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Communicating Solutions for a Greener World

~A case study of The Bellona Foundation's
communication process within the Hydrogen Project~

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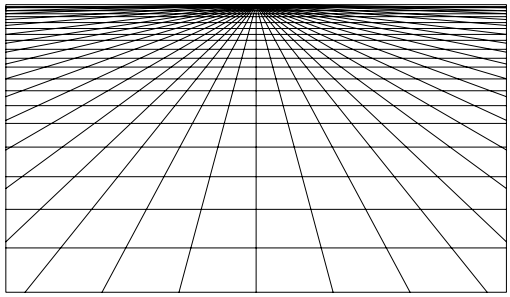

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Abstract

The world is facing increasing energy and global climate change problems. Facing future depletion of fossil fuels and the threat of increased temperatures on earth due to air pollution from the burning of fossil fuels, there is a need for a clean alternative. The Norwegian environmental organization The Bellona Foundation believes that hydrogen as an energy carrier coupled with hydrogen technology is the solution and the only road to a 0-emissions society—a hydrogen society. Under the slogan, "From Talking to Walking the Hy-way," Bellona is through their Hydrogen Project working to achieve this green society. In a case study of Bellona's Hydrogen Project, this thesis aims to examine how Bellona communicates with the intended target groups within this project and how the organization perceives the communication process. As the slogan suggests, in order for the Hydrogen Project to be completely successful, Bellona has to not only inform people about the hydrogen solution but also convince them and get them to begin implementing hydrogen technology. This is conducted through a communication process. The communication process includes both internal and external activities and is divided into four stages: translation, strategy, channels and feedback. Through contrasting the communication process with science communication models, the need for an interactive, multi-directional approach that makes problematic the receiver and recognizes the receiver as an active participant in addition to adhering to the correlation between message and context of the receiver. The case study aims to look at how Bellona conducts and perceives the different stages in the communication process and find out whether Bellona recognizes these features in or adheres to these factors within the Hydrogen Project.

Keywords:
Environmental organization, hydrogen, The Bellona Foundation, Hydrogen Project, technology, science, communication process, science communication models.

Index:

1.0. Introduction

Communication is more than just a message conveyed through words written, spoken or signed; it is an art. Communication is context, cultures, experience, values, norms and technology. Communication takes place between persons, but is influenced by technology and interpreted within the framework of society—our daily lives.[1]

How does one get a whole society, let alone a whole world, to change course of action? In ancient times, the word of a king carried out at the sword of his men would ensure observance. In modern times, words serve as the sword, its command carried out through communication. In its early years, the Norwegian environmental organization The Bellona Foundation[2] won environmental battles with activism. Members would cut their way through fences and chain themselves to the gates of polluting companies to draw attention to environmental crimes. The activities were brought to public attention primarily through the mass media. Today Bellona not only uncovers crimes but actively seek out solutions, often with the support of science and technology. Activism has not been forgotten although the fence cutting has decreased, but the channels of communication open to Bellona have increased. The aim is still the same, though, persuasion, persuading people to take the green road and help save our planet. This is the same goal the environmental movement always has had, but Bellona works to achieve this with solutions firmly founded in science and technology. This is especially true of Bellona's Hydrogen Project where the solution to energy and climate problems is hydrogen as an energy carrier and hydrogen technology.

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[1] These are my thoughts in my own words.

[2] In Norwegian: *Miljøstiftelsen Bellona*. The Bellona Foundation will hereafter be referred to as "Bellona." In addition, it should be mentioned that the organization has a policy of not referring to particular names when writing editorials or offering a point of view. As a rule in formal writing opinions and ideas are not attributed to an organization, as it is considered grammatically incorrect. I will, however, do so in this thesis both to adhere by the anonymity promised to interviewed sources and to stay in accordance with the Bellona policy.

The object of this case study is Bellona and their Hydrogen Project. The idea is to look at the communication process in which The Bellona Foundation engages in within this project. Bellona bases its solutions to environmental problems on science and technology, making the organization a science mediator. Through the presentation of models of science communication, the need for an interactive, multi-directional approach that makes problematic the receiver and recognizes the receiver as an active participant in addition to adhering to the correlation between message and context of the receiver will be demonstrated. By contrasting this theoretical framework with the communication process and examining its respective stages, this case study aims to examine how Bellona carries out and perceives the different and whether Bellona recognizes the framework highlighted in the science communication models and adheres to these factors within the Hydrogen Project.

Bellona's aim is to achieve a hydrogen society through communicating to the "world" that this is the solution for the future. The ultimate goal is a world running on hydrogen—a hydrogen society—where hydrogen is the primary energy carrier and 0-emissions is achieved. If achieved, this scenario is of course a few years ahead of us, as a change of technological trajectory is not achieved overnight. In addition to being long-term, the Hydrogen Project is complex, taking on global problems like energy shortage and global climate change. The Hydrogen Project is about communicating and ultimately implementing a solution, hydrogen as the leading technological trajectory, replacing the petroleum trajectory the world is following today. Since the solution is technological, the hydrogen issue is high in content when it comes to science and technology.

The Hydrogen Project's slogan is "From talking to walking the Hy-Way," illustrating that it is not enough to inform target audiences about hydrogen, action has to be taken, as well. However, one thing is to get people to talk about hydrogen technology and understand the hydrogen solution; quite another thing is to get them to walk the hydrogen highway. What

seems to be essential is to be an effective communicator on several levels. This means that Bellona needs to be a disseminator of information but also a receptor and catalyst. The Hydrogen Project is not only about informing about a solution but also the creation of one, as is reflected in the two informational levels of the project: popularization and development of the solution. Sounds simple enough but the environment within which the communication process takes place is a complex system of actors, interests, perceptions, cultures, experiences and ideas. It is also an environment where there are competing issues and where rational factors are not always the determinant of whether a message is heard or not. In addition, the communication process is influenced by the nature of the issue, which is certainly true for the Hydrogen Project. Within this environment it becomes crucial to take a holistic approach to the communication process and recognize that importance of interaction with the target groups and the multi-directional flow of information.

In chapter 3 and 4 will present Bellona, the Hydrogen Project and its solution in order to give an understanding of the organization the framework within which the Hydrogen Project emerged and what Bellona is trying to communicate through this project.

In order to understand Bellona's role as a science mediator, provide a broader framework for the communication process and an understanding of how complex the communication process is, the traditional model of science communication will be presented. This model makes a number of assumptions about the communication process and hence provides a contrast to how the communication process should be perceived in order to communicate efficiently. As a mediator of science one has to recognize that communication is an interactive process with a multi-directional flow of information. It is also crucial to make problematic the receivers and recognize their differing contexts because this influences the construction and effect of a message. A message's effect upon a receiver is not a function of scientific content only. Finally, it is important to view the receivers as active participants.

In chapter 6, the four stages of the communication process will be presented. The division into the four stages has been made in order to make it easier to study the process. The first stage concerns the construction of a message to be communicated through a project. Here it is important to recognize that a message is more than a scientific and technological foundation. At this stage the role of science and technology for Bellona and the communication process within the Hydrogen Project will also be considered. The second stage concerns the construction of a strategy in regards to how the message should be communicated to target groups. The third stage concerns the channels, which have been divided into direct and indirect channels. The focus will mainly be on two indirect channels, the mass media and the Internet. In terms of the two mediums it is interesting to see whether they are adversary or complimentary tools and how they compare to direct channels. The final stage concerns feedback and how this is used in the project.

Chapters 7 and 8 will present and discuss the findings from a survey and interviews conducted with Hydrogen Project members. Chapter 7 will present three phases of the Hydrogen Project, the perception of target groups and their roles and importance to the project, and a Bellona's roles in the project. Chapter 8 will study how Bellona handles and perceives the communication process stage by stage, attempting to get a picture of whether Bellona engages in an interactive and dynamic communication process or adheres to the traditional model of science communication.

2.0. Methodology

At the outset of this project, I had trouble finding applicable theory or works as I decided to look at the whole communication process. It might have been a little ambitious, but I figured it would be important to take a comprehensive look at the communication process within the Hydrogen Project in order to understand how Bellona communicates. A more limited view would only expose how Bellona uses certain channels or engages in particular activities. The notion of the thesis is that all these activities interact and influence each other, which makes it crucial to look at the whole communication process.

As Bellona uses science and technology as a foundation for its work, it seems natural to move toward science communication models as a framework for the communication process. More research in this area is needed, as indicated by Lewenstein (1995), but the traditional model of science communication is used as a contrast to highlight the necessity of having a multi-directional flow of information, making problematic the receiver and viewing them as passive, recognizing the correlation between context and effect, and contextualization of the communication process. In addition, this theoretical framework portrays the obsoleteness of dichotomizing science production and popularization.

The traditional model and its critics provide the framework for examining the actual communication process that takes place within the Hydrogen Project. Although it is recognized that the activities in the communication process are intertwined, for the purpose of the study I have divided the communication process into four parts: translation, strategy, channels and feedback. In order to better explain these four stages of the communication process, I have used theories and works dealing with popularization of science, environmental organizations, the mass media, agenda-setting, Internet to piece together a picture of some of the necessary elements in the communication process.

To study how Bellona navigates the communication process and how the organization perceives it and their own role within the Hydrogen Project, a survey and interviews were conducted. In addition to the survey two informational meetings with my two contact persons at Bellona were conducted.

The survey contained a total of 68 questions regarding the communication process within the Hydrogen Project and, to a certain extent, experiences from previous projects (see appendix 11.1.). The survey was distributed by mail to Bellona employees deemed relevant to the Hydrogen Project by one of my contact points in Bellona. These persons included employees working directly with the Hydrogen Project, in overlapping areas or with administrative duties. The prospective respondents were asked to fill out the 1 –1 ½-hour long electronic survey and mail it back to me. The survey was in English but respondents had the option of filling out their answers in Norwegian. All respondents to the electronic version chose to answer in English. Some of the persons who received the survey did not answer because they had either stopped working in Bellona, not worked there for very long or leave of absence. Four respondents filled out the electronic survey and returned it via mail.

To get some more data to work with, three separate sessions where respondents filled out the survey while I was present. The respondents were given a print copy of the survey in English, but I filled in their answers on an identical form. The sessions were also taped. All sessions were conducted in Norwegian. All questions were explained and paraphrased by me. This might have has some influence on the respondents' answers. Some details might have gotten lost in the translation or my explanations might have influenced the respondents in the direction I wanted them to go. On the other hand, my explanations might at times have helped clear up certain questions that might not have been completely clear to the respondents to the electronic version. It should be mentioned, however, that I am sure that most

respondents had looked at some of the questions before the session with me. In addition, I think my presence prompted longer answers, as the respondents were thinking out loud.

In the end 10 persons answered the survey. When presenting the findings from the survey in the thesis, when quoting comments from respondents to the electronic version, it will be indicated that the respondent "wrote" whereas when quoting the other respondents, the respondent will "say" something.

In addition to these two methods, I conducted three interviews that did not follow the survey. They were open-ended interviews touching in various aspects covered in the survey. First of all, these were persons it was hard to get hold of and get an interview time with. Second, when getting an appointment (one was in person and two were over the phone), I felt the time was better spent doing an open-ended interview and in some cases it would be difficult to hold their attention with the survey. In two of the cases, the interviewees were not directly involved in the Hydrogen Project.

In retrospect, I find that perhaps I should have just done interviews in accordance with the survey outline. Part of the reason why response to the electronically distributed survey was so low is believed to be due to the length of the survey. Although it took longer to sit down and fill out the survey with the respondents, I find them more willing to do this than to fill it out on their own. The employees at Bellona have a busy schedule, and it is understandable that spending over an hour filling out a survey for a "faceless" person might take a little more effort than sitting down with someone to talk. This format also gave me the chance to spur and encourage them, get them back on track if their minds started wandering and ask some follow-up questions.

Finally, I had some informational meetings with my two contact persons at Bellona. At the outset of the thesis, we had one meeting where I presented what direction I wanted the thesis to take and they gave me some information on what Bellona is all about. The second

meeting took place towards the end of the process, and I was allowed to ask questions that had come up during the research. Information from these interviews has been used in the thesis, with permission, and only been referred to as interviews at Bellona. It should also be mentioned that these two persons have given me assistance and information along the way crucial for me to see the case study through.

3.0. The Bellona Foundation

The Bellona Foundation was established in 1986 in the wake of the Chernobyl accident. Its founders, Rune Haaland and Frederic Hauge, saw a need for a new environmental organization in Norway. The idea was to create a simple organization with the personnel and economic resources at its disposal to stay up to date on environmental affairs. Bellona's solutions are anchored in science and technology used to battle environmental degradation, dangers to human health caused by pollution and negative ecological impacts due to economic development (The Bellona Foundation, 2000).

Currently, the organization has 45 employees. Out of these, 13 are civil workers, 6 in advertisement, 4 positions in the administration (some part time) and the rest work within the various target areas with experience ranging from nuclear physics, chemistry and biology to economy, law and social studies. Out of these 23, three-quarters are full-time while one-quarter is part-time employees or trainees.

Bellona works to inform the public, especially lawmakers, opinion leaders, and the media, of environmental problems and their possible solutions. Originally, the focus of Bellona was on local and national problems, but over the years their scope has broadened. In addition to the headquarter in the capital of Norway, Oslo, Bellona has offices in St. Petersburg and Murmansk in Russia, one office in Brussels (Belgium) and an office in Washington, D.C. (US).

3.1. Viable scientific solutions

Bellona is probably best known for its extensive work, experience and knowledge regarding environmental hazards in Northern Russia, but the organization claims to have expertise within most sectors within the environment: transportation, energy, nuclear power, municipal waste, waste management and climate change (http://www.bellone.no). Over the years,

Bellona has turned its activities from simply uncovering environmental crimes to searching for and implementing feasible solutions to the problems on which the organization focuses. Though direct action might have been a trademark of the past, the organization now follows a somewhat more pragmatic path, not placing direct action on the shelf, but in addition searching for practical solutions anchored in the investigation and building of knowledge. Based on science, Bellona aims to find solutions that have the least impact on human activities and the environment while simultaneously allowing for continued economic growth and sustainability. Bellona is continually updating the current knowledge base in addition to building new knowledge in order to uncover the best solutions (The Bellona Foundation, 2000).

3.2. Funding

Over that past three years, Bellona has had an average annual budget of 25 million Norwegian kroner (NOK). Out if this, NOK 10 million are income from advertising sales.[3] About NOK 6 million are funds earmarked projects in Russia received from the Norwegian Ministry of Foreign Affairs. About NOK 1 million is state funds earmarked various projects. Supporting members contribute about NOK 1 million.[4] Approximately NOK 6 million comes from the B7 cooperation with the business sector. The last NOK 2 million is income from various activities like sale of reports, gifts to Bellona, sponsored equipment, etc.

[3] It should be mentioned that the advertising is posted on the Internet only after Bellona discontinued its print publication *Bellona Magasinet*. A range of companies and organizations support Bellona. For a list, look at http://www.bellona.no/imaker?id=289&sub=0. In addition, it is important to note that the advertisement is a profile of the company not a product. Finally, in Norway donations to foundations like Bellona are not tax deductible; however, funds spent on advertising are, since it is counted as value creation. Companies and organizations therefore often channel their support to Bellona through advertisements.

[4] Bellona is organized as a foundation, not a member organization. Membership in Bellona is on support basis only. Due to computer failure, Bellona was not able to pull up any membership records but estimates the total number of members between 3000 and 4000 members.

3.3. B7

Adopted in the summer of 1998, the B7 strategy is a ten-year program designed to add structure to Bellona's preferential areas, projects and programs. The seven focus areas are environmental rights, international environment protection, environmental management, economy, environmental technology, energy and Envirofacts.[5] A common denominator for the seven areas is the "emphasis on finding viable and realistic initiatives and solutions through interdisciplinary and scientifically based co-operation on a national and international level" (The Bellona Foundation, 2000). The B7 strategy is also meant to define the conditions for the organization's cooperation with trade and industry.[6] According to Bellona, the companies have two main reasons for wanting to cooperate with the environmental organization: to gain access to Bellona's large amount of knowledge and creativity in regards to sustainable environmental solutions, and to make use of Bellona's large international network. (Bellona brochure). Bellona's close cooperation with private companies—who by some environmentalists are viewed as the enemy and source of pollution, only—has been criticized.

3.4. The four principles of Bellona

Bellona's philosophy is the foundation of the B7 areas. There four principles are similar to what Eyerman and Jamison (1989:100-101) calls cognitive praxis, a core set of values. Bellona anchors its activities in four principles viewed as the corner stones for and the long-term goal of the organization. In a sense, they are a broad outline of Bellona's activities and direction. These principles are intertwined and central in all the work that Bellona does, including the Hydrogen project recently launched. There has to be a balance between being believable scientifically and taking a stand on the various issues (Interviews at Bellona).

[5] See appendix for a detailed description of the respective B7 areas.
[6] For a detailed list of the B7 partners, visit http://www.bellona.no/n/b7/partnere.

3.4.1. The precautionary principle

Bellona shares the "precautionary principle" with the rest of the environmental movement. It builds on the belief that absolute certainty about environmental threats is not needed in order to take action. The focus is on prevention. If there is suspicion that the current path could damage the environment in the future, precautionary steps should be taken to be on the safe side instead of waiting. Having to repair the damages might be more costly than merely preventing them, both in financial resources and damage to the environment. And if waiting too long, damages may prove irreparable.

Often this situation occurs on a conflict between companies continued quest for profits and subsequent environmental costs. This leads to the question of what should be the leading principle: ethics or money? It is important to keep in mind that it is profits, which increases and sustains the living standards of citizens. Aiming to be a mediator between the two, Bellona positions itself in the middle not seeing the two as opposing, contending that it is possible to continue economic growth and development in an environmentally friendly manner.

3.4.2. Technological optimism

Bellona has technologically optimistic view, meaning the organization has moved beyond the technological determinism characterizing many environmental groups. Instead of viewing all technology as evil, Bellona aims to solve environmental problems with the *right* use of technology. Bellona aims to make technology part of the solution, using clean technology to improve the environment.

3.4.3. 0-emission society

Bellona's goal is to achieve a 0-emission society. This is a focal point in the organization's work. The 0-emission policy is an underlying framework for all the other principles, as well.

3.4.4. North-south divide

Bellona emphasizes the north-south perspective. The organization does not agree with groups attempting to stop technological development in Third World countries because of their increasing contribution to environmental problems like global warming. The root of the problem is the type of technology used in Third World countries, not the technology in and of itself. While Western countries' innovativeness produces increasingly cleaner technologies, environmentally unsound, polluting technologies are being dumped in Third World countries that cannot afford anything else. The result is a high emission pr. capita in these countries. The solution, as Bellona sees it, is not to deny Third World Countries use of technology. Without technology and further technological advances, it is unlikely these countries will be able to rise out of poverty and improve living conditions for their citizens. Bellona's suggestion is to help Third World countries by making environmentally clean technology available and affordable to them.[7]

4.0. Hydrogen Project

Before moving on to the actual project, it is important to understand within what framework the Hydrogen Project was born. Energy and climate change are two of Bellona's focus areas. When it comes to energy, two issues need to be addressed: the threat of energy depletion stemming from heavy reliance upon fossil fuel and the need for more efficient utilization. In

[7] Information about the four principles comes from a meeting with contacts in Bellona.

terms of climate change, there is the threat of increasing temperatures on earth caused by emission of harmful gasses from human activities into the atmosphere, contributing to the greenhouse effect and a permanent increase of the temperature on earth. Both energy and climate change are global issues, requiring attention and changes from a number of different national and international actors. Curbing emissions of CO_2 in Norway would do little to prevent climate change as CO_2 released somewhere else could still influence the climate where emissions were curbed, which is why climate change is an inherently global environmental problem (Yearley, 1996).[8] The all-encompassing societal scope of energy and climate change issues means that there are economic, political and social implications, which is often case with environmental problems, both nationally and internationally.

It is in the midst of this that Bellona is championing a hydrogen society. The notion is that in hydrogen has to become the leading technological trajectory, which in essence means using hydrogen as the leading energy carrier coupled with hydrogen technology. The message is that hydrogen is the only path to secure the world's future energy needs and achieve a 0-emission society—fostering sustainable development—all while ensuring as little disruption to our daily lives as possible. This view is anchored in the four principles upon which Bellona is founded: Something needs to be done before it proves to be too late; technology can be and is the solution; a 0-emissions society is possible to achieve; and all countries can continue to advance technologically and economically.

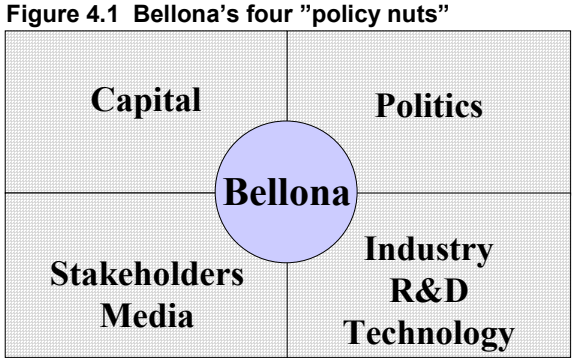
4.1. Four policy nuts—two main levels

There are four target groups in the Hydrogen Project outlined by Bellona in four "policy nuts": politics; industry, R&D and technology; capital; and stakeholders/media. (see figure 4.1.) When looking at the four policy nuts, it is important to note that Bellona is situated

[8] For a further discussion of energy depletion and climate change as global issues, see discussion in Yearley (1996).

at the cross section of the four target groups, emphasizing the organization's role as a mediator. Within each target group, Bellona sees individual actors located at different places in the grid, depending on their competencies, interests and needs. This notion seems to recognize the importance of context when it comes to members of the target groups, something that will be discussed later.

Figure 4.1 Bellona's four "policy nuts"



The "policy nuts" figure is Bellona's but I have added the tiling to the squares to indicate the difference *between* and *within* the respective target groups.

There seems to be two main communication levels in the Hydrogen Project. The first level seems to be a popularization effort; sort of a broad informational front or educational effort directed at the general public. Included here is the communication of information to the average citizen; the mass media and politicians/policy makers[9] also fall into this area at times.[10] It should be emphasized that both media and politicians/policymakers have a larger responsibility than the average citizen: the media as an agenda-setter and politicians/policymakers both as an agenda-setter and through political action. The aim of the information is to prepare the general public of a hydrogen society, make them see that it is technologically possible, a viable solution, and a trajectory to be pursued, and in the case of the politicians to create a framework enabling a hydrogen society. It is also towards this audience that Bellona has to make decisions about what a level of scientific and technological information is needed in the "messages" or information directed at them.

The second front is directed toward actors involved in the development of hydrogen technology: the industry and R&D institutions, and investors. The aim here is not so much to

[9] In the four "policy nuts" Bellona refers to this target group as "politics." I have chosen to call this target group as politicians/policymakers for the sake of this case study.
[10] In the Hydrogen Project, the technology is new and fairly unknown to both media and politicians/policymakers, which is why I have placed them on the first communication level.

inform as to foster an environment where hydrogen technology is developed, built and implemented. Bellona acts as a catalyst and networker to promote cooperation between various actors, forge new connections and dialogues, and hatch solutions. As will become evident later, this front has been the most crucial in the Hydrogen Project so far.

The Hydrogen Project's target groups reflect the global character of the issue, as all segments of society are included. The problem ultimately has to be solved on an international level, but Norway is a valuable starting point because of its petroleum history. Norway's natural resources feed a potential as a hydrogen producer.

4.2. Hydrogen

Hydrogen, the first element in the periodic table, is the most common element in the universe. The name comes from Greek, *hydro* meaning water and *genes* meaning create, and hydrogen is found mainly in a combination with oxygen as water molecules. Hydrogen is also found in large quantities in organic compounds like plants, oil, coal and natural gas. It is the lightest of all the gases and reacts easily, often explosively, with other elements. Industrially, hydrogen is mainly produced from hydrocarbons (e.g. coal or natural gas) through steam reformation or through electrolysis of water. Only about 2-3 percent of the 500 billion m^3 world-production of hydrogen gas per year is made from electrolysis of water. The rest comes from hydrocarbons (Norsk Hydrogen Forum, 2001). Among the uses of hydrogen today is a raw material in certain industrial processes, like methanol and ammoniac production, for example. It is also the most important rocket fuel.

4.3. Norway on the road to the European Union

Norway is a small country with a small population of about 4.4 million people, only 1 percent of the European total. This rocky country with the long coastline controls 75 percent of the

oil reserves and 45 percent of the natural gas reserves in Europe. Norway is the world's sixth largest producer and third largest net exporter of oil, and Norwegian gas exports in 2000 accounted for about 2 percent of global consumption, placing Norway among the ten largest gas exporters in the world. Roughly 10 percent of Western European gas consumption stems from Norway. The world today relies on fossil fuel to satisfy ever-increasing needs for energy, used mainly for three purposes: heating, cooling and mechanical labor. It is from black gold this northern country has built a welfare state. A large part of the petroleum sector is government owned and profits yield a surplus budget.[11]

Fossil fuel is a non-renewable source of energy and a large source of pollution. Emissions to the air and discharges to the sea come from activities in the petroleum sector such as exploration, development, production and transport of oil and gas. Various emissions from the offshore operations are carbon dioxide and methane, which contribute to the greenhouse effect, and nitrogen oxides, which can lead to over-fertilizing, acidification and—in combination with volatile organic compounds (nmVOC)—the formation of ground level ozone (Norwegian Ministry of Petroleum and Energy, 2001). In addition, one should not forget emission of the same gases connected with use of petroleum products, like gasoline in cars, for example.

The emphasis of the Hydrogen Project is on the production of hydrogen in Norway, in an environmentally sound manner. The idea is to develop a hydrogen production infrastructure to support commercial sales of hydrogen and electrical power to the European Union. There are two ways that hydrogen can be produced in Norway, through extraction of electricity and hydrogen from natural gas and through electrolysis of water. There are two additional aspects to both of these production methods. When extracting hydrogen and electrical power from natural gas, CO_2 is a by-product, which raises the need for a CO_2-

[11] In 1990, a Government Petroleum Fund has established and by the end of December 2000, the fund had accumulated NOK 386 billions. This is the equivalent of about 28 percent of Norway's GDP (Norwegian Ministry of Petroleum and Energy; 2001).

infrastructure to safely deposit this waste, either in used oil- and gas reservoirs or in empty water pockets (The Bellona Foundation, 2001). If the CO_2 is just released into the air, there is no point in extracting the hydrogen from the natural gas in the first place. If, however, the CO_2 is safely deposited in underground storage or used as pressure support in oil wells, the polluting gas has been eliminated at the production stage. The burning of hydrogen in a fuel cell,[12] for example, will only yield water as a waste product, not CO_2 as the internal combustion engine does.

When producing hydrogen from electrolysis of water, electricity is required to split the oxygen and hydrogen of the water molecule. The idea is to get this electricity from renewable energy sources like solar energy, wind power, etc. Producing hydrogen through electrolysis has the advantage of on-site production, unlike production from natural gas, which has to be transported to the consumer. Norsk Hydro, a Norwegian company with 70 years of experience with electrolysis, has developed a compact plant especially designed for hydrogen fuel stations. The first such station was opened in May 1999 and supplies hydrogen to the busses at the airport in Munich, Germany.

In addition to Norwegian expertise on the production side and depositing of CO_2, Norway also possesses expertise on storage of hydrogen through the Institute for Energy Technology and Raufoss Composites with expertise in hydrogen tank systems for fuel cell cars running on hydrogen.

Third Norway already possesses an extensive transportation system, which can be used to transport hydrogen to the continental market. The system was originally developed

[12] The fuel cell is an electrochemical device that produces electricity through a chemical reaction between hydrogen and oxygen to form water. The fuel cell can be used in both stationary power generation and in transportation. It is perhaps best known as a clean alternative to the internal combustion engine. The only waste emitted from a fuel cell run car is water, which is drinkable. Most of the leading automotive manufacturers invest billions of dollars each year in fuel cell research for automotive transportation, and personal vehicle prototypes are expected to hit the market in 2003. It should also be mentioned that as the fuel cell differs greatly from combustion engine, it falls outside the core competencies of automotive manufacturers. Hence, the car industry relies heavily on other actors, like oil companies, chemical companies and other specialty firms, and many projects are joint ventures, like the Ballard, DaimlerChrysler and Ford cooperation.

to transport natural gas, but transporting hydrogen is not such a different operation (Bellona Report No 3, 2000:52).

5.0. Models of science communication

Models of science communication are ways of thinking about science and the media. The models look at the relationship between scientists and the general public in regards to popularization of science. Popularization is mainly about division, creating two unequal spheres—the scientists and the general public—and the movement of scientific information from one sphere to the other.

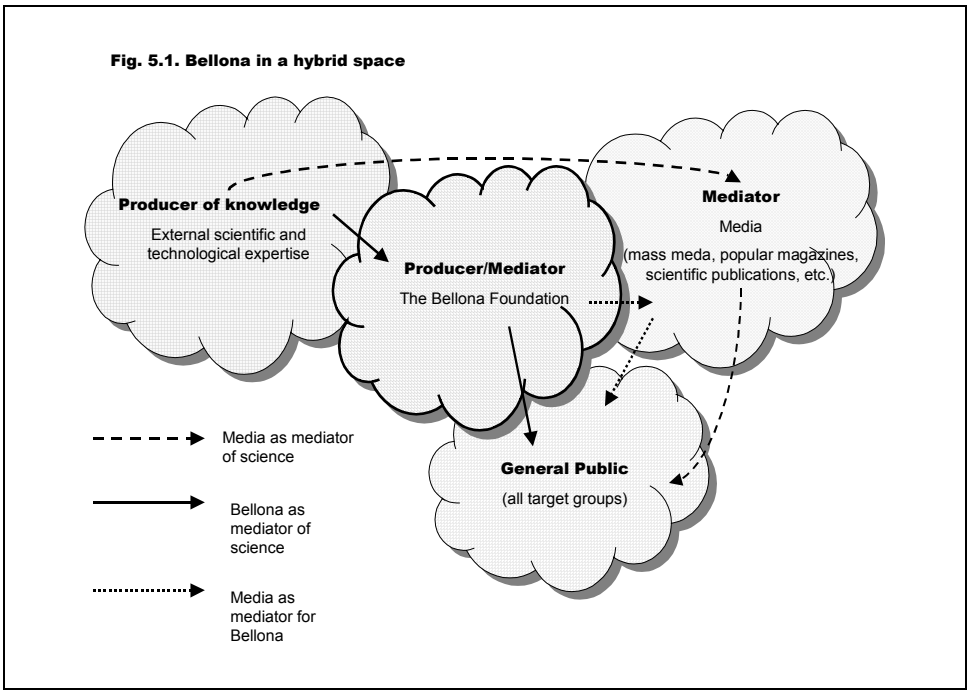
The role of the media in the communication models is as a mediator of information traveling between the scientists and the general public. Traditionally, scientists themselves were the mediators.[13] This was a role later assumed, to a large extent, by the media. The Internet is changing this as scientists increasingly can engage in direct communication with the general public, but in order to see why models of science communication can be relevant to Bellona, it is important to consider the mediator. Before looking at the traditional model of science communication and three major critiques, it is important to consider why these models area relevant since Bellona is an environmental NGO not a mass media.

5.1. A hybrid space

Bellona enjoys a particular position in relation to science and the general public. The organization's solutions are anchored in science and technology and communicated to the general public.[14] Bellona is a mediator of science and technology in the sense that through championing solutions to environmental problems, the organization communicates scientific

[13] This was before the 1600s when Hobbes began the closure mechanism.
[14] It should be noted that the general public here encompasses all the groups in society, not just the lay-people, but also the politicians, industry, media, etc.

and technological information in its original or a distilled format. The solutions are built from synthesizing internal and external knowledge. Bellona might not have the same specialized scientific and technological expertise as external sources, but the employees have the advantage of taking in broader view of the resources out there. This enables Bellona to produce solutions that otherwise would not have existed. So in essence, Bellona becomes a producer of internal knowledge and a mediator of both internal and external knowledge (see figure 5.1.). This places Bellona in a hybrid space as it harbors a role both as producer and communicator of science (lecture by Felt 06.02.01).



It is Bellona's role as a mediator that makes models of science communication a relevant framework to how Bellona communicates within the Hydrogen Project. As a mediator, Bellona takes on much the same role as the media, although there are some differences. There is a notion that the media presents objective accounts of what goes on in

the world, merely describing events and presenting all sides to a debate without favoring sides. For Bellona, taking sides is central as their task is persuasion, to get people to change their actions according to Bellona's view or solutions. Though it can be debatable how objective or neutral the news media really is (Anderson, 1997:45-48),[15] whereas the mass media harbors these ideals or illusions—depending on how you look at it—Bellona's values are fronted openly to everyone. Another difference is the production of science, in which the media does not normally engage. It should also be noted that whereas Bellona act as a mediator of science, the media could serve as a mediator for Bellona. The media is a target group in the Hydrogen Project and its role will be discussed later in the paper.

5.2. The traditional model of science communication

The traditional model of science communication, also called the culturally dominant view of popularization of science, has been the prevailing model for years. Even though this model has been criticized for oversimplifying the communication process and having conceptual problems, the traditional model of science has continued to be dominant (Hilgartner, 1990:519-520). Central the traditional model is the idea that "popularization" is a "diffusion" process, in which scientific or technical information is "disseminated" to broad, uninformed publics (Lewenstein, 1995:348). A two-stage model is assumed: first, scientists develop genuine scientific knowledge, mirroring a natural objectivity; second, popularizers disseminate simplified accounts to the public (Hilgartner, 1990:519). The traditional model builds on the construction of a dichotomy with the idealized notion of pure, genuine scientific knowledge on one side contrasted against popularized knowledge on the other. Any variation between the two is seen as a "distortion" or "degradation" of the original thruths. Popularization is at best "appropriate simplification" and at worst "pollution," the distortion

[15] See Anderson (1997) for a further discussion.

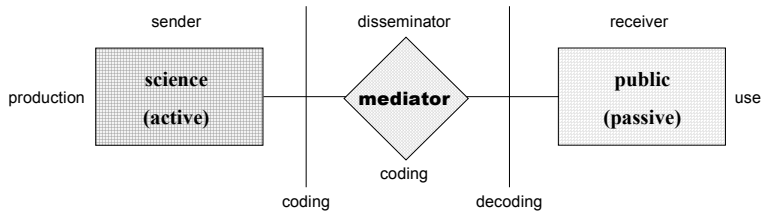
of science by outsiders. The ideal is to have an "appropriate simplification," which is the distilled essence of the knowledge presented to the audience in the appropriate succinct and usable form (Hilgartner, 1990).

The model is founded in two dichotomies: The construction of clear boundaries between science and the general public and a clear line between "appropriate simplification" and "distortion). This first dichotomy allows scientists to label knowledge as either "genuine" or "popularized." In the second case, there is an assumption that there exists a uniform set of criteria for makes communicated scientific material a distortion. Hilgartner (1990) has refuted both these sets of dichotomies, arguing a continuum of science,[16] which refers to the notion that "popularization" is a matter of degree. It is impossible to locate the precise boundary between genuine scientific knowledge and popularized presentations. When simplification or distortion, Hilgartner (1990) argues that the question is not how different the information is from the "original" but rather whether the difference is significant. The judgment of significance will depend on the context (social location, interests, and appraisal of the circumstances) of the person judging.

The root of the traditional model is a sender-receiver model developed in the 1940s at the dawn of electronic communication. It draws on the codification work of Shannon, an engineer associated with the Bell Labs. The idea was that a sender codes a message and sends it across a line to an intended receiver. While traveling, the message will encounter noise. Upon reception, the receiver decodes the message into its original form. It can be likened to talking on the telephone. Transferred in its entirety to science communication, this model (see figure 5.2.) became known as the traditional model (lecture by Felt 06.02.01).

[16] Continuum of science communication was first put forward by Shinn and Whitley (1985).

Figure 5.2. Traditional model of science communication



Reproduced and augmented from lecture by Felt, Strasbourg 2001.

The traditional model assumes a uni-directional flow of information, always from sender to receiver. The sender-receiver model acknowledges that there can be noise disturbing the message, which in the traditional model has been replaced by a mediator, a role often filled by the mass media. The notion is that the message from the sender is comprised of "objective" scientific facts, which is coded and sent through the mass media where it is coded again (interpreted) before being passed on and decoded by the receiver (general public). This is the manner in which the information is popularized.

A second in factor is that largely the public is not made problematic. The scientists are considered active participants, producing and disseminating scientific facts; their responsibility is to discover a perceived "objective" reality, capture it in a simplified version, which is disseminated to the general public. The receivers, on the other hand, are seen as passive receptors of whatever scientific information divulged upon them. They are viewed as an unstructured, ignorant and homogenous group. The receivers are likened to a science information consumer, scientifically illiterate, harboring a void waiting to be filled with quality scientific facts by scientists as they see fit. This is also known as the "deficit model" (Miller, 2001).

The view of the general public as a passive receiver leads us to a third assumption, an assumed direct correlation between dissemination and effect. The belief is that all

disseminated information will affect the receiver simply because it reaches the target. Furthermore, there is an assumption that the degree of effect is a function of the quality of a message and quantity of exposure. Lack of scientific detail or a deficit in dissemination of information is considered to cause the public's inability to absorb said information (Hilgartner, 1990).

This is closely linked to a fourth problem, the traditional model's emphasis on message content and dissemination quantity. The idea is that the "perfect" message is a message closest to a scientific truth. Inherent in such a view is the assumption that an "objective" reality exists, waiting to be discovered by scientist. Such a realist view ignores the fact that scientific facts are socially constructed. A scientific paradigm is not an absolute truth or a state of nature. It is something that has been negotiated, selected among other alternatives and through this process emerged as the leading paradigm. This in turn means that the leading scientific paradigm is not an absolute; it might even be proven wrong by future research and replaced with another paradigm.

Another assumption made here points to the fifth point taking place in the traditional model, decontextualization. The model ignores that fact that the sender (scientists) and the receiver (general public) do not exist within the same context, which can influence how the message is interpreted. The model assumes that the interpretation of the message is in the text of the message itself; that the meaning of the message never changes. The message is simply coded before being sent and decoded by the receiver to reconstruct the exact same message that was sent.

As seen, the traditional model makes a number of assumptions about the sender, receiver, the message or scientific facts, the context, the effect of dissemination and nature of the communication process. Hilgartner (1990) has argued that the reason it has survived as the dominant model for so long is because it serves scientists as a political resource in public

discourse in three ways. First, it serves as a "boundary work" to demarcate "genuine" from "popularized" knowledge. Second, it establishes genuine scientific knowledge as the exclusive preserve of scientists. Third, it grants scientists broad authority to determine which simplifications are "appropriate" (and therefore usable) and which are "distortions" (and therefore useless or worse). The consequence of this is that scientific experts enjoy great flexibility in public discourse (Hilgartner, 1990). Fundamental in Hilgartner's argument is that there is a continuum of science communication that occurs in various texts. Linear view neglects the feedback and epistemological consequences of communication but gives an illusion of control. In addition, simplification happens everywhere, both internally and externally of science. Popularization is an integrative part of knowledge production

Hilgartner goes on to argue that there are three problems with the dominant view of popularization. First of all, popularized knowledge feeds back into research processes. According to Fleck (1935/1979), this means that scientists learn about fields outside their immediate research areas from popular accounts that shape their beliefs about both the content and conduct of science. Second, simplification is important in scientific work. Third, recent work has argued that scientific knowledge is constructed through the collective transformation of statements (Hilgartner, 1990:522-524).

5.3. Further critiques

Questioning the idea of a linear model, Grunig (1980) proposed the situational theory of science communication. Not seeing the audience as a passive receiver, Grunig made problematic the notion of one coherent audience. In addition, he recognized the context within which science communication takes place. This means that a person's receptiveness for technical information will change according to the context of the particular person. Empirical evidence suggests that when a scientific and technological issue has direct impact

on a community, members will quickly and accurately acquire significant amounts of information.[17] Failed dissemination of information might not be so much the result of ignorance on the part of the general public or not enough scientific detail but rather the lack of application or implication for said audience. The audience is situated in a context, influenced by personal, cultural and situational restraints or experiences. The context of an audience is a strong determinant of the receiver's interpretation of a message and ability or willingness to absorb any scientific information. The meaning of a text is not a given (Moores, 1990), but influenced by cultural, educational, structural and personal factors.

The interactive approach, which has developed within risk and health communication, has emphasized the communication process as being at least a two-way process, depending as much on the interests and concerns of the audience as on those of the scientists or others in position of authority. Logan (1991) in his model called "secularization" has argued that the traditional model builds on a naïve interpretation of social learning theory. There are multiple variables affecting the acquisition of knowledge. The "secularization" model stresses that dialogue takes place among the public, media and scientific sources, and Logan points out that dialogue involves give-and-take, not a one-way flow from the scientists to the public. The notion is that in order for science communication to be successful, one should reject scientific authority and acknowledge the value of opinion, beliefs and values held by the audience.

Bryan Wynne and Alan Irwin showed importance of social context and lay knowledge as playing a significant part in how science was used by members of the public. The notion is that interpretation of messages is a process influenced by complex, surrounding factors. It is not a simple, straightforward process. These and studies by H.M. Collins, Trevor Pinch and Bruno Latour, which highlighted the importance of understanding science-in-the-making,

[17] This has also been shown by Wynne (1989) in his study of the Cumberland sheep farmers.

gave rise to what is termed the "contextual approach" to public understanding of science. This approach sees the generation of new public knowledge about science much more as a dialogue in which, while scientists may have scientific facts at their disposal, the members of the public have local knowledge and understanding of, and personal interest in, the problems to be solved. They need to know: why the facts being communicated are required by the listeners; what their implications may be for the people on the receiving end; what the receivers might feel about the way those facts were gleaned; and where future research might lead (Miller, 2001).

6.0. The communication process' 4 stages

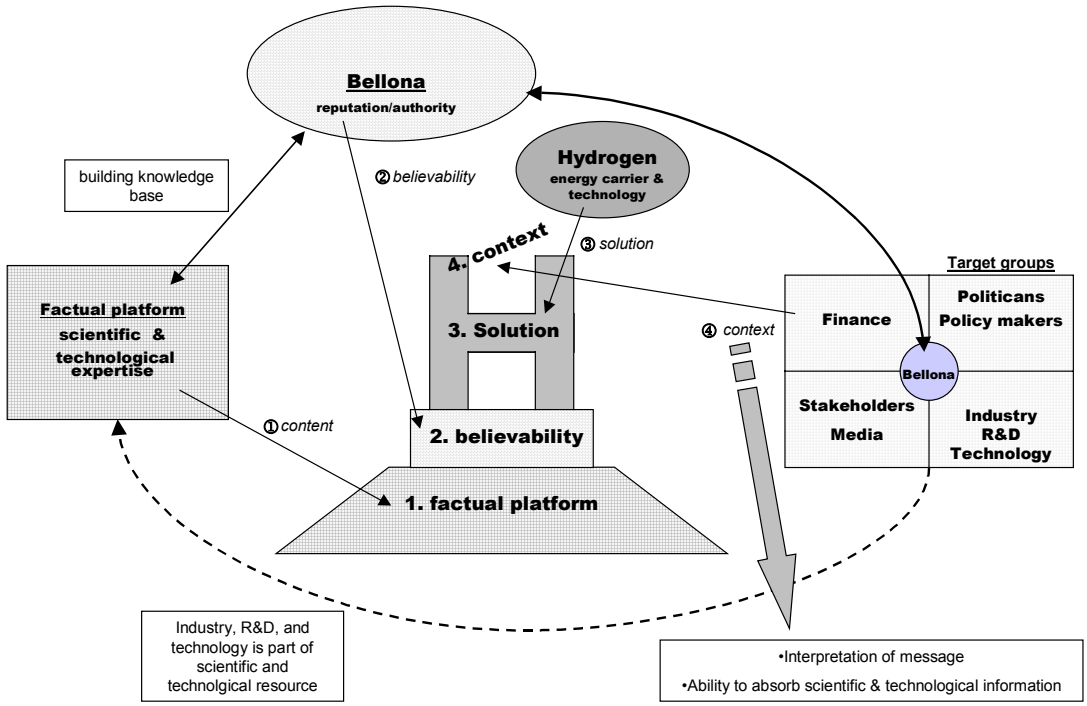
The focus of this study is to analyze the communication process in the Hydrogen Project. In order to do so, I have divided the communication process into four parts, including both internal and external activities. Internal activities are, for example, the production of information and planning of a project strategy. External activities are the use of communication channels and interaction with target groups. Feedback can be both an external and internal activity.

6.1. Translation

The first stage concerns the construction of a message to be communicated. A message can take the form of printed material like brochures, fact sheets, articles, press releases or more oral presentations like conference speeches, presentations, notes used in dialogues, etc. I have called this process for "translation" because it is a matter of transferring certain elements into a communicable package. In the traditional model of science communication, the focus is solely on the scientific content, as this is viewed as the determinant of effect upon the

audience. My contention is that a well-constructed message needs to be more holistic in its approach, containing additional elements, recognizing that receivers' respectability to a message is influenced by more than one single factor, the science and technology. (see figure 6.1.)

Figure 6.1. The elements of a message.



First, there needs to be a factual base one which the solution, claim or view is built; in this case scientific and technological research and reports on hydrogen technology, energy and climate change, for example, form the foundation. This is the codification of knowledge into information that can be communicated to a receiver. Knowledge codification is the process of conversion of knowledge into messages, which can be processed as information (Cowen and Foray 1997: 596).

Second, a message needs to convey a solution or a notion of what should happen. As in the case of the Hydrogen Project, the message is that turning to hydrogen could solve our energy and climate change problems.

Third, the message should incorporate a consideration of the context in which the intended receivers of the message is situated. The context to which a message is communicated is a strong determinant of the content of the message, as this influences the receivers' interpretation of the message and ability to absorb difficult scientific and technological information as pointed out above. However, incorporating all the aspects of an issue—the full range of impacts and applications, all the scientific and technological evidence—would at require a thorough report.[18] Even in a publication like that, one would probably be forced to compile, summarize and refer. To certain specialized audiences, communicating through reports might be a useful tool, but most times and to most audiences, shorter messages are needed.

In the Hydrogen Project, there are four main target groups as outlined in the four policy nuts. As mentioned before, these four groups are comprised of various sub groups or segments, each within a different context. Therefore it becomes important to determine what aspects of an issue are important to the receiver: the implications, applications or scientific and technological facts?[19] A selection has to be made. In a sense, it is sort of like creating a recipe: how much of each ingredient goes into the mix. When communicating a solution, it is the persons at the receiving end subject to persuasion, and who possibly would have to make changes, and therefore it becomes important to consider the factors that might influence their reactions. As Miller (2002:117) points out, the contextual approach sees the generation of new public knowledge about science much more as a dialogue in which, while scientists may

[18] A report on hydrogen is currently in the making at Bellona and could be expected in November, 2001.
[19] It should be noted that just as selections in terms of content are made at the messages' construction stage, a selection process has taken place during the compilation of the knowledge base upon which the factual basis of the messages is built. In its use of external resources and expertise, Bellona is material of relevance to their activities, distilling what is useful and, of necessary or fruitful, fusing this with other material or research.

have the scientific facts at their disposal, the members of the public concerned have local knowledge and understanding of, and personal interest in, the problems to be solved. So just like the receivers are multi-dimensional and layered, so should the message be.

Considering the context of a receiver is also important because it is a determinant of the receivers' ability to absorb scientific and technological information (Wynne, 1989) and it influences the receivers' interpretation of the message communicated to them. Wynne and Irwin showed the importance of social context and lay knowledge as playing a significant part in how science was used by members of the public: interpretation was not an unambiguous process (Wynne, 1995).

The fourth ingredient but a very important one is the reputation of the organization. The reputation of Bellona is something that more or less automatically goes into all messages communicated by Bellona, the organization's reputation. The scientific and technological foundation is important in terms of whether or not the solution, in this case the hydrogen solution, is feasible. It is a strong rhetoric and lends authority in terms of portraying Bellona as an expert but there is also something more involved. To a large extent it is Bellona's reputation that gives the message believability and authority. In the process of diffusion of scientific knowledge, the knowledge becomes robust. This happens because by just diffusing knowledge, it is removed from the context of production. Hence, the basis of which the knowledge can be contested is removed, as well. The only way to refute the knowledge is to attack the way it was produced. However, when one has no idea of the knowledge was produced, one cannot attack it on this basis. Hence, whatever scientific knowledge scientists put out there becomes the leading paradigm (lecture by Felt 06.02.01). This means that for the average receiver of information, who does not have extensive scientific and technological insight and knowledge on the issue communicated, will have no grounds on which to refute this aspect of the message. Hence, such a receiver will often turn to the believability of the

sender of the message, in this case Bellona, in determining the believability of the message itself. In addition, it should be kept in mind that it is often difficult to convey all supporting scientific evidence or technological details in a message and hence, receivers will often have to take the message at face value, believing it because of an organization's reputation or previous experience with messages communicated by said organization.

For an organization like Bellona, this means that the scientific and technological foundation is something that for most of the target groups is beyond their comprehension. Hence, it seems logical that these persons will turn to the organization's reputation for clues as to whether they should believe the information or not. Keep in mind that such decisions often have to be made in regards to competing claims or scientific evidence, all seemingly legitimate to the uninitiated eye, which makes it even harder to decide whom to believe. At times it is difficult to convey all the supporting scientific material in a message, which means that the reputation of the organization is that much more important in terms of how the message is treated or interpreted. Building a reputation takes experience, sound science and technology in the past and in the future and values.

6.2. Strategy

The second stage in the communication process deals with creating a strategy of how to communicate with target audiences. A strategy can be divided into two levels: cognitive and operational (Pleune, 1997: 734). The cognitive level is the approach to the environmental problem and deals with the organization's view, e.g. world, view, concept or problem definition. The operational level is the method, defined by Pleune (1997:734) as "the concerted, logically linked forms of action aimed at the achievement of ends." The cognitive level of Bellona's strategy is to a large extent described in the four principles described earlier. Methods frequently used by Dutch environmental organizations studied by Pleune

include the influencing of governmental policy, public opinion and behavior, industry, and the offering of alternatives.[20]

Within the framework of the Hydrogen Project, Bellona seems to use all the methods described by Pleune since all the target groups are included and covered in the four policy nuts. Hence, it becomes unnecessary to consider what methods Bellona uses. What becomes more relevant, however, are what channels Bellona communicates through or emphasizes, and how these are used to reach the respective target groups in the Hydrogen Project. My contention is that the use of channels is an important factor in the strategy because it is an important factor when it comes to effect, i.e. achieving one's goals. I will come back to the specifics of channels, which is the third stage of the communication process. The selection of channels (and methods) is influenced by two factors: resources and context.

6.2.1. Resources

The resources an organization controls are vital in terms of the organization's capability to influence or gain access to target groups in a project. A. Paul Pross (1986) divides the typology of pressure groups into four categories: *institutionalized* groups with extensive human and financial resources; *mature* groups who form alliances with other groups and have a staff that includes professionals; fledgling groups with a small staff; and *issue-oriented* groups with a small membership and no paid staff. Pross links the possession of such resources, human and financial, to the ability to maintain regular interaction with government officials and to exercise political influence.

Pierce, Steger, Steel and Lovrich (1992) in their study of environmental groups in Ontario, Canada, and in Michigan, United States, try to assess the impact of traditional organizational resources, informational capacity and the scope of communication factors on

[20] The alternative in the case of Bellona and the Hydrogen Project is the use of hydrogen as an energy carrier coupled with hydrogen technology.

strategies used to influence government policy-making and the self-perceived effectiveness of group attempts to communicate information. With traditional organizational resources, Pierce et al means financial resources (funding and staffing level), human resources (membership size) and networking abilities (affiliations). Informational capacity is the ability of an environmental group to gather and create a variety of types of research and information. Communication effort is the extent to which environmental group personnel works to disseminate a broad range of types of information to groups members and government officials (Pierce et al, 1992: 132).

As pointed out, Bellona has no active members towards, which one has to inform or work directly towards in order for the members to get something back for their paid dues. In addition, the scenario of Bellona differs because the organization is not only targeting government officials. However, the notion remains that these are important factors in terms of gaining access to government officials.

6.2.2. Context of the organization

The nature of the issue championed is another factor that can influence the choice of strategy in terms of what channels would be the best way to communicate through. Certain issues might gain easier access through certain channels. Is the issue complex, clouded with scientific facts, expertise, confusion, or simple with easily identifiable perpetrators, solutions and scientific evidence. In the first case, the mass media might be a difficult channel to gain access to and get coverage for the issue. Second, the actors are involved in the issue, either as perpetrators or par to of the solution, can also influence choice of communication strategy. Certain target groups might respond to certain channels in a better way than others. Is it necessary to reach a large number of people, in which case the mass media seem like a good outlet, or is it a small target group, in which case dialogue might work well. The previous two

points feed into each other and are both influenced by a third factor, the experience of the organization. In a sense, the experience is part of the organization's resources. The notion is that experience from previous projects influences the choice of strategies for new projects. What worked before might work again. However, again, certain target groups might respond differently to a channel that has worked because the nature of the issue has changed. Another side of this is that experience is previous visibility and contributes to the reputation of the organization, as mentioned before, which in turn influences what strategies are open to the organization because it determines where the organization has or can have access.

6.3. Channels

The third stage looks at the channels of communication used to reach target groups. Communication within a project can take place through either direct or indirect channels. The difference is that when communicating indirectly, an intermediate party or tool, like the mass media or Internet, comes into play. When engaging in direct communication, it involves face-to-face interactions with members of target groups in formats like lobbying, dialogue, meetings, conferences and similar situations. I have called this stage of the communication process for "channels." Due to time and space constrictions, I will be focusing on two indirect channels, the mass media and the Internet. Mass media I take to include newspapers, television and radio. The Internet encompasses features like Bellona's homepage, e-mail and on-line information searches.

Historically, the mass media has been very important to the environmental movement or the new environmental movement as referred to by Hanson (1993:150). Emerging in the 1960s, this new branch of the environmental movement turned to the mass media as their channel out to the general public. Not having a lot of connections in the established political segments of society like the conservationist societies of the time, the new environmental

movement turned to an outlet that would give them a voice in their attempts to influence the agenda. Contemporary movements very early on developed media-conscious strategies and even organizational roles for handling problems of communication (Eyerman and Jamison, 1991:40).

The Internet has a history that can be traced back to the Second World War, but its application for the general public and for a large public first exploded in the middle of the 1990s. It was at the end of the Second World War, Vannevar Bush launched his idea, the "Memex", a system intended to aid researchers in keeping track of enormous amounts of information. At the time, Bush did not have the technology to realize his idea, but it was carried over into research primarily by the American military, research institutions and universities in the United States on a computer network called ARPAnet established in the late 1960s and intended to exchange military data and scientific information. The idea is that data is divided into small packages and transmitted over the net as independent units. This eliminates the need for a separate data line between each sending and receiving computer. Every computer has an Internet Protocol (IP) address, which allows the packages of information to be routed to the right machine. Special computers called "routers" keep tag of what route the packages have to travel to find the right address.

Electronic mail was the first Internet "killer-application". Not part of the original plans for ARPAnet, e-mail was developed by Ray Tomlin, a consultant with Bolt, Beranek & Newman. In 1972, e-mail constituted about 75 percent of the traffic. The next big explosion came with Tim Berner-Lee (CERN) and his introduction of the World Wide Web, a "hypertext" concept. Berner-Lee posted the programming code on the net. A group at the University of Illinois programmed a net browser for the WWW called Mosaic. What was so revolutionary about Mosaic was its ability to transmit text as well as showing pictures and

graphics. When released in 1994, the market exploded (Hannemyr, 1999). Today the Internet browsers that are known best are Internet Explorer and Netscape.

Internet has become a world encompassing communication system of connected computers. In January of 1999 more than 43 million host machines were connected in more than 205 different nations. As a comparison, the UN has 185 member countries. About 6 million of these machines are used to publish documents via the World Wide Web. In January of 1999, there were more than 800 million documents available on the Internet (Hannemyr 1999:11-12). Today there is almost half a billion persons with access to the Internet on a world basis. Of these, 41 percent live in the US or Canada. About 27 percent live in Europe, the Middle East and Africa, while in 20 percent live in Asia. Only 4 percent in Latin America have access to the Internet (Digi.no, 18.06.01).

I have chosen to focus on these the mass media and the Internet not only because of time and space restraints, but also because they add an extra mediator to the communication process. First, the two indirect channels are both mediums involving technology. As Croteau and Hoynes (1997:63) pint out: "media technologies are a structural constraint. Like all structures, they are developed by humans and, subsequently, both enable and limit human action." The mass media and the Internet share some limitations and similarities when it comes to technological delivery parameters (see table 6.2.) It is also important to note differences between the two in the sender-receiver relationship. Second, the mass media has the ability to set the agenda, and the Internet might serve as an alternative road. In light of this, it becomes interesting to explore whether Bellona views and uses them as competing or complimentary channels.

Table 6.2. Select characteristics of different media

	Live	Text	Sound	Picture	Video	Interactive[1]
Print	No	Yes	No	Yes	No	No
Radio	Yes	No	Yes	No	No	No
Broadcast TV	Yes	No[2]	Yes	Yes	Yes	No
Computer networks	Yes	Yes	Yes	Yes	Yes	Yes

Table is modified from Crotau and Hoynes (1997: 63).

[1] By interactive means a medium that provides for two-way communication, not simply one that offers a range of choices.
[2] While television can show text on screen, they are not primarily textual mediums, and the text cannot be transferred to paper. Cable or digital television linked to a computer, does offer textual capabilities, but will not be dealt with here.

6.3.1. Text, sound, pictures, video and interactivity

When looking at whether information is conveyed live or in delayed time, with text, sound, picture or video, or if the communication is interactive or not, it becomes evident that the Internet incorporates all the features of the mass media. Whereas the print media cannot provide live coverage due to printing time, sound or video because of the format, television can because of its properties. On the other hand, television does not have the text capabilities the printing press has because of format and space. But whereas the respective mass media have differing capabilities as seen in the table above, the Internet (computer networks in table 6.2.) incorporates these features in addition to being interactive. The linking of text, image and sound in digital communication is what Croteau and Hoynes (1997:265) call hypertext. Instead of the author leading the reader through the text, it requires the reader to “pilot” him or herself through the interlinked documents or files containing the text, image and sound. This alters the writer-reader relationship, giving the reader everything at once and more responsibility.

The mass media also harbors limitations in terms of time and space to cover issues, which feeds into the depth with which they can cover an issue. In the mass media, the format of a newspaper or a newscast does not lend itself very well to in depth coverage. Obviously, a newspaper article has more space to publish background information than a newscast, but restrictions in terms of column-inches and minutes on the air, automatically leads journalists to cut or focus on certain angles of a story. This is not to say that extended coverage is not possible, something the recent coverage of the actions of terrorism in the US against the World Trade Center and the Pentagon. However, the extended coverage of these gruesome events either means that other news items are pushed to the back or not printed or broadcast at all. The added newscasts on television means that additional resources, human and financial, are put into use, and it is not something that will or can continue indefinitely.

On the World Wide Web, however, space is virtually unlimited and publication is instant. Of course there are technological restrictions here as well (space, quickness of the net etc), but the format of the World Wide Web lends itself very well to the publication of in depth information in addition to the ability to give this information in all formats, text, picture, video and sound. The space on a hard drive is not limited by number of pages that can go into press or minutes a newscast has at its disposal on the air. Adding hard drive space is a relatively easy operation. Hence, on a homepage, and organization can publish large quantities of information: background information, scientific and technological details, links to other documents. The possibility of linking documents or linking to external pages also opens up for the possibility of posting layered messages. There can be documents with the essence of the story, no complicated details, while for those who desire more there will be links to documents with scientific and technological details, for example. For those who require even more information, links can be added to even more specialized pages. The Internet makes it easier to distribute various tailored messages, something for everybody.

6.3.2 Sender-receiver characteristics

There are three defining characteristics of mass media according to Croteau and Hoynes (1997:264-265). First, there is a one-to-many orientation, meaning that from one sender (one point of dissemination), e.g. a newspaper or television channel, thousands and thousands of receivers can be reached with the exact same information (today's edition of the newspaper or the 6 o'clock newscast). Second, there is a known sender but usually anonymous receiver. The receiver knows exactly who the publisher of the newspaper is or what news channel is broadcasting the news, perhaps their political inclination. However, the publisher of the newspaper or the news station knows few specifics about the receivers, other than the viewer demographics, which only give large trends. Finally, the mass media is built on one-way communication. Readers of viewers can respond in letters to the editor or news station, but there is no real time interaction between the sender and receiver. The feedback does not travel across the same lines as the information. The Internet breaks down these barriers between sender and receiver and uni-directional flow of information. But as will become evident, this digital media also has a limitation in terms of the broad scope of receivers the mass media are able to reach.

The one-many flow of the mass media is worth another look in terms of the mass media and Internet being competitive communication channels. The format of a newspaper, for example, is such that when buying or subscribing to the print edition, readers get a package of news with each edition. The journalists and editors put the package together and the news stories become part of the news agenda, which will be explained below. The reader is of course free to choose what articles to read, but generally a reader will flip through pages fairly methodically (even if it is backwards). In this process, a headline might catch the readers' eyes and they might read an article about something they would generally not be interested in or concerned about, meaning that it would not be an item the reader consciously

would seek out. This form of activity is regular, especially in the case of the subscribers, where the paper ends up on their doorstep every morning. This becomes even more evident in the case of the regular news broadcasts, like the evening news. An avid news watcher will normally follow the news cast from beginning to end, which means that even stories of no particular initial interest to the viewer is something he or she will be exposed to (unless he or she changes the channel).

Structured and regular readership is much less, if not completely absent, when it comes to an organization's homepage. Reading news items and information on a homepage requires that the visitor log onto the homepage each time, seeking it out consciously. Hence, information on a homepage is likely to reach only the especially interested. The visitor might know of the homepage beforehand as a good site for the type of information sought or might have learned the web page's address from a newspaper article, news story on television or from a friend or co-worker. Nevertheless, the visitor has to engage in active behavior. He or she cannot more or less passively receive a story or information. It requires more effort.

Media comes from Latin meaning *middle.* The mass media certainly adds a third party to the equation since anything reaching the audience through the mass media has been subject to the gatekeeping[21] processes of the respective media outlets. The term "gatekeeping" is a widely used term to describe the process by which selections are made in media work, especially decisions whether or not to admit a particular news story to pass through the "gates" of a news medium into the news channels. Original studies into the gatekeeping processes of the news media focused largely on the news values upon which stories are chosen. Subsequently more attention has been given to organizational and cultural factors which also influence what issues become part of the news picture and in turn become part of the media agenda (McQuail, 1994: 213). This leads us to consider three things. First of all,

[21] It should be noted that sources can act as gatekeepers as well because in certain cases they can play a role in the agenda construction and sustaining issues once picked up by the media. Greenpeace is perhaps one of the better examples of a source acting as a gatekeeper (Anderson, 1997).

not all issues come news items and the issues that become part of the media agenda are not necessarily the most important issues. It could be a simple matter of a fit between the issue and the criteria for slipping through the gatekeeping processes of the mass media. Second, because entry to the audience takes place through a third party, the question of access arises. Certain issues pitch themselves to the media in terms of being natural disasters or events that immediately warrant the attention of journalists. However, other issues are subject to claims-making (Anderson, 1997), meaning that they have to be pushed into the limelight by interested parties. Finally, by going through a third party, the information or message is subject to interpretation. The message or information fed into the system might not be the same as the information coming out at the other end and ending up with the audience (target groups).

The Internet on the other hand, as pointed out by Rogers (1986) is closer to a face-to-face interaction. The middle interpreter has been eliminated. The information posted on a homepage, for example, is retrieved by the receiver directly, meaning that it has not been the subject of a third party interpretation and rewrite. This means that the source of the information enjoys full control over the content of the information that reaches the receiver. Access, on the part of the sender is also not such a big question, especially in the Western World.[22] After acquiring the necessary equipment and securing server space and a URL (homepage address), anybody can host and post information on an Internet site. Updating a site with new information and stories, with current software, is in essence no harder than typing in a word processing program. Access might actually be more of an issue on the part of the receiver, as he or she needs access to a computer that is hooked up to the Internet. In Norway, hook-up to the Internet is fairly good. In Norway, of the total population a little over 50 percent of 2,35 million people have access to the Internet from home and about 40 percent

[22] It should be recognized that since Internet access requires computer equipment, electricity and phone lines, it is restricted, especially in developing countries. In Norway, however, access is fairly high.

have access from work (Digi.no 30.05.01). Comparatively, about half of all the households in the US have access to the Internet from home.

The interactive nature of Internet goes counter to the one-way flow of information in mass media. It allows the persons to do more than just receive information; they can also disseminate. This blurs the distinction between sender and receiver, making for a more active audience. It links computer technologies closer to face-to-face interaction (Rogers, 1986). Neumann (1991:12) argues, "We are witnessing the evolution of a universal interconnected network of audio, video, and electronic text communications that will blur the distinction between interpersonal and mass communication and between public and private communication." His argument is that these integrated media networks have several key capabilities:

- the new media become increasingly less expensive;
- they will once again alter the meaning of geographic distance;
- they provide the possibility of increasing the speed of communication;
- they allow for a huge increase in the volume of communication;
- they allow for more channels of information flow;
- they provide communities for interactive communication and
- they provide more control for individual users:
- they allow forms of communication that were previously separate to overlap and interconnect.

"In short, the new technologies allow for more, faster, diverse, two-way communication s between users who have both more control and more choice. These properties of the new media provide resources for increased media diversity and give communications power to citizens instead of central authorities" (Croteau and Hoynes,1997:283).

Finally, it is also interesting to look at these two mediums in terms of their role as agenda setters. The mass media is the medium that is often tied to the news and political agenda. The Internet is less known in this regard, but seems to have the ability to be a contributing factor in agenda setting if not always a sole factor. As shall become evident later, the Internet can be an indirect agenda setter in terms of its ability to make access to the mass media easier and more resource efficient.

6.3.3. Agenda-setting hypothesis

The term ”agenda-setting” was first used by McCombs and Shaw (1972, 1993) in reference to election campaigns. It refers to the process which issue hierarchies are mediated to the public through election campaigns. “From this perspective, the news media might not tell us *what* to think, but they present us with a range of issues to think *about*” (Anderson, 1997:24, original emphasis). This view is supported by Trenaman and McQuail (1961: 178, emphasis added) who observe, “The evidence strongly suggests that people *think about* what they are told…but at no level do they think *what* they are told.” As McQuail (1994:356) points out, data does show a correspondence between the order of importance given in the media to “issues” and the order of significance attached to the same issue by the public and politicians. Hence, there is a correlation of importance but not of ideas, which means that one cannot assume a direct effect between the media agenda and public attitudes. A weakness of agenda-setting studies is a tendency to assume that the public are directly influenced by media agendas (McQuail,, 1994; Lang and Lang, 1981).

As Protess et al (1987:180) point out that the change of public attitudes depends upon the nature of media portrayal and frequency of attention by the media to the issue in the past. This means first of all that the seriousness of a problem is not so much an indicator of an issues ability to become part of the agenda and influencing public attitudes as is *mediated*

reality (Nimmo and Combs, 1983). For example, issues portrayed in an unambiguous way with dramatic, convincing and clear evidence, is much more likely to change public attitudes than more routine and complex issues (Protess et al, 1987:180). The reality portrayed to the general public through the news media is not a mirror of the real world; it is slices of the world as chosen by the mass media. The nature of the issue is important as well. Protess et al (1987) divide the issues up into ”recurring issues” and ”non-recurring” issues. As opposed to the “recurring issues”, the “non-recurring” issues are breakthrough news with infrequent or no prior attention. The notion is that these types of issues have a high impact potential because they reveal unknowns. Although, it should not be assumed that the effects are long-lasting. Anderson (1997:147) also points out the correlation with issue characteristics and agenda-setting: “Issues are sustained by factor’s intrinsic to the nature of the issues, by a certain degree of fortuitousness and by external social and political forces.

With that being said, it is important to recognize that journalists and editors do not exclusively set the media agenda. One should not ignore how agendas are built and social problems are transformed into political issues (Anderson, 1997:143). Another factor that should not be ignored, as pointed out by Anderson, is the role of sources in the agenda building and sustaining of issues on the agenda once there. In her case study of the mysterious seal deaths around the Coasts of Northern Europe in 1988, Anderson (1997:1961) notes on the role of sources in turning the seal virus, viewed as a purely scientific issue, into a “political issues” in defining the nature of the problem and the institutionalization of environmental issues through government departments and non-governmental organizations. This leads us to the final point that it is important to be aware of the fact that the media agenda is influenced by agendas of other societal groups.

Anderson (1997:142) divides the overall agenda into political, public, scientific and media agendas. Separate interests and actors drive the respective agendas. The issues dominating the respective agendas can differ at times, but the agendas feed off and into each other to build an overall agenda, as well, on certain issues. The politicians and policy makers set the political agenda, the parliamentary table of properties. The public agenda is the degree of concern attaches to various social issues by the general public. The scientific agenda is the ranking of importance of scientific knowledge by scientists. The media agenda is the range of topics that the media presents us with (Anderson, 1997:142). McQuail (1994:357, original emphasis) notes, "It is likely that the media contribute to a *convergence of the three agendas* [media, public and political], but that is a different matter from setting any particular one of them. This view is supported by Anderson (1997:139) who suggests that there is a complex interaction between the scientific agenda, political priorities, media coverage and public attitudes towards environmental issues." However, this does not exclude the fact that the media can at times mold the political agenda (Land and Lang, 1981; Solesbury, 1976; Schoenfeld et al, 1979).

There seems to be a larger influence of the media towards politicians and specialized sectors than the general public. In a case study of the impact of investigative reporting on public opinion and policymaking, Protess et al (1987) revealed that certain issues had no influence on the general public's actions but nevertheless policy changes were made. Protess et al (1987:182) pointed out that there are four factors that can contribute to influencing the government. First, it is the timing of publication. Second, the extent to which journalists collaborate with policy makers or lobby them will have an influence. Third, the level of general public and interest group exerted pressure. And finally, the availability of cost-effective solutions to the problems disclosed. However, it should not be forgotten that the media tends to be a follower of the political agenda much more so than a leader

(Anderson, 1993: 467). The effect of the media agenda can be issue specific. Anderson also emphasizes the importance of using the appropriate media for the right audience and for environmental groups to diversify their messages according to the social group they are targeting.

Could perhaps suggest that the mass media is more often a better tool to reach politicians and policy makers than the general public. The other side of that is that it is important to get to the politicians and policy makers in order to get something on the media agenda. To get something on the media agenda is a good way to create awareness, but it seems that it has to be followed up with other forms of communication in order to make a ”bigger” impression.

6.4. Feedback

The fourth and last stage of the communication process deals with the flow of information between Bellona and members of its intended target groups. It is important to recognize that feedback can take place at any stages of the communication process, which is what makes it interactive. Just as information can have different levels, so can feedback, meaning that its content and area can vary. It is not necessarily something that takes place after the project is over. It is a continuous process that takes place as Bellona interacts with the actors in the communication process or the target groups they aim to influence. This is an important stage in the communication process because it indicates that Bellona is not only a divulger of information but also a recipient. The communication coming from the target groups can also be done through direct or indirect channels. In instances where the feedback is done through direct channels, like at meetings or in a dialogue, it becomes obvious that feedback is part of a dynamic and ongoing process. It is an inherent part of the interaction Bellona has with its target groups. As will become evident later, direct channels are very important to the work

Bellona does. The feedback can be in the form of reactions, information requests, ideas or simply through a dialogue.

The feedback continuously flowing back to Bellona is not just a chance to spread more information by responding to information requests. It is also an opportunity to learn more about the contexts of the persons the organization is targeting. In a sense, the feedback can be viewed as a message from the target groups, which can be used to improve the message coming from Bellona because it could possibly improve the fit between the message and the context of the intended target group. It is important to note that there are differences not only between target groups but also within the target groups. Hence, it is difficult to figure out the context of all the members of a particular target group before starting a project. Things or persons along the way can emerge that could help your case or make your work more difficult. The communication process is not only about getting a message out there, it is also about learning how to become a better communicator which in time could contribute to the message or solutions implementation.

Since the feedback is something that takes place over the course of a project, it should be used continually to make updates to strategies and use of channels, messages and target groups if necessary. This is what makes a project dynamic and what learning is all about. This builds on the notion that the environment within which the Hydrogen Project takes place is a complex system with a number of actors who interact with each other daily. Bellona is a player in this environment on a daily basis and has to continually adapt and navigate in this system in order to champion the organization's solutions.

Feedback is also an area where resources come into play, especially when it comes to indirect requests. To answer letters, phone calls and so on for information takes time. The interactive properties of the Internet have made this easier and less time consuming than previously. This, of course, goes both ways. It has been easier for the general public to get in

touch with Bellona. Now Bellona and the general public are only a click away. The Internet has in this sense become more of a direct link with those who wish to get in touch with Bellona.

7.0. Bellona, the Hydrogen Project and the target groups

In this case study, seven Bellona employees were surveyed and three were interviewed. The surveyed members will be referred to as respondents. Out of the respondents, 3 were surveyed in person and 4 responded to the electronic version, which was then submitted via e-mail. The interviewed members will be referred to as interviewees. Two interviews were conducted over the phone and one in person. The respondents and interviewees comprise a diverse group in terms of age, education, previous work experience, affiliation to the Hydrogen Project and reasons for coming to work for Bellona. The respondents ranged in age from 26-61 years. The educational background varied from no formal education to technical backgrounds (engineering). The work experience ranged from the environmental movement to R&D and the petroleum sector. Reasons for working for Bellona varied from being part of the first years of the organization and liking the operational methods and emphasis on solutions to being able to contribute scientific and technological knowledge and consultant services.

Not all respondents work directly for the Hydrogen Project but are indirectly or partly involved through work within energy, administration or position in the organization. Currently, the Hydrogen Project is comprised of 7 persons, but this is a recent change. The members of the Hydrogen Project group have been added gradually as the project progresses from an idea to an actual project.

7.1. The Hydrogen Project's three phases

The progressive expansion of the Hydrogen Project is a result of the project gradually progressing through various stages. The first stage was an explorative stage for a solution to energy and climate change problems. The "founder" of the Hydrogen Project came across a couple of articles about hydrogen as an energy carrier in the fall of 1997, which made him realize that hydrogen might be the solution. He continued reading everything he could find about the topic. As he continued his research, it evolved into a Hydrogen Project. The next step was a verification process, where work concentrated on corroborating hydrogen as technologically feasible solution. Naturally, this is part of what prompted the close cooperation with the industry and research and development institutions. The next phase, which Bellona is getting ready to climb, is the realization step. This includes showing that hydrogen technology is economically feasible and make it happen on a large scale, continuing the climb towards a hydrogen society.

These phases of the Hydrogen Project are crucial to the understanding of why there has been such a large emphasis on science and technology so far in the project. This is reflected in the strong links and frequent dialogues and cooperation with the industry and R&D sector so far in the project, which again influences what channels are viewed important and used at this point. It is also mirrored on the Bellona homepages dealing with energy and hydrogen in that the content is highly detailed and mainly dealing with scientific and technological issues.

It is also an important point in terms of analyzing the communication strategies as it points to one external and one internal strategy. The emphasis so far seems to have been on the external strategy, and Bellona is preparing these days to being the internal planning.
A third point is that it illustrates that when it comes to the two informational fronts, Bellona has so far been the most active towards the specialized target group responsible for

implementation and the technical aspects. This is not surprising as this target group is not just a receiver of a "message" but an active partner in developing the message and carrying out the solution (developing and implementing). This seem to indicate that target groups are not just receptors if information but also divulgers and involved at all stages of the process, a notion underlining the interactivity of the communication process. (pointed out in figure 6.1.)

7.2. The selection and perception of target groups

Bellona's selection of target groups for a project is a function of what groups are determined important to reach in order for the project to be a success. The target groups for the Hydrogen Project are outlined in the four policy nuts described in chapter 4.1. For the purpose of the survey, the stakeholders and media group is separated into two groups. In addition, the "general public" is added to the stakeholder category, in order to find out if there are any differences between the two terms. It should also be mentioned that since Bellona views the media as a target group, to separate the target group from the indirect channel, the latter will be referred to as the mass media.

There is an awareness of the necessity to divide certain target groups into sub-groups. However, when asked to pick particular target groups, almost all respondents picked politicians/policy makers (4 out of 5). Only one respondent picked the general public. Two respondents picked the media in addition to politicians/policymakers, and two other respondents picked the industry in addition to politicians/policymakers.

It is no surprise that politicians/policy makers are not viewed as homogenous, as they are already divided along party affiliations. In addition it is a rather small group in numbers, comparatively with the general public. It is also easy to pinpoint respective members' points of views on specific issues, which places members in specific contexts. The general public, however, is a numerous group. This makes it the most diverse or segmented target group,

which should necessitate division into further sub-groups. There can be several explanations to why this is not reflected by respondents in the survey.

One explanation could be that the general public is viewed as a rather faceless homogenous group since it is a large group with which one might have infrequent contact and often through indirect channels. Harboring such a view would be falling into the trap of the traditional science communication model. On the other hand compared to many other organizations or institutions, Bellona seems to pride itself on being a local organization, talking to the grassroots as well as the voices of authority.

Finally it could be an indirect result of the preferred channel in reaching the general public, the mass media. When using the mass media, the focus tends to become not so much on the audience but on gaining access to the media and the information or story one is pitching to the media, which is why the media is perceived as more important than the general public.

7.2.1. The roles of target groups in the Hydrogen Project.

There is a fairly coherent view of what roles the respective target groups will have to play to implement a hydrogen society. There is a minor difference concerning the financial sector, but this is not deemed important.

Politicians/policy makers are viewed as responsible for creating a supportive framework for the introduction of new technology through political action and their control of public budgets. This group is also largely viewed as harboring few technological capabilities.

The industry on the other hand is first of all viewed as the developer, builder and implementer of new technology. This target group is a strong force in terms of actual changes. The industry is also viewed as a channel to politicians—telling them what they want—and as a point of pressure in getting the politicians to implement changes.

The media is first and foremost viewed as a pressure point and a mediator. The media is a pressure point towards politicians and a means through which the general public and industry can exert pressure on politicians. The media also has a role as an informer or educator, achieving accept for and educate about new technology and sell the message of change.
The general public is viewed as a pressure group towards politicians and policy makers. One respondent also notes that it is not a primary force of change, which can explain why this group is not viewed as very important in a project like the Hydrogen Project. This group is also perceived as one that needs to be educated about the issue.

The financial sector is by one respondent indicated as crucial because the possibility to earn money from the technology development in the long run is crucial. Another respondent notes, however, that this target group is not a driving force.

Overall, this indicates that there is recognition that each group is different and occupies a distinct role in the implementation of a hydrogen society. This in turn means that certain target groups are crucial in terms of an implementation of a hydrogen society, underlining the interdependence of target groups.

7.2.2. The industry, a crucial target group

The general trend seems to be that the general public and media are viewed as a little less important to the success of the Hydrogen Project than the other groups. When asked to indicate the importance of the respective groups, the general public is not ranked as “crucial” by anybody. The respondents are evenly placed between “important” and “fairly important.” In terms of the media, the majority (five respondents) indicates this group as “important,” while one views it as “crucial” and another as “fairly important.” Four respondents view politicians/policymakers ”crucial”. Three respondents view the industry ”crucial,” the financial sector by three, as well. When digging deeper into the Hydrogen Project, it will

become evident that so far communication with the industry seems to have been most frequent and emphasized. However, these findings indicate how important it is to get politicians/policymakers involved the in the process in order for a hydrogen society to become a reality.

The perceived low importance of the general public and the media could be due to the current stage of the project, indicating that the Hydrogen Project has not moved towards the popularization stage yet. In addition, the Hydrogen Project is of such a nature that implementation to a large degree depends upon the development of technology by industry and provision of a political and economic framework by politicians. The general public is largely seen as a pressure group. The role of the media as being the main channel towards the general public could explain why the mass media is viewed as less important, as well. Another explanation could be that the general public has not been made problematic to a great extent so far in the Hydrogen Project.

7.2.3. How active are the target groups?

The activity levels of the respective target groups are a reflection of how closely Bellona interacts with them. The respondents were asked to rank the respective target groups on a scale between 10 and 1, 10 being active and 1 being passive. Being active was indicated as meaning that ongoing interaction or dialogue occurred. Being passive was indicated meaning that target groups received information through indirect channels. The industry comes out on top, being perceived as the most active, spreading from 10 (3 respondents) to 9 (2 respondents) to 8 (1 respondent). Politicians/policy makers have a rather large spread, from 10 to 3, with the majority ranking this group between 10 and 8 (5 respondents). The financial sector was ranged from 9 to 5, the majority ranking the activity level as 8 (4 respondents). The number for the media is also rather spread out, ranging from 10-4, four respondents ranking this group between 10 and 7, while 3 respondents gave it a 4. The general public is

perceived as the least active, ranging from 7 to 1, which is not a big surprise considering the difficulty of engaging in dialogue with such a large target group.

These findings are to a large degree supportive of the notion that the current stage of the Hydrogen Project has a lot of influence. They reflect a correlation between the roles of the different target groups and the current activity of the Hydrogen Project. Since the project has been at a verification stage, it has been necessary to work with the industry to develop the technology. It is not unlikely that the politicians and policy makers for example will become more active as the focus shifts towards them when the need for a political and economic framework increases.

7.3. Communication more than information

There seems to be three major roles that Bellona has: information spreader/mediator, catalyst and coordinator are the ones that clearly emerge. It is important that included in this is an emphasis on Bellona as a solution creator, a knowledge producer, not just a conveyor of other persons' or institutions' solutions. It is also emphasized that Bellona is an independent mediator, likened to a think-thank, providing counter expertise. This is important in that it demarcates Bellona from other mediators. It is not just about mediating information but producing solutions and contributing to their implementation. Bellona is a much more active mediator than for example the mass media.

In a sense, Bellona has become a specialized general public in possession of the local knowledge and understanding of, and personal interests in, the problems solved. Bellona possesses more competencies when it comes to interpreting and developing solutions from scientific facts than the average citizen as their work is precisely to understand what the scientists are doing, synthesize solutions and convey this to the general public. However, what sets Bellona apart from the average scientist is that they are more extraverted, seeking to find out and understanding how scientific facts are compatible or can be put to use in the local

environment as problem solvers. Here "local knowledge" can concern a small region, Norway as a whole, Europe or larger areas, depending on the size and scope of the project. In part, what makes Bellona such a successful organization is precisely this combination of scientific and local knowledge. Bellona seems to have found a way to combine these two factors into realistic solutions, meaning that they are possible to implement. This underlines the role of Bellona as a mediator in a hybrid space. In addition it indicates that Bellona also overlaps with the general public, which can be seen in figure 5.1.

When it comes to Bellona as an expert, the catalyst role is emphasized. The notion seems to be that Bellona is not responsible for developing science or technology, but to take a holistic view of the detailed knowledge that is out there. The notion is that Bellona should possess a broad knowledgebase and an extensive network. This is what sets Bellona apart from the other experts. "The main point here is that most other institutions are concentrating on one or some parts of the picture, whereas we embrace it all," one respondent wrote.

Bellona also has an educational role, explaining facts. There seems however to be a notion that not everybody needs to know the science and technology. The need to know varies between target groups and from project to project. There is a notion that the need has been larger in the Hydrogen Project since there has been a large need to convince people that this technology is out there and really works. This has consisted, to a large degree, of explaining basics.

There seems to be interdependency between the activities Bellona engages in, their strategies and the communication process as a whole. It also recognizes the multi-directional flow of information traveling between Bellona and target groups. The three roles are something Bellona engages in simultaneously, again emphasizing the interactivity of the communication process within the Hydrogen Project.

8.0. Handling the communication process

When asked about which stage of the communication process they deemed most important answers were varied. It should be kept in mind that the interviewees were not surveyed on this question. The majority (4 respondents) answered that they are "equally important." It is interesting that nobody picked feedback as the single most important. One picked "channels" while another selected "channels" and "translation." This could be a logic outcome if a number of the respondents view feedback as being information requests only. It is interesting that four respondents view the different stages as equally important. This coincides with later findings that Bellona has a fairly holistic view of the communication process. Whether conscious or not, Bellona has a much more interactive approach and a much larger awareness of contextual differences than anticipated.

8.1. Participation in translation

Seven out of 10 respondents say they are positively involved at this stage. There seemed to be some diverging views on whether translation is the right term for the first stage of the communication process (4 said "yes" and 3 said "no"). Bellona has not coined a particular term for this stage, but the notion seems to be among the dissidents that it is more a simplified summary or a presentation of knowledge. One respondent observes, "We present our knowledge in various disguises (news stories, fact sheets, reports, slide shows etc, as information." Another respondent wrote: "Translation gives the impression that the knowledge is something incomprehensible, which without a translation, the average person would not understand." The respondent goes on to emphasize that this is not the case.

8.1.1. Constructing a message

In codification of knowledge there is an emphasis on quality (producing as accurate information as possible, including the science and technology aspects) and the audience

(producing the right information for each target group). There is recognition that the construction of a message depends upon the intended target group. One respondent said:

> It depends upon whom you are addressing. I mean if you concentrate on the general public, it is equally important to incorporate *quantity* as *quality*. If you are addressing politicians, the *quality* is very important, to the business sector too, the media as well really. It depends on whom you are addressing, I think.

This does portray an acknowledgement of the necessity to consider the target group when constructing a message. The question, however, is whether there is awareness that the context of particular members of a target group is a determinant as well as to which target group the person belongs.

8.1.2. The important role of science and technology

Overall, there seems to be recognition that science is not an absolute: scientific paradigms can change and even scientists can have an agenda. "Scientist/technologists will often interpret information differently and draw differing conclusions which need not be wholly sensible because everybody has an underlying agenda and can readily fall into the trap of using information to further their own (or company) cause," one respondent wrote. There is a perception that Bellona's knowledge base is objective or, at least, that this is something they strive for. However, there is recognition, again, that there might be underpinnings in terms of scientists or organizations having an agenda. This recognizes the social construction of scientific knowledge.

Overall there has been an increased reliance on scientific expertise in Bellona. Five respondents answered "yes" and two answered "somewhat." However, two respondents pointed out that Bellona's relationship with science is not one of *reliance* but of *utilization*.

"'Reliance' is not quite correct because we are not dependent upon it, but we use it, so to speak. It could rather be said that we take advantage of it," one respondent said.[23] Another respondent wrote:

> We've always done that, but we were less good at it the first years. Must comment through: it's more a question of USE than RELIANCE" (original caps). Although not viewed as reliance, there seems to be coherence on Bellona not having been able to argue a lot of previous cases without science: one "yes", four "no" and one "don't know.

Science is to a large degree viewed as a foundation on which Bellona builds arguments and solutions. One interviewee said, it will always at the bottom.[24] The notion seems to be that Bellona uses science or scientific expertise to back up their solutions. As coming up with solutions has become a greater part of Bellona's activities so has the use of science. In addition, as pointed out by one respondent, the organization's experience has contributed to Bellona being a more efficient user of science today.

Science and technology has been more important in the Hydrogen Project as the solution builds on hydrogen technology. The solution is to a large degree built from work done by external actors. "Bellona does not develop technology, and will therefore need to rely on scientific expertise," wrote on respondent. However, this should not diminish the work the Bellona has done in taking these external actors and the work and synthesizing into a solution and a project. Again, this underlines Bellona's role as both a producer of solutions, which subsequently is communicated. Another respondent wrote:

[23] Original quote: "'Reliance' er kanskje litt feil, for vi er ikke avhengige av bruk av den, men vi bruker den kan du si. Så vi heller utnytter den, du kan si det sånn."
[24] Original quote: "Den vil alltid ligge i bunn."

> It is a serious issue, which requires high level of technology understanding to understand the status of technology development, and communicate the issue in a comprehensive manner. Plus Bellona considers it has a role to play being part of the solution process not just a messenger.

But science is more than just a foundation for solutions. One respondent said, "The knowledge yes. I would say so. But the opinions are not necessarily objective. But the knowledge we possess is more or less objective."[25] The observation about knowledge and opinions is interesting. It could indicate that for Bellona science is not just a foundation from which solutions can be drawn and built. In addition, it is used to give the opinions of Bellona force and neutrality. To an environmental organization values and opinions are crucial as they are part of the organization's identity. However, in order to be heard, more than values and opinions are needed; there has to be a foundation in which the opinions are founded. For Bellona, this foundation is often science and technology. Being regarded as an authority is crucial both in terms of gaining access to certain target groups, and building and preserving a reputation.

There is a perception that Bellona's use of science has increased their access both to politicians and policymakers and the industry. Out of six respondents who answered the question, five respondents saw science as making it easier to gain access both to politicians/policymakers and businesses. One respondent answered "somewhat" on both groups. This feeds directly into the reputation of Bellona. The organization is perceived as serious, knowledgeable, and consequently is heard. Comments by respondents imply that the use of science is needed to "be taken seriously and believed as professionals" and that it makes the organization seem "more serious, less fanatical." It is also pointed to the fact that

[25] Original quote: "Kunnskapen, ja. Det vil jeg si. Men meningene er ikke nødvendigvis objektive. Men kunnskapen vi sitter op er stort sett objektiv."

solutions proposed by Bellona cannot be based on hype but have to be documented. It is important to point out that it is this type of access that allows Bellona to rely so heavily on direct channels, which will be discussed below.

There is a notion that Bellona's believability is in part built on the organization's values. In regards to the outcome, Bellona has no personal vested interests as the organization has nothing to win or loose financially depending on the outcome of a project.[26] In addition, correctness of the factual base Bellona possesses is an important. Certain environmental organizations have been known to embellish, like Greenpeace in the seal virus issue, which caused reporters to shun the organization for a while in the aftermath (Anderson.). This is something Bellona strives to avoid, as it would discredit the organization's believability and consequently inhibit their access and effectiveness. This ties in with the last factor, which is experience. During its 15-year existence, Bellona has emerged as the leading environmental organization in Norway; it is an organization that has gotten results, made positive changes, and it is an organization listened to by the media, politicians, the industry, and the general public.

8.1.3. Understanding the science and technology—necessary?

Since the Hydrogen Project is such a scientific and technological issue, it is interesting to see how important Bellona perceives it to be for the respective target groups to understand this aspect of the message. Unequivocally the industry is perceived as the most important target group. All respondents indicated that it is "crucial" that members of this target group understand the science and technology. The next two groups seem to be the media and the financial sector, with answers ranging from "crucial" to fairly important. Then come the politicians/policymakers and the general public, the politicians being perceived as slightly more important than the general public.

[26] From interview with Bellona employees at Bellona 13.09.01.

There is no surprise that the industry is unanimously found "crucial," considering the nature of the Hydrogen Project and its current phase. What is a little bit surprising is that politicians/policymakers are not perceived more important. This could be because they do not develop technology and have not been central yet. Again, their importance might increase as the Hydrogen Project moves into the "realization" phase. The low perception of the general public's need to understand the science and technology seems to indicate there is not much emphasis on conveying this aspect of the issue to the general public. Though it might not be crucial in all projects, this aspect should not be ignored as was demonstrated by Wynne (1989). It should also be noted that feedback in regards to the Hydrogen Project has been running high on the science and technology content. This seems to include information requests. This indicates that people do want to know how the technology works and what it is all about; there is a curiosity. However, the survey does not indicate if these information requests come from the general public.

8.2. Two strategy levels: internal and external.

All respondents surveyed are either involved in strategy development or will be. In addition, at least two of the interviewees are involved in this process. Chapter 6.2. focuses on strategy as an internal activity. From the survey and interviews, it became clear that there is an external strategy, as well—on which Bellona has currently been focusing—dealing with the technological trajectory of the Hydrogen Project. This means exploring what technologies should be emphasized, including evaluation of competing trajectories and alternative routes to a hydrogen society. One example given by an interviewee is the ruling out of methanol as an alternative energy carrier. Whereas methanol is less polluting than gasoline, it is not a completely clean energy carrier like hydrogen. It should be noted that this type of strategy could be called external because its development depends on external actors through use of

external research and reports. When completed, the external strategy is integrated into the solution communicated to target groups.

The two strategies differ in their use of feedback in the project. One respondent wrote:

> The term strategy for a project is a bit unclear. If the strategy means that the goal of a particular project is, i.e. reduce emission from a particular sector like the Hydrogen project—then you don not alter that definition of the strategy. It might however, be required to alter the strategy for how to reach the goal by selecting a different route for implementation (political, economics, technological) than originally planned. This will in particular be the case when you are working on projects with a long time duration.

In addition to pointing out how the external strategy is rather static, it also indicates that the internal strategy is viewed as highly contingent. Again this underlines the interactive approach Bellona takes to the communication process and recognition that a dynamic, flexible strategy is needed.

Respondents were asked how Bellona proceeds constructing an internal strategy when launching a new project. Two respondents answered both "Construct new, independent strategy" and "Transferred parts of old strategy." This recognizes the importance of experience as well as strategies being project specific. One answered, "Transferred parts of an old strategy" and one picked "Don't know." Two respondents picked, "Construct new, independent strategy," only, which again acknowledges the notion that different projects require different strategies due to the nature of the issue.

Emerging from the comments is recognition, again, of the dynamic nature of strategies and the use of feedback to augment or modify it. It is not set in stone and will change as the project progresses, especially in a project like the Hydrogen Project, which requires a change

in the current technological trajectory and has a long-term range. One respondent said: "Well, [the strategy] is not really constructed. It is something we work on contingently. So it changes at regular intervals."[27] Another respondent backs this up:

> In general terms, we never nail down any particular communication strategy, although certain aspects, or tactical decision are made (i.e. to publish a report, create a dedicated news channel on the web). Otherwise, our communication is more about *tactics* than *strategy*; they change as circumstance dictate (emphasis added).

The notion that the nature of the issue influences the strategy or tactics of a project is mirrored in the views of respondents on whether practical changes is best implemented if Bellona targets the industry or politicians/policymakers. Three respondents answered it was more productive to work with the industry, two answered to a certain degree and two said no, that the two groups are equally important. Among those answering positively, the notion seems to be that the industry is a channel to get the politicians/policymakers involved. There are also certain factors in the business sector that makes this group a primary target for the Hydrogen Project.

There are a number of reasons why the industry is the primary target for Bellona in the Hydrogen Project. First of all, going back to the different roles of the various target groups, the politicians/policymakers were seen as framework creators, controlling political and economic action. The industry on the other hand was perceived as a doer: a developer, builder and implementer. One respondent observes, "Where politicians can only set the general condition, companies must develop, do the actual work." The latter qualities are extremely important for the Hydrogen Project in that no changes can take place without the

[27] Original quote: "Ja, altså, den er jo ikke konstruert. Det er noe vi holder på med hele tiden. Så den endrer seg med jevne mellomrom."

hydrogen technology to produce hydrogen, deposit CO_2, convert the hydrogen to electricity and so on. Underlining the importance of implementation, one respondent point to the Hydrogen Project slogan, "It is about "From Talking to Walking the Hy-way."

The time perspective also favors the industry. "Most companies have real long-term view of things, while politicians don't," the respondent wrote. This makes the industry a prime target in the Hydrogen Project because of the willingness to work and invest on a long-term basis. One respondent predicts a 5-50 year time span for the hydrogen society to begin emerging and ultimately becoming a reality. In addition, a lot of the special expertise needed to develop hydrogen technology is found in the industrial sector. Norway is a country with several core competencies in regards to hydrogen production, CO_2 depositing, storage of hydrogen, and fuel tank systems for vehicles and transportation.

A final factor is the ever-remerging question of financial resources. In Norway, the percentage of the state budget going to R&D is actually decreasing. Needless to say, investments in new technology are costly and often long-term. One respondent wrote, "They [the industry] are more positive to funding projects that have a potential long term commercial value." Of course it is important for the industry to see the possibility of making money off their investment. Within the Hydrogen Project, there is the potential of large future profits while developing and implementing clean technology. This is one of the cases where the interests of the industry and the environmental movement coincide, nourishing technological optimism. However, there is no doubt that hydrogen will also be profitable for the government. The government is a heavy owner in the petroleum sector and the plan is to make parts of the hydrogen from natural gas. In addition, cuts on CO_2 emissions would contribute to Norway being able to meet reduction agreements.

In addition to pointing out the importance of the industry in the Hydrogen Project, combined these factors also show that certain target groups are not only receptors of a message but also information providers and active in developing the solution. One interviewee indicated that the industry and research institutions have been crucial in the information gathering process and contact with these companies and research environments has been frequent. This again points to the multi-directional and interactive environment of the Hydrogen Project.

8.3. Choosing the channels

Involvement with the indirect channels, mass media and the Internet, is fairly high among the respondents and interviewees. Of the respondents, only two are not involved and will not be at a later stage either. Involvement is largely connected to Internet, which underlines the emphasis on this channel. Responses to this stage should be called are varied as Bellona has not really coined phrase for this phase. It is interesting to note that that in considering what to call this stage of the communication process, one respondent recognizes the existence of a layered audience:

> It is hard to name this process because it depends on whom you are spreading information to. Especially in a project like the Hydrogen Project, which is rather new, and you have to spread a lot of information to people. But in addition, you have to communicate with members of parliament, in the ministries, on a higher level of detail, which comes under education.

8.3.1. Dialogue, the primary channel

When asked to pick and rank the four most important channels to each target group, mass media and dialogue emerged as the two most important channels across the board. It is

interesting that respondents did not rank Internet higher considering the emphasis on this medium in Bellona.

Respondents were asked to rank the channels for each target group from 1-4, with 1 being the most important.[28] Subsequently, since there are 5 target groups there could be a total of 20 hits pr channel in the electronic version (4 respondents x 5 target groups) and a total of 15 hits pr channel in the print version (3 respondents x 5 target groups).

Dialogue is the channel perceived to the most important with 16 out of 20 hits of which 10 hits are number 1 picks in the electronic version. In the print version, dialogue received 10 out of 15 hits with 7 respondents ranking it as number 1. Mass media received 11 hits out of 15 in the print version. In the electronic version, mass media had been divided into newspaper coverage, television coverage and radio coverage. Newspaper coverage received 12 out of 20 hits and television coverage 13 out of 20 hits. Radio coverage only received 2 hits.

Overall, Internet is not perceived as important here as might have been expected, but an interesting picture emerges when digging deeper. First, the Internet seems to be targeted towards groups where dialogue is not a major channel: mainly the general public (stakeholders) and, to a certain degree, the media. All respondents indicated the general public (stakeholders) as the primary group targeted by Bellona's homepage. Politicians/policymakers and the media were picked three times each. The media and politicians/policymakers also rank high in use of dialogue, but the emphasis on Internet as a channel as well can be explained by these groups' search for background information.

[28] Because some respondents filled out an electronic version and some filled out a print version, they received different formats on this question. It should be noted that the respondents had some more options in the electronic version in terms of the mass media being divided up into newspaper, television and radio coverage. The Internet was also divided up into homepage, e-mail and newsgroups. This might have influenced responses to some degree but does not seem to have affected the main trends emerging. See appendix for a list of the options for the respective versions.

The mass media seems to be perceived as the primary channel to politicians/policy makers and the general public (stakeholders). Overall, both respondents in the print and electronic survey picked the mass media as a primary channel towards this group. Politicians/policy makers received 6 hits, while the general public (stakeholder) received 7 hits. This coincides with findings when respondents were asked to pick the target groups primarily trying to be reached through mass media in a later question (6 out of 7 picked both politicians/policymakers and general public (stakeholders).

What is interesting here is that the mass media and Internet seemingly have the same primary target groups. However, the Bellona homepage is targeted toward *stakeholders*, while the mass media is targeted toward the *general public*. The difference between general public and stakeholders is that the latter is a much smaller group encompassing the especially interested only. They are persons harboring a particular interest in the hydrogen issue, meaning that the issue has caught their attention and they would like to know more. These persons can come from all target groups.

What seems to occur here is first of all recognition of the Internet's limitations in reaching the "masses," going counter the one-many flow of the mass media. The mass media is viewed as the only way to reach a large number of people all at once. One respondent wrote, "The numbers are vast, and mass media combined is the only way to reach a great number of people." Another respondent corroborates this:

> If you have an article in VG or Dagbladet and NRK[29] then you have half a million, right. Here, comparatively, there are probably 10,000 [visitors on the homepage] a day. It has a limitation since they have to go to Bellona's information…but even so it

[29] VG and Dagbladet are the two leading dailies in Norway. NRK is the government owned national television network, received by all households in Norway with a television.

> is effective because those who visit are going to find more concrete…are set on finding more information.[30]

Certain respondents indicate that the Internet harbor limitations in terms of impact compared to the mass media. One respondent said: "I don't think it actually influences that much [on the strategy], considering—what should I say—that it requires that people actively enter the pages. So it is more a question of providing more to those who are hungry," the respondents said.[31] It is however important for Bellona to keep in mind that even though half a million people are reached with a news story, this does not equal an effect on half a million people. Such a view would be falling into the trap of the traditional science communication model. It is also important to keep in mind that visitors on the Bellona homepage are already interested in the issue; they are looking for more information. This means that the Hydrogen Project or the hydrogen issue has already struck a cord with these persons. Hence, it becomes reasonable to assume that the information these people find potentially can have a larger resonance with these people than the information printed in one newspaper article, for example. So although the number of persons reached through the Internet might be smaller, the impact could be greater overall. It this is true, it is crucial to channel audiences to the web page through traditional channels, something one respondent recognizes: "It is only when you have aroused people's attention/interest that the Internet becomes important. Note you still have to get them interested through mostly conventional ways."

Mass media's perceived importance toward the general public is also due to lack of optional channels. This is a function of the relationship between direct channels and group size. Dialogue is emphasized towards target groups smaller in size and more homogenous,

[30] Original quote: "Har du en artikkel I VG og Dagbladet og NRK da har du halvannen million, ikke sant. Her er det kanskje til sammenligning 10,000 om dagen. Det har jo en begrensing i og med at de må gå til Bellona sine informasjon…men allikevel er det effektivt p.g.a. at de som går til dette de får for å se konkret…som er mer gira på informasjon."

[31] Original quote: "Jeg vil ikke tro at det faktisk påvirker så veldig mye, i og med at web er veldig—hva skal jeg si—det krever at folk aktivt går inn på sidene. Så er det vel bare at vi får gitt mer mat til de som er sultne."

like industry, politicians/policymakers, the media and the financial sector. Of course face-to-face interactions can be utilized toward segments of the general public, as well, but is more realistic in smaller, local projects than the Hydrogen Project. Being a global issue, the general public is not just a local community in Norway, but the whole nation and beyond. "When it comes to the general public, this [mass media] is the only way to reach them, really. But the others aren't that important because to them there are other channels, as well," one respondent said.[32]

8.3.2. Internet vs. mass media

Respondents were asked whether either of the two direct channels had been considered specifically in the Hydrogen Project strategy so far. Use of Internet has been specifically targeted in the strategy for the Hydrogen Project. (5 respondents answered "yes" while only 1 answered "no"[33]). Use of the mass media, on the other hand, has not been dealt with ostensibly (2 answered "yes" and 3 answered "no"[34]). Some characteristics of the two mediums might help explain this picture.

Internet is a fairly "new" medium for Bellona (began publishing material on the web in 1995) and the majority of society at large. This technology is still developing rapidly and so is its use within Bellona. The mass media, on the other hand, is a much older institution with locked in structures and norms. The medium has been a channel for the new environmental movement since its early years (and for many continues to be a primary channel).[35] In the early years when activism was Bellona's trademark, mass media was primarily the voice outward and hence retain an old familiarity. The organization is familiar

[32] Original quote: "Men akkurat med vanlig publikum er det eneste måten å nå frem til dem egentlig. Mens de andre er det ikke så viktig, for der er det også andre kanaler."
[33] The respondent answering "no" did so because a strategy had not been constructed for this particular part of the project yet.
[34] Again, one of the "no"-respondents indicated at the time a strategy had not been constructed yet for the part of the project the respondent was participating in.
[35] Greenpeace is an example of an environmental organization relying heavily on the mass media, employing a very proactive media approach. See Anderson (1997) for more.

with how the mass media operates, how to "use" it, and most importantly enjoy fairly large access today. There is a perception that Bellona uses the mass media to about the same extent or perhaps a little more than previously, but access to the mass media is perceived as much better or a little better across the board. The reason for this increased access is attributed to an improved reputation and a perception that Bellona is a more serious organization. This change has also altered the media coverage. Bellona attracted attention with on-site activism. Now the organization is called up for comments and expert advice in connection with most environmental issues in Norway as a provider of independent counter-expertise

Second, although an indirect channel Internet almost leaves out the extra mediator. "You skip a link. It is more direct," one respondent said.[36] This underscores the point made by Rogers (1986) that Internet is closer to a face-to-face interaction. The mass media on the other hand certainly add a second mediator (journalists and editors) who exerts control over the final product. Getting information, in the form of news stories or articles, to target groups requires access to the mass media, which is influenced by said groups organizational and structural restraints. Access to the mass media is inconsistent in terms of getting stories printed or broadcast regularly. Even if Bellona's access to the mass media has improved over the years, communication through this channel will still occur in phases, depending on factors like the issue, the overall news picture, stage of a project, context of target groups, etc. In addition, all news stories are subject to the writer's interpretation and penmanship.

Third, Internet when used to host a homepage yields a large degree of control to the owner in terms of what to publish, how much and when. It also allows for a constant presence in that the information is continually updated and always accessible.[37] Writing, editing and publishing can be done in-house which makes this an internal activity since. It is

[36] Original quote: "Fordi du hopper jo over et ledd. Det er mer direkte."
[37] Although it does require visitors to have Internet access from wherever they are, the information on a particular web page is always posted unless erased. Technical problems might prohibit visitors from accessing the information, but it is still there and available again once the system is restored.

also a technology with the potential of providing information to all target groups. It is however perceived to be most effective toward certain segments.

The mass media on the other hand is an external actor, and as mentioned before, communication through this channel requires access. Bellona is therefore subjected to structural and cultural norms of the respective mass media. Space is limited and press coverage each day is not possible. In addition to the space issue there are the news value restrictions to consider. "We decide. We never managed to make Aftenposten publish a 128-page report. Nor would they print links from one story to a fact sheet or a complimentary story," one respondent wrote.[38]

Fourth, Internet also allows for the unique feature of linking material, offering the possibility of layering information. "There is the possibility of dividing it up. Well you can have a small facts article, and then you can attach a detailed technical background piece, which makes it more flexible sort of," one respondent said.[39] Internet does make it easier to divide up material and to publish everything, but it should however be mentioned that if there are too many layers or these are not organized so information is easy to find, navigation becomes harder for the visitor and might discourage further browsing. When it comes to Internet, access to a machine is crucial but it is also important that homepages are user friendly, making information easy to find.

8.3.3. Internet, a channel to the mass media

As pointed out earlier, Internet incorporates all the technological features of the mass media combined, giving this medium a unique opportunity to present information. But instead of replacing certain the mass media functions, Internet is considered a resource saving method to

[38] In all fairness, it should be pointed out that the on-line editions of newspapers do allow for internal links to related stories and external links to relevant homepages. However, it still is more limited than the information it is possible to print one's own homepage.

[39] Original quote: "Pluss at du har mulighet til å dele det opp. Altså du kan ha en liten faktaartikkel, og så kan du henge på en grundig bakgrunnsteknisk som gjør at det er mye mer fleksibelt på den måten."

gain access to the mass media. Instead of having to fax over information, they can just point journalists to the Bellona homepage where background information is already posted. In addition, journalists can access information without being prompted and turn out a story. One respondent pointed out that journalists visit the Bellona homepage regularly and at times pick items or articles posted by Bellona and writes a story. One respondent said:

> [Information] we have posted on the web in the format of an article, which media reads. There are often several in a newspaper who read the web every other day…then they take it, write the article, right…without us having been in touch with them even. [40]

This again indicates the reputation of Bellona among journalists as a reliable source of information on issues concerning environmental matters.

The Internet, through regular monitoring by journalists, and journalists approaching Bellona had seemingly made press releases obsolete. One respondent observes that press releases are currently used to alert the press about staged events, only. This also points to the complimentary role of the Internet and not competitive role in regards to the mass media

8.3.4. Influencing the agenda?

There is a perception that Bellona in the past has used both the Internet and the mass media to set the agenda. There is also recognition that politicians and policy makers read newspapers and follow the news regularly and actively, perhaps more so than the average general public. In terms of impact through the mass media overall, and in terms of influencing policy or inducing changes, the potential is greater towards politicians and policy makers, pointed out

[40] Original quote: ”[Informasjon] vi har lagt ut på weben i form av en artikkel, så har media lest den. Det er ofte flere i avisen som leser weben annenhver dag…så er den tatt…og så skriver de ikke sant…uten at vi har vært i kontakt med dem en gang.”

by Protess et al (1987) and Anderson (1997). However, it should also be kept in mind that although the mass media agenda potentially can influence, and does at times, the political agenda, the mass media tends to be a follower of the political agenda more often than a leader. Overall though when it comes to the Hydrogen Project, Bellona is seemingly not so much in the business of setting the agenda through mass media but rather attempting to influence the scientific and political agenda. Particularly the first one has been important considering Bellona's emphasis on the industry developing hydrogen technology. As indicated above, politicians/policymakers are also perceived as important in terms of implementation of a hydrogen society.

In addition, the hydrogen issue is highly complex and not one to easily lend itself to mass media coverage. When looking to newspapers, coverage so far seems to occur when single events, like the implementation of a hydrogen bus project occurs or similar events. This corresponds with the notion that mass media tends to be event prone, among other things.

Finally, when considering that mass media is viewed as the primary channel towards the general public and to some degree politicians/policymakers there is not surprise that the media agenda has not been a large concern with Bellona in the Hydrogen Project so far. The general public is not perceived to be such an important target group in the project, at least so far, and the politicians/policymakers have not been highly involved either.

8.3.5. Indirect vs. direct channels

It is also interesting to see how these two indirect channels compare to other channels, especially face-to-face interactions. This is especially interesting in the light of the indications that mass media are primarily targeted towards groups not easily accessible with other channels. Respondents were asked to rank mass media, Internet, distribution of information and face-to-face interactions. The scale ran from 5 to 1 with 5 being very

important and 1 being not important. All seven respondents gave face-to-face interactions a 5. The Internet ranged from 5 to 3: four respondents giving it a 5, one giving it a 4 and two giving it a 3. The mass media ranged from 5 to 4: one respondent giving it 5 and six respondents giving it a 4. Last, distribution of information was perceived as the least important, ranging from 4 to 2: one respondent giving it a 4, three respondents giving it a 3 and three respondents giving it a 2.

This again shows how important dialogue with target groups is for Bellona. The ability of Bellona to rely on direct channels is a reflection of the organization's reputation in Norway, especially, and degree of access to these certain circles. The findings also indicates that mass media is perceived as a very useful channel. To a certain degree this could be attributed to some of the "automatic" coverage Bellona enjoys and fairly easy access. The "low" rating of Internet could in part be due to the targeting of stakeholders with this medium. Another factor is the perception of Internet as a complimentary tool to more traditional channels not a competitive one. The only traditional channel Internet seems to have partly replaced is distribution of information material. Bellona does not print as many publications or as much information material as before but posts everything on the Bellona homepage instead.

8.3.6. Internet is central in Bellona

Overall, indirect channels seem to play second fiddle to direct channels. There seems to be no doubt that face-to-face interactions are Bellona's primary outlet. This is a function of access and reputation. It also says something about Bellona's network. For the Hydrogen Project, so far, there is no doubt that dialogue has been the most important channel. The mass media has hardly been used so far. This is due to the current stage of the Hydrogen Project and the nature of the hydrogen issue. The Internet on the other hand can be deemed to be the most

important indirect channel for the Hydrogen Project so far. This is in part owed to increased emphasis in Bellona on the Internet for a number of reasons:

1. Control: There is an increased control over what to publish, in what format, when and how much;
2. Availability: The information is always there, and offers easy access to all published material for visitors (especially in Norway where access is fairly good);
3. Time/resources: It saves time both in terms of the speed with which information can be posted and retrieved. In addition, there is the time and resources saved in terms of handling information request.
4. Technology: It has become easier to post information on the Internet due to improved software, equaling posting of information on a homepage to a word processing program.

The use of Internet in the Hydrogen Project, primarily the homepage, also coincides with the nature of the project. The issue is very complex and has a high degree of science and technology. This is again due to the stage of the project. Hence, the Internet has been a valuable tool for Bellona in posting information with a high scientific and technological content, something that is evident if you visit the energy pages. The Internet becomes a way to publish information material that would never pass through the mass media's gatekeeping processes.

8.4. The automatic incorporation of feedback

Five respondents said they are involved in this process. At least two of the interviewees are involved in this. The feedback that Bellona receives can be divided into two levels: information requests and feedback pertaining project strategies or goals. Most of the respondents referred to information requests or general questions when commenting on feedback. One respondent, however, comments that they "use feedback to continuously to

reassess the project strategy and goals." This continual use of feedback and its impact on project strategies and goals is something that becomes evident later in the survey, as well.

There seems to be no formal structure dealing with feedback and that this instead is a rather automatic process. However, this does not mean that feedback is not listened to and incorporated into current and future projects. One response it, "possibly it should have been. However, as always, we improvise." Another response," since the strategy is dynamic, the feedback could possibly change things, but it is not like we have a database where things are kept track of."

The feedback can seemingly be divided into two sectors: information requests and feedback related to project strategy or goals. In terms of the information requests, there is a trend that in the Hydrogen Project the scientific and technological content of these requests is higher than in previous projects. Again this is probably a reflection of the exploratory and verification stages of the Hydrogen Project. However, it does also indicate that there is an interested out there to learn more about the detailed foundation of hydrogen as an energy source and hydrogen technology. This should be considered and adhered to when Bellona moves into the phase of informing a broader audience in the Hydrogen Project.

When it comes to the other aspect of feedback, it is crucial to note that Bellona recognizes the potential of feedback in terms of adjusting a project course and the fact that this is incorporated into the organization's activities. One respondent observes: "Projects normally moves through various phases—from idea to implementation. During that period it is normal to make choices between optional routes—feedback is essential when those decision points are reached, and more often than never—direction of how to implement the final project are adjusted (and projects sometimes aborted as more information become available). This indicates that Bellona works according to an interactive communication model.

What should also be considered is that feedback can reveal information about the context of members of various target groups, which influences the construction of a message. One respondent also indicates that Bellona should perhaps improve their routines and attention to the evaluation of feedback. It is important to recognize that not all feedback is going to be crucial to a project or will lead to major changes in a project. However, the feedback is the voice of the target groups and hence a way for Bellona to learn more about how the project is being executed and the context of the target groups. At the outset of a project as complex and with such a long time perspective as the Hydrogen Project it is difficult to know everything as things have yet to happen. It is also impossible to know everything about all the target groups. This is especially true for the general public. However, in order to get everybody on the hydrogen highway, it is important to follow the communication process full circle and listen in addition to developing, implementing and convincing.

9.0. Conclusion

The communication process within the Hydrogen Project is much more than getting information to the target groups. It is also about synthesizing solutions, spur development of technology and research into hydrogen. It is also about determining an external strategy for the hydrogen project, the technological trajectory. All these activities occur simultaneously with the communication of information, but the different activities are emphasized to different degrees at various stages in the project. The roles Bellona play in the Hydrogen Project underlines the organization's position in a hybrid space, acting as a knowledge producer, knowledge mediator, and local knowledge. Words might be the sword with which Bellona fights environmental problems but behind the sword there is a solid foundation of knowledge.

In the communication process, Bellona prefers direct channels, especially use of dialogue to interact with certain target groups. Direct channels are preferred over indirect channels only when the target groups are relatively small in size, like the industry related to hydrogen and politicians/policymakers. Bellona's ability to engage in dialogue with these target groups is due to access, which in turn is a reflection of Bellona's reputation and influence in Norway, especially. The Hydrogen Project is about a solution, hydrogen as an energy carrier coupled with hydrogen technology. To realize this solution, the technology has to be developed, built and implemented by the industry. Therefore it is crucial to work closely with this group, spur them along and help them in any way, in order for the hydrogen society to become a reality.

For the general public at large, mass media is still the preferred channel. Bellona has not increased its use of mass media markedly, partly because of increased access to target groups through other channels, dialogue especially. In addition, constant coverage in the media is impossible due to the mass media's structural and cultural values; hence, the mass media is often used in phases depending on the project type and stage. Mass media also

actively seek out Bellona more often than before for comments and opinions, which makes it easy for Bellona to sit back and answer questions instead of running after the media. The Hydrogen Project, however, deals with a complex issue and a new technology, unknown to most journalists and editors. This might require Bellona to be more active in their targeting of the mass media when the Hydrogen Project enters the stage where popularization becomes more emphasized.

The main target group for Bellona's homepage is stakeholders. Of the two indirect channels, Bellona seems to be stressing and addressing use of Internet more than mass media, but the two are not competitors. Rather, Internet seems to be a complimentary tool for mass media, used to provide more information for the especially interested and as a channel to the mass media. Targeting mass media through Internet has improved access and been resource saving. In addition to Bellona being able to direct mass media to their homepage for background information, the flow of information also travels the other way. Mass media also actively seek out information on the Bellona homepage, turning it into stories without involvement from Bellona. Internet is used as a complimentary tool to other traditional channels, as well. All the information that Bellona generates is posted on the homepage. The only area where Internet might have replaced some aspects of an old channel is the publication of printed information material. The increased emphasis on Internet compared to mass media in Bellona seems to be due to the first being an internal activity yielding a large degree of control to Bellona. Internet also leaves out the added mediator that mass media is; comparatively Internet is closer to a face-to-face interaction.

There seems to be a perception in Bellona, however, that messages mediated through the mass media has a greater effect upon receivers and affects a larger number of persons than what is mediated through the Bellona homepage. To a certain degree, audience numbers seems to be assumed correlated to numbers influenced by the message. It is possible to argue

that since visitors to the Bellona homepage already are interested in the hydrogen issue, looking for more information, there is a chance of there being a larger resonance between the message and these receivers than when messages are communicated through the mass media. This could be an area for further study.

The Hydrogen Project, comparatively, is a small project with a tall order. Currently there are 7 people working on this project in Bellona. However, this underlines the importance of Bellona's extensive network. The project is highly complex in that it aims to change the world. There is no single event that is really taking place but meticulously research and advances around the country and the world. It is also extremely long-term. We are talking about changing a whole system onto a hydrogen highway. It also involves a whole new technology, which makes it a project extremely high in science and technology content. Currently the Hydrogen Project has been in a verification stage to find out if hydrogen as an energy carrier and hydrogen technology is a realistic solution. The stage of the Hydrogen Project and the nature of the issue has been a strong influence on the communication process in terms of what messages are communicated, what target groups are perceived as primary and what channels are used to convey information.

Bellona does not really seem to fall into the trap of the traditional model of science communication. There seems to be awareness that the communication process is multi-directional. Bellona also takes an interactive approach to the process in recognizing the need for feedback in order to adjust initial goals and strategies for projects. Some even view the strategy more as a tactic, sort of a loose game plan of how to proceed initially and which will be changed as the projects environment changes. The communication process is not viewed as static. There is also a recognition that messages will need to vary in terms of what target group one is communicating with. Bellona recognizes that there is not one objective natural reality needed to be discovered and then communicated to the public. There is also

recognition that other factors need to back the message besides science and technology like the reputation of Bellona. It is however believed that the solutions Bellona comes up with has to have science and technology as a foundation, meaning that the solutions are substantiated. Bellona also does not seem to completely decontextualize the communication process, however there might be some question as to whether all the members of the Hydrogen Project consciously recognize that the message does not only have to be layered according to the various target groups in terms of their member status of a certain group but in terms of their context regardless of what group they belong to.

One area that Bellona should perhaps increase its awareness concerns the general public. There are some indications that general public should be made more problematic once the Hydrogen Project moves heavier into the popularization stage. As the project progresses and it becomes more important to communicate with the general public it is necessary to keep in mind that this target group is the largest in number and subsequently the most diverse, making it even more significant to recognize the multiple contexts. It is important to keep in mind that this should be done prior to the construction of messages intended for members of this target group since context is one of the message ingredients. Related to communication of messages is the assumption about mass media and effects mentioned before. It could prove valuable to increase the emphasis on alternative channels to the general public if possible. However, there is some recognition the need for layered messages directed at different segments of the target groups.

How Bellona engages in the communication process seems to a large degree to be automatic, based on previous experience, and the addition of new elements as there is broad recognition messages, strategies, channels and feedback is project specific. However, there does seem to be some incoherencies within the groups on certain elements in their perception of how Bellona engages in the communication process. Bellona is an organization with a

broad influence especially in Norway and Russia when it comes to environmental matters. There is little doubt that they work hard for the environment and do deliver results. I do, however believe that it would serve the Hydrogen Project positively to become better at sharing their knowledge about the communication process within working group.

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11.0. Appendixes

11.1. Hydrogen Project Survey 2001

Background

1. How old are you?
   years

2. How long have you worked for the Bellona Foundation?

3. Why did you decide to work for the Bellona Foundation?

4. What is your educational background and/or area of previous work experience?

5. How long have you worked on the Hydrogen Project?

The Communication Process:

With the Hydrogen Project, Bellona is trying to make society more aware of the potential of hydrogen technology and solutions. In order to execute the Hydrogen Project, Bellona engages in a communication process with the target groups the organization aims to influence. The communication process can be divided into four stages. The four stages involve both internal and external activities. Typical internal activities include how Bellona produces information used in the Hydrogen Project, how and what type of strategies Bellona uses to communicate and how the organization handles feedback from various target groups. External activities include how Bellona deals with the mass media, use and view the Internet, and interact with the intended target groups.

The four stages are explained in detail below. After the explanation of each stage, there are questions concerning your role in the communication process and some questions about the terms used to label some of the stages in the communication process.

Stage 1:
The Bellona Foundation possesses an extensive knowledge base about hydrogen technology and solutions. Before it can be communicated to people outside Bellona, this knowledge must be codified into information. This can be compared to packaging the knowledge Bellona possesses into little packages that can be directed at the project's target groups; the knowledge has to be turned into something that is easily presentable to external recipients. The information packages can take the form of brochures, Bellona Magazine articles, press releases, conference speeches, presentations, etc. The first stage of the communication process deals with how Bellona views and produces these information packages. I have called this process of codifying knowledge into information for *translation*.

6. Do you feel that *translation* is an accurate term?
   Yes ☐ No ☐

If you answered <u>yes</u> to question 6, please proceed to question 8. If you answered <u>no</u> to question 6, please answer question 7 before proceeding to question 8.

7. Please name the term Bellona uses or what term you would deem more accurate and descriptive of this stage of the communication process (in both Norwegian and English, if possible).

8. Are you involved at this stage of the communication process?
   Yes ☐ No ☐

   If the answer is <u>yes</u>, please describe your role:

Stage 2:
When launching a project, Bellona has to decide how the project should be executed. A strategy has to be developed describing what groups to target, how to communicate with the target groups and how to approach them. Stage 2 of the communication process focuses on the strategies Bellona has developed and employs in order to carry out the Hydrogen Project. I have called this part of the process for *strategy*.

9. Are you involved at this stage of the communication process?
   Yes ☐ No ☐

   If the answer is <u>yes</u>, please describe your role:

Stage 3:
When communicating with a project's target groups, one can use either a *direct* or an *indirect* approach. Examples of *indirect* approaches are the use of channels like the mass media (television, radio, newspapers and popular magazines) or the Internet (e-mails, newsgroups, the Bellona homepage and on-line information searches). A *direct* approach means that one engages in face-to-face interactions like dialogue, lobbying, conferences, etc. Stage 3 of the communication process focuses on two of the channels Bellona uses to communicate information about the Hydrogen Project to target groups. Due to time constraints, I have chosen to limit the study to two *indirect* approaches. The two approaches I will study are the mass media and the Internet. I call this part of the communication process for *channels*.

10. Are you involved at this stage of the communication process, dealing with either the mass media, the Bellona homepage or both?
    Yes ☐ No ☐

    If the answer is yes, please describe your role:

11. Communication of information to target groups is a large part of the Hydrogen Project. What would you call this part of the process? Please indicate what term you find the most fitting or write your own term in the other field (please give the Norwegian equivalent as well if you are filling in your own term).

    Spread _____☐
    Disseminate ___☐
    Transmit _____☐
    Other: _____

Stage 4:
The communication process not only entails that Bellona communicates with its intended target groups. There is also a flow of communication coming from the target groups back to Bellona, a reaction to the information packages Bellona conveys. The fourth stage of the communication process deals with the flow of information that comes back to Bellona from the target groups in the form of messages, information requests, letters, e-mails, etc. I have called this part of the communication process for *feedback.*

12. Are you involved at this stage of the communication process?
    Yes ☐ No ☐

    If the answer is yes, please describe your role:

General:

13. From your experience with the Hydrogen Project or previous projects, what stage(s) of this communication process do you deem to be the most important? Please check the stage(s) you think is/are the most important. If you deem them equally important, please check the equally important box, only.

    Translation _____ ☐
    Strategy _____ ☐
    Channels _____ ☐
    Feedback _____ ☐
    Equally important _____ ☐

Target Groups:

This section deals with the target groups that Bellona aims to reach and influence through the Hydrogen Project. These target groups are outlined in the Hydrogen Project's four policy nuts.

It is important to note that the mass media is not only an approach through which one can reach and influence target groups. The mass media is also a target group in and of itself in the Hydrogen Project. In the four policy nuts, Bellona refers to this target group as the media.

Hence:

- When the survey refers to the **mass media**, it means the approach or means through which one can attempt to reach and influence target groups (a channel).
- When the survey refers to the **media**, it means the target group as outlined by Bellona in the four policy nuts.

14. The target groups of the Hydrogen Project include politicians and policy makers, general public (stakeholders), media, industry, and the financial sector (investors). These are groups viewed to be important to influence in order for the Hydrogen Project to become a success, ultimately meaning that a hydrogen society is achieved. Please indicate below the importance of reaching and influencing each target group in order for the Hydrogen Project to be successful by checking the appropriate box.

Importance / Target group	Crucial	Important	Fairly important	Little importance	Not important
Politicians/ Policy makers	☐	☐	☐	☐	☐
General public (Stakeholders)	☐	☐	☐	☐	☐
Media	☐	☐	☐	☐	☐
Industry	☐	☐	☐	☐	☐
Financial sectr. (investors)	☐	☐	☐	☐	☐

If you have labeled any of the target groups as crucial or important, please explain why it is of greater importance to reach this/these target group(s) than the others:

15. Do you see the respective target groups as being *active* or *passive* participants in the communication process of the Hydrogen Project?

Being an *active* participant means that there is ongoing interaction and/or dialogue between Bellona members and members of the intended target group. Being a *passive* participant means that the members of the target groups only receive information from members of Bellona either directly through information material or the Bellona homepage, or indirectly through mass media coverage.

Please indicate on the scale below how *active* or *passive* you think the various target groups are, 10 being the most active and 1 being the most passive.

Active **Passive**

Target group / Ranking	10	9	8	7	6	5	4	3	2	1
Politicians/ policy makers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
General public (Stakeholders)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Media	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Industry	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Financial sector (investors)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

16. In each project, there are target groups that Bellona is primarily trying to reach with its campaign efforts. How does Bellona choose the target groups for the various projects?

17. When it comes to the target groups for the Hydrogen Project, do you see the need for further division of one or more of these target groups into sub-groups?
Yes ☐ No ☐

If the answer is yes, which target group(s) do you see as requiring further division into sub-groups? Check all that apply.

Politicians/policy makers_____☐
General public (stakeholders)__☐
Media_____☐
Industry_____☐
Financial sector (investors)____☐

18. In the Hydrogen Project, Bellona is working towards several target groups. Different means or approaches are employed by the organization to reach the respective groups, ranging from use of the mass media and the Internet to printed information material and face-to-face interactions. In your opinion, what are the best means of reaching the various groups?

Again keep in mind that the **mass media** is the channel (radio, television, newspapers, popular magazines) while **media** is the target group.

Please choose your options from the drop down menu, beginning with the option you deem most important under 1, the second most important under 2, etc. You can choose up to four different means if you think it is necessary. If you find that certain means used by Bellona are lacking from the drop down menu, please feel free to fill out your own options under *other.* Please make your selections for all the target groups.

Alternatives for the drop-down menu[41]:

- Television coverage
- Newspaper coverage
- Radio coverage
- Distribution of printed information material lobbying
- Dialogue
- Press releases
- Posting information on homepage
- e-mail
- Newsgroups
- Mass mailings through regular postal service
- Conferences
- Information stands
- Hosting informational meetings
- Activism

Politicians and policy makers: 1. --Click and choose here--
2. --Click and choose here--
3. --Click and choose here--
4. --Click and choose here--
Others:

(continues with same format for remaining target groups)

[41] Added here because this is not visible when the electronic version is pasted into a print publication.

The version of question 18 distributed to respondents where survey was conducted in person.

Means/approach \ Target group	**Politicians/ Policy makers**	**General public** (stakeholders)	**Media**	**Industry**	**Financial sector** (investors)
Mass media (TV, radio, newspapers)	☐	☐	☐	☐	☐
Distribution of information material	☐	☐	☐	☐	☐
Lobbying	☐	☐	☐	☐	☐
Dialogue	☐	☐	☐	☐	☐
Press releases	☐	☐	☐	☐	☐
Internet (homepage, e-mail, newsgroups)	☐	☐	☐	☐	☐
Mass mailings (regular mail)	☐	☐	☐	☐	☐
Conferences	☐	☐	☐	☐	☐
Information stands	☐	☐	☐	☐	☐
Host informational meetings	☐	☐	☐	☐	☐
Activism	☐	☐	☐	☐	☐

19. From your experience with previous projects, how valuable for a project would you say it is that you get feedback from members of various target groups?

Crucial _____ ☐
Important _____ ☐
Fairly important _____ ☐
Little importance _____ ☐
Not important _____ ☐

Strategy:

This section deals with how Bellona plans to execute the Hydrogen Project. How Bellona intends to reach and influence the target groups and what goes into the strategic planning of a project. This in turn reflects what role Bellona intends to play.

20. When developing strategies for the Hydrogen Project, did you transfer the strategy from a previous project or did you construct a new strategy specifically tailored for the Hydrogen Project?

Constructed new, independent strategy _____ ☐
Transferred parts of an old strategy _____ ☐
Complete transfer of an old strategy _____ ☐
Don't know _____ ☐

21. Bellona has been involved in a number of projects dealing with issues ranging from nuclear waste in Russia, toxic waste in Norway and now the hydrogen issue. Have you ever experienced that the same target group has reacted completely different to a communication strategy from one project to another?

Yes ☐ No ☐

If the answer is yes, please explain and give examples if possible:

If you answered no to question 21, please proceed to question 23. If you answered yes to question 21, please answer question 22 before proceeding to question 23.

22. When discovering that a target group reacted differently to the same approach or method used in a previous project, did you adjust your strategy or make any other adjustments? Please explain:

23. As part of the overall strategy for Bellona, the organization has a partnership with a number of Norwegian businesses and corporations through its B7 program. When it comes to implementing practical changes that can lead toward a hydrogen society, do you see it as more productive to target and work with businesses and corporations than politicians and policy makers?

    Yes ☐ No ☐ To a certain degree ☐

    If the answer is yes or to a certain degree, why?

24. The aim of the Hydrogen Project, according to Bellona, concerns to a large degree the spreading of information about hydrogen technology as a leading trajectory (together with other environmentally sound, renewable energy sources) in areas like transportation and combustion engineering, energy politics and economic strategies. In addition to that of an information communicator, what other roles do you see Bellona playing? If there are any, please list and describe these other roles below.

    1.
    2.
    3.
    4.
    5.

    Comments:

25. If there are other roles that Bellona has in addition to being an information communicator, how central are these roles in the Hydrogen Project compared to the informational role? Are they more important, equally important or less important? Please explain:

26. When producing information material for the Hydrogen Project, how important are concerns like *quantity*, *quality* and the *audience*? Please rate below how important you think the three different characteristics are for the production of information.

Characteristic / Importance	Crucial	Important	Fairly important	Of little importance
Quantity (Codifying as much knowledge as possible.)	☐	☐	☐	☐
Quality (Producing as accurate information as possible, including the science and technology aspects.)	☐	☐	☐	☐
Audience (Producing the right information for the each target group.)	☐	☐	☐	☐

Channels (mass media and Internet):

This section concerns two of the indirect channels that Bellona uses to communicate with and influence the target groups indirectly. The questions concern both the mass media (radio, television, newspapers and popular magazines) and the Internet (e-mails, newsgroups, the Bellona homepage and on-line information searches).

(Again keep in mind that the **media** refers to the target group.)

27. The mass media includes radio, television, newspapers and popular magazines. Has the use of mass media been specifically dealt with and outlined in the Hydrogen Project strategy?
Yes ☐ No ☐

28. The Internet includes e-mails, newsgroups, the Bellona homepage and on-line information searches. Has the use of the Internet been specifically dealt with in the Hydrogen Project strategy?
Yes ☐ No ☐

29. Bellona has an extensive web page where information concerning the organization's various projects is presented. Has the introduction of the Internet and your capability to use this electronic media in your communication process changed your strategies for various projects?
Yes ☐ No ☐

If you answered <u>no</u> to question 29 please proceed to question 31. If you answered <u>yes</u> to question 29, please answer question 30 before proceeding to question 31.

30. a) Do you use the Internet to do jobs previously done by other communication channels?

b) Does the Internet give you more freedom in constructing your strategy?

c) Other changes?

31. Which of these target groups are you trying to reach primarily through the mass media?

Politicians and policy makers __☐
General public (stakeholders) _☐
Media _____☐
Industry _____☐
Financial sector (investors) ____☐
No particular group _____☐
Not specified in strategy _____☐

If you checked <u>no particular group</u> or <u>not specified in strategy</u> in question 31, please proceed to question 33. If you checked one or more boxes in question 31, please answer question 32 before proceeding to question 33.

32. What is it about these target groups that makes mass media a good channel of influence?

33. What target groups are you primarily trying to reach through the Bellona Homepage?

Politicians and policy makers ☐
General public (stakeholders) ☐
Media ☐
Industry ☐
Financial sector (investors) ☐
No particular group ☐
Not specified in strategy ☐

If you checked <u>No particular group</u> or <u>Not specified in strategy</u> in question 33, please proceed to question 35. If you checked one or more of the other boxes in question 33, please answer question 34 before proceeding to question 35.

34. What is it about these target groups that makes the Internet a good channel of influence?

35. How important for the Hydrogen Project is mass media coverage and use of the Internet compared to the other channels through which you can reach target groups, like distribution of information material and face-to-face interactions?

Please rank the channels on the scale below according to how important you view them as being for the Hydrogen Project. The scale runs on a 5 to 1 point scale, 5 being the most important and 1 being the least important.

	Very important				Not important
Means/approach \ Importance	5	4	3	2	1
Mass media (TV, radio, newspapers)	☐	☐	☐	☐	☐
Internet (Homepage, e-mail, newsgroups)	☐	☐	☐	☐	☐
Distribution of information (Brochures, magazine, reports, etc)	☐	☐	☐	☐	☐
Face-to-face interactions (Lobbying, dialogues, conferences, meetings, etc)	☐	☐	☐	☐	☐

36. In order to get mass media coverage, access is critical. Access refers to one's ability to successfully pitch stories to journalists or editors, for example through press releases, personal contact, or submittal of footage, and have it appear as an article or segment. Do you think Bellona has better access to the mass media now than 10 years ago?

Much better _____☐
A little better _____☐
About the same_____☐
A little worse _____☐
Much Worse _____☐
Don't know _____☐

Comments:

37. The mass media as an institution works according to long evolved professional guidelines about what a news story should be like. In addition, a news outlet is governed by organizational restraints, which also to a large degree decides what will be covered in the news. When constructing a message for the mass media, what would you say is most important?

To construct a message most likely to be picked up by the mass media _☐
To construct a message that reflects the issue accurately _____☐
To construct a message that is comprehensive _____☐
To construct a message relevant to specific segments of the audience _☐

Comments:

38. Traditionally, the mass media has been the main channel for the environmental movement in its efforts to influence the political agenda and forcing change. If you compare current projects to your experience with older projects, do you think Bellona uses the mass media more or less?

A lot more _____☐
A little more _____☐
About the same _____☐
A little less _____☐
A lot less _____☐
Don't know _____☐

39. Traditional means of approaching the mass media are press releases and initiation of personal contact. From your experience with the Hydrogen Project (or previous projects),

has the Internet changed how you approach the mass media?

Yes ☐ No ☐

If the answer is yes, please explain how:

40. Is it your experience that the Internet has made it easier to access the mass media?
Yes ☐ No ☐

If the answer is yes, please explain how:

41. Do you see the Internet as a competitor to the mass media, meaning that it can fill some of the functions only the mass media could fill previously or is it more of an aid in your work towards the mass media, a complimentary tool?

Substitute for mass media _____☐
Substitute for mass media in certain areas ____☐
A complimentary tool _____☐

If relevant, please explain what areas the Internet has taken over from the mass media:

42. Before the introduction of the Internet, the main outlets were the mass media, lobbying of politicians, face-to-face interactions with business representatives, mass mailings, etc. Do you feel the Internet allows Bellona more freedom in publishing material at its own leisure and more control over what is published?

Yes ☐ No ☐ Somewhat ☐ Don't know ☐

If the answer is yes or somewhat, please explain how the Internet has given Bellona more freedom to publish material and more control over what they publish:

43. Has the Internet made any difference in your ability to convey information that is scientific and technological, material that perhaps is difficult to pitch to the mass media?

Yes ☐ No ☐ Somewhat ☐ Don't know ☐

If the answer is yes or somewhat, please explain how the Internet has contributed to you being able to publish more scientific and technological information:

44. Compared to the mass media, how effective is the Internet in reaching people and influencing their perceptions or ideas about hydrogen technology and energy solutions?

Very effective _____☐
Highly effective _____☐
Effective _____☐
Somewhat effective ___☐
Little effect _____☐
No effect _____☐
Don't know _____☐

45. Do you think you reach more people now that you are able to use the Internet?

Yes ☐ No ☐ Somewhat ☐ Don't know ☐

If the answer is yes or somewhat, please explain why you think you reach more people now that you have the Internet:

46. Have you ever experienced in a project that Bellona has been able to use the Internet or the mass media to place an issue on the political agenda? Check all that apply.

Yes, the Internet _____☐
Yes, the mass media __☐
Never _____☐

47. Is your experience from previous projects that the Internet can be a back up or an alternative source of influence if more traditional channels like the mass media or lobbying politicians fail?
Yes ☐ No ☐ Somewhat ☐ Don't know ☐

If the answer is yes or somewhat, please explain how:

48. Do you think there has been an increased emphasis on the Internet as a communication tool at Bellona over the past years?

Yes ☐ No ☐ Somewhat ☐ Don't know ☐

Why is there an increased use of the Internet, if there is one?

49. Has the Internet increased your communication with other environmental organizations nationally or internationally?

Yes ☐ No ☐ To a certain degree ☐ Don't know ☐

50. Would you say that the Internet has changed the amount of feedback that you get when comparing to projects conducted when the Internet was not available?

Yes ☐ No ☐ To a certain degree ☐ Don't know ☐

If the answer is yes or somewhat, please explain how:

51. Has the Internet changed your ability to handle the feedback and make better use of it?
Yes ☐ No ☐

If the answer is yes, please explain how:

Science and Technology:

Bellona is a science-based organization, using scientific expertise to back arguments and solutions presented in various projects. The questions below deal with this relationship Bellona has with science and technology, and how and for what purposes science is used.

52. Bellona is a science-based organization, using extensive research and expertise advice to underpin environmental arguments and solutions. Science is often seen as a neutral tool because it follows standards that apply to all scientists, regardless of political views. Have you ever encountered situations or projects where scientific expertise has worked counter to the beliefs of Bellona?
Yes ☐ No ☐

If the answer is yes, please give examples:

53. In your opinion, has Bellona increased its reliance on scientific expertise to back up their arguments and solutions?

Yes ☐ No ☐ Somewhat ☐ Don't know ☐

If the answer is yes or somewhat, please explain why you think Bellona has increased its use of scientific expertise in its environmental work:

54. Over the years, Bellona has built an extensive knowledge base, which the organization continues to develop and expand, especially in energy related areas. Is your experience from the Hydrogen Project or previous projects that the knowledge Bellona possesses is comprised of objective facts?

Yes ☐ No ☐ Somewhat ☐ Don't know ☐

If the answer is yes or somewhat, please explain why you see Bellona's knowledge as being factual:

55. In a number of instances, Bellona uses science to show that the environment is in trouble, then to explain sound solutions to environmental problems, and the feasibility of technical solutions. In more recent projects, is it your experience that Bellona would have been able to argue these cases without the use of scientific expertise?

Yes ☐ No ☐ To a certain degree ☐ Don't know ☐

If the answer is yes or to a certain degree, please explain how:

56. Do you think the use of scientific expertise has made it easier to gain access to governments, other policy makers and/or businesses? Please select the answer you deem most appropriate in the table below for both categories.

Answer / Target group	Yes	Somewhat	No
Governments and policy makers	☐	☐	☐
Businesses	☐	☐	☐

If the answer is yes or somewhat, please explain why you think the use of scientific expertise makes it easier to gain access to governments and policy makers and/or businesses:

57. Bellona possesses and continues to expand an extensive knowledge base about hydrogen technology and solutions relating to energy and transportation. One could claim that Bellona has become somewhat of an expert in this field. What other organizations or institutions do you consider to be experts in this area, both nationally and internationally? Please list them below:

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

58. In terms of *quality* and *amount* of knowledge about hydrogen technology and solutions, how would you say that Bellona's expertise compares to the expertise of other organizations or institutions you consider to be experts in this field? Please indicate how you view Bellona's expertise by checking the appropriate box.

Expertise / Knowledge	Excellent	Very good	Good	Fair	Poor
Quality	☐	☐	☐	☐	☐
Amount	☐	☐	☐	☐	☐

Comments:

59. The issues dealt with in the Hydrogen Project have some complex scientific and technological aspects dealing with how hydrogen is produced, how a fuel cell can power a vehicle, how hydrogen technologies can be developed and improved, how the current energy

sources contributes to the deterioration of the environment, etc.

Do you think these scientific and technological aspects of the hydrogen issue have influenced the communication strategies chosen by Bellona in this project?

Yes ☐ No ☐ Somewhat ☐

If the answer is If the answer is yes or somewhat, please explain how:

60. When creating information material, how much weight is placed on conveying the scientific and technological aspects of the issue?

In the case of the Hydrogen Project this means, for example, explaining how hydrogen can be produced and with what technology, how a fuel cell operates, how hydrogen and CO_2 infrastructures can be developed, and what the environmental impact is. Please check the box you think apply the best.

Always _____ ☐
To a certain degree _____ ☐
Not at all _____ ☐
Various degrees depending on type of material _ ☐

Comments:

61. Do you think it is important for the target groups to understand the scientific and technical aspects of the hydrogen issue, like how a fuel cell works or how hydrogen is produced, or is it enough for certain groups simply to understand the applications and implications of hydrogen technology and converting to a hydrogen society?

By checking the appropriate box, please indicate below how important you think it is for the various target groups to understand the scientific and technological aspects behind hydrogen technology and solutions about which you try to champion and spread information.

Importance: / Target group	Crucial	Important	Fairly important	Little importance	Not important
Politicians/ Policy makers	☐	☐	☐	☐	☐
General public (Stakeholders)	☐	☐	☐	☐	☐
Media	☐	☐	☐	☐	☐
Industry	☐	☐	☐	☐	☐
Financial sectr. (investors)	☐	☐	☐	☐	☐

62. When comparing the Hydrogen Project to other projects, would you say that Bellona relies more on scientific expertise in this project than in previous ones?
Yes ☐ No ☐

If the answer is yes, please explain why you think this is so:

63. Is it your experience that the content of the feedback in the Hydrogen Project is more of a scientific and technological nature than in previous projects?
Yes ☐ No ☐

If the answer is yes, please explain:

Feedback:

This section deals with the flow of information coming back to Bellona from the respective target groups and what type of response system Bellona has to the feedback it receives.

64. Is feedback specifically targeted in the strategy of the Hydrogen Project in terms of how it can play a role and be used?
Yes ☐ No ☐ Indirectly ☐

Comments:

65. On average, how often would you say that the feedback is evaluated in various projects? Please feel free to fill in your own option under *other* or use the *comments* field if the options provided does not fit your answer.

Continually _____ ☐
Once a week _____ ☐
Every two weeks _____ ☐
Every month _____ ☐
After each project _____ ☐
Other: _____

Comments:

66. Have you ever experienced in previous projects that feedback has led to major changes in the strategy of that particular project, for example how a specific target group has been approached?
Yes ☐ No ☐

If the answer is yes, please explain how:

67. Have you ever experienced in previous project that the feedback from one project has led to major changes in the strategy or approach of a following project?
Yes ☐ No ☐

If the answer is yes, please explain how:

68. Is your experience from previous projects that the feedback is used to continually make changes to the strategy as the project proceeds or is the insight learned from the feedback applied to later projects instead?

11.2. B7 focus areas

B1 Environmental rights

Bellona views clean air, soil, water, and food as a fundamental right of all humans. Hence, environmental crimes have been a core target of the organization since the beginning, going back to the Titania actions. It was dues to Bellona's work on this issue in the mid-80s that the word "environmental crime" was included in the Norwegian vocabulary. A crucial area in fighting environmental crimes is the legal structure, especially the right for private organizations and individuals to participate in making changes without fear of being persecuted. The Niktin case showed how intertwined environmental protection and basic democratic rights are intrinsically linked. Alexandr Nikitin is a Bellona employee who has been charged for espionage and harassed by Russian authorities because who authored an environmental report on the region where he lives.

B2 International environmental work

Pollution is a global problem. There seems to be a notion that some of these problems cannot only be fought through environmental research and national regulations; international treaties have become an intrinsic part of the fight for cleaner air, seas, foods and so on. Recognizing the need to be visible on the international arena and the role of the EU and the U.S. in fighting pollution, Bellona has established offices in Brussels and Washington, D.C. The environmental work Bellona does internationally is focused on global ecological problems and environmental problems in Russia. It is for the latter that Bellona is perhaps the best known, especially in Norway. It began with actions against the nuclear bomb testing at Novaya Zemlya and since 1990 Bellona has worked with sources of radioactive contamination in Nortwestern Russia. Nuclear energy and radioactive waste has become a particular field of interest and expertise in Bellona. It is also for particular projects in Russia that Bellona has gotten financial support from the Norwegian Ministry of Foreign Affairs.

B3 Environmental management

Bellona sees the biggest challenges in this area as being to secure biological diversity in a long- and short-term perspective and to fight pollution of the environment. Through this program, Bellona aims to identify the threats to biological diversity, identify the best initiatives to counter them, and establish strategic alliances to implement these actions. The programs in this area are threefold. First of all, it is to fight destruction of biotopes and securing sustainable populations of endangered species. Second, it is to keep the oceans clean. Bellona has from its beginning in 1986 worked to prevent environmental hazards to the seas. Third, this work concerns the environmental record of the primary industries.

B4 Environmental economy

This program aims to stimulate investment in business that is environmentally sustainable. The aim is to establish a framework within which business decisions and long-term environmental thinking are not oppositions. This requires close cooperation with the business sector.

B5 Environmental technology

This program aims to combine environmentally friendly technological solutions with maintaining economic development. Bellona does not see it as impossible to create pollution free industry if one develops new technology and uses the technology to achieve less pollution. Another important area of this program is the transportation sector and the environmental challenges this sector poses. The aim is to develop and implement new transportation technologies that preserve our environment. The program is divided into several fields: air transport, railways, road transport, sea transport, and urban transportation.

B6 Energy

Bellona sees some of the most serious environmental problems of today in connection with the production and use of energy. The hottest issues are nuclear waste, climate changes, oil spills, and local air pollution. This is another area that Bellona has focused on since the beginning, especially problems related to the Norwegian oil and gas industry. Challenges concerning energy efficiency also concern Bellona. The strategy Bellona has deployed in meeting these problems is to focus on cleaner and more efficient energy solutions, like cleaner use of fossil fuel and the development and implementation of other and cleaner energy solutions. It is within this framework the hydrogen project fits.

B7 Envirofacts

Part of the organization's work is to increase the ecological consciousness in society, and this is in part done through publishing fact-oriented environmental material. Currently versions of this material are distributed electronically, as well, through the Bellona Web and e-mail. Bellona also uses the Internet actively themselves to collect and publish data. Bellona also published a bi-monthly magazine, theBellona Magazine. Recently, this magazine is just being published on-line. Reports, working papers, and fact sheets are most often published in Norwegian, English, and Russian.