Constructing a ‘Green’ Nation Brand
Through Storytelling

Visual and Discursive Impressions from the Danish Case

Olivia Elena Burchea
Karen Louise Foster
Copenhagen Business School
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Thesis Supervisor: Birgit Stöber
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Abstract

Nation branding is an emergent field and is currently marked by a lack of clear theoretical frameworks to accommodate the complexities of real world practice. Particularly in terms of communicating the nation brand there are very few theoretical guidelines of how to manage the challenges that emerge in practice when following the nation branding imperatives set out in the literature. The scope of the thesis is to investigate how Denmark attempts to communicate a ‘green’ nation brand through two stories: of bicycles and windmills. The purpose of our research is to explore how Denmark’s ‘green’ nation brand is constructed visually and discursively through these two stories. The analyzed materials comprise two videos and two publications located on the internet.

The materials have been analyzed by employing a mix of methods: compositional interpretation, semiology and discourse analysis. Further a storytelling framework was used with the purpose of uncovering how Denmark positions itself in a larger narrative context.

The analysis revealed that Denmark attempts to create a ‘green’ nation brand through a two-layered process: the bicycle and the windmill were presented as possessing certain symbolic meanings, which were ultimately transferred to Denmark. The analysis uncovered that the two stories are structured in a very similar way, yet the ‘green’ brand is more prominent in the ‘windmill story’, whereas in the ‘bicycle story’ it was to a large extent diluted. Both stories are rife with contradictions and silences that further undermine the credibility of the brand.
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Chapter 1: Introduction

There is evidence in theory and practice of a wide-spread agreement that nations must brand and differentiate themselves, because failing to do so will endanger the nation’s ability to compete globally for talent, investments, tourists and export markets. As Wodak, de Cillia, Reisigl and Liebhart (1999: 25) point out, “globalization tendencies result in dangers of a loss of national uniqueness”, which summarizes very adequately why nations choose to engage in nation branding activities. What makes nation branding interesting is its interdisciplinarity, combining various academic fields - management, communication, and humanistics. Moreover, it is a field with “little theory but a huge amount of real world activity” (Dinnie, 2008: 13).

Communication is an essential aspect of nation branding. Largely speaking, the purpose is to instill a certain image of the nation in the minds of target audiences, and the messages must be appealing, unique and believable, and of course must also be presented in such a way. Ultimately telling stories about the nation can be a powerful way of communicating these messages because “stories are memorable, produce a richer picture, expand the range of perspectives on an issue, and stimulate sense-making and learning” (Allan, Fairtlough and Heinzen, 2002: 4). Storytelling within the practice of nation branding is permeated by visual communication. The ‘visual’ is a powerful medium for communicating, as images can be both symbolic and persuasive, “molding what and how things are viewed” (Fesenmaier et al., 1996 in Govers and Go, 2009: 144). The visual can be “read like a statement” (Kress and van Leeuwen, 2006: 1), and thus studying the ways in which the ‘visual’ creates meaning is also relevant for understanding how nation brand images can be built.

Denmark, too, has joined the wave of nation branding and has since 2007 engaged strategically in branding activities through an initiative called “Offensiv Global Markedsføring af Danmark” (Global Marketing of Denmark). The stated objective is to “establish a clearer and more positive image of Denmark in areas where it offers specific advantages in the international competition for global talent, tourists, investments and market shares” (OEM, 2010: 3). Brand themes were identified with the intention of creating a “unique story” (OEM, 2007: 29), amongst these, the theme “Green Nation”. Storytelling appears as a cornerstone in the communication strategy, as do moving images “which are a central element to modern communication [...] contemporary, relevant, trustworthy and attractive images are necessary in order communicate Denmark’s competencies” (OEM, 2010: 16).
1.1. Research Purpose and Question

The research interest guiding this thesis is the brand theme “green nation” in the Danish initiative. Branding experts usually recommend that brand themes should be concise and easily understandable (Anholt, 2007; Dinnie, 2008), and therefore the communication of a ‘green’ brand is particularly interesting, as it is a very abstract and complex concept.

Our research approach has been exploratory, and the scope and focus of this thesis have developed and changed continuously in light of our research findings. Initially, we intended to investigate how Denmark worked to establish a “green” brand through international events - specifically the UN Climate Change Conference COP15 held in Copenhagen in December 2009 and the Danish Pavilion at the World Exhibition EXPO 2010 in Shanghai. However, data collection for this focus proved very cumbersome: during our research process, the homepage of the Danish EXPO Pavilion, which was an important source of information, was closed down. Moreover, we were unable to get in touch with the brand organizers of these events for interviews, which would have been necessary for this focus. Some of the research conducted in this phase (several interviews) has since then become irrelevant. The readings and data collected in this phase have nonetheless given us a broader insight into the cross-disciplinary work of the branding initiative, and have certainly sparked the formulation of our current research focus.

With this thesis, we intend to examine how Denmark makes use of storytelling to establish a “green” nation brand through the visual and written presentations of two core stories: the story of Denmark as a nation of windmills and of Denmark as a nation of bicycles. The following research question guides this thesis:

Which brand images of Denmark are presented through the branding stories “windmills” and “bicycles”?

- How are these brand images presented visually and discursively?
- Which role does the brand “green nation” play in these stories?

Our focus is the communication and presentation of nation brand images, within a Danish case. We have chosen to examine how stories are constructed visually in branding videos, and how narrative structures in written communication position the nation in the context of the story.
It has been suggested that research in the field of nation branding is still in an exploratory phase and further studies are necessary in order to understand issues pertaining to the nation brand image. (Papadopolous and Heslop, 2002). In this light, we hope that the case-based research in this thesis can make a small contribution to advance understanding of the complexities when communicating and presenting nation brand images and building national narratives.

1.2. Delimitations

Choice of Focus: Nation Brand Communication
The scope of this thesis is to examine how nation brand communication is conducted. This is an interesting perspective of the field, since the theory offers limited guidance on how to cope with the challenges that emerge when communicating a nation brand - particularly seen in the light of the imperatives set up in the literature. For our purpose, we focus on analyzing in-depth a few key examples of nation branding communication in the Danish case, focusing on structures of language and how meaning is created at different levels of perception. For this reason, it is beyond the scope of this thesis to look at both at the receiver and the producer of communication (such as an analysis of brand images held by disparate audiences, or the intent of the producers). We focus on the ‘text’ itself.

Choice of Focus: Brand “Green Nation”
Keith Dinnie (2008) contests that being an ‘environmentally sustainable’ nation is a very attractive brand, as it carries global appeal and brings associations of responsibility and morality. However, what does it mean to be ‘green’? Environmental concerns comprise many challenges: waste management, air and water pollution, deforestation, dependence on fossil fuels, changing ecosystems etc. In the second Action Plan of the Danish branding campaign, the brand “green nation” became a cornerstone of the branding effort. However, lacking a clear focus for the definition of what Denmark understands as being ‘green’, our project takes its point of departure in an exploration of how this brand can be understood in concrete examples of branding communication. For this reason, we do not delve into the other brand themes of the Danish branding initiative.

Choice of Two Stories: Bicycles and Windmills
In our data collection that started in January up until mid-April 2011 we have looked over a multitude of materials pertaining to the Danish branding campaign: action plans, evaluations, reports, and articles. What caught our attention was the recurring appearance of windmills and
bicycles in many of these materials. Other ‘green’ stories did not seem nearly as prominent. Also in the recommendations set forth by the marketing panel of the Branding Danmark initiative, ‘bicycle’ and ‘energy technologies (M-Panelet, 2010: 21) were mentioned as aspects proving that Denmark is a ‘green nation’. A one-page photograph of windmills in this report, lead us to believe that windmills were of key importance amongst the “energy technologies” to which they referred. By mention of these as “success stories” (M-Panelet, 2010: 20) we became interested in examining how these stories are told. Therefore this project will not deal with the other branding stories which are told by Denmark pertaining to other aspects of Danish society.

Choice of Visual and Written Materials
In order to explore how these stories frame and communicate a ‘green’ brand, we have chosen to analyze visual materials (video) and written material (publications).

Nation branding is a field and practice which is permeated by the use of visual images in its communication. Watching CNN will quickly reveal this. Visual images can be “read much like a language” (Kress and van Leeuwen, 2006: 2), and because “images ‘speak’ to us, they link to constellations of signs and are rhetorical” (Spencer, 2011: 22). Images are also seductive and persuasive:

> “the explicitness of images presents an unarguable reality, yet paradoxically this indexical relationship of images to actual reality has the potential for systematic distortion […] in the hands of those who wish to persuade or shape attitudes” (Spencer, 2011: 22).

Video (the moving image) is particularly “multilayered” (Haw and Hadfield, 2011: 26), as meaning is also created through sound and editing for instance. “What people chose to film and how they film it can become almost as important as the content of what they record” (Haw and Hadfield, 2011: 27), because nearly every angle and perspective can carry cultural meaning. As “shaping attitudes” is the main purpose of nation branding, it is interesting to examine how moving images convey meaning, and guide the viewer towards a certain understanding – “a preferred meaning” (Hall, 1997: 228). This is also seen in light of the Danish branding campaign, which acknowledges that “moving pictures are a central element to modern communication […] contemporary, relevant, trustworthy and attractive images are necessary in order communicate Denmark’s competencies” (OEM, 2010: 16). For this reason we have found it interesting to examine two branding videos.
As the communication of the ‘green’ brand happens through telling the story of “bicycles” and “windmills”, it is also interesting to examine how these stories are told and structured. Analyzing written texts (publications) on a detailed level, can provide insight into the way narratives and discourses are created and rearranged in order to promote a compelling view of the nation.

**Definitions**

*Nation brand* = “The unique, multi-dimensional blend of elements that provide the nation with culturally grounded differentiation and relevance for all of its target audiences” (Dinnie, 2008: 15). We see the nation brand as a construction established in the process of producing and interpreting ‘texts’ pertaining to the nation.

‘Texts’ = Because “virtually everything around us can be considered as textual” (Burr, 2003: 66), we have a broad understanding of the concept of ‘text’: as being anything that can be interpreted for meaning. In the context of this thesis, we view ‘texts’ as the visual and written materials produced by the nation branding actors with the purpose of building a nation brand.

*Language* = We understand language in a broad sense, in the sense that language is a carrier of culture and mediator of discourse (Halliday, 1994 in Fairclough, 1995). In this thesis, film, sound, images, written text, verbal text are all examples of what we consider to be language.

*Nation brand image* = Refers to how a country is perceived (Dinnie, 2008: 42). We view brand image as the visual and discursive representation of a nation in the minds of those interacting with the nation’s ‘texts’

*Story or narrative* = an account of events that reveals four elements: message, conflict, characters and plot. Used with the purpose of branding to engage an audience.

**The Structure of the Thesis**

Chapter 2 will outline in detail the research approaches and methods employed in this thesis. In chapter 3 we will review the existing literature and theory in the field of nation branding and storytelling, and examine what guidelines are given regarding the communication of a nation brand and structuring stories. The case of Denmark’s branding campaign will be introduced in chapter 4,
where the theme ‘green nation’ will be discussed as it is described in the branding Action Plans. The analysis in chapter 5 is divided in two parts: the first part will analyze how the ‘story of bicycles’ is presented, while the second part will analyze how the ‘story of windmills’ is presented. Finally, chapter 6 offers a conclusion of the findings of the analysis as well as a further reflection on the field of nation branding in this light. We will end the thesis with a discussion of the possible future perspectives related to communication in nation branding.
Chapter 2: Methodology

The purpose of this chapter is to outline the methods used in this thesis. This thesis is guided by a social constructionist research philosophy and employs the following methods: case study design, a critical methodological framework inspired by Gillian Rose (2001), and an exploratory approach to the collection and analysis of relevant qualitative data: secondary data mainly from internet sources, and primary data through interviews (as background information) and the interpretation of nation branding ‘texts’. The use and choice of each method will be detailed and justified in the following sections.

2.1. Research Philosophy

This thesis is founded on the social constructionist approach, which generally is concerned with understanding how views of the world are constructed dynamically in interaction (Burr, 2003). Knowledge and understanding is seen as something people “do together” (Burr, 2003: 9). Social constructionists propose the idea that there is no single truth; but rather that several ‘realities’ can exist simultaneously since they are bound to certain negotiated cultural and historical contexts, as “knowledge is derived from looking at the world from some perspective” (2003: 6). Therefore questions concerning language and discourse (how meanings are negotiated) are of central interest for social constructionists: “every ‘thing’ we think or talk about […] is constructed through language and discourses” (Burr, 2003: 105).

Language

Social constructionists view language as an important “resource for constructing different accounts of the world” (Burr, 2003: 14). Language can be seen as a complex “system of representation” (Hall, 1997: 4) – a ‘sign’ system – in which cultural meanings are produced and circulated in a symbolic manner. Meanings are “coded in culture” (Hall, 1997: 23) and therefore our preconceptions shape the way we approach the creation of new meaning, and the interpretation of symbolic signs around us.

Discourse

Discourse is another central element to the social constructionist perspective. Discourse refers to a set of “meanings, metaphors, representations, images, stories, statements that produce a particular version of events” (Burr, 2003: 64). As several ‘realities’ and understandings can exist simultaneously, it is also possible to have several different discourses (or interpretations) surrounding the same event, situation, experience or person. Discourses about objects and ideas are manifested in “texts” (Burr, 2003: 63) or “cultural artifacts” (Fairclough, 1995: 4) – which can be
spoken conversations, written documents, visual material etc.. People navigate around a
discursively constructed world:

“Given that there is virtually no aspect of human life that is exempt from meaning,
everything around us can be considered as textual [...] Objects and events come into
existence for us as meaningful entities through their representation in discourse.”
(Burr, 2003: 66)

The shared understanding of the conceptual framework and discursive context in which a ‘text’ is
embedded, shapes the meaning of the ‘text’ and the way individuals interpret it (Burr: 2003). Norman Fairclough also emphasizes that ‘texts’ therefore function as “spaces of knowledge and belief” (1995: 6). ‘Texts’ can also be important indicators of how “discourses are actualized and extended” (1995: 10), and should be seen as both the products and producers of cultural and historical understandings. Language then becomes the carrier of culture and mediator of discourse, having a social function at its core: “to map relations between text and social structures” (Halliday, 1994 in Fairclough, 1995: 10).

Some discourses are perceived to be more truthful than others, ultimately culminating in an agreed upon “common sense view” (Burr, 2003: 68). Such discourses can be leveraged by persons or institutions, automatically endowing them with power and placing their actions in “an acceptable light” within society (Burr, 2003: 68). Discourses provide frames of reference - a cultural backdrop so to speak - which guide the way in which people, actions, events and situations are interpreted, and provide us with resources to create an account of the world.

**Implications for this Project**

The social constructionist perspective has had a great impact on our approach towards the nation branding field itself: our approach is focused on understanding how symbols, representations and stories as well as dominant discourses are leveraged in order to advance and construct a particular understanding and image of the nation.

The social constructionist approach would presuppose that the understandings of a nation are contingent on the culturally bound discourses which surround it and upon our preconceptions – it has no essence as such. In this view, nation branding, can be seen as a dynamic process of promoting a dominant discourse around a nation, positioning it within the framework of a
dominant/accepted discourse, or remaking orders of discourse. What the nation communicates through its branding efforts – through all types of ‘text’ - carries meaning: it can both be ‘read’ as an indication of how the nation perceives itself, but also as an indication of how it wishes to be perceived by others. We view ‘text’ in a broad perspective: it comprises all communication conducted by the nation to foreign audiences. However, in this specific case, ‘text’ refers to visual and written documents produced by nation branding actors. A specific understanding of a nation comes into ‘being’ in the act of interpreting its ‘text’. The stories nations construct about themselves often “arise from discourses of history and culture [...] which position the nation” (Räthzel, 1994 in Wodak, 1999: 23). By looking closely at the use of language and discourse in nation branding communication, this allows us to examine how narratives can construct the nation as having “particular philosophies and habitual ways of dealing with the world that signal their preoccupations” (Phoenix, 2008: 67). Thus, branding nations can be seen as a process of managing, manipulating and building narratives through ‘text’ and language.

**Reflexivity**

An important consequence of the social constructionist perspective is the idea that “objectivity is an impossibility” (Burr, 2003: 152), which has far-reaching impact on the role played by the researcher. “No human can […] view the world from no perspective at all” (Burr, 2003: 152). Constructionist researchers must acknowledge that they cannot remove themselves from their research subject - even the questions asked by researchers are formed by the assumptions carried by the researcher (Burr, 2003; Steier, 1991). Constructionist research is marked by a particular understanding of the world while also underpinning and contributing to a certain understanding. Reflexivity can be described as “turning back one’s experience upon oneself” and “being conscious of ourselves as we see ourselves” (Steier, 1991: 2,5), making it an introspective exercise which can help make links between knowledge claims, personal experiences of the researcher and the social context of the research more explicit (Finlay, 2003; Burr, 2003) In the last section of this methodology chapter, we will reflect upon our role as researchers in the context of this thesis and how our own understandings and assumptions inevitably have shaped its development.
2.2. Research Design and Methods

2.2.1. Case Study Design

Our research design follows the lines of case study research as we are only looking at one specific case (Denmark) within the nation branding field. According to Yin,

“a case study investigates a contemporary phenomenon in depth and within its real-life context” (2009:18).

This thesis explores how certain images about Denmark are created visually and discursively with the purpose of branding Denmark; exploratory case studies are driven by the purpose of discovering what the realities within a field are, gaining insights and analyzing these in a new light (Saunders, Lewis and Thornhill, 2003).

The advantage of employing case studies as research methods is that it “allows investigators to retain the holistic and meaningful characteristics of real-life events” (Yin, 2009:4). However, case studies are criticized to fail on providing basis for scientific generalization. The purpose of our paper is neither to provide recommendations for the Danish branding actors (or for branding actors in general) nor to evaluate Denmark’s nation branding campaign. Rather, it is to explore and explain how certain brand images are constructed visually and discursively. By exploring this single case study we managed to analyze this phenomenon in-depth; by doing this we hope to shed light upon the way brand images are created on a basic and subtle level. In turn, we hope that this may further the knowledge on image creation within the nation branding field.

2.2.2 Data Collection

Secondary Data

Our secondary data is documentary secondary data which is particularly relevant in case-study research (Saunders, Lewis and Thornhill, 2003: 190). Our secondary data includes both written documents (ministerial publications, promotional brochures etc.) and non-written documents (images and videos), which was collected on the internet. A natural point of departure for our case was the information in the official Action Plans for branding Denmark (in Danish: “Handlingsplan for Offensiv Global Markedsføring af Danmark”) published in 2007 and 2010. These have provided important insights into the official branding strategy and goals.
The collection of our secondary data was guided by an exploratory approach: the purpose was to get a general overview of what the nation branding campaign involved and which messages were being communicated. It was our mission to discover patterns and shared themes between the branding actors, and to gain more insight into the Danish nation branding case. Our search led us to discover that the reoccurring themes and stories of ‘windmills’ and ‘bicycles’ were a cornerstone in the strategy of communicating Denmark’s green brand, which ultimately led us to conduct an in-depth analysis of these stories. Given our discourse analytical research design (in which we sought to examine nation brand ‘texts’), data subject to the interpretation of third parties (such as the media) would not have been relevant.

**Primary Data**

A few key pieces/examples of nation branding ‘texts’ in the form of videos and promotional publications were chosen for in-depth analysis. We consider these our primary data as “there is a direct connection between the research focus and [these materials]” (Haw and Hadfield, 2011: 27) in our case. This is because our research is focused on generating an understanding of how communication is composed and structured in nation branding, by examining in detail the complexities of language and discourse in these materials and how meanings are shaped. We want to observe, understand and discuss the “construct” in these materials, and as such we use them as primary data. (Haw and Hadfield, 2011: 29). Below is an overview of the materials:

Material presenting stories about bicycles:

- **Video:** “Green Bicycle Lanes in Copenhagen”
  - Available on www.denmark.dk – ‘The Official Site of Denmark” which is managed by the Center for Public Diplomacy in the Ministry of Foreign Affairs of Denmark.
- **Publication:** “Let’s Reinvent the Wheel for a Change” (June 2010)
  - Published by the Center for Public Diplomacy in the Ministry of Foreign Affairs of Denmark. Edited by Thorstein Andreasen (representative of the Ministry of Foreign Affairs at Branding Denmark’s cross-disciplinary taskforce).
  - Also available at www.denmark.dk – ‘The Official Site of Denmark’.

Material presenting stories about windmills:

- **Video:** “Wind Power – To Combat Climate Change”

- **Publication:** “The Danish Wind Case – To Combat Climate Change: How to integrate wind energy into the power system”
  - Featured on www.thedanishwindcase.com (which is a domain under www.energinet.dk - the central Danish electricity transmission operator - which is part of the Danish Ministry of Climate and Energy), published by Energinet.dk.
  - The publication is written in accompaniment to the video “Wind Power – To Combat Climate Change”.

The publications can be found in Appendix 6, while the videos can be seen either online or on the attached DVD. To gain a deeper understanding, we encourage our readers to read and watch these materials before reading the analysis.

We realize that these are not the only materials which communicate the stories of ‘bicycles’ and ‘windmills’. However, our reason for choosing precisely these materials is two-fold: firstly that in relation to each story, the two materials can be considered as ‘one unit’ or as complementary parts of an overarching story because they deal with the same subject. Secondly, since they all appear on websites of organizations (or are co-produced by organizations) that are part of the official Branding Denmark initiative, we consider them to be examples of official nation branding communications.

In the case of the materials related to the story of ‘windmills’ our chosen video and publication accompany each other (as evident in their identical) titles. The video appears on the website of the ‘Climate Consortium Denmark’ which is a public-private foundation “promoting Denmark as a frontrunner in climate- and energy-friendly solutions” ¹, was established in 2008 and co-founded by The Branding Denmark Fund amongst others.

Similarly, in the case of the materials related to the story of ‘bicycles’, the video and publication both appear on the ‘Official Website of Denmark’ – therefore we assume that they can be considered as one ‘unit’ (one overall story) as they appear in the context of the same organization (the Center for Public Diplomacy which administers the website). The Center for Public Diplomacy supports traditional political diplomacy by aiming to “increase Denmark’s influence on

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¹ Climate Consortium Denmark: http://climateconsortium.dk/AboutUs.aspx (last accessed on 10.09.2011)
foreign non-state actors” and “to strengthen Denmark’s reputation abroad”\(^2\). The Center is represented in the cross-disciplinary task-force of the branding initiative.

Our interest in these particular organizations stem from a previous focus in our project in which we were examining in which ways they engaged in branding activities and storytelling work.

**Interview**

We also collected primary data by conducting an interview with Mads Mordhorst – associate professor at Copenhagen Business School – who has researched the field of nation branding and been involved in commenting and critiquing the Danish nation branding campaign. We were interested in hearing his views and experiences with the Danish case, and his critical stance towards the field, which helped us gain an understanding of the dynamics of the nation branding field. The interview functions as backdrop against which we can critically view the materials which we examine in the analysis.

The interview was semi-structured, guided by a list of key questions and themes. In keeping with our exploratory approach, it was important to keep the flow of the interview flexible and open in order to probe topics of interest if and as they appeared. When new knowledge emerges, adaptation is a natural part of the research process – and conducting flexible interviews is in keeping with this emergent process (Wilkinson and Young, 2004). This interview was conducted in an earlier phase of the project, and therefore some of topics covered are no longer relevant to this focus. Nonetheless, our discussion with Mads Mordhorst about the field of nation branding, has brought new theoretical insights and critique points. The interview is attached in Appendix 3.

**2.2.3. Critical Methodology**

For the purpose of analyzing nation branding ‘texts’, we have been inspired by Gillian Rose’s (2001) seminal work on critical visual methodology. She argues that “images offer views of the world [and] render the world in visual terms” (2001: 6), yet images are not an objective representation of the world, but rather an interpretation of the world. It is through these interpretations that humans make sense of the world, create meanings and can influence how we behave. Methods such as discourse analysis and semiology are primarily based on the analysis of language. Yet since images convey meaning and are open to interpretation, they can also be considered as a form of language (Kress and van Leeuwen, 1996; Monaco, 2009; Stokes, 2003),

and are thus open to be disseminated through methods such as semiology. As images seldom appear in isolation, but together with other types of representations (spoken and/or written text), this makes video a very rich site for the creation of meaning. In this context we have chosen to look at moving images by employing compositional interpretation and semiology and at written text by employing discourse analysis and a storytelling model.

We take our departure in Gillian Rose’s two methodological terms: sites and modalities\(^3\), yet we only look at the “site of the moving image” (adapted from Rose, 2001) in terms of the compositional modality and at the “site of the written” (adapted from Rose, 2001) in terms of the social modality. In terms of the methods we employ, we use Gillian Rose’s (2001) compositional interpretation (guided by James Monaco’s (2009) detailed vocabulary about reading moving images), Monaco’s (2009) approach to the language of film (semiology of moving images), Fran Tonkiss’ (1998) framework of analyzing discourse and Klaus Fog, Christian Budtz and Baris Yakaboylu’s storytelling model (2004).

**Methods for Video Analysis**

**Compositional Interpretation**

We have chosen the method of compositional interpretation because it is focused on the compositionality of the moving image itself; we agree that in order to understand the meanings moving images tell in certain social contexts, it is first and foremost crucial to acknowledge the power they have on their own (Rose, 2001) and the effect produced by elements of mise-en-scène, montage and sound as Monaco (2009) defines them. Mise-en-scène comprises “the tools with which the filmmaker alters and modifies our reading of the shot” (2009: 205) as different camera angles, focus, distance, movement etc. have different effects on the viewer by emphasizing some aspects while concealing others. Montage is used in order to communicate large amounts of information in a rather short time period by adjoining short shots to each other. Montage addresses issues such as compression of time, rhythm and interference with the action of the shot. Sound “shows its value by creating a ground base of continuity to support the images, which usually receive more conscious

\(^3\) An image can be interpreted at three sites at which meaning can be conveyed: “the site of the image itself, the site of the production of an image, and the site where it is seen by various audiences” (Rose, 2001:16). Each site has different aspects to its processes, which Gillian Rose calls “modalities” (2001:16): “technological modality” entails all the technologies used to create an image\(^3\); compositional modality” comprises the formal strategies an image is created on; “social modality” refers to all social, political and economic context around an image
attention” (2009: 236). In this sense, sound has the effect of creating a setting, an atmosphere. We believe that moving images communicate messages in a language of their own as both the hearing and the sight senses are activated and for this reason we want to analyze them on their own before we can have a look at the social context they appear in.

In performing a compositional interpretation we shortly describe the videos and choose three sequences that will be analyzed in depth by looking at aspects of mise-en-scène, montage and sound.

**Semiology**

The second method we will employ in the analysis of moving images is semiology as Monaco utilizes it in terms of denotative and connotative signs (2009). Semiology will help us gain a detailed and precise insight into the meanings carried by the videos.

“Semiotics is the “study of signs and codes, signs that are used in producing, conveying, and interpreting messages and the codes that govern their use” (Moriarty, 2005: 227). Originally developed by Ferdinand de Saussure to analyze “sign systems” within language, Monaco argues that film can be analyzed as a language:

> “People who are highly literate visually see more and hear more than people who seldom go to movies. An education in the quasi-language of film opens up greater potential meaning for the observer” (2009: 170).

Semiology “addresses the ways in which the various elements of the text work together and interact with our cultural knowledge to generate meaning” (Stokes, 2003: 72). In this sense “the key to semiotics is how the producer of an image makes it mean something and how we, as readers, get meaning out” (Stokes, 2003: 71).

We will depart from Ferdinand de Saussure’s sign model (Moriarty, 2005), in which he unifies a sound/an image with the concept/content it stands for; the former is called the signifier, while the latter stands in for the signified. Further we will analyze the denotative and connotative meanings; at a denotative level, film “can give us such a close approximation of reality, it can communicate a precise knowledge” (Monaco, 2009: 179). At a connotative level, film has specific aids such as camera angles, movement, focus, sound etc. that achieve certain effects in an efficient way. In addition, connotative meanings arise from paradigmatic and syntagmatic connotation; the former
appears from the unconscious comparison of a shot with its “unrealized companions”, while the latter stems from the comparison with the shots preceding and following it. Monaco argues that since film is a one-way-communication “even the most utilitarian of films is artistic in some respect […] so connotations attach to even the simplest statements in film” (2009: 183).

Finally we will use C.S. Peirce’s three-part model of the sign as Monaco discusses it (2009) in order to explain the relationships between the signs:

- The Icon resembles the object by similarity and as such is mainly denotative
- The Symbol is an arbitrary sign that stands for something else that is grasped through convention
- The Index sign entails qualities which are inherent in the relationship between signifier and signified; the indexical sign opens the way for metaphorical expression in film.

In this way we can start to observe how links between concepts and signs are established and how this imparts symbolic meaning.

**Methods for the Publication Analysis**

**Discourse Analysis**

To analyze written ‘text’ (publications) we employ a discourse analytical framework as Fran Tonkiss (1998) approaches it. We departed from Gillian Rose’s perspective on what she calls “discourse analysis I” which “tends to pay rather more attention to the notion of discourse as articulated through various kinds of visual images and verbal texts” (2001:140) as opposed to discourse analysis II, which focuses on the practices of institutions and issues of power and regimes of truth related to them. We will focus on the study of language and text and analyze how certain discourses are pulled towards creating a certain image of Denmark. In this regard we will use Fran Tonkiss’ (1998) guidelines on conducting discourse analysis. She proposes the following discourse analysis process that we have used:

*Organization of the data into recurrent key themes of interest:* “Analysis then becomes a process of sifting, comparing and contrasting the different ways in which these themes emerge within the data” (1998: 254). We have been guided by some of the questions she recommends in this step such as: What ideas are grouped around the main themes? What associations surface? What kind of meanings are triggered? This first step has helped us organize the data within the texts and “bring a
more systematic order to the analytic process” (1998: 254). In this sense we managed to acquire an overview of the discourses employed.

Discovering variation in the texts: “Differences within an account point us to the work that is being done to reconcile conflicting ideas, to cope with contradictions or uncertainty, or to counter alternatives” (1998: 255). Here we have looked for internal inconsistencies and the way some discourses seemed to dismiss alternative accounts. By doing this we managed to comprehend how contradictions and alternative accounts are dealt with, which from a nation branding perspective is challenging and remains unresolved.

Discovering emphasis and detail: “as discourse analysts are concerned […] with the often intricate ways in which these meanings are put together, they aim to examine the twists and turns through which data are shaped” (1998: 257). We have looked for how taken-for-granted notions and formulations that are difficult to challenge are used in the texts. This has helped gain a thorough insight into the creation of meanings regarding bicycles and windmills through various discourses; this detailed account has helped us understand how images of a higher, more abstract order are created about Denmark.

Addressing the silences: “discourse analysis often requires the researcher to read against the grain of the text, to look to silences and gaps, to make conjectures about alternative accounts which are excluded by omission” (1998: 258). Although these stories were chosen as stories which communicate a ‘green brand’ for Denmark, we have not forced them to reveal only ‘green’ aspects, but kept our minds open to all the communications going on (Tonkiss, 1998). By addressing the silences we managed to “place the discourse in a wider interpretative context” (1998: 258); similarly the analysis of the story structures within the texts has allowed us to further our understanding of these discourses. However, the silences we addressed are bound to our own backgrounds and understandings of the world.

The Storytelling Model
As a second method for analyzing texts we employ the storytelling framework Fog, Budtz and Yakaboylu (2004) propose. This framework is not a method as the other three are per se, but rather a model on how to construct branding stories. We used their model to deconstruct the stories told in the two publications, and ultimately the story Denmark tells. By doing this we managed to find out how Denmark positions itself within the story and what kind of meanings this created. This is an
important aspect within nation branding as the theory stresses the significance of differentiation, relevance and appeal in opposition to others.


By looking at each of these elements we managed to uncover the messages Denmark wants to send about itself, what Denmark fights against and stands for, who Denmark is in terms of who/what it is fighting against (what Denmark is not) and finally how Denmark achieved the goals it set to reach. In terms of nation branding, storytelling is deployed as both communication tool as it brings certain messages about Denmark across and as tool for brand creation and strengthening as it creates an entire brand persona endowed with certain traits and values. We will further discuss this model in Chapter 3 where the importance of storytelling within the branding field is touched upon.

**Limitations of the Methods**

The methods we chose to employ in the analysis of visual and written texts have their own shortcomings that will be addressed in this section.

Compositional interpretation has been criticized to neglect the social and cultural context, in which the visuals are produced and seen (Rose, 2001), but that compositional techniques can convey cultural meaning. By combining compositional interpretation with semiology and discourse analysis we hope the analysis will not be limited to mere description and interpretation of “the site of the videos”, but will take into consideration the social context these appear in. Further, this method has...
been criticized for not allowing a “reflexivity that considers the particularity” (Rose, 2001: 52), resulting in reliance on “notions of connoisseurship” (Rose, 2001: 52). In this sense by drawing on semiology we will explore how videos carry meanings that we understand through our cultural lenses.

Semiology has also faced some criticism regarding its inability of producing representative and replicable results as it is an interpretative and thus subjective method (Rose, 2001; Stokes, 2003). As stated earlier in this chapter, our project deals with a unique case, that through its nature cannot be replicated or imitated; thus the findings will not be representative of nation branding videos in general. Furthermore, semiology has been occasionally criticized for lack of reflexivity. Again we will address this limitation by employing a mix of methods that will help us reflect on the nature of the findings.

Discourse analysis is a useful method, because careful attention is dedicated to understanding the complex web of social contexts in which a specific text is embedded. Yet there are a number of challenges to discourse analysis: first knowing when enough connections between different linguistic elements have been discussed (Rose, 2001). We believe that because we are a team of two students, we will scrutinize the relevance of each argument, before it will become a final part of the project. Furthermore, we have time limitations to how many connections we can make, since our project has a clear set deadline. A further challenge is that discourse analysis deals with small-scale data sets; thus findings cannot be generalized in a broader context. Since we are looking at concrete examples of branding communication in the Danish case, we do not expect to generalize about how this *should* be done, but rather we hope to produce understandings that can shed light on some of the issues in communicating nation branding messages as they appear in the theory.

Mixing the methods described in this chapter, “allows a richly detailed picture of [text’s] significance to be developed, and in particular it can shed light on the contradictory meanings a [text] may articulate” (Rose, 2001: 202). By combining these methods, we hope to unravel how different and/or similar meanings are created at different levels, and as we are part of the intended audience, we view our interpretations as equally important.

**2.3. Our Role as Researchers**

As mentioned in the section on social constructionism in the beginning of this chapter, the role of the researcher in interpreting and making sense of ‘texts’ is substantial, and of course we - the
authors of this thesis - also have a profound impact on the conclusions voiced here. We consider the following to be the most important factors which we as individuals have brought to this thesis (and acknowledge that this list might not be exhaustive):

We have two different nationalities: Danish and Romanian. Particularly when writing a thesis about Denmark’s nation branding campaign, our differing backgrounds have had a strong influence on our views concerning the campaign, because “[nationalities] are the source of our language, sentiments and, to a large extent, our thoughts” (Steedman, 1991: 55). Our interpretations are shaped by our cultural and societal history, but also by our individual personal experiences. On a practical level, this has meant that we have had access to documents concerning the campaign, which were exclusively available in Danish language. This has affected the shape of the project, particularly in regards to our insight into the case. In addition, as only one of us speaks Danish, the understanding and critical viewing of these documents have been shaped by the interpretation inherent in the act of translating them. On a more abstract level, this has given us the ability of viewing the branding campaign from the perspectives of “looking in to” and “looking out of” (Denmark). Through discussions, we have to some degree even been able to transfer these views to each other, helping each other to view Denmark and ‘Danishness’ from new perspectives: from the perspective of a foreigner and from the perspective of a Dane.

Because images are “polysemic” (Barthes 1977: 39) and therefore open to a number of potential interpretations, the viewer necessarily engages in an act of interpretation – whether consciously or unconsciously - when making sense of an image. Similarly, textual discourses can be thought of as “icebergs, which require cultural and social knowledge in order to know whether a discourse is meaningful” (van Dijk, 2003: 92); what is observed as ‘meaningful’ within discourse is a highly individual interpretation, which inevitably means that each ‘reader’ understands the material in a different light. In our strategy to approach our chosen analytical material, we were able to take advantage of the fact that we each brought forward different interpretations. The interpretation brought forward in this thesis is a collective interpretation, brought about through two individual interpretations, which have continuously been challenged through in-depth discussions. It, of course, remains but one interpretation, amongst any number of possible interpretations. However, in our collective analysis, we have attempted to be “critically subjective” (Haw and Hadfield, 2011: 45).
We both live in Copenhagen, Denmark and both ride our bicycles every day. Although this point may seem banal, we agree that this very likely has had an impact on our interpretations of how the city and bicycles are represented in our chosen materials. We have an insight into how the bicycle infrastructure works in Denmark and in Copenhagen, which is a knowledge that goes beyond what we can deduct solely from the images in our chosen visual material: we see bicycles every day. Thus we are participants in the bicycle phenomenon which we observe and analyze in this thesis. In regards to the windmill, we do not have similar attachment, as we both have a limited technical understanding – which inevitably also affects the way in which we can critically assess the technical descriptions of windmills as they appear in the materials we have chosen to analyze.

It is also important to acknowledge that we approach the notion of being ‘green’ through our pre-understandings. We have some general knowledge of the debate concerning environmental sustainability, and both have very strong opinions on what can be interpreted as ‘green’ and the standing of Denmark in this regard (e.g. one of us works in a company providing electric vehicle solutions in Denmark). Even though we have attempted to approach this case with an open mind, it is fair to assume these preconceptions have inevitably shaped our interpretation of the nation branding campaign and the findings in our analysis.

The videos and publications analyzed in this thesis were viewed briefly during the preliminary phase of our research process. Therefore, as the research focused narrowed, and these were chosen for in-depth analysis, we had already evaluated that they were relevant from the perspective of nation branding, and the perspective of the brand theme ‘green nation’. Given the overall context of our research, it is fair to assume that this has guided our interpretations, in the sense that we filtered the viewing of these texts through these lenses.

Finally, we would like to emphasize that this thesis is a result of a learning process. Neither of us had any prior experience working with the methods employed in this thesis or analyzing any type of visual material before. It has been both challenging and rewarding. It has also meant that the methods used in the analysis have been guided to a large extent by the steps and vocabulary outlined by the authors who inspired the framework of our analysis, even though we continuously attempted bring in new perspectives in order to nuance our approach.
Chapter 3: Nation Branding Theory

The purpose of this chapter is to introduce and review the theories in the field of nation branding and storytelling. Primarily, we will summarize the views held by Simon Anholt (2007, 2010), Keith Dinnie (2008), Ying Fan (2006), Wally Olins (1999) Robert Govers and Frank Go (2009) as well as Mads Mordhorst (Interview - 2011). We will discuss in broad terms the background, challenges, and imperatives which are found in their literature. In regards to storytelling we will introduce ideas by Julie Allan, Gerard Fairtlough and Barbara Heinzen (2001) and use part of the storytelling model described by Klaus Fog, Christian Budtz and Baris Yakaboylu (2004) to guide part of our analysis.

3.1. The Emergence of Nation Branding

3.1.1. Definitions of Nation Brand

Dinnie proposes a definition that takes into consideration the complex nature of the nation brand as existing in the minds of the consumers, rather than an independent construct of marketing agents:

“The unique, multi-dimensional blend of elements that provide the nation with culturally grounded differentiation and relevance for all of its target audiences”.

(2008: 15)

Anholt argues that “nations may have brands in the sense that they have reputations, and those reputations are every bit important to their progress and prosperity in the modern world” (2010: 2). He defines a brand as “a word that captures the idea of reputation observed, reputation valued and reputation managed” (2010: 20).

Fan offers a further definition concerning what a country has to offer:

“The concept of nation brand refers to the nation as a whole: it describes the country’s intangible assets without any explicit links with a product” (2005: 6).

3.1.2. Nation Branding Background

Nation branding is an emergent field that came around in the early 1990s, when Philip Kotler et al. published Marketing Places: Attracting Investments, Industry, and Tourism to Cities, States and Nations (1993). This text focused on economical and marketing issues regarding places, thus setting the scene for further research. In the late 1990s, branding expert, Wally Olins, published Trading Identities: Why Countries and Companies are Taking on Each Other’s’ Roles (1999), where he discusses why countries have to develop “national brands” to compete globally in three big areas:
inward investment, branded exports and tourism. Yet while countries are forced to learn about branding from companies, the latter are forced to learn how to involve themselves in the communities and society at large.

By the early 2000s nation branding became a field on its own, after a special issue of the *Journal of Brand Management* (2002) was dedicated to it. This field became so intriguing that in 2004 a new journal was launched: *Journal of Place Branding and Public Diplomacy* managed by Simon Anholt.

Anholt (2007) himself states that he has coined the term *nation brand* back in 1996, but not the concept of *nation branding*; he explains the former as a reality – nations have brands, whether they are aware of them or not, while the latter implies that a nation can use branding tools to adjust its external image. Anholt advocates that nation branding is impossible and he now talks now about *Competitive Identity* as “it has more to do with national identity and the politics and economics of competitiveness than with branding as it is usually understood in the commercial sector” (2007: 22). In this context he talks about nation branding as reputation management: when countries become engaged in developing new ideas, technologies or policies that benefit the entire world, people start paying attention, and thus the reputation of the country can improve. Furthermore, he actually argues against governments engaging in promotional activities with the sole purpose of creating a certain brand image, but rather advocates investing in innovations as the driving force of image change.

Olins argues that nation branding is not a new concept as “nations have always competed for power and prestige, branding- although it was never called that- has been an integral element in the competition” (1999: 5). Most nations have “invented” new traditions and identities over their history, but none has succeeded doing this better than France, a nation that “navigated through five republics, two empires and about four kingdoms (depending on how you count them)” (1999: 7).

3.1.3. Why do Countries Engage in Nation Branding?

Nation branding becomes more and more relevant as more than 190 countries are confronted with the challenge of creating wealth. Philip Kotler and David Gertner argue that national economic development has grown out of the hands of public policy, because nations now compete against each other for investments, talented workers, tourists and markets to export their products: “The

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new economic order has transformed economic development into a market challenge as well” (2002: 253). Now, more than ever, nations have to learn to manage their brand efficiently.

Furthermore, it is not a voluntary choice for nations to engage in branding activities, because nations will not remain unbranded: “the alternative to managing national image isn’t not managing it: it is allowing somebody else to manage it for you” (Anholt, 2007: 41). Anholt calls this ‘belligerent branding’ and warns that countries which do not actively position themselves globally, will be left to the mercy of super-powers to assess their skills and knowledge.

The benefits for creating a powerful nation brand are various. Already famous countries offer a “promise of value” to external audiences, but a positive place image also benefits its population representing a “source of pride” and thus creating a stronger competitive strength. Anholt talks about the importance of brands rootedness as the world becomes flooded with brands: “[…] their [brands] rootedness will surely become more and more important to consumers in their constant search for brands with trustworthiness, character and distinctiveness” (Anholt, 2003 in Govers and Go, 2009: 16). Thus nation branding is a key tool for meaningful differentiation.

By engaging in nation branding activities countries will be able to manage their image abroad, which is seen as a significant factor in the global competition among nations. Countries with positive images will experience easier access to all the resources they desire, while countries that have a negative image will find it almost impossible to work on a global scale.

3.2. The Basics of Nation Branding

3.2.1. Developing a Nation Brand

As discussed earlier, nations engage in nation branding activities with the goal of managing their reputations, which ultimately leads them to gain easier access to the resources they desire. Yet successful nation branding is bound to a couple of imperatives and implicitly various challenges. This section will map the imperatives of developing a nation brand, followed by a discussion on the challenges that stem from them.

Nation branding theory stresses the importance of considering the following five factors when developing a brand (Roll, 2006 in Dinnie, 2008):

- Brand vision - the description of the direction and achievements the brand hopes to reach (the goals of the brand)
Brand scope - the outline of the markets the brand can enter (market segmentation)
Brand positioning - the position of the brand in the consumers’ minds (brand associations)
Brand personality – the emotional components of the brand (emotional connections to consumers)
Brand essence – the uniqueness of the brand (what the brand stands for)

Dinnie (2008) argues that the first four components can easily be modified and applied to nation brands, yet the brand essence of a country is difficult to encapsulate creating various challenges. In this context Dinnie (2008) proposes a category flow model of nation branding presenting the elements that have to be given thought when developing and attempting to encapsulate the nation brand essence.

Knowledge and images of nations, in form of stereotypes and cultural understandings, exist outside the country before any attempts to consciously create a certain nation brand have been initiated (Dinnie, 2008; Anholt, 2007). Nations cannot start creating a nation brand personality from scratch as they consist of various and heterogeneous personalities that have been shaped by history and preconceptions (Polunin, 2002 in Govers and Go, 2009). Because these personalities are broad and mixed, they “are likely to resist being shoehorned into a homogenous mould” (Polunin, 2002 in Govers and Go, 2009: 254). In this sense before embarking on the development of nation brands, nations should be aware of the way they are perceived by external audiences. Stereotypes are most often negative perceptions that can possibly harm the country’s economic welfare; as such “effective nation brand management seeks to counter the potentially damaging caricatures” (Dinnie, 2008: 144). However, the stereotypical perceptions can also have a positive nature, which in the context of developing a nation brand have to be harnessed “without allowing the nation brand to become pigeon-holed by a too narrow range of associations” (Dinnie, 2008: 144). In this sense the stereotypical perceptions have to be acknowledged, but eventually overcome. In connection to this the need of bridging the gap between the past and the present is emphasized in nation branding literature as people do not take kindly having their preconceptions challenged:

“We carry on believing the same things we’ve always believed about places, and only change our views slowly and reluctantly. There’s something comforting about those simple narratives that we all hold in our minds about places, and something has to change quite dramatically in the real world before we are prepared to alter those stories or replace them with new ones.” (Anholt, 2007: 27)
A further imperative is building an appealing, relevant and unique nation brand, which is communicated to audiences that have different needs and expectations. In order to appeal to audiences, nations have to do more ‘new things’: “new and interesting things are the only things that get adequately reported in the media, because they are the only things that people are always interested in” (Anholt, 2007: 35). The brand has to further be relevant and “tap into the prevailing zeitgeist” (Dinnie, 2008: 149). Dinnie recommends further: “The social trends and phenomena contributing to zeitgeist require to be monitored and taken into consideration if the nation brand is to have resonance and relevance within society at large” (2008: 151). As far as uniqueness is concerned nation branding literature recommends to diving into the “cultural expressiveness” comprised of heritage, landscape and the arts (Dinnie, 2008).

“Every nation has its own idiosyncratic cultural expressions, and in terms of nation brand management, these cultural expressions represent an important differentiator that decision-makers need to incorporate into the nation brand strategy development” (Dinnie, 2008: 148).

After the relevant and unique features of a country have surfaced, they should be encapsulated in the brand essence as a consistent and coherent story (Dinnie, 2008). However nation brands are subjects to different uncontrollable factors ranging from the individual behaviors of the citizens to events outside the control of the state. In this regard it is important to identify and acknowledge uncontrollable factors. Further try to reconcile possible “urban/rural dichotomies” by segmenting markets in order to address the specific needs of each sector.

Once the brand essence has been defined, countries should “produce a constant stream of new ideas, all of which serve to prove the truth of the strategy and achieve its goals”. Success stories about important milestones should be communicated along the way both to internal and external audiences. Anholt (2007) recommends countries to communicate only if they have something worthwhile to say, and can actually prove it through actions:

“Consumers and media aren’t interested in countries talking about why they think they should be more famous, but they are usually interested in real that are striking, relevant, and part of a bigger, compelling story” (Anholt, 2007: 34)
However nations should not rely just on developing and communicating the brand essence, but on actually but implementing good policies and coupling a nation branding strategy with substance and symbolic actions (Anholt, 2010). A good strategy comprises a nation’s knowledge of who it is and how it is being perceived by others; as such defining the goals and the actions necessary to achieve them is intricately connected to it. The substance is putting the strategy in practice in form of new developments within all societal areas. Symbolic actions are “a particular species of substance that happen to have an intrinsic communicative power” (Anholt, 2010: 13); they are both part of the story and the means of telling it. A successful campaign must incorporate all three aspects consistently and over a long period. In this sense Anholt (2010) recommends that nations undertake the ‘policy-approach’ instead of the ‘communication-approach’, which is based on the premise that peoples’ perceptions can be altered through communication.

3.2.2. Ethical Imperatives within Nation Branding

Branding is a powerful tool a country can use in order to adjust its image, but it should be part of a greater strategy; if the other components of the strategy are by-passed, branding will have no other consequence than leaving a hole in the public budget. A nation should first and foremost invest in developing its political, economic and social systems and only then communicate the developments through branding (Fan, 2005; Anholt, 2010). As mentioned above, Anholt argues that “communications are no substitutes for policy […] altering the image of a country may require something a little more substantial than PR campaigns” (2010: 9). One of the core ethical considerations within nation branding is portraying the realities within a country in an accurate way:

“When applying the concept of a brand to nations [...] there is an ethical obligation to do so in an honest, respectful manner and to acknowledge the limits of how appropriate it is to treat nations as brands.” (Dinnie, 2008: 15).

Anholt (2007) developed the so-called “virtuous circle of competitive identity” that works according to the motto “actions speak louder than words”. Consumers and media are not interested in countries that talk about themselves, but rather in “real events that are striking, relevant, and part of a bigger, compelling story” (2007: 34). As the circle shows⁵, a country should start off with an excellent strategy, that is executed at the highest standards and once the results are achieved, it can communicate the success story globally. This process is self-perpetuating, because once a country

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⁵ See Appendix 2, Fig. 1
produces a couple of success stories, the positive image of the country will strengthen the overall positive reputation of the nation.

If the virtuous cycle were to run the other way around – starting with a strategy which is communicated to people in the hope of convincing them it is true, without actually making sure it is – the communication will turn into propaganda. Choosing policies because of their publicity-friendly character might work on the short-term, but the real intentions and motivations will surface at some point and the government will lose the support of the country’s citizens. In this regard Anholt (2007) points out the ambiguity of whether it is legitimate and moral for a country to communicate both its current realities and its future intentions; communicating both might end up in propaganda-like messages. However, he counter-balances this thought by arguing that even if politicians might communicate empty messages with the purpose of manipulating their audiences, they will not succeed in today’s world where most people can see right through it. Furthermore he contends that the practice of branding is not synonymous with lack of ethics:

“‘There’s something inherently democratic about a brand-led approach to public affairs, because it’s about persuasion rather than coercion, about proving rather than telling. [...] It depends a lot on rhetoric, which has always been an integral part of the democratic approach to public matters, and which is one of the main tools of marketing’” (Anholt, 2007: 40).

A further ethical imperative Anholt (2010) addresses is the legitimacy of the communication activities; the legitimacy of the branding communication might not be sufficient to ensure effectiveness, but it is essential. The audiences have to grant ‘permission’ to the senders of the messages: “the act of communication must be perceived as legitimate” (2010: 84). In other words establishing legitimacy is a pre-condition for effective branding; it is just the first step in the process of brand development: attracting attention to an issue that might concern the rest of the world; it should be followed by an attempt to change the behavior or attitude. Communication should not be focused merely on itself, but rather offer something in particular to the consumer.

Dinnie (2008) discusses environmental sustainability as a differentiator within nation branding:

“‘the heightened concern for good environmental stewardship represents an opportunity to spotlight the level of responsibility with which nations are managing their environmental resource’” (2008: 174).
There are a number of indexes assessing countries’ quality of environmental stewardship, that have gained massive media coverage, such as Environmental Sustainability Index, Ecological Footprint Index, Environmental Vulnerability Index, Environmental Performance Index etc. Nations have the opportunity to create a strong and unique nation brand for themselves if they choose to communicate their commitment regarding environmental issues in a coordinated way.

3.3. The Challenges of Nation Branding

The controversy around the nation branding field lies in the idea of looking at and calling nations “brands”. Anholt argues on the one hand that nations have brands, but on the other hand he says that it is impossible for a nation to do branding as it is done in the commercial sector. As the creator of the Anholt Nation Brands Index, he states that “there has been no detectable correlation between changes in national image and expenditure on ‘nation branding campaigns’” (2010: 2). He points out the fact that marketing communications do not apply to nations in the same way they do for products, and this poses a number of challenges within the practice of nation branding.

Fan (2006) describes brand characteristics in connection to the nation as they are presented in Fig. 3-1 (below). These characteristics bring forward some challenges for nations engaging in branding activities: firstly, the development of a brand essence poses a challenge in the sense that it has to be defined in a narrow, yet distinct (from the competitors’ brand) manner. Linked to this challenge is the imperative to be honest and truthful about the messages communicated. Anholt (2007) argues that countries are already distinct and they already have a brand; in this sense nation brands do not have to be manufactured, but rather “dug out of the history, the culture, the geography, the society of the place” (2007: 75). He further explains that the strategy built around these brands should offer true messages about the place and its people, yet “truth alone is not sufficient to make the strategy inherently competitive […] the world also demands that each nation’s story should be interesting enough for them to pay attention to it” (2007: 75).

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He discusses the encapsulation of the brand essence as an unlikely strategy of differentiation (that is if it is even possible to sum up the essence of a nation):

“Is it really possible, or desirable, to sum up the ‘essence’ of an entire nation in a series of coloured squiggles? […] Will it serve to distinguish the ‘brand’ from its ‘competitors’ (i.e. every other country on the planet), and does it need to? […] Will it really make anyone change their minds about a country they’ve hardly heard of, or about which they have believed pretty much the same things for most of their lives? It seems unlikely” (2010: 88-89).

This brings forth a second challenge: communicating the brand essence to different audiences in an appealing, relevant and unique way without creating meaningless ideas. Fan reasons:

“An image that appeals in one culture or in one situation may not do the same in another culture or in another situation. Trying to be one thing to all audiences renders the message meaningless”. (2005: 10)

Nation’s images are complex and ambiguous, making it difficult to define them concisely for all audiences; each target group has different needs and expectations and as such a “nation brand that tries to be all things to all people will inevitable fail, as it will isolate a significant proportion of its target audience through its vagueness” (Fan, 2005: 10).
A further challenge is moving away from certain historically embedded stereotypes that no longer apply to the nation. Stereotypes and cultural understandings of nations have strong roots within history that will not disappear in the light of marketing communications:

“The historical inertia possessed by these unfavourable associations encapsulated by the nation brand represents a significant barrier impeding its development. The evolution of a nation's image may take years or decades” (Fan, 2005: 10).

People do not take kindly having their long-standing beliefs challenged:

“we carry on believing the same things we’ve always believed about places, and only change our views slowly and reluctantly. [...] and something has to change quite dramatically in the real world before we are prepared to alter those stories or replace them with new ones” (Anholt, 2007: 27).

Thus a nation has to become familiarized with the perceptions others have and try to reinforce the positive ones and weaken the negative ones. Yet defining the audiences becomes an important condition here, since audiences may have differing perceptions (Fan, 2005).

Further challenges are:

- Lack of brand ownership: nations do not have an owner and can therefore not control how its image is used by others
- Difficulty in defining audiences and creating brand messages for each target group
- Benefits of the brand offer are purely emotional since on an abstract level there is no tangible object on offer
- Inclusion and approval of all internal stakeholders in the brand development process
- Legitimacy of nation branding management
- Treatment of the nation as a brand
- Measurement of a nation branding campaign’s success

3.4. Critical Voices within Nation Branding

The nation branding field is a rather young field and is mostly discussed within a practitioners’ setting; most of the books on this subject are written by branding consultants and the only journal
dedicated to nation branding is driven by demonstrating „how place branding strategies are implemented in practice”\(^7\). Thus nation branding still lacks dissemination within the academic field.

However, the interview with Mads Mordhorst, associate professor at Copenhagen Business School, brought some critical insights regarding nation branding. The interview is attached in Appendix 3.

He discusses four challenges regarding nation brands and doing nation branding. Firstly, he underlined the challenge of defining nation brand values since branding is essentialist in its nature. Brands need a clear definition, a limited area of focus. Yet nation brands are defined in broad terms so that all possible opportunities can be exploited. He is critical towards the nation branding literature which states that the first step should be to find the DNA of a nation, its true essence. He questions whether a nation even has a DNA, and if it does “who will define this DNA? The government or the people? If they then define this DNA, what are they going to do with people who do not subscribe to this DNA?” (Interview with Mads Mordhorst). Furthermore, he describes nation brand values as self-contradictory – typical examples are that nations brand themselves as both innovative and traditional, so that all opportunities can be taken advantage of, if they arise. However, a brand cannot incorporate everything, because then it loses its nature as a brand.

In connection to the definition of brand values, Mads Mordhorst discusses the outlining of the purpose of a nation branding campaign. A nation branding campaign ought to first have a clear task, whether it is a political or economic task; only in the light of the clearly set purpose, can a nation define the brand as such. The difficulty of defining brand values also stems from the fact that different audiences have to be addressed. It is certainly important to have a wholesome brand, as Mads Mordhorst explains: “You have to focus but you can’t have the rest of your brand working against you […] the rest has to support this idea” (Interview with Mads Mordhorst). But different audiences expect different stories – while a tourist might look for information regarding the unique aspects of a country, an investor looks for information about the existent infrastructure, level of education, tax system etc. Mads Mordhorst articulates these aspects as obstacles to creating a brand that can address all audiences and be focused and non-contradictory at the same time.

A second challenge Mads Mordhorst refers to is regarding the tools used within nation branding. He believes that nation brands are facts; they developed over the course of the last 200 years, which makes them extremely powerful constructs. Thus, nation branding is possible, yet the tools

\(^7\) Journal of Place Branding and Public Diplomacy: http://www.palgrave-journals.com/pb/about.html (last accessed on 10.09.2011)
recommended by nation branders are not efficient since they are taken from commercial branding; and it was companies that learned from nations how to do branding. But the tools needed by nations must address far more complex issues than those adapted by companies:

“*Nation branding is not just possible, it’s a fact. But the tools you use in nation branding are not developed to brand nations, they are developed to brand products. And it’s quite sufficient to branding products the idea is just – ‘buy an Apple product instead of an IBM product’*” (Interview with Mads Mordhorst)

Finally, nation branding is confronted, as was discussed in an earlier section, with perceived images, which can be outdated or not representative of a nation. Nation branding campaigns aim at altering or removing these images through a process of re-branding the nation. However, Mads Mordhorst is concerned whether images can be erased and replaced by new ones. On the one hand, even if the images are outdated and do not represent the realities of a nation anymore, these are the only images people might have of the nation; and if they are obliterated people are left with no image. On the other hand, he discusses the possibility of actually manipulating them. Although it is not enough that the nation stops telling the old-fashioned stories, they will not stop existing in the minds of individuals; rather a nation has to go against these stories, expressing how unrepresentative they are of its society.

Regarding the manipulations of country images, O’Shaughnessy and O’Shaughnessy claim that audiences tend to believe information that cannot be manipulated by governments; thus when a nation is being branded as being defined by certain characteristics, while media headlines tell a radically opposing story, the audience will rather believe the stories told by the media (O’Shaughnessy and O’Shaughnessy, 2000).

Overall, there are certain challenges and concerns to be considered when engaging in nation branding. The literature available in the present is still practice oriented, lacking reflection regarding the techniques employed and their effects. The theory provides very few guidelines of how to cope with these challenges in their communication efforts, as they will differ from nation to nation.
3.5. Storytelling Theory

Telling stories has been part of human affairs since before literacy; in fact stories are rooted in orality rather than literacy, and act as a “bridge between the world of literacy and the world of orality – the world where nothing is written down and there is nothing to read” (Allan, Fairtlough and Heinzen, 2001: 205).

The National Storytelling Network defines storytelling as “the interactive art of using words and actions to reveal the elements and images of a story while encouraging the listener’s imagination”\(^8\). A story is defined by Oxford Dictionary as:

- “an account of imaginary or real people and events told for entertainment”
- “a report of an item of news in a newspaper, magazine, or broadcast”
- “an account of past events in someone's life or in the development of something”
- “the commercial prospects or circumstances of a particular company”\(^9\)

In today’s world stories are all around us; they help us define who we are and what we stand for. Stories help create meaning while aiding us in making sense of what is going on around us. In a nutshell, stories are identity shapers: we communicate ourselves through them, thus “we can better understand the conflicts of our daily lives and find explanations for how we fit into this world” (Fog, Budtz and Yakaboylu, 2004: 16). Storytelling has gained new territory in the branding field, as consumers are now driven by emotions and desires for a better life when purchasing a product or a service. Thus, products and services are the revealers of values, and we as consumers can pick and choose what we want to believe in as we purchase different products. Furthermore, Fog, Budtz and Yakaboylu (2004) explain that consumers in the Western world are looking for products and services that fulfill their dreams and emotions as their basic needs for life have been met:

“The challenge facing companies today is to build solid values into their brand. This is where storytelling fits in. When companies and brands communicate through stories they help us to find our way in today’s world. They address our emotions and give us the means to express our values” (Fog, Budtz and Yakaboylu, 2004: 20).

Baker and Boyle (2009) argue that stories should focus on the future, while understanding the brand’s past and present, because this will endow the company (or country) with a guide that can

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\(^8\) The Storytelling Network: http://www.storynet.org/resources/whatisstorytelling.html (last accessed on 10.09.2011)

help navigate through the challenges ahead. All good stories share a number of common traits: first, good stories ought to be universal: if a story appeals to many, it will start to spread across continents, cultures and ages (Baker and Boyle, 2009). Secondly, good stories draw on emotions and create a reaction in every receiver. Further on, stories must be relevant: the issues dealt with in the story should reflect the dilemmas and challenges the audiences are faced with, the story should provide answers about the individual reading it, but also about the world we live in (Baker and Boyle, 2009). In addition good stories attract attention because they are entertaining; the more entertaining the story is the more likely it is for listeners to keep paying attention to it. The better a story is told the more likely it is for listeners to internalize the content of the story in a constructive way (Allan, Fairtlough and Heinzen, 2001). Further on, stories are never complete: listeners fill in the gaps, adding new details as the story unfolds. “There is usually no such thing as a ‘complete’ story […] The sender can therefore change the message slightly, without harming its intelligibility or losing the receiver’s attention” (Allan, Fairtlough and Heinzen, 2001: 6).

Stories are memorable; the human brain cannot remember more than seven items at a time, but expressed through a story, these items fall into a logic sequence of events, that will be remembered by the listener as stories unfold as life does. Finally stories work because they are centered on people as both tellers and receivers of stories. Communication through stories is not easy to misuse, since the teller has to keep in mind that the listener is a human being; failing to understand this might impact the effectiveness of the story in a negative way (Allan, Fairtlough and Heinzen, 2001).

3.5.1. The Elements of a Story

The Message

“Without a clearly defined message there is no reason to tell stories – at least not with a strategic purpose” (Fog, Budtz and Yakaboylu, 2004: 32).

Engaging in storytelling should be done if values, attitudes, beliefs and missions are to be communicated. Thus the “central message, or premise of the story, is a moral statement that works as a central theme throughout the story” (Fog, Budtz and Yakaboylu, 2004: 32). As such having one clearly defined message is a crucial step. A story that communicates more than one message might risk creating confusion and messiness.

The message of a story runs through the story like a red thread as the story itself justifies the message and thus convincing the audience of the validity of the moral.
The Conflict

“The conflict is the driving force of a good story. No conflict, no story” (Fog, Budtz and Yakaboylu, 2004: 33).

As written earlier, stories have to entertain and entice. It is the conflict that provides the driving force of a good story. The conflict is “the central turning point of the entire story” (Fog, Budtz and Yakaboylu, 2004: 33). The importance of a good conflict is explained through the aspiration of humans to find balance and harmony; when something upsets this balance, humans take on actions to restore it. It is the conflict that urges action. Thus a conflict is not necessarily a negative aspect, but it actually offers a platform for the storyteller to differentiate between right and wrong, moral and immoral, ethical and unethical. However, formulating an exaggerated conflict might create a chaotic story that no listener will be able to follow. In this context Fog, Budtz and Yakaboylu (2004) discuss the “conflict barometer” as a conflict measurement in terms of the relationship between harmony and chaos. A conflict situated at any of the two extreme ends does not create enough tension to keep the audience captivated.

The Characters

“Generally speaking a successful conflict needs a hero and a villain with opposing agendas” (Fog, Budtz and Yakaboylu, 2004: 38).

Herskovitz and Crystal (2010) explain that when creating a powerful brand narrative, the first element to be taken into consideration is the “brand persona - the articulated form of the brand’s character and personality” (2010: 21) which ultimately is the “essential connection between what a company says and what it does” (2010: 21). The brand persona involves persona archetypes refer to different characters that play different roles. The key figure of a story, the hero, can fall in different categories: amongst others, the hero can be an adventurer, curious to explore the world and overcome the constraints of the everyday life or he can be the rebel, who breaks the rules and fights the dominant systems of norms. Different persona archetypes express different values a country stands for; for this reason it becomes important to create consistent and complementary persona archetypes (Herskovitz and Crystal, 2010; Fog, Budtz and Yakaboylu, 2004).

Stories are enacted by characters that fulfill different roles. In classic fairy-tales every character has a specific role:

- The hero who is pursuing a goal
• The supporter or helper who offers “the means and tools needed by the hero to reach the goal” (Fog, Budtz and Yakaboylu, 2004: 87)
• The adversary or villain whose agenda opposes the hero’s
• The benefactor who grants the hero support through his authority
• The beneficiary who benefits from the solved conflict.

The characters and the purpose of their actions have to be clearly defined as the audience has to be able to identify them. Ultimately a story’s credibility is bound to its characters representativeness in real life.

The Plot

“Given the fact that we can only tell one thing at a time, and that a story exists only as a progression of events within a given time span, the sequence of events needs careful consideration” (Fog, Budtz and Yakaboylu, 2004: 42).

A story is usually segmented in three parts: beginning, middle and end. In the beginning the stage is set: the central characters and the conflict are introduced. The middle is marked by progression of actions where the conflict reaches a point of no return. The conflict increases until the story reaches the climax. The conflict is resolved, thus reaching the end of the story.

3.5.2. The Power of the Metaphor

Stories communicate on the basis of metaphors. A hero who symbolizes all that is good, ethical and morally correct fights the adversary, a witch or dragon for example, who symbolizes all that is evil, corrupt and immoral. Stories about the fight between good and evil are deeply rooted in the human spirit; they have been told again and again, albeit with different characters fighting against different evils. Thus metaphors bring “new meaning to our pasts, to our daily activity, and to what we know and believe” (Allan, Fairtlough and Heinzen, 2002: 208). Metaphors emphasize certain aspects, while neglecting others; and finally they guide actions that reinforce the metaphors.10

3.5.3. Newsworthy Stories

“A story told by a journalist will always be more credible than if you tell it yourself”
(Fog, Budtz and Yakaboylu, 2004: 196).

10 Allan, Fairtlough, and Heinzen (2002) give the example of expressing love as a collaborative work of art and as madness; in the first example, such a metaphor calls for collaboration and imagination, while in the second one agony. Different metaphors call for different actions that ultimately reinforce the metaphor.
Journalists pick the stories they want to feature in the media according to the logic of storytelling, rather than on the emotional content of it. It is therefore important to understand what makes a story newsworthy.

Getting the story across in the media will “increase the credibility [and] can also give widespread visibility, which would cost a fortune for the equivalent in advertising” (Fog, Budtz and Yakaboylu, 2004: 196). Journalists filter the four elements of storytelling through five news criteria (Fog, Budtz and Yakaboylu, 2004: 197): relevance, identification, sensationalism, actuality and conflict.

Conflict and identification are “fixed guideposts for journalists on the hunt for a good story” (Fog, Budtz and Yakaboylu, 2004: 198): the conflict should ideally be focused on people and their emotions. The next criterion is identification; the audience should identify with the characters of the story. Further the story should be sensational: “a good story needs a twist of something unusual […] in an ideal scenario the “norm” will be turned upside down” (Fog, Budtz and Yakaboylu, 2004: 198). Finally, if the story is not current it might not be relevant for audiences. By measuring a story against the five criteria, its appeal to journalists and the media can be determined.

3.6. Storytelling as a Branding and Communication Tool

Storytelling is a useful tool both at a strategic level and an operational level with the goal of communicating messages about the brand to different audiences and strengthening it at the same time. In this sense “places should try to tell their story by designing message, conflict, characters and plot” (Govers and Go, 2009: 264). Storytelling has an invaluable effect, because people “have a natural propensity to organize information about experiences in story format” (Govers and Go, 2009: 146).

At the strategic level, storytelling becomes useful as a branding tool as it creates the entire brand persona, as such it is the means to creating a brand. The core story plays the important role as bearer of fundamental values (Fog, Budtz and Yakaboylu, 2004). Powerful core stories can be stories about the past, the history of an organization or a nation: “… the story becomes embedded in legends and myths […] Stories thus promote cultural norms” (Brown, Denning, Groh and Prusak, 2005: 28). Other stories can be about the future: “They [stories about the future] fulfill real needs by pointing the way forward” (Brown, Denning, Groh and Prusak, 2005: 31). Stories that carry important messages can also be stories about milestones, successes and failures; it is ultimately in

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11 See Appendix 2, Fig. 2
moments of crisis when the proclaimed values are demonstrated and exceptional performance is called for (Fog, Budtz and Yakaboylu, 2004).

At an operational level stories can communicate the desired values and ideas in any given context, whether it is part of an article in a brochure or an exhibition showcasing products.

Using storytelling in branding entails various advantages (Allan, Fairtlough and Heinzen, 2001):

- A multitude of perspectives emerge that will create a richer understanding for certain aspects, while producing new shared meanings
- Quickly attract the attention of audiences
- Involve the imagination as a generator for creativity
- Exploit the extensive cognitive capacity of the human brain, as making sense of our complex world is not possible only through fact-based information

Thus storytelling used as a strategic tool can ensure consistent messages across communications, while as an operational tool it can be used to communicate messages in a wide variety of contexts.
Chapter 4: “Handlingsplan for Offensiv Global Markedsføring af Danmark”

The purpose of this chapter is to review the objectives, motivations and communication efforts outlined in the Danish branding initiative. The section will review the two official Action Plans, as well as recommendations set forth in the publication “Danmark I Verden – Verden I Danmark” (2010). Towards the end of this chapter we will look at how Denmark’s branding campaign intends to deal with the overall challenges of branding a nation, as they were outlined in the theory of Chapter 3.

4.1. Handlingsplan for Markedsføring af Danmark 2007-2010

In 2007, an agreement between the ruling government parties launched the “Handlingsplan for Offensiv Global Markedsføring af Danmark” for the years 2007-2010 which is published by the Ministry of Economics and Business Affairs (in Danish: Økonomi- og Erhvervsministeriet, hereafter OEM). The rising “challenges and opportunities of globalization” (OEM, 2007: 8) are referred to as catalysts for the initiation of this branding effort, and the action plan notes that Denmark “will only make concrete gains in globalization when Denmark’s strengths are perceived by both Denmark itself and relevant target audiences abroad” (OEM, 2007: 8). Overall, the stated objective of the branding initiative is to:

“establish a clear and positive image of Denmark abroad, in order to maintain a strong standing in the global competition for tourists, investment, global market share and creative and competent employees and students. The goal is to extend the awareness of Denmark’s strengths and competencies” (OEM, 2007: 4)

"the knowledge of Denmark’s strengths and competences must rank amongst the top 10 in the OECD countries and new growth economies by 2015” (OEM, 2007: 9)

Some of the tools to be used were: “attracting large, international events to Denmark, ensuring better coordination of branding activities through synergies between the public and private sectors, communicating Danish core competencies and strengths through a common communication platform/framework”. (OEM, 2007: 4) Particularly the ‘communication platform’ provided an overview of the values and strengths which brand actors should aim to communicate in a coordinated manner. Defining these values was necessary in order to “ensure the streamlining of brand messages”, however they were broadly defined to allow for “their development and
multiplicity” (OEM, 2007: 24). An ethnographic study of the image held of Denmark by foreign target audiences, revealed that if an image of Denmark was present with foreign audiences, it was mostly positive. The images held by foreign audiences analyzed in this study led to the formulation of the brand values. The goal was to strengthen the positive images already perceived abroad; and not to change them entirely. The framework aimed to showcase Denmark from four perspectives: as a country which is “responsible and balanced” and also “experimental and brave”, and as a country which values “high quality” as well as “environmental issues, simplicity, and efficiency” (OEM, 2007: 26). These values were to be connected to Danish niche industries such as design, film, environmental and energy technology, agriculture and the Danish society’s welfare model. In particular four areas of action/target groups were identified: to brand Denmark as a tourist destination, study destination, investment destination (linked to modernizing the promotion of Danish exports), and Denmark as a creative nation.

4.2. New Focus: Brand ‘Green Nation’

In 2010, a second action plan was announced for the years 2010-2012, following an evaluation conducted by the Ministry for Economics and Business Affairs (within which the branding initiative is anchored). An important contribution to the revision of the action plan were the recommendations set forth by the marketing panel in their publication “Danmark i Verden - Verden i Danmark” (“Denmark in the World – the World in Denmark”, hereafter referred to as ‘M-Panel, 2010’). The most significant change was the revision of the branding themes/values. The panel recommended narrowing the themes down to three central points: Denmark as ‘Life in Balance’, ‘Innovation’ and ‘Green Nation’. These themes “all refer to specific Danish strengths and competencies, and each is characterized by a high degree of societal responsibility” (M-Panel, 2010: 14). For the purposes of this thesis, we will only delve into a further explanation of the brand theme ‘green nation’.

The marketing panel outlined three main reasons justifying the brand theme ‘green nation’ in the case of Denmark. Firstly, the marketing panel explained that “Denmark is a frontrunner within energy and environmental technologies - both in terms of ideation and implementation”. (M-Panel, 2010: 20) The fact that Denmark hosted the United Nations Climate Change Conference (COP15) in 2009, and that the first climate commissioner of the European Union is Danish, are emphasized

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12 Conducted by ReD Associates (2006)
by the marketing panel as evidence of Denmark’s international standing and reputation in this respect. For the first time, the use of storytelling as a branding tool is concretely exemplified:

“Denmark’s ability to balance high economic growth and stable energy consumption, incorporating the use of renewable energy is a success story with international appeal. This story must be used actively in the branding of Denmark, particularly toward emerging economies which now face large energy challenges” (M-Panel, 2010: 20-21).

The panel argued that because 16.5% of Denmark’s total energy consumption derives from renewable sources, this should be communicated as evidence of a significant effort to reduce CO2 emissions as it shows a “strong political engagement in the environmental issue”. (M-Panel, 2010: 20)

Secondly, the marketing panel claimed that Denmark also can be considered a ‘green nation’ in terms of environmental issues which not only concern CO2 emissions and energy technology. The marketing panel highlighted that Denmark has a “clean and accessible nature, plenty of national parks, and clean urban harbor areas which can be used as bathing and recreational facilities”. (M-Panel, 2010: 21) Particularly Denmark’s “clean urban areas” are explained by an efficient public transportation infrastructure and the “frequent use of non-polluting means of transportation, such as bicycles” (M-Panel, 2010: 21).

Finally, Denmark can also be considered a ‘green nation’ in terms of its agricultural sector which increasingly delivers organic products with concern for a holistic value chain approach “which derives from Danish consumer demand” (M-Panel, 2010: 21). These tendencies are also echoed in the new gastronomic field ‘Nordic cuisine’ which builds upon an ideal of cooking “local and organic” and has gained significant attention in recent years (M-Panel, 2010: 21).

The marketing panel reasons that knowledge of Denmark as a ‘green nation’ would “support and increase the existing export of Danish technologies in the field, while also attracting experts, researchers and students leading to increased cooperation, knowledge sharing and investments in the field.” (M-Panel, 2010: 21) Accessible and clean nature would also attract tourists who increasingly expect travel destinations to be environmentally sustainable. (M-Panel, 2010: 21) The marketing panel thus argues that the brand ‘green nation’ can be expected to have a very wide appeal across different target audiences.
4.3. Handlingsplan for Markedsføring af Danmark 2010-2012

Similarly to the first, the second Action Plan reiterates the overall objective of the branding initiative as "increasing knowledge of Denmark in those areas where Denmark may reap concrete advantages in the international competition for global talent, tourists, investments and market shares". (OEM, 2010: 3) In terms of the brand ‘green nation’ the Action Plan states:

"The image of Denmark as a ‘green nation’ must be strengthened by focusing on energy-friendly technologies, green nature areas across Denmark, and the burgeoning interest in Nordic cuisine and food products [...] the image of Denmark as a green welfare nation will contribute to increasing the sales of products and services, attracting investments in the fields of welfare technologies and green solutions, as well as attracting talent and tourists" (OEM, 2010: 9).

Thus the brand ‘green nation’ is intended to appeal to all target audiences. Although the Action Plan outlines initiatives for all of these audiences, communication of the brand ‘green nation’ is only explicitly detailed in regards to the tourist audience. Here, the focus is on promoting ‘green’ coastal and city tourism (OEM, 2010: 20). ‘Green’ coastal tourism is focused on attracting tourists to,

“national parks and cultural heritage sites [...] emphasizing ‘green’ experiences such as bicycle tourism, hiking and dining experiences [...] particularly branding hotels and hostels certified with the sustainable ‘Green Key’ scheme” (OEM, 2010: 20).

The ‘green’ city tourism focuses on “Denmark’s strengths in the area of sustainability [by] branding amusement parks, festivals, gastronomy, design, architecture, fashion, cultural heritage, green oases, shopping, and sustainable hotel- and conference facilities”. (OEM, 2010: 20)

In regard to promoting to investment audiences and export markets, the strategy for communicating the brand ‘green nation’ is less detailed. The Action Plan explains that Danish strengths within the field of energy and environment, welfare technology and societal responsibility should be emphasized when communicating to these audiences (OEM, 2010: 22). It remains ambiguous
however, exactly which technologies are being referred to, and as such the brand is very broadly defined towards these audiences.

In regard to the “talent” audiences (international students, and skilled foreign employees), the Action Plan does not detail any strategy for communicating the brand ‘green nation’. As there is no evidence of guidelines for promoting the brand to these audiences (despite the claim that these audiences are key to the branding effort), this can be viewed as a significant shortcoming in the branding plan.

A brand should ideally be narrowly defined and have a core message at its heart in order to make it relevant and appealing to its audiences (Dinnie, 2008). Broad brand definitions can dilute the message of the brand and without a clear communication strategy towards its main segments – the nation may fail to reach their audiences with message that are appealing and relevant to them. Despite the realization that, “[Denmark] cannot afford to send out unclear or contradictory signals” and that “targeted initiatives focused on concrete effects within the target audiences must be developed” (OEM, 2007: 22), it remains unclear how the ‘green’ brand will be targeted in a focused manner to the identified audiences.
Chapter 5: Analysis of Materials

In the following analysis we will firstly analyze the nation brand ‘texts’ pertaining to the ‘bicycle story’, and secondly those of the ‘windmill story’. The videos will be analyzed according to the methods described in Chapter 2 – compositional interpretation and semiology. For analyzing the publications, we will firstly employ discourse analysis, where after we will look at the narratives through a storytelling framework. For a better understanding of the vocabulary used in the analysis of the videos, we have highlighted some technical terms (bolded) which are defined in the glossary (see Appendix 1).

5.1. Bicycle Video – “Green Bicycle Lanes in Copenhagen”

In this sub-chapter we will analyze the video “Green Bicycle Lanes in Copenhagen” by using two methods: compositional interpretation and semiotics. The first method entails a brief description of the video and a detailed presentation of mise-en-scène, montage and sound. The analysis of these elements will give us a better understanding of the visual presentation of the bicycle. The second method will bring light into how bicycles are to be understood at a conceptual level - the symbolic meanings created.

5.1.1. Compositional Interpretation

Description of Video

The video introduces us to a girl taking her cargo bicycle out of the backyard of an apartment building. She bicycles throughout the city: through crowded intersections and green bicycle lanes. Three bicyclists are interviewed, which describe the reasons why bicycling is advantageous. In between the interviews the narrator reveals information about the bicycle infrastructure and the existing bicycle culture. The video ends with the girl arriving home and waving to the camera, while the narrator mentions the ‘green’ goals of Copenhagen.

For the purpose of a more detailed compositional interpretation we have chosen three sequences of frames from this video:

- Sequence 1: 00:01-00:15 (16 sec.) – this sequence is an establishing scene that introduces the girl and the bicycle; it sums up seven individual frames.
- Sequence 2: 00:39-00:48 (9 sec.) - this sequence is short in terms of number of frames (two frames), yet they portray the bicycle in the context of the bicycle culture.
• Sequence 3: 01:58-02:15 (17 sec.) – this is the final sequence and plays the role of wrapping up the video.

Mise-en-Scène
The tools for mise-en-scène we use in our analysis are: frame, distance, focus, angle, movement, point of view and lighting.

The first sequence comprises five frames with the girl and her cargo bicycle; they are the main subjects and they never leave the image. The other two frames have different subjects: a bicycle lane and a bicycle post; these two subjects never leave the image either. Thus we can say that these frames are on their own closed frames as the space of the scenes is significantly limited (Monaco, 2009) and our attention is directed to the girl and the bicycle. Moreover, by beginning the video in this fashion, it appears as if we are seeing the city on bicycle through her eyes. In this sense, having closed shots, is meant to create some familiarity with the presenter and the surroundings. The shot distance varies from full shots to head-and-shoulders shots and close-ups. The first frame is a full shot of the girl with the cargo bike and works as an introduction to the subjects of interest (Fig. 5-1).

The frames continue with a detail back shot of the cargo area of the bicycle, a head-and-shoulder shot of the girl on her bicycle (Fig. 5-2), a close-up of the left hand on the steer; these play the role of acquainting the viewer with the subjects. The focus is deep and sharp throughout the entire sequence as it presents subjects both in foreground and background accurately and in a realistic way (example Fig. 5-3).
The angles in this sequence are mainly **low-angles** towards **eye-level angles**; as the “eye-level shot is the least obtrusive” (Monaco, 2009: 228), the effects these angles create are of neutrality and verisimilitude. The movement of the camera together with the movement within the images creates a feeling of reality, as if the viewer is transported on the bicycle or in the cargo area. It appears as if we are viewing the scenery from the point of view of the girl (first-person view point).

The second sequence offers one **open frame** (Fig. 5-5) and one half-way between open and closed (Fig. 5-4). The open frame creates the idea of the bicycle as a moving object, thus the camera is placed still at street level shooting approaching bicycles from a low-level angle. The latter is a low-angle shot of the “ibikecph” logo\(^\text{13}\) (appears in Fig. 5-4) in the right foreground of the shot, while on the left side constant passing bicycles are shot. Thus this image is both closed as it focuses on the logo and open as the bicycles leave and re-enter the shot. Both frames focus on the movement within the frame – the bicycles passing by.

\(^{13}\) I Bike Cph: http://ibikecph.dk/ (last accessed on 10.09.2011)
The point of view in this sequence is omniscient, the shots have deep and sharp focus and there is no camera movement at all. The created effect is of objectivity, verisimilitude and emotional distance (there are no “distractions” within the frames). The first frame is interesting from the point of view of lighting: through use of backlighting the post with the logo is highlighted while the passing bicycles are mere moving silhouettes which when passing in front of the sunlight appear to have a halo around them. Against such lighting bicycles are presented as clean and natural objects.

The third sequence incorporates the final two frames; the first frame (Fig. 5-6) is an eye-level shot with deep and sharp focus of bicyclists passing by. The second frame (Fig. 5-7) is a full shot of the girl, returning to the location she left from. Two written messages appear on the screen while the girl is waving to the camera: “The goal for 2015: 50 percent traffic on bike” and “Lower CO2 with 80.000 ton”. These messages communicate visually the environmental aspect of the bicycle.

The rest of the sequences can be divided into two categories: interview sequences and landscape sequences. The first category is comprised of close-up frames of the three interviewees, while the second presents different landscapes showing bicycle infrastructure (green lane, highly trafficked intersection, bicycle traffic signs, the bicycle lane along the beach).

Montage

As far as montage is concerned, it fulfills its purpose of communicating a great amount of information in a rather short time (Monaco, 2009). The succession of the shots creates a logical progression of the action: introduction of the girl, introduction to the city, and finally the departure of the girl. The video has a round, cyclic structure that is visible through the montage techniques. Paradoxically, the effect created by these is not particularly a noticeable one, because the frames are cut in an unobtrusive manner by using “invisible cuts” and “jump cuts” to compress dead time.
These do not disturb the viewing of the video; actually they work well together with the narration and sound that are parallel to the images.

**Sound**

We will analyze sound by looking at three categories: speech, music and environmental sound (Monaco, 2009).

Speech appears in the form of narration – a female voice-over narrates, and three interviews. Amongst all three categories, it is speech that receives the most attention: its volume is distinctively higher and it is the only source of factual information throughout the video.

The second sound category, music, is relatively constant throughout the video. There are two distinct soundtracks in the video, yet both in the same genre – instrumental chill-out music. The first soundtrack is slightly more dynamic than the second one; the former offers some bass beats in the beginning that fade into saxophone sounds, while the latter has a purer sound because of the soft piano reverberations.

Environmental sounds are present on and off during the entire video: different bicycle bell sounds, cars and bicycles passing by, bird sounds, whistle sounds, heels on the asphalt, wind blowing. Some of these sounds are almost imperceptible, while others more pervasive (the car sounds).

All in all, the sound within the video is non-intrusive in the sense that it does not attract attention to itself. Adding environmental sounds has the effect of spontaneity and verisimilitude, while the relaxed and slow-paced soundtrack creates an enjoyable watching atmosphere. Music is discontinued when there is speech sound; this has the effect of guiding the viewer’s attention away from mere watching to listening and watching.

All in all the video presents its subjects, the bicycle and the bicyclists, in a realistic way. As such the video is somewhere in the middle of being a promotional video and a documentary: on the one hand there is emphasis on the well-developed bicycle infrastructure which reminds us of a “sales pitch”, and on the other hand the realism of the shots provides an objective portrayal of the city of Copenhagen.
5.1.2. Semiology

The semiotic analysis of the video will address the visual and audio elements that compose signs. The **denotative meaning** of the main sign, the bicycle, and the **connotative meanings** and deeper implications will be addressed.

**Denotative Signs**

The main sign present in the video is the bicycle in relation to the bicycle infrastructure as the title denotes: the bicycle lanes and the “green” quality they bear.

The setting of the video is the city of Copenhagen, thus the bicycle is shown in an urban setting; this fact denotes the bicycle as an *urban phenomenon*. Furthermore, there are a high number of city elements that denote the bicycle: bicycle traffic signs, bike counter, the blue colored street pavement signaling bike lanes, the green lanes\(^{14}\). The bicycles shown are most often ridden, only sometimes we can see parked ones in the background. Thus movement is denoted as our understanding of the bicycle is that of a moving vehicle. As far as the audio signifiers are concerned, the bicycle is denoted through words like bicycle/bike (mentioned seven times), bicycle/bike lanes, bicycle traffic, cyclist/biker, cycling areas.

As denotation is “the meaning or referential connection established between signifier and signified” (Beasly and Danesi, 2002: 44) we conclude that Saussure’s signifier-signified-sign model (1966 in Moriarty, 2005) applies as follows to this video:

- Signifiers of the bicycle: the depiction of the bicycle in the video, may it be a cargo bike, a mountain bike or a city bike, the words bicycle/bike as written and spoken, the sounds of a bicycle bell and the sounds of the wheels of a moving bicycle.
- All these signifiers stand for the concept of the bicycle, which is the signified.

As Monaco states: “a film image or sound has a denotative meaning: it is what is and we don’t have to strive to recognize it” (2009: 178); film offers a very accurate depiction of reality and communicates “precise knowledge that written or spoken language seldom can” (Monaco, 2009: 179). In this sense, the video comes very close to depicting the bicycle realities as the compositional interpretation also has managed.

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\(^{14}\) Green lanes are roads only designated to bicycle traffic (from transcript of the video: see Appendix 4)
Connotative Signs

Connotative meanings “stem from film’s denotative ability [but] in addition film has its own unique connotative ability” (Monaco, 2009: 180). In this section we will uncover these abilities in regard to the video “Green Bicycle Lanes in Copenhagen”.

As we follow the girl on her cargo bike through the city, the associations that come to mind are on one hand the discovery of the city’s hidden “beauties” (the beach, the bridges over waters, the intimate narrow streets, the dynamic city pulse). On the other hand we follow a girl who might go to work or run errands through the city, thus the bicycle is seen as a friend who helps in the everyday life.

Furthermore, three cyclists talk about their relationship to the bicycle. The first interviewee tells us that it is convenient to ride the bike. The meanings attached to the bike have a pragmatic nature and the associations to be made are that in the city it is a matter of choice between different transportation alternatives according to convenience. Even though the interviewee makes a simple remark, nothing is simple about the speedy life style of urban areas; the challenge for future cities regarding transportation lies in the need for faster transportation alternatives. Yet it is not just about convenience, but also about safety: the second interviewee says that it is “a nice thing to be secure”\textsuperscript{15}. This rather straightforward remark reveals hidden meanings: people populating urban areas ask for secure surroundings. The connotative meaning attached to the bicycle is that it is a “fighter” against slow and unsafe traffic conditions. The third interviewee emphasizes a third need: “my freedom is much bigger using my bike because I do not have any obstacles in going from one place to the other. So the city is getting smaller – everyone is closer”\textsuperscript{16}. This statement implies two higher-ranking needs of the human being: freedom and community belonging. Thus the bicycle fulfills both lower and higher-ranking fundamental human needs.

Additionally, in the middle of the video there is a frame of a child being carried on the back of a bicycle (Fig. 5-8). On a denotative level we see the same meanings as stated before: the bicycle as an ordinary transportation vehicle that is safe and convenient since one’s children can be transported to and from different places.

\textsuperscript{15} Transcript of the video “Green Bicycle Lanes in Copenhagen” (see Appendix 4)
\textsuperscript{16} Transcript of the video “Green Bicycle Lanes in Copenhagen” (see Appendix 4)
However, on a connotative level, we understand that the human being is exposed to the bicycle from an early age; it becomes part of their life. Thus the bicycle is not just a useful transportation vehicle, but an extension of the human body. The issue of safety works similarly to a **syntagmatic sign**: the meaning of the bicycle as a safe vehicle “adheres because it is compared with other shots that we see” (Monaco, 2009: 181); thus the meaning is enhanced. The child on the bicycle wearing a helmet is an **index sign** that represents safety and responsibility in traffic. Yet it also takes on a symbolic meaning, as children are fragile human beings that need to be taken care; additionally children have to be taught about safety in order for them to become responsible adults. The emphasis of the narration underlines these meanings, as the narrator stresses words like “easier”, “safe”, “parted”, “secure”, “freedom…bigger”, “go by bike”.

The signification system at work in this video is rather extensive as the bicycle retains indexical and symbolic meanings. The index appears in the visual representation: riding a bicycle is associated with happiness; this is represented in the video by smiling characters since the smile can be a measurement of happiness and joy. Furthermore, the bicycle is presented as a fast and convenient transportation vehicle: visually this is represented through the image of the green lanes.

A further index sign is the bicycle as a green vehicle; this is underlined by the audio elements throughout the video: a measurement for “green” is quantity of CO2 emission. In the last shot the narrator tells us “50% of the commuting traffic has to be on bikes, which also means to lower the CO2 emission with 80.000 ton”\(^{17}\). This statement is structured as a formal goal: it specifies by when what has to be achieved with what consequence. Therefore, we are leaving the world of the bicycle and its symbolic meanings and move into urban planning and policy. In this case, the line between

\(^{17}\) Transcript of the Video: “Green Bicycle Lanes in Copenhagen” (see Appendix 4)
denotation and connotation is blurred - as Monaco reveals “in film, connotations if they become strong enough are eventually accepted as denotative meanings” (2009: 187). From this point of view it becomes clear that the bicycle as a ‘green’ vehicle is bridging the gap between an indexical meaning and a symbolic one – ‘fighter’ for a ‘green’ environment. Yet the importance of this symbol is downplayed since it is only mentioned in the last few seconds of the video; the viewer’s curiosity is raised but not met with more information on this matter.

To sum it all up, the bicycle is portrayed in interaction with humans and thus its meaning derives from this interaction. Safety, convenience and freedom are mentioned throughout as main associations of the bicycle. As such the bicycle is depicted as a safe and convenient means of transportation in urban areas; the bicycle also provides freedom for bicyclists while also strengthening the sense of community. As such the bicycle fulfills greater individual and societal needs. The bicycle is also mentioned in connection to the environment, but since this connection is only made in the end of the video, its importance seems to be undermined.

5.1.3. Sub-Conclusion: General Impressions of the Video

In this chapter we have managed to describe the impact of the video with the help of the compositional interpretation and the meanings attached to the bicycle through the semiology. We have concluded that it portrays the bicycle in terms of the infrastructure in a realistic and objective way: although we get a feeling of familiarity regarding the girl on the bicycle, our imagination is never let to break free as the girl disappears from the frames, while the narrator provides factual information regarding bicycle infrastructure. This maintains the viewer’s attention at a rather focused level and does not engage him in an emotional way as there is no real character development. The elements of mise-en-scène all have the effect of ‘talking’ to the viewer from equal-to-equal, while still keeping a distance. The sound is not intrusive: the music is relaxed and soothing, the environmental sounds are present to create an effect of verisimilitude and the speech is inter-tangled with images and the other sound categories. In this sense the viewer is not bombarded with too many narrated facts, but also has time to absorb the visual information.

Through the semiology analysis we have managed to comprehend the different meanings attached to the bicycle. Our analysis has brought to our attention that the main sign, the bicycle, takes on denotative meanings such as a fast and convenient means of transportation, as a safe vehicle which enables humans in their everyday life. On a symbolic level the bicycle is presented as being part of the human being: as an extension of the human body. Additionally, it symbolizes happiness, well-
being and freedom; and creates a sense of community around it. Thus the bicycle is not just a tool that simplifies our lives, but it actually fulfills deep human needs.

5.2. Bicycle Publication - “Let’s Reinvent the Wheel for a Change”
In the following sub-chapter we will analyze the Danish publication (2010) “Let’s Reinvent the Wheel for a Change” with the help of discourse analysis and Fog, Budtz and Yakaboylu’s storytelling model (2004). By employing the first method we will understand how particular discourses are deployed with the goal of portraying the bicycle and ultimately Denmark as a cycling nation. The second method will aid us in grasping the role Denmark has set for itself to play on the global stage. We will deconstruct the story told by using the four elements of storytelling: message, conflict, characters and plot.

5.2.1. Discourse Analysis
The discourses employed in this publication all circle around the Danish Cycling Solution, which is the sum of knowledge and expertise Denmark has gained through the experiences with the bicycle over the last century.

The Danish Cycling Solution is justified through Denmark’s long-standing bicycle culture and thus the knowledge gained throughout time; the solution is promoted as a holistic approach to an extensive number of global challenges. Ultimately the Danish Cycling Solution is used to communicate messages about Denmark’s commitment to sustainability, life quality, research and innovation.

Key themes: Presentations of the Bicycle
The Danish Cycling Solution focuses on the bicycle as a holistic tool that can address a wide variety of challenges and concerns. The publication presents the following presentations of the bicycle:

- Traffic challenges: The bicycle is presented as the “fighter” against congestion and slow traffic conditions.
- Health challenges: The bicycle is presented as a solution against obesity and other “lifestyle diseases such as diabetes and cardiovascular disease” (p. 14) that are defined as global challenges.
- Safety concerns: The bicycle is depicted as a safe means of transportation, given the fact that the infrastructure and bicycle mentality exist.
Environmental challenges: The climate issues are always mentioned in connection to CO2 emissions and the bicycle is in this respect portrayed as a sustainable means of transportation.

Societal challenges: The bicycle helps achieve social integration across age and status.

Life quality concerns: The bicycle is depicted as bringing joy in the individual’s life, improving his well-being.

Individual freedom: The bicycle is rendered as a contributor to personal freedom regarding mobility.

Economic challenges. Finally the bicycle is represented as a creator of wealth since less congestion means fewer hours spend in the car and healthier citizens means a lower burden on the health system.

Urban lifestyle and fashion. The bicycle is depicted as an “accessory” that communicates messages about personal lifestyle and fashion consciousness; thus the bicycle is a status symbol.

The above-mentioned themes are all organized around the Danish capital Copenhagen and further transferred to the entire country. At the heart of the publication stand the ‘Danish Solution’ and the ‘Copenhagen Example’. Thus the bicycle is portrayed in a Danish context and the content of the publication is meant to convince the reader of Denmark’s solution to cycling.

The ‘Danish Cycling Solution’

The idea of a cycling solution presupposes that there is a challenge that the bicycle can solve. But this solution is Danish, thus it is implied that Denmark overcame this challenge and now holds the necessary know-how that it wants to share with the world. We are given recounts on the role of the bicycle in Denmark’s culture, history and lifestyle:

- “Cycling is such an ingrained part of Danish culture that we hardly think about it” (p. 14)
- “Cycling is a natural part of Danish culture and lifestyle” (p. 22)
- “In Denmark, we see cycling as a basic skill on par with walking and talking” (p. 14)
- “In a cycling country like Denmark” (p. 14)

Words like “natural”, “basic” and “ingrained” express the idea of a deeply imbedded cultural value. Thus Danes are presented as cyclists by birth:
“Most Danish children can cycle by the time they start school [...] You often see proud parents walking through the city with children as little as to two years of age pedaling along next to them on small bicycles” (p. 14)

Moreover bicycling is presented as a “contagious bacteria” passed on from generation to generation:

“in families where the adults use a bicycle in their daily life- cycling is very contagious. [...] Continued positive experiences of cycling can almost create dependence on this healthy and green means of transport” (p. 14)

The words “contagious” and “dependence” have negative associations, but in opposition to “healthy”, “green”, “positive experiences” and the idea of parenting, it achieves a new meaning: the bicycle as a healthy addiction. In connection to parenting the bicycle is presented in terms of the “cycling family” as a “symbol of energy and success” (p. 14) and to the cargo bicycle as “a status symbol for the modern metropolitan family” (p. 14).

Yet the bicycle culture does not just exist by itself without maintenance; Denmark is “taking care of the bicycle culture” (p. 14):

“Even here in the stronghold of cycling, we can see that car culture can easily threaten bicycle culture. In addition, children in some immigrant families do not learn to cycle at home” (p. 14).

In these contexts the bicycle is presented as a symbol for family and everything that is associated with it – happiness, nurture, care, energy, and well-being.

A historic account of the bicycle presents a further justification of the ‘Danish Solution’: in the 1960s challenges such as increased number of cars, traffic accidents and pollution problems became impossible to overlook; Denmark developed what now is called the ‘Danish Cycling Solution’ and successfully overcame these challenges. Yet the threats against the bicycle are portrayed as constant and never-ending; but the ‘Danish Solution’ addresses them permanently through a commitment to human-driven development and innovation. Denmark is presented as a “cycling laboratory”, “where new trends and ideas are combined with knowledge gained through years of experience” (p. 4); there are also “experts in city planning, infrastructure, cycling promotion, bicycle tourism, biking, bicycles equipment, health promotion and much more” (p. 4). Battery-free bike lights, fashionable
bike helmets, city bike counters, bicycle parking solutions, waves of green traffic lights and policy regarding snow removal are just a few of the innovations that are exemplified in the articles.

**Promoting the ‘Danish Cycling Solution’**

The title of the publication, “Let’s Reinvent the Wheel for a Change”, works as a metaphor by the attachment of the two idiomatic expressions “reinvent the wheel” and “for a change”. The first means: “To waste time trying to develop products or systems that you think are original when in fact they have already been done before”\(^{18}\). The second is “an expression announcing a decision to make a change”\(^{19}\). By attaching these two, a new meaning is established: while it may impossible to reinvent something already invented – in this case the bicycle, it is possible to discover new challenges the bicycle could address and solve. In this sense the bicycle is presented as something new.

While the title does not incorporate any reference to Denmark or Copenhagen, the logo and what seems to be a slogan appears (Fig. 5-9). This logo plays on the style of New York’s famous city logo (see Appendix 2, Fig. 3), yet the heart has been replaced with a bicycle. Certainly one has to know the New York City logo to make this connection in order to conclude that Copenhageners love bicycles. But as far as city branding initiatives go, New York’s campaign is one of the most prominent.

Logos and slogans are concise communicators of ideas and values and comprise the essence of the company, product or city; thus together the logo and slogan communicate the idea of Copenhagen as a large bicycling city – a metropolis, where the bicycle is loved.

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\(^{18}\) The Free Dictionary: http://idioms.thefreedictionary.com/reinvent+the+wheel (last accessed on 10.09.2011)

\(^{19}\) The Free Dictionary: http://idioms.thefreedictionary.com/time+for+a+change (last accessed on 10.09.2011)
A scan through the table of contents sets the stage for what will follow: reading about cycling (6 times mentioned) in Copenhagen, Odense, Denmark. The content’s background is an image of an empty pedestrian cross; in the right corner the shadow of a cyclist is looming: cyclists are the new pedestrians in Denmark.

The first article in the publication, “The World’s First Cycling Embassy”, communicates very comprehensively to the reader that Denmark wants to position itself worldwide as a cycling nation:

“The Embassy is a comprehensive network of private companies, local authorities, and non-government organizations, working together to promote Denmark as a cycling country nationally and internationally” (p. 4).

The article exhibits Denmark as a frontrunner in bicycling: “international interest in Danish cycling culture has grown rapidly” (p. 4) and now there are “experts in different fields” (p. 4), which can help other countries with the knowledge and expertise which Denmark has collected, and “show them the Danish cycling solutions” (p. 5).

**Associating the Bicycle with Denmark**

As discussed before the publication communicates that Denmark has a long-standing bicycle culture deeply embedded in the Danish culture and mindset. Thus we as readers should understand that bicycles and Denmark are to be thought of together. By equating bicycles with Denmark, the meanings of the bicycle are transferred to Denmark. In this sense Denmark should be thought of as a safe country for bicyclists, environmentally-friendly, concerned about the well-being of its citizens, fighting towards social integration within the society, a fashion and style conscious nation and ultimately as constantly developing new ideas that benefit the society.

This process of transferring the meanings of the bicycle to the nation happens in a fused manner. The excerpt below shows it:

“The development of cycle path networks that can supplement the public transport system also makes a significant contribution to reducing CO2 emissions – in Copenhagen for example, cyclists are saving the city 90,000 tons of CO2 emissions annually” (p. 10).
We are told that the bicycle combats toxic emissions, thus it is an environmentally friendly vehicle, and that in Denmark emissions are reduced with the help of bicycle networks. Through this juxtaposition we can associate Denmark with environmental consciousness.

Despite the fact that the bicycle is presented as addressing many issues and challenges, not all associations are equally strong and comprehensive. Some of the meaning transfers are more exhaustive, such as:

- The bicycle as an accessible and people-friendly vehicle
- The bicycle as a safe means of transportation
- Denmark as a country of cyclists
- Denmark’s expertise, knowledge and commitment to research, development and design-driven innovation regarding the bicycle

**Contradictions and Silences**

So far we have discussed what is being said in the publication and how these discourses are linked to Denmark. However the publication has its shortcomings in the form of contradictory accounts, silences and usage of taken-for-granted concepts.

**Contradictions and Inconsistencies**

Upon closer scrutiny, the publication reveals a number of inconsistencies and internal hesitations. The theme of climate change is recurrent in all articles and paints the image of Denmark as being an environmentally conscious country. We encountered the following contradictory statements in the publication:

“In Denmark, as in other countries, there is a desire to combat climate change” (p. 20).

“Many Copenhageners are of course focused on environmental issues but, when asked, only 1 per cent of Copenhageners mention it as the main reason” (p. 17).

On the one hand the first statement clearly points out that there is a common desire within the country to fight climate change. The second statement emphasizes this desire, yet this is not the reason for the existing bicycle culture.
A further inconsistent association lies in the portrayal of the bicycle as deeply embedded in Danish culture, as something that “occupies so little space in our consciousness” (p. 9), opposed to the portrayal of the bicycle as a fashion and lifestyle symbol. Lifestyle and fashion communicate the identity of an individual and as such are conscious. We read: “cargo bicycles with space for one or several children have also become a status symbol for the modern metropolitan family” (p. 14) and “in recent years cycling has actually become a symbol of personal energy” (p. 20). These statements indicate that riding a bicycle says something about the bicyclist and as such cannot be something he does not think about at all.

Finally, the publication presents the bicycle as helping to achieve social integration: “a bicycle-friendly city helps create a more socially inclusive and socially just city where large groups of people are not excluded from moving around in the city” (p. 10); however, later on we discover that “in Denmark there is a strong tradition for people from all strata of society to cycle” (p. 20). Yet this image of the bicycle in Denmark is contradicted when one article mentions the threats the Danish bicycle culture is facing because “children in some immigrant families do not learn to cycle at home” (p. 14).

Such contradictions create opposing images of Denmark and fail to create a consistent, clear and comprehensive image of how the bicycle culture benefits Denmark.

Silences

Mentions of the environment in connection with the ‘Danish Cycling Solution’ appear in six out of seven articles. In this context, taken-for-granted concepts like climate issues, CO2 emissions, environment, green, pollution, climate change, sustainability, eco-friendliness are used painting a rather vague image of what environmental issues actually entail. In this sense, the publication merely touches upon environmental discussions, but does not engage further with this topic.

Furthermore, the ‘Danish Cycling Solution’ is introduced as a ‘fighter’ against CO2 emissions; this is the only connection made between the bicycle and the environment; it is presented as the only tool needed to reduce CO2 reduction.

While we acknowledge the bicycle as a CO2-neutral vehicle, the fact that the concept of ‘green’ is not defined and the bicycle is presented as the sole CO2 emissions reduction strategy, paints a somewhat incomplete picture of environmental issues. In a similar manner are other issues spoken, or rather not spoken of; obesity and economic concerns are issues that are merely mentioned, but
not really discussed as to how they would be overcome through the promotion of the bicycle as the main means of transportation.

Another silence is embodied in the lack of information (and examples) regarding the bicycle culture in the whole country. Most examples of the bicycle culture and mindset are from urban areas such as Copenhagen, Odense and Århus, yet it ends up being transferred to Denmark as the whole country. Even the article entitled “How Denmark Became a Cycling Nation” points to examples from urban areas, but ends up ascribing the strong bicycle culture to the entire country.

The portrait of the bicycle as a safe means of transportation is depicted in a detailed way; the reader finds out that there are initiatives of infrastructure development, of teaching children traffic rules and of innovative safety equipment. Yet the commitment and need for further development towards making bicycling even safer are mentioned throughout the publication. However none of the articles mention what the present unsafe aspects could be. Thus the following question arises: why is there a need for more safety if bicycling in Denmark is already safe?

To sum up, the publication utilizes a wide variety of discourses in association with the bicycle presenting it as a holistic solution to global societal issues. However, most of these aspects are briefly mentioned, some of them lacking important details, others expressed through contradictory statements. This has the effect of superficial, sketchy and improbable images. We acknowledge the various challenges named in the publication in connection to the bicycle, yet we find it difficult to see it as an all-round solution tackling all of them.

5.2.2. Deconstructing the stories

In this section we will analyze the two stories told in the publication with the help of Fog, Budtz, and Yakaboylu’s story framework (2004). By deconstructing the stories we will be able to understand how Denmark positions itself on a global stage.

The publication presents two stories about Denmark and its bicycle culture that reinforce each other. The first story tells how Denmark became a cycling nation and the second how Denmark’s bicycle culture will help the world. On the one hand Denmark’s success story will help the world because it shares the gained knowledge and experiences; on the other hand the world can learn how to improve living conditions by looking at the exemplary story Denmark tells.
Story 1: “How Denmark Became a Cycling Nation”

This story is told in the seventh article entitled “How Denmark Became a Cycling Nation” (pp. 19-20). The structure of the story follows a classic fairy-tale structure: beginning, middle and end. In the beginning we are introduced to the hero of the story, “Copenhagen and other Danish cities”. In a Danish context the bicycle starts out as being exclusively used by the richer population, but soon it is adopted by all social groups. This development took place within almost half a century (from the early years of the 1900s to the 1960s). At this point that the status-quo is challenged and the conflict arises: the advent of the car. Cars became accessible to more people because the standard of living was increasing: “cars were vigorous symbols that a brighter future lay ahead” (p. 19). However the “bright future” is challenged in the next sentence: “But what is a brighter future? The multitude of cars brought not only prosperity but also pollution, congestion, and traffic accidents” (p. 19). Well into the plot we find out that the increasing amount of cars was upsetting the Danes as their cities were taken hostage. The nascent environmental movement and the oil crisis ‘forced’ Denmark to rediscover the bicycle. As the story rushes to the end, the conflict finds its solution in “city planning that gave space to cars, bicycles, pedestrians and public transport” (p. 20). And out of this resolution the “Danish Model” (p. 20) came around. The story does not end here, because “in the last 10 years, new challenges have emerged” (p. 20) and thus a new story loop surfaces: the present story Denmark is telling.

Story 2: “How Denmark’s Bicycle Culture Will Help the World”

The present story which Denmark is telling is a continuation of the original story, albeit adjusted to a global context. The story is more complex as it tackles multiple conflicts, plot lines and characters. The message of the story is that Denmark can help the world become a more livable place because of the expertise it owns; this expertise is justified through the first story that documents the success of the ‘Danish Model’ - now called the ‘Danish Cycling Solution’.

The story’s conflicts have multiplied: traffic congestion, health concerns (obesity and lifestyle diseases), climate issues, economic concerns, social segregation. However as the story unfolds some of the conflicts remain unaddressed and ultimately unsolved. The multiplicity of conflicts creates confusion and a lack of clarity and comprehensiveness within the areas the hero can solve problems. While none of the conflicts are resolved, the hero celebrates the triumph over the challenges: Denmark has gained enough knowledge regarding its bicycle culture that justifies tags such as
“cycling nation” or “cycling laboratory” and statements like “Copenhagen has at last been placed firmly in the global consciousness as one of the most important cycling cities on the planet” (p. 9).

The characters populating the story also evolved from the original story: the adversary is highlighted more punctually. The story uses an “us vs. them” rhetoric that underlines the adversary as countries/cities that do not adopt the bicycle in the same way Denmark does. This rhetoric evolves from the general by using a ‘wow-effect’: “When people from abroad visit Denmark, they are often surprised by our bicycle culture. […] We get surprised if people cannot ride a bicycle” (p. 14); to the particular by naming particular countries/cities:

“Each day thousands of new cars come onto the streets at the expense of bicycles and ultimately the environment. China is thus facing an exceptionally large task in the coming years to safeguard the environment, and here Odense can help with its knowledge and experience” (p. 6).

On the other hand, the supporters are those cities/countries that adopt the ‘Danish Cycling Solution’. Under the headline “World metropolises take the important first steps”, New York City is mentioned as a city that learned from the ‘Danish Solution’ and an image of a “Copenhagen lane” from Melbourne is shown on the same page (p. 12).

The message of the story is that the hero, Denmark, has managed to solve many challenges that most countries and cities are facing and is now eager to share its solution with the world. Through this story Denmark is portrayed as a responsible towards and caring of its cities and citizens, but also towards the global environment as those who harm the earth are being put to the stand. Yet the hero empathizes with the adversary as soon as he is ready to correct the situation by internalizing the knowledge Denmark provides.

In this sense Denmark presents itself within a combination of different hero profiles:

- the wise hero as owner of expertise and scientific innovation
- the selfless caregiver as Denmark wants to share this expertise with others towards the goal of creating a better world
- the brave hero as Denmark wants to fight for a better world, against all evil
- the ruler as the ‘Danish Cycling Solution’ is presented as the only solution
A problematic element of the story is the multiplicity of conflicts: while the first story focused on a smaller scale conflict (traffic congestion as a result of increasing number of cars), the second story develops multiple complex conflicts. This points out that Denmark wants to fight all evil in the world and make everyone happy, yet by trying this, the “message is likely to become so weak, it becomes irrelevant” (Fog, Budtz and Yakaboylu, 2004: 86). The question remains open if Denmark can overcome all the challenges.

5.2.3. Sub-Conclusions: Impressions of the Publication

The Danish publication tells a complex story: Denmark, the hero, fights against many evils with the help of the ‘Danish Cycling Solution’. The hero managed to overcome some obstacles in the past gaining knowledge and experience. Yet we do not find out how these multiple evils will be overcome through the same ‘Danish Cycling Solution’.

Within the stories, different discourses are employed: on obesity, social segregation, traffic congestion, lifestyle, and the environment. These are contemporary discourses addressing challenges many countries are faced with. By including all of these, the publication gains an international focus and Denmark creates a global stage on which it can communicate its messages. Yet at a closer look, these aspects of modern urban life are briefly called upon, some lack details and some contradict each other. The discourse of the publication is organized around the ‘Danish Cycling Solution’; therefore the identified challenges are not in the forefront, but the ‘Danish Solution’ is. By failing to produce a comprehensive image of these challenges, the publication falls short of convincing the reader of the all-round efficiency of the proposed ‘Danish Cycling Solution’.

While Denmark’s goal is to help the world become a better place by sharing the expertise on bicycling, the risks of engaging in such a quest are high. A hero is always expected to overcome the challenges and restore the status-quo. If he fulfills his task successfully, he will be faced with an even greater task in his new quest. This is where Denmark stands at the present: it has managed to resolve the conflict in the first story, but the conflicts have multiplied since. Even without overcoming them, Denmark presents itself as a successful hero.

5.3 Windmill Video: “Wind Power: To Combat Climate Change”

The following sections contain a detailed analysis of the promotional video “Wind Power: To Combat Climate Change” using two interpretive methods: compositional interpretation and
semiology. These methods allow a discovery of the visual impact of the film, while also looking at how meanings and associations are established in the film.

5.3.1 Compositional Interpretation

This section will highlight and describe frames which stand out in particularly unique ways due to their visual and/or audio effects. By looking at the composition of an image, we can “begin to say something about the image’s possible effects” (Rose, 2001: 52).

Description of the Video

The video “Wind Power: To Combat Climate Change” provides a brief overview into the wind power infrastructure in Denmark, the main challenges in its implementation and its potential as a sustainable energy source. A host/narrator guides the viewer through an explanation of the infrastructure needed for the integration of this energy source in a national electricity grid. The film shows scenes from Denmark to illustrate - with the help of graphical images - how this can be achieved. Finally, the video also makes note of Denmark’s future plans and ambitions to increase the share of wind power already available in the nation’s power grid.

The following analysis focuses on three sequences in the video “Wind Power: To Combat Climate Change”:

- Sequence 1: 00:01 – 01:05 (1 min 4 sec) - consists of 14 separate frames, and the entire sequence can be seen as establishing scene which serves to introduce the main subjects: the narrator and the windmill. Five frames in the sequence involve the narrator: a close-up introduction, and of him driving and parking a red car. Another five frames depict the main subject of the film: the windmills and the concept of wind power. The remaining four frames depict global scenes of climate change, setting the scene for further narration.

- Sequence 2: 01:05 – 01:30 (25 sec) - consists of six closed frames depicting exclusively the film’s main subject: windmills. This sequence is interesting from a compositional perspective, but particularly in regards to narration.

- Sequence 3: 02:46 – 03:43 (57 sec) - consists of seven frames, and concludes the film. Six frames depict windmills, while the last frame presents the departure of the narrator.

Mise-en-Scène

In this film, there is a diverse use of camera angles both at eye-level, low and overhead angles. These perspectives create a sense of visual stability (eye-level shots in the first sequence helps the
viewer digest the many impressions introduced in the beginning of the film). Therefore the viewing effect is not intrusive, in fact quite relaxing (Fig. 5-10). The low-angle perspective appears throughout, but is particularly apparent in the frame which introduces the title of the film (Fig. 5-11).

![Fig 5-10](eye-level angle) ![Fig 5-11](low-level angle)

Depicting the windmill from a low angle in this way, places the viewer in a subordinate position vis-à-vis the windmill and instills a sense of both respect and awe in the viewer for the windmill and “Wind Power” in general. The duration of the frame is quite long as well (9 seconds), and with few visuals available inside the frame, the viewer has plenty of time to be ‘blown away’ by the windmill. This perspective stands in stark contrast to the eye-level angle, as the viewing effect is more aggressive and powerful.

One particular shot in the first sequence makes use of an interesting viewer **point-of-view** perspective (illustrated in Fig 5-12) where the viewer is drawn into the film by ‘driving’ a car. This contrasts to the rest of the film where the viewer remains a neutral on-looker: listening to a technical account of windmills. The point-of-view is that of the narrator, and thus a more intimate relationship is established between the viewer and narrator; which is important for establishing the credibility of the narrator. Having experienced this drive from the narrator’s perspective, the viewer is given the impression of going on a ‘friendly’ excursion together with the narrator.

![Fig. 5-12](Driver's perspective) ![Fig. 5-13](Narrator)

An example of a close-up shot is seen in the first sequence, where the narrator is introduced to the viewer in a head-and-shoulder shot (Fig. 5-13), in which his name and title (“host”) are also presented. This gives the film a more journalistic feel, and endows it with authority and credibility. Putting a face and a name to the narrator’s voice gives the impression that viewer and narrator are acquaintances.

Variations in camera movement characterize the second sequence, which is a closed frame sequence in which all six frames depict the same subject: windmill farms at sea. These alternate between slow and fast pan camera movements. As the camera moves, new windmills continue to appear in the frame, giving a sense that the windmill farms are very large and cover large geographical areas – seemingly omnipresent.

In the third sequence, one frame makes use of a combined pan and tilt camera movement, where the viewer sees two construction workers enter a windmill at its base; where after the camera moves diagonally up the base of the windmill and takes on an extreme low angle perspective looking up at the windmill (similar to that illustrated in Fig. 5-11). The slow tilt movement of the camera enhances the experience of the viewer as subordinate to the windmill as its size is emphasized. As the windmill towers over the viewer and the blades are turning – it gives the impression that they will touch the camera – underlining the image of the windmill as a powerful machine.

Throughout the film, the camera distances vary between long-shots and close-ups. Close-ups are used to underline the feeling of windmills as over-towering and powerful. Wide long-shots are used most often to present windmills as omnipresent in panoramic which allow many windmills in the same frame (f.ex. Fig. 5-14).

![Fig. 5-14](image)

Throughout the film, the focus is both deep and sharp: all elements in the frames are always very clear and easily recognizable. The explicit use of foreground and background is only noticeable in
two frames (Fig 5-12 and Fig. 5-13), yet even in these cases, neither foreground nor background dominates. Given the journalistic and factual approach to the film, having a deep and sharp frame focus keeps the images realistic and in turn makes the entire account of the narrator more believable. This encourages the viewer to engage seriously with the subject matter.

**Graphic Visual Aids**

The film makes use of several visual aids to underline the account of the narrator, and position it within a Danish context. The frame in Fig. 5.15 highlights Denmark’s percentage of wind power in the national electricity grid in comparison to that of other nations. This presentation tricks the viewer’s eye at first glance. As there is no indication of a 100 per cent mark, the largest representational bar could momentarily be mistaken for 100 per cent, as percentages are often thought of in absolute terms. It is only upon closer scrutiny that the viewer perceives of the largest bar as representing 20 per cent. Ultimately, the image delivers the information and numbers very well from a visual perspective, and the effect is clear: it encourages the viewer to conclude that wind power practices in Denmark are superior to those of other countries.

![Fig. 5-15](image)

The image in Fig 5.16 appears on screen during an explanation of Denmark’s electricity market. As the narrator speaks, the key words are highlighted in the side panel, helping the viewer understand and visualize a concept which is difficult to depict in real photographic terms. In many ways this makes the content of the video - even though it is quite technical - understandable and accessible to a variety of different audiences – also for those that do not have prior knowledge of the wind power industry.
Fig. 5-17 appears when the narrator describes the future plans of Denmark to expand its network of windmill farms. The locations of windmills on this map are spread across the country, giving the viewer an impression that windmills are omnipresent in the country. At the same time, the map has an important function of visualizing the map of Denmark for especially foreign audiences. All in all, the graphic images function as important memory devices and enhance understanding of relatively complex and technical concepts.

**Montage**

The overall viewing of this film is fast and logical. The film makes use of parallel montage where two stories unfold: first, the viewer follows the narrator arriving and leaving in a red car in the very beginning and end of the film which creates a frame for the narrative and invites the viewer on an ‘excursion’. The topic of the film is introduced in the middle sections of the film, and here a second, more technical, story unfolds. Thus the montage is logical as the viewer is first introduced to the narrator who guides the viewer through the middle sections of the film. Overall, the editing is quite fast, with frames passing in quick succession, which is especially important in the first sequence as it catches the attention of the viewer, and sparks an interest in the subject of the film.

In three frames of the second sequence, there is an interesting use of a fade-in and fade-out editing technique. Each frame shows a larger section of the windmill farm progressing from approx. 10 windmills in the first frame to 16 and then 40 windmills in the second and third frames. The fading technique between the frames has the effect that the windmill farm grows before the viewer’s eye, and gives the impression that there is an endless ocean of windmills, which is in keeping with the windmills’ general portrayal as omnipresent.

**Sound**

Monaco (2009) identifies three types of sounds: environmental sounds, speech and music, and in this film all of these appear, in the following forms:
- **Recurring environmental sounds**: windmills turning (‘whoosh, whoosh’), helicopter propellers, waves breaking onto shore, birds chirping, a car driving by and fingers snapping rhythmically

- **Speech**: in the form of the narrator’s voice. It is a male voice, with what sounds like a British accent. Extremely captivating and clear voice.

- **Music**: Mostly soothing, yet up-beat background music, never too loud. Drums, finger-snapping and electronic digital beats characterize the music. Towards the end of the film a slow, romantic piano tune takes over.

Most of the environmental sounds are **parallel**, because they complement the images (for instance, the viewer sees the ocean, the windmills or the car while hearing the accompanying sound); and/or relate to the camera angle (during overhead shots the viewer is given the impression of sitting inside a helicopter due to the propeller sound). The ‘whoosh, whoosh’ of windmills turning strengthens their image as powerful machines. The sounds of birds chirping and the softness of waves breaking seem to place the viewer in a very natural setting, imbuing tranquility and calmness. All in all the environmental sounds are not invasive, but combine to give a very realistic picture.

The combination of speech (narration) and music has the effect of guiding the listener’s attention and emphasizing climax in the narrative, through crescendo effects.

For instance when the narrator explains why wind power is difficult to integrate in the power system, up-beat music and fast finger-snapping underscores narration: “what do we do with the power, when the wind is so strong that we generate more power than we can consume, and where will the power come from when there is no wind?”

Towards the end, the viewer sees – for the first and only time in this film – a windmill farm, where all the windmills have stopped turning, at which point the music beat stops abruptly in a dramatic climax and is replaced by a very long, hollow and eerie sounding whistle. This is a very effective use of music, image and narration which all combine in order to visually and audibly to impact the viewer and illustrate a key issue with wind power.

Similarly in the third sequence the narrator states: “Despite the huge challenges of integrating wind power into the grid, Denmark has no intention of settling at 20% wind power. In 2020, a wind power share of approximately 50% of electricity consumption in Denmark is within reach”.

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20 Transcript of the video: “Wind Power: To Combat Climate Change” (Appendix 5)
21 Transcript of the video: “Wind Power: To Combat Climate Change” (Appendix 5)
Speaking very optimistically about the future, the voice of the narrator is accompanied by the soft sound of breaking waves and a slow, romantic piano tune. Visually, the frame presents a windmill farm at sea, and the sea surface is shining as the sun sets in the distance. Overall these frames create a very idyllic, tranquil and relaxing feeling; suggesting that Denmark has a beautiful dream. Lastly, the use of lighting in this frame is also interesting: the windmills in the foreground are backlit by a soft orange sunlight, making the windmills appear as natural and peaceful objects.

The compositional interpretation showed the viewer is placed in a subordinate position to the windmills, which therefore are perceived as powerful and over-towering, inducing awe and respect. Camera movements have the effect of presenting the windmills as omnipresent, while lighting presents them as natural and pure. Through narration, the viewer is lead to understand that windmills should be seen in a Danish context.

5.3.2 Semiology
Films are “continuums of meaning” (Monaco, 2009: 178), because meanings deducted from film are contingent on images in previous sequences, accompanying sound and narration which all unite to construct the viewer’s understanding of the film. The following sections will identify the main signifiers and signifieds which construct the denotative meanings of the dominant sign: the windmill. Thereafter, other signs appearing simultaneously will be discussed in terms of their connotative and symbolic functions identifying how these impact the meaning carried by the windmill. Finally, we will discuss how narration also creates meaning.

**Denotative Signs**
In this video, the dominant and recurrent sign is the windmill. Windmills are primarily signified by the word “wind turbine”, its sound (“whoosh, whoosh”) as well as the movement of the turning windmill. The written and spoken word ‘wind’ is also a signifier, as are recurring images of the windmill (whole and/or parts). The relationship between these signifiers and the signified is iconic because the viewer understands instinctively that they compose the actual physical windmill.

The word “wind” is an extremely important signifier for the windmill, as it is combined in many different constellations of words such as: wind power, wind conditions, wind turbine, wind power share, wind farm, and wind case. By attaching new words to this core signifier, the meaning of the signified becomes more multifaceted. It helps the viewer connect the signified windmill to concepts such as weather, electricity, energy, construction, and example. Some of the words could be
considered new signifiers of the windmill; however “wind” and “wind turbine” remain the core signifiers. These word combinations have an indexical function which lies between that of denotation and connotation: on one hand they produce a conceptual mental image of a windmill (denoting it), while also associating the windmill with other concepts (creating connotations from it). The indexical relationship between the signified and these ‘new’ signifiers is encoded through a certain “referent system” (Williamson 1978 in Rose, 2001: 89), presupposing a viewer knowledge which preexists the viewing of the film. The viewer must know that windmills produce energy/electricity/power from a natural source (wind).

By extending the meaning of the primary signifiers in this way and connecting it to other ‘common knowledge’ concepts, these words almost become synonymous: the concept ‘wind’ and ‘wind power’ is inextricably associated to concepts of ‘energy’ and ‘electricity’. Because they refer the viewer towards new concepts but also back to the signified windmill, a more holistic and multifaceted meaning is attached to this sign.

**Connotative Signs**
By surrounding and embedding the windmill in other signs such as ‘technology’ and ‘nature’, the windmill starts to connote more nuanced meanings as the qualities normally associated with these other signs are transferred to the windmill. An overview of how ‘technology’ and ‘nature’ are captured and denoted:

Signifiers of ‘technology’ are: *images* of technicians, engineers, onsite workers, cables, uniforms, computers, graphs, and screens; as well as *words* such as ‘tool’, ‘scheme’, ‘system’, and ‘grid’; and the sound of helicopter propellers.

Signifiers of ‘nature’ are: *images* of blue oceans, blue skies, green fields, wide horizons, panoramic landscapes, and the sunset; as well as the *sound* of birds chirping and waves breaking onto shore.

Seeing uniformed technicians enter the base of a windmill with tools for reparation reminds the viewer that the windmill is a man-made machine. Images of transmission system operators with multiple screens and graphs suggest that windmills require great technical expertise in handling. The narrator explains:

> “the challenge is when thousands of windmills are connected to the power grid [...]  
> For what do we do with the power, when the wind is so strong that we generate
more power than we can consume, and where will the power come from when there is no wind?"\textsuperscript{22}

Surrounding the windmills with signifiers of the sign ‘technology’ (system operators), gives the notion of technology a connotative metonymic function, as the viewer is led to associate great technological expertise with the construction and maintenance of windmills, effectively equating windmills with technological expertise.

The fields (signifiers of ‘nature’) are always very green and lush, creating associations of sustaining life, while the oceans are wide, open, and calm. Effectively, the sign ‘nature’ connotes tranquility, stability, and purity. By placing windmills at the heart of this sign (as dotting fields and oceans), windmills are seen as central in nature. They are shown as natural and peaceful objects, which do not disturb nature: the natural sound of waves suggest that they are soothing and do not harm nature. It gives the impression of windmills ‘growing’ out of and being ‘in sync’ with nature. By juxtaposing the denotations of the two signs - nature and windmills - the characteristics usually attributed to nature seem to be transferred to windmills, making them seem also natural, pure and clean. This link between nature and windmills is strengthened by knowing that windmills produce what is commonly called “clean” energy – the narrator explains that “wind is the most abundant natural energy source in the world”. Windmills thus manage to harness a natural element, and to create energy which maintains nature. Windmills can be viewed as ‘natural machines’.

The integration of the three signs – windmill, nature, and technology – and all of their separate and interlinked connotations is evident in the frame introducing the title of the film. (Reference to this frame was also made in the compositional interpretation (see Fig. 5-11).

Here, nature is denoted in the words “climate change”, while the notion of technology is manifested in the dominating position of the windmill, which suggests that it is a powerful machine. The title functions as “anchorage” (Barthes, 1977: 38-41) which “helps the viewer/reader to choose the correct level of perception – it focuses their gaze and guides understanding and interpretation” (Barthes, 1977: 40). The subtitle, “to combat climate change” allows the viewer to perceive of the windmill as an instrumental ‘weapon’ or machine to eradicate climate change.

\textsuperscript{22} Transcript of the video: “Wind Power: To Combat Climate Change” (Appendix 5)
This frame concludes a series of impressions created in the four preceding frames which all depict images nature in a detrimental state (melting ice caps, a flooded city, drought areas, and a pollution factory chimney). The narrator explains (as the first sentence in the film):

“Not a single day goes by without mention of the environmental and climate challenges facing our world. The ice caps are melting and oceans are rising as we quest for answers and durable solutions. The good news is that there are sustainable answers and solutions: one of the most convincing is wind power.”

Here images and narration combine very dramatically to underline that nature is under grave threat, and which role wind plays in the scenario. In this sequence, the windmill functions as a connotative, metonymic sign because it is associated with ‘sustainable energy’ which then in turn is seen as representing the solution to climate change (Rose, 2001). In order to understand this metonymic relationship, the viewer needs not only to know that windmills produce energy, but also that this energy is sustainable (i.e. that it does not emit any greenhouse gases), and be familiar with the causes of climate change (f.ex. the emission of greenhouse gases into the atmosphere). Only with the knowledge of these “codes which fix this [association] between sign and concept” (Hall, 1997: 21) will viewers truly grasp the windmills’ representation as solutions to environmental challenges.

The signs nature, technology and the windmill thus combine and become syntagmatic because they gain their meaning from each other, and from the meanings which were elicited in preceding frames (Rose, 2001). Similarly, once this connection has been made, the viewer will attribute these meanings to these signs when they reappear in later sequences of the film. It is precisely for this reason that films are considered “continuums of meaning”.

**Creating Meaning Through Narration**

In the narrator’s description of “wind” and “windmills”, some of the words used are: “good news, [wind power is] abundant, cheap, convincing, tricky, [it] fluctuates”. These are strong adjectives and descriptions that both make a pragmatic case of the pursuit of wind energy (wind is abundant, cheap, convincing) and spark hope for the future (“good news”). They also describe why technological expertise is necessary (wind is tricky, it fluctuates). These mostly positive expressions underline the viewer’s understanding of wind as desirable to harness, but also as a very difficult to manage, requiring expertise.

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23 Transcript of the video: "Wind Power: To Combat Climate" (emphasis added) (See Appendix 5)
5.3.3 Sub-Conclusion: General Impressions of the Video

The compositional interpretation revealed that the video presents its main subject, windmills, as powerful man-made machines, inducing both awe and respect. Moreover, the windmills are shown as natural and pure, and omnipresent in Denmark. Visual graphic aids functioned as important devices for enhancing understanding and memory of complex and technical concepts associated with the windmill, and encouraged an understanding of Denmark as a wind power leader. Environmental sounds gave the film and subject a realistic feel, and positioned the windmill in natural settings, while music and narration went hand in hand to guide the viewer's attention. Putting a face to the narrator's voice created a feeling of intimacy, as being 'acquaintances', and established the narrator's credibility. The journalistic feel of the video, encouraged the viewer to engage seriously with the subject matter.

Many of the same impressions were confirmed in the semiotic analysis. Here we discovered that the concepts of “wind power” and “sustainable energy” were linked by a metonymic connotative relationship, which ultimately had the effect of depicting the windmill/wind power as a solution or weapon to fight climate change. By embedding the sign “windmills” within other signs of “nature” and “technology” a transfer of meaning was evident. The qualities usually associated with nature and technology were transferred to the windmills, making them as seem natural, pure, clean as well as powerful, man-made and to be handled with great technical skill. Through narration, the concepts “wind” and “wind power” were presented as challenging and difficult, suggesting that managing wind should be seen as great achievement – an “amazing” story.

5.4 Windmill Publication: “Wind Power: To Combat Climate Change”

In the following section, we will analyze the publication “Wind Power - To Combat Climate Change: How to Integrate Wind Energy into the Power System” (2009) which is published by Energinet.dk. We will firstly use discourse analysis to examine the themes of the text, while paying close attention to its rhetorical organization. Secondly, we will examine the narrative structure of the publication in order to discover how storytelling is performed; allowing us to see how Denmark is positioned and framed.

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Transcript of the video: “Wind Power: To Combat Climate Change” (See Appendix 5)
5.4.1 Discourse Analysis

*Key Themes: Environment, Future and Global Sustainability*

The main themes which appear in this document are centered around notions of *climate change*, the *future* and *global sustainability*. Generally, these themes are linked through a “challenge-solution” relationship.

Climate change is presented as omnipresent: it happens “right before our eyes” (p.5) and “not a single day goes by without mention of [it]” (p.5). Seemingly, this issue occupies everyone in the world. It is a problem that requires urgent global action, and must be “combatted” (p. 1), which is why the world is on a “quest for answers and durable solutions” (p. 5). Here, the word “quest” suggests that fighting climate change is a difficult and hard task or journey which requires a long-term commitment. The word “combat” brings to mind images of battle and war. Together the idea of fighting climate change is presented as a long war.

The text suggests that the cause of these global climate challenges can be attributed to the “world’s growing energy needs” (p. 5). Therefore the role of wind power is portrayed as instrumental, because “wind power can make our future more sustainable” (p. 3). The text does not clarify why precisely wind energy is sustainable, or more sustainable than other forms of energy. Becoming “independent of fossil fuels” (p. 3) is described as a “vision” (p. 3), but there is no explanation why this is desirable. It is clear, that a general knowledge of energy and climate issues is taken for granted, because references are brief and superficial. Writing in this way suggests that these linkages are generally accepted truths (i.e. that sustainable energy is the solution to climate change).

The future is presented as being greatly endangered by climate change. Formulating and reflecting on “long-term visions” for a sustainable future (p. 3) are presented as both responsible and necessary actions, in order to secure the future survival of the planet. The following image very clear illustrates the interplay of these themes:
The carefree and innocently playing child symbolizes the next generation and hopes for the future, while the polar bear symbolizes the environment and eco-systems, which both are endangered by climate change. The globe shows that climate change is an issue that affects everyone. Particularly the image of the playing child is a powerful one: she represents the idea of family, a notion that most readers will be able to relate to – everyone hopes and aspires to a better future for their children. The elements of the image are all pictured as powerless towards imminent climate changes, but also blissfully unaware of their existence. By making references to notions such as innocence and family in this way, it instills in the reader feelings of urgency and moral obligation to address the issue.

*Constructing the Wind Power Solution as ‘Danish’*

There is evidence that retelling historical events and referencing the development of the wind industry in Denmark, serves to construct the ‘Wind Power Solution’ as inherently Danish. Moreover, discourses pertaining to the past are used to justifying claims to expertise and experience.

Some examples are the following passages: “ten years on, these programs have made us wiser” (p. 27), or, “over the past 25 years, the invisible wind has become one of Denmark’s most valuable natural resources” (p.11). In the final pages, the publication states “our energy systems [are] all based on experience gathered and optimized over the last 25 years. “ (p.56). Referring to the past is a rhetorical strategy used as grounds to establish credibility and respect. Expressions such as “Denmark’s immense experience/ good experience/ constant political focus/ long-term cooperation” (p. 7) give the reader a sense of historical continuity and commitment. In this way, having a history within a field equates to having a deep-seated knowledge of this field - it gives Denmark “an edge” (p. 26) and serves to convince the reader that wind power ‘actually is’ Danish.
Similarly when talking about the future, the text reads: “[a wide range of tools] must be developed in the future in order to meet our ambitious climate goals and to ensure that Denmark will continue to be “wind power champion” (p. 11). The words “will continue” in this context make reference to the successes in Denmark’s past and suggesting that Denmark still is a ‘champion’. This formulation is used to foster faith that Denmark can and will achieve their stated future goals – and to promote them as both realistic and achievable.

Comparing the wind industry of Denmark to that of other nations, is part of an ‘us vs. them’ rhetoric, which was also evident in the video (see Fig. 5-15). Percentages are meant to support claims of leadership in a factual manner, perhaps in the hope of achieving a ‘wow-effect’.

Other passages highlight Denmark’s leader position in comparison to other nations, either implicitly or explicitly. For instance:

“Denmark gained a head-start [to other nations] in wind technology – a head start that has been growing ever since” (p.10)

“In many other countries, politicians lack a proper decision-making basis which hinders the development of renewable energy at sea” (p. 27)

“As one of the few European countries, Denmark has a long-term plan for offshore wind turbine sites” (p. 26)

In some cases Danish strengths are highlighted (f.ex. its ‘head-start’ and ‘long-term plan’), but in other examples, the weaknesses of other nations are highlighted to signal what Denmark ‘is not’ or ‘does not lack’. By indicating that other nations do not have a “proper decision-making basis,” the text implies that Denmark, by contrast, does.

Words like “pioneer” and “front-runner” which frame a leadership position, connote notions of Denmark being innovative, daring to experiment and take chances, which is reflected in the statement “in the 1970’s [wind energy integration] was completely uncharted territory [for Denmark]” (p. 10). These types of expressions can also be seen as belonging to the ‘us vs. them’ rhetorical strategy: seeing that there can only be one ‘world champion’, other countries – by consequence - must rank lower.

Finally the solution is constructed as being the result of a unique mentality:
“A targeted strategy, an unrelenting, active political effort and a unique innovation culture have created this Danish success story. We call it the Danish example” (p. 6)

Here, words such as “effort / unrelenting” seem to make reference to notions of difficulty and ambition, suggesting that Denmark has been head-strong and determined. Differentiation of Denmark happens through the words “unique innovation culture”. The wind industry becomes the foundation for a national uniqueness by describing it as a product of national culture, suggesting that the ‘wind power solution’ is inherently Danish. Finally, this passage is also an example of what Tonkiss calls a “three-part-list tactic, which creates emphasis by building up a sequence to create a crescendo effect” (1998: 257). In this case, the three parts are “strategy, effort and culture”, are strengthened by positive adjectives (“targeted, unrelenting, active, unique, Danish”), which crescendo in a compact description of the ‘Danish example’. By continuously underlining Denmark’s leadership position within the field of wind energy, the two concepts (‘Denmark’ and ‘wind energy’) enter an almost synonymous relationship, in which the concept of wind energy is directly associated with Denmark.

Promoting the ‘Danish Wind Power Solution’ as Appealing and Relevant

Because the Danish renewable wind energy solution is promoted as both a well-functioning success and a global solution it becomes relevant for the rest of the world. This is achieved by framing wind power as particularly challenging to master:

“Wind power is an unstable element requiring various tools to control it [...] and transmitting wind from the source to the consumer’s sockets poses a huge challenge to the electricity grid” (p. 11).

This passage summarizes why a comprehensive ‘wind solution’ is necessary – wind power is challenging and “tough-to-control” (p. 11). It requires “skill” (p. 14), “all-important abilities” (p. 10), “flexibility” (p. 25) and a “giant effort” (p. 21) to achieve an integration of wind power in the energy system. The complexities and difficulties of wind power are “seemingly insurmountable” (p. 22), “head-splitting” (p. 24) with components similar to a “jigsaw puzzle” (p. 20). It is “a task requiring specialist knowledge, money and quite a lot of time” (p. 20).
The notion of wind energy expertise is reflected in the text by the many photo portraits of Danish electricity experts. Out of the 36 photographs featured in the publication, 18 of these feature wind energy experts mentioned by name and profession.

By framing wind power as troublesome, the text attempts to engender respect for the solution and the Danish “feat” (p. 11). The arrival at the current Danish solution to wind power is described as a “rocky and winding road” (p. 9), which suggests that its development has been challenging.

Since wind power is described as relevant to the entire world (for climate change reasons), the underlying message of the text is that other countries should also strive to integrate wind power. Because it requires Danish expertise and knowledge, however, the text encourages nations to “learn from the Danish wind case” (p. 3). By highlighting the development in Denmark as “costly and time-consuming” (p. 20), the text seems to suggest that countries can gain access to the Danish expertise without the expensive upfront investment which Denmark has been burdened with, and as such importing the Danish solution is framed as appealing and relevant for other countries by being less costly.

The appeal of wind energy as economically profitable is described in the articles “Green – and cheap - electricity” and “Green energy must make good economic sense” which explain that “environmentally friendly electricity equals less expensive electricity” (p. 38), and future wind-fuelled electric cars are “money-makers” (p. 36). The final argument for the economic case of wind energy is that “in the past 25 years, Denmark’s economy has grown by 75%, while energy consumption has remained largely constant” (p. 6). Again, this economic statement is warranted through a reference to long-standing experience, and manifests the value proposition of the Danish solution.

In this way wind power is framed as inherently Danish, relevant as a solution to climate change, difficult to manage without Danish expertise, and as economically profitable.

Contradictions and Silences

Contradictions

Generally, the publication presents a quite coherent account of the Danish wind industry and power system; however, there are occasionally internal inconsistencies which undermine certain claims. The status of Denmark’s as world leader in the production of renewable energy is undermined in the
text’s comparison to Norway’s renewable hydropower generation which accounts for 99% of the country’s electricity (p. 18). The explanation: “wind power is a non-storable energy source, while hydropower can be stored as needed” (p.18), does not place wind power in a particularly favorable light in comparison. The text seems to disqualify the superiority of the Norwegian solution (and hydropower) by explaining that “hydropower requires abundant amounts of water and a considerable difference of height between water and the turbine plant” (p. 18). The reader may infer that hydropower therefore is contingent on particular geographic and natural endowments (access to water), whereas wind turbines can be installed in any part of the world as wind is omnipresent. Nonetheless, the Danish leadership position is momentarily undermined.

Within the text’s discussion of future tools needed to integrate larger shares wind power, the electric car is promoted. The publication claims that “by 2030, electric vehicles will have become increasingly popular in Denmark” (p. 31). This factual-sounding claim seems quite unfounded without any supporting arguments. Interestingly, a later article states that, “Danes have never really taken a fancy to electric cars even though they are tax-free” (p. 34), which seems to further undermine the claim. This is an example of textual contradiction which creates confusion about the main messages. This is further complicated by text’s following argument that new electric car infrastructure will change this trend: the illustrative example is the US-based company ‘Better Place’ which is building charging and battery switch infrastructure for electric vehicles across Denmark. In a publication clearly promoting Denmark and Danish wind solutions it seems contradictory that American solutions are highlighted and brought to the forefront of the reader’s attention.

A third contradiction in this text is apparent in the passage “the number of Danish onshore wind turbines has declined since 2001” (p. 42). This is particularly contradictory seen in the light of the overall claim of the publication, that Denmark has a “head start in wind technology – which has been growing longer ever since [the 1970’s]” (p. 10). This admission has the effect of placing doubt about Denmark’s industry leadership and their commitment to growing their wind power share. However, the subsequent explanation that “new regulations and subsidy schemes” (p. 42) have been initiated to reverse this tendency, are meant to trivialize this decline, and prove the dedication of Denmark to growing the industry. Upon closer reflection, this fact may even have been included on purpose to illustrate that Denmark – despite difficulties and challenges – are still very dedicated to
growing the wind power industry and by extension prove their deep commitment to fighting climate change.

Silences

One of the text’s silences appears in connection with the claim that “Denmark’s economy has grown by 75% over the last 25% years, while energy consumption largely has remained constant” (p. 6). At first glance, this is a very convincing economic argument for the deployment of wind energy. However, it fails to acknowledge the effects of industrial outsourcing, which is an important economic and industrial trend which developed in much the same time span. The fact that a portion of Danish industrial production was outsourced in the same time-span - effectively moving Danish energy consumption to remote locations - could offer an alternative explanation for the positive achievement in Denmark. If approached from this perspective, Denmark and the Danish energy solution suddenly do not have the same environmental appeal. This alternative explanation is not mentioned in the publication, as it would undermine the text’s claim of wind energy as a holistic solution to global energy challenges, and that of Denmark as world leader within renewable energy as well as a role model for “green” economic growth.

Although there is brief mention of hydropower as an alternative renewable energy source, the publication generally presents wind energy as the only viable renewable energy, and the Danish solution as the only adequate technology to handle it. Reference to other renewable sources such as solar, geothermal and biomass energy are not made. Similarly, there is no discussion of other environmental challenges. Emissions from fossil fuels in the energy sector are presented as the cause of climate changes, without any mention of other environmental concerns such as waste management, production and recycling, use and disposal of chemicals, the environmental effects of agriculture of deforestation. These, and many others, are all contributors to environmental and climate challenges, and must also be addressed. By presenting wind energy as a holistic solution, the publication seems to disqualify the importance of any other environmental concerns by omission, in the interest of promoting Denmark’s position as a global environmental front-runner.

Windmills and wind power are positioned as a ‘Danish Solution’ to global challenges. In this way the solution is framed as relevant, while arguments of economic profitability construct the solution as appealing. An ‘us vs. them’ rhetoric, served to underline Denmark’s leadership position, however several contradictions in the publication undermined claims of Denmark as leader in renewable energy technologies.
5.4.2 Deconstructing the Story

In this publication, there is evidence of an unfolding of two parallel narratives which are constructed in ways that reinforce each other: “How Denmark Became a Wind Power Nation” and “How the Danish Wind Power Solution will Help the World”. The following section will analyze these stories in terms of message, conflict, plot and characters (as outlined in the methodology in chapter 2) to examine how Denmark positions itself in a larger narrative context.

**Story 1: “How Denmark became a Wind Power Nation”**

The plot of the first story is firmly rooted in the past. As it unfolds, the reader is brought up-to-speed to the state of current energy affairs in Denmark, as the main themes are centered around the theme: oil vs. wind energy. The plot is introduced in the following passage:

“October 1973. The energy crisis came as a shock [...] The oil price skyrocketed, generating major uncertainty about the future energy supply. At the time, oil covered 90% of Denmark’s energy requirements and the shock of two oil crises galvanized innovation and change in Denmark” (p. 6).

This passage introduces quite dramatically the main conflict of the story: to find a way to cope with the lack of oil. The external forces causing this to happen (other countries at war) position Denmark as a victim, assuming the role of underdog hero. In order to accomplish the mission of “decreasing energy consumption and dependence on oil” (p. 6), support is enlisted from the Danish government (the benefactor) to make “make energy policy a priority” (p. 6).

The plot unfolds, and “by the early 1980’s, the Danish Government and the large energy companies erected a number of experimental wind turbines” (p. 9) helping the hero achieve its mission. Ultimately, the conflict is resolved as the hero manages to integrate a 20% wind power share in the system, thus achieving the mission of reducing dependence on oil. Moreover, with a 20% wind power share, the story celebrates the hero as the leading wind power nation in the world. By positioning the hero as underdog as a small nation, this achievement is made to seem extra impressive:

“A hundred years ago, hardly anyone would have imagined that nature’s bountiful storehouse would come to play such an important role in a small country far to the north” (p. 11).
The story is described as an “energy fairytale” and “a success story” (p. 6-7). The word “fairytale” connotes an almost magical feeling while the phrase “a hundred years ago” reminds the reader of a classic fairytale beginning (“once upon a time”). The power of the story lies in its reference to the realities of the past and its ‘happy and successful ending’, creating a kind of legend around Denmark as a successful nation. The story is appealing because it places the hero (Denmark) in the position of underdog and has a good message and moral to which many may strive: being determined, ambitious and hard-working is worthwhile; even underdogs can succeed in the face of great adversity.

**Story 2: “How Denmark’s Wind Power Solution will Help the World”**

The second story takes its departure from the results of the first story, and also reinforces it. It is the story of the Danish wind turbine industry as a fighter of climate change. Again, the hero is Denmark and the ‘Danish Wind Solution’. Denmark is no longer portrayed as an underdog, but rather a role model, a visionary hero. The use of words such as “pioneer” (p. 9) and “climate front-runner” (p. 6) exemplifies this. Climate change caused by emissions from use of fossil fuels in the energy sector is framed as the adversary. The relationship between the story’s adversary and hero is introduced as follows:

“The world is faced with the twin challenges of addressing global warming and ensuring security of [energy] supply. [...] We quest for answers and durable solutions to the world’s growing energy needs. [...] One answer lies in how we produce and consume energy in Denmark” (p. 3-5).

The goal of the hero is to “reduce energy consumption and CO2 emissions and achieve a wind power share of 50% by 2025” (p. 5). The hero faces several obstacles in managing this: it requires accurate wind forecasts, 24-hour balance of the power grid, cooperation with the European Union on a transnational electricity grid, and finally also a number of tools for the future such as electric vehicles and smart buildings. Overall, the tasks are many, and the goal seems nearly unachievable.

The hero’s ability to achieve this mission is justified by making reference to the hero’s success in the first story, which “has given Denmark immense experience and a strong position in the energy field” (p. 7). This expertise is described as a “secret” (p. 11), a “key to success” (p. 11) and a special “Danish recipe” (p. 42). The hero does, however, give the world a “sneak-preview” (p. 30) into the Danish solution and its future plans, thus presenting itself as a selfless caregiver, willing to share its
unique knowledge with the rest of the world. In contrast to the first story, the beneficiary is no longer exclusively Danish society, but the environment and the whole world. As the Danish Minister for Climate and Energy exemplifies, “I hope the world will profit from the Danish experience” (p. 3). Also here, Denmark’s role as a selfless and kind caregiver is illustrated: “wind energy is a gift […] wind farms are Denmark’s gift to the world” (p. 33, 26).

Presenting the hero as the world’s caregiver makes the character’s personality very likeable. Fighting against ‘evil’ and ‘destruction’ portrays Denmark’s intentions as good and moral. The message of the story has a broad appeal: Denmark is a result-oriented climate front-runner, taking the brave steps towards a responsible approach to global environmental problems. The plot, however, is ongoing, since the hero’s goal (to increase the wind power share to 50% by 2025 and ultimately to eradicate climate change) has not yet been achieved. The hero is nonetheless celebrated as if the goal has already been achieved.

5.4.3 Sub-Conclusion: General Impressions of the Publication

The most prominent discursive themes of the publication were ‘environment’, ‘the future’ and ‘global sustainability’ in which the representation of the windmill was embedded. General but recurring reference to discourses concerning climate change and the endangered future of the planet, were leveraged to uplift the windmill/wind power as a sustainable solution. Tools such as the aggressive ‘us vs. them’ rhetoric were used to uplift Denmark to the position of ‘world wind power champion’ and this position was justified by embedding it in a historical discourse equating history with expertise and knowledge. Finally, the ‘Danish Wind Solution’ is also posited as the answer to global climate change, making it relevant to the rest of the world. There were, however, some significant contradictions and silences which seemed to undermine this leadership position.

The analysis of the story’s structure revealed a two-part narrative, in which Denmark is positioned as hero. Rooted in the past, the first narrative serves to position Denmark as a determined underdog, succeeding in great adversity, resolving the conflict (managing to reduce dependence on oil). Denmark portrays itself as an ambitious climate front-runner in the second story, and in sharing its hard-won expertise positions itself as a selfless caregiver to the world.
Chapter 6: Discussion and Conclusion

In this thesis, we have attempted to look at a very particular aspect within the processes of communicating nation brand stories, namely trying to deconstruct the different layers of meaning that contribute to building an image. Our four methods have each contributed to a deeper understanding of how an image can be built: from the ‘simple’ image, to more complex sign systems and abstract orders of discourse. Finally storytelling offered an interesting perspective on the positioning of the nation in relation to its surroundings.

In this chapter we will summarize and reflect on the findings of our analysis. It is structured according to our initial research questions, which were:

1. *Which brand images of Denmark are presented through the branding stories “windmills” and “bicycles”?*
   - *How are these brand images presented visually and discursively?*
   - *Which role does the brand “green nation” play in these stories?*

Our research has been exploratory throughout this thesis. Our original intent was to investigate the function of these stories as branding Denmark as a ‘Green Nation’. In the analysis – which we approached with a broad perspective and exploratory mindset - we have, however, also discovered many other interesting aspects pertaining to communication within these stories. Therefore, this chapter will end with a broader conceptual discussion of the challenges in the field of nation branding, as they were reflected in our study of the Danish case. Finally, some interesting further perspectives for research within the field of nation branding communication will be outlined.

**How are brand images of Denmark presented visually and discursively?**

Our analysis found that brand images of Denmark are created in a two-layered process. Firstly, the bicycles and windmill are visually and discursively presented in such a way that symbolic meanings are attached to these objects. By positioning the bicycle and windmill within a Danish context, these symbolic meanings, become attached to Denmark by association, creating some higher ranking brand images. So in order to answer this part of our research question, we must first briefly look at which symbolic meanings are attached to the bicycle and windmill.
The visual and discursive presentation of bicycles

Visually, the bicycle is presented as an urban means of transportation: as a fast, convenient and natural means of transportation, that does not come at the expense of safety or harming the environment. Further the bicycle enables happiness and joy and contributes to the overall well-being of the bicyclist. Bicyclists cherish the freedom, flexibility and community belonging the bicycle helps them achieve; thus the bicycle becomes a friend which makes the bicyclist’s life easier and more enjoyable. Discursively the bicycle is presented as a ‘fighter’ against various global concerns: societal issues of segregation, health concerns in form of lifestyle diseases, environmental challenges in form of climate change causes (CO2 emissions), economic concerns stemming from burden on the public health system and lack of efficiency arising from time lost in traffic, aspects concerning lifestyle and fashion. All in all, the bicycle is presented visually and discursively as being a versatile, multipurpose device; easily adaptable to every need.

The visual and discursive presentation of windmills

Windmills are visually and discursively presented in a triad: natural-technological-purposeful. Windmills are presented as a pure and clean objects in-sync with nature; further as highly technological machines that overpower humans, yet also that they are man-made and thus to be handled with great technical skill. Additionally, windmills are purposeful and sustainable tools for fighting climate change. In relation to the environmental fight, notions of a threatened future of the planet are used to create a sense of urgency for action and a justification for the case of wind power. In this way, wind power and climate change enter a relationship of solution and challenge and windmills are presented as “good news” that spark hope for the future. However, these actions do not have to be taken at the expense of the present, as windmills are now presented in the context of economic profitability, which in turn creates a new and attractive imperative for the pursuit of wind energy. Finally windmills are presented visually as omnipresent; they are part of the Danish landscape; as such windmills become attached to Denmark.

Which brand images of Denmark are created?

Because the bicycle and windmill appear in a Danish context, they are presented as inherently Danish. Reference to a long-standing history and culture justify this link, which is what makes the stories unique. The bicycle and windmill are simultaneously presented as holistic solutions to solve multiple global challenges – what we have referred to as the ‘Danish Bicycle Solution’ and the
‘Danish Wind Solution’. In this way, Denmark is positioned as an important contributor to solving global challenges.

In both cases an intricate transfer of meanings is evident: all the positive connotations and attributes of the bicycle and windmill (which were highlighted in the previous section) become attached to Denmark, since the bicycle and windmill are framed as particularly Danish. In this way higher, more abstract brand images of Denmark are constructed. As such, the stories suggest that Denmark can be seen as:

- a country that values individual freedom and mobility, as well as community belonging
- a country that values its citizens’ convenience, well-being and happiness
- a highly technological country with unique expertise
- a country which prioritizes addressing global challenges by developing solutions
- a country which does what is morally correct

In the stories, Denmark is position as a hero which offers important and necessary solutions to global challenges. Although the status as hero is attractive, it is also quite problematic: it builds a high expectation that Denmark will continue to offer global solutions for a multitude of issues. If Denmark fails to live up to these expectations, its status as an important contributor to solving global problems will be undermined, as will its credibility in the future.

**Which role does the brand ‘Green Nation’ play in these stories?**

**The Story of Bicycles:**

Our analysis indicated that the role of the brand ‘green nation’ is not particularly prominent in the story of bicycles. The environmental challenge is but one of the many global challenges, which bicycles are claimed to address, and even amongst these, other challenges are more center stage. Since the bicycle as a ‘fighter’ of environmental issues is mentioned only in passing key words, its importance is relegated to the side lines, and the association remains weak. Claiming that the bicycle can address a multitude of challenges has the effect that the bicycle is not associated very strongly with any of these challenges. Ultimately this creates confusion about what the core brand message is. Although the bicycle is associated with Denmark, its environmental role is downplayed
in comparison to others, and therefore the bicycle as a symbol of a ‘green nation’ is not prominent in our findings.

**The Story of Windmills:**
In contrast, the role of the brand ‘green nation’ in the story of windmills is very prominent. This is because the windmill is presented as a single-purpose instrument (only claimed to address environmental challenges), while the bicycle is claimed to be multi-purpose. With ‘only’ this single environmental adversary, the ‘green’ association is quite strong. In this sense, Denmark can be seen as a responsible and forward-looking global citizen and ‘fighter’ of climate change. Framing the solution as complex and its development as a “rocky and winding road” (p. 9) seems to encourage the idea of Denmark as skilled, hardworking and dedicated. Referring to the windmill as a result of a specific “unrelenting and unique innovation culture” (p. 6), suggests that windmills are unique for Denmark. Overall, the story paints a strong ‘green’ profile for Denmark, however occasionally the coherence of the brand is disrupted, as contradictions in the account undermine certain claims to Denmark’s environmental leadership.

**Discussion: Reflections on the Field of Nation Branding**
As discussed in Chapter 3, nation branding poses various challenges when put in practice. Denmark has attempted to position itself on the global market as a ‘green’ nation through two stories: bicycles and windmills. Our analysis has shown these stories do not just communicate messages about the ‘green’ brand, but also about other values as was mentioned above. In this sense the challenges that arise are more complex and we will discuss them not just in terms of the ‘green’ brand. We will address those challenges within the nation branding field that our analysis has shed light upon.

As discussed in Chapter 3, when engaging in nation branding countries have to create a relevant, appealing, and unique brand, which differentiates the country from its competitors by remaining truthful and honest about the stories told.

Denmark creates an appealing and relevant brand by offering a holistic bicycling/windmill solution that addresses and solves global challenges. By locating these solutions within discourses on global sustainability, future ‘green’ technologies, life quality challenges and economic development, the solution offered seems to resolve issues mankind is confronted with and needs to find answers to.
By making the solution Danish, the constructed brand appears to be *unique* and *different*. Uniqueness is paramount to nation branding; a country can only differentiate itself and gain the attention of tourists, investors, skilled labor etc. by creating a unique and inimitable brand persona. Denmark wants to create a unique brand persona by telling the story of its long-standing relationship with bicycles and windmills. As such, these stories are unique, because they are part of Danish history and culture. Yet when promoting bicycles and windmills as ‘solutions’ – which are offered to other countries – one may wonder if Denmark can continue to uphold its uniqueness in this regard, if the solutions are implemented elsewhere.

A differentiator within nation branding is, as theory points out, the pursuit of environmental sustainability and responsibility. Seen in this light, Denmark’s wish to establish a ‘green’ brand is understandable. Our analysis showed that the communication of this brand falls short on some accounts. In terms of conveying a ‘green’ image, both stories contradict themselves and struggle to convey a clear image of the authenticity of ‘green’ concerns within the country:

*Contradictions in the Windmill Story:*

“Denmark has a head start in wind tech – which has been growing longer ever since [the 1970’s]” (p. 10)

“Denmark is the world’s leading wind power nation”

“In Denmark the number of wind turbines has been declining since 2000” (p. 42)

*Contradictions in the Bicycle Story:*

“In Denmark, as in other countries, there is a desire to combat climate change” (p. 20)

“many Copenhageners are of course focused on environmental issues but, when asked, only 1 per cent of Copenhageners mention it as the main reason” (p. 17)
Moreover, the stories describe that the original motivations for pursuing the development of windmills and bicycle infrastructure were not triggered by environmental concerns but due to energy insecurities and traffic issues. It seems that the inherent sustainability of the bicycle and windmill have been ‘rediscovered’ in the light of new global environmental discourses, in order to frame them as solutions to current challenges. However, in an attempt to rearrange historical events by showing them in a different light, such contradictions surface. Even though the bicycle and windmill inherently contribute to lowering CO2 emissions, and that these exist in Denmark, we are prompted to ask the questions: is a nation really ‘green’ if its citizens do not bicycle out of environmental concerns? Can Denmark really be a world leader in wind power, if the number of wind turbines is declining?

These contradictions point out the difficulty within nation branding of developing a unique and coherent brand. While the theory unravels that “every nation has its own idiosyncratic cultural expressions” (Dinnie, 2008: 48) that should be encapsulated in the brand, little guidance is offered as to how to deal with contradictions.

Communication of the nation brand has to be honest and truthful. The two stories are based on historic and cultural accounts, creating a perception of honesty and truthfulness; the stories are created through a historic recollection of sorts that seems to be factual. In this sense uniqueness of the brand is created through grounding the two stories in traceable events in Danish history. As far as the contradictions go, they disrupt the coherence of the brand, yet appear to be an attempt of being honest about the realities within the country. The problem is that by attempting to be honest, Denmark loses its credibility as a leader and expert. Thus the challenge becomes: how to be truthful without succumbing to contradictions that undermine a countries’ position? Nation branding theory recommends a perseverant communication of positive and successful stories (Anholt’s Virtuous Circle). Here, nation branding theory claims that only sensational, exciting and novel news about the nation is interesting.

In our case, Denmark has set ambitious goals for itself that (if met), could create sensational story, and as such they hold potential in terms of nation branding. However, these ambitions lie in the future and thus are not yet current “news”. The original stories upon which these goals are founded, are outdated (from the 1960’s – 1970’s) and therefore lack the element of novelty. Also, the fact that the current stories place a strong emphasis on the inherent properties of a bicycle (for instance, as emission-free, enhancing physical fitness, and as a cheap mode of transportation etc.) does not
qualify as exciting and novel news about bicycles. In this sense, the currently told stories are only “fairly interesting” (Anholt, 2007: 36), and may risk having only little impact.

It is also problematic that the claimed success and positive effects the “Bicycle Solution” are not supported by any evidence. For instance, there is no information about how the “bicycle solution” has helped increase social integration or reduce obesity rates in Denmark. Without concrete success examples, the solution remains unconvincing. This also has an impact on the image of Denmark as being honest and truthful. Since omissions can also be viewed as lack of honesty, we ask ourselves whether Denmark has actually experienced these successes?

A further challenge within nation branding is that in an attempt to address everyone, there is a risk that “a significant proportion of [the nation’s] target audience will be isolated through the brand’s vagueness” because communication is not targeted but left broad (Fan, 2005: 10). This issue was also evident in our case of the bicycle story, in which we discovered that the ‘green’ brand image is vague since it is diluted amongst many others. In fact, the bicycle is not associated with anything in particular and as such there is no apparent core message in this story; no focused brand. Ultimately, this has the effect of promoting bicycling in general, but not a clear and focused brand image of Denmark.

Our analysis has shown that many of the challenges in the literature of nation branding surface in the case of branding Denmark as a ‘green’ nation. The analysis of a few key examples of nation branding ‘texts’, showed that communication is highly complex. Our in-depth look at these ‘texts’ show that one of the most difficult issues is to communicate a unique brand in an honest and truthful way, because often when anchoring the brand in the country’s history contradictions and idiosyncrasies surface. Surely countries are unique and have each in their own way something special to contribute to the world. But because nations are complex, it is difficult – if not impossible – to compact this uniqueness in a few key terms, without losing its meaning, as nation branding theory posits.

Nation branding is a complex and messy field, which offers interesting insights into the complexities of nations and branding, but little clarity on its practice. The current theory on nation brand communication does not offer adequate guidelines to deal with contradictions and idiosyncrasies, and does not reflect the complexities of real-life branding communication, as our case has shown.
Further Perspectives:

In our thesis we looked at how brand images about Denmark are constructed visually and discursively. In doing this we decided to only look at the “site of the text itself” (adapted from Rose, 2001). Thus we have not looked at some other interesting aspects of communication within the field of nation branding, which we would also have liked to examine, if we had more time.

We delimited the “site of the production of the text” (adapted from Rose, 2001) which is interesting to look at in terms of who the producers are and what the production context is. Looking at who the producers are, what their intentions are and who they wish to communicate to, can open up some interesting research opportunities in terms of nation branding; more specifically regarding brand identity: how Denmark wants to be seen by others.

Further we delimited the “site where texts are seen by the audiences” (adapted from Rose, 2001). Conducting further research on image creation from the audiences’ perspective would bring light into how meanings are “renegotiated or rejected by particular audiences watching in specific circumstances” (Rose, 2001: 25). In this sense, analyzing the context of the viewing and the reading position of the viewer are intriguing from the nation branding perspective: understanding the relationship between the intended message and the interpreted message, which would shed light on the identity-image construct.

Finally we did not take into consideration the medium through which the messages are sent, in this case the internet. Within nation branding the medium through which messages are sent is of central importance and “places need to start preparing themselves to be able to manage their narratives and project consistent images through the right channels” (Govers and Go, 2009: 261). The internet and the social media networks are popular communication channels, yet how are meanings created within the “jungle” of information available on the internet? How does the producer of texts interact with the viewer? And more importantly, how can branding actors overshadow information available on the internet, which does not shed a particularly positive light on Denmark? These are important aspects that remain unexplored: “little empirical research has focused on how image is actually formed … analyzing its dynamic nature by investigating the influences on its structure and formation” (Baloglu and McCleary, 1999 in Govers and Go, 2009: 41).
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Appendix 1: Glossary of Terms

**Backlighting** = light source is set behind the objects in the forefront, which can “either dominate or highlight” (Monaco, 2009: 219) the object

**Closed frame** = “the image of the frame is self-sufficient [and] the camera tends to follow the subject faithfully” (Monaco, 2009: 207)

**Close-up shot** = a detail shot of a person or object, in which a smallish object fits easily within the frame

**Connotative sign/meaning** = carries “a range of higher-level meanings” (Rose, 2001: 82)

**Denotative sign/meaning** = “film image and sound has a denotative meaning: it is what it is and we don’t have to strive to recognize it” (Monaco, 2009: 178); through the power of denotation films come as close as is possible to reality, communicating precise knowledge

**Environmental sound** = noise (sound effects)

**Eye-level angle** = a scene shot from the eye-level point on the vertical axis

**Fade-in / fade-out technique** = “calls attention to the ending or the beginning [as] one image ends, another begins” (Monaco, 2009: 247)

**Focus** = the closest proximity to the lens in which the objects being photographed will remain in focus approaching the infinitesimal

**Frame** = each individual photographic image making up the film

**Head-and-shoulder shot** = is the shot distance which allows the viewer to see the person from the chest up

**Low angle** = a scene shot from a low point (below normal eye-level) on the vertical axis, looking up

**Mise-en-scène** = “the codes of mise-en-scène are the tools with which the filmmaker alters and modifies our reading of the shot” (Monaco, 2009: 205)

25 http://www.dur.ac.uk/m.p.thompson/filmterms.htm
Metonymic sign = “figure of speech in which an associated detail or notion is used to invoke an idea or represent an object” (Monaco, 2009: 187)

Montage = style of editing involving rapid cutting so that one image is juxtaposed with another or one scene quickly dissolves into the next.

Open frame = “the shot is composed in such a way that we are always subliminally aware of the area outside the frame [and] the filmmaker allows the subject to leave the frame and reenter”

Overhead angle = scene shot from directly overhead; an elevated view of the scene

Pan camera movement = a movement in which the camera turns to right or left on a horizontal axis.

Parallel montage = “allows the filmmaker to alternate between two stories that may or may not be interrelated” (Monaco, 2009: 243)

Parallel sound = “is actual, synchronous, and connected with the image” (Monaco, 2009: 238)

Point-of-view = shot which is understood to be seen from the point of view of a character within the scene.

Semiotics of film = denotative and connotative signs, syntagmatic and metonymic signs

Sequence = a series of scenes which form a distinct narrative unit.

Shot = a continuous strip of motion picture film, created of a series of frames, that runs for an uninterrupted period of time.

Sound = speech, music and environmental sound

Syntagmatic sign = gains its “meaning from the signs that come before or after them in sequence in a moving image” (Rose, 2001: 78)

Tilt camera movement = a movement by which the camera moves up or down while its support remains fixed.
Appendix 2: Figures and Images

Fig. 1: The Virtuous Circle of Competitive Identity (Anholt, 2007: 35)

Fig. 2: Branding is the Goal, Storytelling is the Means (adapted from Fog, Budtz and Yakaboylu, 2004)
Fig. 3: New York City logo (http://www.iloveny.com/)
OB: Can you maybe tell us how you were involved in the Danish nation branding campaign?

MM: I’m actually not involved in it because I’m the academic, so I have got the outside view and the critical view on nation branding and also on the Danish campaign. That is a quite privileged position to be in, so I can make all the critiques of the campaigns. I would like to stress from the start that I’m critical about nation branding - about the concept and also the Danish nation branding campaign. Not against the actual practitioners of the Danish nation branding campaign – I think they are doing quite a good job, but it’s the framework of the nation branding campaign that I’m quite skeptical about and the political settings.

KF: What do you mean when you say “framework”?

MM: The whole set-up. The idea that you have placed a branding campaign inside a structure that is mainly developed to deal with political matters and then you start to try to make this framework, the institutions - the political institutions - to deal with a framework that is taken from the commercial world and commercial ideas. And that creates a lot of – not just conflicts – but also problems of knowing who’s going to deal with what? I mean, you see that sometimes it’s consultants who are actually formulating the political principles and then afterwards it’s the politicians who are going to execute those frameworks. From a political and democratic point of view this can be quite problematic.

On a practical level it creates a lot of problems. First they said: “okay, it’s just going to be one minister that is in the lead of this”. But then afterwards they created a task force. But all the different ministers have very different aims and scopes, which creates lots of conflicts - especially between the Ministry of Foreign Affairs and the Ministry of Economics and Business Affairs. Lots of conflicts - all the time.

KF: If you think that the way that it’s set up in the Danish case is problematic in terms of both communication and interest, how would you suggest that it be done? Do you think it’s possible?

MM: I not only think that nation branding is possible, I think nation branding is a fact. Actually when you go to other studies than branding studies – to nation studies and studies of nationalism – you have a separation between state and nation. The state is the political unit with vertical powers –
military so on. And above that you have the nation. The nation is a shared identity and a shared idea of belonging. It is an imagined community. A nation is a brand. And it has taken two centuries to develop this brand. And investment costs in this brand have been enormous. Millions and millions of people (think of the two world wars) have been part of creating nations as brands. The educational systems - everything is directed into creating nations and nations are brands. So nation branding is a fact. The problem is thinking that nations can be branded using the same tools used in product and commercial branding? I’m quite skeptical about this. Because it’s actually the other way around: it was nations that created the concept ‘brand’. A simple definition of branding is that you have to differentiate yourself from others and you have to create identity. That’s the basic definition of branding. Can you think of any other brand communities that are as strong as nations? I can’t imagine anyone. Brands were more or less invented by nations and then afterwards discovered by commercial companies, who created tools for managing it. But they are not nearly as good as the tools that were created in nations. I’m quite skeptical about using the tools and ideas from corporate branding on nations. To think that it is possible to brand a nation like Denmark for 100 million kroners in the whole world is nearly the same as thinking that you can drill a huge tunnel with a hand drill or something like that. So - nation branding is a fact, but the tools used in nation branding are not developed to brand nations, they are developed to brand products. These tools are quite sufficient to branding products – the idea is just “should I buy an Apple or IBM”? Nations are much more complex than products.

KF: In terms of nations: if you look at branding and reputation management separately, do you think it’s possible to do some kind of damage control or reputation adjustment?

MM: Yeah – I think definitely that they are going to see much more reputation management and trying to control reputation in the forthcoming years and today you have got two main types of tools to reputation management. That is public diplomacy and nation branding. They are quite different actually. At the same time, branding (both products and nations) has become so popular is because it’s trying to control the uncontrollable. I mean, it’s nearly impossible to control a brand. And especially to create a brand (especially nation brands where there are political influences). But I think that you have to try to do it somehow – perhaps not to control a brand, but to create damage control and to prepare for damages like we saw in the cartoon crisis. And that’s also one of the main differences between nation branding and public diplomacy: nation branding meaning trying to differentiate yourself; while public diplomacy is much more concerned with preparing to engage in
damage control. So I think for a country like Denmark would be far better off using much more effort in public diplomacy than in the branding efforts. Norway is a good example: they have no nation branding program, but they have a huge public diplomacy program for these reasons.

KF: In the Danish case they emphasize not using a logo or slogan in the branding effort. Instead they seem to have a focus on telling stories. When you look at the branding of Denmark as a ‘green nation’, in which ways do you think storytelling can contribute?

MM: In modern branding, storytelling is everything – it’s a narrative connected to the brands, not the logo that means something today. Also when it comes to ‘green nation’, storytelling is everything. But you have to define what is storytelling and what is it in the Danish case because today everything can be ‘storytelling’. The way we frame our surroundings, our society, give meaning to it, is through narratives and through stories. It’s nearly impossible to find a European country, at least, that hasn’t got a nation branding program or public diplomacy program: and all of them want to be a ‘green nation’. So today to be a green nation is not something that differentiates, per se, you have to say how are we a green nation? And there, storytelling is very important because you can go out and say: we are a green nation because we have bikes in Copenhagen, if it’s Copenhagen you want to brand or – we’ve got windmills or wind power energy and so on. So you have to be very specific in arguing, why you are a green nation?

KF: When reading the Action Plans for the branding effort, it struck us that the concept ‘green’ was so broadly interpreted or defined. Flemming Johannesen told us that it’s not in their interests to define things narrowly because they need to be able to grasp the opportunities available. What do you think about that?

MM: Flemming’s answer is quite on the spot. He is from a public diplomacy section, right? From that point of view, he doesn’t want to narrow anything down because public diplomacy is all about being aware of what’s going on and using the different possibilities. If you really want to create a brand, you have to do the opposite - you have to focus. I think you have to take one step back and reflect carefully on the question: What does the nation want to achieve? That’s extremely unclear. I mean, that’s the first thing you should ask yourself. What is the purpose of this nation branding program? If you want to brand the state of Denmark – not the nation but the state of Denmark – then there’s a political target. If you want to attract resources like FDI [Foreign Direct Investment]
and skilled labor force and so on, then it’s another task. But it’s not defined in the nation branding program what the goal is.

OB: It seems to want to achieve everything. I think.

MM: Yes. Why is it so undefined? Because it’s extremely difficult to do this. So, you can’t know whether branding is useful before you find out what the purpose is. They don’t have a clear purpose. That’s also why they just started using Anholt’s Nation Brand Index as target and benchmark.

KF: Yeah, that would’ve been my next question. Do you feel this Index in an appropriate benchmark?

MM: No, it has lots of problems. I want to stress, that I think the practitioners are doing a good job. Everyone tried to tell the evaluators to forget about this index. It simply not useable and its unachievable. The problem is that you want to create a brand in the nation branding program. The nation is not the aim - it’s a means for the state to brand itself. Even Simon Anholt, the creator of the index, he today admits that he has not seen any case example – where it is possible to see a change at the Nation Branding Index after a nation branding campaign. Not one single case. And in the time this Nation Branding Index has existed, there has only been one case where you have seen a real change in the index. And that was three years ago, where the United States went from, I think it was 6-7th place on the index to the top place. And the point is, of course, that was the Obama effect. So it was the politicians who actually did this. The Danish government is actually working against their own nation branding effort: first they decided on branding Denmark as an open society, and now they are increasing border control. If the perceptions around the world is that Denmark is not a closed society, it’s not going to work.

KF: But this is also the issue of talking the talk and then walking the walk, which is probably difficult with many actors and differing interests?

MM: For a country like Denmark, you really should start by asking yourself: do you want to be a brand, in traditional branding thinking? Because when you are a brand, then you differentiate yourself. And if we go back to storytelling: what is the main idea in storytelling? That is, you have to build it up in a narrative, just like a Hollywood movie. What is the main thing in a Hollywood movie? That is to have a good villain. The villain is much more important than the hero or the
helper. So – but who do you want to define as your villain? In the case of Denmark, I think the cartoon crisis is quite a good example of how things can get mixed up if you start to believe that you one of the huge actors on the international scene. When the cartoon crisis came, Denmark found out that they had no tools to deal with the issue. If we take a look at Danish history – Danes have always been a merchants nation – selling and buying – and therefore never had an interest in defining our enemies. During the Second World War for example – Denmark sold to two markets – Germany and the Allies. That’s what Denmark has tried to do for two centuries now. If you define who your enemies are, then you don’t have a market anymore. Why is America such a huge brand? It’s because they always have villains to fight. There are lots of people who actually hate America and always have. To be a brand, or a hero, you need to have villains that hate you. Try to look at Apple. There are lots of people who hate Apple. They have the most valuable brand today. So you have to have something that says I’m not, and I am.

KF: Yeah, that’s an interesting perspective.

MM: Instead of framing it as branding, it would be much better if Denmark starts with reputation management. Then you don’t have to differentiate yourself all the time and create villains and so on. You can pursue different opportunities that are open for you. Denmark is a small scale state. But it tries to act as if it were one of the main players in the world. That was one of the things that went wrong in COP15 – we tried to act like one of the big countries and in the nation branding campaign we have written our main target is the BRIC countries. By focusing on the BRIC countries, Denmark forgot that there are 100 lower developed countries, which are now quite angry with us because we just focused on the rich countries and the BRIC countries. I mean, sometimes it’s laughable.

OB: Do you think that it was a wise idea to connect branding with an event like COP15? Because it was not Denmark’s influence, more or less. I mean, they could just organize the event but –

MM: I think it could have been a wise idea. I can see the idea having symbolic events and attracting events – you get a big platform. But it became a disaster for Denmark. OK, maybe not a disaster but it became quite problematic because they thought they could create the new green brand in the world. If you work with storytelling, then a main idea in storytelling is that there are two favorable positions you can be in. You have to have a villain, of course, that can be the emissions - CO₂ emissions f.ex. But then there are two favorable positions to be in: one is the hero, and the other one
is the helper. Very many make the mistake of thinking that the most favorable position is to be the hero. But it’s extremely dangerous to be the hero, because, first of all, if you become the hero, then you have to act, really 100% like the hero. Because if you don’t behave like the hero, people’s – you let down people’s their identity. A hero is an icon, and if you’re an icon you can go just from hero to villain. You can’t go from hero to nothing. And that’s partly what happened. The most favorable position to be in, in branding, is always to be the helper. To help. Because the helper helps other people to be the hero in their own life. If we can take Coke or Apple. Apple helps you to be the hero in your own life. You can be the new creative class by having an Apple phone. So Apple tried to position themselves as a helper, and not as a hero. The problem was that Danes – Denmark – tried to place themselves as a hero, instead of just being the helper. When you look at our size then it’s quite laughable. Both at COP15 and IOC congress, the main idea for Denmark was to make pairship branding on Obama’s brand. It was to get Obama to Denmark. Then he came both to COP15 and IOC congress. But it was very unsuccessful. So today, what is Denmark’s international brand? Denmark is the place Obama comes to get his international defeats. That is perhaps not the best brand – but Denmark took its chance. Another problem about those events that you have attracted, is that there is no connection. I can’t see the connection between Outgames, IOC congress and COP15. The explanation is that the Danish nation branding program was agreed in a political settlement: so the Social Liberal Party – Radikale Venstre – they want the Outgames because that’s very much their target group. Then the tourism at the sealines – this is Danish People’s Party – Dansk Folkeparti - who of course wanted this into the program. So, the idea of creating a brand is quite impossible if the politicians behind it, go in all different directions. If you want to be a green nation, then I think the symbolic actions should be more than just events. Wouldn’t it be great if it – if Denmark got a Nobel Prize for sustainability? Just like the Nobel Peace Prize. Then it would symbolize what Denmark is trying to achieve.

KF: In our research we found that the branding actors see to view the power of the Danish green brand, in terms of its history, which dates back several decades. But some people say, that Denmark is not green anymore. We’re still living high on a reputation we established 30 years ago but its stagnating. Do you think that history defines everything?

MM: Now, I’m a historian so I think that it’s not the past in itself that defines everything but it’s the narratives from the past and how you use those narratives that mean everything. Because as a historian I would say, if you go down – really go down to the sources, it’s very, very questionable
whether Denmark is actually a green nation and has been it for decades and centuries and so on. That’s quite simply questionable. But we have – in – its right that we for decades have created narratives that we are on the forefront of wind power and so on. We have created those narratives very successfully. And I do think that they are – I agree that they are right, Flemming and Marius in saying, of course we are going to use those narratives. But in one or two days, you will see that the World Wildlife Fund are going to show a report where they clearly show that Denmark is no longer in the forefront of developing new technology in those areas. So the narrative is of course just a tool you can use and not the case in itself. The idea of narratives, like the Danish narrative, is to always make small changes in it so it’s keeping up with what is actually happening. You have to keep generating good stories. And so it’s always problematic because if you have destroyed all your villains, and so on, in the first one, then you have to create an even more evil villain for the next one, right? Denmark has just kept the same enemy. When you fail to define what you want to achieve in your branding, it also mean being unfocused about who your enemy is. That’s why Nordic gastronomy and organic food products and green areas becomes central in this, because you don’t know what your purpose with this is. Who is the villain? What do you want to achieve?

KF: Of course it’s also an issue of getting a return on your investment. And you don’t want to lose out on the opportunity to catch those few tourists who want to come and visit the green nature areas and live in the hotels with a mark of sustainability.

MM: I think you have to focus on the one side but you can’t have the rest of your brand working against it. Talking about tourism: that’s another central problem about nation branding. Often nation branding textbooks write that you have to attract resources like tourists, foreign investments and skilled work force – skilled employees. But these are very, very different types of groups and they want very, very different stories. Because if you’re a tourist, then you want to go to something that is different from your own country, from your own culture. You want to see something new, I mean, why else would you leave? It’s quite simple. There’s no reason – if everything is the same then there’s no reason for taking a holiday. So you would go for something that is authentic. I don’t believe in the concept of authentic, but that’s another question. But you would go for something that seems authentic. That is, the old harbor, Hans Christian Andersen, local food and something like that. If you would like to invest in Denmark, in developing new wind power or something like that, you would look for indication that the country is culturally similar to minimize conflicts and misunderstandings. When we are investing today in China and other countries, it’s not because they
have got cultural differences, it’s because it’s cheap. Likewise, you would also look good infrastructure? Is there are a lot of power energy? Are there huge harbors and so on? I mean, it’s very few tourists who go out say “Nice highway, man.” It seems simply impossible to me to create a brand that can achieve both sides.

OB: Yes. Not defining the values and also having such a big target audience, how does this fit in together really?

MM: Especially in the first nation branding – in the first action plan, where ReD Associates had created this platform. It was taken just as a brand. But it’s self-contradictory, this platform, because you can be both creative and new-thinking in the one corner and traditional in the other. It is self-contradictory and is not focused. It can’t be a brand if it’s everything at once.

KF: But you mentioned this that you don’t believe in authenticity. In branding literature they always talk about authenticity and when does a brand value become legitimate or authentic – if it can ever become that and then, to whom?

MM: So, the notion of authenticity is what makes branding literature so essentialistic in its world view. Very often you can also read that you have to find the DNA of the nation First, for me (perhaps because I’m a historian) the word DNA reminds me of something we heard in the 1930s and that’s Nazism. It’s very much a racist approach towards this. So, that’s one problem. Do we have a DNA as Danes? I don’t think so. The second thing is: who is going to define this DNA? The government or the people? The third thing is, if they define this DNA, what are they going to do with people who don’t subscribe to this DNA? For example, I’m quite sure if it’s the government we have right now, I wouldn’t subscribe to this DNA. If you are a company, you have legitimate tools to deal with it. You can fire them. The state of course could jail me or something like that, but that would be quite problematic if you claim to be the most open society. So again, this essentialistic approach is quite problematic and that is also why people talk so much about authenticity. There is nothing that is authentic. Other people can perceive something as being authentic and believe in it. It’s just like identity. Identity is a social construction that you always define when you are comparing yourself to other people. So it’s first when you start thinking about who you are, that you get an identity and you can only create an identity by comparing yourself to other people. So it is a social construction. And on an academic level that’s quite easy to understand, but of course on a personal level it is nearly impossible to deal with it. Accepting that
you are nothing more than what my environment has created me into, I have no identity in myself. So brands create identity, but they don’t have any identity. They create constructions that can be used for identity creation and therefore they use words like authenticity. But there is nothing that is authentic. But I know this is an academic approach to it and if I was going to sit down and create a nation branding campaign or a campaign of – branding campaign, of course I would ask how could I create something that could be perceived by – in my target audience as something they would see as authentic or they would believe in, they would find had a huge ethos or something like that. So I’m quite – I agree that you create the concept of authenticity, but it’s not something that is.

KF: We also have a question of dealing with perceptions. How can you build on preexisting images held abroad? Should you move away from them completely, in order to create something new? It seemed a contradiction to promote Hans Christian Andersen and the little mermaid at EXPO 2010 in Shanghai, when the Action Plan wants to create a more modern image. How can you deal with this issue?

MM: In the press release that Bendt Bendtsen came with (when the Action Plan was launched) there were three sentences –something like: Denmark is only known for bacon, butter and Hans Christian Andersen. That’s not enough. We have to rebrand Denmark so we can be known for something else. The idea was: get rid of Hans Christian Andersen, it’s dusty. The problem was that if you get rid of those, then people have exactly nothing. No images at all. And you have to start with the images that you have created for 2 centuries. EXPO went totally against the nation branding campaign. They did everything they weren’t allowed to do. They used the little mermaid, sold Danish rugbrød, Danish smørrebrød with bacon and butter. Those are the images they have there. I think they did the only thing that was possible: to start with the images, and develop them further. Quite simply for two reasons: firstly, it’s the only thing people have. Secondly, if you want to stop working with those images then you have to not just stop telling them because they are narratives that are already out there so you can’t just stop them. You would have to say - very hard – “we don’t like Hans Christian Andersen in Denmark, we hate him, he is a huge villain in the Danish narrative and he has nothing to do with Denmark”.

OB: But even the mermaid might be difficult…

MM: Yeah, but then you can start working with it. You can’t just ignore it. That was the problem for Germany for 3 decades. They just tried to ignore the Nazi period - to be silent about it. You
can’t do this, because the narratives are out there. So you have to work with those images. They are many centuries old and extremely powerful. And therefore you should also see reputation management and nation branding – especially reputation management – as something that is going to work for decades and decades and decades and not a campaign lasting 3 years or 5 years. So I think they did the only thing they could do and I think it was quite successful. To be a bit hard, I think it was a success it was not a part of the Danish nation branding campaign. Quite simply. It was not a part of the official plan.
Appendix 4: Transcript of the Video “Green Bicycle Lanes in Copenhagen”

Green Bicycle Lanes in Copenhagen

[Narrator]: Copenhagen is one of the best bicycle cities in the world. More than 38% of the commuted traffic through the city is on bike.

[Interview 1: Louise]: “You can go by bike anywhere, and I really enjoy that.”

[Narrator]: The different districts of the city are connected by more than 25km of green bicycle lanes. This means that the bike lanes are separated from the car traffic, which makes it safer to ride through the city. By making it easier to cross the city in a safe way, the amount of bikes are increasing and this means less cars and a greener city in the long run.

[Interview 2: Cyclist]: “One of the good things about being a cyclist in Copenhagen is that the cycling areas are parted from the lane where the vehicles is. That’s a nice thing, to be secure.”

[Narrator]: Copenhagen is now planning all its new urban districts with integrated bicycle traffic and parking as part of the plan. A new bridge has for instance been made across the water to connect two new districts of the city, and make the distance for bikers and pedestrians much shorter.

[Interview 3: Boris]: “Personally, I have a feeling my freedom is much bigger using my bike because I do not have any obstacles in going from one place to the other. So the city is getting smaller – everyone is closer. So in this kind of a sense it gives me a better freedom.”

[Narrator]: Several places around the city, a bike counter has been put up to show how many bikes are passing each day.

The goal of the city is that in 2015, 50% of the commuting traffic has to be on bikes, which also means to lower the CO2 emission with 80.000 ton.
Appendix 5: Transcript of the Video “Wind Power – To Combat Climate Change”

Not a single day goes by without mention of the environmental and climate challenges facing our world. The ice caps are melting and oceans are rising as we quest for answers and durable solutions. The good news is that there are sustainable answers and solutions. One of the most convincing is wind power.

Wind is one of the most abundant natural energy sources in the world. And it’s cheap. But it’s tricky, because it fluctuates. The main challenge with wind energy is to ensure a constant and reliable source of energy supply to consumers: and how do we do that when the energy source fluctuates, as wind conditions change? This is the amazing story of how to integrate large amounts of wind energy into the power system.

The wind power share of electricity consumption varies a lot from country to country. With a 20% share, Denmark is the leading wind power nation of the world.

Connecting a few wind turbines to a country’s power grid is not a problem, the large challenge is when thousands of wind turbines are connected to the power grid, and wind power becomes a large part of consumption. For what do we do with the power, when the wind is so strong that we generate more power than we can consume, and where will the power come from when there is no wind?

Let’s take a look at some of the main tools needed to make integration of 20% wind power a success - in both windy and calm conditions.

A wind power share of approximately 20% in Denmark is being reached by employing a number of tools

Naturally, it takes a great number of wind turbines. In Denmark, an effective scheme subsidizes the generation of electricity from wind turbines. Furthermore, they can be connected to the grid for free. Legislation and planning ensure that wind power is first in line to the grid, and a national plan establishes where wind turbines can be erected.

A strong and well-developed electricity grid within Denmark and to the neighboring countries transmits energy from the wind turbines out to where consumers are.
Denmark is part of a strong electricity market, where electricity can be bought and sold, all-in-all to accommodate supply and demand, and to ensure competitive and fair prices for electricity.

A national transmission system operator ensures that the actual generation of electricity and its actual consumption always balance, by asking the power stations to step on the brakes or to step on the accelerator, or through import and export to neighboring countries.

Despite the huge challenges of integrating wind power into the grid, Denmark has no intention of settling at 20% wind power. In 2020, a wind power share of approximately 50% of electricity consumption in Denmark is within reach. A variety of new tools could come into play as Denmark expands its wind power production with new and possible future off-shore wind farms geographically spread around the country.

Denmark has led the way with large-scale wind power. To learn more about the Danish wind case watch the full version of: Wind Power – To Combat Climate Change.
Appendix 6: Publications

Ministry of Foreign Affairs of Denmark, 2010. “Let’s Reinvent the Wheel for a Change”

Energinet.dk, 2009. “Wind Power: to combat climate change – how to integrate wind energy into the power system”
LET'S REINVENT THE WHEEL FOR A CHANGE

INTRODUCING THE WORLD'S FIRST CYCLING EMBASSY

I CPH COPENHAGEN IS A BIKING METROPOLIS
CONTENT
THE WORLD’S FIRST CYCLING EMBASSY

International interest in Danish cycling culture has grown rapidly. As an answer to this, a completely new phenomenon has seen the light of day. The world’s first cycling embassy: a center for service and knowledge for anyone seeking information on cycling in Denmark.

By Lotte Ruby, Danish Cyclists Federation

Congestion, obesity and climate issues: In the last decade a new set of challenges have emerged, and they have slowly but certainly changed the common view on cycling as a means of transport. Cycling is no longer a mere curiosity; it has become part of the answer to many of the problems concerning modern life in thousands of the rapidly growing cities all over the world. This change of view has turned many eyes towards Denmark – a country that, for more than a century, has been a place of cyclists. Today, Denmark is a cycling laboratory where new trends and ideas are combined with knowledge gained through years of experience – experience that we’re more than happy to share.

One entrance to knowledge

“No other single activity can simultaneously improve general health conditions and fitness, reduce pollution and CO2 emissions, and help tackle congestion. That is why countries around the world now want to re-introduce the bicycle as a means of daily transportation,” says Marie Magni from the private company Vekso, one of the members of Cycling Embassy of Denmark.

The Embassy is a comprehensive network of private companies, local authorities, and non-government organizations, working together to promote Denmark as a cycling country nationally and internationally. The construction of the embassy has also simplified information seeking about everyday cycling.

“Earlier it could be a challenge finding a way into the jungle of Danish cycling knowledge. Cycling Embassy of Denmark has made it easier. The main actors in the field of cycling are now members of the Embassy, and through the Embassy’s website it is easy to get in touch with experts in different fields,” says Troels Andersen, representing the Municipality of Fredericia, and Chairman of the Cycling Embassy.

Experts in all fields

Today, Cycling Embassy of Denmark comprises experts in city planning, infrastructure, cycling promotion, parking facilities, bicycle tourism, biking, bicycles, equipment, health promotion and much more.

“As a private company with years of experiences in working with urban cycling solutions and cycling equipment, I find the Cycling Embassy an excellent...
platform to develop new ideas with colleagues in other organizations. When we unite our efforts through the Embassy we can reach out much further and help each other. And of course we can also help people in other countries who want to develop a cycling culture,” says Marie Magni.

**Starting from scratch**

Building, or as is often the case, rebuilding a cycling culture is not an easy task. There is much more to it than simply constructing bicycle paths (or “Copenhagen lanes” as they have been named in some countries). But Denmark’s experience shows that with the right know-how it is possible to change habits and create cleaner, safer, healthier, and more liveable cities.

“Many city planners, politicians and NGOs around the world begin from scratch when trying to build up a bicycle culture. One of the main goals for Cycling Embassy of Denmark is to share the experiences from Denmark and facilitate the development of attractive cycling cultures around the world. We cannot give people a cycling culture, but we can help them with ideas, share our experiences, show them the Danish cycling solutions, and help them take the first important steps,” says Troels Andersen.

**Ask us about everything**

Cycling Embassy of Denmark was launched in May 2009. Since then a huge number of delegations from all continents have visited Denmark, and many more have been in contact with members of the Embassy with inquiries concerning all aspects of cycling. Cycling Embassy of Denmark has participated in various international conferences, seminars, and exhibitions. The Embassy collaborates with other international organizations and Danish Embassies abroad in promoting cycling. In addition to this, the Embassy helps plan visits to Denmark for professionals, journalists, and students interested in cycling solutions and knowledge.

“Some delegations have already been working with cycling for years. They are usually seeking detailed information on very specific subjects. Others come from countries with no cycling culture at all and are looking for answers on a very basic level. But everybody is welcome – and for us it is an endless source of inspiration to follow the development of cyclist cities all over the world,” Troels Andersen concludes.

**The members of the Cycling Embassy:**

City of Copenhagen, City of Århus, City of Frederiksberg, City of Odense, Fredericia Municipality, Ballerup Municipality, The Danish Two-wheel Retailers Association, VisitDenmark, Danish Cyclists Federation, Aros Communication, Reelight, Velorbis, Vekso, Cowi, Gehl Architects, and the Danish Cancer Society.

**Further information:**

[www.cycling-embassy.org](http://www.cycling-embassy.org)

**Contact:**

Secretariat for Cycling Embassy of Denmark,
Danish Cyclists Federation
Rømersgade 5
1362 Copenhagen K
Denmark

Art: Cycling Embassy of Denmark
Tel: (+ 45) 40 70 83 58
Fax: (+ 45) 33 32 76 83
E-mail: info@cycling-embassy.org

“We are actually just copying Copenhagen so it should really be us awarding a prize to the Danes instead”, New York City’s Mayor Michael Bloomberg said receiving a prize from the Cycling Embassy of Denmark in acknowledgement of New York’s recent efforts for cyclists.
CITY OF ODENSE JOINS WORLD EXPO 2010

When the World Expo 2010 opens in Shanghai, the city of Odense will be there with its exhibition pavilion ‘Spinning Wheels’ along with fellow cities such as London and Madrid. Odense has been specially invited because of its know-how and experience in cycling, city planning and sustainability.

By Kristina Edrén, Odense Municipality

For more than 30 years the two-wheeler has cycled around in the thoughts of the people of Odense when they have discussed city planning, environment and health, and now their efforts have resonated on the other side of the globe.

When Shanghai hosts World Expo 2010, the people of China will be able to see with their own eyes, a city where the citizens are crazy enough to ride their bicycles every day and are even proud of it.

Can Odense’s message impress the Chinese, even though China is known for more cyclists than any other nation. The reason for this is gas-guzzling cars, which are gaining ground at a rapid pace in China.

Each day thousands of new cars come onto the streets at the expense of bicycles and ultimately the environment. China is thus facing an exceptionally large task in the coming years to safeguard the environment, and here Odense can help with its knowledge and experience.

In Shanghai the challenge will be to present the bicycle to the Chinese, who already know plenty about the subject, in another context than the one the Chinese know. The focus of the exhibition is that cycling is more than two wheels and two pedals. It is just as much about image, design and health, as well as sustainability and environment.

A hands-on experience for visitors

Odense’s pavilion is built up around Hans Christian Andersen’s famous papercutting “The Sun Face”. The sun’s face itself is an open space that can be used for events and theme weeks on special subjects, technologies or knowledge areas.

At the exhibition the bicycle is an icon of the special mindset and consistency that forms part of the urban planning of Odense today.

Radiating out from “The Sun Face” are a number of exhibition rooms, each with their own theme of cycling, city design, healthy lifestyle and eco-friendly thinking about traffic, water, heating, electricity and renovation.

Around the exhibition and alongside the neighbouring Shanghai and London pavilions, a typical Danish cycle path will be constructed allowing visitors to get the wind in their hair.

Danes say that they live in a country where the bicycle reigns supreme. The exhibition will have a bicycle park, a special designed device counting cyclists and bicycle pumps to show how Odense accords cyclists the same attention as motorists.

The pavilion is built as an open construction so that it can be seen from the surrounding pavilions and from the bridge across the neighbouring river that runs through the exhibition grounds.

Think! Choose! Live!

The exhibition communicates to everybody in a clear and factual way. It is spiced with a number of activities, screen displays and information stations to make the communication more playful. Quotations from Hans Christian Andersen are incorporated into the exhibition to support the bicycle theme.

At its entrance, the exhibition features a short introductory film about Odense and
Funen which presents the city and island as seen from a bicycle.

The exhibition then divides into three themes, which are also invitations: Think! Choose! Live!

Think! explores how to design a modern city with continuous consideration for the environment and accessibility. Using photos and short texts, it presents examples of bicycle parks, types of cycle path and bicycles to suit every need. Think! demonstrates how to design a city to cater for cyclists, while offering cyclists solutions that give them the opportunity to continue cycling throughout life for the benefit of both their health and the environment.

Choose! shows how safety, fashion and health can be combined through innovative design and creative solutions. Photos and short texts show examples of cycle helmets (design), magnet lamps, and the sport and exercise aspects of cycling. Choose! aims to show that design and functionality do not have to be compromised to ensure safe cycling.

Live! invites visitors into the Danish culture, where the bicycle has become a permanent and integral part of both working and private life. Through visuals and text bites, visitors will see how cycling starts in childhood, and that cycling is a lifestyle and not a necessity for Danish people. Cycling is a natural part of everyday life and everybody cycles; visitors will gain an impression of this from images of cycling postmen, police officers, taxi, etc.

These three invitations present a number of stories ranging from the more serious long-term planning to personal choice and decision, lifestyle-oriented subjects, police officers and taxi.

More than bicycles
The bicycle is used to communicate what Odense can offer in terms of sustainability and environment. The bicycle is the most sustainable means of transport, it is inexpensive, good for health, and it helps improve accessibility in the city and reduces CO2 emissions. The city of Odense has made major environmental efforts for many years, and in a number of areas Odense has been a pioneering city both nationally and internationally.

Facts on the City of Cyclists
In Odense cycling is a very strong symbol, because many citizens ride a bicycle to work, to school or to spare time activities every day. Over the last 10 years, Odense has been promoting cycling and designing the city to be bicycle-friendly with cycle paths, pumps and parking. Efforts have also been targeted at improving safety and reducing the number of accidents. In addition Odense has run many campaigns to make people aware of the many new initiatives and the benefits of cycling for adults and children alike.

The foundations for encouraging more cycling have thus been laid, and so the time has naturally come to shift the focus from the city to the citizens, because a city of bicycles is nothing without cyclists. The great challenge is to maintain, motivate and change mobility patterns so that even more people choose a bicycle instead of a car for the benefit of both health and the environment.

Odense Cycle City has thus changed its name to the City of Cyclists. The vision is that Odense becomes the place where cyclists thrive the most because the city makes it easier, safer and more comfortable to ride a bicycle.
Copenhagen Cycle Chic is one of the world’s leading fashion blogs. Bicycle advocacy in high heels showing how gorgeous a city can be once the bicycle is given the respect it deserves in the urban landscape.

Copenhagenize.com is one of the world’s first blogs on bicycles and urban mobility.
Copenhagenizing and Cycle Chic

By Mikael Colville-Andersen

One thing is certain. The bicycle is hot, all over the world. By all accounts we are returning to a place where the bicycle is a respected, accepted and feasible transport option on the urban landscape, just as it was a century ago. Bicycle Culture 2.0, if you like.

In many countries, the bicycle long since disappeared from cities and towns, relegated to being merely a piece of sports equipment or a child’s toy. In some countries, like Denmark, the bicycle continued to thrive and we are now world leaders in inspiring others how to rediscover the bicycle.

Ironically, for the vast majority of Danes the bicycle is nothing more than a tool. A quick way to get from A to B and often the quickest. We have demystified and mass-marketed the bicycle to such a degree that we regard it in the same way as our vacuum cleaners. Functional, practical and effective but hardly a fetish object. This is a good thing. This is redemocratizing the bicycle and mainstreaming it as urban transport.

It’s odd to consider that an object that occupies so much of our time and urban space occupies so little space in our consciousness. It’s there on our streets and outside of our homes as a physical object. It’s infiltrated our daily language. If your “chain hops off”, you’re having a bad day. If you “give somebody the back wheel”, you just beat them soundly at something. If a person “cycles around in it” he is clumsy and unclear.

The bicycle is under our skin and inside our head without us knowing it. Indeed, when I started photographing my ongoing series about Danish bicycle culture back in 2006, there was a gaping hole in the subject. There were few references to Copenhagen as a bicycling capital and photo material on the internet was virtually non-existent. I don’t suppose that the Inuits go around photographing snow, so why should a Copenhagener photograph bicycles?

As it turns out, documenting our bicycle culture in detail turned out to be an important move. In the course of the last three years Copenhagen has at last been placed firmly in the global consciousness as one of the most important cycling cities on the planet.

This was accomplished by using the modern facilities that the internet offers. Two blogs form the backbone – www.copenhagencyclechic.com and www.copenhagenize.com and add to that exploiting the many advantages of social marketing and branding.

Copenhagen, in many ways, resembles other cities. An ancient city centre, sure, but it’s surrounded by wide boulevards and, farther out, urban sprawl. Visitors to the city can, if they squint a bit, see their own city in Copenhagen’s reflection and imagine what an organic mass of bicycles would look like at home. In addition, Copenhagen is constantly evolving and bringing new ideas to the table, all serving to encourage more people to choose the bicycle.

At the end of the day the biggest inspiration is the citizens who continue to ride each day. 80% of them continue to ride through the Danish winter. They ride from A to B to C and back again. The bicycle is simply the quickest way to get around the city.
THE CITIES OF THE FUTURE ARE PEOPLE-FRIENDLY CITIES

A humanistic, people-friendly city is first and foremost an accessible city, where mobility is possible for all. Many cities today are plagued by traffic congestion, and in densely populated city areas the fastest way of getting around is often on a bicycle, which is a highly efficient means of transport.

By Louise Kielgast, Gehl Architects

A steadily growing number of cities around the world are eager to become cities of bicycles, as part of an overall strategy on sustainable development and the desire to become green cities. The development of cycle path networks that can supplement the public transport system also makes a significant contribution to reducing CO2 emissions – in Copenhagen for example, cyclists are saving the city 90,000 tons of CO2 emissions annually. But there are many more benefits to be gained from focusing on bicycles than a green profile. Cities of bicycles are very much people-friendly cities, and city planning that considers pedestrians and cyclists will form a significant contribution to the humanistic city of the future. Gehl Architects have helped to promote this development in a number of the world’s metropolises.

People-friendly cities require mobility for all

A humanistic, people-friendly city is first and foremost an accessible city where mobility is possible for all. Many cities today are plagued by traffic congestion, and in densely populated city areas the fastest way of getting around is often on a bicycle, which is a highly efficient means of transport. In Copenhagen, a survey has shown that the majority of cyclists choose this means of transport because they want to get quickly to their destination, and that this is one of the most important reasons why they use a bicycle instead of a car. As an efficient means of transport the bicycle is also becoming popular elsewhere in the world, including Mexico City – one of the cities worst affected by traffic congestion. Traffic congestion represents a major economic problem because of the many working hours lost each day from sitting in traffic jams. The average speed of cars in Mexico City is 4 kph in the rush hour, while bicycles have a comparative average speed of 10 kph. As part of alleviating the major traffic problems and generally creating a better public environment in the city, local government has chosen to prepare a bicycle strategy in collaboration with the National Autonomous University of Mexico and Gehl Architects.

Besides being an efficient means of transport in terms of time, a bicycle is also affordable. Unlike cars, even the poorest segment of the population can generally afford one. Planning a bicycle-friendly city thus helps create a more socially inclusive and socially just city where large groups of people are not excluded from moving around in the city. This social inclusion can be put into practice in several ways.

The bicycle as social integration

In Mexico City, spatial segregation is very distinct with the upper and middle classes living in the city’s central areas, while the poor segment of the population is generally relegated to informal settlements on the city’s periphery. In the bicycle strategy that Gehl Architects have prepared, this problem is tackled via a comprehensive cycle path network which aims to create mobility through otherwise closed areas and thus enable different social groups to interact.

A sustainable and people-friendly city – how?

A city of bicycles naturally needs the right infrastructure including cycle paths and bicycle parking, but also a number of communication initiatives such as campaigns to promote cycling, educating children and special initiatives targeted at groups who do not normally cycle. Such initiatives are important in building a bicycle culture in cities where it is otherwise absent.

It is also important to create a quality of urban environment that makes it attractive to move around both on foot and by bicycle. This is a self-perpetuating process since the presence of pedestrians and cyclists significantly contributes to the life of the city and thereby its
‘You are absolutely lucky here!’ he exclaimed. ‘You have such wide streets. So you can have nice comfortable wide sidewalks, street trees, bike lanes. Maybe even,’ he allowed with a grin, ‘also some lanes for the cars.’

Architect Jan Gehl on the potential of New York City in an interview with The Architect’s Newspaper, 2008
attraction.

In contrast to motorists, cyclists and pedestrians share the characteristic of moving at a moderate pace, making them visible in the cityscape. Cyclists are also flexible in the sense that they can quickly shift from being cyclists to being pedestrians. This creates the conditions for people to see and meet each other in the city. It is equally important to highlight that both cyclists and pedestrians are physically present in the public spaces – in contrast to motorists who are essentially isolated from their physical settings. But the desire to move around in a city on foot or by bicycle does not come by itself, and must be supported by a people-friendly urban environment.

Pedestrians and cyclists are exposed to all sorts of weather – sun, wind and rain – and to the extent possible, these conditions must be incorporated into the planning of sidewalks and cycle paths. In addition, presence in and movement around a city must be encouraged by creating interesting and involving urban environments. Long, monotonous stretches have to be broken down into smaller sections and offer details that can be registered at head height, such as interesting features at ground floor level. These are significant principles that can be used all over the world, but different cities naturally need different strategies and initiatives.

**World metropolises take the important first steps**

In New York City a general upgrading of the public environment has had high priority. As part of the city’s 20 year vision "PlanNYC for a greener and greater New York", Gehl Architects has advised the city on preparing the "World Class Streets" strategy, which involves the conversion of a number of public spaces and a plan for a comprehensive cycle path network. A number of pilot projects have been carried out to facilitate new ways of thinking about and planning the city’s public spaces.

Acknowledging that it has no strong bicycle culture at present, Mexico City has chosen to prepare different strategies for different target groups in a collaboration that involves the municipality and the National Autonomous University of Mexico. In Beijing, the problem is in a way reversed. It has a deeply embedded bicycle culture, but the problem is that it is considered opposed to the country’s desire for progress and growth. In China’s future scenarios, the car is seen as an important symbol of progress, while the many bicycles which still dominate street life are considered a relic of the past and an aesthetic blight on the urban landscape. Local government is nevertheless promoting cycling as a necessary and sustainable activity in relation to the city’s progress, which can help ease the enormous traffic problems that have arisen in the last 10 years. The aim is that bicycles primarily function as a supplement to a well-developed public transport system.

With consultancy from Gehl Architects, Melbourne has chosen to promote and strengthen urban life, and here “Copenhagen” cycle paths are just one of many initiatives. This effort has produced significant results in the last 5-10 years, where the city has flourished and built a strong and lively city centre.

**Different facets of the same issue**

Thinking of the city of bicycles as one contribution among many which are intended to promote an attractive urban environment, has turned out to be highly effective: the city of bicycles, the pedestrian city, the healthy city, the attractive city and the accessible city are all facets of the same issue. Planning for pedestrians and cyclists is thus an obvious place to start in order to create a sustainable and people-friendly city.
“Bike riding is bliss in Copenhagen”
The Star, 2009

Photo: Mikael Colville-Andersen/Copenhagenize.com
Cycling is such an ingrained part of Danish culture that we hardly think about it. Most children can cycle by the time they start school. But innovative thinking is still needed – even in a cycling country like Denmark.

By Lotte Ruby, Danish Cyclists Federation and Camilla Liv Andersen, The Danish Cancer Society

When people from abroad visit Denmark, they are often very surprised by our bicycle culture. How come you cycle so much? they ask. The short answer is: we start early.

In Denmark, we see cycling as a basic skill on par with walking and talking. Most Danish children can cycle by the time they start school – perhaps not perfectly, but they can usually keep their balance and steer a straight line. Children are thus not taught to ride a bicycle at school – it is generally taken for granted that they will be taught at home. Schools can then start at a slightly higher level by teaching children about traffic rules and road safety, and participate in campaigns which support good cycling habits – for example “All children cycle”, which the Danish Cyclists Federation has carried out with great success for a number of years. This shows some of the strength of the Danish bicycle culture: we get surprised if people cannot ride a bicycle.

Three year old children on two wheels
Bicycle training in an ordinary Danish family starts when a child is between three and six years old. By that time, the child has already been pedalling around on a three wheeler for a while and in recent years often also on a training bike, which is a play bike without pedals. But ultimately pedal power and balance need to be combined so the child learns to master a real bicycle. The motivation in children is almost always high, especially in families where the adults use a bicycle in their daily life – cycling is very contagious. So it is of less importance that bicycle training methods have been inherited through generations, that they are home-taught and not always completely educationally correct, because the result is almost always that the child learns to cycle. And the moment when the bicycle is finally under control, most children remember as one of their first great victories. It is also a day of joy for parents when their children learn to cycle. In big cities in particular the cycling family has become a symbol of energy and success in recent years. You often see proud parents walking through the city with children as little as to two years of age pedalling along next to them on small bicycles. Cargo bicycles with space for one or several children have also become a status symbol for the modern metropolitan family – even Crown Prince Frederik has one.

Taking care of the bicycle culture
But the ingrained cycling culture in Denmark also has a drawback. Even here in the stronghold of cycling, we can see that car culture can easily threaten bicycle culture. In addition, children in some immigrant families do not learn to cycle at home, which also presents a challenge. It is thus important that we constantly work on strengthening the bicycle culture and making sure that everybody gets the opportunity to use a bicycle in their daily life.

The list of good reasons for teaching children to cycle is long. We know that children who cycle on a daily basis have significantly better physical fitness than other children, and are a lot less at risk of developing serious lifestyle diseases such as diabetes, cardiovascular disease and obesity. Cycling also has a positive effect on learning ability, joy of life and social well-being. When they get a bit older, children enjoy the freedom of cycling to school, to spare time activities and to visit friends.
Personal transport habits are founded in childhood. Continued positive experiences of cycling can almost create dependence on this healthy and green means of transport, while children who do not cycle are not likely to become cyclists as adults.

Unfortunately the proportion of children who cycle to school has declined in recent decades. The Danish Cyclists Federation, in collaboration with the municipalities, is making great efforts to get day care centres and schools involved in the work of maintaining and strengthening the bicycle culture.

**A good start is an early start**

In 2008, the Danish Cyclists Federation published the book “Cykelleg” [Bicycle Play], a guide to how parents and day care centre staff can teach small children to cycle based on play – a project we are following up on with the establishment of a team of instructors with special knowledge of how to initiate fun games involving cycling.

Learning to ride a bicycle can already be started when children are two or three years old. At that age most children can learn to ride a running bike – and then the bicycle play can start. Cycle tag, bicycle circus, skid mark competitions – the opportunities are endless.

Training bikes have become very popular in many Danish families and day care centres. Many children, parents and day care centre staff have quickly adopted the idea of bicycle play, which bodes well for future generations of cyclists.

As schoolchildren they will have no problems with learning traffic rules and participating in bicycle campaigns - and later safely cycle to school by themselves.

**Cycling should be fun**

But how do we give our children positive cycling experiences? Play is always a good place to start. We adults can quickly start focusing on rules and technique, but if you give children bicycles and a safe area to cycle in, wonderful things start happening.

Children immediately start playing on bicycles – they cycle quickly, they brake, they cycle slowly around in small circles, stand up on the pedals, perhaps try to lift the front wheel off the ground, cycle without their hands on the handlebars or with their feet on the handlebars. This is how children slowly become one with their bicycles – and that is the first step to becoming safe and confident cyclists.

Unfortunately not all children have a safe and car-free area to cycle in. They need access to this – and if engaged adults enter the play with challenges and ideas, and if more children can play together, it gets even better.

**Cycling towards health**

Everyday cycling is not only an enjoyable way of commuting where people interact with the city and each other, it is also one of the most effective ways of promoting good health. For example, cycling reduces the risk of serious conditions such as heart disease, some forms of cancer, high blood pressure, obesity and the most common form of diabetes.

Health is one argument for making cities more bikeable, economy is another. The economic pay back of making a city more bikeable is 2 – 7 times the invested amount. Savings primarily derive from health costs such as less hospitalization and less work related sickness absence. Thus there are many health related reasons for encouraging politicians, architects and urban planners to design bikeable urban areas in order to make the bicycle the preferred mode of transportation - also for children.

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**FACTS**

- Most children can cycle by the time they start school.
- 45% of all children cycle frequently to school.
- 66% of of children under the age of 11 use a cycle helmet.

**Sources:** The Danish Cyclists Federation, the Danish National Board of Health and the Council for Safe Traffic.
“Copenhagener don’t simply preach the “progressive city” ethos, they live it.”
New York Times, 2010
CYCLING IN COPENHAGEN - THE EASY WAY

Every morning at around 7am Copenhagen comes to life. Men in business suits, women fashionably dressed in the latest styles down to their high heeled shoes and parents carrying their children in a cargo bike all hop on their bikes and get off to work or school.

By Lasse Lindholm, City of Copenhagen

Actually, 37 per cent of everybody working or studying in Copenhagen prefers the bike in the morning - and the equivalent number of people living in Copenhagen is as high as 55 per cent. That makes cycling the most popular means of transport and 1.2 million kilometres are covered daily by cyclists in the city, where cycle tracks are an integrated part of the traffic design.

Cycling is the preferred means of transport because it's the quickest and easiest way to get around town. It's the glue that keeps our lives together – allowing us to connect our everyday tasks in a smooth manner. While this tells us a bit about the Copenhagener mindset it also demonstrates that given the right support, cities around the world can be modelled to be more sustainable.

From A to B
While many guests in the Danish capital seem to think that Copenhageners must be really concerned with the environment since so many use a bike, it’s just not the reason why Copenhageners ride. Many Copenhageners are of course focused on environmental issues but, when asked, only 1 per cent of Copenhageners mention it as the main reason.

Surfing green waves and snow
However, you also have more low hanging fruit to pick – in terms of investment. Two good examples from Copenhagen are the green waves for cyclists and the snow removal policy.

First of all you need to make cycling competitive and safe, and a great point of departure is having city planners armed with political will who make access for bicycles in public spaces a priority. In Copenhagen there is a coherent network of segregated lanes designated as cycle tracks in all city areas. That means you can ride from one part of the city to another almost without leaving the cycle track, which in most cases also ensures less travel time than going by car or bus.

Creating a city of cyclists
But how do you create a city of cyclists?

A child is easily transported in a cargo bike in downtown Copenhagen.
cyclists can surf a wave of green traffic lights through the city without putting a foot down. Efficient for car drivers? No. But definitely an advantage for cycling citizens.

Should it snow in winter, city policy mandates that snow be removed from the cycle tracks before it is cleared from the car lanes – with the exception of car lanes on the four largest roads, which are cleared at the same time as the cycle tracks. This top priority helps explain why 80 per cent of Copenhagen cyclists still choose bikes in January.

Perception is (also) reality
Creating viable infrastructure and policies is important, but these are only some of the elements in developing a more sustainable and living city. As long as the common understanding of mobility is connected to the concept of driving a car, the road towards sustainable urban mobility through cycling will not be an easy one. Hence part of the work is also to change public perception of which kinds of mobility carry the greatest benefits for both citizen and society. Fortunately cycling leaves plenty of facts on the advocate’s side – to be used in campaigns and other communication activities.

Performing over the long haul has been the essence in the Danish capital. Copenhagen – as a city of cyclists – wasn’t designed and constructed overnight. It has been in the making for decades and the consistency in prioritizing cyclists on the street scene goes a long way to explaining why there are more bikes than citizens in Copenhagen today.

Copenhagen to host global conference on cycling in 2010
Velo-city Global is the first conference to bring together cycle experts and professionals from all over the world in Copenhagen. The European Cyclists’ Federation has named Copenhagen as host city because of its strong cycling tradition and because it will be possible for participants – with their own eyes – to see that with continued focus, cycling can achieve a large market share. Copenhagen shows that growth in the number of cyclists can occur at the same time as economic growth and a high quality of life.

From 22 to 25 June the conference will highlight the bicycle’s potential to enhance quality of life around the world and to help solve global challenges such as congestion, obesity and climate change.

By going global for the first time, the conference is celebrating 30 years of Velo-city conferences held by the European Cyclists’ Federation and the hosting cities.

For further information
www.kk.dk/cityofcyclists
www.velo-city2010.com

Easy mobility seems to be the key to achieving high numbers of cyclists in the city centre.
HOW DENMARK BECAME A CYCLING NATION

In the 1960s, cars were threatening to displace bicycles in the main Danish cities. But the oil crisis, the environmental movement and a couple of controversial road projects reversed the trend. This is however just part of the story behind why Danes still cycle so much.

By Lotte Ruby, Danish Cyclists Federation

Is it possible to cycle in your city? Is it safe? Is it even attractive? If you can answer yes to all three questions, then the cycling culture in your city has good expectations for growth. But often the answers are in the negative, and then the next question is: how did this come about?

The answer lies in a city's historical development, because surprisingly many of the major cities that today are packed with cars actually have a past as cities of bicycles. A journey back into Denmark’s history shows how and why Copenhagen and other Danish cities have managed to maintain a flourishing bicycle culture.

The bicycle was invented in the latter half of the 1800s. The first bicycles were quite primitive and somewhat awkward to ride. Nonetheless they soon became the big fashion craze – especially among young men in high society. Bicycles were first used for sport and recreation, but in the late 1800s some more practical types of bicycles gradually came into the market, and the general public, who otherwise had poor access to transport, quickly adopted them.

Freedom for all

With the bicycle, ordinary men and women suddenly gained much more freedom of movement. The bicycle was their ticket out of the inner city’s cramped tenement houses and into the clean air of the rapidly growing suburbs.

In a Danish context, the bicycle has been inextricably linked with freedom ever since.

Photographs of urban scenes from the 1930s clearly show how Danish cities became cities of bicycles in the first half of the 1900s. People from all social classes cycled on a large scale and several professions also adopted the bicycle – today cycling postmen and home helpers are still a permanent part of street life.

The bicycles’ first heyday lasted for half a century until around 1960, when the increasing standard of living slowly but surely made car ownership possible for more and more families. That development was welcomed because cars and single-family houses were vigorous symbols that the depression of the 1930s and the darkness of World War 2 had lifted, and that a brighter future lay ahead.

Decades of headwind

But what is a brighter future? The multitude of cars brought not only prosperity but also pollution, congestion and traffic accidents. It can be an eye opener to see photographs from Copenhagen in the 1960s. Many of the areas now treasured by the city’s inhabitants and tourists alike are car-free areas, but in the 1960s they were characterised by dense traffic and car parks. Nyhavn, Stroget and Langelinie are just some examples.

Until the 1960s, Copenhagen’s history unfolded in parallel with developments in many other western metropolises. But then a number of things happened which made Copenhagen and several other major Danish cities depart from the beaten track.

During the 1960s it became increasingly difficult to turn a blind eye to the many traffic accidents and the growing pollution problem. Copenhagen was no longer the city of bicycles that most Danes knew and loved, and it upset a lot of people.

For more than half a century, bicycles had steered their way into the core of Danish self-perception through the visual arts, poetry and music. The cheerful spinning of the wheels and the summery image of a blonde haired girl cycling...
through the town – what was the city without this? At the same time the budding environmental movement and the oil crisis greatly helped to shake the dust off cycling culture, which in the 1970s again began to appear in a positive light.

The Danish model
From the 1970s to the 1980s, several conflicts arose between bicycle and car interests in Danish cities. One example was the wave of popular protests which followed in the wake of a proposal from the Copenhagen authorities to establish a motorway across the lakes which separate the inner city of olden times from the more recent suburban districts. There was an enormous outcry because, then as now, the lakes were some of the city’s loveliest open spaces.

Gradually it became clear to most people that the solution to the problems had to be city planning that gave space to cars, bicycles, pedestrians and public transport.

Out of this realisation grew the Danish model with its extended network of cycle lanes along the roads, which continues to be further developed. In the last 10 years, new challenges have emerged. In Denmark, as in other countries, there is a desire to improve public health and combat climate change. In Copenhagen and several other Danish cities it has led to an intensified effort to maintain and strengthen cycling culture.

The bicycle is an additional choice
Cycling – especially in a wealthy country like Denmark – is for most an active additional choice which can easily change. So the only way forward is to make it safe, easy and attractive to cycle, and that does not happen solely by changing the infrastructure.

In Denmark there is a strong tradition for people from all strata of society to cycle. Cities. Most Danes associate the bicycle with positive values such as freedom and health, and in recent years cycling has actually become a symbol of personal energy. The bicycle has become ultramodern again, aided by societal development, successful political initiatives and conscious marketing.

The three largest Danish cities – Copenhagen, Århus and Odense – have all carried out large branding campaigns that put cyclists in a positive light on advertising billboards, on the internet and by actively including cyclists in new bicycle projects. The result is an increasing number of cyclists and cleaner, healthier and more lively cities.

Today the vision of a pleasant city is different to that of the 1960s. We all want to make space for progress and development. But progress and development in the modern metropolis depends on whether we manage to make it a place where people want to live.

Summer girls riding their bikes in the 1950s Copenhagen
“...the age of the automobile is coming to an end and it looks like the Danes have got it right.”

The Telegraph, 2009
DANISH DESIGN AND INNOVATION FOR CYCLISTS

If cycling is to become the modern trendy choice for city transportation it is important to provide innovative high quality solutions for both the urban space and the cyclists themselves. In Denmark different companies have specialized in innovative cycling solutions like designer bikes, cargo bikes, really smart helmets, battery-free bike lights and different cyclist service equipment for the urban space.

By Sara Fritzner, Reelight, and Marianne Weinreich, Vekso

Danish design is known the world over – with architecture and furniture being two of the areas in which we excel. The special characteristics of Danish design are clean and simple lines, but it has also become synonymous with quality, function, innovation and sustainability.

These values and principles also apply to cycling. Danish cyclists do not use a bicycle out of necessity, but because it is the quickest and easiest means of transport, and because cycling is a natural part of Danish culture and lifestyle.

Danish bicycles

Most Danes cycle in their everyday clothes, on bicycles that are made to be used as a means of transport in cities and not for road racing or mountain biking. Like Danish furniture, Danish bicycles are designed in simple harmonious lines, without a lot of superfluous accessories. There are however many different types and models of bicycles to choose from depending on the cyclist’s needs – classic bikes, city bikes, cargo bikes, etc. The leading Danish bicycle brands are Avenue, Principia, Kildemoes and Winther. But smaller brands like Von Bachhaus, Velorbis and Biomega are also successful. Danish cargo bikes like Nihola, Christiania Bikes and Trio Bike are also becoming popular around the world.

The Danish frame number system

Although the vast majority of Danes own a bicycle, many bicycles are stolen in Denmark. To make it easier to return a stolen bicycle to its owner, the Danish Parliament adopted a law in 1948 that all bicycles and bicycle frames that are sold or transferred in Denmark must be marked with a unique frame number stamped into the frame. So if you are unfortunate enough to have your bicycle stolen, you can state the frame number to the police when you report the theft. If the theft is not reported and registered in the police database, you cannot obtain compensation from your insurance company. Receiving compensation for a stolen bicycle is however also based on the condition that the bicycle was locked, with a frame mounted bicycle lock, which has been approved by the Danish Institute for Informative Labelling, whose purpose is to promote voluntary use of informative labelling of consumer goods and services for consumers.

Battery-free bike lights and other safety equipment

Making a bicycle a safe and easy choice helps promote cycling. One of the latest and most innovative solutions in safety equipment is the patented battery-free light from Reelight. With Reelight, cyclists always have lights on their bicycles – day and night. The light is based on the electrodynamic induction principle and operates via two magnets mounted on the spokes with the light itself on the wheel hub. Electricity is induced when the magnets pass the light.

The new magnet lights give safety and freedom to cyclists. Safety because the lights are fixed and always lit, and freedom because cyclists never need to worry about remembering to switch on the lights or change batteries. A comprehensive survey conducted by Odense Bicycle City shows that fixed magnet lights on bicycles reduce the number of accidents by 32 per cent. In addition, fixed magnet lights increase cyclists’ feeling of safety by up to 85 per cent.

The bike lights from Reelight are the only ones in Denmark that have been approved by the Danish Institute for
Informative Labelling. This is the guarantee for cyclists that the product fulfills legal requirements, and that it has been tested and checked by an impartial authority. In addition, Reelight has won a Eurobike Award for two years in succession. The award is one of the most significant in the bicycle industry. Innovation, safety and eco-friendliness were the decisive criteria when the jury chose to award the prize to Reelight.

It can be difficult to get cyclists to use a helmet. The arguments for not using a helmet are numerous – it looks anything but elegant, it messes up the hair and is awkward to carry around. A Danish manufacturer has taken up the challenge. Yakkay developed a helmet where the requirements for safety and aesthetics are compatible and equal. Yakkay helmets consist of a helmet and a cover. The latter resembles a hat or a cap and is available in countless designs. The helmets have been developed for cyclists who want to feel safe and well-dressed at the same time. Yakkay has already won several design and innovation awards including a Eurobike Award in 2009.

**Bicycle parking and cyclist service facilities**

Every cycling trip ends with a parked bicycle, and bicycle parking is thus a significant factor in promoting cycling. Without bicycle parking, lots of parked bicycles quickly become a mess that makes the city hard to access for pedestrians.

In the last 60-70 years, Danish companies have provided bicycle parking facilities with a focus on quality, design, innovation and sustainability. Veksø for example uses leading architects and designers to develop bicycle parking solutions to ensure not only that the solutions are attractive-looking and functional, but are also connected in terms of design with other city fixtures such as benches, waste bins and lighting, thus making bicycle parking part of a city’s design expression.

Altogether there has been a major focus in the last 10 years on developing different innovative solutions for cyclists. Odense municipality was for example the first to install a bicycle counter from Veksø, which records how many cyclists pass the counter each day.

In addition to giving City of Odense important trend data on the number of cyclists, installing equipment such as cyclist counters sends a signal to cyclists that it makes a difference whether they cycle or drive a car. To the cyclists the information about how many other cyclists have previously passed a certain spot that day shows that they are not alone, and that they are part of a community.
Wind power to combat climate change

How to integrate wind energy into the power system

GREEN THINKING IN
denmark
You need an active imagination to comprehend a world without electricity and heat. This is where Energinet.dk comes in – the independent public enterprise that owns the main electricity and natural gas systems in Denmark.

We maintain security of supply and ensure efficient electricity and gas markets with fair competition to the benefit of the consumers.

We also integrate renewable energy into the power system. We support research and development in environmentally friendly power generation and administer the public subsidies for renewable energy.

**Do you want to contribute to tomorrow’s energy solutions?**

Environmentally-friendly alternatives to traditional energy sources should be strong enough to take some blows. This is why we welcome unsolicited applications from skilled candidates who are interested in using their professional expertise in the hot spot of public interest, energy policy and international cooperation.

Visit www.energinet.dk
All countries may learn from the Danish Wind Case

INDEPENDENT: The Government’s long-term vision for Denmark is to be 100 per cent independent of fossil fuels. An independent climate commission is now producing recommendations as to how and when that vision may be achieved. Their report is expected on 28 September 2010. The Government will then present its strategy as to how and when the long-term vision may be achieved.

The world is faced with the twin challenges of addressing global warming and ensuring security of supply. In Denmark, one answer lies in how we produce and consume energy. To reach our long-term vision we have set a series of interim targets within Danish energy policy up to the year 2020. Today, about 20 per cent of the electricity is generated by some 5,100 Danish wind turbines. In the near future, we will see a strong development of wind power - both onshore and offshore.

Integrating 20 per cent wind-generated electricity into the power system is a challenge for our utilities and dispatch centres, but we have already eliminated several obstacles. In this magazine Danish wind and grid specialists highlight some of the lessons learned.

At EU level, great prospects lie in creating super grids that move inevitable power generation from renewable sources to high-demand regions. Nationally, the rollout of Smart Grids can lead to better monitoring of wind power and improve the matching of supply and demand.

Wind power deployment is rising globally. Within the EU, the boom in offshore wind power is benefiting Danish wind turbine manufacturers and enabling governments to meet their EU targets. Cross-country dialogue is necessary, as offshore wind power can make our future more sustainable.

Our way of integrating wind energy is what we call ‘the Danish Wind Case’. To support the Danish case, we have recently decided to develop a test site for wind turbines of up to 250 metres in height. I hope the world will profit from the Danish experience.

Lykke Friis
Minister for Climate and Energy
Wind power tools

TO THE READER: Not a single day goes by without mention of the environmental and climate challenges facing the world.

The ice caps are melting right before our eyes and the oceans are rising as we quest for answers and durable solutions to the world’s growing energy needs.

Wind is one of Denmark’s most abundant natural energy sources, today accounting for one-fifth of the electricity supplied through Danish outlets.

As the illustration shows, a number of tools provide the recipe for integrating considerable amounts of wind energy into the power system, thus ensuring that wind energy is always used where most needed.

The list of tools available today is long and will be growing longer. Because there is more to come. The goal is 50 per cent wind power in 2025. But how?

This is precisely what this magazine wants to clarify.

Pages 6-10 contain articles on the historical background for Danish wind power.

Pages 11-30 describe the tools that allow us to manage 20 per cent wind power in the power system today.

Pages 31-39 offer articles on how electric vehicles and a range of other tools will enable us to reach our goal: 50 per cent wind power!

And if you are interested in the more technical and financial aspects, you can read more about them in the back of the magazine on pages 43-55.

Enjoy your reading!
In the past 25 years, Denmark's economy has grown by 75 per cent, while energy consumption has remained largely constant.

A targeted strategy, an unrelenting, active political effort and a unique innovation culture have created this Danish success story. We call it the Danish example.

**Oil boycott**

October 1973. The energy crisis came as a shock – precipitated by the war between Israel and Egypt/Syria and the Arab oil boycott of the USA and Western Europe.

The oil price skyrocketed, generating major uncertainty about the future energy supply.

At the time, oil covered 90 per cent of Denmark's energy requirements, and motorists had to learn to live with car-free Sundays, while shop owners were asked to turn off lights outside opening hours. It was just the beginning.

In 1979, a new oil crisis followed the Islamic Revolution of Iran and the fall of the Shah.

The shock of two oil crises galvanised innovation and change in Danish society.

Mr and Mrs Denmark turned down the heat and insulated their houses.

Popular movements worked to meet the global challenges engendered by the energy crises and thus advanced development.

Companies began taking an interest in energy savings and energy efficiency, and politicians made energy policy a priority.

**The first Ministry of Energy**

In 1976, the first complete energy plan came into being, focusing on decreasing energy consumption and dependence on oil.

In 1979, the Danish Parliament passed acts on the supply of heat and natural gas, Denmark created its first Ministry of Energy, and in the following years, acts governing renewable energy subsidies and energy savings in buildings were passed.

**Climate front-runner**

In the mid-1970s, Danes had to adjust to car-free Sundays and cold radiators. The energy crises spurred societal changes that have brought Denmark to the forefront of today's climate challenge.
In the 1980s, district heating and co-production of electricity and heat were dramatically expanded, and in the 1990s, the Danish Ministry of Environment and Energy grew very strong.

**Green taxes**
New energy plans set continually higher goals for reducing energy consumption and CO₂ emissions. These objectives were met with the help of stricter legislation, green taxes, incentives and energy-saving campaigns.

Since the turn of the millennium, the basis of energy policy has changed once again. Large oil price increases and a new, strong climate awareness in Denmark and globally have given rise to new energy agreements with even higher targets.

By Hans Mogensen | hmo@energinet.dk

Read more about the milestones in the promotion of Danish wind power on pp. 44-45.
SYMBOL: The Twind wind turbine, erected by laymen in the 1970s, became a symbol of the result of ordinary people’s campaign against nuclear power and centralised energy supply. Here it is in its new ‘garb’ designed by the architect Jan Utzon.
Photo: Dagbladet Holstebro
The great saviour. This was how the majority of Danes perceived nuclear power in the wake of the 1973 oil crisis, when heating went off and electricity became expensive. Popular sentiment, however, shifted over the next decade, fuelled by strong opposition from a number of grass-root movements.

Instead, the anti-nuclear movements launched wind power as a viable alternative energy source. In 1985, nevertheless, Elsam, the predominant regional Danish power producer, had advanced far in its plans to build Denmark’s first nuclear power plant, when the Danish Parliament responded to the shift in public opinion and struck nuclear power from its energy plans.

This decision actually breathed new life into wind energy, which now 25 years later covers one-fifth of Danish electricity consumption.

A rocky and winding road
The road has been rocky and winding. As early as in the 1890s, the physicist Poul la Cour succeeded in supplying the Askov Folk High School in Jutland with direct current from his own windmill. Oil and coal soon took the wind out of wind power, which, however, experienced a brief boom during the two world wars. Not until 1957, when the power company SEAS introduced the asynchronous motor as a generator in an experimental turbine near the town of Gedser, was the way paved for wind power in the public power grid.

But after five years, the power companies concluded that wind-powered electricity production was no match for coal and oil. In 1967, the Gedser turbine produced its last kWh for the grid. So, when the first oil crisis hit Denmark in 1973, wind power remained for only its staunch supporters.

In the following years, numerous craftsmen, teachers and folk high schools experimented with wind power, but only a few of the pioneers managed the transition from home builder to industrial company. Still, the 1980s and the early days of the green climate and energy movement saw the production of limited-series wind turbines ultimately get underway.

Mass production
In the early 1980s, a number of small machine manufacturers joined forces and started mass-producing the first wind turbines. Concurrently, the Danish Government and the large energy companies erected a number of experimental turbines.

The major private manufacturers used this experience to construct turbines for the wind farms that successive energy ministers had ordered the large energy companies to build. This includes the first offshore wind farms at Horns Reef off the west coast of Jutland and Rødsand south of the island of Lolland, which were supplied by Vestas and Bonus (today Siemens), respectively.

In the 1990s, favourable payment terms encouraged thousands of private individuals to make joint investments in wind turbines, which gradually moved off shore as opposition to onshore turbines grew louder. The first wind turbine went up at Middelgrunden near Copenhagen in 2000, where a cooperative owns half of the turbines, and more were subsequently erected south of the island of Samso.

Today, cooperatives provide 15 per cent of the Danish wind capacity.

By Torben Bülow / tob@energinet.dk

Read more about Danish cooperatives on pp. 46-47.
It is one thing to build a wind turbine, but quite another to produce electricity for the public power grid. Today, it is so common that wind turbines covers close to one-fifth of Danish electricity consumption. The integration of wind energy makes Denmark a global role model, but in the 1970s this was completely uncharted territory.

In 1976, out of dire necessity – and without asking permission – wind power pioneer Christian Riisager discovered that his home-built turbine in his back garden could make his electricity meter run backwards. Inspired by the innovative Gedser wind turbine, he had used an asynchronous motor as a generator, which requires grid connection.

The somewhat anarchistic grid connection prompted common regulations for the entire electricity supply, ushering in an all-new era for renewable energy sources. Denmark soon gained a head start in wind technology – a head start that has been growing longer ever since.

Security of supply
The Danish head start is much in evidence when it comes to the all-important ability to integrate large amounts of often highly unpredictable wind energy into the power system without compromising security of supply, a feat that only a few central and typically coal-fired power stations have so far been able to accomplish. For as long as electricity cannot be stored, the power system must balance supply and demand hour by hour. This requirement takes planning and a well-equipped toolbox.

In the 1980s, however, the challenges posed by wind energy in the power system could still be met, but during the next decade environmental policy took another direction that fostered highly favourable payment terms. As a result, the number of even larger wind turbines owned by private individuals as well as by cooperatives and power stations increased dramatically.

First claim to the grid
When the climate-neutral wind energy obtained a first claim to the grid, the many wind turbines put tremendous pressure on the power system during the 1990s – not least because, during the same period, the power system had to manage an increasing number of local CHP plants, which also had a first claim.

Brussels, however, came to the rescue, adopting an EU directive on electricity market liberalisation that required the unbundling of production from transmission. In 1998, the Danish Government subsequently assigned the responsibility for the power system and renewable energy resources to the transmission systems operators – Eltra in Western Denmark and Elkraft in Eastern Denmark. In 2004, the two TSOs merged to become Energinet.dk, which now manages the entire Danish power system from its control centre in Fredericia in Jutland.

By Torben Bülow / tob@energinet.dk

Read more about unbundling on p. 48.
A hundred years ago, hardly anyone would have imagined that nature’s bountiful storehouse would come to play such an important role in a small country far to the north, where variations in the otherwise flat countryside come only with the undulating hills and small valleys.

Today, however, wind turbines are generously scattered throughout the country, the majority of them on the west coast of Jutland.

In the past couple of decades, wind turbines have grown in popularity generating anything between 0 and approx. 3,100 megawatts (MW) for the power grid daily.

Over the past 25 years, the invisible wind has become one of Denmark’s most valuable natural resources.

A wide range of tools

Today, wind supplies 20 per cent of the electricity used in Denmark. In future, this percentage will have to increase if our ambitious climate goals are to be achieved.

The following pages describe the many tools available today and those that must be developed in the future to ensure that Denmark will continue to be ‘wind power champion’.

Wind power is an unstable element requiring various tools to control it.

– The secret is, however, that this entails not a single but several tools. To integrate wind power and ensure a high degree of interaction, we need a wide range of tools, says Dorthe Vinther, Head of Strategic Planning at Energinet.dk.

The range of tools includes everything from the planning of the power grid and robust interconnections through accurate wind forecasts and adequate reserve capacity for calm periods to a well-functioning electricity market in which players trade themselves into balance, and consumer behaviour comes to reflect the strength of the wind.

The power grid is the backbone

Transmitting wind force from the turbine blades to consumers’ wall sockets poses a huge challenge to the electricity transmission grid.
Wind power is only of value if the power lines between the wind turbines and the end-users are up to standard. This involves more than just Danish consumers. To make optimum use of wind energy, we have to be able to transmit it to the location in Europe where it is most needed, explains Lene Sonne, Vice President of Electricity Market, Energinet.dk, which is responsible for integrating renewable energy into the electricity transmission grid.

Consequently, Energinet.dk spends an annual amount in the nine-digit range on expanding and reinforcing the Danish grid and the interconnections.

A task that puts strong demands on planning as well as analysing the estimated need for new power lines and the siting of wind farms.

Reserve capacity for calm periods
Consumers demand electricity whether the turbines rotate or not. Therefore, substantial amounts of wind power require considerable reserves of other types of power generation.

In changing weather conditions, the output of Danish wind turbines may go from 0 to close to 3,100 MW in only a few hours – and vice versa.

Steady and adequate supply of electricity depends to a considerable extent on access to other production facilities capable of taking over should the wind calm down. One option is coal-fired power stations, but Norwegian hydropower in particular is an excellent supplement to wind power.

– Denmark is fortunate enough to be located between the hydropower-based Nordic system and the thermal power-based system to the south. Therefore, we are often able to import environmentally friendly electricity from Norwegian hydropower stations, when the wind is not strong enough. This is often the case during the summer months when Danish CHP plants supply less electricity and heat than in the winter months, explains Peter Jørgensen, Vice President of Electricity System Development, Energinet.dk.

First priority to green electricity
To provide Danish consumers with as much renewable energy as possible, green electricity from renewable energy sources is given first priority in the power grid. In this way, wind energy provides a ‘bottom’ under the market, but as the amount of wind energy in the grid literally fluctuates with the weather, the price charged by other producers for electricity is subject to similar fluctuations.

– Our market model forces other electricity suppliers to produce only when it is profitable. Danish consumers, therefore, benefit from electricity generated with the least possible environmental impact, explains Anders Plejdrup Houmøller, Director of Business Development with the power exchange Nord Pool Spot, which organises the trade in electricity between the Nordic countries.

Wind energy for a multitude of purposes
When it comes to renewable energy, Danish and European politicians are very ambitious, so in 2025, 50 per cent of
Danish electricity will come from renewable energy sources. This means many more wind turbines than today, for which reason the number of tools must also be increased.

– Managing the amount of wind energy available in the future will present quite a challenge, but we have already come a long way in developing tomorrow’s tools.

We need to put wind energy to even better use. To use it for transport, electric vehicles and heating in our houses. We need to integrate all energy systems and use wind energy for an increasing number of purposes. This will allow us to handle even larger amounts of wind, says Dorthe Vinther.

FACTS:

In Denmark, there are close to 5,200 wind turbines with a capacity of almost 3,100 megawatts. On a day with wind speeds of up to 10 metres per second, they can meet the electricity requirements of all Danish households during peak periods, ie between 5 and 7 pm when parents are preparing dinner and kids are watching TV.

MARKET FORCES:

‘Wind energy causes the price of electricity to fluctuate and forces other suppliers to produce only when it is profitable,’ says Anders Plejdrup Houmøller, Nord Pool Spot.
OVERVIEW: The control centre is equipped with no less than 34 screens and one big screen measuring 9 x 2 metres. All screens are in use, so it requires skill to maintain an overview – a skill that Lars Fogt Andersen as balance supervisor with Energinet.dk possesses. Photo: Palle Peter Skov

Balancing the power system

A well-equipped toolbox and quick intervention are a must when the supervisors at Energinet.dk’s control centre balance the power system. Production and consumption must balance minute by minute, 24-7. Otherwise, the power grid may break down.

The average Dane’s electricity consumption is amazingly predictable. Fortunately. Because statistics on total daily consumption hour by hour and day by day truly help the employees in Energinet.dk’s control centre, who are responsible for maintaining a constant frequency and voltage in the Danish part of the European power system. No more, no less. The slightest imbalance requires action.

Wind forecasts – a challenge
A key task of the control centre is to find out whether the wind is actually blowing at the exact speed predicted. It rarely is.
– It is not uncommon for forecasts to be off by 30-40 per cent, says Lars Fogt Andersen, balance supervisor at Energinet.dk.

At wind speeds between 5 and 15 metres per second, a single, unpredicted m/s increase or decrease will cause the Danish wind turbines to feed approx. 350 MW more or less into the power system.
Thus, control centre employees keep a watchful eye on wind power production. If it deviates from the forecasts, they have to take action.

Several advanced systems support the balance supervisors in their daily work. By combining online readings from the wind farms with statistical calculations, forecasts can often be adjusted to make deviations manageable. Inaccurate wind forecasts cost Energinet.dk millions of Danish kroner – because finding another power producer or buyer becomes a race against time.

Accelerator and brakes
The two principal levers used by the employees in this situation are called upward and downward regulation.
– The principle resembles that of a car. If you want to increase the speed, you step on the accelerator. If you are going too fast, you hit the brakes. In our system, the accelerator equals the power stations that can increase their power production precisely when needed. They fire their boilers harder. The brakes are the power stations that can quickly halt some of their power generation, explains Lars Fogt Andersen.
On an ordinary day, the levers are pulled approx. 50 times. Therefore, the job as balance supervisor requires paying close attention to the movements of the many curves and graphs on the screens.

**Market mechanisms apply**
The figures on the 34 screens tell the balance supervisors where in Denmark, Germany, Norway and Sweden they can buy upward or downward regulating power etc., as all power stations with available capacity participate in the Nordic electricity market on a continuous basis. They state how much extra power they can produce at a given time and at what price – and, when there is a power surplus, they state how much of their planned production they can stop at short notice.

Thus, the telephone is an important tool in the control centre. The balance supervisor uses it every time he deals with his Nordic cooperation partners. Danish producers are activated via an electronic message.

– In principle, all imbalances in the system must be balanced through trading. And the market mechanisms apply: We buy extra power at the lowest price possible and sell surplus power at the highest price possible, explains Lars Fogt Andersen.

**IN SHORT:**
The vast amount of wind power is a daily challenge for Energinet.dk, which – as system operator – is responsible for ensuring balance between consumption and production around the clock. All imbalances must be balanced through trading.

**CONSUMPTION:** Only rarely does the wind blow exactly as forecast, as Saturday night, 4 October 2008, clearly demonstrated. The wind hit Western Denmark approx. three hours earlier than forecast, and it was so strong that the wind power production from 10 pm until 3 am exceeded consumption by up to 250 MW/hour. As the wind turbines produced up to approx. 650 MW more than calculated, the balance supervisor had to perform downward regulation by selling the excess power, i.e., pay some generators not to produce. The graph also shows that household appliances were being used intensively at 10 am on Saturday morning – perhaps for the weekly washing and house cleaning – and that Danes were busy using the stove, oven and cooker hood on Saturday evening at 6 pm. The graph covers Western Denmark, i.e., Jutland and Funen, where approx. three million of Denmark’s 5.5 million inhabitants live.

Source: Energinet.dk

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By Mary-Anne Karas | freelance journalist
When wind topples electricity prices

The market price tends to dive when wind turbines feed vast amounts of electricity into the power system. In Denmark, this is especially the case when wind-generated electricity exceeds consumption.

It is almost a given: When the west wind is strong, electricity prices plummet at the Nordic power exchange, Nord Pool Spot, where power from the Nordic countries is traded. Anywhere between 50 and 100 hours a year, the spot price hits rock bottom.

This usually occurs when the some 5,200 Danish wind turbines are working at full throttle, transmitting approx. 3,100 MW into the grid at a time when everybody is off work.

– The Danish electricity price is highly sensitive to the amounts of wind power in the system. So the varying amounts of wind make electricity prices go up and down like a yo-yo. It forces the other power suppliers to keep an eye on their costs at all times – and to produce electricity only when it is profitable, explains Anders Plejdrup Houmøller, Director of Business Development at Nord Pool Spot, and adds:

The market ensures minimal environmental impact
– According to the Danish Electricity Supply Act, electricity from renewable energy sources has prioritised access to the power supply grid. As wind turbines also have very low marginal costs, wind-generated electricity is, in fact, offered at the lowest price on the market. In this way, the market mechanisms keep the environmental impact of Denmark’s power supply to a minimum.

Exactly how much wind affects the market price, Anders Plejdrup Houmøller hesitates to guess. But he knows that the environment pays the price when wind turbines stand still:

– If you imagine that the wind stopped blowing for a year, many old coal-fired power stations would have to run at full capacity. That would be expensive for consumers and incredibly bad for the environment. But this is a hypothetical situation. If the wind turbines had not been built, the Danish production facilities would have been quite different, Anders Plejdrup Houmøller adds.

Every day, the Nordic power exchange calculates the electricity price hour by hour based on estimated supply and demand in the next 24 hours. When the wind turbines generate more power than we can use in Denmark, market prices drop. And when production exceeds consumption, settlement prices to the producer may drop to zero.

Free electricity – then again, maybe not
In that case, the wind turbine owner in principle supplies free power to the grid, but the consumer will not
experience it as ‘free electricity’. The environmental taxes and charges on electricity consumption, which Danish consumers always have to pay, make up approx. three fourths of the total electricity price.

When the electricity price is zero, which it is for approx. 100 hours a year, the consumer only experiences a 25 per cent decrease. Moreover, this only applies to consumers who have made agreements to buy electricity at spot price. If the consumer has a fixed-price agreement, only the supplier benefits from a zero price. However, Denmark is not giving away free electricity to its neighbours. Bottlenecks, as grid congestion is also called, prevent the low price from rubbing off on the neighbouring price areas in need of electricity. Instead, the transmission system operators of the two countries will split the price differential of the electricity transmitted. When the countries are Denmark and Norway, Energinet.dk splits 50:50 with Statnett.

**Surplus production exported**
Once or twice a year, the wind turbines generate more power than Denmark can use.

– The wind turbines in Western Denmark have an installed capacity of 2,400 MW. So the wind turbines are capable of producing far more electricity than we can use at night in Western Denmark, explains Gitte Agersbæk, a civil engineer working in Energinet.dk’s control centre.

– In those situations, we must quickly find out where in Europe electricity is most expensive, and whether we have available grid capacity to transmit it there, she explains.

In 2009, the power exchange will introduce negative electricity prices, which means that electricity suppliers will actually have to pay to sell their power at times when the market is saturated. The negative prices are an attempt to give suppliers an incentive to halt production, which will make it easier to balance production and consumption.

By Mary-Anne Karas | freelance journalist

Read more about subsidies on p. 49.

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**Power generation 2008 broken down by type**

**WIND POWER:** In 2008, total Danish power generation reached 34.6 TWh. The wind turbines generated 7.0 TWh electricity, a drop of some 3 per cent on 2007 as a result of poorer weather conditions. In the period March–September 2008, total Danish power generation was less than consumption, and Denmark saw net imports of hydropower from Norway and Sweden. One of the reasons for the imports was the high levels in the Nordic water reservoirs, which affected the price of electricity.

Source: Energinet.dk
Wind is much like everything else in life: It comes when we least expect it or need it.

– But that’s just a basic condition of the work we do. The unpredictability of the wind is our major challenge, explains Peter Jørgensen, Vice President of Electricity System Development, Energinet.dk, and adds:

– Western Denmark’s fortunate geographical position means our interconnections allow us to transmit wind energy to Norway in times of surplus production and to import electricity when the wind calms down. Wind power and hydropower are as close to a perfect match as you can get.

**When the wind blows, Norway saves water**

In Norway, 99 per cent of electricity is generated from hydropower, which is based on a simple principle of utilising the energy contained in huge amounts of running water.

A hydropower station typically comprises a number of water reservoirs from which water is led through a turbine that powers a generator and thus converts mechanical energy into electrical energy.

When the Norwegians receive wind-generated electricity through the direct-current submarine cables from Denmark, they close the valves at the hydropower stations and use Danish electricity.

Generating energy from hydropower requires abundant amounts of water and a considerable difference of height between the water stored and the turbine plant. While wind power is a non-storable energy source, hydropower can be stored as needed. Hydropower also allows electricity to be generated whenever it is required.

– In other words, the water reservoirs serve as an energy storage facility. If surplus Danish wind power is utilised to reduce the amount of water used from the reservoirs, wind power is, in fact, stored in hydropower, Peter Jørgensen explains.

This is only possible if the wind power and hydropower interconnections are up to standard, which, fortunately, they are. In 1965, the Danish peninsula of Jut-
land was connected to Sweden via the Konti-Skan cable and in
the 1970s to Norway via the Skagerrak interconnection.

Robust cables and power lines
Robust cables and power lines on land, at sea and in the air guar-
anteed that electricity is transmitted from the wind turbines off the
west coast of Jutland to the regions where it is most needed.

The interconnections are used frequently. In a typical calendar
year, Denmark imports and exports close to 10-11 terawatt-hours,
TWh, nearly 30 per cent of overall annual consumption.
– The Danish transmission grid is a true link between the Nordic
countries and the Continent. A robust European transmission grid is
simply a must for integrating large amounts of renewable energy into
the system and for making optimum use of the existing grid, Peter
Jørgensen points out.

By Mary-Anne Karas | freelance journalist

Read more about market players and the Nordic electricity market
on p. 50 and pp. 52-53.

Net exports of electricity broken down by country

EXPORTS: Denmark’s foreign trade in elec-
tricity is strongly affected by the prices on
the Nordic power exchange, Nord Pool, which
are again affected by the precipitation rate in
Norway and Sweden with their predominantly
hydropower-generated electricity. In 2008,
Denmark had total net electricity imports of
1.5 terawatt hours, TWh, as a result of net
exports to Germany of 7.8 TWh and net
imports from Norway and Sweden of 4.4 TWh
and 4.8 TWh, respectively.

SOURCE: Data for 1990-2007 are based on the
Danish Energy Agency’s energy statistics. Data
for 2008 are based on the data contained in Ener-
ginet.dk’s Environmental Report 2009.

IN SHORT:

Wind power and hydropower go well together.
Denmark, Norway and Sweden exchange large
amounts of environmentally friendly electricity.
When Danish wind turbines generate more
electricity than required, surplus electricity is
often transmitted to Norway or Sweden, which
reduces the drain on the water reservoirs.
When the wind calms down, the hydropower
stations step up production, transmitting elec-
tricity to Denmark.

Robust interconnections and a traditionally
sound working relationship are preconditions
for importing and exporting environmentally
friendly electricity.
Strong transmission grid ensures good wind energy

Wind power requires a strong transmission grid capable of sending power from where it is produced to where it is worth the most.

Beaches, sand, dunes and water – the first sight that greets visitors arriving at the lighthouse in Blåvands Huk, Denmark’s westernmost point. However, if they let their eyes wander over the waves, 80 offshore wind turbines quickly catch their attention.

About 15 kilometres off shore, wind turbines soar from the sea. Since June 2002, the wind turbines have accounted for approx. 1.5 per cent of Denmark’s total electricity consumption.

In clear weather, the attentive observer will soon make out the contours of another 91 wind turbines in the horizon, namely Horns Rev 2 offshore wind farm.

The wind turbines will be erected during spring 2009 and are set to be connected to the transmission grid in May 2009. When this happens, the two offshore wind farms at Horns Reef will generate power corresponding to approx 3.5 per cent of total electricity consumption in Denmark. However, a giant effort is required before this can happen.

Dependent on good weather
The Horns Rev 2 offshore wind farm will be the largest in Denmark. The farm is placed 35 kilometres off shore, and Energinet.dk is tasked with bringing power from the wind turbines ashore and transmitting it to the consumers. A task requiring specialist knowledge, money and quite a lot of time, technology and not least loads of cables and good weather.

– Numerous factors impact on this type of construction project, turning it into a jigsaw puzzle. Delivery times on both transformers and cables are long, and the weather may quickly disrupt the time schedule. For instance, the transformer can only be sailed out and mounted on the platform in fairly calm weather, and

High-voltage interconnections in Denmark

Countries participating in the EWIS collaboration

SYSTEMS: Thirteen European countries participate in the EWIS (European Wind Integration Study) project. This is the first time four European synchronous areas, each with their own frequency, join forces in a collaboration project to plan the future power systems with a high share of wind power. One of the challenges is to find the best possible interplay between technology and markets. The four synchronous areas are now organised in ENTSO-E, which comprises all European TSOs. The cooperative bodies of Nordel and UCTE have been discontinued.

Read more about EWIS on p. 55.
CABLES: The power generated at Horns Reef is set for a long journey before reaching the consumers’ outlet. Great distances between production and consumption points place massive demands on a strong transmission grid.

Photo: Bent Sørensen

cables may sustain damage if we work when temperatures fall below 5°C, explains project manager Jens Christian Hygebjerg from Energinet.dk.

And laying the almost 100-kilometre long cable will not do it alone. Offshore wind farms are generally placed far away from the consumers, so electricity often needs to be transmitted several hundred kilometres before reaching the consumers’ outlet.

**Wind power as a business**

– The stronger our transmission grid, the more customers we can reach. We need to expand the international grid and not just the national connections to integrate much more renewable energy into the system, emphasises Peter Jørgensen, Vice President of Electricity System Development, Energinet.dk.

Historically, the infrastructure of national transmission grids throughout Europe accommodates national needs, typically creating bottlenecks when international connections are used for trading large amounts of wind power as imports/exports.

– Electrons do not respect national borders. To ensure optimum exploitation of wind and other renewable energy sources, we need to view it as a business and make sure that energy goes where it is worth the most, explains Peter Jørgensen.

In his opinion, this is why the work of expanding the motorways of electricity should be handled internationally.

**New pan-European cooperation**

Other European countries have long faced the same problem. This is why some 50 experts from European transmission system operators (TSOs) are discussing the possibilities of working closer together to meet the challenges of integrating vast amounts of wind energy.

– This is the first time work is coordinated on an international scale to address the issues in connection with grid expansion and operation and to share knowledge about the future location of wind turbines. We discuss the necessary framework conditions such as harmonisation of connection rules and managing wind power in electricity markets, etc. Discussions are founded on an awareness that wind power requires dialogue, says system analyst Antje Orths, who is Energinet.dk’s representative in the European collaboration project EWIS.

EWIS stands for European Wind Integration Study and boasts participants from 13 European countries.

– The European grid must be used to its full potential to integrate wind energy while maintaining security of supply. Power flows to where it encounters the least resistance. This is the law of physics. We therefore need to work together to establish an optimum grid and good balance possibilities allowing us to manage the massive fluctuations in power generation, which wind power is certain to engender, she explains.

**Many scenarios**

EWIS works with various scenarios for the interaction between wind power and the rest of the power system. One of the challenges is to uncover how technology and markets best cohere. Discussions are held about grid expansion requirements, reassessment of market regulations as well as exploitation and expansion of grid flexibility based on one interconnected grid.

– We need to know what will happen in Denmark, for
example, in case of a short circuit in Germany and the other way round. Are there any risks we need to foresee and what are the costs? And is anything preventing us from sharing our reserve capacities for the benefit of the environment and the consumers? We have a lot of questions which we can only answer together, stresses Antje Orths.

Although it may at times seem insurmountable to map the interaction of all aspects of the European power system, it is the only way to keep energy efficiency high.

– Lacking knowledge of how to make systems interact in future and of who is in charge of the various expansion plans may quickly result in expensive, wasted investments.

– If Denmark is to reach the goal of 50 per cent renewable energy, all systems must interact, the interconnections being particularly important in this respect, she adds.

**Fair share of sun and wind**

– If the EU countries are to reach the overall target of 20 per cent renewable energy by 2020, all countries need to accept our interdependence, states Peter Jørgensen and continues:

– Increased European interdependence is basically a precondition for reducing our dependence on fossil fuels.

In other words: Ideally, the transmission grid must be organised so that sun and wind energy can be distributed in Europe where it is needed. In principle, the stormy forces often at play in the North Sea should be able to reach Spain via the wind turbines at Horns Reef. And when the weather turns, Denmark will benefit from environmentally friendly power from Costa del Sol.

By Mary-Anne Karas | freelance journalist

Read more about grid codes and voltage levels on p. 54.
When winds heading towards Denmark hit the Scottish or Norwegian mountains, they may change strength and direction, so that we will not get the amount of wind power we had anticipated. We therefore constantly need to adjust forecasts based on the latest weather forecasts and any instant readings we receive from the wind farms, explains Lasse Diness Borup, model developer at Energinet.dk.

One metre of wind more or less per second may not sound overwhelming, but translated into power it corresponds to 350 MW, which is quite noticeable in the system.

Pinpointing the time of impact
– If, for instance, the wind blows two metres more per second than anticipated, wind power will generate a surplus production equaling the output of a large power station. Forecasts are therefore crucial tools for us, emphasises Lasse Diness Borup.

His work involves pinpointing the time when the forecast weather fronts hit the Danish wind turbines and their impact on the power system.

Energinet.dk’s control centre needs to stay constantly updated on how much power the wind turbines will generate in the coming 24 hours. This is a key factor for selling power on the Nordic power exchange and maintaining the balance between consumption and production.

Forecast accuracy impacts the spot price in the market and the price of regulating power during the day of operation.

Mountains affect wind direction
Four times each day, Energinet.dk receives forecasts from three different providers of meteorological forecasts.

– When forecasts deviate sharply, we contact the meteorologist on duty at the company whose forecast deviates the most from the rest, explains Lasse Diness Borup.
– We discuss the causes. Often it is a mistake, other times we may need to be aware of greater uncertainties than normally, he adds.
– North-westerly winds are particularly hard to predict.

By Mary-Anne Karas | freelance journalist

Photo: Gerth Hansen

Wind forecasts are used to calculate how much wind power the wind turbines will generate minute by minute. Energinet.dk bases its expectations for purchase and sale of power in the electricity market on wind forecasts, among other things. So forecasts must be as accurate as possible.
A storm from the northwest is expected to hit the country tonight with gusts of up to 25 metres per second. The Danish Meteorological Institute regularly issues this kind of weather forecast in the winter months.

Strong winds and night make a head-splitting cocktail for the power system, as the combination creates an electricity surplus produced by the imbalance between high production and low consumption. For this reason, CHP plants have now begun giving the power system a helping hand, using the surplus electricity to heat district heating water.

Legislation lowers taxes
Norway and Sweden have long used the immersion heater principle with electricity from hydropower stations, but in Denmark, taxes on electricity used for heating were so steep until recently that it was unprofitable.

However, in 2008, a new act was passed, reducing taxes on electricity used for heat generation at CHP plants to such an extent that the plants can now save money by replacing oil or gas with surplus electricity when the electricity price is low.

So far, this has resulted in four units with water tanks wrapped in 30 cm insulation capable of keeping several million litres of water hot for many hours before it is distributed to the consumers. In other words, right until the storm that made prices plummet has passed, and the electricity price regains its strength. Then, the fuel of choice will once again be oil and gas.

Two birds with one stone
The CHP plant in Skagen at the northernmost tip of Denmark has spotted the trick. When power is cheaper than natural gas and oil, the electric boiler can reduce the plant’s operating costs.

This improves the budget of some 2,500 households to which the plant distributes heat, but also produces some positive side effects that Jan Diget, operations manager, greatly appreciates:

– The electric boiler transforms environmentally friendly wind energy into district heat, thus helping to give the plant a green image. The unit has also enabled us to act as a so-called interruptible customer on the natural gas market, since we now have an alternative fuel, he explains.

... and highly profitable
According to the plant’s own analysis of spot prices in 2007, running the boiler for about 800 hours would have been profitable. That amounts to 10 per cent of the plant’s annual heat generation.

– When electricity is free or cheaper than gas and oil, we turn the electric boiler on ourselves. Some days we even make money on power because of surplus production.

Apart from saving money by heating water with inexpensive power, the plant earns money by making the electric boiler’s 10 MW capacity available to the power system as a downward regulation unit.

By Mary-Anne Karas | freelance journalist

Turning wind into hot water
In Denmark, gigantic water tanks at CHP plants now function as immersion heaters – to the profit of plant and power system alike.

BUSINESS: In 2008, four CHP plants invested in an electric boiler. In Skagen, operations manager Jan Diget hopes that cheap wind-generated power can provide approx. 10 per cent of the plant’s heat.

Photo: Lars Horn

IN SHORT:
CHP plants now use electric boilers to produce heat and compete in the regulating power market (downward regulation). An electric boiler works like a battery that Energinet.dk charges when the power system has surplus power. This serves to transform wind energy into heat. Electric boilers are an example of integrated planning of different technologies in the energy system.
Negative electricity prices to keep production in check

Wind turbine owners and other power producers will have to respond to market signals if they want to avoid taking a financial risk.

For more than 10 years, the two wind turbines on Kristian Jacobsen’s field on the Danish island of Funen have padded out his pockets with every turn of their blades, but later this year it may even cost him money. Because Nord Pool Spot, the Nordic power exchange, plans to allow the price of electricity to fall below zero whenever supply exceeds demand.

This means that power producers will have to choose between paying to supply electricity, stopping the wind turbines or perhaps just cutting production to meet market demand. Being economically minded, they will probably choose the latter.

– Wind turbines can always profit from responding to market demand, as the last kWh costs us nothing to produce, whereas fossil-fuel based power stations always have manufacturing costs, adds Kristian Jacobsen. He is the chairman of the Danish Wind Turbine Owners’ Association, representing 80 per cent of the installed wind power.

Active team players

Anders Houmøller, Director of Business Development at Nord Pool Spot, describes negative electricity prices as just one of many tools designed to cut power production on winter nights when the wind is strong and electricity consumption low.

– More wind power in the power system requires increasingly flexible production as grid overload increases the risk of power failure. Our ambition, therefore, is to turn wind turbine owners and other producers into active team players who respond to market demand, says Anders Houmøller.

At 12 noon, the power exchange determines the electricity prices for the next 24 hours on the basis of the offers made by market players. During the actual day of operation, however, the power stations are always required, against payment, to adjust production to balance the power system. These adjustments come at a high price to electricity consumers, but the need for regulating power will decline once power producers learn to adjust production to market demand.

A signal during critical hours

– Negative electricity prices send producers a signal that, during the critical hours, reflects a possible imbalance between supply and demand. Therefore, negative electricity prices increase the possibility of providing a balanced power system at 12 noon before the day of operation, explains Anders Houmøller.

Consequently, he is convinced that Kristian Jacobsen and other power producers need not be concerned about the new initiative.

– The mere risk of negative prices will provide an incentive to match supply and demand before the price moves below zero, says Anders Houmøller.

By Sanne Safarkhanlou | ssa@energinet.dk

PLAYERS: It would be impractical for Kristian Jacobsen to install a communication device in his more than 10-year-old wind turbines to cut production when electricity prices may be negative. He will have to choose between paying to unload the electricity or bringing the turbines to a complete standstill. Photo: Heidi Lundsgaard

COMMUNICATION:

Today, new wind turbines have a built-in communication device allowing for automatic control, braking or a possible full stop when there is a risk of negative electricity prices. This type of communication device can be installed in most wind turbines.

IN SHORT:

Nord Pool Spot, the Nordic power exchange, will introduce negative electricity prices sometime in 2009. Consequently, power producers will be charged for selling their electricity when production exceeds consumption. This way, market forces will help to create the necessary balance in the electricity market.
Everybody must be heard – including the ducks

It takes more than a compass and a chart to find suitable sites for large offshore wind farms. Denmark has good experience with long-term planning in this area.

Some might wonder what scoters, porpoises, channels, ferry routes, military shooting ranges and marine archaeology have to do with wind turbines. But for others, the connection is as clear as day: They are all on the list of parties to be considered when offshore wind turbines are to be constructed.

– It is always a matter of placing wind turbines where they do most good and disturb the least – and, of course, the site must be financially viable, explains Anders Højgaard Kristensen, a civil engineer with the Danish Energy Agency.

‘Denmark’s gift to the world’

As one of the few European countries, Denmark has a long-term plan for offshore wind turbine sites. The first plan was prepared in 1997, and a few years later resulted in the wind farms Horns Rev 1 off the coast of Esbjerg in the North Sea and Rødsand 1 south of the island of Lolland in the Baltic – each with a capacity of roughly 200 MW.

Svend Auken, the then Minister for Environment and Energy, launched the two wind farms as Denmark’s ‘gift to the world’.

The wind farm plan was last updated in 2008.

– Back then, we quickly predicted that a conflict of offshore interests would arise, so we chose to bring the parties together and prepare a long-term plan, says Anders Højgaard Kristensen.

Representatives of the parties involved were then tasked with combing the Danish waters for suitable sites. The result was 26 crosses on a map of Denmark.

Before the site search began, a comprehensive research and analysis process had taken place, the results of which gave Denmark an edge when it comes to knowing how offshore wind farms affect the local environment.

Taking wildlife into account

– Assessing sea depths, coast distances, channels and the like is very straightforward. But when questions like how will the wind turbines affect marine mammals such as seals and porpoises arise, another set of supervision programmes is required to find the answer, explains Anders Højgaard Kristensen.

A good example is the scoters by the island of Læsø. The shallow waters southeast of Læsø are among the

Facts:

Four years in the making

As transmission system operator (TSO), Energinet.dk has the overall responsibility for the Danish power system.

The Danish Electricity Supply Act stipulates that Energinet.dk must carry out coherent and holistic planning of the power system. When new high voltage lines and installations are planned, the basis for decision-making includes ensuring security of supply, the environment and sustainability, the functioning of the electricity market and socioeconomics, etc.

Energinet.dk is thus responsible for building offshore transformer platforms and laying cables that land power from the offshore wind farms and lead it to the power grid.

Before the construction of an offshore wind farm can begin, an approval in pursuance of the Danish Spatial Planning Act of the offshore wind farm and the landing facility must be obtained, as well as an approval of the social investment by the energy minister.

Only when all approvals have been granted by the authorities, can the turbines be erected and the power grid expanded.

Despite the comprehensive groundwork required to find 26 areas in Denmark suitable for offshore wind farms, it often takes more than four years from the time the Danish Parliament makes a decision to construct new offshore wind farms and all authority approvals are granted until the farm is completed and commissioned.

Energinet.dk aims to reduce the period to three years.
birds’ preferred habitats, due to the abundance of mussels and snails, their favourite food. In the past, assumptions that offshore wind turbines would scare away ducks from the area made the Danish Energy Agency halt plans to use the site.

– Ten years on, the environment surveillance programmes have made us wiser. As it turns out, mussels and snails attach to the turbine foundations and the ducks can find food there. That is one reason why we are reconsidering the site off Læsø, says Anders Højgaard Kristensen.

Focus on socioeconomics

Once both the interests of birds and fish are ensured, each potential site has to be considered with regard to the cost of erecting and connecting an offshore wind farm on that particular site.

In addition, the wind farms should preferably be geographically spread to ensure that wind fronts do not hit all turbines at once. A geographic spread helps to ensure that wind energy is effectively integrated into the power system and thus used optimally.

Speeding up expansions

– The mapping we have completed in Denmark makes it far easier for politicians to speed up the expansion of renewable energy at sea. By now, we have conducted so many readings and studies of how turbines affect the environment that politicians more or less have only to deal with the financial aspects. They basically have to determine which site would generate most renewable energy for the money, explains Anders Højgaard Kristensen.

He adds: – In many other countries, politicians lack a proper decision-making basis, which hinders the development of renewable energy at sea.

By Mary-Anne Karas | freelance journalist

IN SHORT:

Rapid wind energy expansion requires a long-term action plan. Since 1997, Denmark has had a plan demarcating the best potential offshore wind farm sites. When potential sites are selected, wildlife, sea depths, channels and socioeconomic aspects must be considered.
CALCULATIONS: The wind climate in terms of the average wind speed at 10-metres above ground level was calculated from output from a joint re-analysis project undertaken by the USA National Centers for Environmental Prediction (NCEP) and the National Center for Atmospheric Research (NCAR).

- The re-analysis uses a state-of-the-art numerical weather forecast model and techniques that allow taking into account measurement data from around the globe in a consistent fashion from 1948 to the present day.

- This dataset was generated to provide a reference for the state of the atmosphere and to identify any features of climate change. The dataset is also a long-term record of the large-scale wind climate.

Because of the low resolution of the model...
(2.5° latitude × 2.5° longitude), these data serve only as an indicator for the wind resources of a particular region. To estimate the actual wind energy potential, other higher-resolution models, wind observations, and detailed knowledge of the topography and surface characteristics have to be used.

The stronger winds are found between the latitudes of 40 and 50 degrees. In both hemispheres the strongest winds on earth occur over the southern ocean (sometimes called the ‘roaring 40s’). Land masses tend to have weak winds, especially along the equator over the rain forest areas.

By Andrea N. Hahmann
Risø National Laboratory for Sustainable Energy
Technical University of Denmark – DTU
If everything goes according to plan, Denmark is well on its way to ending its dependence on fossil fuels by 2030. But what will the world be like then – from the point of view of the consumer and of the energy sector? Get a sneak preview below:

Wouldn’t it be great to live in a house intent on making you as comfortable as possible?

A house that remembers to open and close the windows when you forget to do it or just cannot be bothered. A house that keeps the level of indoor humidity exactly the way you want it. A house that satisfies your desire for a snugly warm living room in the evening and opens the window at night so your bedroom can be cool and airy.

– In 2030, a home will not just be a passive pile of bricks draining your energy budget. In the future, your home will be an intelligent place that, like a butler, ensures your maximum comfort even though you sometimes make mistakes. It is known as a forgiving, smart home, explains Göran Wilke, Head of the Danish Electricity Saving Trust Secretariat.

Smart and forgiving because, for instance, the house knows that you usually shower at 6.30 am before leaving for work, for which reason it makes no sense to use a lot of energy keeping your water-heating system going between 8 am and 4 pm, when you are not at home.

Your house will therefore warn you of the additional energy cost if you suddenly change your habits and, contrary to expectations, take a shower at a later time.

– Of course, you can still take a shower, though it will
cost you. Because the house disregards your little blunders and adjusts accordingly, he says.

Wall – move!
But future homes will offer much more than the omnipresent butler. They will include features like ultra-mobile TVs that let you watch TV wherever you want, and adjustable walls to give your house the optimum layout at any time – depending on where you are in your life. You might, for instance, need a couple of extra children’s bedrooms at some point, and presto – wall, move!

And then of course you need not worry about electricity and heating bills if you live in a state-of-the-art house.

– The house of the future is energy neutral on an annual basis. It produces as much energy as it consumes. Thanks to the invisible PV cells in the window panes and on the roof, says Göran Wilke.

If, during the cold, dark winter months, you need more energy than the PV cells generate, it will be bought at the lowest possible price – and you do not have to worry about a thing. Just leave it to the system.

Not all houses, old houses in particular, have adjustable walls or forgiving butlers. Still, energy-efficient solutions can be found, perhaps in combination with district heating. These include geothermal heat, fuel cells and PV cells.

As another example, houses could have a micro CHP unit that generates both electricity and heat to replace the gas boiler or a heat pump that produces heating.

– Regardless of the solution required, it can certainly be automated to use electricity when it is cheap and plentiful. For the benefit of your household budget as well as the environment, says Göran Wilke, who is backed by Dorthe Vinther, Head of Strategic Planning at Energinet.dk.

The power system is the backbone
Smart homes are just one example of how we will use energy more intelligently in future.

– Global resources are limited, so we have to use energy wisely. This means we have to integrate tomorrow’s energy systems in a brand new way. Today, we refer to gas, heat and transport as different systems.

In the future, they will be integrated into a common, complementary energy system, explains Dorthe Vinther.

– Most of the energy supply will be based on electricity, with the power system forming the backbone that integrates a substantial production of renewable energy into the gas and heating systems and the transport sector.

In other words, different energy sources must be available for different purposes, and all systems must
interact intelligently and flexibly offering an array of opportunities for using electricity, for driving vehicles and for heating houses.

From the consumer standpoint, integrated planning of energy systems will be reflected in our cars and homes, which renewable energy will heat in the future:
– Wind power will be in plentiful supply and must be put to optimum use, for instance to heat houses via heat pumps converting electricity to heat. Other houses will be heated by district heating generated from biomass or solar energy, says Dorthe Vinther.

**Vehicles must store wind power**
It is not just your future home that will become an active participant in the struggle to create a society whose energy requirements are based on renewable energy sources.
– Your car is another good example. It will probably run on biofuels or electricity, says Dorthe Vinther. Electric vehicles in particular will have become increasingly popular in Denmark by 2030.
– Electric vehicles offer the huge advantage that the batteries can be used to store wind power when it is in abundant supply and as battery storage if wind power is in short supply in the power system.
– Of course, it’s also a question of making the vehicle and the power system intelligent enough to recharge the batteries when the price is low and to feed electricity into the system when the price per kWh is high, she says. This benefits your household budget as well as the environment.

**Sun in the south, wind in the north**
So, if you momentarily board the helicopter that gives a bird’s eye view of the future, a totally different energy landscape emerges.

A supranet crisscrossing Europe and possibly northern Africa. An 800 kV high-voltage grid allowing green energy to flow unhindered between countries, depending on where demand is strongest and the price therefore the best. Without any national preferences or red tape.

The EU member states have adopted legislation allowing solar energy from sunny regions to be used throughout the system, just as Danish electricity generated from wind power and biomass is distributed to regions where the price is high.
– In 2030, the entire energy sector will be highly international, and the member states will address the environmental challenges in close cooperation. I’m certain that close cooperation in the EU on security of supply and the environment will result in resources being optimally utilised between the member states, says Dorthe Vinther.

And finally: You are in for a treat – if we take all this at face value, the future will be more comfortable and no doubt much more fun. Enjoy the fact that this is all happening right before our eyes.

By Sanne Safarkhanlou | ssa@energinet.dk

**ENERGY POLICY:** ‘In 2030, the EU member states will address environmental challenges in close cooperation,’ believes Dorthe Vinther, Energinet.dk. Photo: Palle Peter Skov
All new wind turbines must have emergency brakes; otherwise wind energy will break down the power system.

Wind energy is a gift. However, too much wind energy may become a plague. To avoid this, the transmission system must be able to accommodate the unthinkable.

– Security of supply must always be the top priority. The skill lies in factoring in all critical situations that may cause the power system to break down, explains Jens Møller Birkebæk, Head of Energinet.dk’s System Operation Department, Electricity.

In 15-20 years, wind turbines and other renewable energy sources will account for half of Denmark’s production capacity. This means that a heavy storm may activate the turbines to such an extent that production rapidly exceeds consumption. We must therefore be able to stop part of the production. Even the wind turbines.

New wind turbines must be remote-controlled
It must be possible to stop all new wind turbines. In practice, this may be done by turning the blades approx. 90 degrees away from normal operating position – a feat to be accomplished in just under one minute.

Today, most wind turbines are remote-controlled by the balance-responsible party for production, so they can easily be turned off. But the intention is for the wind turbines to supply all the power they can.

– This is an emergency situation we are trying to ward off, explains Jens Møller Birkebæk.

– Our task is to organise the power grid and the market so that producers can transmit power to where it is most expensive and thus exploit wind power optimally. However, should market mechanisms fail and we still experience bottlenecks in the grid, we must be able to stop part of the production, adds Mr Birkebæk.

By Mary-Anne Karas | freelance journalist

Read more about the Danish rules of financial compensation on p. 51.

TOP POSITION: If you want to be on top, the wind turbine industry may be just the thing for you. Just ask these fitters working 124 metres above ground to fix a few details in connection with German manufacturer Enercon’s erection of an E-112 wind turbine with 50-metre blades. The wind turbine will cover the annual electricity consumption of 3,500 households. Photo: Jan Oelker, Ina Agency Press
Demonstration on the island of Bornholm

The island of Bornholm in the Baltic has been selected as a test area for the technology being developed by the project.

At the same time, Østkraft, the local power company, and the local authorities have joined forces to bring close to 25 electric cars on to the roads of Bornholm. The ambition is to accelerate development rather than leave it all up to the market.

To find out more about the project, visit www.edison-net.dk.

Photo: Think

International cooperation

Project EDISON is a consortium of Danish and international corporations and institutes including DONG Energy, Østkraft, IBM, Risø, Siemens, Rittal and a number of DTU departments. The Danish Energy Association manages the project.

Project EDISON has a budget of EUR 5.7 million and receives funding to the tune of EUR 4.3 million from the PSO pool, from which Energinet.dk annually awards EUR 17.4 million to promote the development of environmentally friendly power generation technologies.

Danes have never really taken a fancy to electric cars even though they are tax-free. For this reason, only about 300 electric cars buzz along the Danish roads.

But now the EDISON consortium has its mind set on making the electric vehicle a household product throughout Denmark. The consortium plans to develop a new Danish infrastructure that will allow car owners, the power system and not least the climate to benefit from electric vehicles in the thousands.

– Wind turbines and electric vehicles are a perfect match, says Esben Larsen, associate professor at Centre for Electric Technology at the Technical University of Denmark (DTU), a member of project EDISON.

– Wind turbines supply large amounts of clean energy, and electric vehicles can absorb surplus wind power, significantly reduce transport sector CO₂ emissions and help to balance the power system if the batteries are charged or drained as required, he says.

We are mostly parked

The Vehicle To Grid (V2G) study performed by Siemens and the DTU shows that on average a Danish car

ECO-FRIENDLY RACER: It is possible to be green despite having an inclination to fast sports cars. The electric Tesla Roadster’s top speed is more than 200 km/h, and it goes more than 350 km per charge. Photo: Sisse Stroyer
is parked for more than 22 hours and travels a distance of less than 40 km a day.

More surprisingly, however, only 12 per cent of cars are on the road when Copenhagen rush hour traffic is at its peak. Incredibly, the other 88 per cent are parked somewhere.

– That’s precisely why the electric vehicle offers such great storage for surplus electricity, Esben Larsen points out.

– The batteries will help to balance the power system by storing wind-generated electricity when production is high and supplying electricity to the grid when the turbines cannot keep up with demand, he adds.

This is what Denmark needs in order to meet the political ambition of having wind power cover 50 per cent of Danish electricity consumption in 2025.

– This represents a completely new way of energy thinking, offering a wide range of interesting perspectives. Focusing on intelligent and flexible systems will allow us to integrate more wind power into the power grid and reduce overall CO₂ emissions from cars, he says.

**New habits**

For electric cars truly to capture the Danes’ hearts, however, a technical solution must be found to recharging the car at home, at work and in the cities. Moreover, project EDISON must help to set up ways to control the charging of electric vehicles.

Esben Larsen admits that in the long term the real challenge will be persuading the Danes to invest in electric vehicles – and to remember to plug them in when they are parked. In return, they will be able to travel a distance of 200 km every morning without having to think about the battery.

– Developing the technology is not enough; we also need to change consumer behaviour. Old habits die hard, and we are used to filling up the tank with 50 litres of petrol or diesel now and then, he says.

The tools to speed the process along already exist, and Esben Larsen is convinced that in 2025 one in 10 Danish driveways will have an electric car parked in it.

**IN SHORT:**

Electric vehicles and wind turbines are a favourable combination that can help to fulfil the Danish Government’s ambition of having wind turbines cover half of Danish electricity consumption by 2025.

Car batteries can help to balance the power system by absorbing surplus wind turbine power when production exceeds demand and supplying electricity to the system when demand exceeds production.

Moreover, electric vehicles will reduce transport sector CO₂ emissions.

**BEHAVIOUR:** Esben Larsen from the Technical University of Denmark (DTU) is convinced that persuading Danes to buy electric vehicles and remember to plug them in whenever not in use will be an uphill task.

**Photo:** Private

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**Soon it will be possible to replace the electric vehicle battery**

**EASY:** Driving an electric vehicle must be easy. This is the motto of the US-based company, Better Place, now establishing itself in Denmark.

Like other electric vehicle owners, owners of Better Place cars will be able to recharge flat batteries at charging stations at home, at work or at traffic hubs.

What is new is that when travelling over long distances, electric vehicle owners may choose to let an industrial robot replace the battery. The plan is to make this possible at a number of service stations throughout the country.

Better Place cooperates with DONG Energy, which sees a great potential in recharging batteries at night when limited consumption and considerable wind power production keep electricity prices low.
Moneymaker on wheels?

Your future electric car could be the real deal, believes Jacob Østergaard, professor at the Technical University of Denmark (DTU), who has crunched the numbers.

It has no smell. It makes no noise. It leaks no oil in your driveway, and it can even boost your household budget by as much as EUR 1,300 a year!

– I agree. It sounds almost too good to be true. Nevertheless, Jacob Østergaard, professor at the Department of Electrical Engineering at DTU believes that future electric cars could become quite lucrative for their owners.

– It costs Energinet.dk – and thus electricity consumers – EUR 67 million a year to have power stations supply regulating power, ie increase and decrease production to balance the power system. In principle, electric car owners might as well earn that money and simultaneously do the environment a favour, says Jacob Østergaard.

Notice the battery

The car battery will make the entire difference as opposed to today when your four-wheeled friend is guaranteed to be synonymous with expenses. Because once parked and plugged in, the electric car can supply a number of services to the power grid.

For instance, the battery will be capable of storing surplus electricity from wind turbines or supplying power to

How to make money on your electric car

CYCLE: In future, you will be able to make as much as EUR 1,300 a year by charging or discharging your electric car battery at the right time, Jacob Østergaard believes. The illustration shows where the money comes from and how the electricity market will settle your electricity account using current electricity prices on the power exchange. Illustration: Franck Wagnersen
the power grid when extra kilowatts are needed. All without any risk that you will be left stranded with a dead car battery, unable to get home and pick up the kids on a Friday afternoon.

Developers will naturally create a system that ensures you can always drive the kilometres you set as a condition for making your car battery available to the power system.

**Supply and demand**

According to Jacob Østergaard and his team at the DTU, the service provided by your electric car will be worth EUR 1,300 annually for the first 100,000 electric car owners. Provided, of course, that the owner remembers to plug in when parking.

– Obviously, market forces also apply here, and supply and demand will determine the value of the service. The more batteries available, the lower the price. On the other hand, a future with more electricity from wind power will raise demand, he adds.

However, before scrapping your petrol-guzzling car for one that is noiseless, odourless and leaks no oil, remember that theory differs from practice. Moreover, the technical systems that will make using the electric car as surplus storage for wind energy possible are not ready yet.

– Car manufacturers – and not limitations in the power system – will undoubtedly determine when electric cars become a reality. To make a conservative estimate, I guess it will take three to four years before we see the first electric car capable of interacting intelligently with the power system, says the professor.

By Sanne Safarkhanlou | ssa@energinet.dk

**TEST DRIVE:** Professor Jacob Østergaard from the Department of Electrical Engineering at the DTU did not have to think twice when offered a chance to drive the electric Tesla Roadster. Photo: Peter Hoffmann, DTU

It costs Energinet.dk – and thus electricity consumers – EUR 67 million a year to have power stations supply regulating power. In principle, electric car owners might as well earn that money and simultaneously do the environment a favour.
Green – and cheap – electricity

Conscientious consumers have the possibility to buy the most inexpensive and least polluting electricity. In future, they may even help to balance the power system.

Billund Airport does it. Rømø Holiday Centre does it – and in 10 years’ time you will probably be doing it too: Using more electricity when it is cheap and less when it is expensive. This is a great idea that benefits both the environment and the consumers.

In Denmark, the price of electricity is often linked to the available amount of environmentally friendly electricity. Typically, wind power from Denmark or hydropower from the Nordic countries equals less expensive electricity. Conversely, high electricity prices are often linked to electricity generated from fossil fuels, such as coal.

Moving energy consumption
– Therefore, the economy as well as the environment would benefit from our using all the Danish wind power ourselves. Since wind power requires windy weather, however, we must consume energy more flexibly, moving our consumption to times of considerable wind power. Close links between production and consumption will improve security of supply, explains Kim Behnke, Head of Research and Development at Energinet.dk.

For this reason, Energinet.dk supports research that will make Danish electricity consumption more flexible so that electricity customers can take advantage of the cheap hourly rates in the electricity spot market. Moving electricity consumption may seem complicated, but it is possible.

Electricity, shifting with the wind
Many companies already take advantage of the option. The close to 100 electric vehicles used to transport luggage to and from the planes at Billund Airport are recharged at night. This is because electricity is often cheap at night when demand is low – and if it is windy, a good deal of it may even be green electricity.

The many electric radiators heating the flats at the Rømø Holiday Centre are often turned off during the day, but turned on at night. The same goes for the pump heating the Holiday Centre’s swimming pool.

Neither Billund Airport nor the Rømø Holiday Centre pays particular attention to whether the electricity is green or not, but the prospect of potential savings suffices to make them move some of their energy consumption.

– And this is precisely the reaction we want from even more electricity customers in future, Kim Behnke points out.

With 50 per cent wind power in the system in a few years, we need to consider all available resources – including demand response – when balance is required on a minute-by-minute basis. The wind may suddenly change, and then we need to take the appropriate measures, Kim Behnke explains.

Consumers as team players
This is why numerous tests are being done to identify the share of consumption that can be moved, how to go about it in practice and what that will cost.

– In the future, individual household consumption may be grouped into large pools via computers communicating with stakeholders in the electricity market. In this way, the limited consumption of thousands of individual households becomes large flexible pools to be activated as needed.

– There’s no need for each of us to turn consumption on or off, it should be automated, and active electricity

FLEXIBILITY: ‘We could save fossil fuels and thus reduce CO₂ emissions by moving some of our consumption away from peak-load periods to times of considerable wind and low consumption,’ says Henriette Hindrichsen, Energinet.dk. Photo: Palle Peter Skov.
customers should receive a cash bonus for participating, he explains.
– This requires the installation of remotely-read hourly electricity meters and remote control. Without smart electricity meters, we’ll get nowhere.

Smart electricity meters
A smart electricity meter, today capable of measuring hourly consumption – and in the future consumption per second – and of communicating household consumption data to the electricity market, may be an integral part of all houses in a few years.

Studies show that close to 10 per cent of an ordinary household’s electricity consumption can easily be moved to periods during the day when the price is low. This is particularly relevant when it comes to washing machines, electric water heaters, electric floor heating and electric heating.

Smart meters allow customers to monitor consumption closely and to be charged the hourly market rate. Customers save money by moving some of their electricity consumption to periods during the day when the price is low.

Elegant solution
– If introducing smart meters enables us to inspire the business sector and consumers in general to help out during periods of significant imbalance, it’s definitely an elegant solution, Kim Behnke points out.
– We’ll undoubtedly save fossil fuels and thus reduce CO₂ emissions by moving some of our consumption away from peak-load periods to times of considerable wind and low consumption, says Henriette Hindrichsen, senior consultant at Energinet.dk. However, she also mentions an array of other appreciable advantages of demand response.

Flexibility stimulates competition
– Wind turbines generate electricity at limited marginal costs, ie once erected wind turbines produce energy at a very low price. Therefore, other things being equal, more wind power will force down spot market prices when it’s windy, explains Henriette Hindrichsen.
– Today, most of the electricity is sold to small-scale consumers under fixed-price contracts. This means that their electricity bills will not directly reflect whether they use electricity at peak times or not. But if consumption were measured on the basis of the electricity market’s hourly rates, more end-users would become more price conscious, she says.

By Mary-Anne Karas | freelance journalist

IN SHORT:
In the future, small-scale consumers will save money by using more electricity when it is cheap and less when it is expensive. If they change their habits they help to integrate huge amounts of wind energy into the power system. This requires a smart electricity meter and being charged by the actual hourly rate. Prices must fluctuate so much that customers are encouraged to change their habits.
In December 2008, a number of European politicians adopted an ambitious, long-term plan to combat climate change. This climate and energy package has set the bar for the countries’ energy policies in the years to come, the objectives of which include having renewable energy constitute 20 per cent of energy consumption.

To this end, Denmark has to produce approx. 10 percentage points more green energy by 2020, at which time renewable energy must make up 30 per cent of total Danish energy consumption. Today, that figure is 20 per cent.

Rich countries to carry the heaviest burden
– The EU is raising a high bar for Denmark because of its economic standing. The economic burden has been distributed between the countries so as to place the heaviest burden on the rich countries, says Stina Wullumsen, MSc in political science, from Energinet.dk.

Each country decides how to achieve the set targets – but when the figures are calculated in 2020, the EU’s bottom line has to read 20 per cent renewable energy.

Save energy
In addition to increasingly using renewable energy, the EU countries must save energy. The Danish action plan includes a range of energy-saving initiatives, the aim being to improve the national energy accounts towards 2011.

The goal is to reduce Denmark’s gross energy consumption by 2 per cent from 2006 to 2011 and still further by 2020. To this end, Denmark will primarily decrease the energy consumption of buildings. Energy consumption requirements for new buildings will be 75 per cent higher by 2020.

Automobile energy consumption is also targeted. One aim of the EU’s climate and energy package is for 10
per cent of fuel used for cars to stem from renewable energy – for instance, electric vehicles running on electricity from wind turbines.

**End of free CO$_2$ emission allowances**
Another familiar means of achieving energy savings is increasing energy prices. In that connection, the CO$_2$ emission allowance system works as a lever.

Since the system was introduced in 2005, industry and electricity producers have been awarded allowances according to their emissions, free of charge. Extra allowances have been traded at market prices. However, 2013 will bring the end of free allowances for most EU power stations. From then on, they will have to buy allowances at market prices.

The emission allowance system will increase electricity market prices by approx. 20 per cent. Higher electricity prices will help us reach the goal of 30 per cent renewable energy in Denmark faster, believes Stina Willumsen:

– Electricity producers will add the allowance price to the electricity price. This will raise electricity market prices, thus making electricity from renewable energy sources, which can be produced without allowances, more competitive. Higher market prices will spur greater investment in renewable energy, explains Stina Willumsen.

**Long-term investment**
Nobody knows exactly how much it will cost Denmark to reach the target of 30 per cent renewable energy in 2020. However, the Danish Energy Agency has attempted to put a price tag on the target, and costs are estimated at EUR 0.7-0.9 billion so far.

In addition, the climate and energy package will impose a range of other costs on the entire EU, for instance in the form of higher electricity prices. However, implementing the EU’s climate and energy package will also generate cash benefits.

The package will reduce the climate impact and simultaneously promote the development of environmentally friendly technologies, as well as allow the Danish business community to strengthen its position on the market for renewable energy and energy efficiency improvement. Today, Danish exports of energy technology and equipment already totals EUR 6.7 billion annually.

– It is a misconception that environmental efforts cost nothing. They do. But the investment is extremely long term, reaching far into the future. One thing is certain: If we do not act, it will cost far more, emphasises Peter Jørgensen, Vice President of Electricity System Development, Energinet.dk.

**Facts about the EU’s climate package and the Danish targets**

The EU has committed itself to the so-called ‘20-20-20 plan’.

According to the plan, by 2020 the EU must:
- reduce its greenhouse gas emissions by 20 per cent compared to 1990 levels
- have 20 per cent renewables in the energy mix (compared to 8.5 per cent today), and
- 10 per cent renewables in the transport sector
- improve energy efficiency by 20 per cent.

The energy efficiency target is a non-binding, recommended target.

The target of 20 per cent renewables is distributed between the individual countries according to economic capability. However, all countries must meet the target of 10 per cent renewables in the transport sector.

For Denmark this means that by 2020 we must have 30 per cent renewables in our energy mix compared to 17 per cent in 2005.

Read more on www.ec.europa.eu under environment, climate.

By Mary-Anne Karas | freelance journalist
Green energy must make good economic sense

Preben Heberg Krogh conceived his wind turbine idea on one of his habitual trips to purchase wood pellets for his pellet burner. It takes time to heat up a 250 m² house when the pellets must first be retrieved and then fed into the burner, which must also occasionally be emptied of ashes.

– I wanted to find a solution that was both easier and less expensive, and I succeeded, says Preben Heberg Krogh. On 1 January 2008, he became nearly self-sufficient in heating and electricity. On that date, his 11 kW household wind turbine was connected to the grid and his pellet burner replaced by a heat pump, for which reason his annual heating and electricity bill dropped from some EUR 4,000 to approx. EUR 940.

Preben Heberg Krogh has no doubt that the turbine in his back garden produces green energy and is economical.

– If energy prices increase by 5 per cent annually, the turbine investment will generate a profit of almost EUR 0.1 million over the next 20 years, explains Preben Heberg Krogh. This is precisely the thinking that will pave the way for more Danish wind energy.

New act paves the way
The number of Danish onshore wind turbines has declined since 2001, but new regulations and subsidy schemes have been put into place to make more people – like Preben – realise that investing in green energy is much more than mere fancy.

The new Renewable Energy Act, passed by the Danish Parliament in December 2008, was intended to motivate local enterprisers, who played a crucial role in making Denmark the world’s leading wind turbine nation in the 1990s.

The schemes under the new act make it more profitable to scrap old turbines and replace them with new, more effective ones.

With the new act, the Danish Government has also made an agreement with Local Government Denmark to find sites for new turbines capable of generating 150 MW in total. Depending on the size of the turbines, this corresponds to 50-80 new onshore wind turbines.

Cooperative wind turbines make a comeback
Another new initiative is local co-ownership, which is to help reopen the possibility of erecting new onshore wind turbines.

– The act simply entitles neighbours to buy shares in the wind turbines, thus ensuring that the investment benefits the local community, explains Stina Willumsen, MSc in political science from Energinet.dk.

She is convinced that neighbours’ option to buy shares is key to finding new wind turbine sites.

From 20 to 30 per cent
In many ways, the Danish recipe for increasing the amount of renewable energy seems familiar. More subsidy schemes and new regulations must pave the way for more onshore and offshore wind turbines, and greater attention must be paid to the energy consumption of buildings, households and cars.

The goal is to reduce Denmark’s gross energy consumption by 2 per cent from 2006 to 2011. Moreover, if Denmark is to achieve the EU target that 30 per cent of Denmark’s total energy consumption must stem from renewable energy sources by 2020, consumption must fall still further. Today, the figure is about 20 per cent.

By Mary-Anne Karas | freelance journalist
If you want to know more

Did you know that 15 per cent of the Danish wind turbines are owned by wind turbine cooperatives? Did you know that the Nordic electricity market is the world’s most transparent market as a result of the effective unbundling of the energy sector? And that 70 per cent of the electricity used in the four Nordic countries in 2008 was traded on the Nordic power exchange, Nord Pool Spot?

This is some of the questions that will be answered on the following fact pages. Here we focus on political, cultural, financial and technical factors that also play a major role in wind power integration in Denmark.

Contents:
- Milestones in the promotion of Danish wind power
- Cooperatives - a local and democratic ownership of wind turbines
- Liberalisation of the Danish energy sector
- Subsidies before and now
- Market players - activities and responsibilities
- Rules of compensation when the TSO stops the wind turbines
- The Nordic electricity market - congestion management and transparency
- Grid codes and voltage levels
- EWIS - European Wind Integration Study

Visit our website www.thedanishwindcase.com
Milestones in the promotion of Danish wind power

1973/74: Oil crisis
The Middle East oil countries (OPEC) increase the oil price by about a factor of three and threaten the industrial countries with an embargo. This strengthens the official Danish interest in nuclear power.

1974/75: NGOs for renewable energy
A number of Danish NGOs are opposed to nuclear power and support the creation of a special NGO (called OVE) for the promotion of renewables (RES).

1975/76: The Danish Academy of Technical Sciences promotes wind power
The Danish Academy of Technical Sciences (ATV) publishes reports in 1975 and 1976 proposing research and development programmes for Danish wind power.

1976: First official Danish energy plan
The first official Danish energy plan focuses on a shift from oil-based electricity production to coal, natural gas and nuclear power. Modest attention is given to RES.

1976: First alternative Danish energy plan
An alternative energy plan prepared by researchers at Danish universities includes significant contributions from RES, especially wind, but excludes nuclear power.

1976: Private pioneers of modern wind turbines
Two modern wind turbines of about 22 kW capacity are installed on private initiative. Their reliable production promotes additional private investments in Danish wind power.

1978: The world’s largest wind turbine in operation
Young people with no previous experience with wind power technology build the world’s largest wind turbine (2 MW) at the Danish Tvind School.

1978: Test station for wind turbines at Risø National Laboratory
A test and certification station for wind turbines is established at Risø National Laboratory. Researchers at the station pioneer the construction of wind atlases.

1979: Investment grant for private wind power investors
By virtue of new legislation private investors in turbines tested and certified by Risø are eligible for an investment grant corresponding to 30 per cent of the turbine purchase price.

1979: First Danish Ministry of Energy
The new Danish Ministry of Energy focuses on the introduction of nuclear power and natural gas in the Danish energy supply system. Modest support for RES.

1981: Second official Danish energy plan
A second official Danish energy plan prepared by the new Danish Ministry of Energy focuses on low-cost
energy and security of supply, giving modest attention to renewables.

1982: Committee for Renewable Energy
A new committee for the promotion of RES becomes a central promoter of research, development and demonstration of new RES systems from 1982 to 1991.

1983: Second alternative Danish energy plan
A second alternative Danish energy plan prepared by university researchers focuses on energy conservation, RES and the use of cogeneration. It excludes nuclear power.

1985: The Danish Parliament excludes nuclear power in Denmark
The Danish Parliament decides that nuclear power will not be an element in the Danish supply system. This opens up for a more general political support for RES.

1990: Third official Danish energy plan
Ambitious goals for RES are set up, including 1,300 MW installed wind power capacity by 2000. This is subsequently promoted by a favourable feed-in tariff.

1991: The world’s first offshore wind farm is erected in Danish waters
The first offshore wind farm consists of eleven 450 kW turbines positioned about 1.6 km from the shore in the Baltic northwest of the island of Lolland.

1993: New Ministry of Environment and Energy
Energy and environment policies are combined in a ministry for energy and environment promoting a rapid increase in installed wind power capacity during the 1990s.

1996: Fourth official Danish energy plan
The goal for installed wind power capacity is increased to 1,500 MW land-based capacity by 2005 and additional 4,000 MW offshore wind capacity by 2030.

1999: Official shift in Danish support scheme for RES
Following the liberalisation of the EU energy market in 1996, new Danish energy legislation supports the shift from the feed-in scheme to green certificates trading. This shift was never implemented.

2002: New Danish RES policy
A new government changes the energy policy for RES to rely more on market forces. Feed-in tariffs are reduced and end up as the lowest ones in the EU, resulting in a net increase of installed wind power capacity in Denmark from 2003 to 2008 of close to zero.

2008: New Danish RES act
Rules for RES are integrated in one single act, and the production subsidy for wind power is increased to DKK 0.25/kWh (3.3 eurocents/kWh) on top of the market price.

By Niels I. Meyer,
Emeritus Professor of Physics,
Technical University of Denmark
Cooperatives – local and democratic ownership of wind turbines

**GUILDS:** One of the characteristics of the Danish wind energy sector is the cooperatives or guilds. Many of the wind turbines erected in the 1980s and early 1990s were and still are owned by local cooperatives/guilds. At that time, the wind turbine ‘guilds’ from all over the country were often the grass-roots activists, working hard to get permission to have their turbines erected and also participating in public debate.

Since then, single-person ownership has superseded the importance of the cooperatives, and now utilities and large energy companies play an increasing role in the establishment and ownership of wind turbines in Denmark, especially when it comes to large-scale wind farms. However, cooperative ownership is still an important factor, and new legislation from January 2009 is aimed at stimulating the local engagement in and ownership of new wind energy projects. The new Danish Renewable Energy Act imposes an obligation on all new wind energy projects to offer minimum 20 per cent ownership to local people, eg cooperatives.

**The background for cooperatives**

The overall concept of cooperatives can briefly be described as an autonomous association of persons united voluntarily to meet their common financial or social needs through a jointly-owned and democratically-controlled enterprise. A cooperative may also be defined as a business owned and controlled equally by the people who use its services or who work at it. In 1844, local weavers and other artisans in Rochdale, England, set up a society to open their own store selling food items they could not otherwise afford. This is often referred to as the first successful cooperative enterprise, used as a model for modern co-ops.

The first co-op store in Denmark was opened in 1866, and the first cooperative dairy was started in 1882 in Western Jutland. Later followed cooperative abattoirs and feedstuff wholesale societies. The foundation of a large number of cooperatives can be considered as one of the most important commercial developments in the history of Denmark.

In the 1970s, many cooperative undertakings disappeared from the villages of Denmark. Some of these are still formally organised as cooperative undertakings, but they have been merged into large units or companies often operating both nationally and internationally. Although the number of cooperative undertakings have fallen, the idea of joining hands, establishing local associations or working groups, is still a widespread phenomenon in Denmark in order to start new businesses or local associations in relation to cultural or social activities. On that basis the wind turbine cooperatives or guilds were formed.

**Cooperatives in practice**

Wind turbine cooperatives in Denmark are normally partnerships, which in daily practice function as cooperatives. For legal reasons they are forced to establish formal partnerships due to the fact that in Denmark interest on wind turbine loans is tax deductible from the

![Ownership of Danish wind turbines](image)

As the number of small turbines (< 600 kW) will decrease over time, the number of cooperatives may also decrease. On the other hand, the new Danish Renewable Energy Act, which imposes an obligation to offer shares for possible local ownership, could revive the cooperatives.
private income of the individuals in a partnership, not in a cooperative.

Jointly owned wind turbines in Denmark are organised as partnerships with joint and several liability. In practice, the risk of joint and several liability is minimised in that the partnership is unable to contract debt. This is ensured in the bylaws, which maintain that the partnership cannot contract debt, and that the turbines must be adequately insured.

As a partner you own a part of the wind turbine corresponding to the number of shares you buy. Often one share is calculated corresponding to the yearly production of 1,000 kWh from that particular wind turbine. Private individuals and cooperatives have played an important role in the development of the Danish wind energy sector. On a rough estimate, approx. 15 per cent of the Danish wind turbines today are owned by cooperatives.

**Advantages of cooperatives**

Local acceptance of a wind turbine project is necessary. Public resistance against wind turbines in the landscape has been and still is one of the largest barriers to the development of wind power.

Opinion polls show wide support in the population in favour of wind power in general. However, uncertainties and lack of information in the planning phase of future wind power projects often give rise to local skepticism.

Experience from a number of wind energy projects in Denmark shows that public involvement in the planning phase and co-ownership increases the acceptance. In addition, two private offshore projects show that cooperative development and ownership is an option also in large-scale projects. The Middelgrunden Offshore Wind Farm (40 MW) close to Copenhagen was developed through cooperation between the municipality, an energy company and not least a number of private individuals. Middelgrunden is the world’s largest cooperatively owned wind farm with more than 8,000 members of the cooperative. The Samso project off the east coast of Jutland (23 MW) was developed by a cooperative with local people on the island of Samso and the municipality as members.

**Strengths of a cooperative**

- Active and committed members
- Dialogue and political contacts with many stakeholders through a widespread network
- Large public support
- Direct contact to local authorities

A possible drawback of a cooperative may be the financially weak starting point, but this can be overcome through cooperation with municipalities, utilities or other investors.

Local ownership creates local dialogue and acceptance. Through dialogue with different interest groups widespread understanding of the chosen location and layout of the farm can be generated. Potential conflicts can be avoided by taking direct contact to local stakeholders at an early stage in the development of the project, eg contact and dialogue with local farmers, fishermen, enterprises or inhabitants in villages close to the site.

With local investment in power generation, it is the local people who – at least to some point – take the decision on the planning and implementation of power supply, bringing more responsibility to the local level. Experience from many wind energy projects in Denmark shows that often there are more complaints when unknown investors install the wind power than when the local population does.

Local production of and engagement in wind energy projects make sustainable development understandable. Cooperatives engaged in the development and building of local wind turbines is a concrete example of how private people can contribute to the development of environmentally friendly and sustainable energy production.

By Henrik Skotte
The Danish Wind Turbine Owners’ Association
Liberalisation of the energy sector

UNBUNDLING: Since the introduction of the free electricity market in Denmark on 1 January 2003, all electricity consumers have been free to choose their electricity supplier. The aim of introducing a free electricity market was to create a competitive market.

The Danish electricity market is an integral part of the free Nordic electricity market. The authorities in Denmark and in the EU have promoted liberalisation to further free competition in power generation and trading. Trading in the wholesale electricity market is conducted on the power exchange, Nord Pool Spot, which facilitates trade between generators and traders.

The full opening of the electricity market on 1 January 2003 saw all the players in the Danish electricity business collaborating on setting up rules and specifying the requirements for the systems handling the mutual relations between electricity traders, grid companies, transmission system operators, etc., and the settlement between market players.

New market players
The liberalisation has brought about many new market players. The most important step towards a free electricity market was taken in 1999 when an EU directive dictated full liberalisation of the electricity markets.

This led to the unbundling of the transmission grid from power generation. The grid is now independent, and all market players have equal access to it.

Independent of commercial interests
The state-owned enterprise Energinet.dk was formed to ensure that the main electricity and natural gas infrastructure remains independent of commercial interests.

The Danish Act on Energinet.dk came into effect on 1 January 2005, and as the owner of the main high-voltage grid and the natural gas system Energinet.dk must:

- Ensure efficient operation and expansion of the energy transmission system
- Undertake system operation, ie ensure balance between supply and demand on market terms
- Ensure open access and equal terms for all grid/network users
- Undertake coherent and holistic planning (infrastructure expansion, integration of different types of energy into the power system, etc.).

Energinet.dk also purchases and operates regional electricity transmission grids and natural gas distribution networks, which, due to the state's purchase obligation, must be sold to the state in case of realisation.

By Sanne Safarkhanlou, Energinet.dk

Photo: Jan Djenner, BAM
Subsidies before and now

**TARIFFS:** Special subsidies are granted to wind-based power generation. Some are granted as a permanent subsidy whereas others are adjusted in relation to the market price so that the total of the market price and the subsidy ensures wind-turbine owners a fixed settlement.

Generally, the trend has been from fixed settlement to more market-based tariffs. That is why the subsidies primarily depend on when the wind turbine was commissioned. In 2008, subsidies for Danish wind turbines totalled EUR 69.5 million.

**Wind turbines bought before the end of 1999**
receive a subsidy which, together with the market price, ensures a settlement of DKK 0.60/kWh until the full-load-hour share has been used up, and after that DKK 0.43/kWh until they are 10 years old.

The wind turbines will subsequently be settled on market terms, and the subsidy drops to DKK 0.10/kWh until they are 20 years old. The reduced subsidy is adjusted in relation to the market price as the total of the subsidy and the market price must not exceed DKK 0.36/kWh. To this must be added a balancing subsidy of DKK 0.02/kWh.

**Wind turbines connected to the grid (2000–2002)**
receive a subsidy which, together with the market price, ensures a settlement of DKK 0.43/kWh for 22,000 full-load hours.

The wind turbines will subsequently be settled on market terms, and a subsidy of DKK 0.10/kWh will be granted until they are 20 years old. The total of the subsidy and the market price must not exceed DKK 0.36/kWh. To this must be added a balancing subsidy of DKK 0.02/kWh.

**Wind turbines connected to the grid (2003–2004)**
receive a subsidy of DKK 0.10/kWh until they are 20 years old. The rule that the total of the subsidy and the market price must not exceed DKK 0.36/kWh also applies here. To this must be added a balancing subsidy of DKK 0.02/kWh.

**Wind turbines connected to the grid from 1 January 2005**
receive a fixed subsidy of DKK 0.10/kWh in addition to the market price until they are 20 years old. To this must be added a balancing subsidy of DKK 0.02/kWh.

**Wind turbines connected to the grid from 19 February 2009**
receive the market price plus a fixed subsidy of DKK 0.25/kWh for 22,000 full-load hours. To this must be added a balancing subsidy of DKK 0.02/kWh.

**Offshore wind farms**
financed by power stations or constructed after a tender procedure are settled according to special rules. The grid-connection costs are socialised and paid for by all electricity consumers. For instance, the 160 MW Horns Rev 1 offshore wind farm receives a subsidy which, together with the market price, gives DKK 0.43/kWh for the first 50,000 full-load hours. Then the market price will apply.

**Decommissioning scheme**
Wind turbines connected to the grid after 1 April 2001 can receive up to DKK 0.17/kWh in addition to the other subsidies if the new wind turbines replace dismantled ones (decommissioning subsidy).

**Costs of balance responsibility**
Until the liberalisation of the electricity market in 1999, wind turbines generated power to the grid and received the statutory payment from the grid companies.

With the introduction of market terms, it was decided that the transmission system operator would be responsible for the sale of power from wind turbines, and that the payment to wind-turbine owners would be collected from the electricity consumers in the form of a PSO tariff; so all costs of balance responsibility would be paid for by the consumers.

From 2003, it became possible for wind turbines not included in any subsidy schemes to undertake balance responsibility and cover the costs of balance responsibility against a subsidy of DKK 0.02/kWh paid by the electricity consumers.

**EUR 1.00 = DKK 7.45**

EFFICIENT: Energinet.dk is transmission system operator in the Danish energy markets and as such responsible for developing the market regulations necessary to ensure an efficient market. Purchase, production and trade in the electricity market are decentralised activities performed by various market players.

The scope of activities for players in the electricity market is based partly on the provisions of the Danish Electricity Supply Act (regulation of grid access, ‘unbundling’ requirements) and partly on the framework provisions laid down by Energinet.dk (electricity suppliers and balance responsible parties).

Balance-responsible parties
Among the balance-responsible parties (BRPs) are production, consumption and trading companies including purchase organisations and traders. The BRPs have agreed with Energinet.dk to assume responsibility for a specific activity (production, consumption and/or trade).

Electricity suppliers and trading companies
In general, electricity suppliers are responsible for servicing end users and enter into agreements on electricity supply. An electricity supplier must be approved by or have made an agreement with a BRP in order to operate on the market.

Most of the electricity trading companies were established when the distribution companies were transformed into companies with a supply obligation and grid companies.

Grid companies
Grid companies are authorised to operate a distribution network. All grid companies operate as monopolies with an obligation to ensure that registration equipment is installed and metered data supplied to all legitimate recipients. Grid companies must also keep track of which BRP the end user has chosen.

Companies with a supply obligation
Authorised companies supplying end users not having exercised their right to choose their own electricity supplier. The companies have the same rights and obligations with regard to balance responsibility as other market players with grid access.

End users with grid access
As a result of the liberalisation, all end users have access to the grid and are therefore free to choose their own electricity supplier.

Nord Pool Spot
Nord Pool Spot is a power exchange with two market places for electricity trading: Elspot and Elbas. Trade on Elspot is based on the auction principle. Players trade on Elbas to obtain balance when Elspot is closed. Nord Pool Spot also operates an exchange for financial trading/hedging where trading is conducted in the same way as on a traditional stock market and players can hedge against price fluctuations by trading options.

By Lisbeth Rasmussen, Energinet.dk
COMPENSATION: The strongly increased use of wind power in the Danish power system may, in extreme cases, force the transmission system operator to stop wind turbines to avoid the risk of overloading the grid. Energinet.dk will, however, compensate plant owners for loss of earnings.

Currently, Energinet.dk can only order wind turbines owned by power stations to perform downward regulation of the power system as these turbines can be controlled centrally.

Few orders for downward regulation
In recent years, downward regulation has only been used in those rare instances when there has been a combination of storm, cold weather and low consumption. In those cases, Energinet.dk compensated the plant owners for production loss. The new Danish Renewable Energy Act has, however, taken account of the fact that a massive increase in wind power may far more frequently push the power system to the point where the grid needs rescuing at any cost.

The new compensation rules apply to offshore wind farms that have been subject to calls for tenders. The first farm to be subject to the Act is Horns Rev 2, followed by Rodsand 2, located south of the island of Lolland, and the planned 400 MW offshore wind farm near Anholt in the Kattegat.

Very specific rules
The new Act states that Energinet.dk may order the wind turbines to reduce or suspend their production if the landing facilities or the remaining transmission grid malfunction or require maintenance or when there is limited grid capacity.

Downward regulation is only allowed if it is necessary to ensure security of supply or the socially optimal use of the power system. In that connection, the Act points to competition in the electricity market.

The payment of compensation depends on whether Energinet.dk has informed the plant owner of the downward regulation before the planned production has been reported to Nord Pool – ie on the day before the day of operation – or whether the order to perform downward regulation is given as a result of sudden malfunctions and breakdowns.

By Torben Bülow, Energinet.dk
Cross-border electricity trading
It is important that cross-border trading works according to simple rules promoting competition. Cross-border electricity trading is important because some regions in Europe have few local electricity producers. To secure a well-functioning electricity market, it is therefore essential that producers from other regions are able to expose the local producers to competition. In order to expose local producers to competition, the electricity from outside competitors must flow across bottlenecks in the grid.

Consequently, a key factor for the competition in the European regional markets is congestion management – the allocation of capacity on the grid bottlenecks.

In this article, we will only discuss day-ahead congestion management. There are two market-oriented day-ahead congestion management methods: Explicit auctions and implicit auctions.

However, explicit auctions have proved to be a poor day-ahead congestion management system. Consequently, only implicit auctions will be discussed.

Implicit auction – market splitting
Implicit auction ensures that all the capacity on a bottleneck is utilised during all hours with energy flowing towards the high-price area.

There are two kinds of implicit auctions: Market splitting and market coupling.

In case of market splitting one power exchange creates the day-ahead plans for the cross-border flow in its own area.

To explain market splitting, let us consider a bottleneck with a 600 MW capacity. We will consider one given hour of the following day. Assuming, during the calculation of the day-ahead prices, the power exchange discovers that there will be different prices on either side of the bottleneck during this hour: One side of the bottleneck will be a low-price area, whereas the other side will be a high-price area.

In this case the power exchange will purchase an additional 600 MWh in the low-price area and sell an additional 600 MWh in the high-price area.

The extra sale and the extra purchase are made on the day before the day of operation. The next day, when we reach the given hour, the extra purchase in the low-price area will cause a production surplus of 600 MWh in this area. In the low-price area, there are producers who will produce the extra 600 MWh. However, in the low-price area, there is no corresponding local consumption. Due to the production surplus, electricity must flow out of the low-price area.

Likewise, the extra sale in the high-price area will lead to a production deficit of 600 MWh in this area. In the high-price area, there are end users who will consume the 600 MWh. However, in the high-price area there is no corresponding local production. Due to the production deficit, electricity must flow towards the high-price area.

Hence, once the exchange has made the extra purchase, the low-price area, the extra sale in the high-price area and the laws of nature will do the rest. The next day, cheap electricity will flow from the low-price area into the high-price area.

Naturally, the extra purchase will increase the price in the low-price area. Likewise, the extra sale will decrease the price in the high-price area. Thus, market splitting...
also implies that the bottleneck capacity is used to level out price differences as much as possible.

By means of market splitting, the Nordic power exchange, Nord Pool Spot, carries out the day-ahead congestion management on the interconnections between Denmark, Norway, Sweden and Finland.

Furthermore, Nord Pool Spot carries out the day-ahead congestion management on the domestic bottlenecks in Norway by means of market splitting.

**Implicit auction – market coupling**

Consider a border where two power exchanges meet. The two power exchanges can carry out the day-ahead congestion management on the border using the principle described above. When the power exchanges, during the calculation of the day-ahead prices, realise there is a price difference on the border, the power exchange in the low-price area buys extra electricity, and the exchange in the high-price area sells extra electricity. This day-ahead congestion management is called market coupling.

In the second quarter of 2009, we will have market coupling between the Nordic area and Germany. The two power exchanges involved are the Nordic exchange Nord Pool Spot and the German-French exchange EPEX Spot.

**Transparency**

In order for market economy to work, there must be transparency. This means all players must have the same access to all price-relevant information.

This level playing field is a precondition for the free market to create the socioeconomic benefits, which have established the wealth in Western societies.

As for transparency in the electricity market, the Nordic countries have become a role model in that there are very strict transparency rules for all the participants in Nord Pool Spot.

These exchange rules apply to all relevant Nordic players, as all the large and medium-sized Nordic players participate in Nord Pool Spot.

For example, unplanned outages must be reported to Nord Pool Spot not later than 60 minutes after the accident causing the outage.

Also, for example, where power stations larger than 400 MW are concerned, maintenance plans and other planned outages must be announced three years ahead of the planned outage: the information must be sent to Nord Pool Spot not later than 60 minutes after the plan has been approved by the relevant company body.

For smaller power stations, planned outages must be announced 6 weeks ahead in time.

Further, all exchange participants must send any other information likely to have a significant effect on the electricity prices to Nord Pool Spot.

Nord Pool Spot distributes the information to the market. Hence, for the Nordic area, the Nord Pool Spot is the distributor of all market information.

**The Nordic power exchange**

Nord Pool Spot is the Nordic power exchange where electrical energy is traded day-ahead and intra-day. Nord Pool Spot is owned by the transmission system operators in Denmark, Norway, Sweden and Finland.

In 2008, the turnover at Nord Pool Spot’s day-ahead auction market Elspot was 298 TWh. The turnover at Nord Pool Spot’s intra-day market Elbas was 1.8 TWh.

In 2008, about 70 per cent of the electricity consumed in the four Nordic countries was traded on Nord Pool Spot.

By Anders Plejdrup Houmøller,
Director of Business Development
Nord Pool Spot AS
Outline on grid codes and voltage levels

**PENETRATION:** The development of grid codes aimed at wind turbines in Denmark is driven by the penetration of wind power into the Danish power system. The first grid code was published more than 20 years ago when wind power was considered a marginal and unimportant part of the power system. The wind turbines were small and built as single turbines or a few turbines connected to the same point in the grid.

**First grid code in 1999**
The first grid code dealt with safe operation of the distribution network only, and it therefore focused primarily on relay settings and inrush current limitation when starting the wind turbines. At that time, the grid codes did not place any requirements on wind turbines' ability to perform any kind of control functions apart from being able to disconnect from the power system whenever needed and staying disconnected until the normal voltage and frequency were restored.

This changed dramatically in 1997 when the Danish Government published a plan for offshore wind turbines. According to this plan, starting from 1999, a 150 MW offshore wind farm was to be built and connected to the transmission system in the following 20 years or so.

The TSOs (Elkraft and Eltra, now merged into Energinet.dk) realised the need for better control of the production from wind turbines and set up a task force to develop a grid code.

The first grid code to require control functions in wind turbines was published in 1999 and applied to all wind turbines connected to the transmission grid (above 100 kV). It was the first grid code for wind turbines in the world that required:
- Control of active power production from wind turbines
- Control of reactive power production from wind turbines
- Fault ride through capability of the wind turbines
- Power quality
- Remote monitoring and control capability.

The wind turbine industry succeeded in meeting the requirements for the first two offshore wind farms (Horns Rev 1 and Nysted). The wind turbines had undergone a transformation from being pure energy generators into being power stations with capabilities allowing for much higher wind-power penetration than previously.

Since then, the development of onshore wind turbines has led to the development of a grid code for wind turbines connected to lower-voltage networks featuring almost the same turbine requirements. The reason is the installed wind turbine capacity in the distribution network.

**Production often larger than consumption**
The importance of the wind turbines connected to low-voltage networks featuring control capabilities is stressed by the fact that in many areas the production from wind turbines in the distribution network is much larger than the electricity consumption.

In 2003, the grid codes were revised to take account of the recent developments in wind-turbine technology, offering even better control functionality. The revision of the grid codes will continue, forcing the industry to develop the wind turbines to become even better power stations. This development is one of the most important preconditions for pushing the limit of wind penetration into the power system upwards.

By Jan Havsager, Energinet.dk

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Number of turbines</th>
<th>Installed capacity (MW electricity)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>132-150 kV</td>
<td>152</td>
<td>325.6</td>
<td>Meshed transmission only used on offshore wind farms</td>
</tr>
<tr>
<td>30-60 kV</td>
<td>62</td>
<td>97.3</td>
<td>Meshed and radial distribution</td>
</tr>
<tr>
<td>10-20 kV</td>
<td>2795</td>
<td>2010.9</td>
<td>Radial distribution</td>
</tr>
<tr>
<td>0.4 kV</td>
<td>2163</td>
<td>719.4</td>
<td>Radial distribution</td>
</tr>
<tr>
<td>Total</td>
<td>5172</td>
<td>3149.6</td>
<td></td>
</tr>
</tbody>
</table>

**CONNECTION:** Almost all small wind turbines are connected to the distribution network, ie from 20 kV and lower, whereas the large land-based wind turbines use the 30-60 kV network. Only the large offshore wind turbines generate power direct to the transmission grid (132 and 150 kV).
European Wind Integration Study

**PROJECT:** In response to the challenge of meeting the European 2020 renewable energy targets European transmission system operators (TSOs) have launched a pan-European grid study on wind power integration.

The European Wind Integration Study (EWIS) is financed by the European Commission and covers all four European power systems – the Continent (UCTE), Great Britain and Ireland (UKTSOA, ATSOI) and Scandinavia (Nordel).

The study is conducted by a consortium of 15 TSOs from 13 countries. External stakeholders, who sit on the project consultation board (eg the European Commission, EURELECTRIC, EWEA, etc.), give advice and comments to ensure that all aspects are considered within the study.

The final results were presented in the autumn of 2009.

**Objective**

The study’s objective is to obtain the necessary information about technical and operational measures for risk mitigation and safe operation of the European power grids. This is done by steady-state and dynamic analyses using power grid models established within the study.

Market and regulatory aspects are taken into consideration as well. The study examines potential reinforcements of the transmission grid, improved operating procedures and linkage with market arrangements as well as technical and connection requirements for wind power generators.

The EWIS project covers all relevant technical, operational and market aspects relating to the integration of large-scale wind power in Europe. For each of these aspects, the project is subdivided into work packages such as the present situation and market aspects, scenarios and exchange schedules, power system analyses, operational aspects, cost calculation and communication.

The objective for reference year 2008 is to find solutions to actual load-flow problems due to wind power. The longer-term target (2015) is to develop common pan-European recommendations and grid reinforcement measures in order to prepare for future challenges.

**Final results**

The final results will comprise not only the necessary requirements relating to the further increase in wind power production capacities within a national/regional generation mix in terms of system reliability but also measures to counteract identified limitations. An assessment of the costs and expected TSO investments in such measures, and the consequences of existing, medium- and long-term issues relating to wind power integration will be considered as well.

Furthermore, the results will cover stability assessments and impacts and recommend harmonised grid code requirements for wind turbines to ensure the successful integration of wind power into European power grids while maintaining system security and stability for the 2015 time frame.

By Antje Orths, Energinet.dk

Visit the EWIS website for further information: www.wind-integration.eu
Denmark invites you to share our climate and energy solutions. We would like to show you our energy plants and our energy systems, all based on experience gathered and optimised over the last 25 years.

You can visit Denmark or read about our energy solutions on a number of interesting websites. Let me introduce a few:

**www.energymap.dk** is a website providing information on renewable and conventional energy installations in Denmark. The participating companies and institutions are ready to inform you about their installations or products.

**www.kemin.dk** is the website of the Danish Ministry of Climate and Energy. Here you will find information on the Danish efforts to replace fossil fuels with renewable energy.

**www.thedanishwindcase.com** is the website for the Danish efforts to integrate wind energy into the power system.

**www.energinet.dk** is the website of the Danish Transmission System Operator. Here you will find information on the current production of all Danish wind turbines and information on the Danish energy system.

Photo: Bent Sørensen