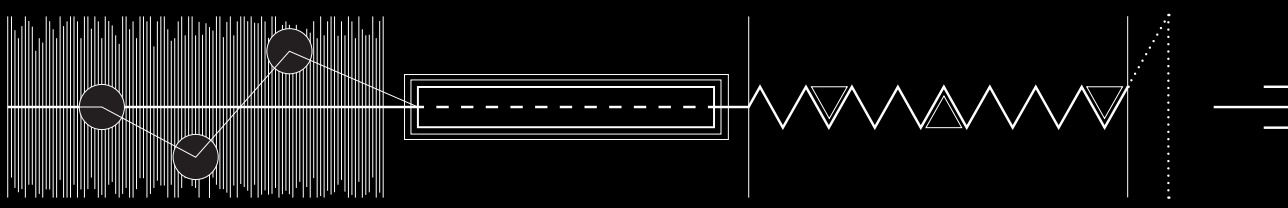
EXPLORATION

Research Report



Equilibrating dualities

The coalescence of man, machine and territory.

Research Report

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Delft, University of Technology
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North Sea: Landscapes of Coexistence
Transitional Territories Studio 2019-2020

To my parents
Bedankt voor alle mogelijkheden die jullie mij hebben gegeven, het zijn van mijn grootste fans en de oneindige steun in alles wat ik doe.
-Vraag alleen nooit meer of ik te laat ben begonnen...-

To my teachers
Thanks for the possibilities, continuous drive and inspiration. It has truly been an amazing and inspiring year.
-Please don't make me change my structure again...-

To my brothers
'Moetjes'

To Rosie and the lil'B Gee's
'Hatsebatsen'

To my friends
Thanks for all the moments, both small and big, creating me who I am today!

Cheers
To all the times that I will have to explain this project and to all the projects still to come.

Index

Introduction

The following booklet titled 'Exploration' is the first of a series of three entailing the project 'Equilibrating dualities: the coalescence of man, machine and territory'. The following is my graduation project created under the supervision of the Transitional Territories studio at the TU Delft faculty of architecture however, mostly from my home desk during COVID-19 restrictions.

To me the project has been an impressing journey which I could not have completed without the help, inspiration and drive from my mentors. There have been tough times, yet I'm sure that it eventually favoured the project.

To all: thanks and hopefully enjoy!
Gijs-Sjors-Goose-Rood and all the other creative pronunciations of my name.

Abstract

The North sea is widely known for its activities related to infrastructure, industry and extraction. These elements have played a vital role in the growth and evolution of the North Sea and its adjacent countries. Among all the fishing and oil industry have become highly governmentally influenced machines and are imposing structural injustice on those in contact with its multi scalar impact. Both industries appear seemingly very different from each other however, both play an imposing role in terms of pollution, territorial claims and impacts on identity and culture. This role has its direct effects on people closely linked to these systems, but also to those far beyond the boundaries of the North Sea. Their lives forever changed, with a low possibility to ever act against.

One of the main reasons for this imposing role is the detached position of these industries in relation to the territorial specificities. The lack of integration in terms of site specific entities such as climate, flows and culture enhanced by its alienated and detached appearance directly result in the separation of man, machine and territory. Unfortunately, these industries are currently indispensable for our present-day lives, without them we couldn't live as freely and developed as we do now. As a solution to the large scale structural injustice without introducing injustice by itself is sought in a new energy proposition. By itself it allows for benefits to be maintained without the imposed disintegration known from our current state of existence.

The city most suitable for the introduction of an integrated industry is one which has greatly benefitted from the extraction of oil and fish however, always correlated by strong cases of structural injustice. The particular city of Bergen, Norway, arises because of its status as Norway's largest centre of sea based extraction, production, transportation, research and education, while displaying clear examples of the effects of the wealth and progress but also the injustice generated by these industries. On the other hand the specificities of the city of Bergen embody a topography of chance suitable for this new type industry.

Key words: structural injustice, industries, integration, flow management, energy transition

The North Sea

1. Territory: North Sea

1.1. Identity - Historical Precedents

I. A Progression of Time

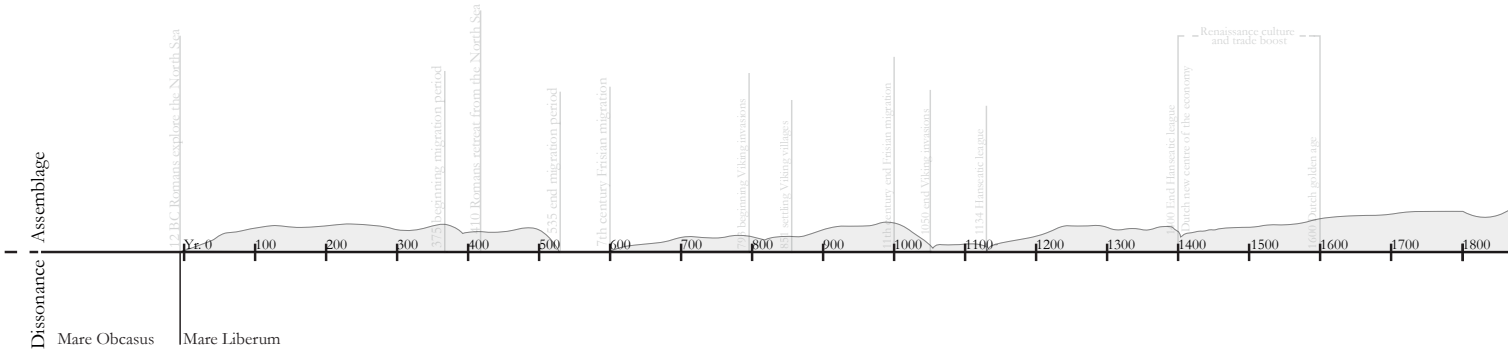
The appearance of the North Sea has changed tremendously throughout the span of recorded history. Starting as 'Mare Obcasus', literally meaning the sea as the end, a void so massive that not even the bravest adventurer ever dared to set sail upon it. Stories recall the North Sea as an unperceivable grey void directly linked to disastrous storms and ferocious monsters. Over the span of time this appearance has changed, the North sea evolved into 'Mare Liberum', literally meaning the free sea. A mutual venue equal to merchants, migration and cultures of all those connected to it. Because of North Sea based relations and interconnectivity national representation and culture in the forms of art, architecture, engineering and religion have been exchanged and found among all countries surrounding it. The appearance of the North Sea as a shared venue changed the idea of the end of the world to the birthplace of the modern world empowered by communal use.

The holistic view on the North Sea has changed because of a discovery being made, one so seemingly important that civility made way for singularity and extraction. This discovery by the name of oil resulted in the division and fragmentation of the North Sea in Exclusive Economic Zones in 1958 and thereby officially putting an end to the notion of a shared North Sea. The EEZ's granted assigned countries the permission to fully extract all existing entities laying underneath the greyish surface of the North Sea with little to no regard to their neighbouring countries in terms of the extracted amount and produced pollution.

The extraction of oil and its essential infrastructure have always been either governmental or corporation influenced. Because of the large-scale management with no local interaction an imposed change occurred to certain locations in and surrounding the North Sea. Villages and cities changed from a local civic approach to a globally directed economic caused by governmental imposition on local identity and communities. The change in usage of the North Sea creates both harm and benefit to different parties involved however, mostly large corporations and governances experience benefit from imposed structural injustice on local identities. As a counter reaction on the governmentally directed oil extraction a driver of social justice is sought resulting in fishing, by its historical identity as reciprocal and locally benefitting approach. The side by side comparison of the oil and fishing industry shows different, yet in a way similar conclusions.

The oil industry experienced a large economic boom in a short period of time aided by new technologies and regulations favouring extraction. The extraction of oil has until today no regulations which control the amount of oil being extracted. The countries surrounding the North Sea do have climate agreements however, reduction of greenhouse gasses are set as goals not strict regulations. These goals are directed at nation-wide emissions of specific gasses, yet not to the origin of the specific gasses therefore, the goals do not directly apply to the extraction of oil. An self-inflicted 'reduction' is the so-called conservation of resources, which implies the possibility to continuously extract oil in the future and to be able to keep de price consistent, not leave oil in the ground. This self-inflicted agreement favours the continuous extraction of oil rather than the conservation as an act of preservation of those impacted by its extraction. Despite the lack of regulations the timeline shows a reduction in the extraction of oil, this is occurring because of the reduced availability of oil in the North Sea oil fields.

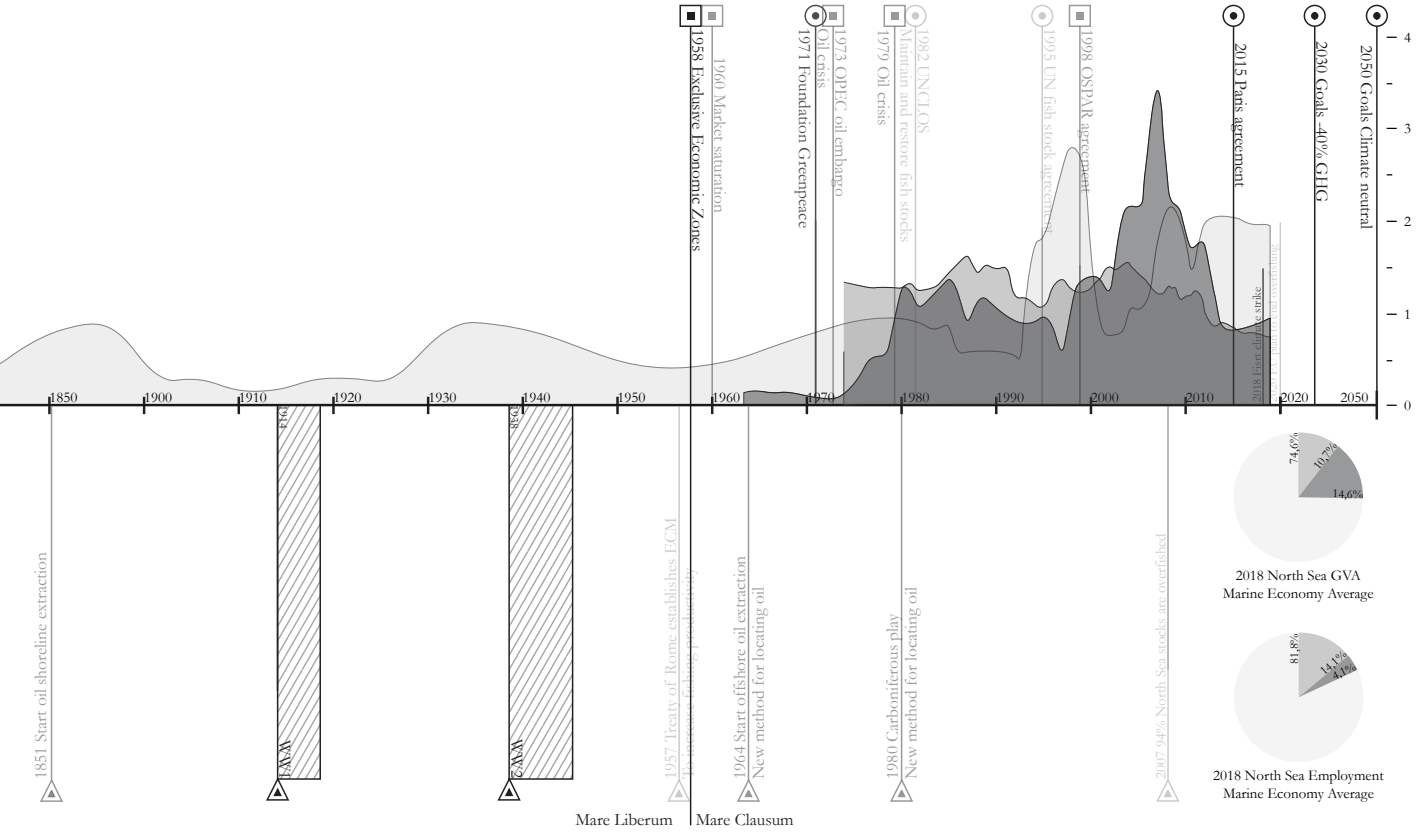
Fishing on the other hand has undergone a different change, the ECM treaty of 1957 to increase the technology used for fishing and directly related its extraction resulted in to massive shortages of fish therefore, in 1982 agreements were made to maintain and restore the fish stocks. In the years afterwards these agreements became regulations and became stricter every several years. The difference between the regulations of the extraction of oil and the extraction of fish can be described by its market value and the tangibility of the resource. Fishing provides a relatively low economic income in comparison to its employment when compared to the extraction of oil amongst the blue economies. The profits related to the oil industry are considerably higher than the profits relating the fishing industry, high governmental income is an important driver for the maintaining of the extraction of oil. Additionally, the tangibility of fish and the direct impact of extracting fish from the sea is more noticeable than the extraction of oil occurring out of sight and unaware of the remaining amount. The regulations currently imposed on the fishing industry changed its traditional and locally benefitting approach towards the so-called 'sustainable fishing'. Sustainable fishing is described as less environmentally impacting than traditional fishing, meaning that local and traditional fishermen are being replaced by large scale corporations equipped with improved technologies for more precise catches or by aquaculture farms as method of growing rather than catching fish. The change from traditional fishing to sustainable fishing is beneficial towards the environment by means of the possibility to restore currently overfished fish stocks. By itself the benefit towards the environment should be greatly praised and continued in the future however, the changing of the fishing industry is harmful to the local identities and cultures which are dependent on the locally benefitting approach.

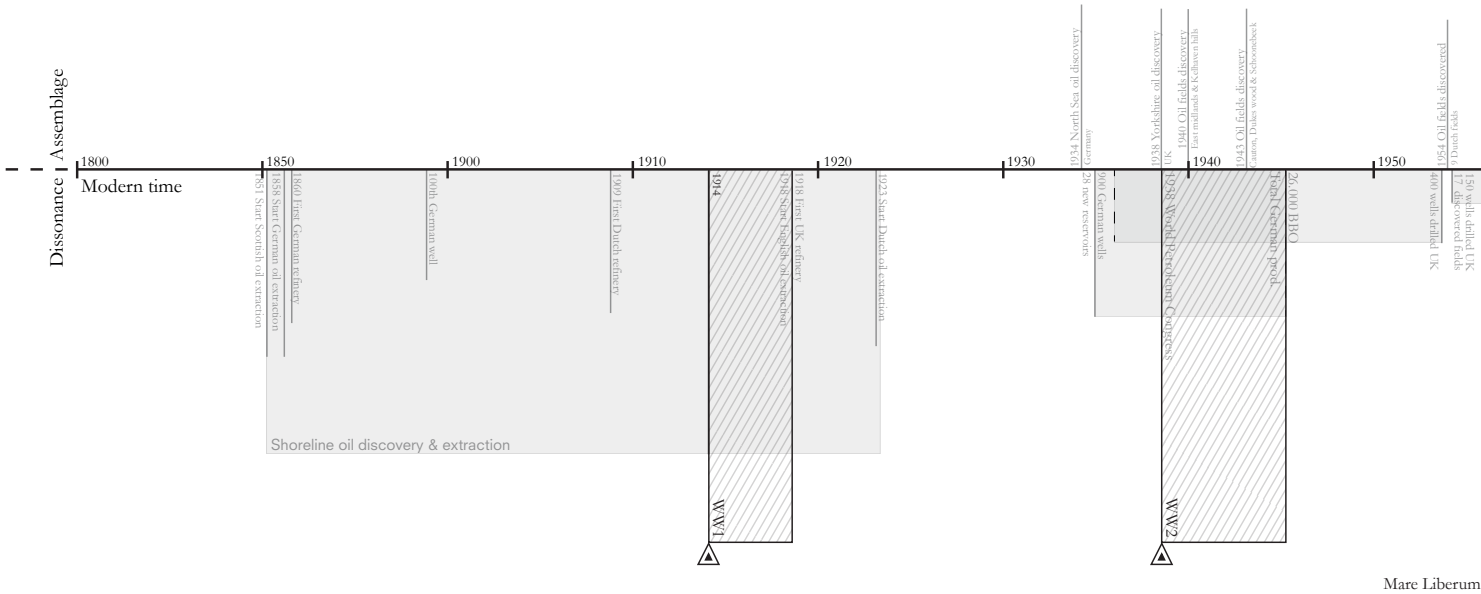


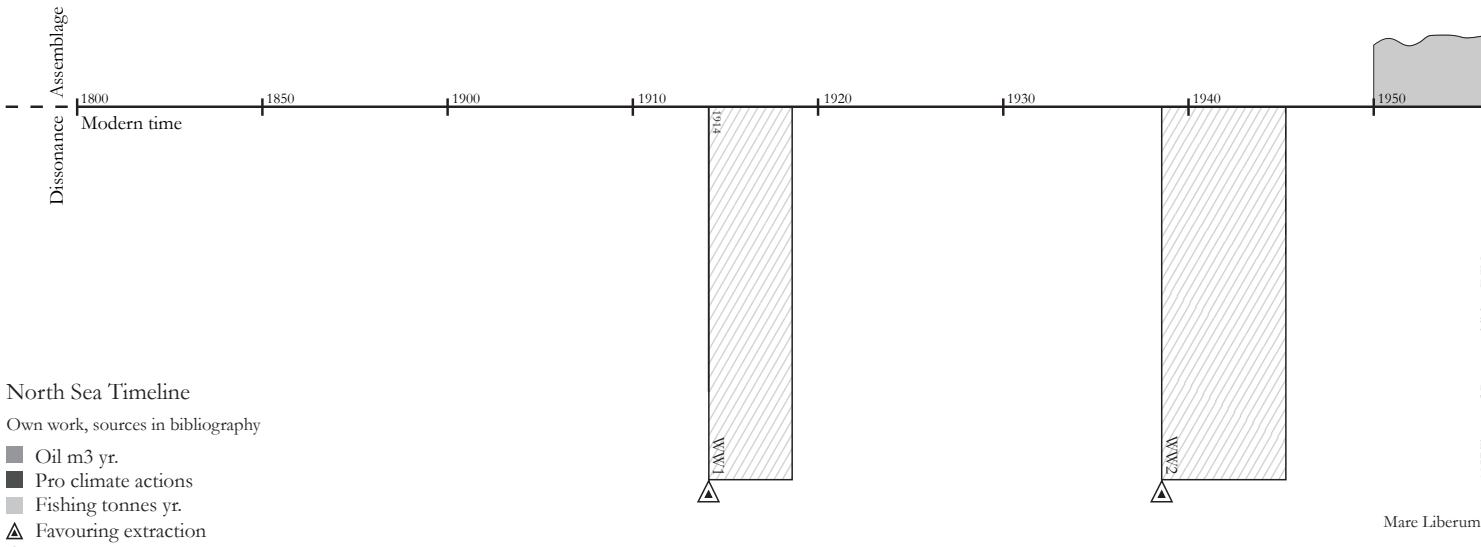
North Sea Timeline

Own work, sources in bibliography

- Crude oil value bln.
- Pro climate actions
- Fish value bln.
- Migration
- Migration numbers mln.
- Living resource extraction
- Non-living resource extraction
- Others relating blue economy
- Favouring extraction
- Favouring climate sustainability
- No particular favour


1851 Start oil shoreline extraction
1958 Exclusive Economic Zones
1960 Market saturation
1964 Start offshore oil extraction
New method for locating oil
1971 Foundation Greenpeace
1973 OPEC oil embargo
Oil crisis
1979 Oil crisis
1980 Carboniferous play
New method for locating oil
1982 UNCLOS
Maintain and restore fish stocks
1995 UN fish stock agreement
1998 OSPAR agreement
2007 94% North Sea stocks are overfished
2015 Paris agreement
2018 Fort dirvace strike
2030 Goals -40% GHG
2050 Goals Climate neutral
1850
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
2050
0
1
2
3
4
Mare Liberum
Mare Clausum
74,6%
10,7%
14,6%
2018 North Sea GVA
Marine Economy Average
81,8%
14,1%
4,1%
2018 North Sea Employment
Marine Economy Average

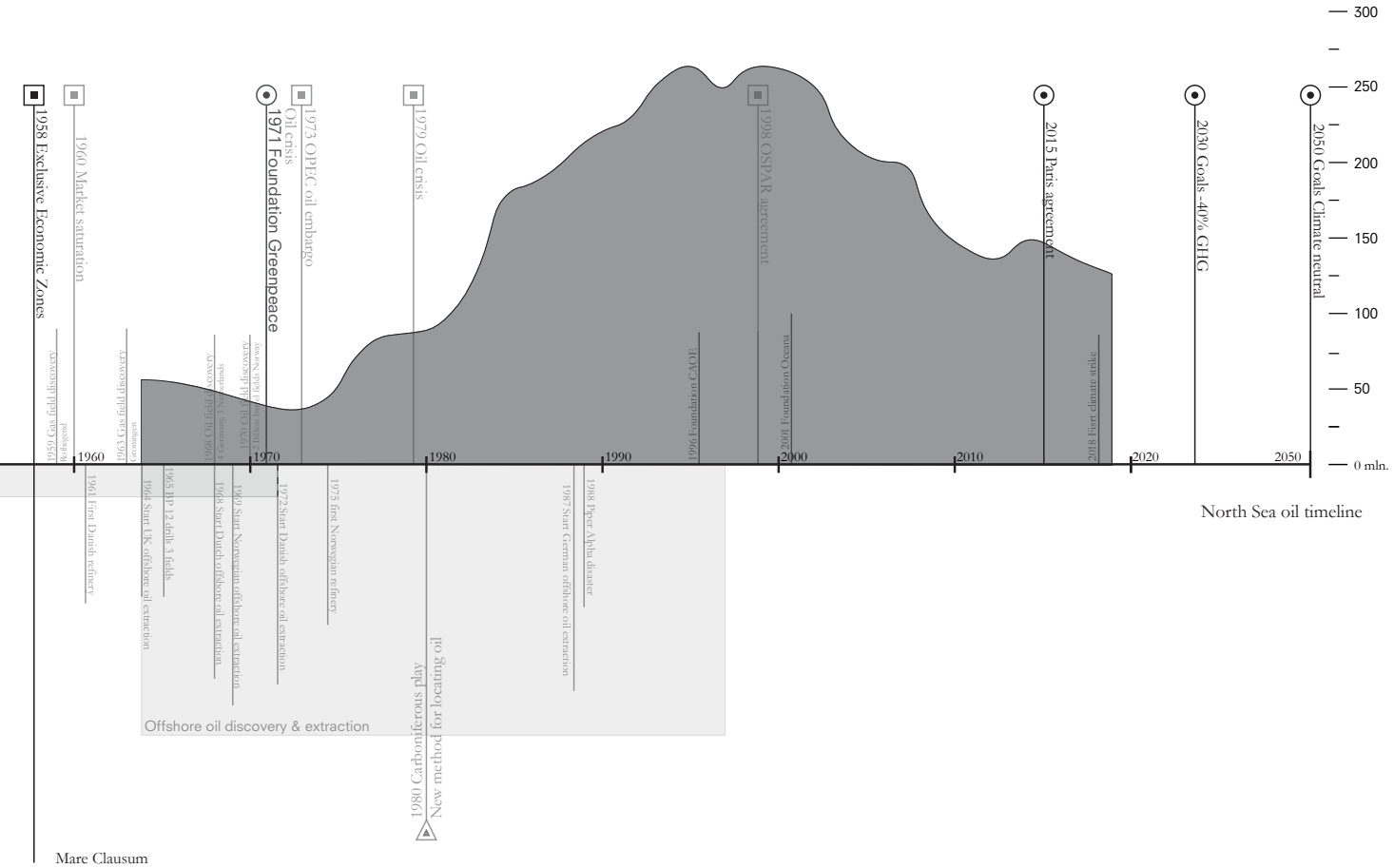




North Sea Timeline

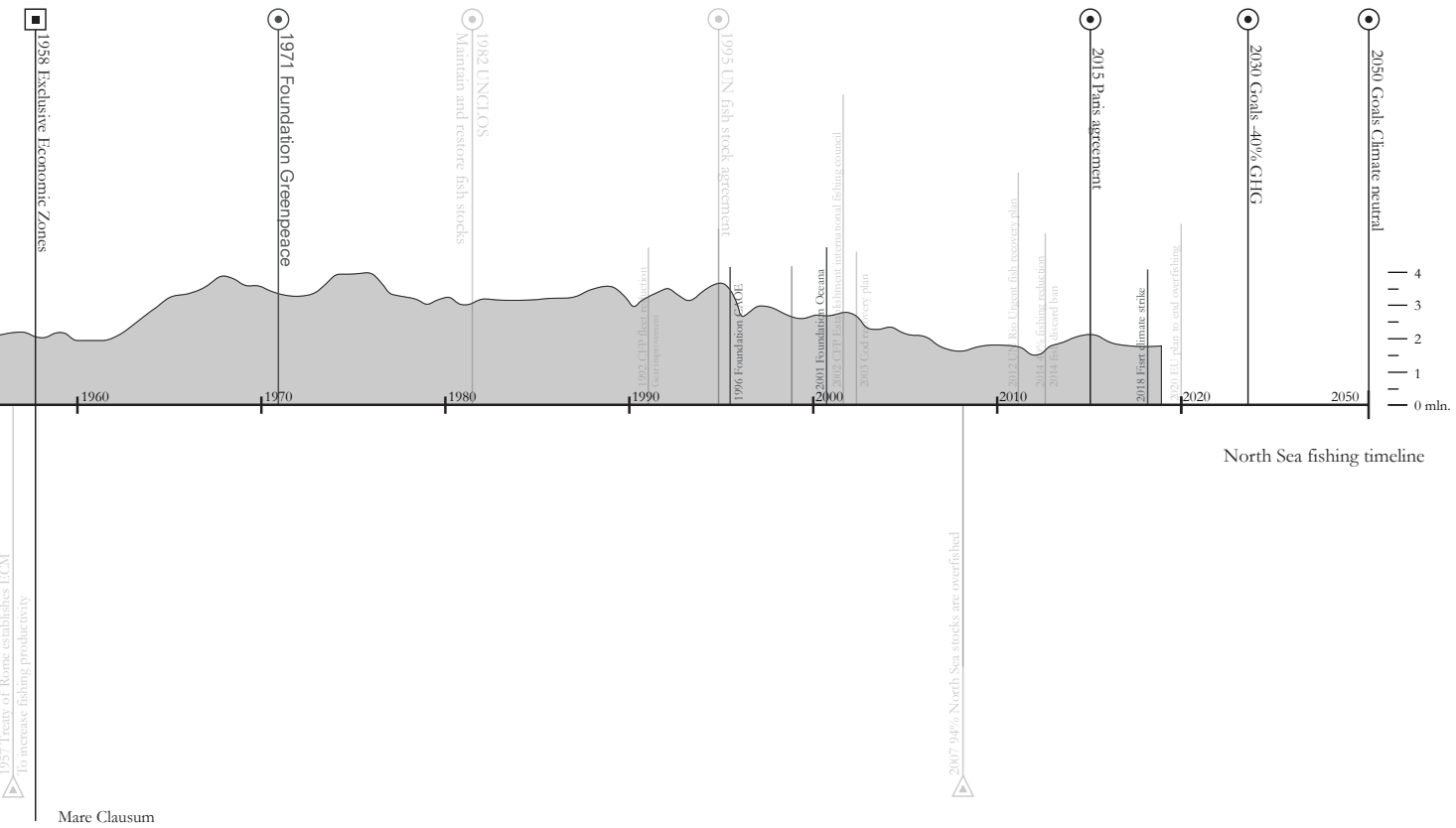
Own work, sources in bibliography

- Oil m3 yr.
- Pro climate actions
- Fishing tonnes yr.
- Favouring extraction
- Favouring climate sustainability
- No particular favour



North Sea oil timeline

Mare Clausum



North Sea fishing timeline

Mare Clausum

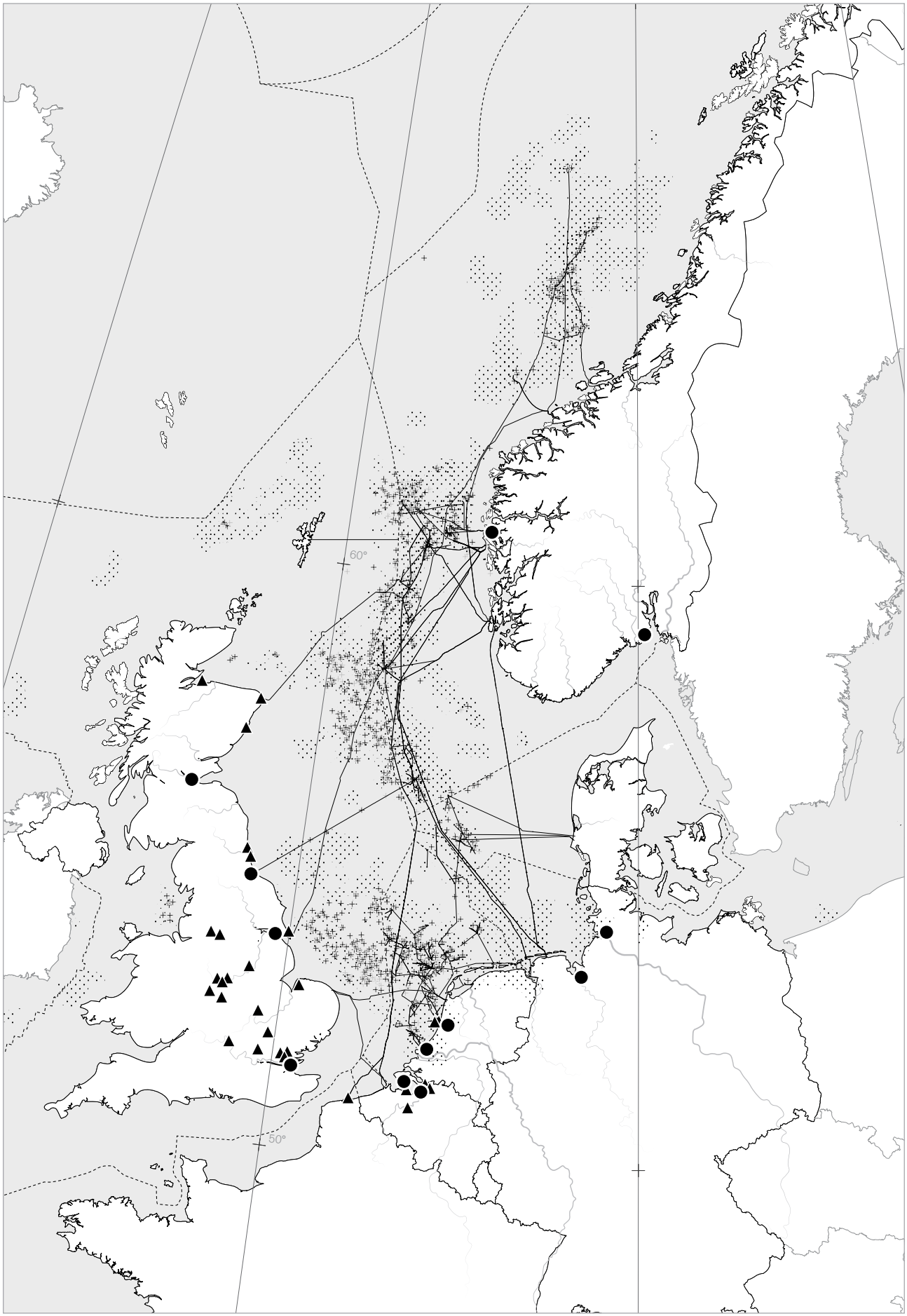
Map showing the division of the North Sea in EEZ's the discovered oil fields and the response of individual countries in terms of extraction infrastructure.

North Sea Oil infrastructure

TT Atlas - Own work

● Refineries
▲ UK fuel terminals
+ Oil platforms
⁝⁝ Oil fields

Oil pipelines
EEZ


60°
50°

1.2. Territorial Analysis

I. Twisted Relations

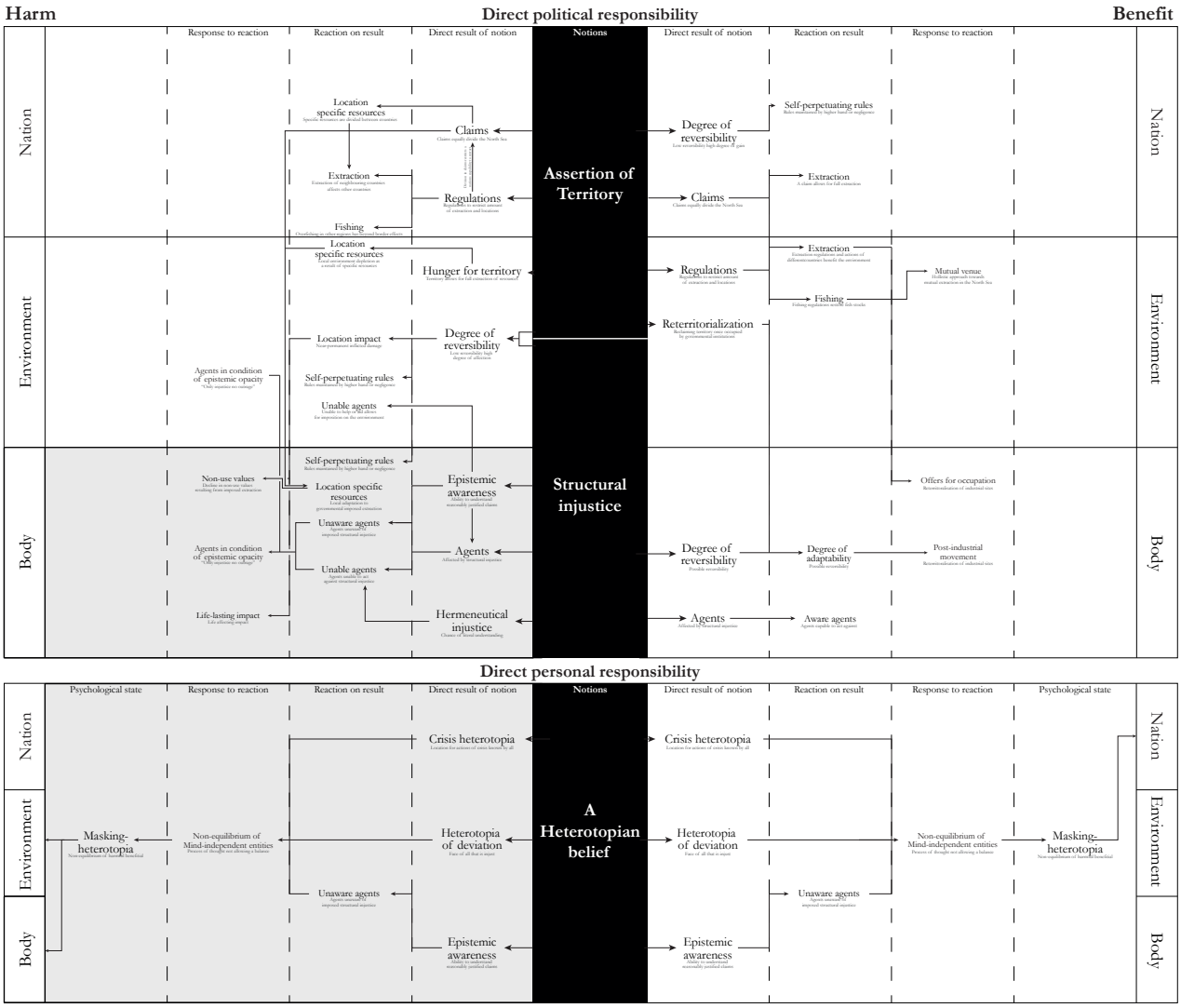
The events relating the extraction of oil and fish within the confinement of the North Sea have triggered numerous reactions from different sides and on different scales. To analyse these reactions and the harms and benefits involved a relation scheme has been set up. The scheme uses three main notions to allow connections to be visualized. Furthermore, the scheme is divided in three categories: nation, environment and body. These categories relate to either the harm or benefit of a country and how it effects itself or is effected by an entity bigger than itself, the EU. The environment relates to all that is related to nature and ecology and therefore more concerning pollution and long term environmental harm. The last category, body relates to human individuals but also local communities or even larger cities. The differences in scale in each category relate to different scenarios currently occurring in the countries surrounding the North Sea.

The first notion 'Assertion of Territory' relates to the claims made by countries both on the North Sea in terms of EEZ's and on land by means of infrastructural landing zones related to oil and fishing. This shows that claims do not only contain themselves to the scale of the nations, it continues to do so throughout the scales all the way down to the body of those who are faced with the infrastructure on a daily basis and even those unaware or unable to act against. The scheme shows that the benefit relating the assertion of territory mainly relates to the level of the nations, since they benefit the most from the claims out at sea and the infrastructure on land. Whereas both the environment as well as the body are connected to more harms resulting from the claims.

The second notion 'Structural Injustice' relates to the multi scalar reaction on the impact by the assertion of territory. The definition of structural injustice is: a system or multiple systems that cause irreversible harms to some are maintained by others who derive structural benefits from them. This structural injustice is mostly experienced by those in close contact with imposed oil infrastructure or the impacts of continuously changing fishing regulations. The placement of alienated infrastructure and the changing of tradition and culture are causing sudden and imposed changes to the lives of the affected. This kind of structural injustice is experienced as harmful to some, yet beneficial to others. The duality of harmful and beneficial is elaborated further by the third and final notion.

The last notion 'A Heterotopian Belief' can be perceived as the allowing factor of structural injustice. The bodies heterotopian perspective on oil infrastructure and fishing can be described as two different heterotopia's. Firstly, as crisis heterotopia. A crisis heterotopia is where actions that are in a state of crisis take place out of sight, however known to and by all. The occurring of these actions far out of sight is in favour of both the oil extraction and the large scale fishing corporations because it is in a way out of sight and therefore out of thought. Secondly, as heterotopia of deviation. Heterotopia of deviation is known for its injustice and difference to that what is considered as beneficial, gathered in a specific location. This can be implemented as a place known to be harmful for culture, sociology and ecology. A space defined as far from beneficial because of its appearance and identity, its face. These places are known for their harmful identity however, we either choose to show a blind eye or do not respond at all mainly believed because of the governmental imposition it implies. The covering of the face relates to the duality of the image which constantly revolves around its harmful and beneficial aspects, however never reaching an equilibrium. This duality in the thought of beneficial and harmful are a kind of masking-heterotopia. The knowledge of the far from equilibrium principle allows for blame and allowance simultaneously, in a way a space of illusion which can be implemented without the need of greater knowledge.

The use of connections and relations between different notions and subjects allows for the understanding of the most impacting elements within the system. These elements are the focal points of the injustice, whether inflicted by others or upon themselves.


Harm
Direct political responsibility
Benefit
Response to reaction
Reaction on result
Direct result of notion
Notions
Direct result of notion
Reaction on result
Response to reaction
Nation
Environment
Body
Location specific resources
Claims
Extraction
Regulations
Fishing
Assertion of Territory
Degree of reversibility
Self-perpetuating rules
Extraction
Claims
Hunger for territory
Location impact
Agents in condition of epistemic opacity
Self-perpetuating rules
Unable agents
Reterritorialization
Mutual venue
Structural injustice
Non-use values
Location specific resources
Unaware agents
Agents
Unable agents
Epistemic awareness
Degree of adaptability
Offers for occupation
Post-industrial movement
Life-lasting impact
Hermeneutical injustice
Agents
Aware agents
Direct personal responsibility
Psychological state
Crisis heterotopia
Masking-heterotopia
Non-equilibrium of Mind-independent entities
Heterotopia of deviation
A Heterotopian belief
Unaware agents
Epistemic awareness
North Sea relation scheme

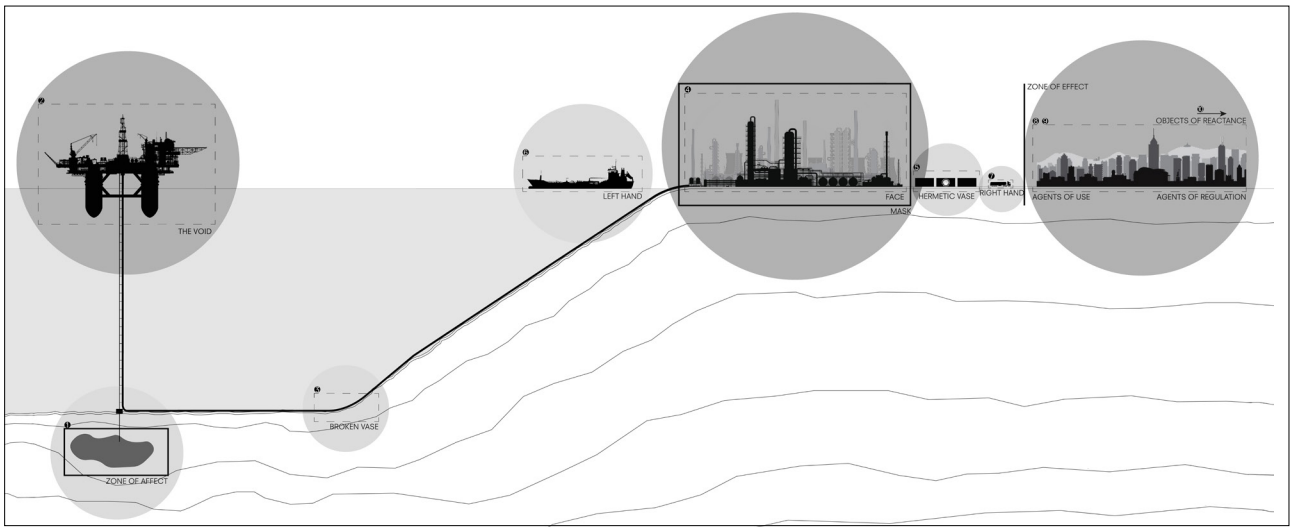
The following diagrams show the individual entities of which the oil and the fishing industries are composed of. The diagrams show the chain of events happening from extraction to production, use and lastly post-use. Again noticable the large scale governmental or corporation directed industry relating oil and the transformation from locally benefitting towards large scale corporational in the fishing industry.

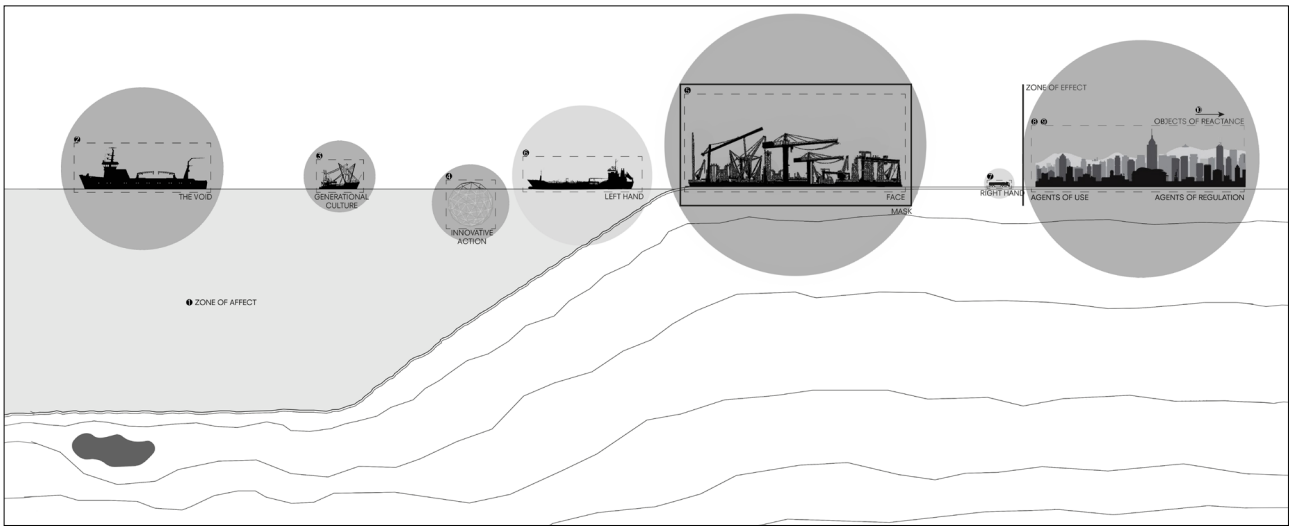
Oil industry infrastructure sequence

Own image

Fishing industry infrastructure sequence

Own image


THE VOID
LEFT HAND
FACE
MASK
HERMETIC VASE
RIGHT HAND
ZONE OF EFFECT
OBJECTS OF REACTANCE
AGENTS OF USE
AGENTS OF REGULATION
BROKEN VASE
ZONE OF AFFECT


THE VOID
GENERATIONAL CULTURE
INNOVATIVE ACTION
LEFT HAND
FACE
MASK
RIGHT HAND
ZONE OF EFFECT
OBJECTS OF REACTANCE
AGENTS OF USE
AGENTS OF REGULATION
ZONE OF AFFECT

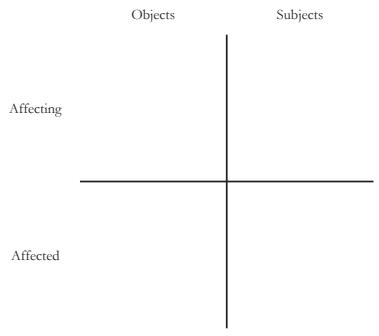
II. Embodied industries

The complexity of the research lays within the joining of the individual entities into a coherent whole. The research relating the industries is pragmatic, quantitative and tangible whereas the research relating injustice is psychological, qualitative and intangible. Therefore, the relation of these two entities relies on the manner they are perceived and experienced. Meaning that, the embodiment (Deleuze body, Guillaume (2011)) of the industries as individual yet interacting bodies allows for a clear perception on injustice, harm, benefit, beliefs, subjects and objects required to fully comprehend the line and all it entails.

Gibson (2015): 'space perceived as reflection of the body itself. The interaction between body and space exist because of the body itself.'

The embodiment of the industry allows for a non-prejudiced perspective on the sensitive subject of harmful, beneficial and injustice. The embodiment of different entities of the individual industries with the use of the relation scheme allowed for the identification of the bodily existence in subjects and objects of influence. A subject as a being who has an unique consciousness and/or unique experiences, or an entity that has a relation with another entity that exists outside itself (object). An object in term has no specific relation with another entity that exists outside itself. It can be used a non-relating object however, in such a condition it cannot itself exert influence on either subjects or other objects, it can be used by subjects to exert influence. The perspective of influence on the notions of subjects and objects deepens the meaning into affecting or affected subjects and subjective or objective objects.

The following catalogue emphasizes essential entities of the processes of extraction to production, use and lastly post-use in the oil and fishing industry. These entities are thereafter embodied in terms of a psychological state which in term defines the action of the entity. This state then clarifies the characteristics of the entity, whether it is subjective or objective and affecting or affected. Concluding from the characteristics is the entities relation to imposed structural injustice which will be elaborated further on in the continuation of the thesis.



The Embodied Industry

Symposium: territory as a project. Own image

III. Catalogue of just

I. Zone of affect: the affection of the body

Oil and fish are both essential entities within the process, both existing in the North Sea, both play an affected role within the process. The entire process revolves around these entities however they merely appear, by themselves they do not inflict influence on other subjects or objects in the process, nor directly to post-use effects. Therefore, they are listed as objective objects.

II. The void: a state of mind outside our vision but within our thoughts

The void is the philosophical concept of manifested nothingness. The void is closely associated with the contemplation of emptiness and with the human attempt to identify it. The void and its knowledge is said to be unknowing and unseen because of its ineffability. The 'call of the void' is a psychological state experienced by all however, because of its harmful effects not executed and therefore not seen therefore, the void only exists in the mind. Similar to the void are the oil platform and the modern large scale fishing trawler. They are known to all however, because of their location far out of reach from the eye we choose not to think about the harm they inflict. Both are considered to be a crisis heterotopia and affecting subjects because of their unjust and harming actions.

III. Generational culture: a tradition based structure grown overtime

Traditional local fishing as generational culture has grown and evolved to the use of large machinery however, always considering a locally benefitting approach with a short extraction, production and use cycle. This cycle however is nowadays imposed by environmentally concerning goals and future-driven solutions. The future of the so-called 'sustainable fishing' is beneficial to the environment and the fish stocks however, it is not sustaining culture and tradition. The duality between culture, identity and the so called sustainable fishing are in unbalance and without prospect of an equilibrium. Generational culture is thereby an affected subject because of its relation to other entities and objects which are simultaneously applying structural injustice to the culture and identity of imposed local communities.

IV. Innovative action: a science based plan or activity to improve specific entities

Aquaculture emerged as a form of 'sustainable fishing' because of the small impact on nature and ecology in relation to traditional fishing. Aquaculture farms are innovative in terms of growing fish in cages rather than catching them. The process of catching is harmful to fish stocks and depending on the fishing method also to the marine environment. The process of growing large amounts of fish in a confined area is not based or linked to any tradition or culture relating to a group of people or a specific location. Aquaculture is therefore replacing traditional methods of fishing and countries are thereby losing a connection to their culture and tradition. Because of this aquaculture is considered as an affecting subject.

V. The face: location for all that is unjust

The face is the entity which displays the characteristics of the whole industry. To both the oil and the fishing industry the face is the place known for its difference to the beneficial by means of the injustice it applies. This is implied to its surroundings in terms of serving different elements then the ones that are being unjust making it the heterotopia of deviation. The face carries the image of the whole industry as a result of it being the connection point between the elements of extraction and use. Because of this the face is an affecting subject directly related to multi scalar injustice.

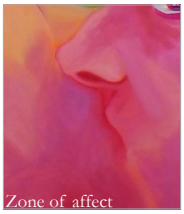
VI. The mask: self-inflicted imposition and injustice

The mask is the representation of dualities existing within our minds. The mask is figuratively placed over the face to hide its harmful qualities. Our actions to hide its hams to allow ourselves to make use of the benefits are in fact showing a blind eye to that what is imposing structural injustice. The mask is therefore a masking-heterotopia and in a state of far-from-equilibrium created by ourselves in our own minds. Because of its state as an harmful and beneficial unbalance the affected entities cannot clearly define its position, resulting in indecisiveness. This indecision allows for the face and in term the industry to exist and to unjust on the entities allowing for its existence therefore, making the mask an affected subject.

Extraction


Oil reservoir


The North Sea

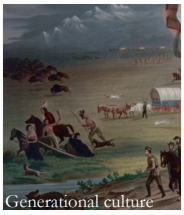

Zone of affect

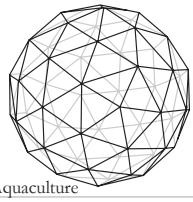

Oil platform


Modern large scale fishing


The void


Traditional local fishing


Generational culture

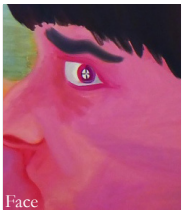

Aquaculture


Innovative action

Preparation

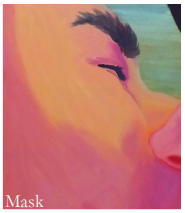

Refinery


Harbour / market


Face


Refinery


Harbour / market


Mask

VII. The broken vase: a connection between two affecting subjects

The oil pipelines have by themselves no direct relation to the oil, other entities or the overall injustice. The only function of the pipelines are to transport oil between predetermined locations. The broken vase is in its way uncapable of holding and therefore uncapable of acting influence on that what passes through. The oil pipelines can therefore be seen as objective object because of the lacking of direct relation to other entities or objects. Secondly, the pipelines are not necessary for the transportation of oil, they are used because they are a functional tool with lesser environmental harms than for example transport ships.

VIII. The hermetic vase: a container of the object of affect

A storage unit has by itself no relation to either the oil or the fish stored within, it could serve similar purposes to a different entity. However, unlike the pipelines subjects can influence the object of affect by means of the duration of the storage. The storage of different entities can limit the market availability or allow access to specific agents. The selective storage influenced by affecting subjects can unjust affected agents thereby making the storage a subjective object.

IX. The left hand: connector of distant subjects

Global transportation has similar to the storage unit no relation to the stored entity. However, because of its characteristics of transporting towards a location that has no relation to the area where the object of affect is extracted from or to the area it is produced it does not benefit the agents who are imposed by the industries injustice. The approach of harming but not benefitting similar locations is an influence imposed by affecting subjects and therefore makes global transportation a subjective object.

X. The right hand: connector of local subjects

Similar to the global transportation the local transportation has no relation to the stored entity. Short range transport benefits a similar location which is imposed with the structural injustice, unlike global transportation. This means that the local transportation is unaffected by affecting subjects and therefore an objective object.

XI. Agents of use: causing and harmed by dualities of mind-independent entities

The Agents of use are the initial cause of all the harms and benefits. Their demand towards the object of affection creates the duality which simultaneously harms and benefits them. The agents of use are imposing on themselves with structural injustice to be able to benefit from our modern-day society. Thereby are the agents of use both the affecting and the affected subjects.

XII. Agents of regulation: the factor of allowance and disallowance

The agents of regulation are elected by the agents of use however, they regulate the amount of extraction and are thereby directly linked the injustice existing in specific locations, yet the agents of regulation are in term directly chosen by the agents of use. The setting and enforcement of regulation is an action relating different subjects and objects therefore, are the agents of regulation affecting subjects.

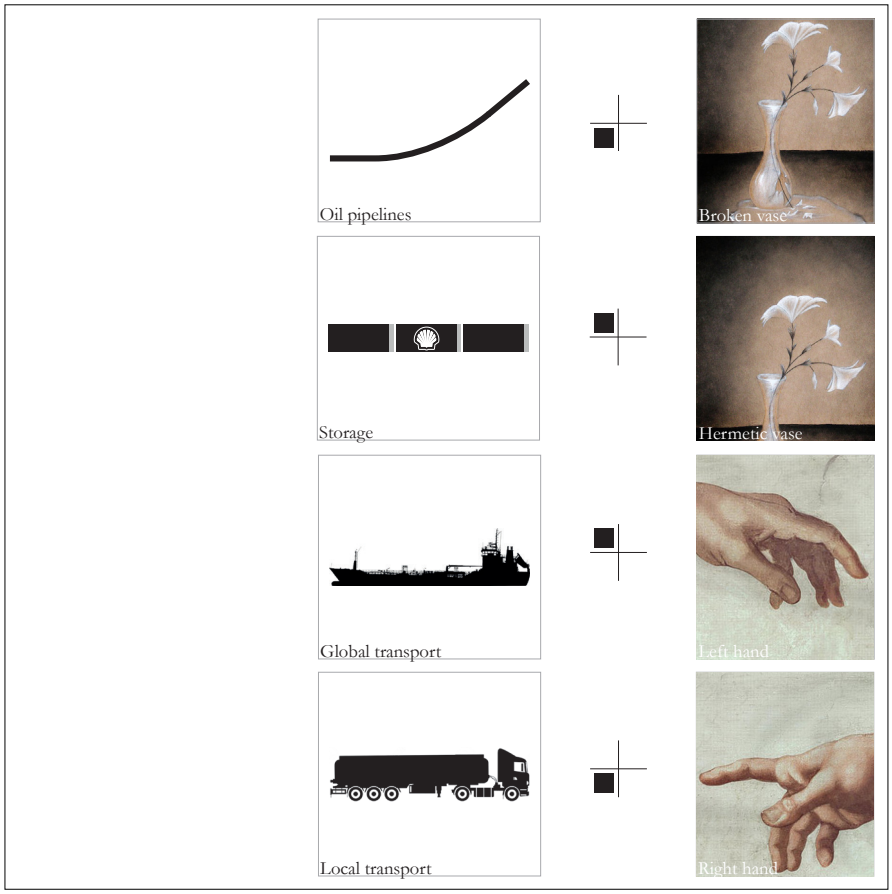
XIII. Objects of reactance: those/that who/what are/is unrelated yet structurally unjust

Objects of reactance are all entities which are imposed with structural injustice coming forth from both industries. These objects of reactance are unaware or/and unable to act against the imposed imposition, yet experience no benefit. This makes the objects of reactance objective objects which are structurally unjust.

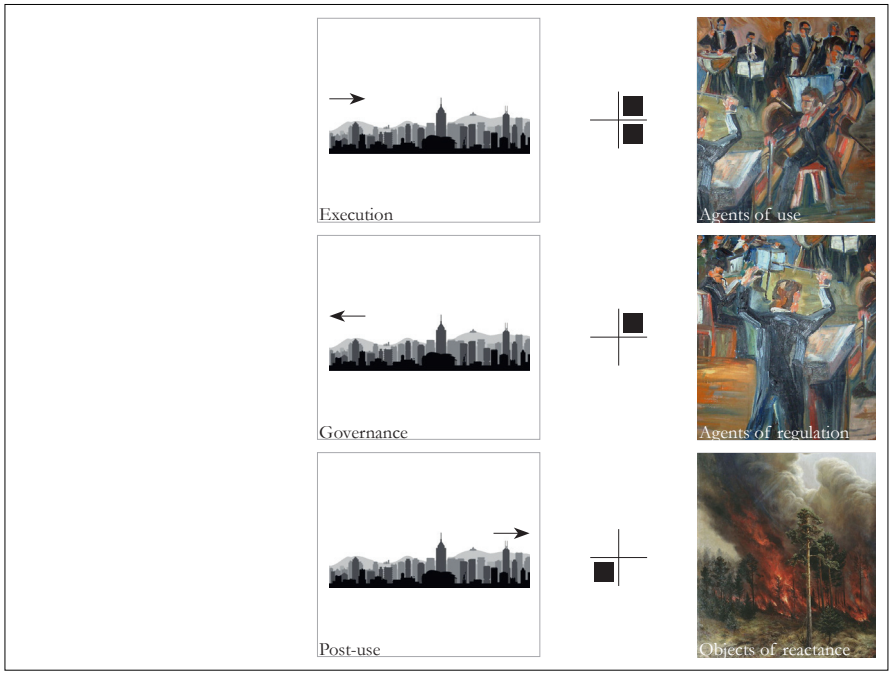
The embodiment of specific elements of the industries concludes the high level of injustice imposed by the face of the industries however, allowed and maintained by its users and affected which in term masked the face. The impact of various faces and their instated masks has been used as a guidance for the remainder of the thesis.

Sources in bibliography

Transport - Storage



Use - Post use



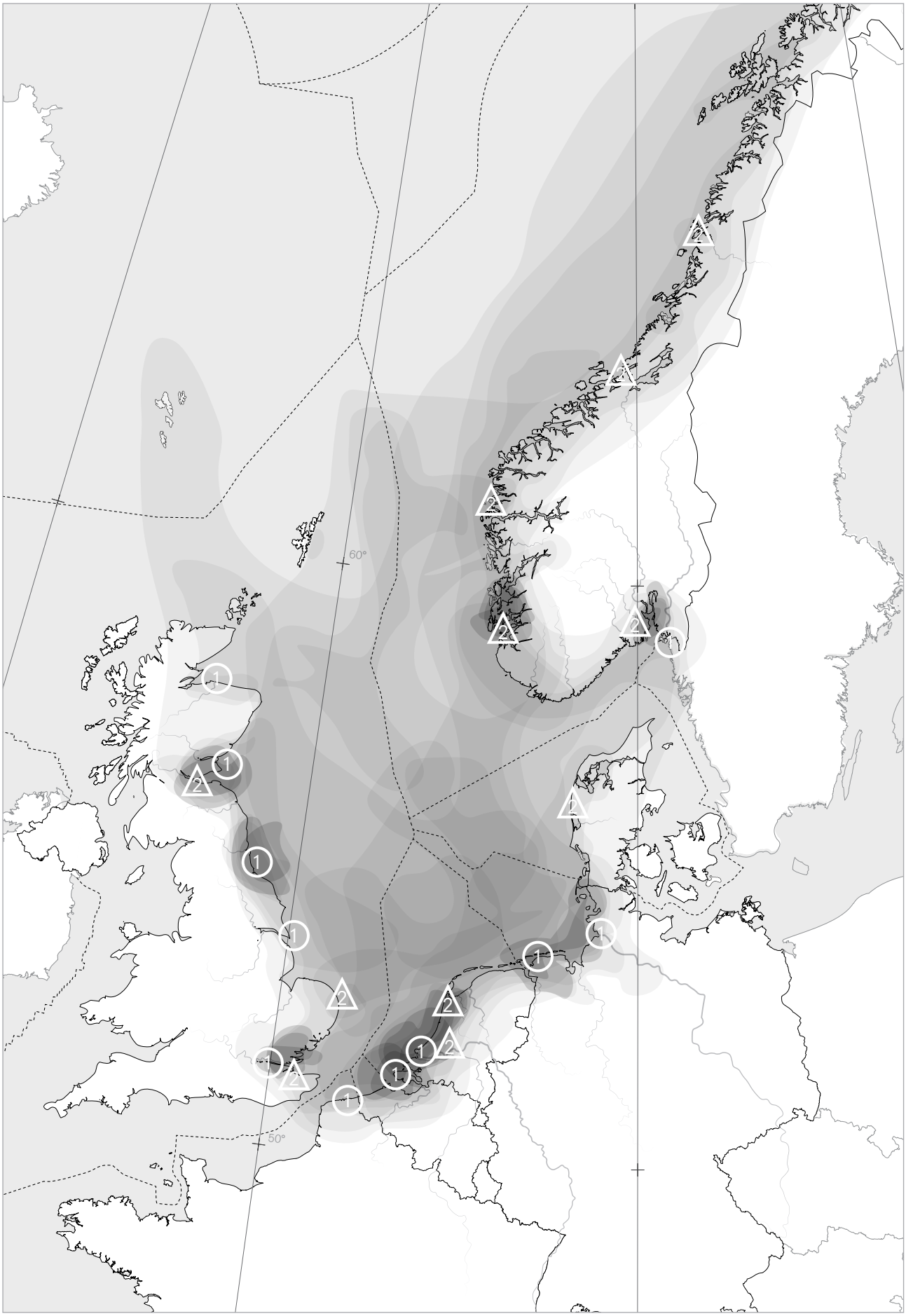
IV. Polluting patterns

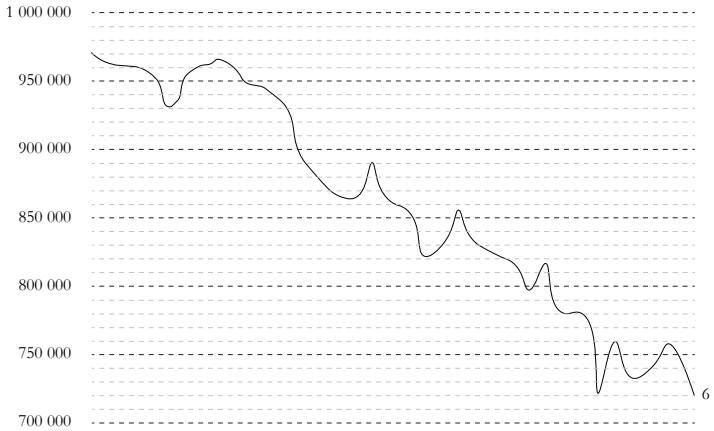
The following map shows the pollution caused by industrial and urban areas surrounding the North Sea, clearly showing more polluted areas in contact with refineries. Sea based pollution originates from extraction, transportation and migration.

Soil pollution in relation to land use

TT Atlas - Own work

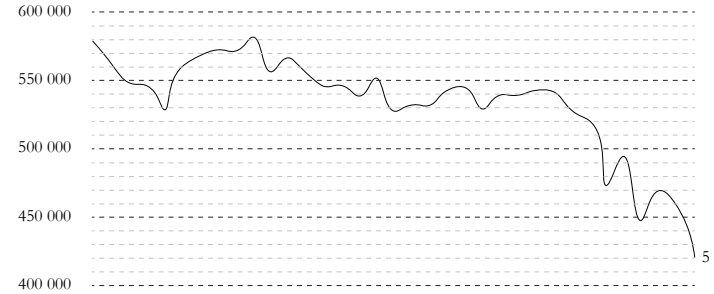
① Pollution in relation to industrial activity
△ Pollution in relation to urban activity
High concentration of pollution
Low concentration of pollution


60°
50°



The map shows the absolute damage on human health of each refinery. The area of the circles is proportional to the caused DALY/a, meaning disability-adjusted life years.

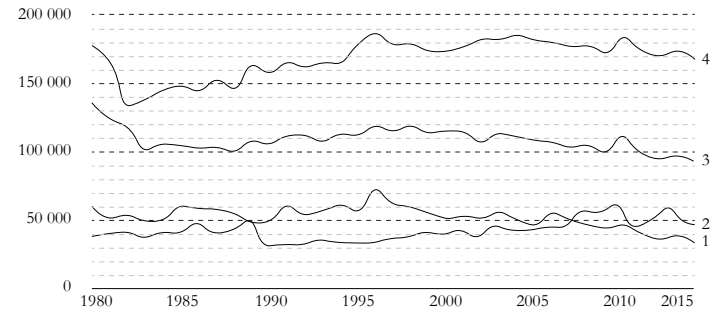
The following graph shows the CO_2 emission of the countries surrounding the North Sea, the graph displays the total amount of CO_2 produced by each country. Noticeable is the low emission of Norway which is explainable by their role in the oil business. Norway is know for their large contribution of oil products however, the vast majority is sold as crude oil. This means that Norway ships not only the oil towards other countries but also the related CO_2 emissions.



North Sea countries CO_2

Source: www.macrotrends.net

1 Denmark
2 Norway
3 Belgium
4 The Netherlands
5 United Kindom
6 Germany



Aerial pollution

Source: www.researchgate.net

1000 DALY/a


60°
50°

V. Contemporary Scenarios

To further research on the structural injustice imposed by refineries four scenarios have been set up. These four scenarios differ in the relations to their surroundings in terms of appearance, action and residue. These relations in term define the either reciprocal or imposed identity of the refinery to its surroundings. Additionally, the effects of a specific location in which a refinery is placed is analysed if to investigate on relations and to what extent the refinery gains benefits from the territory it exists within.

I. Symbiosis

The first scenario 'symbiosis' relates to Rotterdam. Rotterdam and its port area have symbiotically grown, both expecting industrial innovation to be possible in the port area of the city. Additionally the growth of the port and the city have been made possible by the revenue of the oil industry and vice versa. This symbiotic growth emerged from a pattern of expectancy by both entities renders the refinery integrated and reciprocal. The location of Rotterdam provides a logistic benefit for the placed refineries by close connection to the oil fields and a large global trade harbour.

II. Antibiosis

The second scenario 'Antibiosis' relates to Mongstad. Mongstad is an industrial settlement constructed because of the discovery of oil in Norwegian waters. The reasoning behind the placing of the refinery is purely logistical, the area is the only location in relative distance to the oil fields being geographically flat, spacious enough to construct a refinery and its related infrastructure along the Norwegian coast. However, the original settlements surrounding the site have been imposed with an unexpected refinery and either had to adjust their lives to it or move to another location to maintain their original method of living. Additionally, the appearance of the refinery is completely alienated to its surroundings, this does not allow it to blend into its environment. The sudden placement and the alienated character of the refinery makes its relation to its surroundings imposed.

III. Post-industrial

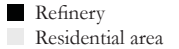
The third scenario 'Post-industrial' relates to Coryton. The refinery of Coryton is like several others surrounding the North Sea either faced with too much competition or unable to keep up with modern-day technological innovations. This resulted in the closure and removal of the refinery however, because of the soil pollution left by the refinery very few plans have been made for the newly vacant locations. Coryton is the only location in the confinement of the North Sea where a new plan has been made for the site. The difficulties of finding a new purpose for the site relate to the industrial location, heavy soil pollution and the large scale infrastructural connection with land and sea. These factors make it difficult to find suitable post-industrial usages for former oil refinery sites. A general solution is the placement of terminals which store either crude or refined oil.

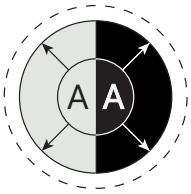
IV. Pro-industrial

The final scenario 'Pro-industrial' does not relate to any of the cases surrounding the North Sea. A pro-industrial scenario can be visualized as the construction of a refinery later added by a residential area to serve the refinery. This scenario does not occur within the confinement of the North Sea, because all refinery locations have previously been used as either fishing or industrial harbours. This relates to their strategic location with connections to both the sea and the land.

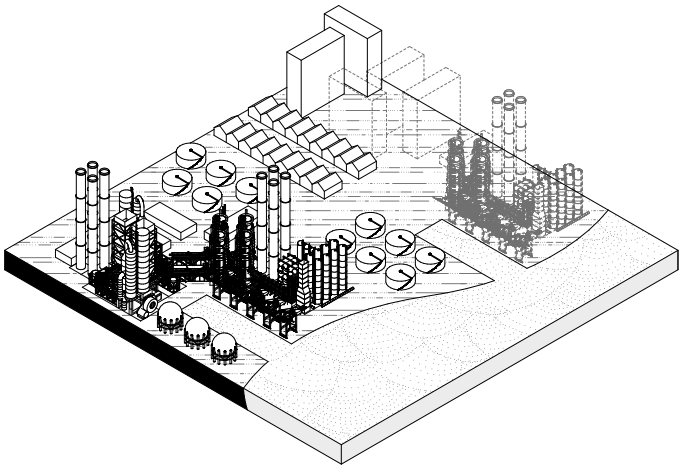
Tested North Sea refinery scenarios

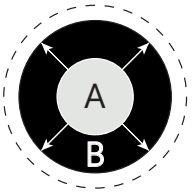
Own work



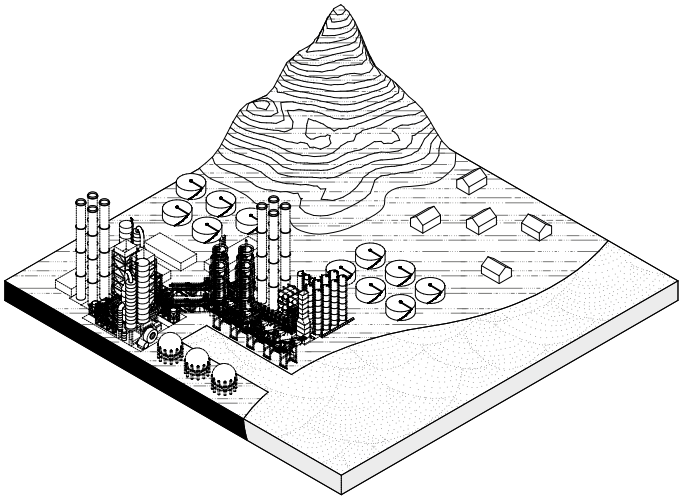


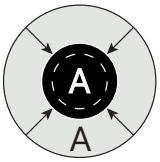
Symbiosis



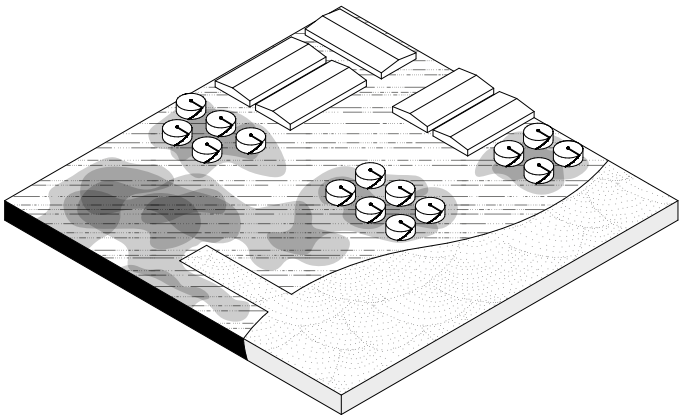


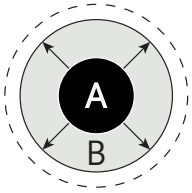
Antibiosis



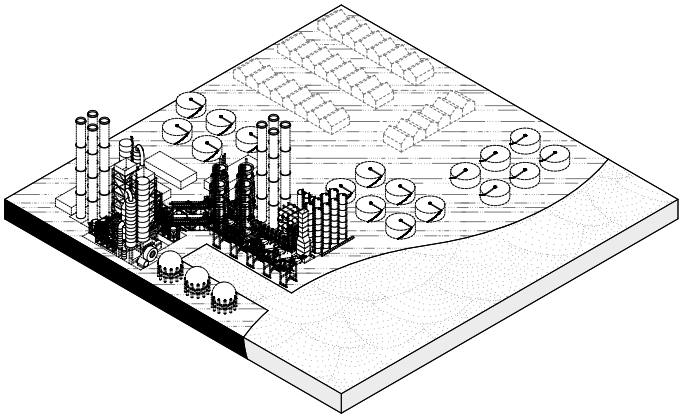


Post-industrial





Pro-industrial



I. Symbiosis - Rotterdam

The scenario of Rotterdam shows a relatively equal size comparison between the city and the industrial area. The map also shows the close connection between the city and the industrial zone which then extends out towards the sea. The growth and spatial planning of the industrial zone and its surrounding residential areas of Rotterdam show integrated interactions rather than an imposed entity. The collection of refineries located within this industrial zone in Rotterdam collectively have a capacity of 1.000.000 BPD by far the largest however, this also implies that the majority of oil the refineries process is meant for different countries. The 85% shown by the graph is distributed to numerous locations in Europe but also the rest of the world, this implies that those who are harmed in any way by the refinery do not receive the full benefit of the refinery.

The oil industry itself has always been a largely automated industry, this is reflected in the amount of personnel currently working in the refinery or anything related to the refinery in comparison to the entire harbour personnel or the city. An important factor is the size of the entities in relation to those involved.

Looking back at the relation scheme to identify the relation of Rotterdam and its refinery it can be determined that the refinery relates to environmental harm because of its production and low degree of reversibility. However, looking back at the time before the construction of the refinery the relation to the body could be described as beneficial, because of the high level of expectancy for future industrial development of the harbour area. On the other hand the high export rate of the benefits whilst the agents in contact are still faced with the harms is a form of structural injustice. Therefore, the bodily interaction between the refinery and the related agents is both harmful and beneficial.

II. Antibiosis - Mongstad

The scenario of Mongstad shows an imposed refinery completely alienated to its surroundings. The discovery of oil in Norwegian waters quickly resulted in the construction of a refinery to provide for the countries need of refined oil products. The placing of the refinery in close relation to traditional fishing villages appears imposed. This imposed interaction arises because of the size of the refinery and the lacking of relation in comparison to its surroundings. Additionally, the construction of the refinery created a greater demand for workers which currently reside in the villages surroundings the refinery. This attraction of new influences had its changing effects on local communities. This imposed governmental action had a low level of expectancy to the original residents in the while the refinery has big effects on the living environment of those in contact with it. Because of the low chance of reversibility the only possibility for those in close contact to avoid this imposition is to move to a different location.

Norway's stock assessment claims that at least 53% of the total amount of oil within their EEZ is remaining. This means that regarding current conditions it is unlikely that the refinery will be de-operationalized anytime soon. Besides that, the 75% export factor of the refinery implies that only a small percentage of benefit is actually applicable to the agents that are confronted with the harms.

If reflected on the relation scheme the harm applies to the body of those in close contact to the refinery, because of its low expectancy, reversibility and simultaneously high impact on the lives of those in contact with the refinery.

Refinery import & export

Sources: www.portofrotterdam.com
www.norskpetroleum.no
www.equinor.com

■ Global export
■ National use

Inhabitants Rotterdam - Lindås

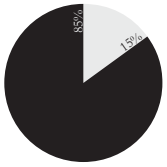
Source: www.rotterdam.nl
www.ssb.no

○ 1.000 persons

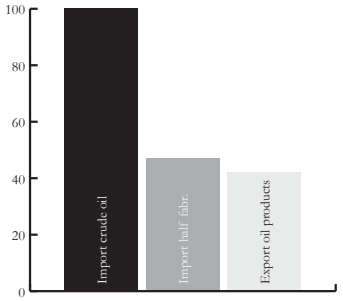
Urban analysis Rotterdam - Mongstad

Own work

■ Industrial area
■ Residential area
■ Land area
▨ Glasshouse agriculture



Percentage of global export

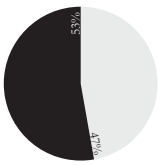


Import and export Mln. tonnes/yr

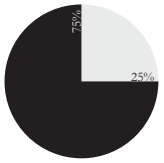
Refinery workers

Harbour workers

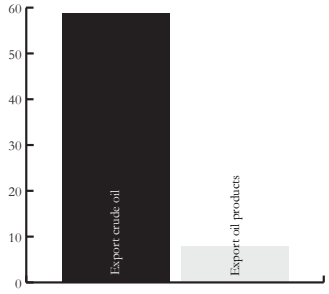
City inhabitants



Percentage of oil remaining



Percentage of global export



Import and export Mln. tonnes/yr

Inhabitants surroundings

Refinery workers

III. Post-industry - Coryton

The scenario of Coryton shows a possibility of the reterritorialization of an earlier imposed action. The absence of the refinery opens up territory which the body can take back however, because of the polluting factors of the refinery this is rarely the case. To reclaim this territory the soil has to be cleaned or it must gain a new function which does not require clean soil. The cleaning of the soil can either be done manually or naturally however, in term they have high costs needs long durations of time. The either costly or long lasting procedure to clean the soil is not very attractive for investors to reterritorialize post-refinery sites. On the other hand functions which do not require clean soil are either heavy industry, storage of oil products or pre-packaged products. The Thames Enterprise Park which is planned for the Coryton site makes use of the latter. Additionally the removal of a refinery is not to everyone pleasantly welcomed. The former workers have lost their occupation because of the removal thereby, there have been numerous protests for different refineries to remain operational.

Other post-industrial sites relating refineries around the North Sea:

UK		
	Coryton	1921-2012 – Refinery partially demolished, land partially converted to fuel terminal and storage – Plans for Thames Enterprise Park
	Shell haven	1912-1999 – Refinery fully demolished, land partially converted to fuel terminal and storage – Plans for Thames Enterprise Park
	Teesside	1965-2009 – Refinery fully demolished, land partially converted to fuel terminal and storage – No further plans
	Nynas Dundee	1956-1973 – Refinery fully demolished, land converted to naphthenic specialty products and bitumen factory – No further plans
FR		
	Flanders	1974-2010 – Refinery partially demolished, partial use as a training facility, partial fuel terminal and storage – No further plans
GER		
	Wilhelmshaven	1976-2012 – Refinery partially demolished, land partially converted to fuel terminal and storage – No further plans
NED		
	Mobil	1967-1982 – refinery fully demolished, land fully converted to fuel terminals and storage – No further plans

IV. Pro-industry - ...

The absence of the pro-industry scenario explains more about the strategic planning and placement of harbours surrounding the North Sea than about the characteristics of the refinery. All feasible locations for refineries surrounding the North Sea have historically been a connection to the sea by a harbour and to land. This means that every location already had some sort of harbour and residential area.

Urban analysis Coryton

Own work

■ Industrial area
▒ Residential area
□ Land area
⊠ Post-industrial area

Not within the confinement of the North Sea

VI. The future of oil

The future of oil and its extraction are still uncertain, there are many speculations of different institutions and involved parties all with a different prospect of what the future may hold. The interesting part is that the wide range of speculations symbolise the duality within our thoughts surrounding both the oil and the fishing industry. Companies relating oil extraction benefit when the extraction rises or at least remain stable, their speculations are therefore set on those goals. On the other hand pro-climate organisations would rather see the extraction and demand decline. The ranging speculations of different industries give no clear image of what the future may hold however, it does show that without hard regulations there are no limits to what can and possibly will be extracted. Additionally, the different scenarios have their own harms and benefits. High extraction rates may be harmful to the environment however, it does ensure that agents of use do not have to give up on their oil requiring lifestyle. On the other hand the reduction of oil extraction will have its benefits to the environment however, some lives may have to be changed or technological innovation will need to provide with solutions which do not require fossil fuels to be able to maintain our current lifestyle. These dualities mostly existing from within our minds are allowing for both entities to exist in a far-from-equilibrium and therefore we cannot fully benefit from either one of the entities.

CO2 emissions relating the full oil cycle

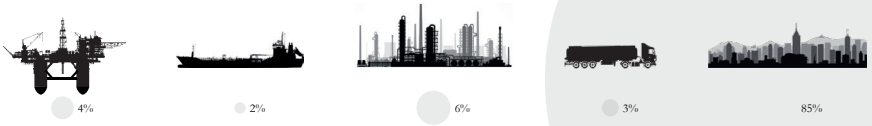
The production to use diagram shows the amount of CO2 emitted in each phase of the process from extraction to production and lastly use. The percentages conclude from a different perspective that the agents of use are in fact imposing injustice on themselves and are thereby not only affected but also affecting subjects.

The impact of the oil industry

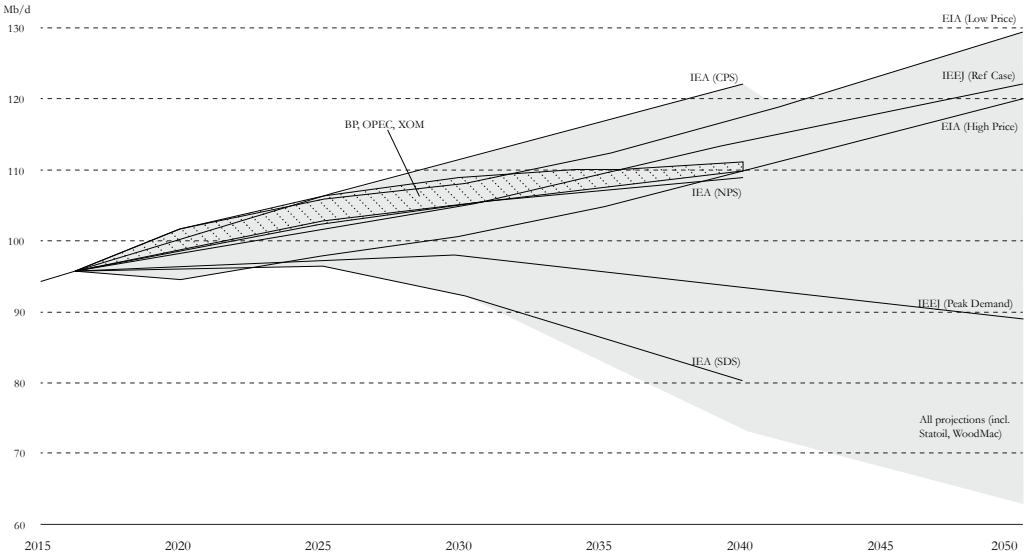
The research conducted on the oil industry makes evident the role it plays in our society by means of pollution, injustice but also our dependency. Appearing from the various site analysis are the lack of direct relations from the industries to its site of existence. The only site dependant element is the extraction site, the remainder have been chosen for logistic and economic reasons. The placement of a generic industries onto local identity imposes structural injustice which cannot be averted with current enclosed and unintegrated systems.

Production to use CO_2 emissions
Projections of global oil demand
New policy scenario for Europe 2040

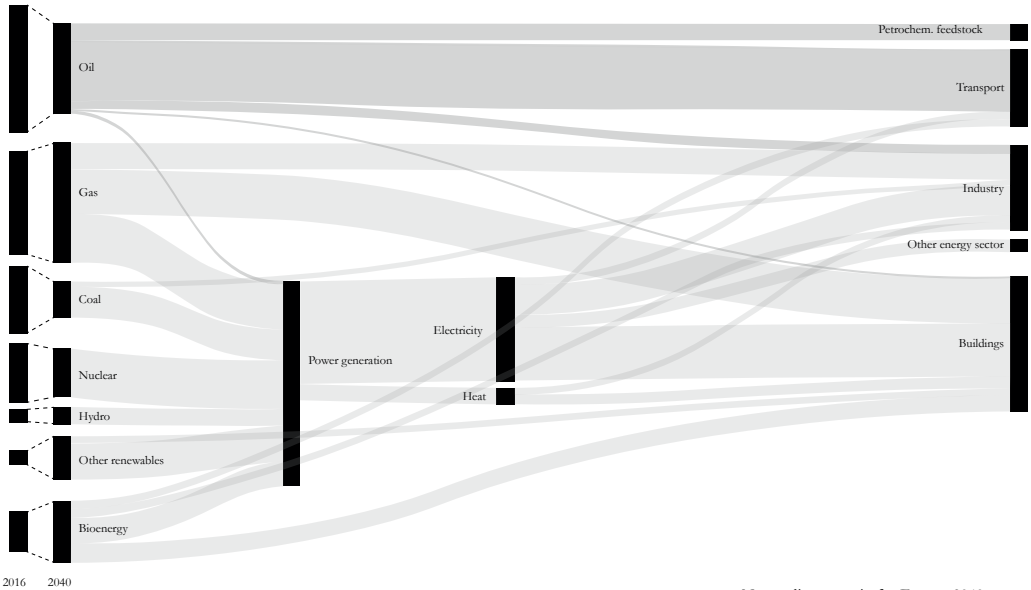
Source: Refinery 2050, refining the clean molecule, clingendaelenergy (2019)



Production to use CO_2 emissions



Projections of global oil demand



New policy scenario for Europe 2040

VII. ‘Sustainable’ Fishing

The North Sea and fishing map

This map shows the division of the North Sea’s fishing zones and the locations of overfishing within those zones. Additionally, it shows the amount species being fished in different locations and the percentage of overfished species in the same locations. Lastly the map shows coastal fishing areas mainly focussed on shellfish.

The North Sea and fishing diagrams

Fishing as shown in the timeline has undergone a change from mass exploitation to regulated fishing. This regulation in fishing is meant to maintain and restore depleted fish stocks. Not only regulations on the catching period and season have been implied by the EU to the North Sea but also locations that have a fishing ban. Marine Protected Areas or MPA’s provide protected zones for fish and their environment. The North Sea has seen a growth in the amount and the sizes of the MPA’s throughout the last two decades. The MPA’s cover nowadays 27,1% of the North Sea, this is considerably higher than the European goal for 2020 which sits at 10% however, most of the MPA’s aren’t year-around protected areas. This means that the actual number of protected area is lower than 27,1%. On the other hand this shows the tendency of the regulations applied to the North Sea to stop overfishing and protect the marine environment. This is confirmed by statistics which are showing a reduced amount of species being overfished within the confinement of the North Sea.

Fish stocks diagrams

- Overfised
- Sustainable level

MPA coverage diagrams

- Not covered
- MPA

North Sea Overfishing map

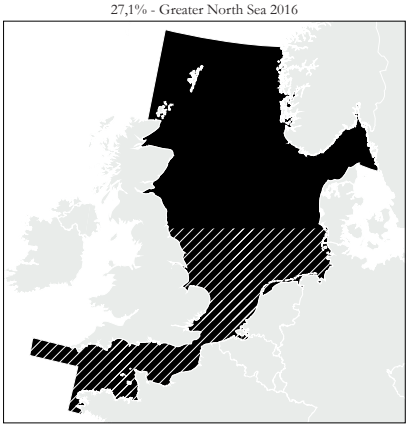
Own work

- Overfished stocks
- Sustainable levels
- Areas of overfishing
- Coastal fishing areas
- Fishing zones

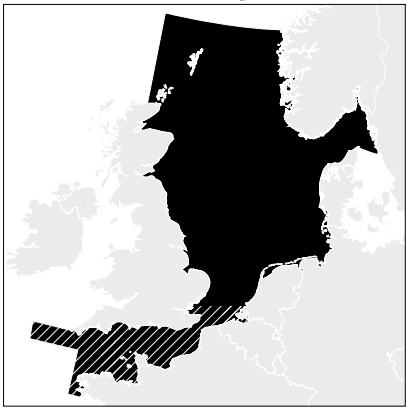
2009 2017 2019

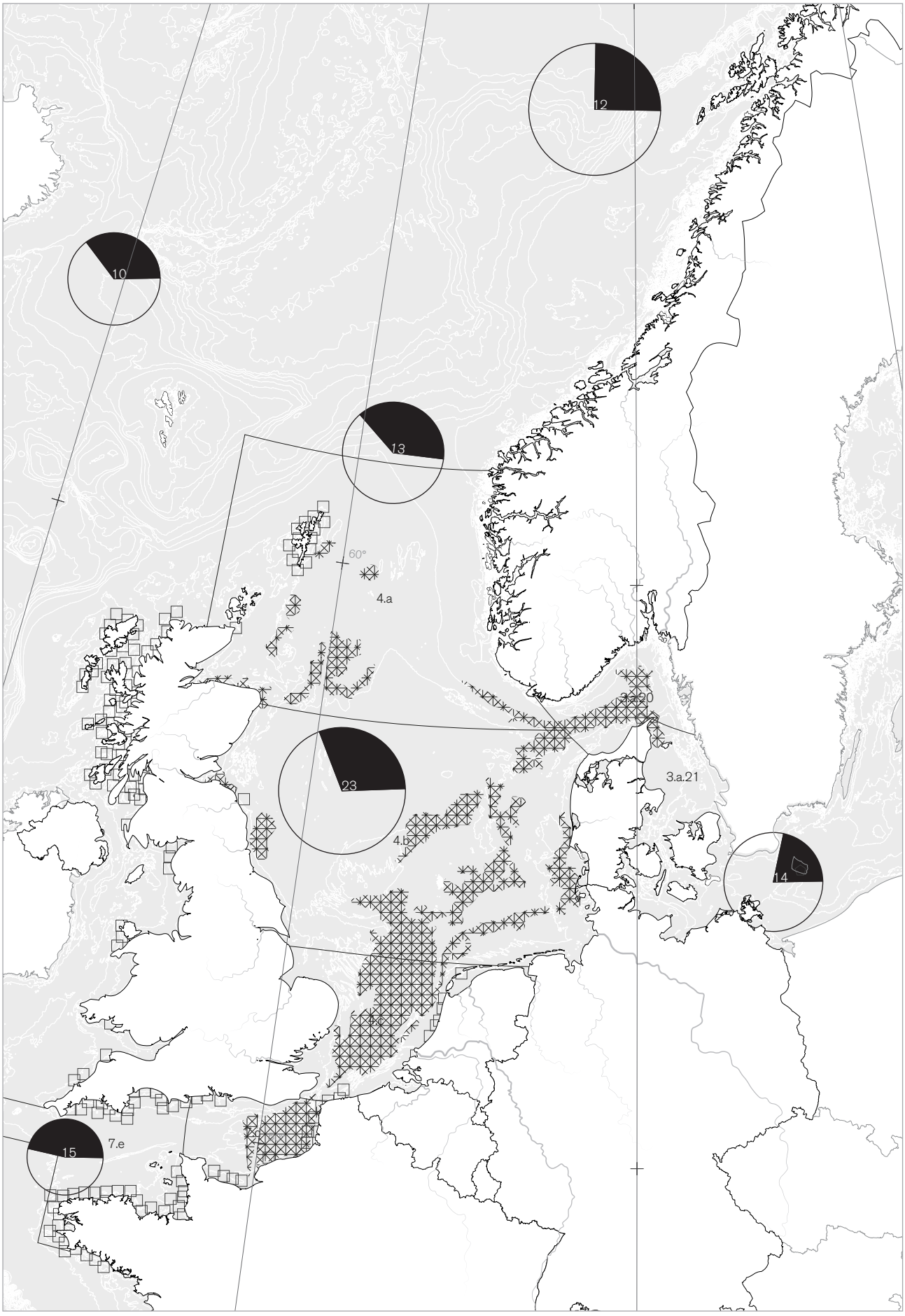
17,9% - Greater North Sea 2012

27,1% - Greater North Sea 2016



10% - EU 2020 goal

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10
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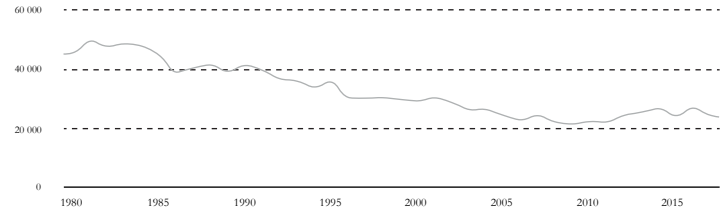
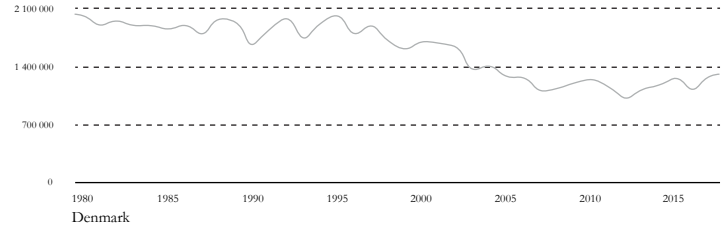
60°
4.a
3.a.20
23
3.a.21
4.b
14
4.c
15
7.e



Belgium



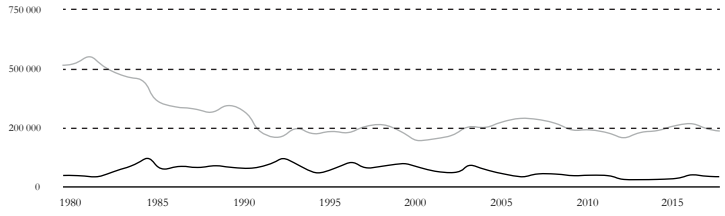
Denmark

The North Sea and aquaculture

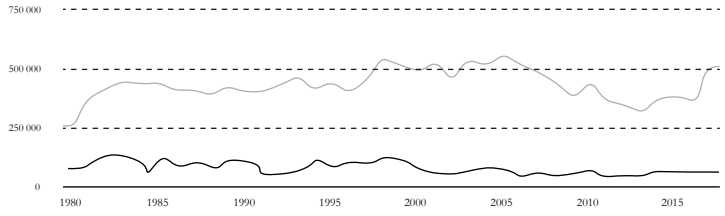
The map shows aquaculture farms surrounding the North Sea. The data shows Norway as the market leader by far, this is because of several conditions relating the water surrounding Norway. The coast of Norway is formed by the last glacier which pushed down on the ground around 10.000 years ago, this means that the ground surrounding Norway rapidly descends to great depths. These are ideal conditions for the large circular cages required for aquaculture. Additionally the waters surrounding Norway are cleaner and colder than the waters surrounding other countries in the North Sea. This is mainly because of its geographical location and the lesser intensively used coastal shipping routes. The combination of these elements grants for the ideal conditions of growing fish.

Fishing and aquaculture in the North Sea

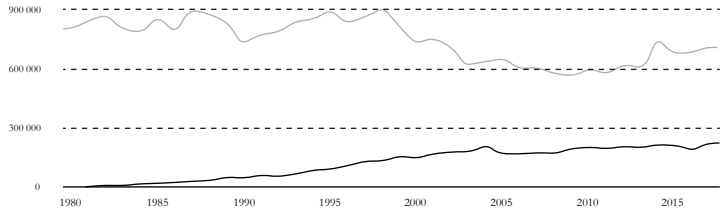
The graph show the numbers of fish captured or grown via aquaculture. The numbers of catches are currently still higher than the numbers grown however, they are collectively showing a reduction in amounts over the last years. This decline is caused by stricter regulations on the catching of fish and the increase of aquaculture activity. Additionally, the graph shows the clear domination of Norway in terms of aquaculture. Its pristine conditions are unmatched by other countries and therefore is the competition is unbeatable for other countries surrounding the North Sea. Countries that do produce fish by means of shellfish mainly focus on species which are not grown by Norway.



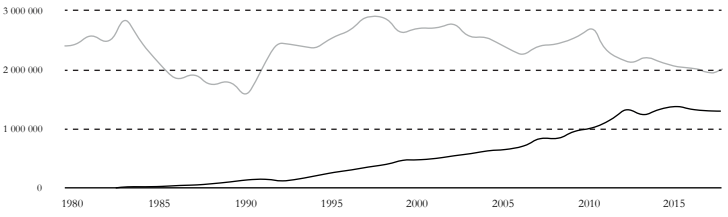
Germany



The Netherlands



United Kingdom



Norway

North Sea Aquaculture graph

Source: www.seafoodfromnorway.us
www.fao.org

North Sea Aquaculture map

Source: www.emodnet.eu

○ Aquaculture sites

EEZ's


60°
4.a
3.a.20
3.a.21
4.b
4.c
7.d
50°
7.e

VIII. The future of fish

Fish demand

New regulations regarding sustainable fishing have decreased the numbers of fish caught traditionally however, did not change the demand for fish related products. On the contrary, the demand for fish and its related products is continuously rising with a low possibility of decreasing anytime soon. This in side-by-side with the increasingly stricter regulations allow for continuous imposition on the identity of fishing and its related culture.

The impact of the fishing industry

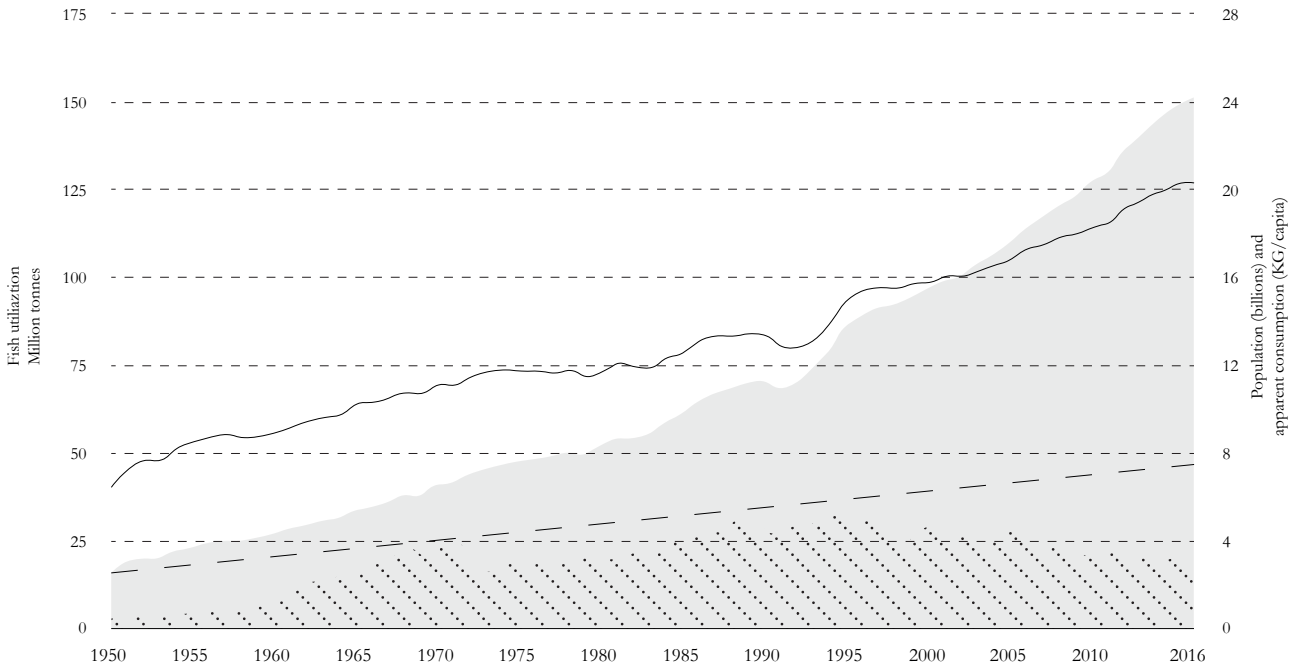
The research conducted on the fishing industry makes evident the change it has gone through. Sustainable fishing coming forth out of the protection of marine life by means of stricter regulations in terms of fishing. These regulations effected in a change of the fishing industry from locally benefitting to large scale governmental or corporation influenced, resulting in the changing of fishing related culture and identity and thereby imposing structural injustice to those affected by these changes in regulation. Similar to the oil industry site dependency is the fishing industries generic approach to its site of existence. Apart from the locations where the fish are caught or grown there is no link to the specificities of the territory and are thereby enclosed and unintegrated systems.

Global fish demand

Own work

Food uses
Non-food uses

Apparent consumption
Population


175
150
125
100
75
50
25
0
28
24
20
16
12
8
4
0
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2016
Fish utiliaztion
Million tonnes
Population (billions) and
apparent consumption (KG/capita)

1. Territory: North Sea

1.3. Problem Statement

Regarding the numerous changes the North Sea has undergone through the years it is clear that the change favouring extraction is an imposition on the mutual approach of the North Sea. Governmentally led industries impose various kinds of structural injustice on a multi scalar level, affecting those in contact with these industries. The impact in terms of pollution, territorial claims and loss of identity are noticeable all-around the North Sea resulting in detached and unintegrated industries.

On the other hand the polluting and damaging effects of these industries are widely known. Yet, we collectively choose not or are unable to take action against these governmental machines. Mostly because our modern-day lives heavily depend on the goods processed by these industries. Because of this the governmentally led industries can be perceived as dual systems existing in an nonequilibrium and thereby imposing structural injustice to all in contact with these industries.

Our collective demand resulting in the depletion of North Sea's based resources and protein is allowed by our detached connection to this entity. Industries as enclosed and detached systems are enhanced by the lack of territorial use in terms of integration and benefit. Mainly governmental and large scale corporations make use of generic elements and thereby making territorial integration unable.

1.4. Research Question

- *How to connect man, machine and territory to allow for an integrated and just industry amidst imposing governmental machines?*

Subquestions

1. How can an industry be introduced without imposing injustice on existing systems or modern-day lives?

2. How to integrate territorial specificities into a specific industry?

Harbour - Jacek Yerka

Visual representation of the impact of our dual world of industries and injustice.

Norway

2. Territory - Norway

2.1. Identity - Historical Precedents

Norway is currently the North Sea's largest extractor of oil and fish and has tremendously developed as a direct result from these industries. As mentioned beforehand these developments came with imposed structural injustice clearly appearing throughout all of Norway. Closer inspection of Norway reveals more interesting aspects surrounding these industries. Both industries are instated for mass exportation to Europe and the rest of the world, making Norway a country focussed on extraction and the wealth gained by this extraction. Up to 92% of each species of fish grown or caught in Norwegian waters is based for export, making Norway a dominating factor in the European fish market but also clearly apparent in worldwide numbers. All made possible by both new and sustainable ways of fishing Norway is currently operating. This means however, that the identity of a locally benefitting system has made way for an imposing machine.

Similar to this is the Norwegian oil industry having an average daily production of 2.5mln BPD, yet only refining 200.000 BPD. This does not only instate that Norway is keen on product export, it also allows for the countries low annual CO2 emission. The direct exportation of CO2 emissions and the energy investments made by its gained wealth has allowed Norway to take a preeminent position as 'climate leader'. However, this status is unjust because of the direct export of polluting products.

The specificities of the Norwegian landscape on the other hand allow for fossil free energy production as instated by numerous hydroelectric power stations. The combination of a wealthy, forward looking country and to some extent utilising its existing specificities, but also the injustice instated by the oil and fishing industry makes Norway the most suited candidate for the research and trial towards an integrated and just energy transition.

GDP Norway (USD)

Source: data.worldbank.org

- Predicted
- GDP per capita

Oil and gas contribution to the GDP of Norway

Source: www.npd.no

- Contribution oil and gas
- Predicted
- GDP volume
- Mainland GDP

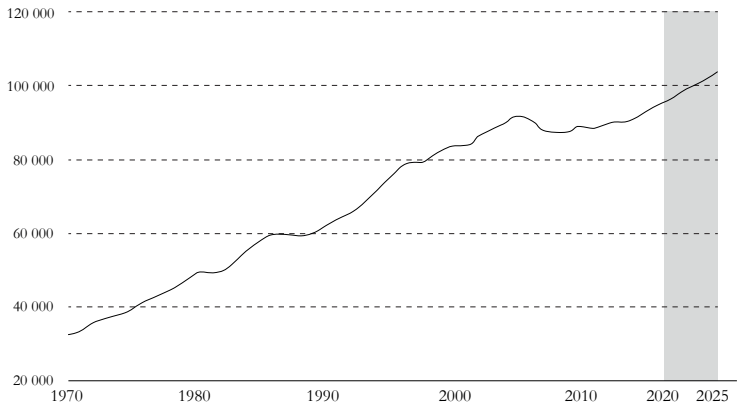
Norwegian energy production

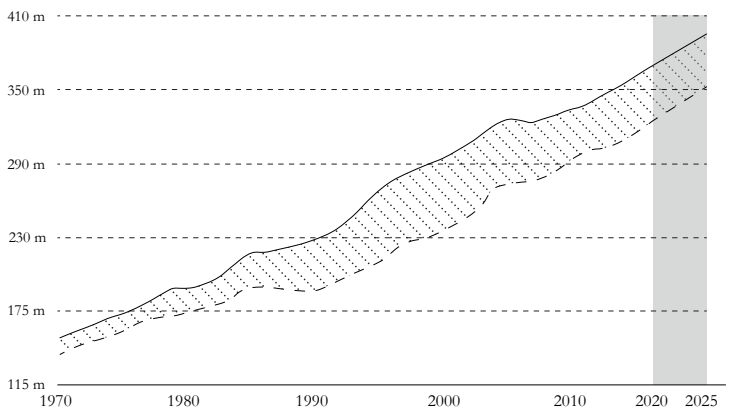
Sources: www.energifaktanorge.no
www.energinorge.no

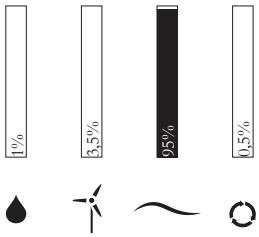
- Fossil fuels
- Wind energy
- Hydro poewr
- Other renewable energy sources

Both Climate Leader and Oil Giant? A Norwegian Paradox

The New York Times







1.2. Territorial Analysis

I. Industrial power

This map shows both the oil and the fishing related infrastructure in Norwegian waters. Its large coastline has provided Norway with a significant area to extract resources.

Norway Oil infrastructure & Aquaculture

Own work

● Cities
▲ Refinery
+ Oil platforms
⁝⁝⁝ Oil fields
○ Aquaculture sites

Oil pipelines
EEZ


A
0
100
200 km
N

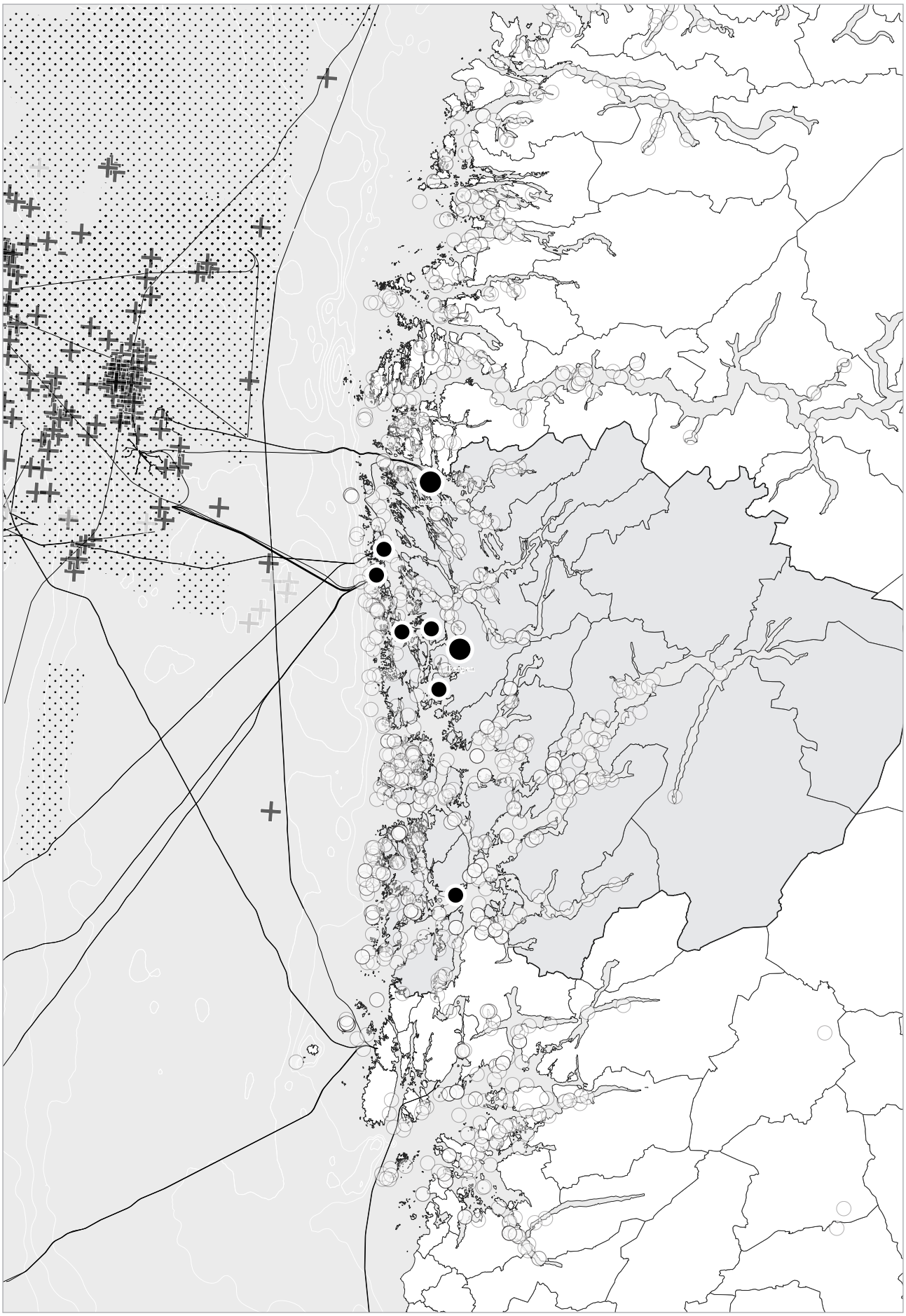
This map shows a zoom in to the province of Hordaland located in the south-west coast of Norway. This area sees most activity in relation to the oil and fishing industry and its mainly grouped in the surroundings of Bergen. Reasoning behind this is its status as Norway's largest centre of sea based extraction, production, transportation, research and education. The city of Bergen is heart of the Norwegian oil and fishing industry housing a wide variety of elements ranging from educational and research centres to explorations, drilling companies, landing sites, export hubs, service bases, operation and production centres.

Hordaland POI relating the oil and aquaculture industry

Own work

○ Aquaculture sites
● Points of interest
▲ Refinery
+ Oil platforms
⁝⁝ Oil fields

~ Oil pipelines



II. Land of opportunity

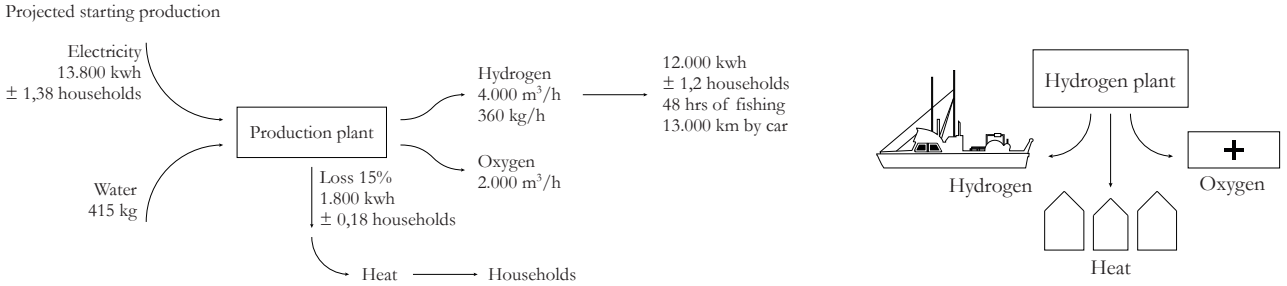
Norway uses numerous hydroelectric power stations to produce its energy requirement as beforementioned. However, these systems with the exception of a few are not capable of storing energy. The continuous downfall of water linked to its site specificities allows for a continuous flow of directly usable energy. In contrast to the embedded energy within oil products this energy is not as easily storable and therefore knows less possibilities.

On the other hand the continuous production of emission free energy through water allows for a new industry to be introduced to this system. A possibility where water and electricity are used to create hydrogen which in term can be used to produce heat and energy. The only waste products from this production are heat and pure oxygen however, the production of hydrogen is at its current state experimental and not as efficient as fossil fuel based energy production. Yet, hydrogen is a storable fuel which does not emit CO2.

The integration of a hydrogen production facility into its surroundings may be beneficial towards both. The use of surplus energy at night to produce hydrogen and conduct research on the production of hydrogen allows for storable energy production without any pollution or imposing factors. The production facility provides benefit to its surroundings by means of the hydrogen and the 'waste' produced. Hydrogen itself can be used as fuel, the waste form of heat and oxygen can be utilised by buildings surrounding the production such as the heat for residential and office buildings and the oxygen for hospitals. Additionally, the production facility can offer global benefit by means of the research towards an energy transition.

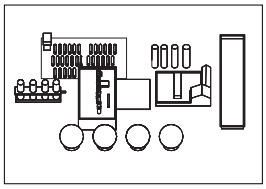
A currently developed research and production centre is capable of producing up to 20MW of hydrogen per day, equivalent to 8,7 Equinor Hywind offshore wind turbines. However, 15% of the total amount of energy produced is lost in terms of heat. An initial reduction in terms of production, yet focus on research and development will allow for growth and adaption of the facility overtime and provide a future possibilities of growth at times of increased knowledge and demand.

1 kg of hydrogen a much higher energy value than oil, because of its small molecule size. However, because of its state as a gas a litre of hydrogen contains less energy. This makes small scale utilisation, for example cars, difficult to adapt. The fuel tank for hydrogen needs to be significantly larger than an existing liquid fuel tank. This however does allow for large scale possibilities such as shipping vessels with the possibility to increase fuel tank size.

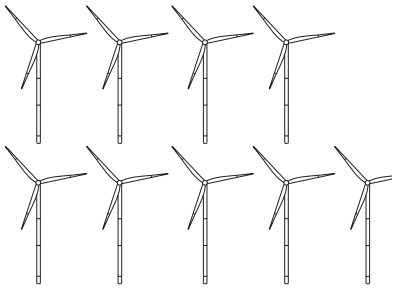


Specificities hydrogen production and use

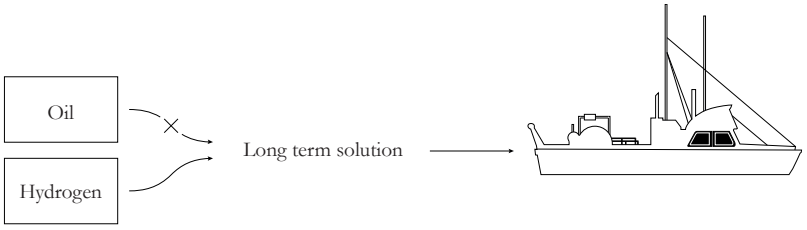
Sources: www.equinor.com
www.world-nuclear.org
www. mcphy.com

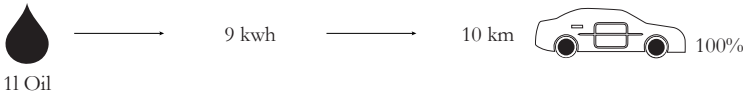


Hydrogen procuction facility 900m^2

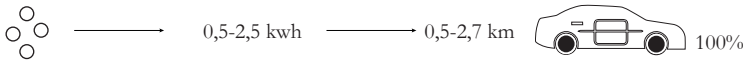


Wind turbine rotor diameter 85m

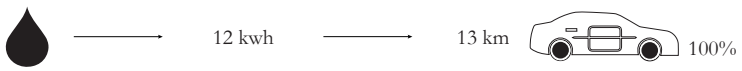




1l Oil

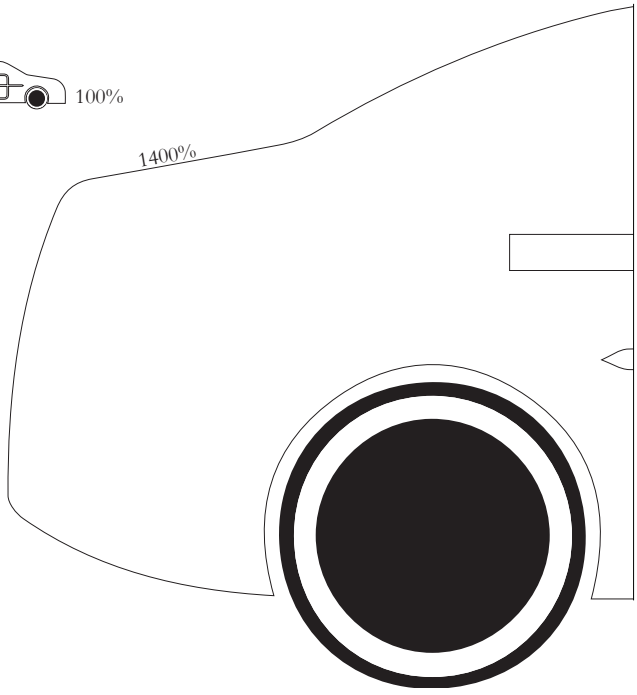


1l Hydrogen



1kg Oil

1kg Hydrogen



2. Site: Norway

2.3. Problem Statement

The imposition and structural injustice known from the scale of the North Sea is reconfirmed on the scale of Norway. However, its energy position and territorial specificities allow for a possible new industry to be created. Integration by means of production of a clean energy source using surplus energy and by the use of waste products grant future multi scalar possibilities. Yet, Norway's position as climate leader does not instate enough to make the effort towards this transition. Its current status as exporter of extracted goods provides it with enough possibilities and wealth to instate an action possible to instate global benefit in terms of the energy transition.

2.4. Design Question

- *How to provide Norway with an integrated energy transition using territorial specificities while allowing for multi scalar benefit?*

Sub-questions

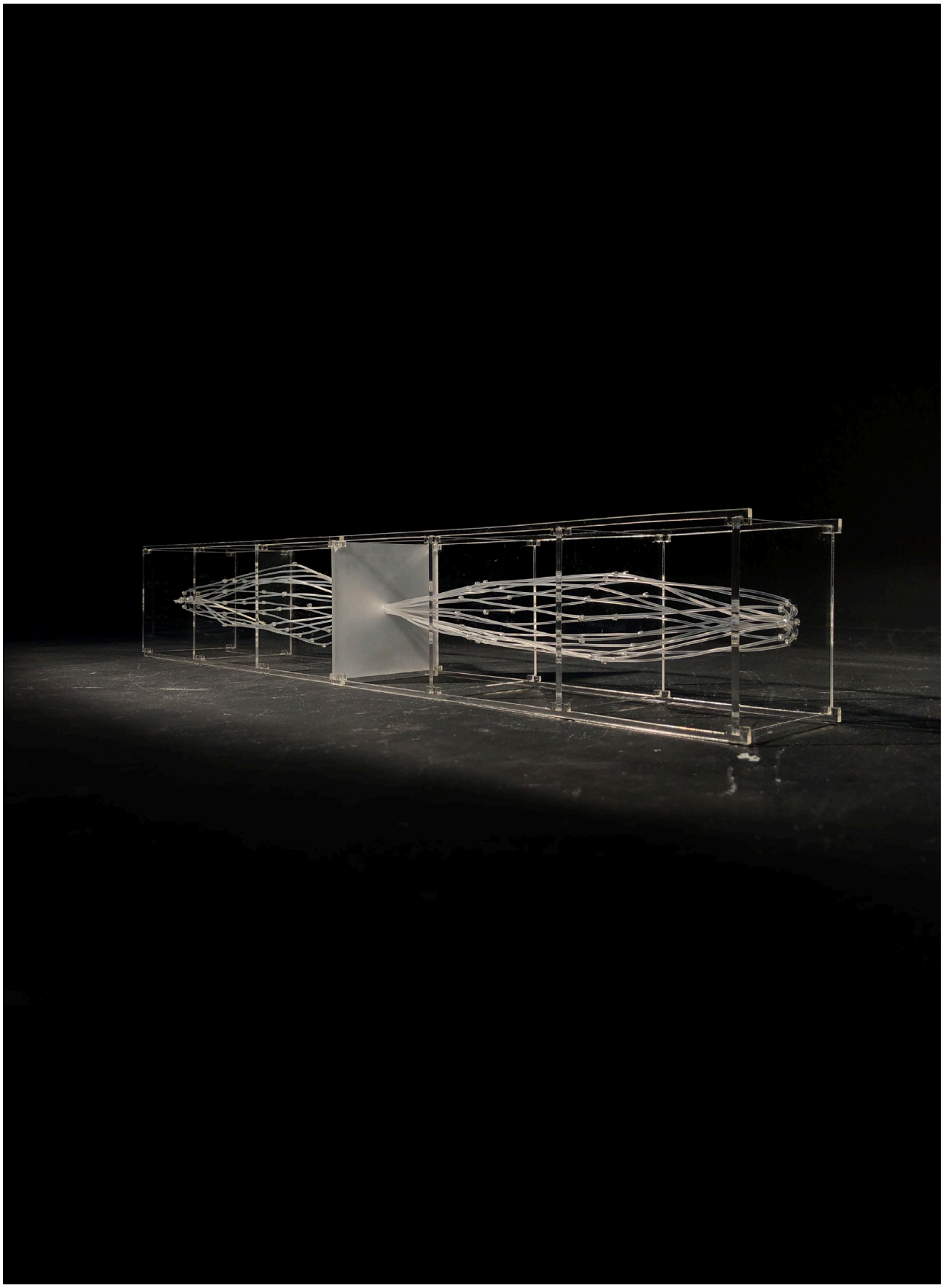
1. *How to create an industry integrated in its site of existence and thereby allow for an un imposed coalescence of man, machine and territory.*

2. *How can flows linked to different specificities be managed, coalesced and activated within a specific territory?*

3. *How can the project create a moment of reflection to reflect on our current and possible future scenario relating to the elements stated and a future energy transition?*

Interacting entities - own model

Representation of the unkown impact of entities on both sides. One may be unaware of the occurrences on the other side however, this will not change its impact. Both sides are connected as one and have to deal with consequences as one.



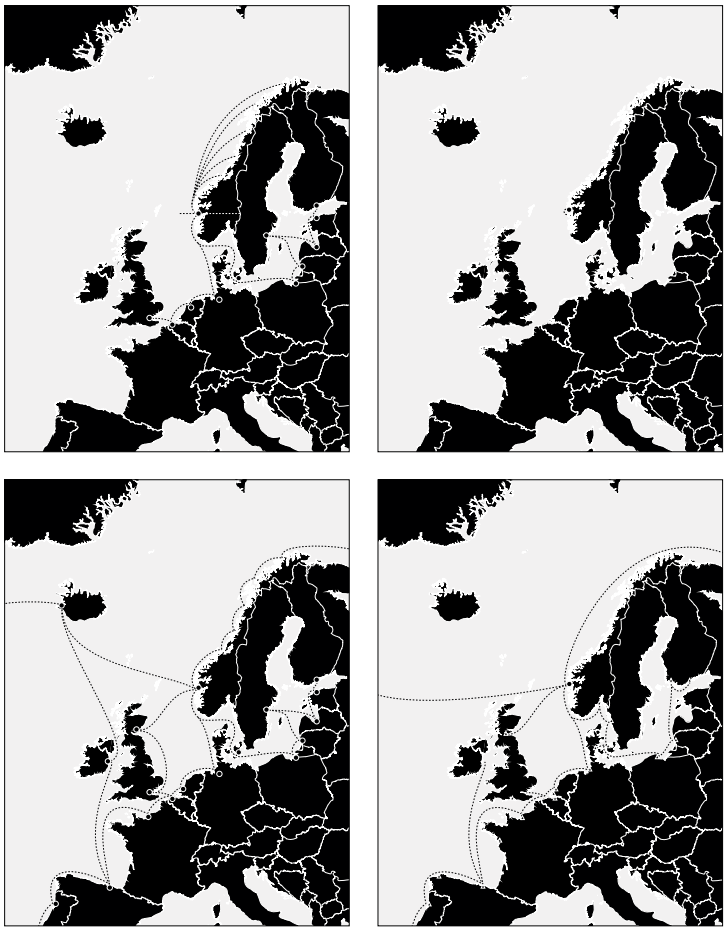
Bergen

3. Site: Bergen

3.1. Identity - Historical Precedents

Bergen has been founded in 1070 by king Olav Kyrre for which it served as capital of Norway until the 13th century. The city of Bergen has historically been a Hanseatic league city, defined by its fishing and trade. Being the only Hanseatic city in Norway it was used as a connection between local fishermen and merchants. Unfortunately, this connection to local communities has faded over time because of the instated oil extraction and fishing regulations. Being Norway's largest city in contact with the North Sea allowed for its development and growth as a direct result from North Sea based industries. Bergen changed to a, for Norwegian standards, large city and the centre of education, research and operations of both the oil and the fishing industry. The industrial growth in the city is noticeable by its waterfront which is completely utilised as harbour, making Bergen the largest port city of Norway. Additionally, the influence of new housing and office typologies in the city changed its traditional appearance.

Bergen is located near Mongstad which has historically been a small settlement of around 50 inhabitants, mainly fishermen and farmers. The discovery of oil has completely changed this settlement to an industrial facility mainly because of its refinery. The placement of the refinery resulted from the location of the oil fields and its reasonably flat topography suitable for the placement of a refinery. The placement of the refinery attracted workers which in term made the settlement grow from 50 inhabitants to 15.000. This had a huge impact on the lives of the original inhabitants.



Trade development Bergen and Mongstad
Own work
Connections

3.2. Site Analysis

The city of Bergen is built around seven mountains varying in height with a maximum of 650 meters. These mountains originally formed by glaciers and continuously eroded by the precipitation create the climate Bergen is known for. Its geographical location makes the climate mostly oceanic aided by the mountains blocking the cold northern winds. These similar mountains act as a blockade for clouds, thereby making the city of Bergen known for its grey skies and constant precipitation averaging around 2100mm of each year. The city has to Norwegian standards mild winters with temperatures ranging from -1Cº to 4Cº and for European standards cool summers with temperatures ranging from 12Cº to 18Cº.

3.2. Site Analysis

The historical city is built around the mountains however, over the span of time the mountains became progressively more built. The bases of each mountain, especially near the city centre, are completely built with either residential or office buildings. This impact to the cities green hearts in terms of territorial claims is a direct result from the cities industrial growth. The city currently knows two building styles with their own relation to their surroundings. The more traditional wooden houses of relative height and distanced from each other allow for a continuous territorial overview over the mountains and the sea. The newer building styles mainly using steel and concrete are built in greater density and heights thereby, blocking views to Bergens unique landscape.

3.2. Site Analysis

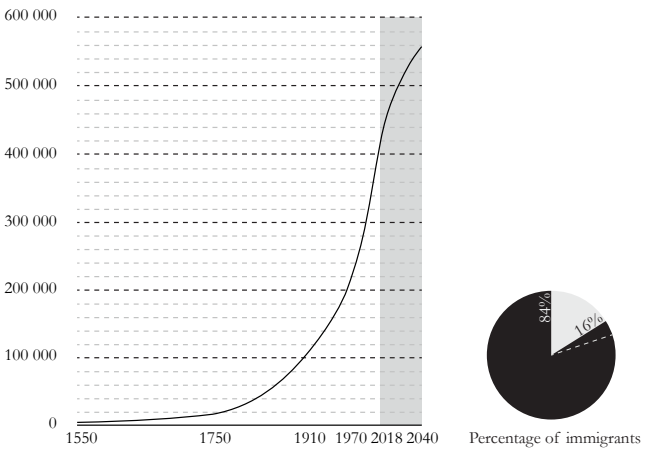
Bergen's topography and connection between the urban and nature are unlike any other. The fjords surrounding the city allow for quick moments of relief in short distance to either the work or home situation. The mountains enclose and opens similar to the cities streets and squares, allowing for moments of enclosure through forest like experiences alternated with moments of wide clear views to the surrounding mountains, sea and city. This landscape's experience makes the mountains not only a moment of relief for the people of Bergen, it also attracts tourists from all around the world.

Bergen's urban sprawl instated by its exponential growth is continuously enacting densification and claims of natural territory for the use of buildings and industry. Territorial claims at the waterfront by means of harbours and on the mountains by means of residential areas. These territorial claims are imposing structural injustice to those utilising these spaces by means of leisure and relaxation. The claims are definitive and disruptive actions imposed on the natural territory with low possibilities of reversing within the span of a human life.

Bergen urban sprawl

Own work

Built area




N
0
2
4 km

3.2. Site Analysis

The currently existing natural areas offer the people of Bergen escapes from their daily lives. The paths on top of the mountains, big and small, are widely used by all visitors of all ages. Their mountain walks make them open up to their surroundings and to others walking the same path. No matter where one comes from or is heading a small moment of interaction always occurs when two paths cross. These crosses may occur at steeper and narrower parts where one has to wait for another to pass, or at the large openings and summits where no matter rain or shine people are always interacting with each other and their surroundings.

3.2. Site Analysis

The connection and interaction with and on the landscape is not only bound to the topography of Bergen. Landscape, relaxation and interaction are preeminent factors of the Scandinavian bathing culture. The Scandinavian and subsequently Norwegian bathing culture are closely linked to moments of opening to the surroundings followed by moments of enclosed relaxation. The placement of saunas and baths in relation to the surroundings makes the visitor not only aware of its own position to the landscape it also allows for a moment of harmony through interaction between the built and unbuilt.

By itself bathing in terms of saunas and baths are a close link between culture and nature seeking for a balance in an unequilibrated world.

The Bands - Oslo school of Architecture 2015

Bath house Sweden - White Arkitekter 2017

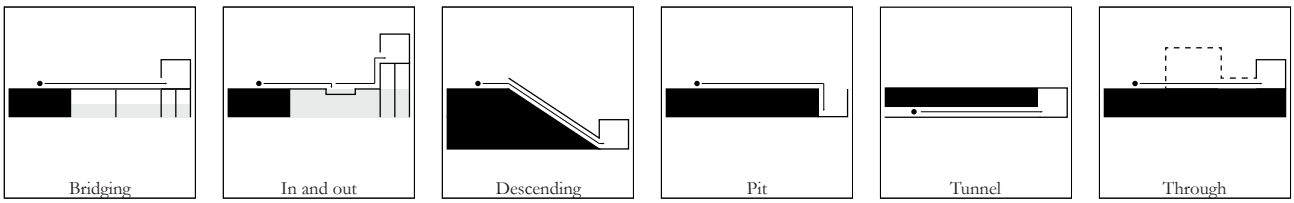
3.3. Bath House Analysis

The relation of baths to their surroundings and to its visitors is important for its role of integration. The built elements of the bath house express a relation with or in contrast to its natural environment. Together working as one to induce a feeling onto the visitor. Throughout the years numerous examples have been developed and constructed in relation to their specific territory. The following catalogue shows different elements of a wide variety of bath houses ranging from baths in natural environments such as the Kogohi Bathhouse by Kengo Kuma and A. and Termas Geomatricas by Germán del Sol. But also baths in urban environments with a more social character such as Gothenburg Bathing Culture by Raumlabor and Immeuble des Amiraux by Henri Sauvage. These are merely four examples coming from a larger analysis on different baths, saunas and their related cultures.

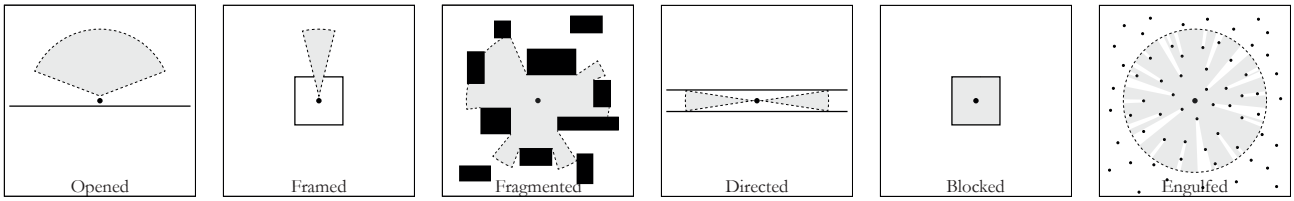
The catalogue firstly addresses entrances and thereby the relation of the bath house to the surroundings in terms of placement. Secondly, views are addressed. Different surroundings allow for different openings or enclosing to guide the sight and mind of the visitor. Thirdly, the sequence of spaces allows for different experiences within the building. This sequence heavily relates to the paths through which a bath house steers both the visitor and its desire to explore. Lastly, architectural spaces which are deeply connected to the sequence of these spaces and work similarly to induce a feeling or experience on the minds of the visitor.

Bath house analysation catalogue

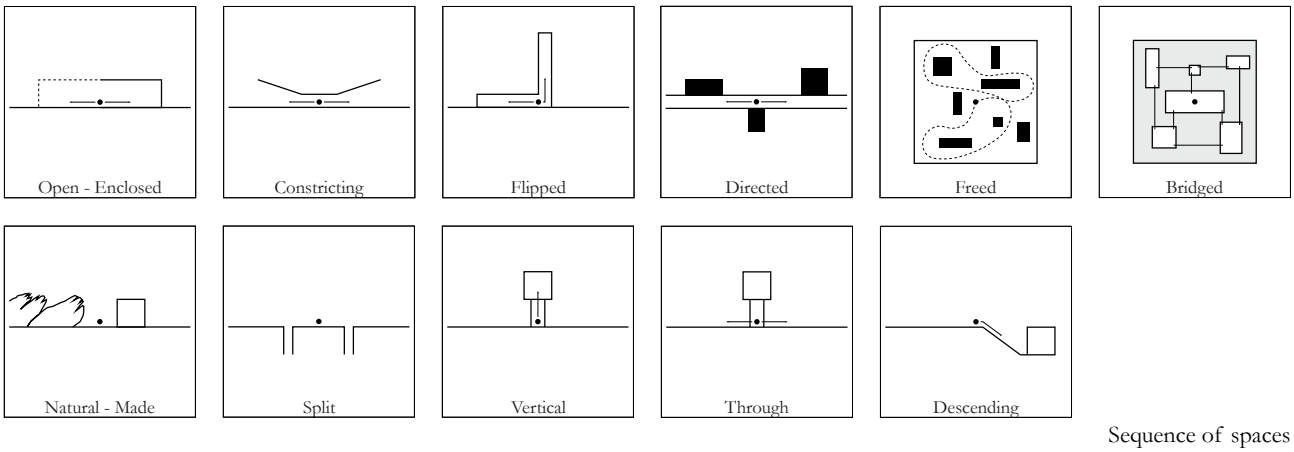
Own work



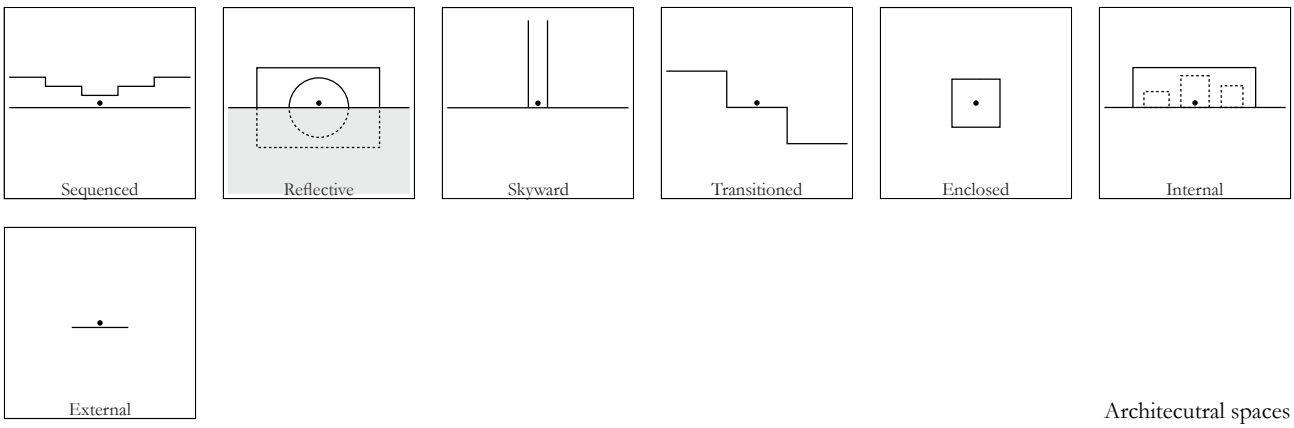
Entrances



Views



Sequence of spaces



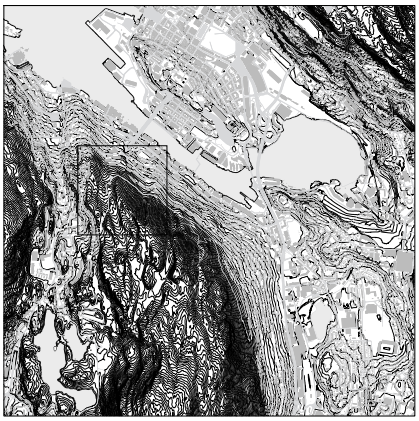
Architecutral spaces

3.4. Mountain Analysis

Among several of the mountains existing in the city of Bergen is the Løvstakken mountain home to various intriguing elements. It bridges the gap between a newly developed area and a traditionally residential area, while in contact with the cities industrial waterfront. The Løvstakken mountain is at its peak 477 meters high and unlike other mountains in the area not exploited as touristic hotspot. The restaurants and cable car know from other mountains impose on the natural existing landscape. This mountain however, is mainly used by local residents as their break from the city.

The mountain knows several hardened and dirt paths either circling its base or leading up to its summit. When walking over these paths different relations to the surroundings emerge. The wider and hardened paths surrounding its base offer for a leisurely and by trees enclosed stroll, while the paths leading up to the summit are experienced as a hike. Along both paths several viewing and resting areas have been installed to provide every visitor the possibility to enjoy the view, nature and company.

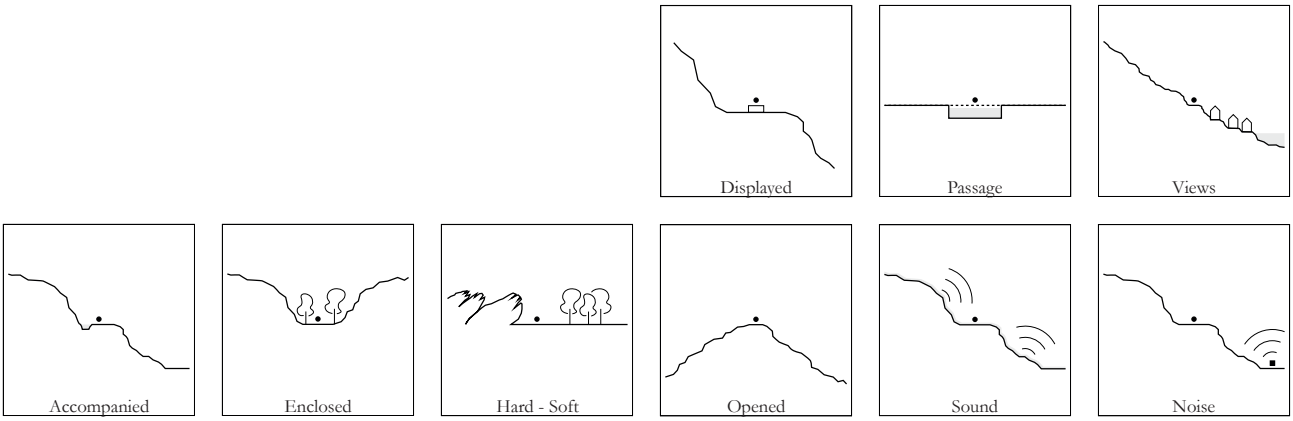
The large amounts of precipitation known to the area collect in different pools and small lakes scattered around the mountain. Several paths bridge over these natural bodies of water for the visitor to acquaint themselves with the water on the mountain. The rain overfilling the waterbodies causes continuous streams running down the mountain, often besides a path. The sound of the running water is perceived as a continuous guidance through the mountain, sometimes in or decreasing dependent of the volume of water coming down. The natural elements occurring on the mountain are continuously varying from opened to enclosed spaces, but also between hard and soft. This continuous play of the specificities of the mountain binds it to the leisurely experience the visitors are in search of.

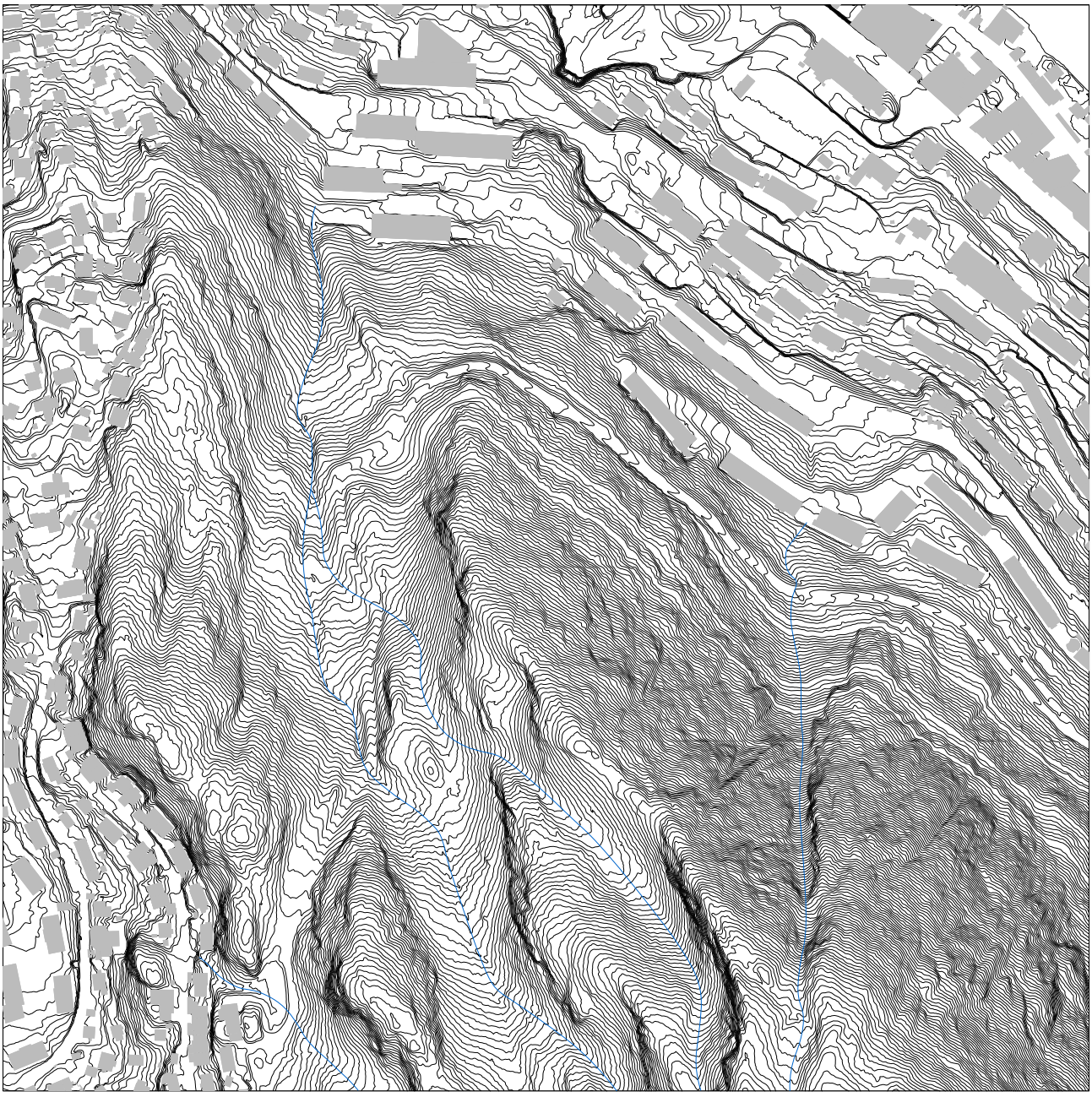


Løvstakken mountain

Own work

Flows of water


Displayed
Passage
Views
Accompanied
Enclosed
Hard - Soft
Opened
Sound
Noise



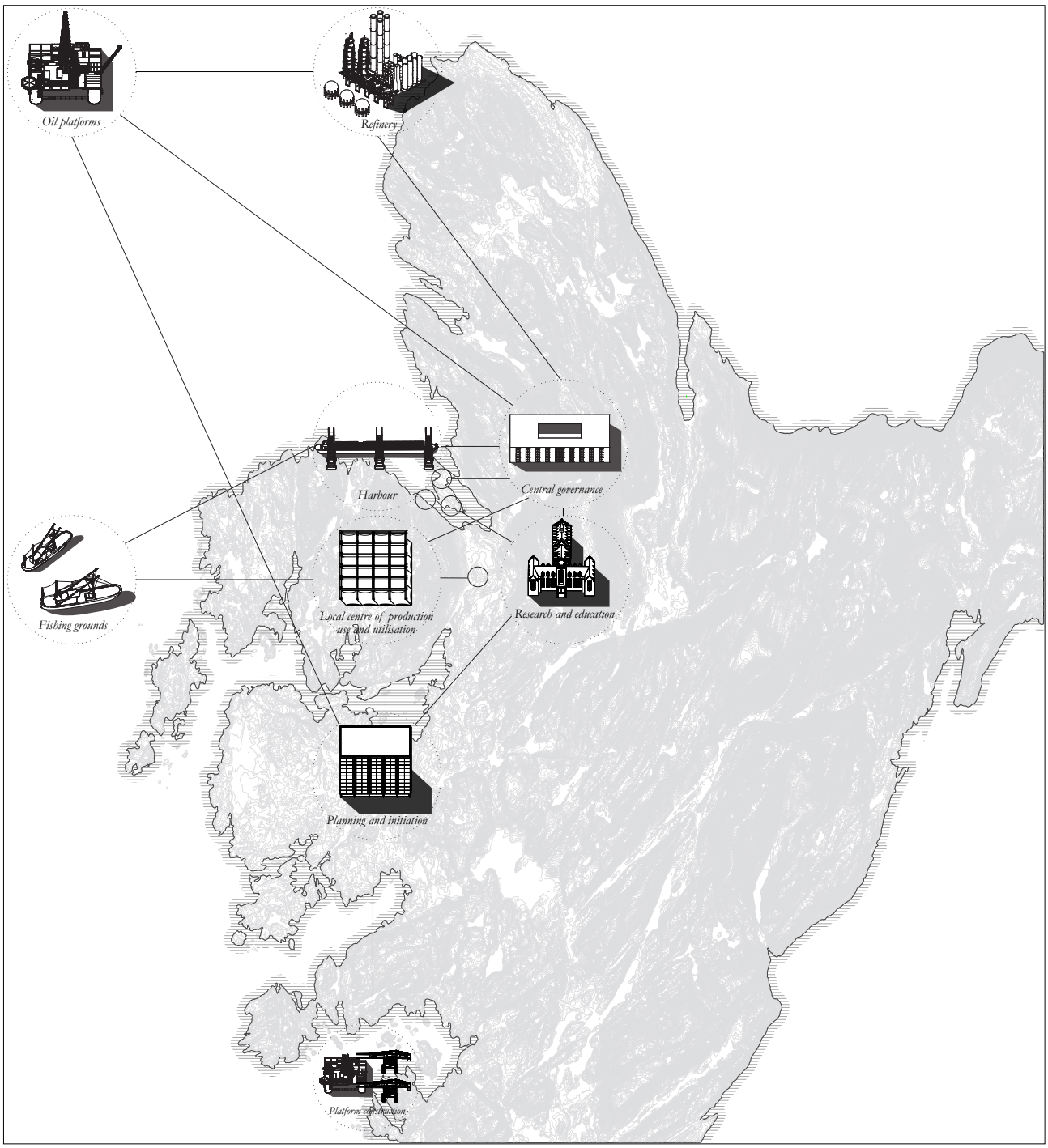
3.5. Industrial impact:

The city of Bergen and its surroundings knows besides it impressive topography a multitude of different industries and offices related to oil and fishing. These offices and industries appear scattered across the landscape of Bergen without much interaction to each other or to the landscape surrounding them. Central governance allows for these industries to have a preeminent role in the city of Bergen, yet the disintegration of these industries impacts the qualities Bergen is known for. The majestic appearance of a fjord, combining rock and water has vanished under layers of concrete designed for industrial use. Besides the impact of these territorial claims the industries lack connection and interaction to other industries and all those in contact with these industries. Besides obvious industrial connections and technical requirements the industries do not have a specific requirement which justifies their placement on the sites of existence. The use of generic and imposed industrial elements are not in harmony with the culture and identity of the place and are therefore impossible to be integrated, resulting in structural injustice.

The benefit gained over the years is still imposing structural injustice upon those in contact with these industries. The refinery of Mongstad goal to operate for another 50 years and the fishing industry possibly forever changed makes the scenario is unlikely that the structural injustice imposed by these industries will seize to exist any time soon. However, regulations regarding fossil fuels may provide new opportunities for those imposed. The fjordic waters surrounding Bergen have set goals for 2030, prohibiting fossil fuel powered vessels from its waters due to pollution. The regulations regarding pollution and future end of oil refining allow for possible new industries and reinstated methods of local benefit through fishing.

Industrial scattering and disconnection

Own work


Oil platforms
Refinery
Harbour
Central governance
Fishing grounds
Local centre of production use and utilisation
Research and education
Planning and initiation
Platform construction

3. Site: Bergen

3.6. Problem Statement

The instatement of large scale industries has allowed nationwide development to take place, in term structurally changing the city of Bergen. The numerous years of development are still imposing structural injustice on those in contact with the same industries. The refinery of Mongstad set to operate for another 50 years and the fishing industry possibly forever changed makes the scenario is unlikely that the structural injustice imposed by these industries will seize to exist any time soon. At the base of this structural injustice stand territorial claims and the lack of integration, together strengthened by the polluting aspects of these industries. Yet, the time will come where fossil fuel makes way for clean energy. Some locations such as the fjordic waters surrounding Bergen may be relieved of this curse sooner that others.

The current and possible future scenario allow for opportunities to be taken towards the energy transition. The lack of integration is not only a problem to the industry of Bergen, it is a worldwide phenomenon imposing multi scalar structural injustice on a daily basis. Yet, the use of territorial specificities by means of flows and culture may enable processes to be conducted more easily and therefore be beneficial to entities on all sides through all scales. The coalescence of specific elements existing in a territory could provide an integrated base for industrial, social and environmental justice.

To equilibrate the just and unjust seen on multi scalar levels a proposition should entail the new element unlinked to unintegrated and imposing industries. The base of the new industry should provide justice to all in contact with the industry, especially those on a daily basis. As an act of progression the energy transition should be instated as a full cycle entailing three elements. Firstly, the production center using site existing specificities and allowing for integrated usage for both product and waste. Secondly, large scale utilization by means of fueling fishing vessels to allow for the reterritorialization of fjordic waters by local fishermen. Lastly, a social proposition of full process tangibility and integration ranging from present-day systems to the management of site specificities, use and enhancement of cultural aspects, utilisation of clean energy and waste and at last a moment of reflection on the self and the structural injustice imposed by the governmental machines which we currently heavily rely on.

3.7. Territorial question

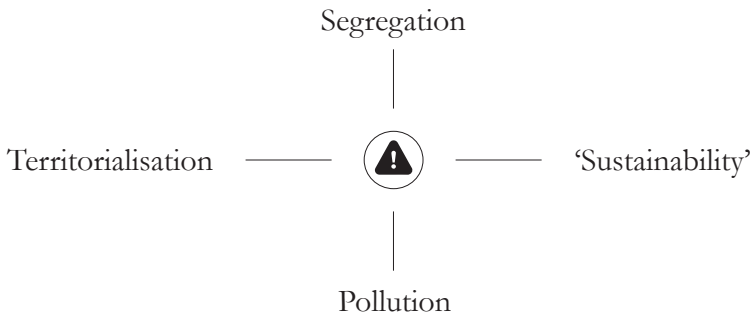
- *How to create an industry integrated in its site of existence and thereby allow for an un imposed coalescing of machine, territory and people.*

- *How can flows linked to different specificities be managed, coalesced and activated within a specific territory?*

Architectural question

- *How can the project make aware the management of flows and its utilisation embedded within a leisurly experience?*

- *How can the project create a moment of reflection to reflect on our current and possible future scenario relating to the elements stated and a future energy transition?*

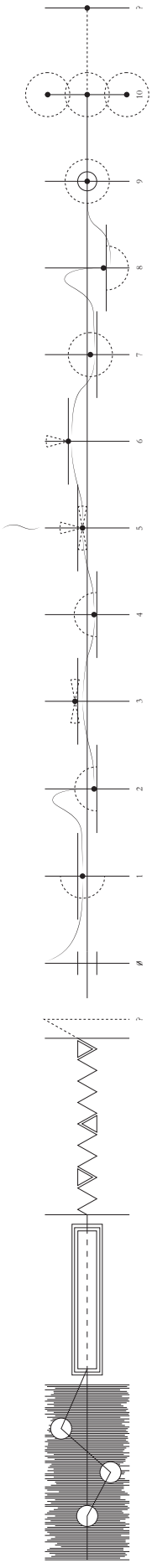

Segregation
Territorialisation
‘Sustainability’
Pollution

4. Design proposition

The relation between the fishing and oil industry as imposers of structural injustice on a multi scalar level is apparent. Yet, possible future solutions regarding the imposed elements are still, like our future, uncertain. The development of Norway and the City of Bergen have over the years allowed for its desired growth but not for complete justice. The proposition of the project uses measures designed for a multi scalar, gradual and integrated energy transition. The projects goal to unwind structural injustice of imposed elements by the creation of an equilibrium of man, machine and territory is proposed through three elements. A hydrogen production facility as the manifestation of integrated production and service to the city by means of both product and waste, a fuelling station as the long term solution and allowing for the possibility of reterritorialization of fjordic waters by local fishermen and lastly a bath house as a social proposition of full process tangibility and integration ranging from present-day systems to the management of site specificities, use and enhancement of cultural aspects, utilisation of clean energy and waste and at last a moment of reflection on the self and the structural injustice imposed by the governmental machines which we currently heavily rely on.

All elements play their individual role in the energy transition, yet collaborate with each other and existing entities to allow for an integrated and un imposed industry. The search for an equilibrium between all factors depends on not only on the production of clean energy but also its social and territorial integration. The new typology introduced to this industrial system is in this case the bath house. The scattering and fragmentation of the bath house allows it to integrate to its site of existence and to utilise flows existing on site. Thereby, also its linkage to the Norwegian culture of bathing and embedding in nature wile creating a just territorial claim. The functions of each fragment of the bath house are linked to the state of the visitor and its surroundings all collaborating as one to provide an integrated experience of flow management, territorial use and energy utilisation.

The placement of the fragments and their relations to the surroundings evoke a thought to the visitor by the sequence of exposure to the current situation, recognition of its imposing elements, closure of injustice, introduction of just, interactions of flows, coalescent action, a moment of reflection and lastly a moment of memory. The sequence and succession of these elements creates insights on possible flow managements and generates a relation to an integrated and just equilibrium by means of bodily experience of territory, flows and machine. As a sequence the elements create a moment of reflection on our current energy situation with the intention of provoking individual action.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