildings closed envelop. As mentioned, building is located in a hot climate zone that the temperatures can go really high. Therefore, in

order to prevent the disturbance and overheating in summer, the building have minimal windows that are located at the interior edge of the building's massive walls; and supported with reflective surfaces.

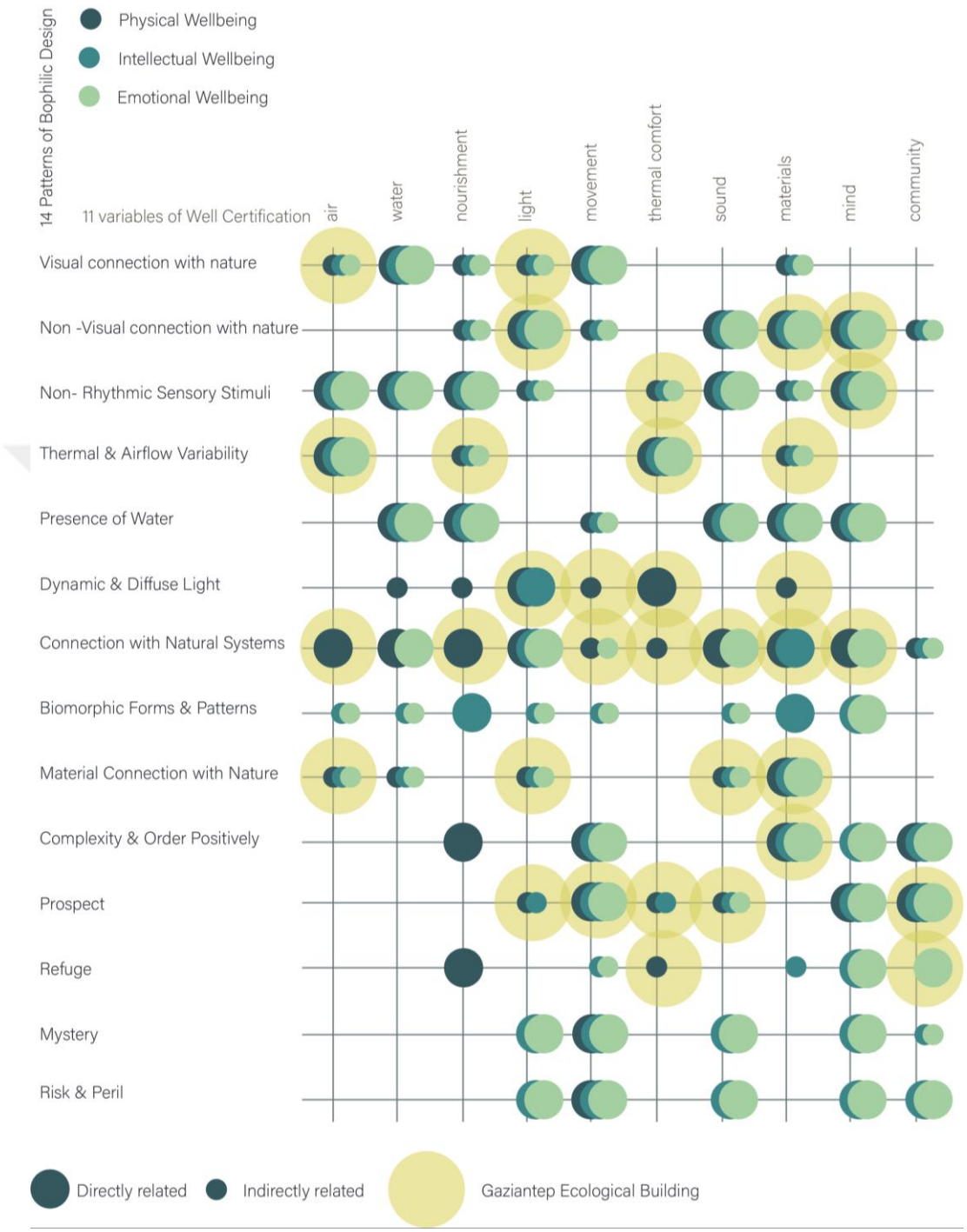


Figure 4-13: Gaziantep Ecologic Building frontal view.

Source: https://www.cekulvakfi.org.tr/makale/gaziantepte-nefes-alan-bir-bina-ekolojik-bina

With respect to the qualities that are mentioned above, the Wellness Correlation Chart of Gaziantep Ecological Building is prepared. To explain, the building interacts with the nature positively, display different types of light and shade, provide refuge places and have planned surrounding area which offers a kind of prospect quality. Nevertheless, the material usage within the building does not display neither natural qualities nor biomorphic forms, as well as no mystery or riskand peril elements.

Table 4-3: Wellness Correlation Chart of Gaziantep Ecological Building drawn by the author.



The table displays 31 physical wellbeing endorsing indicators, 23 intellectual wellbeing indicators and 22 emotional wellbeing indicators which are present in the given project. Although, this project positively interacts with its users that improves

their physical wellbeing, it can possess more intellectual and emotional wellbeing indicators.

4.3.1.2 Nefes Assos Settlement

The second case study is Nefes Assos[243] settlement, which is a recent project that is located in Assos Çanakkale. The project displays several regenerative virtues in settlement scale, while most examples from Çedbik list is in building scale.



Figure 4-14 The site plan of the settlement displaying the positioning of houses and public areas[244].

Source: https://www.nefesassos.com/koyun-evleri.

Nefes Assos is designed with ecosystem thinking concept in order to revive and prevent degeneration of existing systems as well as creating a nıurishing new settlement. The project management phase lasted 18 months with a multidiscipliner

[243] Nefes Assos. https://www.nefesassos.com/koyun-evleri.
[244] Nefes Assos Instagram hesabı. https://www.instagram.com/nefesassos/

team involving stakeholder, architect, ecological consultant, agricultural consultant, engineers and lifestyle specialist.

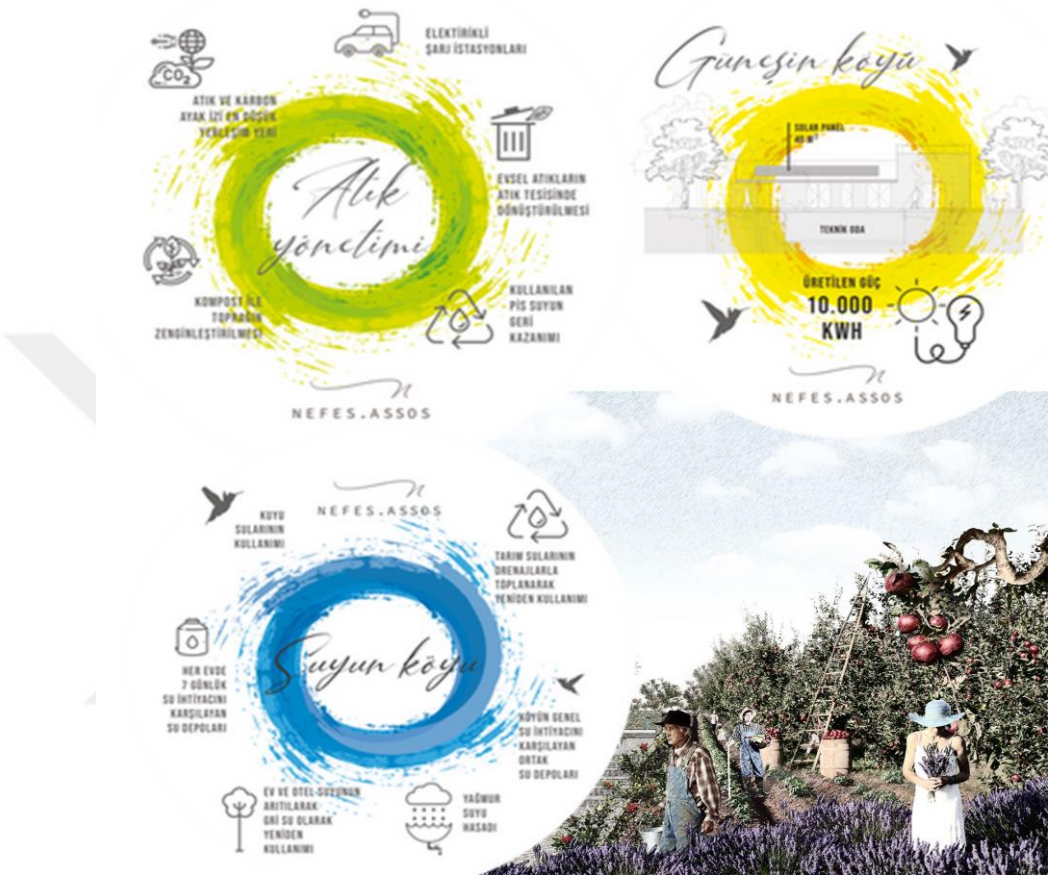


Figure 4-15: Nefes Assos Sustainable feature diagrams directly quoted ifrom their website, emphasizing waste management, water features and photovoltaic electricity.

Source: https://www.nefesassos.com/koyun-evleri.

The village is design to be selfsufficient, thus, it display several green features such as waste management, greywater treatment, rainwater collectors, and photovoltaic energy production with which 10.000 kwh is produced per housing unit. Therefore, the use of photovoltaic panels for energy harvesting is very logical to apply in any

new settlement[245]. Additionally, whole village is designed in walking distances and electrical bycle and electrical car facilities.



Figure 4-16: Render of one of the housing units displaying open and closed façades with shading elements and stone structure coherent with existing environment.

Source: https://www.mimarlar.com/en-US/Product/Detail?id=7

15.000 m2 land is divided for urban agriculture facilities by village institute who also has ateliers in the topics of harvested crops, prepared foods, and enables socializations in order to provide sustainable agricultural facilities. There are joint fruit gardens open to any member of the village. Moreover, the public space design of the village provides it services without any additional people for maintenance. The project offers a village life surrounded by olive trees.

[245] Until 2023 it is compulsory to apply pv solor systems on each buildig's roof in Berlin, Germany and it is way unproductive than in anywhere in Turkey; and Çanakkale has a high sun exposure time.



Figure 4-17: A collective look of residential units among olive trees; small scale structures provide for a human scale settlement, which supports people's wellbeing.

Source: https://www.mimarlar.com/en-US/Product/Detail?id=7

The housing units display several architectural qualities in terms of material choices and planing scheme which have impact on people's intellectual and emotional wellbeings as the thoughtful usage of such elements result in a decrease of stress levels, increase comfort and creativity. Moreover, the used stone and wood materials also have impacts as biomrophic elements; and their relationship with façade openings enables visual and non-visual connectionto nature as weell as sensory sitimuli in terms of residential units' views towards either the sea or cultural settlement. This project has unique cultural qualities in terms of it adjacency to the antique settlement of Assos with visual and spiritual elements and being in community scale. Therefore, in terms of wellbeing, the project is able to offer mindful connections inside the community and offer designed spaces with refuge, mystery and propect patterns.



Figure 4-18: The interior of a residential unit that display materialistic qualities, as well as visual connection with the see within a spacious environment.



Figure 4-19: Axonometric drawing displaying interior spaces of a residential unit that points out the simplistic circulation of interior enabling thermal flexibility as well as free airflow; and the designed recreational areas.

Source of both figures: https://www.mimarlar.com/en-US/Product/Detail?id=7



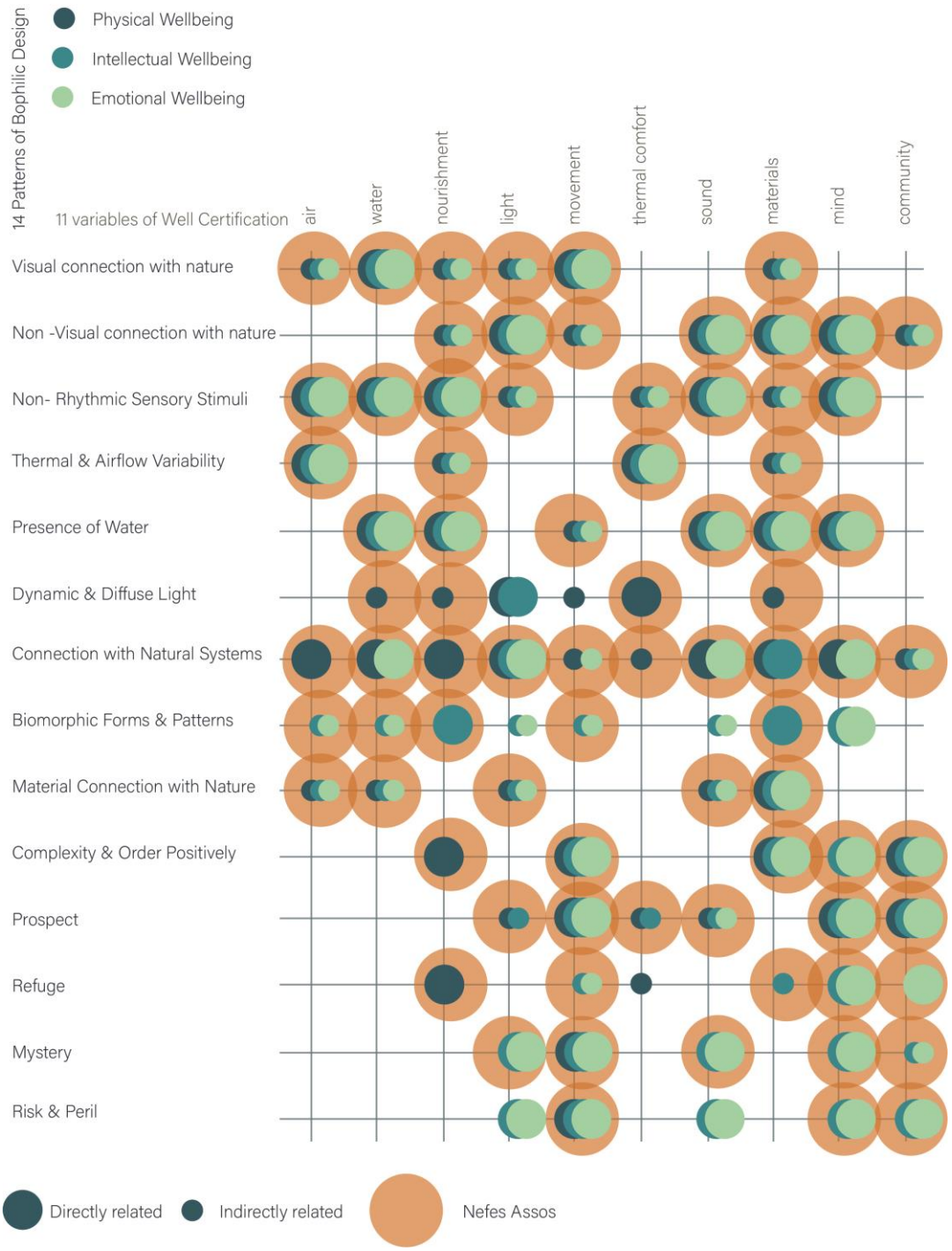
Figure 4-20: Render of the food market and village institute. The common areas in the project supports community engagement and socialization as their primary goal[246].

Source: https://www.mimarlar.com/en-US/Product/Detail?id=7

The project is a really good initiative for regenerative developments in Turkey. Nevertheless, it holds a great deal of profit based investment. Therefore, it is economically unaccesible for many people[247]. Although, in terms of sustainable feature, it offers a great deal of systems, as it is located in Assos region of Çanakkale, the island of project is located on an untouched natural area, with which the project exploits existing ecosystem. Therefore, it can be said that the project display unique qualities in terms of health and wellbeing nourishment and creating interactive settlement. However, it cannot be defended that Nefes Assos is fully regenerative.

[246] "Köyün Evleri." Nefes Assos. https://www.nefesassos.com/koyun-evleri.
[247] Even though, there was not an economic crisis in the post pandemic environment, this projects and similar ones generally are not reachable for low social class.

Table 4-4: Wellness Correlation Chart of Nefes Assos drawn by the author.



The Wellness table indicates 38 directy and 27 indirect reinforcements for physical wellbeing, 38 direct and 23 indirect supporting factor for intellectual

wellbeing and 39 direct and 26 indirect promoters for emotional wellbeing. This projects especially realy valuable in terms of analyzing the connection of projects, intellectual and emotional wellbeings as there are several indicators that project makes use of. Also, in terms of people's physical wellbeing project holds great posibilities, especially for its permacultural qualities as well as cultural and spiritual connections.

4.4 Disscussion and Evaluation: Level of Wellbeing

The Wellness Correlation Chart enables the information of physical features as well as spiritual elements to be related with a kind of wellbeing quality related to the architectural elements; and the features directly related to the welness indicators are present in the case studies. To explain, the architectural implications such as the design features, handling of the project, management of project and having multidiscipliner project teams all enable diverse qualities within projects, which interact with their users. These interactions enable the establishment of the X Factor within the projects; and them to become susceptible to both humand and nature wellbeing.

As it is previously stated, the structures do not become element of architecture until after they start their interaction and communication with people. This relationship can have positive or negative outcomes on people as well as the existing ecosystem. In terms of wellbeing, prioritizing of the X Factor within designs, can become the key of health and wellbeing improvement within architectural implementations. As it is derived from critical evaluations of research projects, wellbeing is connected with architectural qualities concerning by Biophilic patterns and Well Certification main frame variables – architectural qualities of space.

To elaborate, the analyzed case studies demontrate several Biophilic patterns which enbales them to endorse the X Factor in addition to their mechanic sustainable features. First of all both cases have visual connection with nature; non visual connection with nature including the lanscape in Ecological Building and seasight in

Nefes Assos; thermal and airflow variability; dynamic and diffuse light in terms of light and shade balance; connection with natural systems as well as material connection with nature within open, closed and semiclosed areas. Also , they demonstrate different patterns from each other due to their uniqueness such as presence of water. Both projects have explicite water infrastructure concerning waste water management. However, because of its adjacency to sea, Nefes Assos is able to offer a different sence of presence of water which also affects prospect and mystery as well as risk and peril patterns; and Gaziantep Ecological Building does not display any visible water feature other than infrastructural purposes.

These being said, there are several serious critics that are pointed out under each case study as individual comments such as the questionable terms in the consideration of equity which undermines the projects to be considered fully regenerative. Nonetheless, this **thesis regards the notion of wellbeing and health as the primary concern** within other regenerative and social variables, therefore, examplary qualities of these projects in terms of wellbeing in emphasized. There is no such claim for these projects to be fully regenerative, but there is a strong implication that they are firm examples for derivation their capabilites for their wellbeing nourishment. Moreover, with reconsderation of existing built environment, there is posibilities to establish intellectual and emotional wellbeing improvements.

Furthermore, tangible features providing wellbeing endorsement can also additionally be implemented to projects by additional architectural implementations as well as small scale interventions in the post-design or even the post-construction phases, which enables them to connect with diverse dimensions of wellbeing. Each of two case studies displays high level of wellbeing nourishment capacities in terms of regenerative qualities as well as their architectural and systematic qualities. Besides, they possess several regenerative design indicators. To exemplify, they have multiple green features; they both had a process management in their design phase; they demonstrate significant connections to wellbeing providers; and lastly they promote healthy living environments for humans as well as supporting their wellbeing.

There are several qualities within these cases which can be applied daily life/ existing structures in order them to become architectural objects that has the X Factor in order them the enable positive relationships with their users. Firstly, the passive house certification can be applied to existing structures which enables thermal comfort and airflow reconsideration. Also, green and blue features can be implemented within the existing built environment in several scales from individual appartments to streeet even city scale with which connection to natural elements and sitimulies are able to be provided.

As the projects that are presented in case studies have several types diverse of green features and different types of certifications, they display qualities relatively close to the ideal state of regenesis. Of course, these projects are considered in terms of design phase and high performance qualities concerning large scale of investments. Nevertheless, some variables such as thermal comfort, air, light, sound, biomorphic sounds and patterns can be additionally implemented to any kind of project in order to increase its capasity of their ability to connect with humans. To exemplify, Biophilia Enhanced Through Art (BETA) projects can be given. With the addition of apropriate art objects such as paintings, sculptures or furniture, the projects can be supported in biomorphic sounds and patterns as well as material connection to nature. Therefore, they are able to connect to humans in a multi dimensional wellness perspective.

CHAPTER 5

CONCLUSION

To conclude, it is now an insider joke on several movies that even the shrinks have shrinks. It is a funny way to point out that the degeneration has come too far that even the people who are most likely to have a good state of wellbeing, do not. This makes the ideal state of regenesis to become a utopian goal. Since, the existing proceedings are insufficient. As, the consequences of climate crisis become severe, the singular energy and carbon goals of Paris agreement is neither enough nor reachable with the current system of thinking; and in the last decade it is understood that there should be a developmental level of thinking in order to pursue an applicable solution. Therefore, with UN SDGs, the main frame of problems are defined and set the goals for an altogether recovery. Nevertheless, they only point out the problem; and as sustainable development strategies failed to offer a comprehensive solution, there is a need for a system that can provide for one. As a result, the world is at a turning point towards Regenerative Development.

Regenesis Group member Bill Reed asks in one of his online lectures of Regenerative Practitioner series "what are we sustaining with sustainability?"[248] His answer is "the process of life"[249], which is directly related to the humans, human interaction, their health and wellbeing. Because, living is not just surviving. It is constituted from more complex variables. For this purposes, the research projects mentioned above, conclude that there should be an immediate shift towards regenerative development, as it prioritize a co-evolutionary perspective with HBI for nourishment of health and wellbeing and planetary health and wellbeing.

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[248] Working From Potential in Our Projects with Bill Reed in https://vimeo.com/771763615
[249] Working From Potential in Our Projects with Bill Reed in https://vimeo.com/771763615

Nevertheless, this kind of shift in mindsets cannot be done suddenly; it needs a transition period, which is required in a very short term. As it is elaborated in previous chapters, the research projects offer a gradual transition dwelling on existing concepts such as Systems Thinking, Biophilia and existing green building infrastructure. This could be the methodology of the beginning of regenerative development that serves for the permanent improvements. As it is stated before, the degenerative systems and their patch improvements are no longer viable for the needed degree of enhancements against the *extremes*.

Due to the vast perspective of topic of regenerative development, more extensive studies are required to determine and proceed in the path towards it. This thesis made a critical evaluation of existing research projects prioritizing regenerative development in terms of health and wellbeing component; and put emphasize on regenerative development and design regarding the topic in detailed in terms of health and wellbeing nourishment. As the final derivation, it is stated that the wellbeing component can be nurtured in both new and existing built environment through systems thinking and biophilic patterns within regenerative strategies.

Previously mentioned extremes and their consequential problems such as psychological effects of pandemic or war, the physical and psychological impacts of the degeneration of green and blue infrastructures, makes it obvious that there is a need for an investigation and reconsideration of the notions of both health and wellbeing from both nature and Anthropocene. Hence, this thesis regard the subject of wellbeing within architectural implementations; and as the final methodology, made a correlation table of wellbeing variables of tangible and intangible elements within architectural spaces in order to demonstrate the constraints in terms of wellbeing nourishment.

It is indicated that more empirical studies should be conducted in order to reveal the details of methods and elements within biophilic patterns and wellness variables' appearance within architectural spaces. Because, both tangible and intangible elements can be evaluated in terms of their imposition in architectural projects and have diverse effects according to different scale and usage. To

exemplify, it is seen in Ecological Building in Gaziantep that the usage of daylight, thermal comfort, and especially nature on daily basis makes a positive impact on its users; and mostly the same variables have similar effects in Nefes Assos projects as well. Nevertheless, as the Ecological Building is a public building and Nefes Assos' primary concern is residential usage, they have different exposure time intervals, public and private usage also have different impacts on the degree of wellbeing. Even though this is just one example, due to the extensive structure of topic, this thesis' proposed methodology does not intent to make a comparison between case studies. Rather, it is aimed to indicate the present usage of certain elements in the design, pre-occupation and post-occupation phases of architectural spaces in order them to be easily depicted so as to be applicable for other projects.

As another point, rather than the singular view of green roofs, photovoltaic panels etc. that are considered as the widespread green features, there is a need for more elaborated approaches that consider the advanced features of connections of intellectual and emotional wellbeing as well. There should be wider understanding of prospect, refuge, mystery and risk and peril patterns of biophilic design within diverse scales of design. Also, there should be more meaningful connections that interact with the mind and community variables, which hold the spiritual connection of people with the places. Also, with better understandings of the previously mentioned patterns and variables result in better designs, the more they become applicable as they are comprehensible with existing supporting cases.

Moreover, another important point to be drawn out from previous chapters, the existing built environment is most likely to survive for the next 50 years or more. therefore, rather than creating new developments which make the old ones obsolete, the solutions should be applicable to the existing building stock. Because, there is neither the reason nor the motivation for abandoning the present investments. Case studies in Turkey that are investigated in this thesis demonstrate that in terms of the buildings, there is capacity for increasing health and wellbeing through existing structures. Studies suggest that in Turkey, the goals are towards net-zero impact development and architecture. However, there should be more studies in order to transform the existing building stock to net zero or even positive impacts in addition

to the new development's positive gain status. Therefore, the awareness in terms of regenerative development should be increased in Turkey within for both new and existing structures as well as the regeneration of blue and green infrastructure, which also endorse health and wellbeing.

These being said, for further research, architecture's capacity to provide for wellbeing should be supported with economic engagement. Prosperity is a neglected subject as economic concerns are high and too complex to be easily implemented. The examined research projects all conclude that the experts working on in economic variable of regenerative development are insufficient in number and research. There are many unreachable projects which have regenerative effects; and only few people are able to benefit from. This brings out the social problems concerning equity notion, which is pointed out in Nefes Assos project that the problems raised by profit hinders accessibility which is one of the main concerns for further research. To exemplify, many projects from ÇEDBİK list are out of reach from an economically, as they are very expensive that especially young people cannot financially support neither to buy nor to live in them.

Further research can proceed in the direction of the topic of regenerative development and design's social structures in terms of the interrelations of wellbeing, equity and culture. While these wide spectrum topics have several conjunction points in theory, there are very few real life projects that display features serving to all perspectives. Besides, concerned variables and patterns that interact with intellectual and emotional wellbeing have capacity to engage in community scale considerations which require cultural perspective.

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1. Bosco Verticale
   Location: Milan, Italy
   Architect: Boeri Studio
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2. Amazon Spheres
   Location: Seatle, USA
   Architect: NBBJ
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3. Solar Trees Marketplace
   Location: Shangai, China
   Architect: Koichi Takada Architects
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4. Audain Art Museum
   Location: Seatle, Whistler BC, Canada
   Architect: Patkau Architects
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5. Houses Refurbishment
   Location: Dumfries, UK

Architect: Lily Jencks Studio, Nathanael Dorent Architecture
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6. Google Dublin Campus
   Location: Dublin, Ireland
   Architect: Camenzind Evolution ve Henry J. Lyons Architects
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7. The Donald W. Reynolds Center home of the Smithsonian American Art Museum and National Portrait Gallery
   Location: Washington, USA
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8. B2 House
   Location: Çanakkale, Türkiye
   Architect: mimarlar ve Han Tümertekin
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9. Salk Institute For Biological Studies
   Location: San Diego, USA
   Architect: Louis Kahn
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10. Teitipac Cabin
    Location: Mexico
    Architect: LAMZ Arquitectura
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11. Singapore's Jewel Changi Airport
    Location: Singapore
    Architect: Safdie Architects
    Source of image: https://www.archdaily.com/920029/amazon-spheres-nbbj

12. Citibank Singapore
    Location: Singapore
    Architect: Ministry of Design
    Source of image: https://www.dezeen.com/2021/03/02/citibank-singapore-ministry-of-design-banking-conservatory/

13. Persian Window art installation at Franklin Park Conservatory and Botanical Gardens
    Location: Colombus, Ohio, US
    Architect: NBBJ
    Source of image: https://www.chihuly.com/exhibitions/franklin-park-conservatory-and-botanical-gardens/chihuly-celebrating-nature

14. Casa Battlio
    Location: Barcelona, Spain
    Architect: Antoni Gaudi
    Source of image: https://www.casabatllo.es

15. Buro Happold and Cookfox Architects Building Façade
    Location: New York, USA
    Architect: Buro Happold and Cookfox Architects
    Source of image: https://www.dezeen.com/2022/09/16/architectural-ceramic-assemblies-workshop-buro-happold-cookfox-architects-facade-design/