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Master Degree

REGENERATIVE ARCHITECTURE IN EUROPE AND ASIA



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ABSTRACT

REGENERATIVE ARCHITECTURE FROM THE EAST TO THE WEST

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Traditionally, buildings have been created to meet certain needs -function, comfort and budget- but minimally focused on how well they fit with the natural environment.

The current pattern in the field of architecture is one of degeneration and obsolete building technologies. Buildings tend to be thought of as static edifices that remain the same over decades, interacting little with their environment or occupants.

The introduction to sustainable design has begun to change this conception through the establishment of green building standards and rating systems intended to help the current difficult situation. As a further step, Regenerative Architecture is known as the practice of engaging the natural world as the medium for, and generator of architecture: it responds to, and utilizes the living and the natural system which are present on a specific site and that will become the model from which the architecture has to embrace.

The term "regenerate" has several denotations, but it generally represents one of these three things. First, a radical change for the better. Second, the creation of a new spirit. And third, returning energy to the source. Applied to architecture it mainly focuses on conservation and performance through a reduction of the environmental impacts of a building.

This paper introduces regenerative architecture as a mean for future design technologies, starting from the "Nine Principles of Regenerative Architecture" and "Place Analysis Criteria" which are studied to provide a logical and exhaustive execution of regenerative architecture.

These critiques will be employed in the analysis of how an emerging country like Vietnam can exploit the current push towards sustainability and ride a path towards a more environmental concerned country. Due to the quick economy rise many possibilities are open for Vietnam both in the public and in the private sector; the question is, will it rise, or will it fall?

To better understand globally the extent of Our possibilities, a deeper look is also given to one of the countries leader in the field, the Netherlands.

Amsterdam, famous for its many bikes, holds the second spot in greenest world's cities, and is and will be the set of many changes to come: the renovation of 3 silos in Ijburg will be a practical example of this paper, a project that will see the application of the throughout analysed regenerative architecture.

INTRODUCTION

General Framework

The sustainability concept originated in ecology: sustainable fishing or logging means that people do not take more fish or wood than can replenish naturally. Observing this usage of the environment means that future generations can continue to make use of nature and the environment. The 1987 report *Our Common Future* of the Brundtland Commission¹ linked poverty and development issues (WCED, 1987). This report recognises that poverty is a practical obstacle to the sustainable use of the physical environment and that integrating the conservation of nature and economic development are necessary for sustainable development.

This caused the shift from the purely ecologically inspired concept of sustainability to the more socially and economically inspired concept of sustainable development. So sustainable development mainly deals with the question of whether our quality of life in the *here and now* does not place too great a burden on the ability to provide a sufficient quality of life for people elsewhere in the world or for future generations. Societies have many resources available with which they can generate prosperity and well-being: economic capital (machinery and buildings), human capital (labour, education and health), natural capital (natural resources, biodiversity and climate) and social capital (social networks and trust). These resources are necessary to maintain the quality of life of the population. Natural capital is a resource because it is a critical form of capital: people could not survive without natural capital.

This means that the quality of life of future generations must be secured by making sure that they will have enough resources available, while the current generation can also maintain its quality of life. Societies can ensure intergenerational sustainability by investing in each type of capital and by using each more efficiently. How much remains of each kind of capital for future generations depends on their increases (investments) and decreases (consumption and depreciation). The intergenerational perspective is of course very important within the sustainability debate. The central issue is if we, as the current generation, leave enough resources, that is capital, for future generations. The share of income that is not used for consumption is used to invest in ways to make future consumption possible. This is about delayed consumption. Changes in the stocks of resources (the total volume of capital available to us) are determined by the gross investments in physical, natural, human and social capital, minus depreciation and depletion of these resources.

Implementing sustainable development within this conceptual framework requires insight in the needs and available means in the 'here and now' as well as those 'elsewhere' and 'later'. This is not without its problems. First, it is not easy to determine what the conditions are that meet the needs of the present generation. Those needs are great and according to some people insatiable.

A key question is to what extent which needs can be met in a finite world '*without compromising the ability of future generations both here and in other parts of the world, to meet their own needs*'. Brundtland's definition of sustainable development offers room for trade-offs of the various kinds of capital people have at their disposal and which can lead to different types of satisfying needs, including the long-term need to leave future

¹ Formally known as the World Commission on Environment and Development (WCED), the mission of the Brundtland Commission is to unite countries to pursue sustainable development together.

generations with enough resources. The room for trade-offs is not endless. Within the Brundtland approach to sustainable development, turning nature in agricultural land is not by definition an unsustainable act. This is because human life on any scale would hardly be possible without agriculture, or there would only be a very low level of meeting people's needs. So clearly the precise balance between nature and agriculture in a world that could be called sustainable cannot be determined objectively.

Secondly – and closely related to the first point – there is uncertainty about future developments, including uncertainty about the needs of future generations. The size of the world population and technological progress are factors that determine to what extent the needs of future generations can be met. Statements about the development of these determinants tend to be highly speculative. This and other uncertainties about future developments partly explain the huge differences in opinion about the long-term sustainability perspectives for humanity.

How we operationalize sustainable development based on the definition by Brundtland therefore includes serious aspects of uncertainty. Because of differences in preferences and ideas about future developments, there is more than one world conceivable on which one might bestow the 'sustainability' label. In general, it is necessary to understand the targets, underpinned by critical values, to demonstrate if trends develop in a sustainable direction at sufficient speed.

In practice these critical values are hard to determine. Some processes may be irreversible, such as the extinction of species or the destruction of historical countryside but this irreversibility does not necessarily mean that the entire society becomes unsustainable. Key questions are: How many species can we humans afford to lose? How much inequality breaks down society? Or: At what budget deficit do people entirely lose faith in the financial position of a country? These cannot be answered with any degree of certainty. Sustainable development is a search in time and place – given uncertainties and costs – to determine how prudent a society must act in order counterbalance undesirable effects.

SUMMARY

Italian

Il concetto di sostenibilità è nato nell'ecologia: la pesca sostenibile o il disboscamento significa che le persone non prendono più pesce o legno di quanto non possano ricostituire naturalmente. Osservare questo uso dell'ambiente significa che le generazioni future possono continuare a fare uso della natura e dell'ambiente. La relazione del 1987, *Our Common Future* of the Brundtland Commission, collegava le questioni relative alla povertà e allo sviluppo (WCED, 1987). Questo rapporto riconosce che la povertà è un ostacolo pratico all'utilizzo sostenibile dell'ambiente fisico e che l'integrazione della conservazione della natura e lo sviluppo economico sono necessari per lo sviluppo sostenibile.

Ciò ha causato il passaggio dal concetto di sostenibilità puramente ecologico al concetto di sviluppo sostenibile più socialmente ed economicamente ispirato. Quindi lo sviluppo sostenibile riguarda principalmente la questione se la nostra qualità della vita nel qui e ora non imponga un onere troppo grande sulla capacità di fornire una qualità di vita sufficiente per le persone in altre parti del mondo o per le generazioni future. Le società hanno molte risorse disponibili con le quali possono generare prosperità e benessere: capitale economico (macchinari ed edifici), capitale umano (lavoro, istruzione e salute), capitale naturale (risorse naturali, biodiversità e clima) e capitale sociale (reti sociali e fiducia). Queste risorse sono necessarie per mantenere la qualità della vita della popolazione. Il capitale naturale è una risorsa perché è una forma critica di capitale: le persone non potrebbero sopravvivere senza capitale naturale.

Ciò significa che la qualità della vita delle generazioni future deve essere garantita assicurandosi che dispongano di risorse sufficienti, mentre la generazione attuale può anche mantenere la qualità della vita. Le società possono garantire la sostenibilità intergenerazionale investendo in ciascun tipo di capitale e utilizzandole in modo più efficiente. Quanto rimane di ogni tipo di capitale per le generazioni future dipende dai loro aumenti (investimenti) e diminuzioni (consumi e deprezzamento). La prospettiva intergenerazionale è ovviamente molto importante nel dibattito sulla sostenibilità. La questione centrale è se noi, come generazione attuale, lasciamo abbastanza risorse, cioè il capitale, per le generazioni future. La quota di reddito che non viene utilizzata per il consumo viene utilizzata per investire in modi per rendere possibile il consumo futuro. Si tratta di un consumo ritardato. I cambiamenti delle scorte di risorse (il volume totale di capitale a nostra disposizione) sono determinati dagli investimenti lordi in capitale fisico, naturale, umano e sociale, meno deprezzamento e esaurimento di queste risorse.

L'attuazione di uno sviluppo sostenibile all'interno di questo quadro concettuale richiede una visione approfondita dei bisogni e dei mezzi disponibili nel "qui e ora", nonché in quelli "altrove" e "dopo". Questo non è senza i suoi problemi. Primo, non è facile determinare quali siano le condizioni che soddisfano i bisogni della generazione attuale. Quei bisogni sono grandi e secondo alcune persone insaziabili.

Una domanda chiave è fino a che punto è possibile soddisfare i bisogni in un mondo finito "senza compromettere la capacità delle generazioni future, qui e in altre parti del mondo, di soddisfare i propri bisogni".

La definizione Brundtland di sviluppo sostenibile offre lo spazio per i compromessi dei vari tipi di persone capitali che hanno a disposizione e che possono portare a diversi tipi di bisogni soddisfacenti, compresa la necessità a lungo termine di lasciare alle generazioni future risorse sufficienti. La stanza per i trade-off non è infinita. Nell'ambito dell'approccio Brundtland allo sviluppo sostenibile, trasformare la natura in terreni agricoli non è per definizione un atto insostenibile. Questo perché la vita umana su qualsiasi scala difficilmente sarebbe possibile senza l'agricoltura, o ci sarebbe solo un livello molto basso di soddisfare i bisogni delle persone. Quindi chiaramente il preciso equilibrio tra natura e agricoltura in un mondo che si potrebbe definire sostenibile non può essere determinato obiettivamente.

In secondo luogo - e strettamente correlato al primo punto - c'è incertezza sugli sviluppi futuri, inclusa l'incertezza sui bisogni delle generazioni future. Le dimensioni della popolazione mondiale e il progresso tecnologico sono fattori che determinano in che misura i bisogni delle generazioni future possono essere soddisfatti. Le affermazioni sullo sviluppo di questi determinanti tendono ad essere altamente speculative. Questa e altre incertezze sugli sviluppi futuri spiegano in parte le enormi differenze di opinione sulle prospettive di sostenibilità a lungo termine per l'umanità.

Il modo in cui operationalizzare lo sviluppo sostenibile sulla base della definizione di Brundtland include quindi seri aspetti di incertezza. A causa delle differenze nelle preferenze e nelle idee sugli sviluppi futuri, è possibile concepire più di un mondo sul quale si possa conferire l'etichetta "sostenibilità". In generale, è necessario comprendere gli obiettivi, sostenuti da valori critici, per dimostrare se le tendenze si sviluppano in una direzione sostenibile a una velocità sufficiente.

In pratica questi valori critici sono difficili da determinare. Alcuni processi possono essere irreversibili, come l'estinzione di specie o la distruzione di campagne storiche, ma questa irreversibilità non significa necessariamente che l'intera società diventa insostenibile. Le domande chiave sono: quante specie possiamo permetterci di perdere? Quanta disuguaglianza distrugge la società? Oppure: a quale deficit di bilancio le persone perdono completamente la fiducia nella posizione finanziaria di un paese? A questi non si può rispondere con alcun grado di certezza. Lo sviluppo sostenibile è una ricerca nel tempo e nello spazio - date incertezze e costi - per determinare quanto deve essere prudente una società per compensare gli effetti indesiderati.

A fronte di tutti questi problemi troviamo centinaia di idee, tutte dichiaratesi "sostenibili": molte di sostenibile hanno solo il nome, altre invece rientrano chiaramente nella definizione, eppure ci si è resi conto che "sostenibile" non è più abbastanza per risolvere i problemi aggravati dal continuo sfruttamento delle risorse non rinnovabili. Un nuovo tipo di approccio crea una breccia sotto il nome di *Biomimicry*, intesa come imitazione (-mimicry) della natura (bio). Dopo un'attenta osservazione si è arrivati alla conclusione che molti dei problemi attuali a cui ingegneri e non cercano di trovare una soluzione sono in realtà già semplicemente risolti in natura.

Un veloce esempio può essere rintracciato fin dall'antichità a Leonardo da Vinci, il cui primissimo prototipo di "flying machine" era ispirato dalla aereodinamicità e forma degli uccelli. O ancora, come i gecki possano scalare così facilmente una parete verticale tramite i palmi delle zampe ricoperti da minuscoli capillari creando così un'attrazione molecolare riuscendo a rimanere a contatto sfidando la gravità. La natura viene definita "pigra e intelligente" perché trova sempre la soluzione più veloce ad un problema, adattandosi al massimo alle risorse che ha a disposizione. Non ci sono sprechi o eccessi in natura, degli aspetti fin troppo abituali quando invece si guarda alla società contemporanea.

Purtroppo questa nuova scienza é spinta dall'urgenza creatasi dall'impennare del cambiamento climatico, che sta riportando danni incalcolabili e irreversibili al nostro pianeta: ad esempio, la rapida evoluzione e crescita degli stati in via di sviluppo sta comportando un incremento della produzione di cemento armato, il metodo piú veloce per costruire e accomodare il crescente numero di nascite e popolazione come ad esempio in Asia. Come si puó far fronte a questo incremento, senza danneggiare un'economia crescente ma tamponando e possibilmente risolvendo tutti i problemi annessi a questa rapida crescita economica?

L'idea di rigenerazione si fonda su un principio di surplus: é possibile pensare un insediamento che utilizzi risorse naturali del posto, e che allo stesso tempo aiuti a riportare alle condizioni originali un sistema naturale danneggiato dallo sfruttamento eccessivo dell'uomo? Pensatori come Lyle, McDonough e Thayer sono alle fondamenta di questa nuova ideologia, che applicata al campo dell'edilizia viene nominata come Architettura Rigenerativa. Un edificio in grado di sopravvivere tramite un consumo di energia minimo, producendo la suddetta tramite metodi alternativi e rinnovabili (energia solare, eolica etc) ma soprattutto in grado di sopperire all'eccessivo consumo da parte di edifici non pensati o progettati come "rigenerativi" e nemmeno "sostenibili".

Per poter raggiungere questa ideale di rigenerazione il punto comune di molti scienziati gira intorno al principio di lasciare che la natura ci aiuti e che faccia il suo lavoro: sfruttare la natura in modo intelligente, non cambiandone i connotati o forzandola ai nostri piaceri, ma lasciandola lavorare come ha sempre lavorato per migliaia di anni, funzionando perfettamente prima che l'uomo abbia intervenuto su di essa. Per poter "sfruttare" la natura nel cosiddetto "modo intelligente" é necessario inanzitutto conoscerla: ogni luogo ha le sue caratteristiche specifiche, le sue peculiaritá, le sue forze e le sue debolezze, ma tutto é collegato affinché funzioni in modo perfetto. Non é la natura a doversi piegare ai comfort di cui le ultime generazioni si sono abituate, ma é l'uomo a dover entrare in contatto con essa, entrando nel ciclo di vita e facendone parte in modo attivo e salutare, non sfruttandone semplicemente i risultati.

Ogni architettura deve essere pensata per un specifico posto per poter funzionare: purtroppo a causa della globalizzazione questo precetto sembra perdersi sempre piú, arrivando ad avere elementi di "architettura" ed intere città che potrebbero essere localizzate in qualsiasi area del pianeta, funzionando sempre allo stesso modo.

É possibile però, tramite l'attuale economia raggiungere questo ideale? Com'è l'approccio di diversi Stati a questo problema sempre piú presente e incombente? In questo testo vengono analizzati due Paesi molto diversi, con risorse diverse e culture diverse, ma con gli stessi obiettivi: il Vietnam e i Paesi Bassi. Il primo, fa parte del gruppo di paesi in via di sviluppo, uno sviluppo incredibilmente rapido ma che proprio a causa di questa impennata economica pesa molto sull'inquinamento globale; il secondo, un paese dalle dimensioni ridotte, che però sembra essere a capo, e tirare verso quello che viene considerato un paese idealmente sostenibile.

Grazie all'insistenza dell'organo delle Nazioni Unite al riguardo della gravitá del cambiamento climatico e del riscaldamento globale, ha redatto diversi accordi responsabilizzando numerosi Stati a prendere in considerazione la grave situazione attuale: conferenze, incentivi e percentuali da rispettare non sono in grado di far cambiare rotta a tutti gli Stati membri ma aiutano a consapevolizzare e a prendere atto del rischio che si sta attualmente correndo.

Nell'ultimo ventennio, a seguito delle suddette conferenze e spinte da parte delle Nazioni Unite ha creato diversi organi all'interno del Governo, sia a livello nazionale che a livello locale per poter decidere, dibattere e infine redarre leggi e convenzioni che tengano in considerazione l'importanza della protezione dell'ambiente: a livello nazionale il Primo ministro é responsabile di regolare le leggi e le convenzioni, passando le suddette agli

organi provinciali e locali, i quali, con minimi cambiamenti a secondo dei bisogni dell'area si fanno carico di adempiere alle nuove leggi cercando inoltre di coinvolgere il piú possibile i cittadini.

Lo scopo é di avere un piano di lavoro orizzontale: coinvolgendo i cittadini e la popolazione, quest'ultimi possono e hanno il dovere di aiutare nell'ideazione e progettazione in piccola scala di interventi e/o convenzioni della propria area: rendendoli partecipi aumenta anche il livello di consapevolezza, riducendo la soglia di ignoranza per quanto riguarda l'argomento di protezione dell'ambiente e cambiamento climatico. Tramite questo processo il Vietnam é riuscito a conseguire risultati notevoli per quanto riguarda la redazione di nuove leggi e convenzioni nel rispetto dell'ambiente, includendo anche gli aspetti economici e della societá moderna. Purtroppo il livello minimo di educazione e povertá della popolazione rimane ancora al di sotto della soglia sperata, ma recenti studi prevedono un miglioramento anche in quel settore.

A paragone, uno degli Stati piú innovativi, nonostante le dimensioni, sono i Paesi Bassi: considerati all'avanguardia anche rispetto agli altri Stati Europei, vengono spesso posti come modello d'esperienza. L'utilizzo di risorse rinnovabili é a livello capillare, avendo quasi l'80% degli edifici muniti di pannelli solari. Nonostante l'approccio a livello istituzionale, delle analisi rivelano che la consapevolezza a livello dei cittadini é minima per quanto riguarda la conoscenza in materia del cambiamento climatico: il problema é riconosciuto e viene espresso e analizzato solo da quegli organi o settori a diretto contatto con la questione. Per quanto possa essere un buon inizio, purtroppo c'é ancora molto da fare e molti passi da compiere per raggiungere l'ideale livello di "rigenerazione".

Fortunatamente non mancano gli esempi da seguire, come ad esempio i ReGen Villages, e soprattutto i tentativi e esperimenti da parte di architetti e ingegneri che si prestano a creare modelli autosufficienti e idealmente *a zero net consumption*.

Il progetto proposto tratta di un'idea di riutilizzo di scheletri di un impianto di acque grigie risalente al 1950: composto da 3 silos situati su un'isola artificiale con un solo diretto contatto con la cittá di Amsterdam. L'area é a predominanza residenziale, una risposta all'alta domanda dovuta all'incremento della popolazione. I silos sono mirati ad essere il centro di attrazione e servizi per l'area di Zeeburgereiland: educazione, sport e tempo libero sono le parole chiave del progetto.

A richiamo di questa tesi teorica questo riutilizzo prevederá i nuovi Silos come autosufficienti in termini energetici e, in aggiunta, come raccoglitori di risorse naturali come la pioggia, e come catalizzatori di energia rinnovabile, non solo per appunto, essere autosufficienti dal punto di vista energetico, ma idealmente riuscire a predisporre una certa percentuale di energia prodotta rendendola a disposizione dell'area residenziale circostante.

Ancora piú urgente é l'area dedicata all'educazione: il sito mira ad essere un catalizzatore soprattutto di un flusso di partecipanti costante, cercando di introdurre, tramite conferenze, librerie adatte e piccole esibizioni dell'importanza di responsabilizzare la popolazione su un tema che é sempre citato e portato in causa ma mai espressamente spiegato propriamente e in modo diffuso.

Chapter 1:

REGENERATIVE ARCHITECTURE:
CO-EVOLUTION, CO-EXISTENCE, INTERDEPENDENCY

1.1 Doing it Nature's way

With nature as a mentor, Biomimicry is a new way of viewing and valuing nature. It introduces an era based not on what you can *extract* from nature but on what you can *learn* from it. Having reach the limit of nature's tolerance, humanity is facing its shadow on the wall, along with the ones of rhinos, manatees and other species it is taking down with it.

Placing aside all our superficial needs, natural living things have always done what we want to do, without employing fuel, polluting the planet or putting at risk their future. What better models could we find?

Our current society is accustomed to either dominate or "improve" -as if it was possible- nature; the key is, instead, to "do it nature's way", with the potential of changing the way we grow food, produce materials, harness energy and build shelters. We can see already how solar panels are copied from leaves' photosynthesis system and steely fibres rods from spider threads, results from observations and biomimicry studies of what works in nature and more importantly what lasts, acknowledging that nature knows best.

Thanks to the technology so far developed we can stare into nature's world realising how all of humankind's inventions already appeared in a more elegant way and without a cost on the environment itself; our most clever architectural struts and beams are present in lily pads and bamboo stems and our central heating and air conditioning can be compared to termite's towers.

Unfortunately, at this point in history, as we face the very real possibility a quarter of all the species in the next thirty years, biomimicry, sustainability and regenerative architecture -as the focus of this paper- are more than just a new look on the environment, but more of a race and a rescue.

For starters, what is biomimicry? Humans are clever but unwillingly have created massive environmental issues for future generations. Biomimicry is an approach to said issues which believes that the answers are to be found in nature's patterns and strategies that have been fail proof for millennials. The goal is to think new ways of living that are well-adapted to life on earth in the long time. The main inspiration is drawn from the idea that nature has already a solution to many of the problems we are struggling with. Animals, plants, and microbes are the experienced engineers which had solved the issues that we are now facing.

Biomimicry is the "mimic" of the models, systems, and elements of nature for solving complex human tasks: more specifically, biomimicry in the field of architecture and manufacturing is the way of designing and thinking new buildings and living systems that simulate or copy the processes which we see every day in nature, and if it works there why should it not work at our living scale?

*"The way biological systems solve problems is pretty different from the way engineered systems solve problems. Human-designed solutions are crude and additive. They rely on using more materials or energy to accelerate reactions—both costly expenditures. Natural processes rely on unique geometry and material properties."*²

Geckos and their adhesive abilities for example: to copy the wall-climbing nature of a gecko, you could strap a battery to your back and run electricity through electromagnets that only adhere to metal. But in fact, geckos' feet are dense with tiny hairs that each exert a minuscule molecular attraction, allowing the gecko to stick. Nature is "lazy and intelligent,". The way Nature works makes it exceptional at transforming waste into something useful which is a fundamental principle for balancing systems that architecture has ignored for most

² Peter Niewiarowski, biologist at the University of Akron and Biomimicry Research and Innovation Centre.

of its history. But for designers, biology offers lessons which are easy and logical to learn if one has the time to stop and realise that the solution is already somewhere in front of them.

When in nature a problem occurs, evolution works as a selecting tool: what doesn't work is analysed and a more efficient process and solution is adopted. Humans could also face the current environmental with the same efficiency — examining nature's solutions and applying them to human designs. But biomimicry is not a science of the 21st century: in fact, already Leonardo da Vinci's sketches for flying machines are an inspiration from birds and Filippo Brunelleschi had studied the strength of eggshells in order to design a thinner, lighter dome for "*La Cattedrale di Santa Maria del Fiore*", in Florence, completed in 1436. In 1719, Réne-Antoine Réaumur, a French entomologist discovers and studies the wasps use of wood pulp and suggest its better qualities in comparison to cotton in producing paper. In 1948 Velcro was invented by George de Mestral, whom analysing burrs covering his dog after a walk had noticed how, under a magnifying glass, they were dotted with tiny hooks.³

Due to the global remind of sustainable issues biomimetic innovations had met a considerable increase in the last 20 years: the most recent technologies such as some satellite parts are inspired by the folding patterns of hornbeam leaves, or a lightweight concept car based on the boxfish; even in the medical field a medical probe inspired by the way the wood wasp burrows into wood with minimal force to lay eggs: the probe bores through tissue using a pair of oscillating shafts. As one shaft pushes down, the other is held in place by its "teeth" propelling the whole device downward. After realising how nature can influence literally every field, today, it seems a more than appropriate approach to the impending issue of climate change; to address food lack and proper production, energy consumption and water purification; to deal with natural resource over - exploitation or biodiversity loss; and in creating a quality life and environment for humans which is bound to not affect negatively the context.

Due to the skyrocketing evolution of the developing countries every year, around 15 billion of tonnes of concrete are produced worldwide, releasing in the air about the same tonnage of carbon dioxide; unfortunately, this rate of construction is bound to continue if not rise since developing countries need the cities they are building. Aside from a different approach regarding the large scale of smart city, which is the closest equivalent to concrete in nature? Scientists have found many similarities in sea coral, which is formed by small organisms that create structures out of minerals in seawater. Despite the resemblance the making of coral is completely different than the production of concrete: the former binds an atom of carbon with an atom of calcium, while the latter releases a molecule of carbon dioxide for every atom of calcium in the cement. This process is called biomineralization⁴ and it is not completely understood and fully analysed but if that logic would be grasped then it would be possible to completely change modus operandi and remove, theoretically, billions of tonnes of CO₂ from the atmosphere.

In addition to material production, also energy use in buildings is one of the most considerable components of global CO₂ emissions: the high life quality in the westernized countries has introduced many comforts such as demand for air conditioning, yet in Harare, Zimbabwe, a much warmer country than many others, the East gate Centre, a shopping mall and office block that opened 20 years ago, presented an alternative drawn by the lack of resources: Its design was inspired by termite mounds, an incredible device of temperature control in extreme environments.⁵

³ Cit. "Biomimicry, invention inspired by nature" by Janine M. Benyus

⁴ Biomineralization is the process by which living organisms produce minerals, often to harden or stiffen existing tissues. Such tissues are called mineralized tissues.

⁵ Cit. Biomimetic architecture

Therefore, utilising technology such as air conditioning in climates less extreme than Zimbabwe must be a confirmation of our lack in problem solving skills in comparison to termites. Biological organisms have already provided solutions in areas in which we are currently struggling such as zero-waste systems, low-temperature manufacturing and efficient materials and structures. Advances in scientific knowledge, manufacturing technology and digital design tools are all drawn towards biomimicry, which has all the answers and it is ready to be read in the correct way.

1.2 Redefinition

The intention to learn from nature has been translated in architecture in many ways, and contemporary architecture is shifting rapidly -but not enough- towards a more sustainable approach. However, this is an inadequate standard for the current -and future- design, for it aims no higher than attempting to realise a design less impactful on the environment.

Furthermore, present-day standards -such as the LEED⁶ system and so on- for buildings are set extremely low, in fact when a structure is built it is celebrated if it employs any level of environmental acknowledgement, even if the technologies designed have a small or close to zero impact on the site itself.

It is therefore necessary to take a step further, towards Regenerative Architecture. As already stated in the abstract, regenerative architecture is “the practice of engaging the natural world as the medium for, and generator of architecture: it responds to, and utilizes the living and the natural system which are present on a specific site and that will become the model which the architecture has to embrace”.⁷

What is exactly the meaning of such definition? Regrettably the changes occurred to our planet is already beyond the limit of tolerance, which led us to try and find solutions which would allow us to “go back in time” to restore the natural non- renewable resources that have been over exploited in the last two centuries.

The term “regenerate”, according the American Heritage Dictionary of the English Language, means:

- To give new life or energy to; revitalize; to bring or come into renewed existence; to impart new and vigorous life;
- To form, construct or create anew, especially in an improved state; to restore to a better, higher, more worthy state; refreshed or renewed;
- To improve a place or a system, especially by making it more active or successful;

The regenerative approach is aiming to not merely preserve a specific site and/or environment but enhance it through a human designed building meant to embrace the natural system, becoming a part of it, empowering it to “regenerate” the natural sources. Ideally it would reverse the degeneration of the earth’s natural system designing a human system which would co-evolve with a natural one in a way that generates mutual benefits. This field is redefining the way sustainability proponents are thinking and designing the built environment.

⁶ Information from official USGBC (U.S. Green Building Council)

⁷ Cit. J.A. Littman, 2009, University of Massachusetts

1.3 Cradle to Cradle: a closed loop cycle⁸

When the concept of sustainability is introduced it is explained through -among others- the idea of a “cradle to grave” cycle. Whether we are talking about any building or material production, a “cradle to grave” thinking means planning the entire process from the moment of “birth” to the moment of “death”.

In the field of Architecture this means to be able to plan a project starting from the design and planning stage, going through the material selection and production, through the maintenance and “in life” use of the building and eventually carrying out the necessary measure to deal with the “end” and dismissal of the project.

The indicated way of thinking is already considered among the best in Sustainable Architecture, but wouldn't it be possible to push it even further? As the notion “Cradle to cradle” suggests, it does not only stop to the dismissal of the building -in the case of architecture- but advises that the industry must protect and enrich the ecosystem and nature's biological metabolism while also maintaining a safe and productive technical metabolism for the high-quality use and circulation of organic and technical nutrients.

It is based on a *holistic* view (from the Greek ὅλος *holos*, “all, whole, entire”, is the idea that the systems and their properties should be viewed as wholes, not just as a collection of parts)⁹, in which economy, industry and social framework that are not only efficient but also essentially waste free.

To actively and positively achieve a “cradle to cradle” system it is necessary to approach the topic of recycling, or more specifically upcycling. The term indicates the process of transforming by-products, waste materials, useless or unwanted products into new materials or products of better quality or for better environmental value.

Upcycling is the opposite of downcycling, which, in our current society, the most common practice of recycling. This latter one takes consumer's materials -mostly plastic, paper, metal and glass- and breaks them down so their base materials can be remade into a new consumer product, but this process often, if not always, decreases the material quality.¹⁰

The concept is extremely important in Regenerative Architecture since the goal of upcycling is to prevent wasting potentially useful materials by making use of the existing ones, without relinquishing quality: the key stands in reducing the use of new raw materials, thus resulting positively in a reduction of energy consumption, and like a domino effect also air pollution, water pollution and even greenhouse gas emission will diminish.

This is the most significant step towards regenerative design culture: the end products are supposed to leave a positive mark on the external context and fields they embrace: they should be healthier, cleaner and have a better value overall.

Plastic, for example, is one of the most common and versatile material, but during its recycling process, aside from those used to create bottles, many different types of plastics are mixed, resulting in a hybrid which is used in the manufacturing of plastic lumber applications. However, they are different from the engineered designed

⁸ Cit. Michael Braungart in “Cradle to Cradle: Remaking the way we make things”

⁹ Cit. Free dictionary

¹⁰ Cit. Journal article from Intercon “Recycling vs Upcycling: What is the difference?”

polymer ABS: these latter hold better properties, while recycled plastics often suffer phase-separation during the recycle process resulting in structural weaknesses.

1.4 Transitioning from “green” to “regenerative”

Green building strategies, performance goals, and associated assessment methods currently emphasize the ways and extent that buildings should mitigate global and local resource depletion and environmental degradation.

By contrast, the emerging notion of ‘regenerative’ design and development emphasize a co-evolutionary, partnered relationship between humans and the natural environment, rather than a managerial one that builds, rather than diminishes, social and natural capitals. Three ideas are addressed.

First, understanding the relationship between ‘green’, ‘sustainable’, and ‘regenerative’ design and associated assessment frameworks, giving emphasis to how they represent and engage natural systems and processes. Second, characterizing the type of discussions that these three approaches generate amongst the design team and between the design team and its clients in terms of strengthening an understanding of natural systems.

Finally, the inherent potential of green, sustainability and regenerative design approaches to create the necessary and timely changes in performance improvements. One of the most significant differences – and central to this discussion – lies in the ways that uncertainty of the long-term outcomes associated with different design decisions are acknowledged and accommodated in design.¹¹

¹¹ Cit. Raymond J. Cole, University of British Columbia

Chapter 2:

DEGENERATING, SUSTAINING, REGENERATING

2.1 Guiding principles for Regeneration

By reviewing the work of many what is possible to find in common is how it is always underlined the importance of “knowing” the place (or site) on an intimate and deep level, to be able to understand its forces and flow of energy: the patterns and dynamic of every place begin to reveal themselves as concrete data which are then used as generative information during the design process.

In addition to the fore-mentioned sets / lists of principles two other design guidelines are crucial to consider when introducing regenerative architecture. The first set is entitled “*The five principles of ecological design*” developed by Sim Van der Ryn and Stuart Cowan: the main highlight is the importance of specifying and knowing the place and designing structures that compliment the natural world that surround them by integrating the existing system to an artificial man-made one.

“Ecological design occurs in the context of specific places. It grows out of place the way the oak grows from an acorn. It responds to the particularities of the place: the soil, vegetation, animals, climate, topography, water flows and people lending it coherence.”¹²

1. *Solutions grow from the place.*

Ecological design begins with the intimate knowledge of a specific place. Therefore, it is small and direct, responsive to both local condition and local people. If we are sensitive to the nuances of places, we can inhabit them without destroying.

2. *Ecological accounting informs design.*

Trace the environmental impacts of existing or proposed designs. Use this information to determine the most ecologically sound design possible.

3. *Design with nature.*

By working with living processes, we respect the needs of all species while meeting our own. Engaging in processes that regenerate rather than deplete we become more alive.

4. *Everyone is a designer.*

Listen to every voice in the design process. No one is a participant or designer only. Honour the special knowledge that each person brings. As people work together to heal places they can also heal themselves.

5. *Make nature visible.*

Denatured environments ignore our need and potential for learning. Making natural cycles and process visible brings the designed environment back to life. Effective design helps to inform us of our place within nature.¹³

The second set of guidelines is called the “*Todd’s Principles of Ecological Design*”,¹⁴ as the name states they are revised by John and Nancy Jack Todd. In a different way from the previous list, but somehow parallel, at the centre of the design process we find nature: their principles focus on it being a teacher and a generator of design, incorporating architecture means and systems, food production and waste management into the principles:

1. The living world is the matrix of all design.

¹² Cit. Sim Van der Ryn, Stuart Cowan

¹³ Cit. Sim Van der Ryn, Stuart Cowan

¹⁴ Cit. “From Eco-Cities to Living Machines, Principles of Ecological Design” by Nancy Jack Todd and John Todd.

2. Design should follow, not oppose, the laws of life.
3. Biological equity must determine design.
4. Design must reflect bio-regionality.
5. Projects should be based on renewable energy sources.
6. Design should be sustainable through the integration of living systems.
7. Design should be co-evolutionary with the human world.
8. Building design should help heal the planet.
9. Design should follow a sacred ecology.¹⁵

Despite the many lists and principles, one can find which are referred to Regenerative Architecture, one is the constant: artificial implementation and design must be responsive to the natural context surrounding them, and specific for the place it is generated for: clearly, an architectural addition cannot be designed in the same way for different location, climates and environments. "Traditional" architecture rarely engages the natural world in which it is placed, while, as we confirmed, the essence of regenerative architecture is based on the conception that there is no disconnection between human and nature: they are one, humans *are* nature. Everything is connected as a system and each piece of the system is equally important and necessary to its health. For decades engineers had been trying to solve the issues with experimentation and new ideas, concepts and material but the environment provides already more answers to the problems we are facing than we can actually think of, which are awaiting only to be acknowledged and employed.

"How can we do the greatest good for the greatest amount of beings for the longest amount of time and with the least impact?"¹⁶

Regenerative architecture reconnects humans to their life-places: it becomes embedded into the ecosystem of the site contributing to its natural balance, connecting human and nature at a deep and spiritual level. The key is finding balance, because balance is what supports us: we as humans are the most highly evolved species and are the most capable of rapid adaptation and shifting our means of living by taking an active role and participating in maintaining this equilibrium that nature has engineered, because the present one-sided relationship between us and nature cannot continue indefinitely.¹⁷

2.2 Lyle, Thayer, McDonough

Landscape architects Robert Thayer and John T. Lyle, and architect William McDonough are proponents of regenerative design who have published significant works. Each of these authors shares a common vision of promoting truly regenerative design and consequently there is a significant degree of overlap between their respective works. However, each of them tends to emphasize some distinctive aspect of regenerative design.

¹⁵ Cit. John and Nancy Jack Todd

¹⁶ Cit. Ethan Roland

¹⁷ Cit. Daniel Christian Wahl in "The Regenerative Practitioner comes to Europe", global educator, activist and consultant, generalized in whole systems design and transformative innovation for regenerative cultures.

Lyle focuses on the ecological component of regenerative design. His theory's focal point is the project and the community scale, and, as one might expect, his work contains a balance of theoretical principles and practical approaches.

"The landscape must be designed for supporting ongoing supplies of energy and material for habitat, daily living and economic activity"¹⁸

To accomplish this, it is necessary to replace the present linear system of material flow with a cyclical flow, just how an autumn leaf does not just die but transforms in the ground into nutrients for the incoming spring's new green leaves buds. In this sense, a regenerative community provides for a continuous replacement, through its functional processes, of the energy and material used in its operation.

Lyle proposes six basic processes which are required to achieve the just mentioned outcome: conversion, distribution, assimilation, filtration, storage, thought.

- Conversion is the mechanism by which energy is turned into usable energy.
- Distribution is how the energy reaches community members.
- Assimilation is the collection and returning of materials to the landscape.
- Filtration is the process to maintain a clean and healthy ecosystem.
- Storage is a major component of the regenerative system because due to our stationary habitation we no longer migrate with the seasons, requiring the stabilization of products (water and food).
- Finally, regenerative design must be guided by thought.¹⁹

In addition to this Lyle proposes twelve strategies²⁰ for integrating processes within the regenerative design processes.

1. *Letting Nature do the work*

Many mechanism and processes of regenerative design are inherently and already performed by nature. Under conventional design these processes are replaced by engineered systems which are costly in terms of energy requirements and environmental disturbance. Nature provides these services and with a little augmentation we can tap into these processes and utilize them for our benefit and reconnect ourselves to the environment.

2. *Considering Nature as both model and context*

When developing a landscape, re-establishing the connectivity and continuity in nature is crucial. Utilizing nature as a model for design allows insight into underlying connectivity and material flow through the ecosystem.

3. *Aggregating not isolating*

Dismantling complex problems can reveal the characteristics of its individual parts, enabling design to recreate through understanding the processes involved. Aggregation leads to rich links, minimizing the energetic needs of production. Regenerative design must be concerned with the interaction among the parts, the connections, as with the parts themselves to develop successfully.

¹⁸ Cit. John Lyle, 1994

¹⁹ Cit. John Lyle in "Regenerative Design for Sustainable Development"

²⁰ Cit. "Design for Human Ecosystem"

4. *Seeking optimum levels for multiple functions not the maximum or minimum level for anyone*
Regenerative systems will always have multiple goals. These goals might be in conflict, therefore manage the system to maximize the system, not an individual element. Managing the connectivity of the system to create the optimal outcome is equivalent to maximizing the system.
5. *Matching technology to need*
This strategy is about applying appropriate technology for the proper use. For example, instead of using a conventional air conditioning system, we can use natural ventilation and other cooling tubes and sunshades.
6. *Using information to replace power*
Maintaining open lines of communication and a feedback monitoring system allow for greater information sharing and result in community-based decision-making and management.
7. *Providing multiple pathways*
Multiple pathways allow for flexible response to changing market conditions, supply and demand alternations, and system malfunction.
8. *Seeking common solution to dissipate the problems*
Instead of separating and compartmentalizing life-support systems, recognize and utilize the interconnectivity to create common solutions. Specifically recognize system interaction and solutions provided within the same system. An example is our water management system: conventionally water is managed in terms of supply, storm water and sewer management. This system has the potential to be interconnected and effectively managed more efficiently, resulting in reduced demand.
9. *Managing storage as key to sustainability*
Maintaining adequate storage and balancing the rate of replenishment with the rate of use are important keys to successful sustainable community. Nature has available storage devices in groundwater basins and atmosphere for oxygen and other gases. Regenerative design incorporates natural storage mechanisms and develops its own.
10. *Shaping form to guide flow*
Energy and material flow through system within the physical medium of the environment and determine the rate of flow. By shaping the environment, we can guide flow. "Flow follows form follows flow."
11. *Shaping form to manifest process*
In regenerative design technologies are more difficult to hide. Instead of cloaking the technologies in a façade we should utilize them as a means for design, for many are integrated to their context and can be utilized for education secondarily. "Cultural habits and preconceptions change slowly, but if we can manifest the inherent elegance of ecological process in visible forms, those forms will become symbols of the time."
12. *Prioritizing for sustainability*

There has been a slow increase in regenerative and sustainable design in the past decade, yet we are in a long period of transition in which our priorities must change. To succeed in sustainable design, sustainability and regenerative design must take a high priority through all sector of society, the environment and the government.

A major theme in Robert Thayer's work is the relationship between our visual perception of the landscape and technology. He argues that we must bring back elements such as transparency, congruency, and visual ecology by making deliberate attempts to merge the natural with the technological making their separation line almost blurred. Furthermore, he claims that generating a positive association between natural and technical within the perceptual field will have sufficient impact to change the behaviour of our culture.

Although Thayer tends to use the term "sustainable community" his ideas are based on the regenerative concept. An examination of his five characteristics of sustainable design makes this apparent:

1. Renewable energy generated without ecological destabilization.
2. Maximize the recycling resources, nutrients, and by-products, and produce minimum wastes.
3. Maintain local structure and function without reducing the diversity or stability of the surrounding ecosystem.
4. Preserve and serve local human communities rather than change or destroy them.
5. Incorporate technologies which support these goals. In the sustainable landscape technology is secondary and subservient.

At the practical level Thayer depicts the sustainable (regenerative) community and landscape as the proper relationship between a set of specified program elements.

William McDonough brings one of the primary issues underpinning regenerative design theory to the forefront. His view of the design process includes creation, production and social relation, but most importantly also business planning. With Michael Braungart he developed 3 principles to follow to content a regenerative economy to fit the present global society:

1. Recognize that waste equals food.
2. Respect diversity.
3. Reconcile energy consumption to current solar income.

The first concept represents how in nature nothing is reproduced uselessly: this ecological efficiency is meant to serve as a model for our human economy. In addition, he stresses diversity among species, but also in the field of business: although it would require significant changes to the system, achieving diversity will result in more choices for the production, which would mean a greater variety of end products for the consumers. We can see the relation with Lyle's 7th principle, in which he recommends providing multiple pathways. Finally, utilizing solar energy income would mean recognizing that our Earth is a massive ingenious cyclical system only sustained by sunlight.

While McDonough's principles are applicable at the site level their greatest significance lies in the global market place: no community or design can exist in isolation. A framework at a bigger scale is crucial for the ultimate success of any local application of regenerative design theory.²¹

2.3 Regenerative development

Explained in big lines regenerative development is centred around the idea that Earth, which had been exploited almost to the breaking point can be healed and regenerated through human development: the goal is to rekindle our aims and partner it with the latest innovation to apply it to physical places. It is fundamental that we shift our mindset from a human-centred one to one that includes all the aspects affected by the life cycle of humans on this plane, and to redefine the meaning of "progress". At the present day, the environment is mostly still considered as a bed of resources to be exploited and not as a bed to live in which, is ready to accommodate our comforts without needing many changes.

In sharp contrast to this mentality, stands the concept of regenerative development: we are the system that can never be separated the net of life circling in nature. When we release toxins in the environment, they will infiltrate quickly into the food we eat and the water we drink. What we do to nature, we do it to ourselves. Fortunately, science is rapidly -but not enough- shifting towards a better conception of nature as alive, intelligent and self-organizing.

So, after defining what we need to do, how do we do it? Again, there have been already insights on this question, as found in the article "*Green to the Power of Three*" (Regenesis Group, Ben Haggard)²², a set of six distinctive stages have been outlined, which uses "Place" as a centre of transformation:

1. Elucidating place as a living system into which the project must integrate.
2. Envisioning the higher order potential that exists in that system, and how integration of project and place can bring that into being.
3. Generating a concept for the project, based on this understanding of place and potential.
4. Enabling stakeholder ship in what could be.
5. Generating an aim for the project, the project team and the system as a whole.
6. Translating this vision into reality without collapsing into automatic patterns.²³

Every place on the planet is unique, each with its own biodiversity and culture that act as elements which organize the lives processes and routine of the livings in said specific place. Since the spreading of globalisation conventional design brings and builds places like retail malls and chain stores where you can experience the identical environment in any city of the world: this model of settlement pays spends absolutely no thoughts to the specific potential of the site. It is both spiritually and biologically degrading and is part of the so called "geographies of nowhere".

²¹ Cit. "Cradle to Cradle: Remaking the way we make things" by Michael Braungart

²² Regenesis is a world leader in the field of regenerative development—an approach to land use, community development, and the built environment that has defined the leading edge of sustainability practice for more than two decades.

²³ Cit. Thrive Design Studio journal article "What is Regenerative Development"

Only through the regenerative approach a design process can really come alive: it takes patience to understand the strength of nature, but it is essential to achieve a deep level of integration and collaboration. All the issues regarding necessity for a human development (water, energy, waste, food and so on) can no longer work on isolation from each other but need to be synthesized within a system which includes them all, one enhancing the other: this method will improve the health of the whole system, both the physical ecosystems and human communities.

2.4 Living, regenerative, and adaptive buildings

Traditionally, buildings have been designed to meet certain needs – function, comfort, budget – but minimally focused on how well they fit within the natural environment which surrounds them. Buildings tend to be thought of as static elements that remain the same over decades, interacting little with either the site they are placed in and their occupants.

Sustainable design has begun to change these conceptions through the establishment of green building standards and rating systems, “forcing” in a way, to design an element which would respond and interact with the environment. These strategies help introducing the concept of *living buildings*, *regenerative buildings* and *adaptive buildings*.²⁴

Living buildings are ‘autonomous and not reliant upon the electrical grid or other utility systems to operate, or, in accordance with the idea of net-zero, they take in resources at levels equal to or less than what they return to the community and the environment’. To achieve these results a living building is integrated and mimics natural processes and obtains all necessary resources to operate from the surrounding environment, such as rainwater, wind or sunlight. By doing so, the building can function autonomously from power grids and municipal water systems.

Regenerative and restorative buildings go beyond the level we just described, by improving and positively affecting the surrounding in which they are placed: restoring a site’s natural hydrology through the re-shaping of the territory or providing a renewed environment for possibly lost wildlife and plant habitat. To be able act as described, these implementations are designed to produce all their own energy in addition to a surplus which is meant to have a net-positive impact on the surrounding; it is ideal to have a system able to sustain itself and have spare energy to share to other buildings so that also these latter can meet their energy demands without depending on non-renewable resources. This also presumes a reduction in pollutant emission in the external environment, be it water, air or land, being also healthier and safer for the users. Self-sustainability is not only defined through energy consumption but also through quality of life for the inhabitants: creating opportunities for urban agriculture is one of the most common way to link humans and cities back with nature and it can be easily achieved by designing green roofs.²⁵

²⁴ Cit. WBDG, Whole Building Design Guide, a program of the National Institute of Building Sciences

²⁵ Cit. “The green roofs guide” founded by Life+, European Commission Groundwork Sheffield Homes and Community Agency, The Green Roof Centre Livingroofs.org

Due to the impending and spreading concern towards climate changing science is thoughtfully researching new technologies to properly support these concepts of adaptive building systems and every year more and more solutions are becoming available and dependable.

Even without the last trending technology many issues can be addressed simply by considering and planning strategic decisions based on a specific analysis of the site, pointing out its strengths and weaknesses and purposefully thinking of a building which can significantly exploit all possible strengths while reducing any possible risk associated with worsening climate change. Designing buildings in such ways gives an opportunity to contribute to climate change with zero impact due to its ability to adapt to changes during seasons and different weathers in different natural domains without having to be re-designed in time.

To stimulate the progress towards this discipline many different awards are being set up to reward sustainable architecture, one of these being the Living Building Challenge²⁶.

²⁶ The Living Building Challenge is a building certification program created in 2006. It is non-profit and international.

Chapter 3:

SOUTH-EAST-ASIA: VIETNAM

3.1 A rising country

“Sustainable development represents a common trend along which the entire humankind is endeavouring. It is also an important strategic goal that the Communist Party, Government and people of Viet Nam are determined to attain. Sustainable development, as such, has become part of the Party’s guidelines and views as well as the State’s policies and been clearly reflected in the country’s national, sectoral and local socio-economic development strategies, schemes and plans.

20 years’ implementation of sustainable development, especially nearly 10 years’ implementation of the Strategic Orientation for Sustainable Development, has seen Viet Nam taking advantage of good opportunities, overcoming numerous difficulties and challenges, and achieving major gains in the economic, social and environmental fields. The country has escaped underdevelopment, recorded relatively fast economic growth, and improved its population’s material and spiritual living standards. Environmental protection has been attended to and become better in certain aspects. Viet Nam’s international status has been uplifted, important premises have been created for fast and sustainable development and a life with higher quality for the people.

However, those achievements are not commensurate to what the potentials would have promised. Viet Nam remains fraught with global challenges such as energy security, cyber security, water source security and climate change, etc. which are hindering the country’s process of sustainable development. Viet Nam will have to continue to work to maintain the sustainability of the development gains it has recorded. Assessment of achievements and shortcomings of the last 20 years’ implementation of sustainable development is necessary, not only to Viet Nam but other countries in the world as well to take stock of the results and lessons of experience so far gained, identify opportunities and challenges, and map out orientations and solutions for continued successful implementation of sustainable development objectives.

Motivated by new understanding, new resolve and new ways of operation, Viet Nam is convinced that sustainable development is an inevitable path and will be vividly and effectively realized in Viet Nam’s process of development and integration. Viet Nam looks forward to the continued multi-sided cooperation and assistance from the international community, particularly from international organizations and developed countries, with a view to overcoming challenges and moving forward toward a green economy, further improvement of the institutional set-up, hence continued sustainable development of the country.”²⁷

At present, together with the international community, Viet Nam is determined to, step by step, surmount all obstacles implementing sustainable development towards establishing a greener economy.

Having participated in the Rio de Janeiro summit in 1992²⁸, Viet Nam was prepared for the following objectives:

- To provide a broad-based assessment of 20 years’ implementation of sustainable development as well as the achievements and shortcomings in implementing sustainable development in Viet Nam;

²⁷ Cit. Prime minister of the Socialist Republic of Viet Nam, Nguyen Tan Dung

²⁸ The United Nations Conference on Environment and Development (UNCED), also known as the Rio de Janeiro Earth Summit, Rio Summit, Rio Conference, and Earth Summit, was a major United Nations conference held in Rio de Janeiro from 3 to 14 June 1992.

- To improve Viet Nam's current level of commitment to the global issues which it had been contributing to by being a high rate developing country in order to find solutions while not necessarily halting the growing economy but shifting it towards a better and greener path;
- To present Viet Nam's lessons of experience to fellow developing countries, especially in the South East Asia in comparison to a different view of the issue in the westernized countries, to the United Nations Commissions on Sustainable Development.

"Economic growth must go hand in glove with social progress and equity, cultural development, and environmental protection."

"Economic growth is to be closely associated with social progress and equity, preservation and promotion of the national identity, and protection of the ecological environment."

"Environmental protection constitutes a fundamental and inseparable component of socio-economic development guidelines, policies and plans at all levels and of all agencies, and an important basis that guarantees sustainable development and successful implementation of the national industrialization and modernization process."

"Development must be fast, efficient and sustainable, economic growth must be coupled with implementation of social progress and equity and environmental protection. [...] Socio-economic development is to closely link to environmental protection and betterment, ensuring the harmony between the man-made environment and the natural environment, and preserving biodiversity." 29

Over the past decades Viet Nam has been incredibly active in this field, signing many international conventions related to sustainable development such as:

- the Montreal Protocol on Substances Which Deplete the Ozone Layer
- the Vienna Convention on Protection of the Ozone Layer
- the United Nations Convention on the Law of the Sea
- the United Nations Framework Convention on Climate Change
- the Convention on Biodiversity (1994)
- the Commitment to Implementation of the Millennium Development Goals

and so on.

And furthermore, adopted a Viet Nam Agenda 21³⁰, for the sustainable objectives to be realised. The government has assigned relevant ministries and agencies to serve as a contact points which are responsible for the coordination of organization and integration of these commitments into development plans and programs at all levels for the execution.

From the economical point of view, a series of policies have been adopted in Viet Nam to enable the country to make full use of emerging opportunities brought about by the comparative advantages of its market access

²⁹ Set of quotes from "Implementation of Sustainable Development" a national report at the United Nations Conference on Sustainable Development (RIO+20)

³⁰ Agenda 21 is a non-binding, action plan of the United Nations with regard to sustainable development.^[1] It is a product of the Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro, Brazil, in 1992. It is an action agenda for the UN, other multilateral organizations, and individual governments around the world that can be executed at local, national, and global levels. The "21" in Agenda 21 refers to the 21st Century.

reaching more than 150 WTO³¹ member countries. As a result, trade and investment have been promoted, and the country's economy has been improved in the economic scale, export scale, competitive capacity and the use of new scientific and technological advances in production and construction.

High attention has been given to combining economic growth with social development and to raise the overall quality of life, focusing on policies regarding poverty reduction and social security, implementation of social progress and equity for the goal of human development, and constant improvement of the people's material and spiritual livelihoods.³²

Vietnam's Comprehensive Poverty Reduction and Growth Strategy (CPRGS)³³ adopted in 2002 has been effectively implemented through the National Target Program on Poverty Reduction for 2006-2010 and the National Target Program on Sustainable Poverty Reduction for 2012 - 2015. To follow the plan policies and solutions to face the large-scale poverty and hunger issues had touched mainly 3 aspects:³⁴

-to help the poor enhance access to public and basic services, especially those in healthcare, education, legal support, housing, and domestic water.

-to help develop production through policies on guaranteeing land for production, preferential credit, vocational training, agro-forest-fishery extension and development of crafts and trades.

-to develop essential infrastructures to connect those villages and small communities which are in particularly difficult circumstances.

Whereas the scale of investment for education and healthcare remains modest as compared to many countries, the ratio of budget expenditures for education and healthcare to the level of income is very high. More and more provinces have met the criteria on universalization of secondary education and the life expectancy has reached 75 years old.

In the environmental field the Law on Environmental Protection was enacted in Viet Nam as early as in 1993 and amended in 2005. Since then, policies on environmental protection have been implemented extensively and intensively. Ensuring a harmonious combination between environmental protection and socio-economic development. Currently there are approximately 33 laws and 22 ordinances with a content relating to environmental protection, among them:

- 2008 Law on Biodiversity
- 2004 Law on Forest Protection and Development
- 2003 Land Law

³¹ The World Trade Organization (WTO) is an intergovernmental organization that regulates international trade. The WTO officially commenced on 1 January 1995 under the Marrakesh Agreement, signed by 123 nations on 15 April 1994, replacing the General Agreement on Tariffs and Trade (GATT), which commenced in 1948.

³² References to the "Support to the Implementation of the resolution 80/NQ-CP on directions of sustainable poverty reduction 2011-2020 and the National Targeted Program on Sustainable Poverty Reduction 2012-2016"

³³ The Comprehensive Poverty Reduction and Growth Strategy (CPRGS) Paper is an action plan that translates the Government's Ten-Year Socio-economic Development Strategy, Five-Year Socio-economic Development Plan as well as other sectoral development plans into concrete measures with well-defined road maps for implementation. This is an action plan for realizing economic growth and poverty reduction objectives. The CPRGS paper sees a harmony between economic growth and measures to solve social problems. The tasks and objectives contained in the poverty reduction and growth strategy not only calls for targeted measures to support specific poverty groups, but also sees important linkages within the matrix of policies that include macroeconomic policies, policies on structural adjustment, sectoral development policies and measures, and social safety net policies of all sectors and levels that must work in tandem to ensure sustainable development.

³⁴ References to the Communist Review Tap Chi Cong San

- 2003 Law on Aquaculture
- 1998 Law on Water Resources
- 1996 Law on Minerals

Building on these precepts, the ongoing Law on Environmental Protection of Vietnam is intended to be updated and improved to the Law on Environment which will, through a planned framework reliant on new laws and economic adaptations focus on improving the overall perception and common view towards nature and sustainability. To achieve a proper result towards environmental protection said policies and economical agreements had been undertaken by specific agencies and organs which are working constantly to rise the basic level of awareness in the population.

3.2 Achievements and Shortcomings

Thanks to the adoption of the Strategic Orientation for Sustainable Development, Viet Nam has recorded remarkable achievements in all 3 economic, social and environmental pillars which have been summed up at the 1st, 2nd and 3rd national conferences, respectively in December 2004, May 2006, January 2011.

In a general view, thinking about the fields of economy, society and condition, Vietnam has in the previous years appreciated a high monetary development rate, with its economy structures moving extensively toward industrialization and modernization, its full scale economy settling and offsetting, while its spending shortfall and national obligation have been monitored and inside safe points of confinement. Moreover, the fast-monetary development has made a base sufficiently strong to have the essential assets to address the various social issues in the nation. These accomplishments have made assets to effectively tending to a progression of social issues, for example, the officially expressed appetite neediness and poor instruction level.³⁵

Following 10 years from the execution of the Socio-Economic Development Strategy³⁶ in 2001, an audit has affirmed that, with the continuous authority and arrangements, Vietnam has prevailing with regards to exploiting openings supported by the difference in conditions and approach, and defeated various troubles and difficulties, particularly amid the money related emergency, having the capacity to achieve the gathering of centre wage creating nations. A large portion of the key destinations set in the 2001-2010 Strategy have been accomplished, pulling the nation onto another progression of improvement for what concerns creation, and in this manner global combination because of fare: albeit a large portion of the arrangements were connected to a looked for new natural concern however by consenting to them a financial advancement spread through additionally zones, for example, assembly and administration.

By incorporating practical improvement destinations into financial advancement methodologies, plans, and projects in more than the clearly influenced segments the cooperation of the whole populace in mix with universal help, helped enhancing the maintainable blend of 3, to be specific monetary improvement, social improvement and natural assurance, in a way that meets the necessities of today requirements for lessening of

³⁵ References to the Foreign press centre of Vietnam

³⁶ The Vietnamese Government's main strategy for development comprises the 10-year Social Economic Development Strategy (SEDS) and the five-year Socio-Economic Development Plan (SEDP). The actions needed to translate the 10-year SEDS into reality are described in the five-year SEDPs. As one of the most important documents of the Government of Vietnam, each SEDP provides a framework and directions for different ministries and sectors to develop their own plans of actions and annual plans. The 2006-2010 SEDP aimed to move Vietnam from low-income status to the rank of middle-income countries, which it achieved in 2010.

contamination while clutching the set up solace and quality life, and does nothing to hurt the interests and reactions to the necessities of the ages of tomorrow.

However, the country is still at the beginning of this important path, whereas the main check points are the achievements which are yet to be fully completed to be exploiting their full potential. The current market economic institution, the quality of human resources and population involvement in the changing process, and poor infrastructures remain restrains to this much needed development. The foundation for Vietnam to eventually become an industrialized country launched toward modernity are lacking and it is hard to change a culture into a shape which would allow said development.

The first baby steps include a division in prioritized area, namely 19, to focus on which are divided under the economic, social and environmental pillars, and in addition a brief analysis of the shortcoming of such implementation is placed for comparison:

Prioritized Areas	Achievements	Shortcomings
Maintenance of fast and sustainable economic growth	Relatively fast growth of 5%-8% in the past 5 years. "Made in Vietnam" agro-based, forest and aquatic products have rapidly expanded to international markets. Vietnam's Global Competitiveness Index (GCI) in 2010 made a 16-step jump, putting the country in the group of the worlds' 59 most competitive economies compared to the other 137 economies of the world.	Growth quality remains low, the macroeconomic stability is not high, energy consumption remains considerable. Labour productivity is markedly lower than that of regional countries. Growth in many sectors still relies on export of raw natural resources.
Shift of production and consumption toward being environmentally friendly	Greater attention has been given to environmentally friendly production and consumption methods in activities in production, business and day-to-day life. The National Target Program on Economical and Efficient Use of Energy has been extensively put in place, saving 3.2% of the total national energy consumption during 2006-2010.	Out dated and highly materials and energy- consuming productive technologies remain in place in many sectors and localities, resulting in reduced production efficacy, reduced competitiveness of the economy and increased waste to the environment. Extravagant consumption remains common among part of the population, particularly among urban dwellers.
Implementation of the "clean industrialization" process	Many activities encouraging application of cleaner production have been carried out. By the end Of 2010, there had been some 1,031 enterprises applying cleaner production and waste auditing. The unorganized exploitation and rampant export have been corrected	In implementation of clean industrialization, many concrete solutions are still lacking, and so are the inspection, pushing and inter-agency coordination. Cleaner production solutions have not been applied by many enterprises.

	to a certain extent in the minerals exploitation sector.	
Sustainable agricultural and rural development	<p>Agricultural development has enjoyed a relatively high and stable rate toward commodity production, contributing to the stable national food security. The output of agricultural, forest and aquatic production has always stayed at a high level, averaging at 4.85% every 5 years. The system of rural transport, electricity and social infrastructure has seen a quantitatively fast development. By 2010, 96% of communes and 93.3% of households had access to the national grid and over 60% of rural population to clean water. The population's income has been raised, that in 2007 was 2.7 times higher than in 2000.</p>	<p>Rural development is short of planning and spontaneous in nature. The socioeconomic infrastructure remains outmoded and disconcerted, hence failure to meet long-term development requirements. The environment in many rural areas is increasingly polluted due to domestic, husbandry and agricultural chemical waste. Suburban areas, industrial zones and craft villages are seriously polluted. The labour structure in rural areas is slow to shift.</p>
Sustainable regional and local development	<p>Regional construction zoning has been designed and fundamentally covered the 6 key economic regions. By now, 10 interprovincial zoning blueprints have been approved. All the regions have either fulfilled or over fulfilled the set targets on the average GDP per capita and reduction of poverty incidence. Investments have been made in building the clean water supply system, benefitting 80% of urban population and more than 60% of rural population.</p>	<p>The overall socio-economic development schemes in key regions and schemes on developing economic sectors from the development perspective have not been reviewed. The levels of development, infrastructures and living standards among regions remain rather large, particularly among mountain regions and the Mekong River Delta.</p>
Concentration of efforts on hunger eradication, poverty reduction, promotion of social progress and equity	<p>Poverty reduction programs have been implemented effectively. The poverty rates have sharply gone down, from 22% in 2005 to 9.45% in 2010. The national scale poverty gap indicator has been brought down to a remarkable extent, from 18.4% in 1993 to 3.5% in 2008 for all rural, urban, ethnic minority and geographic areas. Social security has enjoyed special attention.</p>	<p>The poverty reduction rates are not sustainable and uneven in mountain and disaster-prone areas. The rates of poor households in ethnic minority, remote and hinterland areas remain high. The numerous risks which highly potentially lead to the recurrence of poverty include natural disasters, pandemics, and negative impacts of the market economy, etc.</p>
Continued reduction of population growth and generation of more jobs for workers	<p>The population growth in a ten-year period tends to decrease. Vietnam's age-based population structure has witnessed a rapid shift, signalling an expectancy increase and an on-going aging tendency. In the 2006-2010 period, employment had been provided for more than 8 million workers; unemployment was kept at</p>	<p>Sex imbalances become increasingly serious. In terms of population quality, human physical factors are very low, most notably as high as 6.3% of the population is with a disability at different degrees. Although the unemployment rate remains relatively low, low-yield employment and youth</p>

	<p>low rates, being at 2.6% in 2010, with the urban unemployment rate brought down to below 5% and the agricultural workforce accounting for less than 50%. Special attention has been given to youth and female workers. The employment structure has shifted toward increased wage-earning and reduced self-employment, in which the rate of agricultural self-employment has gone down while non-agricultural self-employment has gone up.</p>	<p>unemployment tend to go up (in 2006 was 6%, in 2010 was 7%). Generation of employment is unsustainable. In rural areas, underemployment remains serious, imminent of unemployment danger. The untrained workforce accounts for a high proportion. Investment from the State budget for human resources development and employment generation remains too low as against the need. Labour movement to urban and suburban areas is on the rise, accompanied by social issues such as housing, living conditions, and social order and safety, etc.</p>
<p>Orientation for urbanization and migration targeting sustainable urban development, rational distribution of population and workforce by region</p>	<p>The urban construction zoning has been innovated. The national urban network has been expanding and developing relatively evenly among regions. The urban economic growth accounts for 70% GDP of the whole country. Many infrastructure projects and projects on water supply and sewage as well as urban environment improvement have been put in place. The system of urban centres has advanced and modernized.</p>	<p>The urbanization process has taken place mainly extensively, due to mere attention given to urban economic growth at the expense of the environmental, social and cultural aspects. There has been a rise in the declining quality of life, weak infrastructure, social polarization and social vices. Traffic accidents remain serious.</p>
<p>Improvement of education quality with a view to raising the people's intellectual level and professional calibre, in line with requirements of the cause of national development</p>	<p>The education scale has expanded rapidly, especially at the university and vocational levels. The network of schools, classes and education units has reached all parts of the country. Vietnam fundamentally accomplished primary education universalization in 2000. The education quality at all schooling levels and the training capacity have both made progress. The mobilization of social participation in education and training has yielded certain results. Vocational training has taken a step of development, innovating itself and scoring set targets.</p>	<p>The education quality remains lower than required by development and then that in countries in the region and the world. School material and technical bases are both lacking and out dated. The ratio of trained workforce remains low, especially the rural workforce, hence failure to meet the need for modernized commodity production in the context of international integration. There remains uneven access to education among regions and between rural and urban areas.</p>
<p>Quantitative development and qualitative improvement of healthcare services, improvement of working conditions and living environment sanitation</p>	<p>The network of healthcare and the network of occupational healthcare at all levels have step by step been consolidated. The quality of healthcare has been improved. The preventive medicine and endemic control have been put well in place, subsequently helping implement effectively epidemiological oversight, successfully control SARS,</p>	<p>Healthcare quality and services both have fallen short of the population's expectation for health check-up and treatment. Food contamination and poisoning remains at a high level, beyond control. Relevant State authorities are limited in their capacity to control and monitor occupational safety and sanitation.</p>

	<p>A flu (H5N1) and A flu (H1N1). Working conditions, environmental sanitation and control of food hygiene and safety have all been improved.</p>	
<p>Combat against soil degradation, effective and sustainable use of land resources</p>	<p>Vietnam has been putting in place various policies, programs and projects on combating soil degradation and effectively and sustainably using land resources, which cover inter alia assignment of land and subcontracting of forests to households, afforestation and protection of watershed forests, production along the agro-forest combination model, development of perennial trees and indigenous trees on sloppy terrains, and management of river basins and coastal land.</p>	<p>Land environment has been degraded due to soil erosion, wash-offs, landslides, salinization, acidification and sulphate acidification, due to abuse of chemical fertilizers and pesticides causing pollution, and due to industrial waste discharged onto the land environment. Coordination among relevant Ministries and agencies in addressing soil degradation and effective and sustainable use of land resources remains minimal. The land acreage for agricultural purposes has diminished under pressure of population growth, urbanization, industrialization, changes of land use purposes, and the threatening sea water level rise due to climate change.</p>
<p>Protection of the water environment and sustainable use of water resources</p>	<p>Fundamental surveys on the water resources, mapping of river basins, zoning of water resources in river basins and territorial regions and zoning of, are going on. The dissemination of laws and strengthening of community awareness on water resources, inspection and check-up in relation to water resources has been intensified. Participation in the work of the Mekong Commission has promoted international cooperation in the governance and development of water resources.</p>	<p>Investments in governance, basic surveys, inventory, evaluation of water resources, and activities to protect water resources fail to catch up. Suitable mechanisms and policies are not yet available, therefore unable to tap all social resources for environmental protection, combat pollution, degradation and water exhaustion. Awareness and management capacity remains weak.</p>

<p>Reasonable exploitation, economical and sustainable use of minerals</p>	<p>Mining over the past years has witnessed considerable innovation, with technologies in exploitation, screening and processing having developed with a view to saving minerals resources and protecting the environment. The investment mechanism has been further improved in exploitation, land recovery and return, recycling and improving the ecological environment in mining areas, encouraging local communities to more actively participate in activities to protect minerals mines.</p>	<p>Many kinds of minerals have suffered from over-exploitation, becoming increasingly scarce. Governance and decentralization of governance over mining is fraught with marked overlapping and arbitration. Minerals export become over-massive and is subject to many negative export management practices.</p>
<p>Protection of marine, coastal and island environment, and development of marine resources</p>	<p>Many projects on protecting marine, coastal and island environment and on developing marine resources have been designed and implemented. International cooperation activities aimed at exchanges of information and experience regarding management and control of marine, coastal and island environment as well as response to and prevention of oil-spills have been broadened. The coordination among ministries, agencies and localities in execution of State governance over the sea and islands has step by step improved.</p>	<p>There is a lack of legal basis and legal documents with clear and sufficient stipulations on the execution of functions on marine and island management. Limited executive capacity has resulted in low quality and efficiency. Equipment and material facilities in service of implementation of professional mandates as well as of integrated and unified governance over the sea and islands are both lacking and out dated.</p>
<p>Forest protection and development</p>	<p>12 years' implementation of the Project on planting anew 5 million hectares of forests has seen the realization of subcontracting an average of 2.6 million hectares of special-purpose and protective forests per annum and planting anew 2.17 million hectares of forests. This intensified afforestation has helped halt the forest acreage decline and raise the forest coverage, from 28% in 1995 to 39.5 in 2010.</p>	<p>Despite the forest coverage increase, forest quality tends to decrease. Forest destruction continues to occur in a serious manner, mostly in parts of Central Highlands provinces and Binh Phuoc province. Legal sanctions against those have destroyed forests are too light-handed.</p>

<p>Reduction of air pollution in urban areas and industrial zones</p>	<p>Many large facilities and factories have applied cleaner technologies, modern emission control technologies and efficient use of energy. Air-polluting facilities have gradually been dealt with, thus contributing to improving the air environment quality of urban centres throughout the country.</p>	<p>The assignment of responsibilities for urban air environment reveals overlapping. Specialized legal documents on urban air environment are insufficient. Investment in air environment management and protection remains meagre.</p>
<p>Management of solid waste and hazardous waste</p>	<p>The rates of solid waste collection have gone up from 65% in 2003 to 82% in 2008 in urban areas and 20% and 55% in rural areas respectively. The rate of everyday categorization and collection of medical waste from hospitals is 95.6%. The rate of recovery of the recyclables and re-usables is about 20 -30%. 73.3% of hospitals have processed chemical waste by combustion, whereas about 30% of hospitals have by themselves dumped such waste. The treatment of solid waste in 3 key economic regions in the North, the Centre and the South has been designed.</p>	<p>State governance over solid waste remains fragmented. Solid waste collection and treatment remain piecemeal, spontaneous, ineffective and short of both technological and financial investment. The current methodology of urban solid waste is dumping. According to statistics, there are at present 98 concentrated landfills in operation across the country, but only 16 of them can be considered as with proper sanitary conditions. Moreover, technical instructions and specifications are lacking to evaluate solid waste treatment technologies.</p>
<p>Biodiversity conservation</p>	<p>A system of 164 in-land reservation sites has been set up on a total area of 2,198,744 hectares (accounting for 7.6% of natural land area). The Government has so far endorsed 45 mainland wetland reservation sites (in 2008) and a system of 16 marine reservation sites on a total marine area of 169,617 hectares (in 2010). In addition, Vietnam has been internationally recognized as owning 2 world's natural heritage sites, 4 ASEAN natural heritage sites, 9 biosphere reserve sites, and 3 Ramsar sites.</p>	<p>The biodiversity has declined at various degrees. The trafficking in wild animals has not been strictly controlled. Mandates and tasks assigned to State governance agencies remain overlapping. Scientific research and investment targeting biodiversity are limited and inefficient.</p>
<p>Implementation of measures aimed at mitigating climate change and limiting the adverse impacts of climate change, and combating natural disasters</p>	<p>Vietnam has participated in many regional and global activities on climate change. Many ministries and localities have by now devised their plans of action on response to climate change. Investment in the work related to meteorology, hydrology and climate change has been enhanced. Activities to raise awareness for the community and build up capacity to respond to climate change and improve meteorological, hydrological and weather forecasting operations have</p>	<p>Natural disasters and climate change developments on the global scale have increased sharply in numbers, exerting pressures on environmental protection and sustainable development in Vietnam. Many shortcomings have exposed in disaster forecasting. Resources mobilized for disasters and to combat and mitigate climate change impact remain modest. The awareness among the administration at all levels and among the population of all strata on climate change and disaster is not deep and</p>

	been carried out in many localities throughout the country.	not associated closely with highly practical actions.
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Table 1. Summary of achievements and shortcomings in implementation of 19 prioritized areas in *The Strategic Orientation for Sustainable Development in Vietnam*

3.3 Green Growth – The way to sustainable economic growth

As indicated by the UN Environment Program (UNEP)³⁷, a green economy implies one that raises individuals' expectation for everyday comforts and improves social uniformity while essentially lessening dangers to the earth and biological community. Essentially a green economy must have low outflow levels and effectively utilize assets and move towards social equity.

In the present reality of snappy worldwide assets exhaustion, expanded misfortune in biodiversity, and contamination which comes about and compound environmental change, a green economy is the new perfect model to settle onto, which would all the while all the past specified issues. This new model perceives the significance of economy steadiness and has faith in interest in common capital and occupation creation, which gives the establishment and assets to address the rest of the issues. Beginning from the fundamental proclamations and meanings of green economy, this last as opposed to utilizing petroleum derivatives, utilizes sustainable power source and low-carbon innovations and empowers more productive utilization of assets and vitality.

Viet Nam's green growth strategy rests upon the following:

- Green growth must come from people and has to be aimed to people, focused at an equilibrium between humans and natural environment.
- Green growth shall lead to increased investments in conservation, development and efficient use of natural capital, reduction of greenhouse gas emissions and improvement of environmental quality, and thereby stimulating economic growth.
- Green growth shall be based on scientific advancement, modern technology and high quality human resources which will be enhanced to improved governance of internal strengths with external cooperation.
- Green growth is the cause of the entire Party and the Government, ministries and localities, enterprises, social organizations, communities and all people.³⁸

Additionally, many other objectives and strategies are considered and employed, ranging from the field of economy, to production, to energy performance. Specifically, in the latter case, the reduction of intensity of greenhouse gas emissions per unit GDP and increasing renewable energy use, starts from improving the overall

³⁷ The United Nations Environment Programme is an agency of United Nations and coordinates its environmental activities, assisting developing countries in implementing environmentally sound policies and practices.

³⁸ References to article from Human Rights Watch: "The dark side of Green Growth, Human rights impacts of weak governance in Indonesia's forestry sector."

energy performance and efficiency through reducing the consumption and the waste which occur during transportation and trade. By introducing a greener lifestyle and sustainable consumption it will be possible to achieve a sustainable urbanization to improve competitiveness and harmonious development.

All the more imperatively, because of the absence of legitimate spread mindfulness at a subjects' level, foundations assume an essential part in effectively executing the destinations at a national, territorial and worldwide levels, subsequently driving and helping raise the normal level of cognizance. On the off chance that strategies are to be adequately actualized, they should be bolstered by fitting directions, which are, thus, upheld by the natives.

To essentially accomplish such objective a foundation of the National Plan for Environment and Sustainable Development for 1991-2000 had been expressed, from which the nation has created "Introduction for supportable improvement in Vietnam" in 2004. At a littler scale, districts and offices have likewise built up their own Agenda 21, which generally results subjects with respect to economy social issues and natural methodologies. Keeping in mind the end goal to execute the new laws an arrangement of state administration offices at various scales had been set up in a bound together way, particularly the arrangement of condition administration offices.

It is important to set up a compelling planning system among associations and organizations on feasible improvement, to have a working connection between the national scale and the neighborhood scale. This will help ensure the compelling usage of strategies set up on the national scale, in correlation and with input from different nations, and have comes about on the nearby scale, showing before individuals solid consequences of feasible improvement. It is critical that economy, society and maintainability work firmly together, being dependant on each other.

3.4 Where to go from here

Experiencing this pointedly extraordinary strategy had brought numerous changed in both the attitude and perspective of what supportability is, and all the more imperatively the outcome accomplished are esteemed as critical lessons:

The primary lesson: Strong responsibility of the administration to economic improvement³⁹

Solid duty and assurance in the usage of reasonable improvement is the way to accomplish the arrangement of destinations. On all levels Vietnam has been firmly dedicated to reasonable improvement with a moderate however efficient approach; it has nationalized the numerous universal feasible advancement destinations and patterns from alternate countries and associations, coordinating them in their own strategy, laws and techniques.

The Government has, at an early date, declared a National Plan on Environment and Sustainable Development covering the years 1991-2000 and since then it had been effectively actualized. The feasible improvement approach had been declared in progressive Party Congresses' documents such as the "Rapid, efficient and sustainable development" which analyses the topic from an economical point of view linked to the social and

³⁹ Lessons referenced from Communist Review Tap Chi Cong San, Theoretical and political agency of communist party of Vietnam

equity growth that helps the protection of the environment. After the World Summit on Sustainable Development in Johannesburg⁴⁰, Agenda 21 had been instituted and, later, a new strategy for 2011-2020.

Intensive execution of practical improvement destinations is the obligation of the whole government framework from the fundamental to neighbourhood levels in Vietnam's financial advancement. For the acknowledgment of supportable improvement destinations, numerous orders, resolutions and regularizing authoritative records have been declared and executed. The Vietnamese Government has additionally attempted real endeavours in sending national target projects and activity gets ready for the fulfilment of supportable improvement and for the "thousand years goals".

The foundation of the National practical advancement Committee led by an Appointee PM vouches for the Administration's solid sense of duty regarding the acknowledgment of economic improvement in Vietnam.

The second lesson: Mobilization of main social groups for participation in sustainable development implementation

Activation of the whole individuals for interest in supportable improvement execution constitutes one of the major and definitive components for the achievement of the economic advancement process in Vietnam. Vietnam has an arrangement of differing social, political and mass associations, covering all real social gatherings, the greater part of which at an across the country scope and with grassroots structures. Common society associations assume an imperative part in guaranteeing the maintainability of financial improvement and natural insurance. Together with the common society, Vietnam's business group additionally assumes a critical part in the practical advancement process. Vietnam has possessed the capacity to assemble the dynamic investment of common society associations and the business group in the execution of maintainable improvement targets.

The "bottom-up" approach in arranging and strategy making enables the general population to join a consultancy procedure in the outline and elaboration of advancement projects, arrangements and ventures, and in this way, are urged to take a dynamic part in consultancy identified with plans and strategies. Not just, their cooperation similarly means a bring up in mindfulness and productivity of help assets use prompting a higher sensibility towards waste and spillage. From the greater part of Vietnam's victories, a noteworthy lesson is advancement of vote-based system which underlines the significance of making social accord, actuation of the whole country's total quality, and preparation and proficient utilization of all assets for national improvement.

The third lesson: Combining internal resources with international cooperation

Following 20 years of restoration and execution of reasonable improvement, particularly finished in the most recent decade, Vietnam has advanced its interior collaboration in relationship with outer qualities through universal participation and reconciliation for the nation's improvement. Vietnam has exploited open doors and good conditions, defeat numerous troubles and difficulties, particularly negative effects of two provincial and worldwide monetary value related emergencies, and enrolled extraordinary and imperative accomplishments.

Vietnam has lifted itself from underdevelopment, joined the gathering of centre wage creating nations, kept on saving and unite a quiet and stable condition, and made greater worldwide conditions for assist improvement. In addition, it has been effectively and proactively occupied with universal and local incorporation, prompting significant improvement of the nation's stance and quality; its global status has been elevated, making vital

⁴⁰ The World Summit on Sustainable Development, WSSD or ONG Earth Summit 2002 took place in Johannesburg, South Africa, from 26 August to 4 September 2002. It was convened to discuss sustainable development by the United Nations.

premises for quickening national industrialization and modernization and raising the nature of the general population's lives. At present, global combination and participation speak to both a target condition and a subjective interest for the advancement of countries. In its outside relations, Vietnam's predictable approach remains "... proactive and dynamic global mix; a companion, a solid accomplice and a mindful individual from the worldwide group". In the supportable advancement process, Vietnam's approach is the following:

- Vietnam remains for proactive and dynamic support in universal participation exercises identified with feasible advancement, and full usage of worldwide traditions to which it is a signatory. The Vietnamese Government remains for assist usage of recharging strategies, fascination of investment by people and universal associations in the acknowledgment of the Strategic Orientation for Sustainable Development in Vietnam; upgraded participation in the fields of instruction and preparing, science and innovation, particularly for the exchange of clean and ecologically neighbourly generation advancements.
- With international dialogues and trades, Vietnam is to help set up effective participation systems, to support the current improvement help while looking for new guide with a view to joining proficiently universal exercises for worldwide natural insurance and compensating for the financial misfortunes brought about to Vietnam in the release of world ecological assurance commitments.
- Vietnam remains for dynamic investment in worldwide gatherings and exercises for ecological assurance and manageable advancement, development of linkages in the global group, particularly in controlling ozone depleting substance discharges, restricting contamination by chemicals and unsafe squanders, controlling their transboundary developments, and ensuring the marine condition and organic assorted variety. Vietnam is to endeavour always for improved collaboration with different nations in Southeast Asia, Asia-Pacific and the world in economic advancement and ecological insurance, while joining significance to multilateral and respective participation for the maintainable improvement of the Mekong River bowl; and close participation with contributors and global associations in the proficient utilization of authority help for practical improvement destinations.

A noteworthy lesson to Vietnam's advancement over late circumstances lives in the relationship of interior collaboration advancement with worldwide reconciliation and participation. Relationship of national cooperative energy with the qualities of our circumstances constitutes an imperative factor for the fruitful reasonable advancement process in Vietnam.

Chapter 4:

EUROPE: THE NETHERLANDS

4.1 The Netherlands: sustainable?

In the previous chapter we outlined the current situation and effort of a country which is defining as an “emerging country” from different points of views. Viet Nam is rapidly growing, alongside the rest of the South East Asian communities, so fast that it is hard to predict the outcome of such prompt evolution. To correctly direct their growth many examples can be presented as case studies from which a lot can be learnt.

Home to under 17 million individuals and with an economy not as much as a third the extent of France's, this little European state keeps on punching far over its weight in the supportability stakes. So why would that be? The nation gloats a dynamic industry-drove backing gathering. Open mindfulness is likewise high, with manageability issues incorporated into the school educational modules. A vigorous and dynamic common society, combined with predictable business-accommodating governments, helps as well.

In any case, the Netherlands isn't the main country to have a decent structure for sustainability. Consider Sweden, or Germany, or even the UK. Nor does having the correct conditions essentially prompt accomplishing the correct results. Because you can act economically does not mean you will. In addition, the conditions are changing in the Netherlands. Organizations' handbag strings are tight, similarly as wherever else in Europe.

The present quality of life in the Netherlands is high. In any case, particularly along these lines, there are worries that a few parts of this personal satisfaction can't be kept up at the light of the current ecological condition. The primary worries about reasonable advancement identify with the measure of regular assets utilized now, and that will be accessible for future age, notwithstanding worldwide issues:⁴¹

1. Environment: climate change exhibits a worldwide danger: Biodiversity is unfortunately, at risk all through the world, including the Netherlands. In this regard the Netherlands utilizes a moderately substantial offer of the characteristic assets somewhere else on the planet, for example, horticultural land.
2. Financial sustainability: the Dutch government is in a condition of overall debt and the developing expenses of health-care, among others, are reasons for concern. It is not anymore certain whether in the future the citizens will have the opportunity to depend and sustain a similar level of medical services and administrations, annuities and other social advantages.
3. Knowledge level: Knowledge is the key element for proceeding with success. Unfortunately, there are worrisome data in the present situation. The share of R&D in Dutch GDP⁴² and the instruction level of the more youthful ages is fair in correlation with other European nations. Moreover, the quantity of early school-leavers in the Netherlands is moderately substantial and the outcomes accomplished by Dutch understudies in globally equivalent tests are declining, both in essential and optional instruction.

⁴¹ Cit. Dutch Review by Marianne Chagnon, 2016

⁴² Gross domestic spending on R&D is defined as the total expenditure (current and capital) on R&D carried out by all resident companies, research institutes, university and government laboratories, etc., in a country. It includes R&D funded from abroad but excludes domestic funds for R&D performed outside the domestic economy. This indicator is measured as percentage of GDP.

4. Disadvantaged situation of non-westerners: Many non-western minorities in the country confront various detriments. For instance, their joblessness rates are generally high and salary contrasts with local Dutch subjects are augmenting.

Numerous nations, including the Netherlands, have made manageable advancement an arrangement objective: they look to manufacture a society in which the present comfort level can be kept up, and ideally enhanced, without harming the improvement chances of who and what is to come or of individuals somewhere else on the planet.

We infer that the four gatherings of issues recorded above as of now show the strongest hardships. These are not separated issues. To have the capacity to handle them we need some comprehension of how they are interconnected and of the applicable social patterns. In seeking after arrangements for tending to these issues, certain decisions should be made, while thinking about the below listed focuses.

Greening the economy, for example: one of the major worldwide difficulties lies in diminishing the logical inconsistencies amongst economy and biology and turning around negative natural patterns in atmosphere, biodiversity and asset utilization. Furthermore, with the development of new economies, such as China and India rivalry for assets is increasing, which can prompt developing shortage and higher costs. This purpose is tied in with enhancing flourishing without yielding the nature of the Earth; at the end of the day, monetary development inside strict natural and environmental points of confinement. It is a critical intention to accomplish maintainable advancement by making radical enhancements in the proficiency of the utilization of vitality and raw resources.

Generating more added value and using less energy and fewer raw materials presents a major challenge. Key instruments for achieving this are innovation and natural resource pricing. Although greening poses a challenge to everyone, it particularly affects sectors that make major demands on the physical environment, such as agriculture, industry, energy supply, construction and transport. Greening the economy will require substantial investment in the coming years. Apart from reducing pressures on the environment and nature, this can also contribute to economic growth.

Public or private funding? A second significant test is the supportability and affordability of public and semi-public administrations. In the Netherlands there are questions about the long haul manageability of these administrations, halfway in view of the increasing expenses of benefits and medicinal services. In addition, the subsidence has driven up Dutch government obligation, putting the administration under more prominent strain to decrease consumption by setting social needs and settling on decisions. A decent case is the raising of the retirement age. In different regions as well, for example, research and instruction, venture is expected to give future ages the likelihood of keeping up their exclusive expectation of living. The current financial and budgetary circumstance influences the topic of how to make to the fundamental speculations especially intense. What exactly degree is the legislature in charge of giving these assets? Furthermore, to what degree is it conceivable or alluring to pass these expenses on to general society and to the corporate segment?

Consequences of the shrinking labour force. a third real topic is 'statistic decrease'. Throughout the following couple of decades, the population will age, and the measure of the work drive is relied upon is also plan to decay. In the span between 2010 and 2040 the quantity of more than 65s with respect to the potential working populace will increment from a proportion of 1:4 to a proportion of 1:2. The decrease in the span of the potential work power will mean a lessened work supply. The deficiency of work can be partly completely remunerated by higher cooperation in the work showcase; for instance, individuals who now work low maintenance could work all day. Expanding the retirement age can likewise be powerful in expanding the potential work compel. The

degree to which the smaller work power will prompt a genuine lack on the work market will depend halfway on the flow of the economy, yet additionally on the sort of laborers required in future? It isn't simply quantities of working individuals that is important, but also the nature of the work pool.

The nature of instruction is significant in conveying an exceptionally talented work compel that addresses the issues of managers. Other than the contracting work compel, in a few territories of the Netherlands, especially in the outskirts districts, the population and the quantity of family units will diminish throughout the following 30 years. Since a contracting population has negative results for nearby and territorial lodging markets, administrations and conveniences, financial action and work advertises, this will make modifications to the fabricated condition progressively vital. The possibility of regional population diminish is pulling in developing open public intrigue. Calculating the outcomes of this reduction into the re-adaptation of spatial arrangement will be a noteworthy test in the coming years.

Prevention and freedom of choice: arrangements are required for the patterns in, and the dangers to feasible improvement. Counteractive action can be an imperative piece of such a reaction. For instance, social insurance expenses can be monitored if individuals stay healthy for longer: if they eat all the more soundly, smoke less and take more exercise. Individuals can likewise lessen the harming impacts of exploitation on biodiversity and the atmosphere by changing their utilization designs. The administration could set guidelines to compel individuals to receive certain types of conduct.

In any case, directions that lessen opportunity of decision are occasionally prevalent and regularly meet with extensive protection. Inquisitively enough, confinements on opportunity of decision are broadly acknowledged in a few parts of life yet opposed in others. Necessary medical coverage, annuity commitments (mandatory for representatives) and obligatory training, for instance, are broadly acknowledged. The legislature should choose how far it should mediate to change our unfortunate ways of life and utilization designs. This is a precarious issue: automatic anticipation has taken a toll preference and addresses the issues of practical improvement, yet to the detriment of individual flexibility of decision. Conveyance and disparity and additionally keeping up exhibit personal satisfaction, manageable improvement likewise concerns the circulation of riches, both amongst nations and inside the present age, including its dispersion inside the Netherlands.

In numerous aspects of life, individuals in the Netherlands with a non-western outside root are slightly disadvantaged: starting from the lack of employment among them, their trust and their wages. Instruction is fundamental in lessening this gap. On the other side, the level of disparity amongst men and ladies in the Netherlands is low and is reflected mostly in lower earnings of ladies.

4.2 The Netherlands in the world

Why are we discussing such a little nation in contrast with numerous others which may more deeply affect the international stand? This requires some reflection, as the Netherlands is firmly connected to the outside world from numerous points of view. The conduct of Dutch makers and shoppers has its impact outside the country's fringes. Obviously, the Netherlands is just a little nation and one may contend that its commitment to sustainability issues is hence little. Also, this is valid in the large scale. Be that as it may, this is positively not the situation when we take a gander at the per capita load on the earth. The Netherlands at that point ends up

contributing considerably to the sustainability issues. This is basically a direct result of the large amounts of creation and utilization in the Netherlands.

The Netherlands is among the biggest merchants of normal assets according to capita imports inside the EU-28. We additionally need to break down the fares to shape a right assessment. A great part of the transported in unrefined petroleum is sent out in after it got processed. This may demonstrate some nuancing in the degree to which raw materials are prepared more effectively and more reasonably in the Netherlands than in the nations to which they are sent out: in such manner it would be a commitment to practical advancement. The invert is obviously as much as evident. Still this implies imports in themselves additionally add to the fatigue of worldwide common capital of non-inexhaustible assets and are regularly harming to worldwide biodiversity.

The weight the country is adding to the ecological issues is progressively occurring outside the national outskirts: in comparison with the circumstance in 2011, the specifics for the subject 'normal capital' has intensified marginally. Aside from the exchange discharges, which additionally demonstrated a negative pattern in the past examinations, the ecological weight on whatever is left of the world had expanded in 2013 in imports of minerals.

The execution of the Netherlands inside the EU positioning has made strides. In 2011 the circumstance for Netherlands was extremely poor regarding vitality, mineral and biomass imports, positioning at the last position. In 2014 it is no longer among the most exceedingly terrible entertainers in one of these three classes. To the extent vitality imports are worried, in per capita terms obviously, the country is some place in the centre.

Sustainability is basically a worldwide issue. On the off chance that we take a gander at material welfare estimated as far as definite purchaser spending, we may infer that China, India and Russia have gotten up to speed with the high-wage nations. While the utilization level per tenant in China was just 11% of the worldwide normal in 1995, this offer had officially ascended to 23% by 2009. By 2013 this had gone up to 29%. In any case, numerous other creating nations, for example, Viet Nam, were not ready to make up for lost time this way. The normal per capita utilization there is around 7% of the overall normal.

At any rate, as vital as these distinctions are in material welfare between locales, also the appropriation is inside the districts. This appeared by the information about the quantity of individuals living on under two dollars per day. The necessary rates displayed in the Sustainability Monitor of the Netherlands of 2011 demonstrated that the level of individuals living beneath the destitution line fell worldwide from 59 % in 1995 to 47 % in 2005. The highest decrease happened in China (from 70 % to 36 %). The offer of needy individuals in creating nations is incredibly high (78– 85 %). In China and Russia, the offer of the populace living underneath the destitution line fell pointedly in 1995– 2010. There is additionally a diminishing in India, yet this isn't as sharp as in the other two nations.

Another marker giving understanding in social disparity is the 'Sexual orientation Inequality Index'. Difference between the two-sex diminished in numerous parts of the world, although it stays high in India. Life span is regularly utilized as a marker for wellbeing. This is rising around the world, and developing nations are demonstrating a noteworthy increment in this regard. The same is valid for access to clean water. Be that as it may, in instruction, creating nations are yet performing ineffectively. More than 16 % of the general population worldwide is ignorant. Their offer fell marginally in the period 2000– 2010. In creating nations, the offer of unskilled individuals is high and at 40 % it is more than double the worldwide rate. We would now be able to think about the international contrasts in institutional quality estimated regarding corruption. There is moderately little defilement in most high-salary nations. In China and Russia this isn't the situation.

At last, we thought about the global contrasts in active utilization and CO₂ discharges. Past investigations demonstrate that the volume of production per unit fell by 18 % in the period 1995– 2008. This is an overall advancement. In rising economies, for example, China and India, it even fell by 30– 40 %. These numbers show more prominent energy efficiency underway. This pattern has proceeded lately. Be that as it may, the developing productivity is counterbalanced by the huge development of China. If we look at per capita CO₂ discharges, we see this is getting to be bring down in the high-salary nations however that ozone depleting substance emanations worldwide are increasing. This development is principally determined by the strong advancement of China.

4.3 Current situation

Legislators and policymakers have been giving careful consideration to green development for some time. Green development implies animating monetary development while diminishing pollution, utilizing raw materials more effectively and defending common assets levels. Ventures, rivalry and advancement in greener advances give new financial open doors. It is imperative that development stays inside specific breaking points and that no basic limits are surpassed, for example, the convergence of ozone harming substances in the air, water extraction and threatens in biodiversity.

Green economy was one of the focal topics at the Rio+20⁴³ sustainability summit. International activities to input a green development procedure were initiated by the OECD⁴⁴ (green growth strategy), the European Commission (Resource Efficient Europe) and the UN (green economy initiative). The OECD estimation system portrays the collaborations between the economy (creation and utilization exercises) and the earth (normal capital). Different pointers have been concurred inside this system, separated into four subjects:

1. Environmental and raw material resource efficiency;
2. Natural resources (natural capital);
3. Environmental quality of life;
4. Green policy instruments and economic opportunities.

The Netherlands controls green growth as indicated by this worldwide concurred estimating system. Sustainable development depends on the key pointers conceived for Dutch development arrangement by the policymakers, which are additionally found in the OECD estimating system. This aspiration of the present government is to reinforce their own economy while decreasing the ecological weight and the reliance on fossil resources. The administration intends to focus on the economic increase with the available utilization of energy, assets, materials and water while decreasing dangerous outflows into water, air and soil.

⁴³ The United Nations Conference on Sustainable Development (UNCSD), also known as Rio 2012, Rio+20, or Earth Summit 2012 was the third international conference on sustainable development aimed at reconciling the economic and environmental goals of the global community.

⁴⁴ The Organisation for Economic Co-operation and Development (OECD) is an intergovernmental economic organisation with 35 member countries, founded in 1960 to stimulate economic progress and world trade. It is a forum of countries describing themselves as committed to democracy and the market economy, providing a platform to compare policy experiences, seeking answers to common problems, identify good practices and coordinate domestic and international policies of its members.

These chosen pointers are following the guidelines of the administration strategy and underline the deep common base between ecological weight and the economy. They are likewise in parallel with the way the OECD measures green growth in its 'green development procedure'. The determination selected, is less set in respect to the OECD set to impart more effortlessly specifically through a restricted arrangement of key markers. These include:

1. Environmental and asset effectiveness markers (decoupling pointers): markers depicting the link between the nature and the economy about Dutch creation exercises, to be specific, ozone depleting substance discharges, supplement surpluses, vitality utilize, water and material use in connection to GDP;
2. Footprint markers: pointers portraying the connection between household utilization and natural weights (impression), to be specific the carbon, the raw material and the biodiversity impact; in this way, this includes the ecological weight in the Netherlands and abroad (imports);
3. General environmental indicators: air quality and biodiversity.
4. Economic indicators: green growth aims to make economic as well as environmental progress. Employment, innovation and investments play a key role in this.

The inquiries of whether the Netherlands will move towards sustainable advancement and how the nation can enhance it even more are difficult to reply. The reasonable advancement of society is encompassed by much vulnerability, for instance the ones about the necessities of who and what is to come, drifts in population estimate and innovative improvements. There are additionally contrasts in the size of supportability issues. For instance, in the residential circle the issues incorporate things like air quality in residences, clamour disturbance and road wrongdoings.

At national level the main problems incorporate social attachment in the public arena, the national obligation and the work support rate. Worldwide issues incorporate environmental change and asset utilize. Different procedures are possible for each level and each issue. In addition, not all issues now viewed as risky will fundamentally stay dangerous in future. Some manageability issues can be tackled by changes in the public eye itself. In social orders where the populace appreciates a specific level of salary, neighbourhood and natural issues are frequently diminished (in relative terms), somewhat through decoupling systems.

Statistic patterns can likewise have a directing impact. For instance, population develops all the more gradually as their improvement level ascends. In any case, numerous issues do require think activity: environmental change, biodiversity loss and the looming shortage of regular assets. Numerous innovations are as of now accessible, for instance for making more proficient utilization of vitality and raw materials and for making a low-carbon economy. Before these mechanical choices are investigated, we should be clear about what we need to go for. A key inquiry is whether it is attractive for the Netherlands to receive a main global position. From the viewpoint of the economy and advancement, it might profit the country to assume a spearheading part, for instance in the field of sustainable power source supplies. A weakness is that the expenses of assuming a main part are moderately high, for instance in light of the fact that new advancements are liable to beginning challenges and associations need to pick up involvement with the new innovations and materials.

For quite a while, it was felt that the market couldn't take care of issues like environmental change and biodiversity loss, and that institutional activity was important to discover suitable arrangements; at the end of the day, that legislatures should set worldwide standard procedures, for example, cutting ozone by depleting substance emissions. While institutional activity is as yet essential, it would seem sensible to supplement this

by tackling the energy of the market to increment creative limit and by abusing the energy accessible in the public arena. Advancement in the field of clean innovation exhibits the European Union and the Netherlands with chances to fortify their aggressive positions. The inverse has for quite some time been believed to be valid for the issue of asset exhaustion and everything was left to the market.

But the question is whether this in fact requires at least some coordinating action. The impending shortage of raw materials could cause a race to acquire them between different buyers, which could easily degenerate into a 'race to the bottom'. Seeking the right balance between competition and coordination therefore presents a major institutional challenge when tackling global environmental problems in future.

There is no single blueprint for solving sustainability problems that governments can use without question, because an option that has a positive effect in one area often has negative consequences in another. Besides, decisions on which option to take depend not only on understanding the current situation, but also on the consequences of trends that have already been set in motion.

The Dutch economy grew by 12 % between 2001 and 2013. However, growth only took place between 2001 and 2008. The economy contracted because of the financial and economic crises. Nearly all environmental and resource efficiency indicators show a decrease in emissions and the use of raw materials by Dutch production activities. This means that there is absolute decoupling between environmental pressure and economic growth. Remarkably this is the case in the period from 2001 as well as from 2008 onwards. The use of biomass in the period since 2008 has decreased less than the level of GDP. Groundwater use even increased in the absolute sense. The economic downturn seems to have had little effect on the environmental efficiency of the production processes.

In any case, if we look in more detail at ozone harming substances outflows, the emanation power is never decreasing. These pointers of Netherlands score some place amidst the European positioning. Purchaser spending by family units in 2013 was at about an indistinguishable level from in 2001. Thus, the expansion that occurred in the vicinity of 2001 and 2008 has been offset by the financial emergency. The decline in extra cash and the issues at the lodging market have frightened purchasers off from spending on the more expensive things. The utilization related impression pointers are blended. The carbon impression has not expanded since 2001, but rather the impression for utilizing crude materials has expanded since 2008. The indicators for environment and biodiversity are also mixed. Air quality has improved whereas biodiversity in the Netherlands is still under pressure. Employment has not increased as fast as GDP since 2001. Employment had risen by 5% until 2008, but it has fallen by 3 % since then. In 2013 the labour market situation deteriorated even further, with the number of full-time jobs falling by a whopping 112.000. This dip is worse than in previous years.

The problems in real estate have led to a much sharper decrease in investments in the Netherlands than elsewhere. People also invested far less in means of transport and in machinery, equipment and installations than in 2008. In 2013 investments in fixed assets shrank by 4.0 %, which is less than in 2012. The share of environmental investments is higher than in 2001, but there has been a downward trend in recent years.

Chapter 5:

THE DUTCH URBAN PLANNING SYSTEM

5.1 Main planning instruments

Urban planning in The Netherlands is a mind-boggling process, which must be condensed here in wide lines. The country includes three regions: the region in mainland Europe, the Netherlands Antilles and Aruba. Most of the nation comprises of either swamp along the ocean or recovered land, with one-fourth of the land at or underneath ocean level. The density is 400/km². The Randstad area, a combination of the capital Amsterdam, Rotterdam, The Hague and Utrecht covers 26% of the domain and it is home to right around half of the population.

The Netherlands endeavors on spatial planning beginning in 1901 with the "Housing Act", while during the post war the main focus falls generally around the reconstruction and determination of lodging lack, however the vital issues have been changing amid the years and the administration started to distribute its spatial approach, extending from the advancement of development, concentrating outside the metropolitan territory and market-orientating urban arrangements. As respect to local approaches, incongruities inside the nation have been restricted if compared with other European nations and in 2006 it has been chosen to end customary territorial arrangements and place an accentuation on supporting areas which add to the national monetary improvement so to upgrade intensity and advance development.

The above referred to WRO (Wet operation de Ruimtelijke Ordening, in English, Spatial Planning act)⁴⁵ was administered in 1965 to direct spatial and urban arranging independently from lodging. Since 1960 four National Guidelines were readied: the most recent one dated 2006, named Nota Ruimte – Creating space for Development, and spreads the period through 2020, yet in addition incorporates 2020-2030 in the long haul.

Presently the urban arranging process has its premise in "de Wet operation de Ruimtelijke Ordening (WRO)" and the political head responsible of redacting the current plans is the Minister of Housing, Spatial Planning and the Environment. The Ministry readies the urban guidelines and sets out the basic frame in the nation through White Papers and basic anticipation at national level. A "solid choice" that depicts which advancements are to be embraced might be made by the Government.

Considering the solid choice, the Provincial governments create common approaches, which depend on examination of wanted and conceivable advancements. This outcomes in commonplace and territorial designs, beside an arranging program, which may contain the coveted incorporation of interests, the structure for testing and executions of the arrangement objectives and the coveted stage for facilitate advancement and reflection. The zoning design contains the ideal goals, points, maps and solutions regarding the utilization of the soil, the most extreme measurements for structures and it might even endorse the aesthetic appearance, even if not in detail. Moreover, it additionally gives the fundamental devices portraying the waste water designs and the limits of utilization, of urban and of structural outline.

Being the regions and fundamental districts alluded to as decentralized units, they have the commitment to take part in joint authoritative work, which is designated by the national government, notwithstanding playing out their individual managerial work as self-governing substances. The real specialists identified with planning the spatial approach are:

- Ministry of Infrastructure and the Environment for Spatial planning / Water resources management;

⁴⁵ Reference from Verheid.nl, municipality official site to view the policy here described.

- Ministry of the Interior and Kingdom relations for Housing Policies;
- Ministry of Economic Affairs for Regional Policies;
- Metropoolregio Amsterdam for the Amsterdam Metropolitan Area;

5.2 Project area: Zeeburgereiland

As far back as the city's establishment a key trademark was the absence of physical space. On the urgent need of liveable land, the country decided it had to be artificially "created": circumscribed by the IJ, Zeeburgereiland is a piece of the 1990 established "Ijburg" region comprising of simulated islands. It is an island raised in 1907 by building different dams and interfacing them to each other making a triangular diagram around a pool of water which was, later depleted and loaded with sand and soil as to build the present island.

The primary arrangement for this region is followed back to the mid-1960s, when "Plan Pampus" was introduced. Plan Pampus is the name of a proposition for a urban extension of Amsterdam made by the building firm of Jaap Bakema in 1964-1965. The arrangement accommodated a lengthened island gather that ought to have been manufactured east of the city in the IJmeer and reached out past the island of Pampus. It was thought to give lodging to more than 350,000 individuals, while the later Ijburg design obliges just 18,000; the principle thought was to give another region to lodging, sited in nature yet not very a long way from the city, where the structures would comprise of high private towers to accomplish high density.

At last the arrangement was not actualized: right off the bat, the eastern piece of the IJmeer and Pampus did not belong within the municipality of Amsterdam, but rather had a deal with Muiden; also, in 1966, after long transactions, the western area of Weesperkarspel had been gained, and the administration built up the Bijlmermeer as another city region that would be significantly less expensive than the development of artificial islands in the IJmeer river. What's more, the request in the 1970s for lodging did not fall under private towers since individuals needed a house with a garden, prompting the development of the rural zone of Almere.

Later in the 1990s a variety of the Pampus Plan was introduced under the name IJburg, on a similar area yet significantly less thick.

Simply the change of Zeeburg returns to the apex advancement. In previous circumstances, marshes and wetlands were stepped up by dumping substantial measure of waste, rubble, soil or sand until the point when the coveted surface level was come to. Later likewise "polders" were assembled. In light of the above referred to designs, IJburg varies from the polder making strategy: a water framework which is isolated from the encompassing lake by an arrangement of floodgates, guarantees the support of required water levels, so no broad pumping is essential. A further arrangement of dams and banks shields the islands from the IJmeer and rising ocean levels.

The new zone of IJburg progressed toward becoming reality in the start of the 1990s lastly began in 1997. The zone, when finished, will occupy around 45,000 individuals and offer around 12,000 employments. Among these new city territories there is Zeeburgereiland: raised toward the start of the twentieth century as a military region with shooting range and a seadrome, it has been 'debased' since the mid-1950s as a station just to associate the new primary activity conduits around the capital. Because of ecological contamination caused by the previous utilize and a long course of cleaning and disassembling works, it turned out to be a piece of the local

advancement arranging toward the start of the 21st century. With a measure of a sum of 5,500 condos it will take after the other quarter's convention in Urban Planning.

While the development chips away at most IJburg's islands are relatively completed, Zeeburgereiland is still at the absolute starting point of its advancement.

5.3 Project interest: Silos renovation

The area follows the Fourth Partial Review RI-East which provides a spatial policy for the Sporthelden area on Zeeburgeiland: this include also the former sewage treatment plant and will undergo a transformation into an area of urban living and work, where living is the most important destination, with space for business and facilities that fit into the urban environment. *See attachment document 1.*

In more details, the project area is reduced to the interest towards the renovation of the old sewage system dated 1950s. It consists of 3 silos of reinforced concrete structure, which at present date, are out of use and reside in an area mostly destined to residential use. The main purpose stands in renovating the structures, keeping the shape and the image of the silos as a memento from the initial character of the area. Being the island detached from the mainland of Amsterdam there is but one public connection, although the mobility system is highly filled through by bicycle lanes and, in this case, also a highway.

The 3 silos had been entered in a competition from the municipality in order to find the fittest solution for them by encouraging the numerous participants to find a solution for the area, by giving specific limitations and guidelines:

Lot information **ZB18B**

Type of development: transformation

Cave type: terrain with a building

Lot size: 913 m²

Footprint silo: 417 m²

Functions: The following functions are allowed: consumer care services, offices, companies, retail, social services in the form of healthcare, care and welfare, childcare and childcare, education and religion, hospitality I, IIa, III, IV, V; sports and leisure facilities and cultural facilities. Other features, such as living, are not allowed. For offices / companies, a total maximum floor area of 1,000 m² is required. Retail is subject to a maximum of 200 m² gfs, retail should be related to other functions. In the catering industry I is subject to a maximum of 100 m² per occupation. In the catering industry IIa, a maximum of 1,000 m² per occupation is applicable and in the case of hospitals III and IV a maximum of 800 m² per occupancy is applicable. Total is the maximum floor area for restaurants I, III and IV 1,000 m² gfs. For Horeca V (hotel) the maximum floor area is 450 m² gfs, a hotel must be subordinate to other functions. The total maximum program is: 3.000 m² gfs.

Location: detached

Delivery: no later than six months after acceptance of the offer, permanent lease.

What is supplied: Silo in current condition including the air bridge and surrounding area at a distance of 6 meters measured from the top of the projection of the silo. Use of the air bridge must be aligned with the developer of adjacent silo. The current floor mirrors of the Silos are 1.65 meters above NAP (normal Amsterdam peil).

Building rules

Cadastral line: The limit of development is at 6 meters measured from the top of the silo projection.

Construction Height: The destination plan allows a maximum height of 40 meters for NAP

Parking: There is no space for car parking on site. For visitors there are in the parking balance of the sport holder neighbourhood 26 parking spaces per silo in public space included. Bicycle parking must be solved on site.

Wellbeing: The silo and the ensemble of silos must remain essentially recognizable. You may be built on or on the silo, but the current shape may not disappear.

Well-being framework applies.

Subsoil: Underground works should be considered underground foundation remnant.

Max. surface area to be built on ground level: 774 m² (including silo 417 m²).

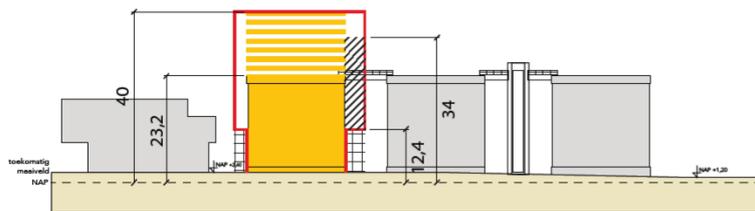
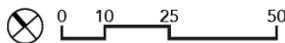
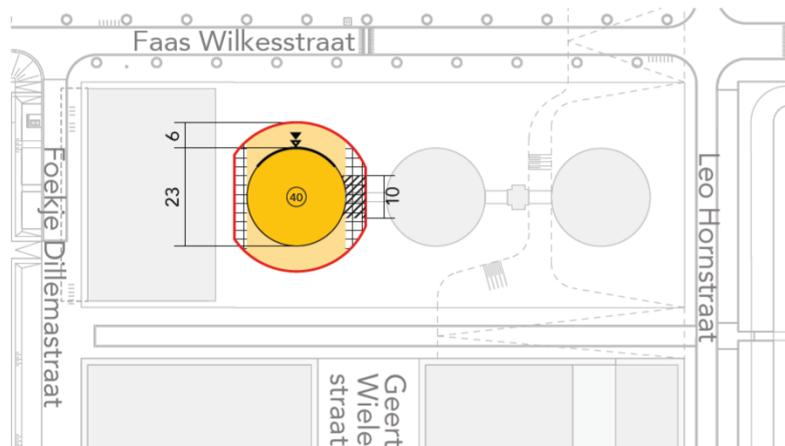
On and / or construction: the maximum load and / or overrun is 138 m² gfs in projection (including the silo the projection is 555 m² gfs). The total maximum expansion is 7,000 m³. When two side-by-side silos are developed by one party, the silos can be turned on linked together by connections. For this, a search area is shown below in the building rules lot.

Air bridge: it is not required to maintain the air bridge. Conservation of the air bridge must be done are matched with the developer of adjacent silo.

Height from "ground": Due to the public nature of the silos, the surrounding field is public and there is a publicly accessible north-south connection between the silos. The bottom of Extensions between the silos should therefore be at least 10 meters above the ground level applied. The zone for terrace, outdoor space and built entrees must be included designed and tailored to the design for the surrounding ground field.

Legenda

-  Main entrance
-  Expedition
-  Plot boundary and extreme building boundary
-  Max building height with respect to NAP
-  Headshape
-  Extension of the headshape
-  Zone for terrace, outdoor space, built entrances
-  Space for public accessibility bottom canting to at least 12.40 meters compared to NAP
-  Search area for connections between silos bottom 12.40 meters compared to NAP top 36 meters compared to NAP



Lot information ZB19

Type of development: transformation

Cave type: terrain with a building

Lot size: 948 m²

Footprint silo: 417 m²

Functions: The following functions are allowed: consumer care services, offices, companies, retail, social services in the form of healthcare, care and welfare, childcare and childcare, education and religion, hospitality I, IIa, III, IV, V; sports and leisure facilities and cultural facilities. Other features, such as living, are not allowed. For offices / companies, a total maximum floor area of 1,000 m² is required. Retail is subject to a maximum of 200 m² gfs, retail should be related to other functions. In the catering industry I is subject to a maximum of 100 m² per occupation. In the catering industry IIa, a maximum of 1,000 m² per occupation is applicable and in the case of hospitals III and IV a maximum of 800 m² per occupancy is applicable. Total is the maximum floor area for restaurants I, III and IV 1,000 m² bvo. For Horeca V (hotel) the maximum floor area is 450 m² gfs, a hotel must be subordinate to other functions. The total maximum program is: 3.000 m² gfs.

Location: Detached.

Delivery: no later than six months after acceptance of the offer, permanent lease.

What is supplied: Silo in current condition including the air bridge and surrounding area at a distance of 6 meters measured from the top of the projection of the silo. Use of the air bridge must be aligned with the developer of adjacent silo. The current floor mirrors of the Silos are 1.65 meters above NAP.

Building rules

Cadastral line. The limit of development is at 6 meters measured from the top of the silo projection.

Construction Height. The destination plan allows a maximum height of 40 meters for NAP

Parking. There is no space for car parking on site. For visitors there are in the parking balance of the sport holder neighbourhood 26 parking spaces per silo in public space included. Bicycle parking must be solved on site.

Wellbeing. The silo and the ensemble of silos must remain essentially recognizable. You may be built on or on the silo, but the current shape may not disappear. Well-being framework applies.

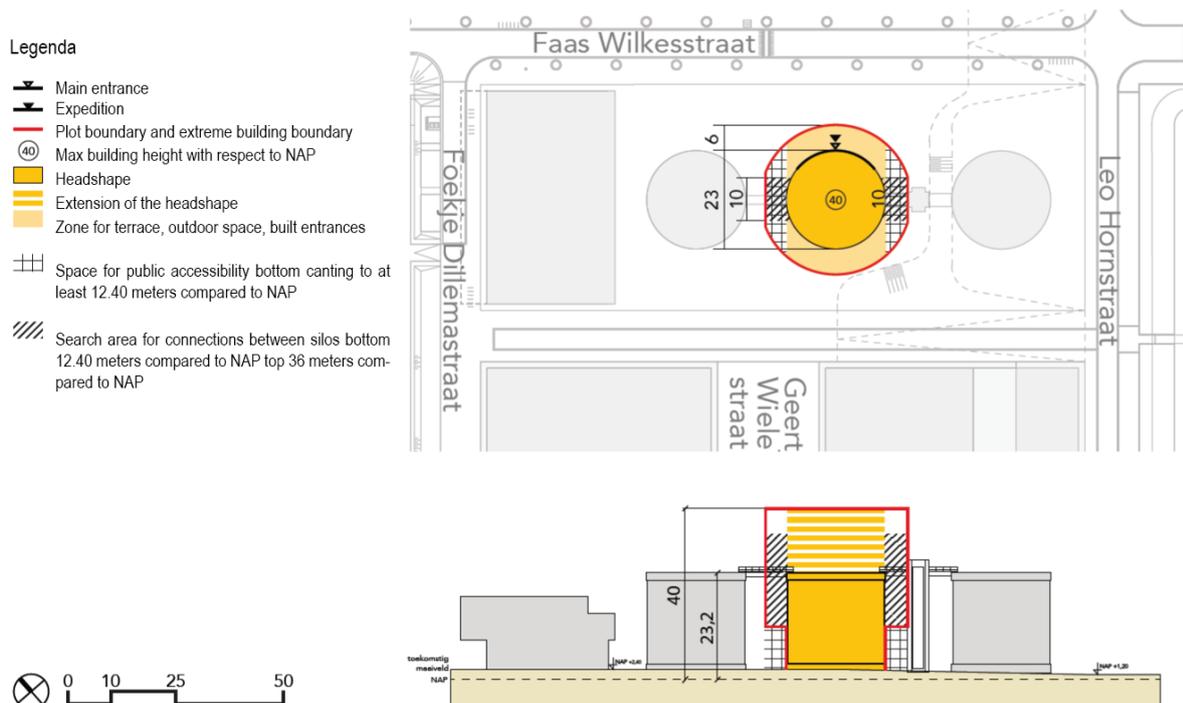
Subsoil. Underground works should be considered underground foundation remnant.

Max. surface area to be built on ground level: 774 m² (including silo 417 m²).

On and / or construction. the maximum load and / or overrun is 138 m² gfs in projection (including the silo the projection is 555 m² gfs). The total maximum expansion is 7,000 m³. When two side-by-side silos are developed by one party, the silos can be turned on linked together by connections. For this, a search area is shown below in the building rules lot.

Air bridge. it is not required to maintain the air bridge. Conservation of the air bridge must be done are matched with the developer of adjacent silo.

Height from "ground": Due to the public nature of the silos, the surrounding field is public and there is a publicly accessible north-south connection between the silos. The bottom of Extensions between the silos should therefore be at least 10 meters above the ground level applied. The zone for terrace, outdoor space and built entrees must be included designed and tailored to the design for the surrounding ground field.



Lot information **ZB20**

Type of development: transformation

Cave type: terrain with a building

Lot size: 1.008 m²

Footprint silo: 417 m²

Functions: The following functions are allowed: consumer care services, offices, companies, retail, social services in the form of healthcare, care and welfare, childcare and childcare, education and religion, hospitality I, IIa, III, IV, V; sports and leisure facilities and cultural facilities. Other features, such as living, are not allowed. For offices / companies, a total maximum floor area of 1,000 m² is required. Retail is subject to a maximum of 200 m² gfs, retail should be related to other functions. In the catering industry I is subject to a maximum of 100 m² per occupation. In the catering industry IIa, a maximum of 1,000 m² per occupation is applicable and in the case of hospitals III and IV a maximum of 800 m² per occupancy is applicable. Total is the maximum floor area for restaurants I, III and IV 1,000 m² gfs. For Horeca V (hotel) the maximum floor area is 450 m² gfs, a hotel must be subordinate to other functions.

The total maximum program is: 3.000 m² gfs.

Location: Detached.

Delivery: no later than six months after acceptance of the offer, permanent lease.

What is supplied: Silo in current condition including the air bridge and surrounding area at a distance of 6 meters measured from the top of the projection of the silo. Use of the air bridge must be aligned with the developer of adjacent silo. The current floor mirrors of the Silos are 1.65 meters above NAP.

Building rules

Cadastral line: The limit of development is at 6 meters measured from the top of the silo projection.

Construction Height: The destination plan allows a maximum height of 40 meters for NAP

Parking: There is no space for car parking on site. For visitors there are in the parking balance of the sport holder neighbourhood 26 parking spaces per silo in public space included. Bicycle parking must be solved on site.

Wellbeing: The silo and the ensemble of silos must remain essentially recognizable. You may be built on or on the silo, but the current shape may not disappear. Well-being framework applies.

Subsoil: Underground works should be considered underground foundation remnant.

Max. surface area to be built on ground level: 774 m² (including silo 417 m²).

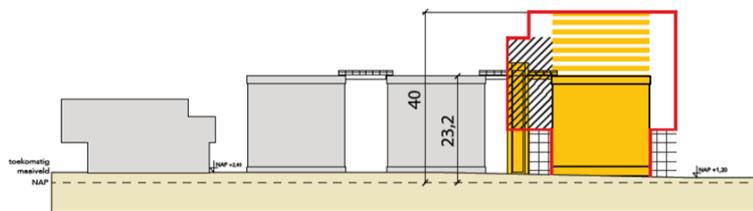
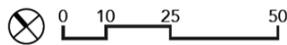
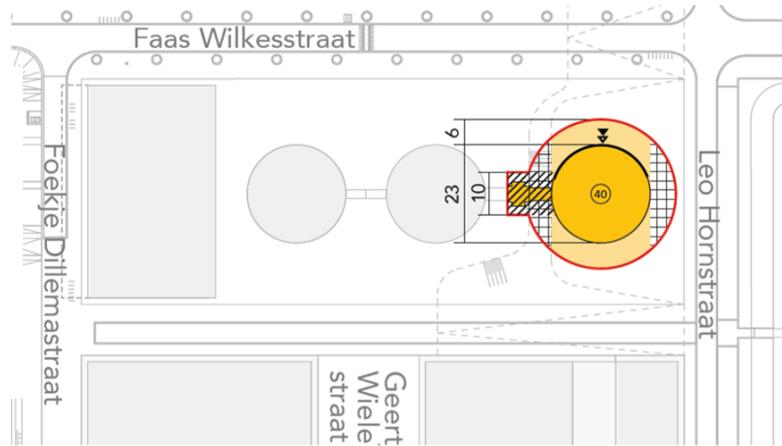
On and / or construction: the maximum load and / or overrun is 138 m² gfs in projection (including the silo the projection is 555 m² gfs). The total maximum expansion is 7,000 m³. When two side-by-side silos are developed by one party, the silos can be turned on linked together by connections. For this, a search area is shown below in the building rules lot.

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Legenda

-  Main entrance
-  Expedition
-  Plot boundary and extreme building boundary
-  Max building height with respect to NAP
-  Headshape
-  Extension of the headshape
-  Zone for terrace, outdoor space, built entrances
-  Space for public accessibility bottom canting to at least 12.40 meters compared to NAP
-  Search area for connections between silos bottom 12.40 meters compared to NAP top 36 meters compared to NAP



Chapter 6:

TWISTED SILOS

6.1 The competition

The Zeeburgereiland just as described earlier, is an artificial settlement which was not initially intended as human settlement. However, due to the high increase in residential demand almost the entire area is being currently renovated to house as many units as possible. The area is crossed by the highway, which is the only impactful car road: in an attempt to raise the quality life of the area every service road is mostly environmental friendly, allowing only pedestrian and bicycles.

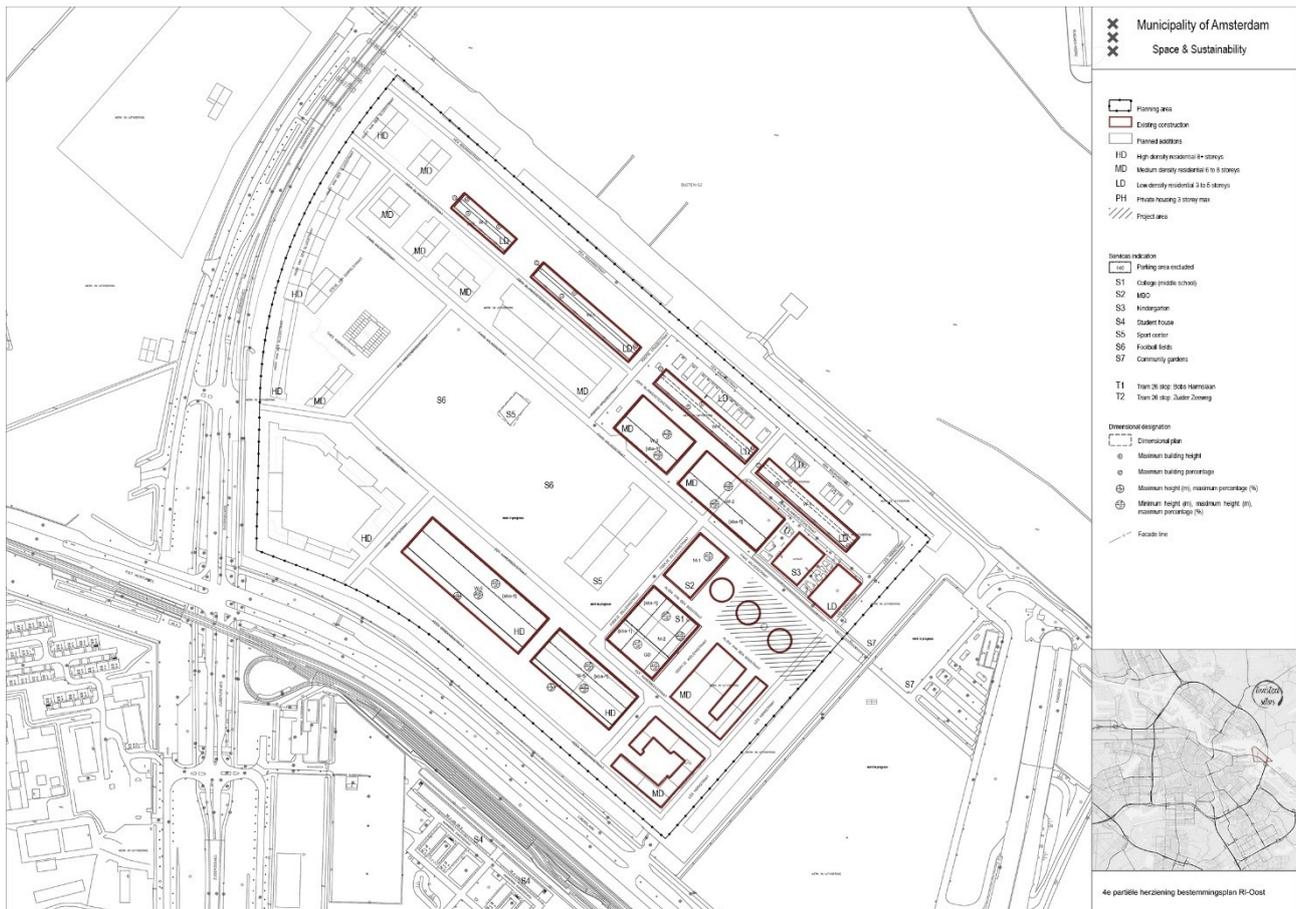


Figure 1. Plan of area, highlighted project area.

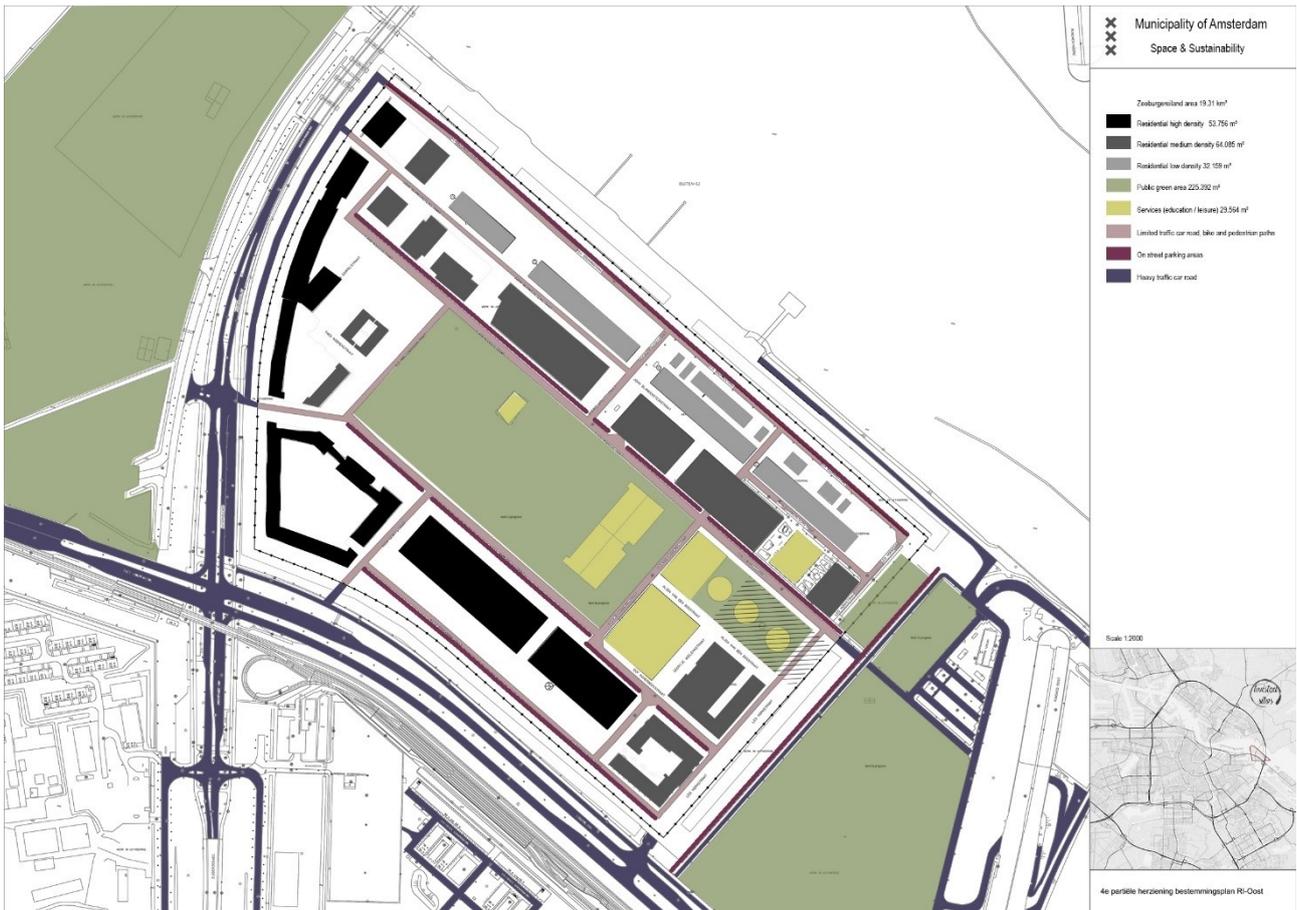


Figure 2. Analysis of actual state of the area: green area, services, residential density and transportation issue.

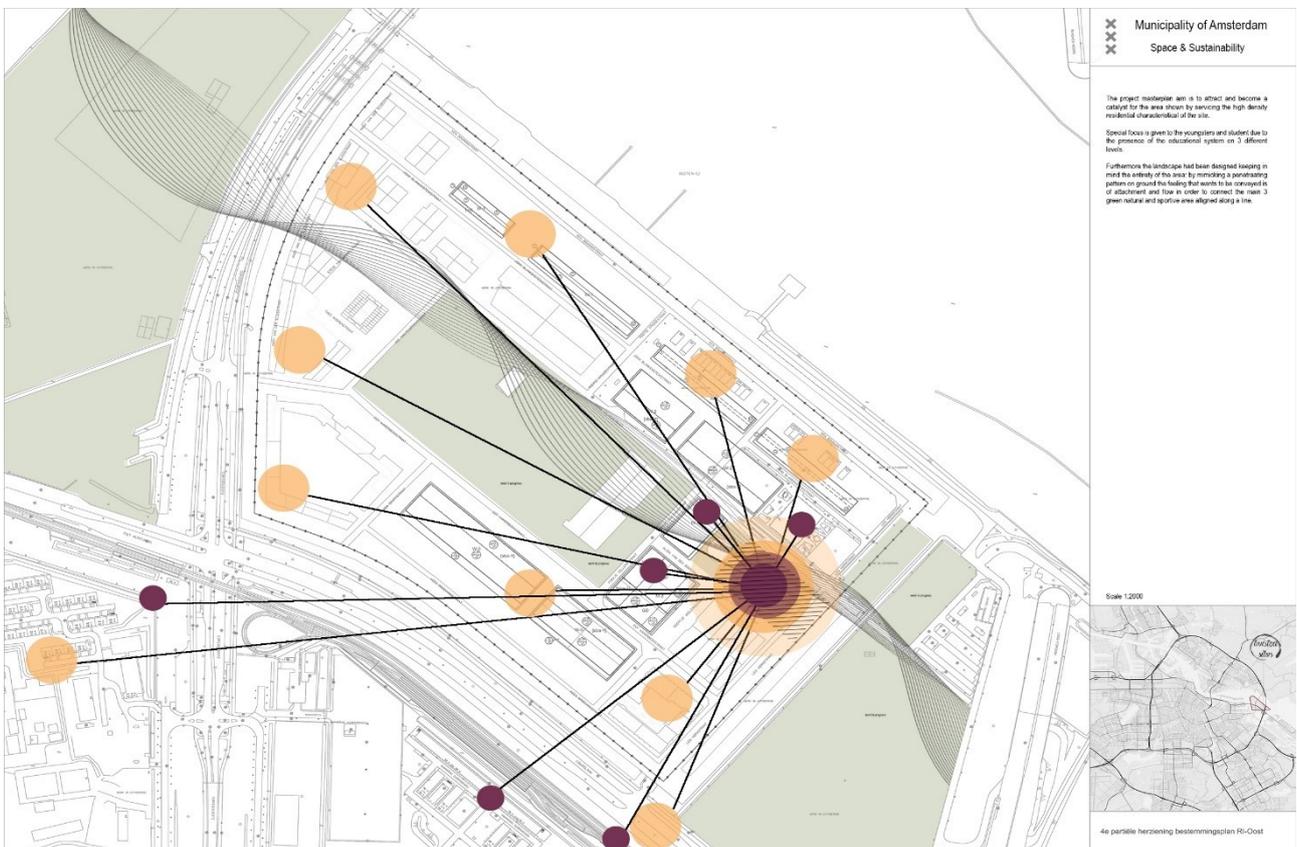


Figure 3. Conceptual idea for a suitable masterplan

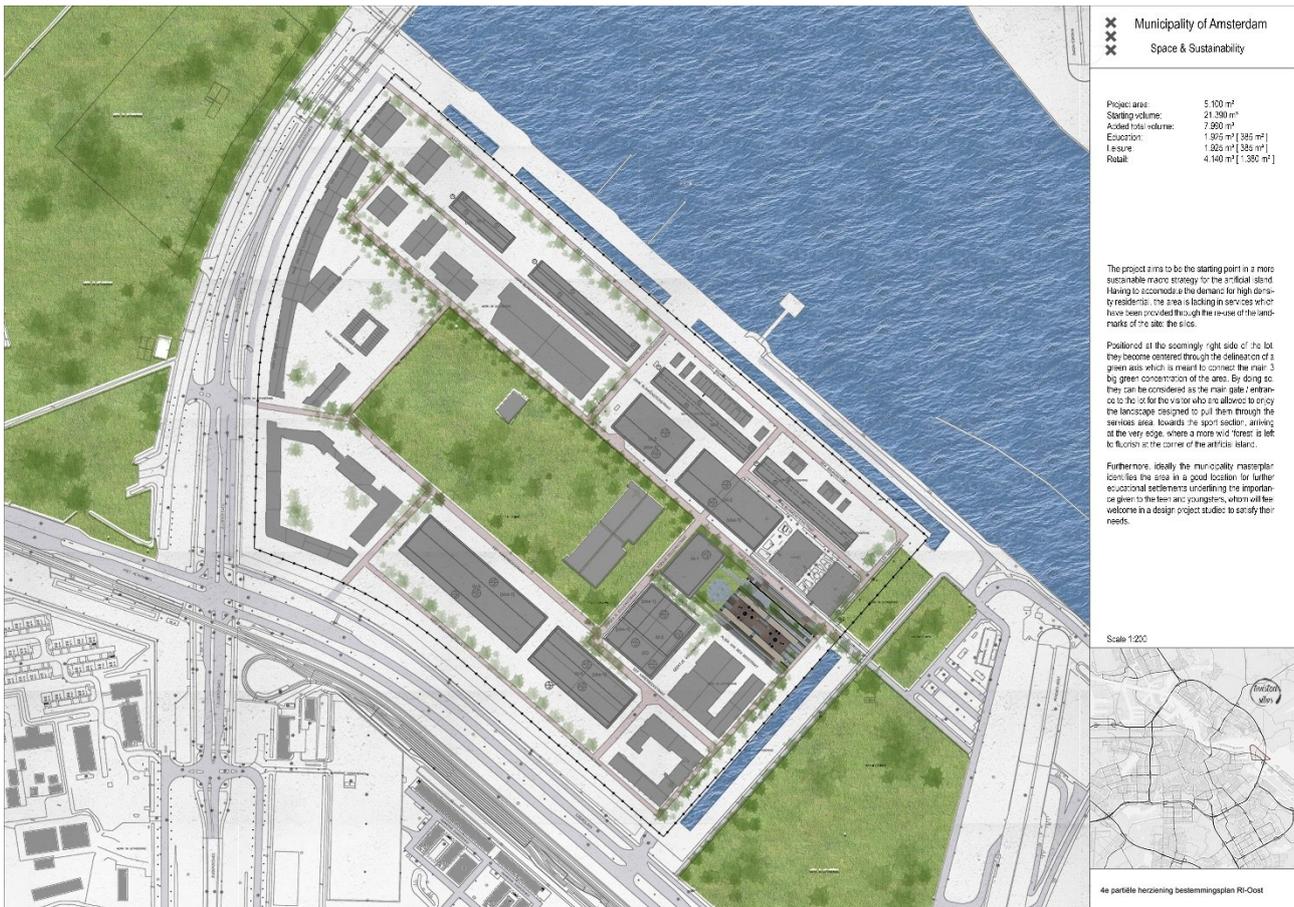


Figure 4. Suggested masterplan

The project aims to be the starting point in a more sustainable macro strategy for the artificial island. Having to accommodate the demand for high density residential, the area is lacking in services which have been provided through the re-use of the landmarks of the site: the silos.

Positioned at the seemingly right side of the lot, they become centred through the delineation of a green axis which is meant to connect the main 3 big green concentration of the area. By doing so, they can be considered as the main gate / entrance to the lot for the visitor who can enjoy the landscape designed to pull them through the services area, towards the sport section, arriving at the very edge, where a wilder 'forest' is left to flourish at the corner of the artificial island.

Furthermore, ideally the municipality masterplan identifies the area in a good location for further educational settlements underlining the importance given to the teen and youngsters, whom will feel welcome in a design project studied to satisfy their needs.

The choice to develop this project set as a competition in Amsterdam stands in the interesting challenge it brings: a particular landmark such as old sewage silos with a heavy envelope and a circular shape is what can be easily recognised as a symbol and attraction point. To fulfil one of the aim of the project, which is creating a catalyst in the area which will help the environment and the local society equally.

6.2 Setting the goals

The idea of re utilization suggested by the municipality of Amsterdam roots in the fact that these silos represent a strong landmark sign, thanks to their shape and previous function. To keep both aspects into the new project the circular shape is going to be maintained, along with the mostly blindness of its envelope to strengthen the image of the silos as a container. Being the area physically disconnected by the city centre, the aim is to design an attraction point in these silos, assigning them only services functions, and leisure catalyst such as shops and retails.

To assure a 24 hours cycle of use a small dimensioned area is destined to retail, while during the night social, educational and restoration features will take the stage: the age target is also rather wide although slightly more concerning young teens and adults. This is caused by the seemingly high criminality rate concerning this age strip: by providing services and entertainment, the municipality hopes to encourage the young generation towards a safer and healthier social environment.

From the sustainable point of view the site is designed to be self-sufficient, with possibly a zero-net energy efficiency: with a combination of already existing and future planned wind mills and solar panelling with a significant reduction in consumption it is a rather achievable goal.

Furthermore, the aim shifts towards a regenerative kind of development: as stated earlier in this paper a regenerative intervention has the aim to positively affect the context area. These silos aim to be a sort of catalyst: producing and retaining energy and collecting and purifying rain water to later distribute it in the very near residential area, so to lower the consumption and need of these latter as well.

6.3 What, why and how

To successfully reach said goals many architectural strategies had been devised: by lowering the ground and creating a slope a lowered public place is formed, which will focus the flow of people, redirecting it towards the retail area situated at the ground floor of the silos, rendering the small square open for relaxation purposes. Furthermore, this public space is design to formally and visually penetrate the lot, affecting neighbouring areas effectively linking the project design to its context. [Attachment 1]

Going back to the main open-air square, this latter is designed to be equipped with strips in which rain water can be canalised, drained and stored in underneath tanks, to be then purified and redirected towards the residential area as clean water through the pipe system already existing being said silos part of an old sewage system. [Attachment 12]

Internally, to create an interesting space, the area will be mostly dark, with few skylights hanging from the above steel structure and metal frame: each skylight will enlighten one platform inducing the visitor to travel among these suggestive platforms through the spiral promenade which follows the outline of the envelope, enjoying the light plays. The space frame which sustains the skylights is also meant as a structural implementation to support the upper volumes which are going to be added with educational and services purposes: this frame rests on the external concrete envelope of the silos, which is reinforced through steel sheer walls in the main cardinal points. [Attachment 11, 13]

To follow through and respect all necessary municipality rules, car parking is not included in the project area, as in incentive to the public to utilise the very direct public transportation, although it will be very bike friendly for what concerns the pathing and the parking. In addition, safety stairs are placed strategically to allow the easiest and fastest path from any area inside the silos.

6.4 Conclusion

Overall the project here by presented is just a concept idea of one of the many possibilities that these silos present. The richness of the past does not have to be necessarily cut down and replaced by a more modern construction: the re-use and renovation hopes to reduce many wastes by creating a place in which, not only people will enjoy but also affect positively the environment.

Through the idea of water conservation and harvest, solar and wind energy accumulation, and re-distribution the positive impact of the project will echo on the residential area of the island: the focus on the landscape means that a project can only be truly efficient and considered architecturally and regenerative "friendly" if taken in consideration its context. By placing and recognising the strength and possibilities of the site a design had been outlined exclusively for this area, meaning that the project wouldn't be as efficient or adaptable to another site.

Additionally, it had been thought to improve also the social issue of the area. By introducing a place whose functions can be attractive 24 hours a day, 7 days a week, the entire neighbourhood safety increases. Furthermore, it also helps in giving purposes, actions and activities to the younger generation, avoiding this latter to possibly create or end up in trouble by lingering on the street. Unfortunately, young teens criminality is a pending issue in Amsterdam, pushing the municipality to actively intervene and improve the system which directly concerns the newer generation.

In conclusion, this project had led to an experience of constant learning and opinion exchange in order to find the most suitable solution with the requirements given, be it from a social, energetic or spatial point of view, which had helped me greatly in improving my perception of what architecture means, who is it for, and especially where does it belong.

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