Senad Gvozden & Martin Frank Petersen

# BASIS

TERROIR

# **Reading guide**

The master thesis project is divided into 3 entities.

The first part, *O1 Basis*, is dedicated to laying a theoretical and strategically research-based foundation for the second part *O2 Embodiment* which represents the architectural project itself.

*O1 Basis* introduces the project motivation and sheds light on the overall thoughts, academic, and personal impetus. Secondly "Place-thinking", a theoretical paper, is introduced, with the aim of initiating a discussion in regards of the overall theoretical framework of the project. Lastly, "Strategy" introduces the research based foundation of the project, with the aim of substantiating and concretising the architectural project.

The paper "Place-thinking" and the project "Strategy" can be perceived and read as independent parts within the entire project, encouraging a light read.

The third part, *O3 Appendix* contains the final drawing material that seeks to visually represent the architectural project. The material includes architectural scale drawings, technical principles, interior and exterior perspectives.

# Motivation

This master thesis project is based on subjective perspectives and considerations on architecture, and the numerous fields it grasps. As students of both architecture and urban design, we believe that architecture should be informed and substantiated by an understanding of the scales of city and nature, its considerations grasping beyond the physical envelope of a building, and the boundary of the building site.

It is exactly in the span between architecture and the larger scales of the city, the place and the construct that the subjective motivation for this thesis is born.

The genesis of such thoughts originate from our architectural endeavours and experience gained from academic studies and professional work. Both having studied together at the same university, and subsequently worked for two offices with very different approaches in relation to aesthetics, research, pragmatism and theory, this project builds on the very core of our early architectural *upbringing*.

As we have come to learn, architecture is a multifaceted discipline. Therefore we find it essential that it attempts to sustain and challenge both the physical and immaterial, the pragmatic and the narrative, the architectural scale and the *urban* scale. In order to do so, the approach must treat and perceive architecture and its surroundings as more than meets the eye.

Hence, the architectural intention has to reside in a certain level of complexity

and theme in order to be able to sustain this undeniably high amount of information that constitutes an architectural project.

By complexity we speak of the many immaterial and material facets architectural practice fathoms; structure, materiality, space, light and shadow, sociology, society, planning, politics, sustainability etc.

By theme we think of an overall thematic topic, hypothesis, a notion which grasps beyond the physical confinements of a building.

Firstly, this doesn't imply that this thesis contains all these aspects, neither does it mean that a mere addition of complexity or a higher level of abstraction ensures better architecture, cities and landscapes, as they must be sorted carefully choosing only the aspects that relate to the abstraction.

In relation to architectural process, the approach in this project, found its theme in a discourse about the future of the Danish landscape, and architecture's role within it. Thus, it is fused with a higher intention, an overall cause which allocates information to the variety of complex layers that constitute an architecture process, into one unifying common thread.

By these means, the approach and outcome should reflect more than just physical and literal reality. Architecture should relate to, build on, interfere, stir up or voice its opinion in society. Thus, not being hidden in an intellectual-architectural drawer, never leaving the confinements of abstract architectural thought or artistic considerations about space - architecture should have an attitude and a stance in the larger context in which it is thought.

In relation to the physical building - the architectural material form, aesthetics and theory - we believe that the intention to some agree has to be unmeasurable, while the more concrete and quantifiable parameters should be treated as means to support and elevate this intention.

"A great building must begin with the unmeasurable, must go through measurable means when it is being designed and in the end must be unmeasurable." (Kahn, L. 2008 pp. 81)

In the end, the built should become more than just a physical entity, it should voice its opinion in the larger context, it should evoke something special in us, it should inspire us and the way we feel and behave.

Our motivation doesn't imply to have a straight answer to the complexities and challenges depicted in the above-mentioned - but instead, and more importantly for our personal progressions, the primary goal is to widen our academic and professional horizon.

The intention of this master thesis is, thus, to strategically, theoretically and architecturally explore and study the multitude of aspects the project statement and hypothesis demands, by means of research, theoretical reflections and architectural considerations.

In the end, we wish to explore these realms of architecture, and spark a discussion of its role across scales. Primarily, these explorations, positions and discussions are subjectively motivated, nonetheless, we hope they can serve as an inspiration to others as well.



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# PLACE-THINKING

PAPER - PLACE-THINKING



# Introduction

The term *place-thinking* can be understood as a certain way of reading and perceiving the world and it's places. In correlation with the thematic foundation of the project, this notion is used to convey, relate, differentiate and substantiate, on one hand, a natural view of the world, and on the other hand a cultural view of the world. This does not imply that place-thinking is solely comprised by natural and cultural factors - it is a multifaceted term, as a place is - meaning that it is defined by various notions and aspects. Ultimately the reason for the notions of nature and culture are the predominant topics in this paper, is based on the fact that these aspects encompass the overall project hypothesis and research question.

In this paper, a discussion of the notion of place-thinking is unfolded as a complex conception, through which - when comprehended - we search to begin perceiving, interpreting and subsequently extending and transforming inherent qualities of a specific geography - whether it being natural or cultural, local or regional, material or immaterial. Therefore, a debate about the cultivation of nature, and the understanding of these geographical places in natural and cultural points of view, represents a central premise in the scope of the project thesis. With the aim of synthesizing and scoping the focus of place-thinking in this project, we construct a lens and a notion - *terroir* - through which we concisely specify a subjectively motivated and theoretically substantiated standpoint towards the transformation of a local



place in the Danish Peripheral areas. Inspired by the French term terroir from viticulture and winemaking, which is translatable as 'a sense of place', represents the sum of the effects created by the geographical identity, culture, geology and climate comprised of cultivated and natural factors of a certain place.

Through the optics of terroir - a contextual tool - nature and culture, environment and architecture are processes that occur simultaneously, embodying, representing and affecting the sum of the inherent qualities across local and regional scales.

Standing on the shoulders of two different positions aid us in deciphering, informing and substantiating natural and cultural notions of scale, context and identity, towards comprehending a regional pragmatic seaweed-network and the embodiment of a research center in a local geography in peripheral Denmark.

In the wake of these lines of thought, two positions are studied with the intent of substantiating a motivated standpoint, spanning between a natural place-thinking – representing a romantic and scenic view of the world - and a cultural place-thinking, representing a new-pragmatic and cultivated view of the world.

What drives contemporary positions on place-thinking? What constitutes a place – more specifically, in terms of nature and culture? How are these places perceived in these relations, and how does this ultimately influence the genesis of architecture?



In light of recent architectural discourse, an increasing critical rhetoric is steadily setting a new agenda. We recognize two contemporary positions that are in play, each propelled by their own specific world view - ultimately revealing somewhat contradictory positions within contemporary place-thinking. In order to be able to clearly reveal both similarities and differences, the positions will be exemplified as two contemporary extremities, one represented by the new Nordic architecture, seen as inspired by Christian Norberg-Schulz'(CNS) notion of Genius Loci, and the other by a new global determinism spawned by the new-pragmatic wave of the Dutch architectural practice, exemplified by OMA and Rem Koolhaas.

The aim is not to uncover one singular truth or construct a blueprint of a correct way of perceiving place, instead the focus is to learn from both positions, and to construct a lens, through which we are able to discuss the link between nature and culture, and how these influence each other in the coupling of the pragmatic and cultivated and the sensed and contextual.

Structured in the logics of Socratic dialectics, the rhetoric ploy is to roughly juxtapose the two above-mentioned positions with the intent of staging a discussion on central questions that come to mind in the process of reading, perceiving, interpreting and subsequently extending and transforming inherent qualities of specific place.



fig. 04



# A historic passage - perceiving the world through different optics

Throughout history, mankind's quest for comprehending the world has propelled the way we portray places through different optics; being time, space, culture, knowledge, science, religion, art and nature. In this context, the conception of place-thinking became a denominator for studying and comprehending the complexities of our universe.

Whenever our societies have given rise to larger shifts - whether being transitions in historic ages, impact of religion, periods of war or scientific breakthroughs - the relation between nature and culture has been a closely-tied and determinant factor for mankind's perception of the world and therefore in many ways also affected and forsaken these transitions. Herodotus in ancient Greece, Johan Joachim Winckelman in the Age of the Enlightenment, Johan Gottfried Herder in the period of Romanticism, René Descartes, Aldo Rossi, Kenneth Frampton and CNS in the post-war era of modernism and Rem Koolhaas' "The Generic City" as a manifesto for a global geographical determinism in the post-modern era. The mentioned represent merely an excerpt of many theorists, which have studied our world – shifting the way we portray place in relation to nature and culture, throughout the history of civilization.

Today, these conceptions are equally relevant - maybe more important than ever, as a result of the increasing globalization since the 1970's. During the proceeding years, the work of; Aldo Rossi's studies on the cities' historicism, Kevin



Lynch's 'mental mappings' and Kenneth Frampton's 'critical regionalism', pointed towards a shift in the perception of place-thinking. A transition from the post-war modernist notion of space to place, ultimately represented radical redefinitions of the fundamental conditions of architecture, where the history and experience of a place became a focus.

Falling within the philosophical branch of phenomenology, CNS would further unfold his position on place-thinking. in his profound view of the genius loci. The genius loci - or sense of place represents the spirit of place and its' identity, setting a new agenda within architectural theory then, while today having inspired a new Nordic architectural practice - represented as a determining fundamental voice in contemporary architectural practice today. With roots to CNS' thoughts of the genius loci - the contemporary new Nordic 'movement' revolves around a type of renaissance of the Nordic place, nature, and cultural identity - very much in line with CNS' earlier thoughts.

20-30 years later, as an aftermath of the increasing connectedness of the world's economies, information and cultures, a new position was born within architectural discourse that focused on a new-pragmatic global geographical determinism. Manifested by Rem Koolhaas and propelled by a Dutch architectural rhetoric, this position was driven by cultural and global shifts. Today, young architects carry out this position in practice worldwide.

Within a framework of a natural place-thinking and a cultural place-thinking, the two different standpoints within each position have given rise to a renewed interest in the discussion of national authenticity and identity. This places mankind's view on nature, culture and the ideology of place-thinking in the epicenter of contemporary architectural discourse.



### **Two positions**

Emphasized by two differentiated standpoints -born in the somewhat successive chronology of each other – each position represents an ideology on the behalf of their own perception of place-thinking. This does not necessarily mean that one position excludes specific views of the other. It must be emphasized that the place-thinking of the natural and cultural standpoint is presented as a construct that to some extent contradicts the other, in order to be able to facilitate and distill a discussion for the sake of the project scope.

### Natural place-thinking

In the first part of the 17th century, an emphasis was put on mapping, collecting, defining and representing mankind's view of the world – exemplified by our relation to the landscape, most notably as a reaction of the industrialization in England. During this period, the character of the landscape was threatened by the expansion of the cities and an efficient cultivation of large areas of land. This movement was especially prevalent in Norway. In the wake of the country's search for a national identity after the Norwegians' emancipation from Denmark in 1814, the Danish born Norwegian architect Hans Linstow asked:

"Doesn't Scandinavia has it's own particular building style, in a manner appropriate to the climate and the country's characteristics?" (Hvattum, 2010)

Throughout the next century, this question would ultimately reverberate into the genesis of CNS' definition of genius loci - the spirit of the place, arguably the



most widespread and thoroughly defined theory on place-thinking and view on nature.

For CNS, it was of upmost importance to restore an authentic relationship between the built and the natural, the architecture and the place – not only in an aesthetic matter, but also as an existential condition:

"Architecture means to visualize the Genius Loci, and the task of the architect is to create meaningful places, whereby he helps man to dwell." (Norberg-Schulz, C. 1979, preface).

CNS believed that the natural landscape with its topography, vegetation and climate was a central premise of architectural form. Hence, CNS argued for a natural place-thinking as the essential way of perceiving and constructing our environments.

"In Norway .... the Nordic character culminates in the eminently romantic structures of the stavechurch and the loft, and in the white-painted houses which concretizes the luminosity of the Nordic summer night." (Norberg-Schulz, C. 1979, pp. 58)

CNS' way of perceiving place emphasized, that by forming the inherent genius loci of the site, architecture contributed in making the world around it comprehensible and authentic in terms of comprehending nature and the cultural identity.



During the 19th century, the writings of German culture historian Wilhelm Heinrich Riehl, who is believed to have introduced the notion of the cultural landscape, would simultaneously inspire a new view on place during the span of the next decade, extending the discussion of place-thinking solely beyond the notion of the natural - by encompassing the construct of the cultural. A central idea which rummaged during this next period of romanticization of national identity, was the notion that; land and people, geography and culture were one - in other word, nature and culture was portraved as one entity, an organic product of the whole.

Throughout the next century, these thoughts would propel and eventually inspire architects to merge natural topography and building style in the conviction that architecture's task was to translate local natural conditions and cultural identity into one unified, natural and cultural architectural form. In contemporary architecture, this trend is exemplified by the idealization of places through a national-cultural canonization of unique landscape areas, local materials, inherent qualities of specific geographies and an increasing vernacular vocabulary in architecture – as exemplified by the todays new Nordic architecture.

The new Nordic 'movement' revolves around questions in relation to its own geography, nature and cultural identity: Is there a Nordic identity? Is it at all possible, despite globalization tendencies of national and cultural heritage, to still talk about identity as something related



fig. 10

to specific locations, areas or regions? How did the Nordic identity evolve, and how can we rethink, define, understand and extend these thoughts into the 21st century. (Kjeldsen, K 2012)

It revolves around the thought of a renaissance of knowledge, use of, and a kind of roots that can be found in Nordic geographical places, traditional cultural identity and raw materials. The new Nordic cuisine has firstly been setting the agenda, but along the way, design and architecture have been refreshed and interpreted into a new Nordic conceptionwhere nature and local cultural identity meet, subsequently searching for something that is ultra-modern and traditional at the same time. A short unfolding of identity and culture is necessary in this context – only touched upon briefly in relation to the overall project focus, in order to substantiate and elaborate the abovementioned in relation to the notion of place-thinking.

Continuing – it can be said that identity and culture are vivid sizes; identity can be defined by both internal and personal factors, as something social and relational, and anything that has to do with being present in a certain place. The identity of the individual is defined by the constant amount of experiences throughout; history, traditions, geography and social practices as well as our human reflection on these themes - the way we perceive and describe ourselves - in processes that draw lines back, but



also into the future. In relation to this discussion, identity and culture is considered as something that substantiates the perception of place as a multi-faceted construct, indeed influenced by both natural and cultural aspects. (Kjeldsen, K. 2012)

Portraying a view on nature as something which is also a cultural and social construct, opposed to only a romanticization of nature, would send ripples throughout the history of architectural discourse, fathoming modernism, post-modernism –ultimately substantiating and inspiring new global geographical determinism – pointing yet again towards a different view on the world in relation to nature and culture.

### Cultural place-thinking

As a contradistinction to nature (representing the naturally born)- a cultural world view (representing the cultivated and man-made) would see the light of the day. This would be exemplified as an extremity, in a cunning supposition by Rem Koolhaas and OMA in the definition of "The Generic City"; as a place where the capitalist world sets the agenda, in which everything is the same and local characteristics only remain as marketing potential.

*"The generic city is the city liberated from the captivity of center, from the straitjacket of identity"* (OMA 1995, pp. 1250)



fig. 12

The liberation from the post-war romanticism and the search for a global geographical determinism gave rise to a new form of place-thinking rhetoric in close relation to architectural globalization theory, in which architecture is not seen as a local, but instead as a global phenomenon.

In stark contrast to CNS' genius loci, this position argues that the genesis of architecture does not stem from local geographical or topographical conditions but instead from the worldwide forces of economic, cultural, political or demographic nature. This points towards a new-pragmatic shift in the perception of place, where an identity culture becomes the main denominator in search for a new and globally connected sense of place. As a divergence from CNS' notion of genius loci, the new-pragmatic mindset would reject the idea to mime or merely represent reality. Instead it is based on a self-developed philosophy, around the idea that the function of thought is an instrument or tool for prediction, action and problem solving. In contrast to the place-thinking of the romanticized and scenic conception - a new-pragmatic and culture-oriented place-thinking is celebrated, contending that most philosophical topics - such as the nature of knowledge, language, concept, meaning, belief and science - are all best viewed in terms of practical uses and successes rather than in terms the representative and picturesque.

Fast forwarding to contemporary new-pragmatic architectural practice,



fig. 13

the search for a national cultural identity, brand and global trends has become the main driver in a pragmatic genesis of architecture.

"In an identity culture, clarity becomes paramount. It's the difference, the ability to make a difference that creates clarity. In their simplicity, the buildings should be easy to decode. The key features appear very clearly. This aim is to generate an immediate appeal and serve a communicative purpose." (Vindum and Weiss 2012, pp. 370-371)

Labeled today mostly as the new-pragmatic approach, this wave has spawned a new way of experimenting with program, function, aesthetics and culture. With great variation in architectural expression, there is not one particular style; instead the approach focuses on distilling a particular view of the world, country, city, site - in sharp opposition to notion of genius loci, it sometimes results in synthesized placeless concepts, which in many ways resembles atopdown approach. By means of thorough data collection and analytical maps, new relationships between global forces and physical form are revealed, setting the basis for a new view on place - based on a regional/global cultural place-thinking.



fig. 14

Based on an extrapolation of Dutch statistics on economics, culture and production, MVRDV's Metacity/Datatown project from 1998 exemplifies an extreme aspect of the abovementioned. The research project imagines a city that is described primarily by data, a city that wants to be explored only as information, which knows no given topography, no prescribed ideology, no representation and no context. It hypothesizes;

"Can we understand the contemporary city at a moment when globalization has exploded beyond our grasp? Have we lost control of its quantities or can we analyze its components and manipulate then?" (MVRDV, 2014) Fundamentally the beforementioned can be said to place emphasis on a juxtaposition between nature and culture, the local and regional/global, the original and acquired, the natural and man-made.



### Not searching for one truth

From Christian Norberg-Schulz' romantic and scenic place-thinking of genius loci, to Rem Koolhaas' cultural place-thinking of a global geographical determinism, these thoughts flow into various dualistic and comparative conceptions about place-thinking - an essential fundamentalism in the discussion, comprehension and genesis of contemporary architecture.

Ultimately, we are presented with the immediately impossible choice between a new-pragmatic global postmodern relativism and pre-modern local natural topsoil thinking - but which position are we as architects and planners to follow?

"The belief that there is only one truth and that oneself is in possession of it seems to me the deepest root of all evil *that is in the world.*" (Born M 1968, pp. 183)

Even though one could argue that Max Born's thoughts are somewhat one-sided and lack nuanced depth and wisdom, the overall meaning of the recitation inspires a nuanced view on place-thinking – a conception which has proven futile to generalize. Carol Burns and Andrea Kahn also touch upon this discourse in their theoretical thoughts:

"Because there is no essence to any site, no single truth waiting to be discovered, different site knowledges – of architects, the investor, the bureaucrat, and others – need to be negotiated." (Burns C, Kahn A2004 pp. 55) Shedding a critical light on both positions reveals strengths and weaknesses, ultimately hinting the fact that defining the notion of place-thinking in absolutes through either culture or nature seems to limit the notion of place into a preconceived and cryogenic state.

critical light, In Christian Norberg-Schulz' notion of genius loci could be perceived as totalitarian - a static understanding of a place as something hermetic and sealed - appearing to lay overwhelming emphasis on one aspect of a place, namely the visual aesthetics of the natural and local place. Despite the interest in materiality and authentic roots, the discussion is somewhat boiled down to the visual characteristics of a demarcated geography, especially in the ideology of place-thinking in the postwar period. Is a place not defined just as much by what is happening and has happened there, as to how it looks? In relation to the new Nordic architectural tendencies - exemplified by the projects of Norway's Tourist Roads and Realdania's, 'Stedet Tæller', one could criticize many of these otherwise qualitative projects of being one-sided in regards of being based primarily on natural viewpoints of peak-season tourism.

In this optic, a purely natural perception of place-thinking has a tendency to reduce a specific geography to a static illustration of existing visual conditions while limiting a place to a physically and aesthetically defined border. In other words, it seems to freeze the natural conditions of a place into an immutable genius loci, somewhat forgetting processes of use, natural change and cultural transformation.

On the other hand, the position of the new global determinism perceives place as a cultural and regional/global construct rather than a local natural given condition. In light of the new-pragmatist's self-declared liberation from the straitjacket of identity, it is interesting to note that this position is imbued with its very own specific restraining geographical determinism, which is just as dogmatic as the genius loci, it rejects. One could argue that the position seems to reduce a view of place to a few specifically chosen quantifiable factors, which are then synthesized, conceptualized and illustrated – giving the illusion of expansion and qualities, by expanding a certain view from local to global factors. In this sense, one could argue that a new-pragmatic approach might overlook the local processes and sensitive conditions of a place.

In light of the recent line of thought, one could say that both positions reduce place to a product of predefined and preconceived factors, each somewhat limited in their respective view of the world – be it in the natural and the spirit of a place or the cultivated and high capitalist market forces.



Nature and culture in the scope of the thesis project

In context of the theoretical scope of the project, following research agenda is outlined:

On the basis of a widespread discussion about the future of peripheral areas in Denmark, the agenda of the thesis project has been to strategically, theoretically and architecturally explore a conception which explores the role of an island in the Danish landscape, reinterpreting the way we imagine coastal culture, resources and research environments.

In relation to this agenda, this paper seeks to construct a theoretical debate about the cultivation of nature. Firstly, seeking to understand these places and subsequently their natural and cultural transformation, represents a central theoretical premise in the scope of the project thesis. Essentially this project places emphasis on an investigation of how we understand, cultivate, consume and experience the potentials of seaweed and a place on the island of Samsø, throughout an architectural transformation. This transformation represents a cultivation that spans across a regional scale of a possible strategic implementation of seaweed cultivation in the Danish belt sea, and a local architectural embodiment of a specific place on Samsø.

Ultimately the goal is to unearth and build upon the terroir of a place on Samsø – investigating the transformation of this place, the utilization of its resources and potentials, by studying the role and impact that architecture can have in Danish peripheral natural settings. Therefore it is of upmost interest to debate place in light of natural and cultural aspects, in order to shed some light on the perception of nature and the conception of its subsequent cultivation. As the aforementioned paragraph casts light on – a segregation of the two positions might perhaps not entail an open-minded way of perceiving the complexities of a place. Instead, it might be more fruitful to sideline the fundamental ideological views of nature and culture in a discussion, which seeks to understand what a cultivation of nature entails and how this conception is unfolded.

Hans Fink's thoughts on the interrelations between nature and culture can be regarded as an interesting input as he, throughout seven different views, argues how nature can be portrayed as a cultural construct as well, and that we as human beings can be regarded both as a natural and cultural product. As one of seven definitions, Fink states that nature is both the original and present, and that all in a sense is original and present.

"Nature can be seen as both-and rather than one sided as in either-or. What we as human beings have affected and influenced, the cultivated and non-cultivated, the urban and the rural, the gray and the green, the subjective and the objective, the eternal and the temporal." (Fink H 1995 pp. 4)

In this respect, nature represents a coherence, which includes both nature and the man-made – the natural and the cultural. In correlation to not absolutely concluding one single truth or world view, we take a point of departure in Fink's definition of nature, being a unified conception comprised of both the cultural and natural, influencing each other – highly dependent on the context in which it is perceived.

Carol Burns and Andrea Kahn indeed also consolidate this line of thought, in the discussion of the natural and cultural:

"Conceptualizing architectural sites within processes of living change, this argument begins with the premise that the site is both a cultural construct and a material reality. The two exist in parallel, but they are not and never can be the same thing. Both halves of this double definition implicate dynamic change. They define from the outset that site is not settled." (Burns C, Kahn A 2004 pp. 308)

Standing on the shoulders of the two before mentioned positions, we recognize both the cultural and natural being fundamental aspects in grasping the roots of a specific geography, which in relation to the complexities of today's world perhaps more than ever calls for a multifaceted approach. In other words, we believe both positions relatively have to enforce and reflect architecture and place and to some extent vice-versa - as one position is equally as important as the other in comprehending and working in a place and its' construct.



## A contextual approach

The aforementioned preludes a subjective standpoint in relation to place-thinking -being that reading and understanding place should not come down to a choice between either a natural or cultural standpoint.

Instead, it is believed that the notion of place-thinking can be understood as a contextual optic, through which we put the natural and cultural aspects of a specific place alongside each other. For it is in the conception of context we begin understanding place, in which context is not delimited by a spatial and material conception of the surrounding landscape, site, building elements, relationship between a building's exterior and interior etc. – but also encompasses a wide range of parameters. In non-spatial and immaterial relations it also fathoms; the history of the place, current and former use, its' atmospheres, the time-related changeability of a place, the notion of theories and concepts related to it's time, the context of a cultural, political, religious era. It also includes a cross-scalar approach, including both the local and regional/global.

In other words, there are many factors - both material and immaterial, visible and to some extent invisible - which constitute, shape and define a place. In essence, this place-thinking supports the holistic collision between the aforementioned natural and cultural aspects and should be accepted as a fundamentalism of what constitutes a place. Ultimately, in the transformation of a specific geography, the interchange between the natural and cultural must be studied carefully in relation to the specific context.

As a somewhat banal example, comparing Kilimanjaro's immovable rock formations in relation to a flat, soft and easily flooded meadow, underlines an immense difference in scale and change over time in regards of temporal, underlining – among other aspects, that it is imperative to include historic layers and the changeability over time, in relation to comprehending the former, current and future natural and cultural state of a place.

# **Transforming a place**

Inspired by the writings of Carol Burns and Andrea Kahn, the thought of grasping both positions through a contextual optic, can be categorized into three distinct areas in comprehending and subsequently transforming a place.

"The site has three distinct areas. The first and most the obvious one, is the area of control, easy to trace in the property lines designating legal metes and bounds. The second, encompassing forces that act upon a plot without being confined to it, can be called the area of influence. The third is the area of effect – the domains impacted following design action." (Burns C, Kahn A 2004 pp. xii)

Despite their different lines of thought, geographies and temporalities, these three conceptions overlap, continually oscillating between the material and conceptual, abstract and physical, discursive and experiential, and general and specific points of view.

The area of control – most commonly denoted by the term site, describes the physical topography, composition, boundary, infrastructure, micro-climate and material of a place. The area of influence fathoms that, which is not immediately present – in other words that which is beyond the physical proximity of a place, which includes the immaterial, invisible, atmospheric, sublime, existential and temporal. The area of effect describes the somewhat unpredictable changes caused by intervention and transformation of the place. "Design does not simply impose on a place. Site and designer engage in dialogic interaction. At once extrinsic and intrinsic, a site exists out there in the world but acquires design meaning only through its apprehension, intellectually and experientially." (Burns C, Kahn A 2004 pp. xv)

Thus, one could argue that the notion of place in contextual optics simultaneously refers to seemingly opposite ideas: a physically specific geography and a spatially and temporally expansive place – spanning distinct areas, divergent spatial constructs and changing time frames. In prolongation, place is understood as a relational construct that acquires meaning and value through interaction and exchange between the realistic and the abstract, the external and inherent. In this sense, comprehending and reading a place must draw on both an objective reality and a subjective perception, encompassing both generic and pragmatic relations, and a subjective world view.

Denoted as terroir – a place is ultimately read as constituted by the sum of all the effects created by its specific geography, identity, resource, usage and climate.

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# **Illustration list**

# All illustration not listed, are by the authors.

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http://upload.wikimedia.org/wikipedia/commons/3/3b/ World\_Map\_1689.JPG

### Fig 2.

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### Fig З.

http://betterarchitecture.files.wordpress.com/2014/01/ crop.jpg

### Fig 4

http://2.bp.blogspot.com/\_FfECqzvVEes/SzE-U5Rad4zI/AAAAAAAAACI0/gTCK1fzcQmk/ s400/10044800214780621.jpg

### Fig 5.

http://www.studiolum.com/wang/german/caspar-davidfriedrich-wanderer-above-the-sea-of-fog.jpg

### Fig 6.

http://britishlibrary.typepad.co.uk/.a/6a00d-8341c464853ef01901beed995970b4123hawh-580wijpg

### Fig 7.

http://24.media.tumblr.com/e0d0a1c7c3d5949d5363f-1813cdca1f1/tumblr\_mw0cg6jmzy1qh7j1wo1\_1280.jpg

### Fig 8

http://dl.ziza.es/upload//image/022014/26/Nordic\_Land-

scapes/Nordic-Landscapes29.jpg

### Fig S

http://upload.wikimedia.org/wikipedia/commons/a/ab/ Caspar\_David\_Friedrich\_029.jpg

### ig 10.

http://i12.tinypic.com/6gv607r.jpg

### Fig 11.

http://l.bpblogspot.com/-cbQc78eLkWE/UmmeN5Ak6uI/ AAAAAAAACW/JIyksyWl08Q/s1600/rem-koolhaasthe-city-of-the-captive-globe-new-york-1972.jpg

### Fig 12.

h t t p : / / w w 3 . h d n u x . c o m / p h o tos/10/41/20/2233366/5/628x471.jpg

### Fig 13.

http://www.jva.no/media/1611/unis5858.jpg

### Fig 14.

http://architettura.it/books/1999/199912002/md2.gif

### Fig 15.

h<sup>T</sup>tp://a136.idata.over-blog.com/0/30/04/75/novembre-2011/snohetta---norwegian-wild-reindeer-centre-pavilion---le-ca.jpg

### Fig 16.

http://futureurbanism.strelka.com/wp-content/uploads/ Stop-City\_-Dogma-2007.jpg

### Fig 17.

http://s8.dk/camp/fotos/samso/samso121.jpg

# *TERROIR* STRATEGY

# **Reading guide**

The strategic part of the project is constituted by three main topics: theme, resource and exponent, all acting as key elements for the strategic and research-based foundation of the thesis project. The content of each chapter is based on and substantiated by research, in which the main objective is to unearth potentials, qualities and resources in 'Peripheral Denmark'. Ultimately all chapters are rounded off by concluding remarks of the overall intentions, possibilities and overall remarks of the chapter.

### Theme

'Peripheral Denmark' represents the overall theme of the project, encompassing the shift of the new rural paradigm and its consequences, furthermore painting different statistics of how the Danes portray 'Peripheral Denmark' and looking into the initiatives of Realdania. The goal of the chapter is to unearth the potentials of 'Peripheral Denmark', in the scope of uncovering a unique potentials to build upon.

### Resource

The second chapter contains data, mappings, research and ultimately the interrelatedness of these. By juxtaposing these aspects, the aim is to uncover possibilities and opportunities within the theme of 'Peripheral Denmark', more specifically the coast and it's potentials. Ultimately seaweed is revealed as an unutilized resource in the Danish coast and marine area.

Through mappings, the chapter also focuses on locating the best growth conditions of seaweed within the Danish marine area, wrapped up by proposing a possible seaweed network in Denmark, constituted by farming areas, power plants, workforces, actors, and ultimately the implementation of a new Danish seaweed research center, which ultimately points towards the main focus of the thesis and architectural project.

### Exponent

In the final chapter of the strategy Samsø's explicit role within the proposed network of seaweed islands is emphasized in relation to the islands existing initiatives, goals, and qualities. The capter brings a closer look at these potentials, arguging for why and how a research center for seaweed could be implemented, becoming an exponent of exponent of seaweed on a national, regional and local platform.

### Prelude - Strategy

Resource

**Theme** 'Peripheral Denmark'

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## Strategy

## A pragmatic prelude to an architectural terroir

On the basis of a widespread contemporary discussion, 'Peripheral Denmark' is an expression commonly used to describe the down-spiraling development of remote Danish areas. Empirical research show that shifts in age, gender, relocation patterns, education, and employment all point toward a decline in the socio-economic and socio-cultural state of specific remote geographies.

Focusing on the most extreme cases of these outskirts - the islands of Denmark - we ask ourselves: could a geographically rooted conception rethink the contemporary underlying construct? - Ultimately revealing a nuanced image of peripheral Denmark in terms of scenic, cultural, and resource based potentials and qualities.

Ultimately, this part of the dissertation - *strategy* - focuses on constructing a national, regional, and local cross-scalar common-thread throughout substantiated and pragmatic research, statistics, policies, and campaigns. The aim is to unearth inherent characteristics of cultural, recreational, and resource based potentials of Seaweed on the strategically chosen island of Samsø in peripheral Denmark.

Most commonly used in the description of wine, fauna, and plants, *terroir* describes a geographical identity comprised of both human and natural factors. In other words, *terroir* fathoms 'a *sense of place'* - as the sum of the effects created by the specific geography, identity, resource, usage and climate of a certain place.

The intention of this *strategy* is to unearth and construct a cross-scalar *terroir* - ultimately laying the bedrock for the main facus of the thesis- the *embodiment*. The embodiment represents an architectural conception which investigates the cultivation of nature, by embodying the inherent characteristics of a place in peripheral Denmark - a place where we begin understanding, cultivating, harvesting, consuming, and ultimately experiencing the potentials of seaweed in a specific place on Samsø.



'Peripheral Denmark'



'Peripheral Islands of Denmark' and the 'Seaweed Network'



# *THEME* PERIPHERAL DENMARK

THE NEW RURAL PARADIGM

'MULIGHEDERNES LAND'

'STEDET TÆLLER'

THE POTENTIALS OF PERIPHERAL DENMARK

SHEER S



The following chapter serves as the thematic foundation of the strategy scoping the aim by delimiting definitions and employed research in relation to the term 'Peripheral Denmark'.

With point of departure in the above time line which spans both architectural projects, policies and campaigns, the goal is to introduce and emphasize the underlying definition of 'Peripheral Denmark' by chronologically introducing important factors which describe, define, and encompass the thematic standpoint of the strategy.

Throughout the chapter, the research is mainly substantiated with national strategies and policies, campaigns, and surveys. As an important factor in the regional Danish planning, the New Rural Paradigm is introduced, which originally is the underlying foundation for Realdania's campaign 'Mulighedernes Land' - an initiative aimed at project oriented development by uncovering the challenges and potentials in peripheral areas.

#### State of the state

Hereafter 'a geographical, cultural and socio-economic delimitation of 'Peripheral Denmark' is synthesized, based on the before mentioned campaign. Lastly, 'Stedet Tæller' is introduced, which focuses on 3 thematic initiatives and 3 inherently based potentials in periphery areas, based on surveys carried out on a national scale.

[Havelund, L. W. & Andersen, C. 2012] [Realdania 2007]

## **The New Rural Paradigm**

OECD introduces a new way of scoping rural areas in OECD-countries - becoming an important stepping stone in future Danish regional planning, a key in reinterpreting the Danish peripheral areas and, the thematic springboard for the strategy



## TRADITIONAL RURAL POLICY

Generally, the new paradigm breaks with the traditional rural policy, which primarily focused on supporting agriculture and ensuring equal opportunities for development anywhere in the country.

In the new paradigm, the rural districts are considered more nuanced and in a broader scene. Essentially, the policy can be said to change from being based on the fact that all areas throughout the country should be treated equally, with agriculture as the primary occupation, to an ideology of viewing each specific geography to be developed on the basis of individual merits and qualities, with a wide range of professions - including business which is based on the experience of amenity values.



## NEW RURAL PARADIGM

## Scoping the peripheral areas

Political, socio-economic and planning based definitions delimit and specify the framework of the strategy theme 'Peripheral Denmark'

There is not one fixed definition or classification of the remote areas, per se.

In general the conception of 'Peripheral Denmark' denotes the rural and remote areas, which are located outside the growth center of eastern Jutland, and the area of Copenhagen.

The geographical boundaries of the peripheral areas vary according to the context in which the definition is used.

With point of departure in Realdania's geographical demarcation, which summarizes the peripheral areas, a geographical map of 'Peripheral Denmark' can be pinpointed, according to three definitions:

(a) The official used and politically agreed definitions in relation to planning, (b) The Ministry's definition in relation to rural development funds and (c) EU structural funds.







#### The Differentiated Planning Law - Peripheral areas defined by the Danish planning law

Municipalities outside of the Copenhagen area and the urban corridor of eastern Jutland, where 40% of the population is living outside of urban areas, including non-bridged islands.

#### The Rural District Program - A categorization of the peripheral areas by The 'Ministry of Foods, Agriculture and Fisheries'

The 'RDP' is defined according to 14 geographical and socio-economic aspects, which sets the basis for an allocation of EU funds for rural development - focusing on providing better opportunities for people living in the outskirts. The main objective is to pinpoint the specific areas which are economically troubled, and therefore in most need of the EU grant funds.



## Structure foundation grants (EU) - A categorization of the outskirts and upcoming transitory peripheral areas

The grants are given to the municipalities based on two socio-economic factors: low business economy and a weak development in the population. Furthermore 35 % of the grants go to municipalities with a high commuter rate.

## Painting a statistical portrait of 'Peripheral Denmark'

Backed by quantitative data, overall statistical research sheds light on population & density, tourism, labor force etc.

peripheral areas comprise

of the entire country's overnight stays and daily visitors, in terms of tourism



of the Danish population live in 'Peripheral Denmark' corresponding to

> 1.245.000 of the total population

in the remote areas,

61

inhabitants live pr. km² compared to

#### 199

in the rest of the country

a decline in the population of

3,5%

is expected to happen in the peripheral areas during the next

a decline of

10%

in population of people of working age is expected over the next 13 years, corresponding to

70.425

13 years, corresponding to

> 43.000 inhabitants

> > an inclination of **28,6%**

of the elderly population is expected, over the

next 13 years

throughout the entire country, the tourism share is

1,6%

of the total turnover in Denmark, in remote areas solely, the tourism share accounts for



of the total turnover

## How do the Danes portray 'Peripheral Denmark'?

Questionnaires cast a general view on the Danes relation to and 'use of' the peripheral areas

68% have been on a trip to a scenic natural area in a peripheral region within the last 12 months. 54% of these have no previous connection to a peripheral area 72% have had at least one trip to the coast located in a peripheral area, the past 12 months 79% point out the great quality in the calmness and tranguility experienced at the remote areas 71% weigh a unique plant and animal life as a quality 82% point towards vegetated scenic areas (eg. forest and heath) as of upmost value 87% choose the scenic coasts as a great characteristic of the remote areas 65% believe that the strong local identities of the smaller communities is a great attribute

## **Realdania - 'Mulighedernes Land'** The experience gained from the Realdania campaign, uels and drives the research-based foundation of the strategy

With point of departure in 'The New Rural Paradigm' - ' Mulighedernes Land' - a pilot project, initiated in 2007, aimed at project-oriented development by uncovering the challenges and potentials in peripheral areas.

In cooperation with 3 peripheral municipalities - Thisted, Lolland & Bornholm - the goal of the campaign has been to create innovative projects, which are based on the inherent qualities and resources that are associated with a particular place - ultimately introducing a site-specific perspective on peripheral areas.

The research and report underlined that areas don't have to compete with major cities in regards of relocation and growth, but instead focus on accentuating and supporting the unique strengths and qualities that are inherent in the peripheral areas but cannot be found, built, or created in and around the major cities. Focus was aimed at upgrading the overall environment and living conditions for those who live in, visit, or move to the 3 mentioned peripheral municipalities. Furthermore the idea was to emphasize qualities of settlements, tourism and planning.

In other words, it is about getting the social and cultural capital of the area to work with economic capital in a way where a combination of bottom-up and top-down projects and processes facilitate ownership and develop projects and initiatives in a long-term strategy.

PRELUDE	PILOT PROJECT	IMPLEMENTATION
Initial studies	Analysis, public involvement, project development	Projects in Thisted municipality
		Projects in Lolland municipality
		Projects in Borholm municipality
	• Trans	rersal analysis and experience gathering

#### Inherent qualities

Focusing on the established strengths and refining the region. Emphasis on strengthening specific settlement, and tourism through the development of the region's already established framework, heritage, attractions, events, residential facilities, etc. Focusing on new tendencies - thus resulting in a transformation of the region. Special focus on strengthening settlements, tourism, and locally based companies, by further developing each regions physical framework, attractions, and residential facilities.

Focusing on the established strengths of the region. A special focus on refining existing cultural heritage, and the existing business through innovation, new relationships, new products, etc. Also strengthening the settlements in the form of 'second homes' Focusing on the new potentials in the region. Special focus on rethinking types of housing, transforming business, and rethinking tourism and products. Develop creative, 'high tech' and highly knowledge-intensive companies.

Non-inherent qualities

## STRATEGIC MODEL

## **Realdania - 'Stedet Tæller'**

The strategy focuses on 3 thematic initiatives and 3 inherently based potentials in 'Peripheral Denmark'

With point of departure in 'Mulighedernes Land', Realdania launches 'Stedet Tæller' in 2012, a campaign which supports and funds concrete projects in 'Peripheral Denmark'.

> 'Potential Denmark' focuses on sustainable development, with point of departure in inherent potentials of a place

#### 1. THE 'POTENTIAL DENMARK'

The pioneer projects in the focus areas are to demonstrate that high quality built environments along the coast can have a positive impact on tourism development and local communities

#### 2. INHERENT QUALITIES IN COASTAL TOURIST TOWNS

The aim of 'Places in the landscape' is to convey and establish contact between the individual and nature, with projects which have a sensitive impact on nature

**3. PLACES IN THE LANDSCAPE** 

The coast is portrayed as the single largest natural potential, and there is a magnificent opportunity to create natural intermediary experiences at the coastal areas, strengthening relations between the coast and the city or building on the existing qualities of the coastal culture.



The Danes who spend their time at the coastlines, beaches, and sea, believe that the coast is one of the greatest qualities in 'Peripheral Denmark', when spending their weekends and holidays at the coast.

THE NATURE

For those who are moving to a peripheral area, a close proximity to scenic nature is a decisive factor - more than the distance to work. And for many of those who dreamed of moving to a remote area, it is precisely the ability to get physically closer to nature, which becomes important.

terms, the Danes also use nature actively. The peace and tranquility inherent in nature is seen as a main denominator - affording activities and introspective contemplation.

Beyond enjoying nature in scenic

Many of the Danes who either live or have dreamt of living in a peripheral region, believe that local associations and communities is of great quality. There are several more volunteering leaders in the unions and the entrepreneurs' average survival rate is higher than in the rest of the country.



There is potential in building upon the strong local communities to support the small, local, self-grown initiatives, as it is often in smaller communities that sustainable development is greatly cultivated.

Focusing on cultural building heritage, the Danes believe that there should be invested in renovation and upgrading of specific villages, coastal towns, and harbors of cultural and historic value.

**BUILDING HERITAGE** 

Reuse of worn down buildings can help develop and upgrade certain qualities in peripheral areas. There is a potential in utilizing the many non-functional buildings - from agriculture, industry, etc. - To create more vibrant and hybrid urban environments.

## The coast

Denmark is one of the countries in Europe with the highest amount of coastal area per capita. The maintenance and utilization of large stretches of varied coastal landscape has enhanced the coast as the peripheral areas greatest asset and potential

Although the coast is considered to be one of most popular attractions in Denmark, Realdania's survey indicate that there is unutilized potential in enabling and indeed conveying the unique and inherent potentials found within the variety of natural and cultural qualities, which the coastal landscapes constitute. A large propensity to invest demonstrates that people see beyond the scenic qualities of the coastal regions, emphasizing the coastal areas as the largest single natural potential. The opportunity to create natural intermediary experiences is evident, by conveying and mediating nature by building on the existing qualities of coastal cultural environment.

#### 90%

of all tourism products sold in Denmark are within three kilometers from the coast. This includes restaurants, hotels, vacation attractions, ice cream parlors, etc.



the amount of coast is allocated pr. inhabitant in the peripheral regions, compared to the non-peripheral areas, corresponding to

4,22m

84% prefer a vacation at one of the peripheral coastal towns, than in a large Danish city without coast

#### 81%

are prepared to add

## 1 hour

of extra transport, in order to spend the weekend at a peripheral coastal town

more than

of the Danes believe that future investments should be spent on better marketing of the inherited amenities that already exist in the periphery - primarily pointing towards the coastal areas

## The nature

Beautiful, sprawling landscapes, exceptional scenic nature, peace, and tranquility. These are some of the qualities that are associated with the peripheral areas

Nature is a constant and inexhaustible resource for delivering unique and authentic experiences, and it is one of the biggest reasons to dwell and visit the periphery areas, according to the Danes. The nature in these areas has immense qualities in terms of both calm and tranquil contemplation, and active recreation The nature and landscapes are important features of the periphery areas. The climate, geology, plant, and animal life are of great importance, while characteristic qualities of these places are also determined by the shape of the landscape and its content of natural and cultural values.

> **71%** weigh a unique plant and animal life as a quality

**82%** greatly value the natural scenery in the peripheral areas

42% Danes. and

## 64%

of holiday home owners have purchased local produce in remote areas in the past year

4/5

highlight scenic areas as an essential quality in the remote areas

### 79%

point out the great quality in the calmness and tranquility experienced at the remote areas

more than **50%** of the Danes would like better access to the Danish countryside

## Local involvement

There is a particularly strong local commitment in the peripheral areas. They help each other, take the initiative, get involved and give projects life - both for the community's sake and for accomplishing our own ideas and dreams

> 66% think that a strong unified local community is a great quality

Peripheral areas represent 'the land of opportunity'. Schools are funded, new types of niche stores are opened and special venues are arranged - several projects are realized in the remote areas - because people are taking initiative and enterprising.

There many enthusiasts and a strong and persistent entrepreneurship, as seen by the entrepreneurs' survival rate, which is higher in the periphery than in the rest of the country.

There is potential in building upon the strong local communities to support the small, local, self-grown initiatives, as it is often in smaller communities that sustainable development is greatly utilized.

65%

believe that the strong local identities of the smaller communities is a great attribute

> the entrepreneurs survival-rate in the peripheral areas is



areas of

43.68%

45%

believe that space for individual entrepreneurship is a quality

## **Preliminary remarks**

Shedding a critical light on the thematic foundation of the strategy reveals certain aspects of the project which might be worth recapitulating in order to strengthen, discuss and connect the previous chapter with the following. Even though many critical aspects could possibly be put forward in this discussion, Realdania's strategies are weighed in this paragraph, as they define, steer, inspire and in many ways portrait the image of peripheral areas in Denmark.

Choosing to fully lean on these strategies, points towards a weakness within the thematic foundation.

This is primarily in relation to the somewhat ideological romanticization of the Danish countryside and ideal natural geographies and as a result how these initiatives and projects predominantly emphasize tourism-based growth, which evidently points toward an extremity in terms of high seasonal growth and activity and on the other hand inactive hibernation in low seasons.

As stated earlier, the 'Stedet Tæller' campaign is very much based on the advocated policies of the new rural paradigm, which indeed has its upsides in capturing site-specific potentials of different geographies, but it also has its weaknesses.

One of the downsides of focusing very locally, includes the risk of overlooking the importance of large inward investments such as infrastructure, initiatives or other major non-localized initiatives.

On one side this bottom-up model be-

comes far more open for involvement and ownership at the local level, but on the other hand also risks of promoting the strongest enthusiasts who will possibly dominate at the expense of the weak, who might risk eventually being forgotten in the process.

In light of the recent, the aim of the next chapter is to investigate and unearth an independent and growthbased resource, which alongside tourism can point towards robust growth parameters in the peripheries, which generate a more steady fluctuation of growth and activity across seasons. Furthermore the idea is to anchor this resource in a national/regional strategy that fosters growth in several cross-contextual geographies through demonstration projects within the strategic network.

# RESOURCE SEAWEED -A GROWTH POTENTIAL IN PERIPHERAL DENMARK

'ENERGY STRATEGY 2050

'THE SEA - AN UNEXPLOITED RESOURCE'

With point of departure in the previous chapter, attention is put on unearthing a potential resource that could utilize and strengthen the before mentioned thematic initiatives and inherent potentials of Danish peripheral areas.

Substantiated by the Danish national 'Energy Strategy 2050' and the 'Danish Ocean Strategy' contemporary results point towards macro algae - or seaweed as it is commonly known as an unutilized potential in Danish sea waters.

Juxtaposing this potential with the above-mentioned national initiatives and the strategy *theme*, certain commonalities appear, creating a common thread which embeds points of interest across campaigns, national strategies, and environmental initiatives - pointing towards the potential of cultivating seaweed in peripheral Denmark.

Linking the 'Energy Strategy 2050' and the 'Danish Ocean Strategy' refers to another report - 'The Blue Biomass' - which ultimately reveals a strong foundation for cultivating seaweed as a resource with strong potentials in relation to, among other things; renewable energy, fertilizer, feed for animals, biomedicine, cosmetics and gastronomy. Throughout the remainder of the chapter, attention is put on understanding the many properties of seaweed, locating a potential area of growth and strategically pinpointing and laying the bedrock for a Danish 'Seaweed Network'. This ultimately proposes an integrated network of seaweed cultivation - spanning from research, experiences to cultivation and products.

The potential of strengthening the local and regional identity of mentioned geographies - creating jobs through innovation, knowledge and harvest of seaweed amidst beautiful scenic nature constructs a strong foundation for the genesis of a regional and locally anchored conception.

Ultimately, seaweed cultivation in Denmark has a great potential as a new resource in regards of various aspects. The knowledge and experience of cultivation of seaweed in the Danish waters is very limited. Research centers for specifically seaweed are just currently being established in the Netherlands and Ireland, becoming first of their kind in the world. To utilize this new and unutilized resource and expand the knowledge of cultivation of seaweed in Denmark, a Danish seaweed research center could lead the way of how and where implementation and cultivation of seaweed in Denmark could take place, showing the way for innovation and development within energy, gastronomy, medicine and product manufacturing.

## 'Energy Strategy 2050'

Juxtaposing the Danish 'Energy Strategy 2050' with the thematic foundation of 'Peripheral Denmark' unearths certain commonalities, goals, and potentials of interest

In 2011 the Danish Ministry of Climate and Energy, released the 'Energy Strategy 2050', which looks towards realizing the Danish government's vision of becoming independent of coal, oil and gas by 2050.

#### The strategy focuses on how

Denmark could transition to a fossil fuel independence by implementing energy policy tools, being the first of its kind in Europe and the rest of the world. By 2020, the goal is to reduce fossil fuels in the energy sector by 33%, while focusing on renewable energy, energy consumption, and energy efficiency. Furthermore the idea is to bolster the Danish growth and wealth, by strengthening companies' opportunities in a rapidly growing global market, for innovation and demonstration of new green solutions in Denmark. Scoping the strategy of 'Peripheral Denmark' and the 'Energy Strategy 2050' - it is interesting to make comparisons in regards of; utilization of resources, the ideology of sustainable development, agriculture and, treatment of the physical land areas and unutilized energy sources.

Juxtaposing these characteristics, potentials, and goals from each strategy, certain patterns start to emerge. Focusing on the diagram indicated below - which displays the three overall phases of the energy strategy the highlighted initiative in the figure below especially becomes interesting in relation to the demonstration-projects supported and funded by the 'Stedet Tæller' campaign, which also represents the role of the architectural project within the strategy.



#### 'ENERGY STRATEGY 2050' + 'PERIPHERAL DENMARK'

- + Promote conversion to biomass at large-scale plants
- + Allow Siliali-Scale plains a file choice of file
- + Introduce a 10% biofuel obligation in the transport sector by 2020
- + Launch market-promotion

"The New Rural Paradigm' focuses on local qualities and potentials as a base for the development of agriculture, sustainable energy and strategic land use in the peripheral areas.

'Potential Denmark' focuses on sustainable development, with point of departure in the inherent potentials of a place.

#### INCREASED USE OF BIOMASS AND BIOGAS

#### THE NEW RURAL PARADIGM & 'POTENTIAL DENMARK' - 'STEDET TÆLLER'

 Set aside DKK 20 million for the promotion of strategic energy planning partnerships constituted by municipalities, local enterprises, and energy companies
Carry out an analysis of the use of biomass for the energy-related purposes in Denmark

 Doubling the funds for research, development and demonstration projects The goal of the 'Mulighedernes Land' has been to create innovative projects, which are based on the special and inherent qualities and resources that are associated with a particular place.

Focusing on new potentials in the regions. Special focus on transforming business and rethinking tourism and products. Develop creative, 'high tech', and highly knowledge-intensive companies.

#### INITIATIVES IN A NEW ERA OF ENERGY POLICY

'MULIGHEDERNES LAND'

+ Support the establishment of testing grounds for green solutions in Denmark

 Ensure sufficient recruitment of university graduates and researchers into the green area 'Mulighedernes Land' is about focusing the social and cultural capital of the peripheral areas to work with economic capital in a combination of bottom-up and top-down projects and processes to facilitate ownership and develop projects.

The pioneer projects demonstrate that high quality built environments along the coast can have a positive impact on tourism development and local communities.

GREEN GROWTH THROUGH RESEARCH, DEVELOP-MENT AND DEMONSTRATION PROJECTS 'MULIGHEDERNES LAND' & 'STEDET TÆLLER'

[The Danish Ministry of Climate and Energy 2011, pp. 16-25]

## 'The Ocean - An Unutilized Resource'

Synthesizing the 'Energy Strategy 2050' and 'Peripheral Denmark' by looking into the Danish seaside as an unexploited resource

Today it is known that the ocean is the richest source of biological life on Earth - having already identified several more species in the ocean than on land.

From land based plants, fungi, bacteria and animals, cultivated knowledge has been obtained about new enzymes, antibiotics, gastronomy, energy sources, and materials.

Based on the fact that 71% of Earth is made up of marine environments, it is now also know that there exists a much more diverse marine plant life than land based - a realm that is not yet fully understood in its' capacity and potential.

Based on the report by the Ministry of Foods, Agriculture and Fisheries; "The Ocean - An Unutilized Resource', the focus is put on researching the potentials of marine resources in Denmark.

In Denmark there is a long tradition of research, development, and optimization within marine culture in both primary and smaller industries.

The report concludes that in an integrated use of the marine resources present, there would be a great basis for combining traditional production and processing methods with academic biotechnological research. As a result, it will among other things, potentially create growth in the job sector, not only in the realm of academic research, but also near the coastal and industrial areas in Denmark.

Public involvement and demonstration projects could be the first step in initiating the process by researching, understanding, and unlocking these potentials.

## MARINE BIOTECHNOLOGY

can be defined as discovery, exploration, and use of biological products and processes from marine organisms for performing practical tasks and to create useful products.

The main areas of application of marine biotechnology medicine and health, food, cosmetics, aquaculture, agriculture, biofilm and corrosion, bio-materials, research tools, energy, and environment

## 5

themes and potentials presented in 'The Ocean - An unutilized resource'

-

- + Utilization of marine biomass
- + The cultivation of raw materials from the sea
- + Health-promoting gastronomy
- Discovery of new substances, materials, and biological activities
  Extraction of valuable biochemi-
- cal substances

#### Of the **36** ioc in which living org

categories in which living organisms are organized,

34 are represented in the ocean, while only 17

are growing on land

[Ministry of Foods 2010, pp. 3-8]

## Seaweed - an unutilized resource as growth potential in peripheral areas

A resource which lays a potential common ground for a new conception, substantiated by commonalities from 'Peripheral Denmark', 'Energy Strategy 2050' and The National Ocean Strategy

It is now regarded as a fact that our human ancestors - the hominids - did not develop in the dry and hot sevannah, but instead in moist and humid areas, the coast and ocean. This is due to the fact that coastal areas were a source for rich essential fatty acids, which are required to form a complex nervous system and a large brain.

It has therefore been a crucial factor in the emergence and evolution of the first modern Homo Sapiens, that a diet which consisted of plants from the ocean could be obtained.

Macro algae - or seaweed as it is commonly known - are aquatic organisms, which like plants are dependent on photosynthesis, nutrients and vitamins.

Seaweed is categorized as a part of the "blue biomass", as opposed to the "green biomass", which encompasses land based plants. It has in recent years gained increasing political, scientific, and cultural attention as a potential source for, among other things; renewable energy, fertilizer, feed for animals, biomedicine, cosmetics, and gastronomy. The production potential is high and the output is essentially not in conflict with the land-based production of biomass for food, feed, and energy.

When comparing the potentials of seaweed in relation to the Danish national strategies within planning, energy, and oceanic resources,

certain commonalities arise as common denominators. It becomes evident that seaweed represents certain inherent qualities, and could potentially be a resource-based driver for many of the common goals and initiatives.

Today, the seaweed-industry is rapidly growing and exceeding a yearly value of 40 billion DKK. Especially China, the Philippines, Korea, Indonesia, and Japan are leading the market.

Denmark has a good platform for cultivating seaweed with specific growth-promoting conditions such as a high amount of coastline, saline oceans, and water containing high amounts of minerals.

# 'THE OCEAN - AN UNUTILIZED RESOURCE' POTENTIAL OF MARINE RESOURCE RESEARCHING IN MARICULTURE

INTEGRATED USE OF BIO RESOURCE

ACADEMICBIOTEEH RESEARCH

DISCOLERY EXPLORATION AND DSE

Partocastas Po charte Photococ And a state of the Contraction of the second Sharpen Sharpe And Shanner and and Banks TURNOUT BEAM MARTINE Sufficience and and Strading RAUTH PROMOTION BIO MATERIALS DISCOVER NEW BULDWALL BISTRACTION OF BIOCHEMICAL SUB BISTRACTION OF DISCHEMENT DEMONGRAMMENT DEMONGRAMMENT PURPLO IN TRATION PROJECTS

DEVELOPMENT OF S-XL INDUSTRY

#### 'PERIPHERAL DENMARK'

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## The General properties of seaweed

A plant with many facets, which already today is used for a great variety of things

seaweed can annually cultivate up to

**10x** more organic carbon per hectare per m<sup>2</sup> compared to land-based plants today, we have discovered

## 10.000

different algae species, of which approximately

#### 800

can be found in the Danish seas

seaweed is a **500** million year old lifeform

algae is responsible for

80% of the organic production and 90% of the oxygen on our planet

in Japan and China, seaweed comprises 10% of the countries' total nutrition

today, the worldwide seaweed-industry is rapidly growing and exceeding a yearly value of

> 40 billion DKK

seaweed is categorized into

#### 3

different algae-species: brown, red and green, each with their own very different properties and qualities

in high growth-seasons, some brown-algae

can grow up to

## 2 cm

an hour

it is estimated, that between 1977-1987,

#### 35%

ll natural substances discovered, derived from seaweed and algae in general

Seaweed has no leaves and stems in a traditional botanical sense, nor does it have flowers, fruits, seeds or, roots. Seaweed does not need to absorb water and nutrients through roots as its cells are in direct contact with the nutrients in surrounding water. In the ocean, seaweed corresponds to what forests, shrubs, bushes, and low vegetation are on land. Furthermore it ensures production and supply of oxygen to the environment, while also being a physical structure and habitat for other organisms. GASTRONOMY & 1 TOOTHPASTIE SHAMPOO BATHPHOO PUDDING SEA VEGEUA VICACREAA

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[Seaweed Industry Association, 2014]

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## Seaweed for industrial purpose and as source of sustainable energy

A potential resource for biomass, biofuel, biomedicine, and animal feed

Seaweed is already proven to be an extremely valuable resource in terms of industrial and agricultural purposes. As seaweeds can produce  $CO_2$ -neutral energy it becomes a potential key resource in terms of green energy. By cultivating seaweeds in basins on land and in the ocean, and extracting biomass from them, it is possible to produce  $CO_2$ -neutral biogas for district heating and energy purposes - while the residue from the production phase can be used as fertilizer and animal feed in organic farming, essentially utilizing 100% of the resource.

The seaweeds purify the oxygen-poor but nutrient-rich wastewater because they convert animal waste products: nitrogen, phosphorus, and  $CO_2$  into new oxygen for the water, plants, and

fish. Furthermore it is a fundamental food source for both fish and shellfish

Seaweed is also used as a filter to purify air and water - as seaweed reduces a high amount of  $CO_2$  in the atmosphere, while also absorbing nitrogen and phosphorus in the sea when it grows, providing fresh oxygen for the atmosphere and water.

Today, seaweed is also used for medicinal and health bioproducts for humans and animals. Overall different types of seaweed have approximately 50-100 times more vitamins and minerals than ordinary fruits and vegetables, while its bioactive substances such as anti-oxidants have preventive properties in regards of diseases such as obesity, influenza, cancer, and HPV-viruses.



## 50-70%

1-2%

fats, 10-30%

proteins and minerals, and carbohydrate content of

60%

unlike traditional oilseed crops, where soy is able to produce between

## 200 liter fuel/acre seaweed is capable of producing 15.000 liter fuel/acre

[Siegel, J. & Neld

Energinet.dk, Risø DTU, Danmarks Miljøundersøgels-er and Dong Energy have so far invested

## 10,4 million DKK

for research, while energy-giant ExxonMobil have invested

#### **3** billion DKK [Forskning i Bioenergi 2009, pp. 8]

in the very early stages of industrializing algal biofuel, The Algal Biomass Organization projec predicts the creation of

## 220.000 jobs

by 2020 in the US [Algaebiomass.org 2014]

compared to other typical biomass resources, the brown-algae *S. Lattisima* has a califoric value of

#### 16.57 GJ/Ton which is the 2nd

highest value in relation to beech, spruce, wood pellets, wheat straw, wheat grain, meadow hay and miscanthus.

[Bruhn, A. & Rasmussen, M. B. 2010, pp. 30] [CALU 2007, pp. 1]

## Seaweed as a salubrious and gastronomic catalyst

From gastronomic innovation and salubrious breakthroughs to being referred to as 'Brain Food'

Seaweed has a combination of substances that are very different from the land based plants we know. The primary thing is that seaweed has a mineral content, which is ten times as large as the plants grown on land, hence a wide range of essential minerals and vitamins.

It can generally be said that a type of diet containing up to 10% seaweed, as is the case in Japan, promotes health. This is due to the large concentration of important minerals and vitamins in seaweed increases bioavailability in the body. Thus, seaweed is a strong source of protein, essential amino acids, and high amounts of fiber.

In particular brown algaes contain chlorophyll, carotenoids, vitamins, sterols, and phenols, which all have well-documented anti-oxidative effects that can prevent heart disease and cancer diseases.

Seaweed contains taurine, which is important for the formation of bile salts, which bind cholesterol. This has an effect of lowering cholesterol in the blood. The combined effects of dietary fiber and sterols relating to cholesterol in the body are positive and can help lower the risk of cardiovascular disease.

Seaweed also has a relatively high content of unsaturated and essential fatty acids, especially omega-3, which prevent cardiovascular disease. In addition these fats are essential to the development of our brain and nervous system, which contain approximately 65% omega-3 amino acids - this is also the reason why seaweed is referred to as 'Brain Food' in specific scholarly circles.

Generally speaking, seaweed seems to have overwhelmingly positive effects on our health.

Of all the seaweed species which are utilized, the bulk use of it is concentrated on food.

The seaweed species, which are available to the general Danish public, find use to many different types of food: as salads, soups, sushi, tea, deserts, bread, snacks and sweets or spice as a flavor catalyst.

With origins in the New Nordic Cuisine, several Danish chefs have in recent years been inspired to use seaweed in their kitchens and restaurants. New Nordic Cuisine enables its 'natives' to ingest the natural and cultural landscape, and consume a material version of local and regional identity. The inspiration is based on the raw diversity, flavor palette, taste, texture, shape, and color of seaweeds.

The focus is creating new dishes where the role of seaweed is thought of as an essential and surprising element, which turns the gastronomic creation into something unique and sublime - something that emphasizes both the sensory and aesthetic sense of a place.

[Mouritsen, O. G. 2009]

*Porphyra -* a red algae - contains

3x

e amount of C-vitamin, compared to oranges [Mouritsen, O. G. 2009, pp. 57

> compared to milk, seaweed averagely contains **10x**

the amount of calcium

Annually *Porphyra* can produce **84g/m<sup>2</sup>** 

of protein, compared to  $40 \text{g/m}^2$  from soybeans and  $5 \text{g/m}^2$  from meat

[Aktuel Naturvidenskab - 'Biokemi og Ernæring' 2009, pp. 10]

seaweed contains

#### 5X

the amount of iron, compared to spinach and egg yolk [Mouritsen, O. G. 2009, pp. 56]

> while also being the main source of omega-3 in the fishes' food chain, seaweeds contain

## 2-3x

the amount of omega-3, compared to the less healthy omega-6 aminoacids while also being the primary source of omega-3

[Aktuel Naturvidenskab - 'Biokemi og Ernæring' 2009, pp. 7

seaweed contains

the amount of A-vitamins, and

**4**x

the amount of C-vatmins, compared to to spinach [Mouritsen, O. G. 2009, pp. 56]

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## Locating a potential area for the seaweed network

Determining the optimal cultivation of seaweed in Denmark

In establishing the potential seaweed network, one of the key parameters is to scope optimal areas of growth in close relation to both land and water.

In order to create a synergistic network, mapping the context in which the seaweed network is to be inscribed in, is of upmost importance.

It is a balanced act between the technical, infrastructural, economical and knowledge-based resources in relation to the biological and aquatic properties and optimal growth conditions for seaweed.

In order to stretch out this network, various parameters are mapped, focusing on aquatic and biological properties of seaweeds and existing potential network participants.

Combined, these factors comprise both necessary and strengthening parameters in cultivating seaweed.

## 106.000 km<sup>2</sup>

constitute the Danish marine area

Habitat and nature reserves constitute

18%

of the total Danish marine area

### **14%**

is zoned as raw material extraction, navigation, offshore windmills, oil fields etc.

2012 the total Danish energy consumption was 785 PJ

in

[Energi Styrelsen, 2014]

by

2020

the goal of the energy production by windmills shall cover

## **50%**

of the total energy consumption, and another

20%

produced by biomass, resulting in

235,5 PJ

#### dirty energy, 2842 km<sup>2</sup>

is needed to produce the remaining amount by marine biomass, which corresponds to

### **4**%

of the free Danish marine area

[Ministry of Foreign Affairs of Denmark, 2014]

## 32%

of the Danish marine area is restricted, corresponding to

## 33920 km<sup>2</sup>

the potential usable marine area of cultivating marine biomass constitute

## 72080 km<sup>2</sup>

without considering practical issues and growth factors

## Stone reef is needed as a basis for cultivating the energy proficient brown algae species

These reefs are the natural habitat of brown algae, functioning as a substrate in the fertility process



[Dahl, K., Lundsteen, S. & Helmig, S. 2003, pp. 29]

## Currents can have an influence on seaweed growth

Depending on which kind of seaweed is cultivated, the currents can either slow down or accelerate the growth process



## Seaweed is dependent of sunlight in respect of photosynthesis

The map shows the average amount of sunny hours per year, based on readings from 1961-90



[Wegeberg, S. & Feldby, C. 2010] [Laursen, E. & Rosenørn, S. 2001, pp. 5]
## Salinity is important for the stability and speed of growth

A high value of salinity results in increased growth and ensures stability of the seaweed. Furthermore it reduces frost during winter, which would otherwise reduce growth



## The growth of seaweed is also dependent on the amount of sunlight which passes through the water

6% of the amount of sunlight is lost in the passage from air to water. At 7-13m it is reduced by 10%, depending on the local conditions



[Dahl, K., Lundsteen, S. & Helmig, S. 2003, pp. 34] [Hansen, J. W. 2012, pp. 4]

## Waves and ripples can disrupt the habitats

Large waves can destroy habitats so only the most tough species will survive. The value is an average based on the top and bottom of the waves



## Vertical currents and upwelling ensure a steady supply of nutrient salts from the seabed

When cultivating seaweed on open sea, upwelling is beneficiary in increasing the nutrient salt concentrations



## Phosphorus increases the growth of seaweed

Phosphorus is mainly cultured from wastewater from the land and the seabed. Phosphorus is then released from the sediment by upwelling and oxygen depletion



## As phosphorus, Nitrogen too is an important factor

The amount of nitrogen is highest near land, supplied by agriculture and wastewater from the urban fabric



< 0,1 mg N/1 0,25 - 0,3 mg N/1
0,1 - 0,15 mg N/1 > 0,3 mg N/1
0,15 - 0,25 mg N/1

Existing biogas power plants in Denmark have the ability to process the marine biomass directly, once harvested - they can cost-effectively transform biomass directly into energy and avoid extra processing

To save energy from transporting the harvested seaweed(biomass), the power plants near the coasts become of great importance



## Kattegat, and Samsø Belt hold the best potential

The various species of seaweed have all unique growth conditions, but the common denominators for optimal growth conditions of seaweed; a high amount of sunny hours, salinity rich water, and a high value of nutrient salts, are to be found in the area of Kattegat and Samsø Belt, which holds the best potential of seaweed farming in Denmark



## Kattegat, the Samsoe Belt and the Aarhus Bay constitute the most potential marine areas for implementing an integrated seaweed network in Denmark

a strategic conception which rethinks the role of a network of islands in the Danish landscape, pioneering the way we imagine culture, resources, and recreational values in 'Peripheral Denmark'

Looking closer at the southern part of Kattegat and the sea around Samsø, the conditions for growing seaweed are optimal, and the area holds a strong potential to create an integrated network of seaweed cultivation spanning from research, experiences to cultivation, and products. Beyond establishing growth for a potential workforce, important operators with interest in seaweed cultivation already exists within the area, such as

### **Algae Centre Denmark**

Algae Centre Denmark was constituted in 2011 as a consortium of Aarhus University, Kattegatcenter, Ocean Centre Denmark and Danish Technological Institute. The goal is to search for the potential of how seaweed can be implemented and utilized for sustainable energy, food production, and medicine.

[Algae Centre Denmark, 2014]

[Danisco, 2014] [Novo Nordisk, 2014]

## Novo Nordisk & Danisco

Novo Nordisk & Danisco are both leading innovation firms in regards of food, health, and medicine Novo Nordisk and Danisco can become important operators in the research of seaweed in the medicine and food industry. Aarhus University, Ocean Centre Denmark, Algae Centre Denmark, Dong Energy, Novo Nordisk, The Energy Academy and the local population in general. Because of its central geography, Samsø has the potential of becoming an important factor within the seaweed network of Denmark, further strengthening its position within the tourism sector through experience-economy.

### **Nordic Food Lab**

Nordic Food Lab is an organization searching for the potential of the New Nordic Cuisine, examine the native cooking of the Nordic region. They could become an important factor, showcasing how seaweed once was, and today can be implemented in our everyday diet, while also lifting gastronomic experience to new heights.

[Nordic Food Lab, 2014]

## **Dong Energy**

Dong Energy introduced the first biomass power plant, and are still leading the market in relation to utilizing biomass as a substitute for oil and petrol etc. Dong Energy is important in the strategy of how to utilize, and implement marine biomass in Denmark.

Realdania novo nordisk

Naturstyrelsen



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## Potential seaweed cultivation areas within Kattegat, Samsø Belt, and Aarhus Bay

32% of the Danish marine area is restricted to certain objectives. The map to the right shows the restrictions within the southern Kattegat, Aarhus Bay and Samsø Belt, in other words zones which cannot be used for seaweed cultivation. The restrictions are made up of by the following factors: existing sea usage, bird protection areas, nature reserves, habitat areas, national preservations,

area preservations, raw material resource areas, raw material extraction areas, preservative belts, preservative fjords, enhanced objectives, and navigation routes.

The 8 marked areas on the map, represent the potential sites for cultivation of seaweed, brown algae - zones which are not occupied by other purposes.

the second s

Firstly, the areas are selected because of their stronger upwelling, which ensures a higher nutrient salt concentration, a must for the growth of seaweed. Secondly, their relative close distance to the shore allows the seaweed to obtain wastewater from the land, which again increases the growth.

The streams from The Northern Sea ensure a higher value of salinity than in the waters of the Baltic Sea, an important aspect in keeping a healthy balance of the seaweed.

Furthermore the seaweed cultivation areas are kept offshore at deeper waters where the strength of the waves are less disruptive during the cultivation process and the amount of sunny hours on the islands also increase the rate of growth.



## The seaweed network of Denmark

The seaweed network of southern Kattegat constitutes a potential area of 720 km<sup>2</sup> for cultivation of seaweed, of which the seaweed islands; Samsø, Sejerø, Tunø, and Endelave, hold the potential of a cultivation area of 219 km<sup>2</sup>.

Hypothetically, if the total area was to be used for cultivation of sugar seaweed, it could produce 3.6 million tonnes of seaweed, resulting in 59,6 PJ, corresponding to 25,3 % of the missing energy production in 2020 to cover the entire energy consumption of Denmark.

For the production of energy from marine biomass, the nearby coastal power plants become of great importance in reducing resources in terms of transportation of the seaweed. In particular Grenaa, Studstrup, and Asnæs power plants are highlighted. For the production of seaweed - whether it being for energy production or the food industry - each area has to be investigated to localize the best potential for the different species of seaweed, based on their different growth conditions.

In this proposed network, Algae Centre Denmark will function as the communicator, ensuring communication across sectors, from knowledge to practice, from scientists and professionals to the wider public.

#### Seaweed research center

The role of the seaweed research center is to promote research and elevate knowledge within the network. It is here the synergy occurs between researchers, workers, and professionals. The center facilitates immersion spaces for research, cultivation, professionals, minor conferences and in the peak summer seasons, it becomes open for the interested public, experiencing the characteristics of seaweed locally and regionally on Samsø.

#### **Ocean Centre Denmark**

Ocean Centre Denmark in collaboration with the Kattegatcenter holds a strong potential to reach a wider public with knowledge of the sea, essentially branding the sea and its potentials ranging from seaweeds and wave energy to the biology of the sea. Ocean Centre Denmark is a part of the Nordic Algae Network, a collaboration between the countries, Denmark, Norway, Sweden and Iceland. Ocean Centre Denmark will function as facilitator for the bigger events and conferences.

### **The Energy Academy**

Between the Energy Academy of Samsø and the seaweed research center, a potential synergy effect can be obtained. Translating knowledge directly to practical cases and showcasing processes of marine biomass and gastronomy. The Energy Academy and Samsø could function as a demonstration project, as a part of the Danish Energy Strategy 2050, showing how marine biomass could be implemented in the Danish society.

## The local population

The local population at the islands is known for their enthusiasm, involvement and enterprising island communities. A strong involvement in starting a new form of production is fundamental in spreading knowledge and achieve success. In return a new seaweed production platform in the waters around the islands has the potential to further develop the communities while creating growth, in form of jobs, energy production, and new brands of local produce as 'Øspecialiteter', 'Ømami' and 'Nordic Food Lab'.





## **Preliminary remarks**

Rounding off the second chapter, certain aspects are deemed advantageous to briefly discuss in specific relation to the regional seaweed network, primarily focusing on the proposed cultivation areas, growth conditions and its physical impact.

Even though the mappings are based on pragmatic research carried out by researchers within the field, it must be underlined that they represent an overall and general portrait of growth potentials. Also, it must be said that some areas around Bornholm and the southern part of Læsø also might hold a beneficial potential for growth. In a possible future implementation, each specific cultivation area would have to be carefully examined. factoring a more in-depth analysis beforehand. Nonetheless, the content uncovers a potential overall map of the generally good conditions for cultivating seaweed in Danish waters.

Secondly, it would be imperative to examine the visual, logistic and aesthetic landscape-based consequences of such a large implementation, as this would undoubtedly change the future waterscapes of the Danish seawaters.

At first glance, the sheer size of the strategically proposed cultivated areas might seem brutal and extensive. On the other hand, one could underline and make a connection to the increasing demand for new energy resources, food sources and biomedicine innovation. Affording the possibility of accommodating these needs, can in many ways be seen both as a required and romantic gesture in this respect. The sheer resource-based potential of seaweed also suggests a great advantage in regards of other energy sources, which, for example is represented by the fact that biomass in the ocean is able to produce 4-10x the amount of energy compared to the same area needed of land biomass.

Furthermore, factoring in the fact that the area of windmills needed to cover 20% of Denmark's energy consumption corresponds to the same 2842 km<sup>2</sup> which seaweed biomass would need, is quite striking and impressive.

Ultimately this also encourages a discussion about the perception of nature and its cultivation - which can be read in the aforementioned paper on place-thinking.

Lastly, concerning the chosen actors of the seaweed network, this chapter lacks a further look at the impact of the seaweed network would affect each of these very different geographies, but also potentially could the beneficiary aspects of such a regional cooperation.

Ultimately, this gives rise to the next and final chapter, which delves into one of the potential actors of the network, which in the case of this project is Samsø. With the aim of shedding light on how Samsø would be able to contribute and potentially gain from being a part of the network, the goal is to establish how Samsø would be inscribed in this context, and how this plays into their goals, identity, physical and local environment.

# *EXPONENT* SAMSØ -DEMONSTRATING LOCAL AND REGIONAL POTENTIALS

In this final chapter of the strategy, Samsø's explicit role within the proposed network of seaweed islands is emphasized in relation to the islands existing initiatives, goals, and qualities.

Building on Samsø's strong local and renowned regional identity, the idea is to enhance and showcase Danish innovation and experience of local resources, amidst scenic atmospheres, through the potential implementation of a seaweed research center.

Throughout the center, the aim is to point towards how, where and why seaweed should be cultivated by mediate entrepreneurship within local renewable energy sources and new Nordic cuisine. The goal is to scope Samsø as an exponent within the seaweed island network, by fostering a fruitful place for knowledge about seaweed, as an implementable and experiential resource.

Ultimately the potential is to strengthen and develop the inherent qualities of Samsø, by building upon and extending these qualities, in line with Energyakademiet "The Energy Academy'.

The potential of such a research cen-

ter in Denmark, being among the first of its kind in the world, could potentially place the seaweed network and the island of Samsø at the forefront of renewable energy.

As a starting point, Samsø's initiatives and branding qualities are unfolded, portraying the islands strong local entrepreneurship within renewable energy sources and local quality produce and gastronomy.

Emphasis is put on the islands' scenic nature, which is of great value for the permanent residents while also creating growth within the tourism sector. Furthermore emphasis is put on innovation of resources, in relation to a strong agricultural foundation of local produce, and utilization of renewable energy sources.

Combined, these specific geographic characteristics constitute and underline Samsø's values within the local community, environmental politics, initiatives, and regional branding - ultimately constructing a conception of a locally based and regionally important Research Centre for Seaweed.

AN EXPONENT OF REGIONAL AND LOCAL IDENTITY

## weed island network

The initiatives, goals, and qualities of Samsø

Because of its initiatives and ventures, the island of Samsø can in essence be seen as a constantly developing entity, with strong objectives and goals. Emphasis is on one hand put on entrepreneurship within renewable energy sources, and on the other; local produce and gastronomy. Based on a strong local involvement, Samsø is 100% self-sufficient on renewable energy, while covering 70% of the islands heat consumption. Furthermore, because of the coastal climate, the local produce of vegetables and fruit is nationally renowned throughout Denmark.

Building upon these qualities, there are clear opportunities to enhance and showcase Danish innovation and experience of local resources, amidst scenic atmospheres. Ultimately the potential is to build upon the inherent qualities of Samsø, an island situated in the periphery of Denmark.

Existing land- and offshore wind turbines will be replaced stepwise with more efficient turbines. An overall strategy for this development towards 2030 is scheduled to be in place in 2015.

The decentralized and flexible energy system for renewable energy production is maintained and further developed

Potential partners who can contribute to the financing of action plans are identified and assembled Share solutions for neighbors and local communities are prioritized.

#### Strengthen and establish partnerships

Coastal stretches with steep slopes hilly landscapes with deep valleys and glacial gorges, moorland and fertile farmlands and a bay with many islands and islets.

Build upon the quality of scenic variety

It is often the case that some opportunities are overlooked - such as the potential to jointly ensure sustainable solutions, which include several of the cultural and natural resources of Samsø.

#### Seize opportunities as they arise

Samsø and the sea around the island affords scenic natural atmospheres, deep relaxation in tranquil surroundings, and summer holiday activities.

#### Utilize the high amount of shoreline

With its many hours of sunshine and mild coastal climate, Samsø has optimal conditions for the production of fruit and vegetables - as fresh and local as it gets.

Advocating New Nordic Cuisine



## Inherent landscape qualities of Samsø



## Resource and energy initiative of Samsø



## An exponent of regional, and local identity

Mediating entrepreneurship within local renewable energy sources and new Nordic cuisine - an exponent within the seaweed island network

In order to emphasize Samsø's role within the network of the seaweed islands, the current identity and characteristics of Samsø become important factors in determining how to inscribe and introduce a new cross-scalar conception.

An overview of Samsø's main initiatives and activities throughout a full calendar year, offers an understanding of the overall processes which also define the local and regional identity.

Samsø is nationally renowned for among other things; the Samsø potato, the Samsø Festival, the Energy Academy, and the scenic nature in general.

Whether being a local inhabitant or a visiting guest, a rough categorization of Samsø's qualities and potentials can be encompassed within two overall characteristics:

(a) Scenic nature - which is of great value for permanent residents while also creating growth within the tour-ism sector.

(b) Innovative use of resources - because of a strong agricultural foundation of local produce, and utilization of renewable energy sources, therefore the basis for strong local bonds and public involvement is strong.

Combined, these specific characteristics constitute and underline Samsø's values within the local community, environment politics, initiatives, and regional branding. Building on these values, in relation to Samsø's geographical and resource-based location, current initiatives, branding, and scenic nature, there is a strong potential role for Samsø being an exponent of the unutilized resource of seaweed across following scales:

(1) The local community (2) The seaweed island network (3) Peripheral Denmark (4) Denmark

Ultimately the following aspects lay an overall common ground for manifesting the inherent values:

- +the inherent qualities of Samsø and the Belt Sea islands
- +the potential of seaweed as an unutilised resource
- +the demonstration potential of a locally based and regionally important research center

The above-mentioned aspects can thus be manifested into:

- +The seaweed network
- +Samsø as an exponent of this net work
- +A research center for seaweed

- which together have the potential of creating a synergy between multiple actors, independent strategies, campaigns, and an unutilized resource.

The potential of strengthening the local and regional identity of mentioned geographies, creating jobs through innovation, knowledge, and harvest of seaweed amidst beautiful scenic nature constructs a strong foundation for the genesis of a conception.



## A national, regional, and local platform

sharing, and the embodied experience

As a place that is operating within the seaweed network, while being locally rooted in its place, the role of the seaweed research center is to encompass and embrace both the local and regional.

The idea is to gather and generate knowledge, spreading this knowledge, and affording an experience of seaweed.

Balancing between the dualities of introvert and extrovert, the enclosed and the open, the private and the public, the focused and the embracing the center grasps across scales - between the international, national, and regional scale of the seaweed island network, to the local scale of Samsø, the surrounding landscape, and the interrelated spaces within.

> ARANGE MENTS University of the second Stranger and State House State

DLVNG GLOCAL FAMAGRE

BUSINESS MEETINGS

NGO INVOLVEMENT

GASTRONOMIC INSIGHT

DEVELOP KNOWLEDGE-COMPANIES

CROSS-DISCIPLINARY VENTURES

ENTREPRENEURSHIP PLATFORM

NEW PRODUCTS, BIOMEDICINE

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## Theme, resource, and exponent

Summarizing a cross-scalar strategy a conception encompassing three elements

Throughout the strategic breakdown, three overall chapters - *theme, resource and exponent* - come into play, defining, portraying and creating a common-thread between various aspects. This is done in order to construct a strong, research-based, informed, and pragmatic foundation in order to unearth - *terroir, a sense of place* - a geographically rooted conception which contains inherent characteristics of cultural, recreational and resource based potentials within the peripheries of Denmark.

On one hand, the map below portrays a geographical extremity of the pe-

ripheries in Denmark - the islands - on the other it reveals an emerged network of unique potentials.

Ultimately, this strategy focuses on unearthing an overall nuanced image of peripheral areas in Denmark. This is done by establishing a seaweed network, emphasizing Samsø within the network as an exponent and proposing a platform - a research center - where we begin understanding variations and multitude of facets of the inherent resources present in each scale from the national, regional, local, and finally the architectural.



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## **Illustration list**

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