



JÖNKÖPING INTERNATIONAL BUSINESS SCHOOL  
JÖNKÖPING UNIVERSITY

# CleanTech

*A sector too risky for Swedish venture capital?*

**A bachelor thesis within Business Administration**

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# Bachelor Thesis in Business Administration

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## Abstract

### Background

CleanTech is the sector where technologies intended to reduce the harmful effect that our current lifestyle has on the environment are found. In Sweden the companies developing these technologies has not yet managed to get their deserved part of Swedish venture capital. A number of venture capitalists do invest in CleanTech, however the majority is hesitant. The hesitation is to a large extent said to be born in the many risks associated to a CleanTech investment.

### Purpose

The purpose of this thesis is to describe and analyze how venture capitalists reduce risks when investing in a CleanTech company.

### Method

An abductive approach has been used to conduct the study, mainly based on primary, qualitative data. The data was gathered through six face-to-face interviews with Swedish venture capitalists active within the CleanTech sector.

### Theoretical framework

The different risks expected to be found in a CleanTech investment are first presented grouped into three broad risks groups; Agency risk, Business risk and Innovation risk. This is followed by a framework covering methods and tools that can be applied by venture capitalists in an attempt to reduce risks in their investments. These being; Convertible equity, Syndication, Information system, Monitoring, Milestones, Bonding, Share options, Stage financing and Intellectual property rights.

### Conclusions

The respondents do not view the risks associated to CleanTech as high as generally perceived. They acknowledge that the risks exists but not to any larger extent than in any other investment. When reducing risk in their investment the respondents make use of commonly known and generally used methods and tools. These are not deliberately chosen in order to reduce a specific risk but rather to safeguard the investment as a whole. It is not just the tools in themselves that leads to a successful reduction of risk, but rather when combined with the respondent's as well as the entrepreneurs skills and experiences.

# Kandidatuppsats inom företagsekonomi

Titel: CleanTech – en sektor för riskfylld för svenskt riskkapital?

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Ämnesord: CleanTech, riskkapital, risk

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## Sammanfattning

### Bakgrund

I CleanTech sektorn hittas teknologier ämnade att minska den skadliga inverkan som vår livsstil har på vår miljö. I Sverige har de företag som utvecklar dessa teknologier inte lyckats få sin beskärda del av det svenska riskkapitalet. Frånsett ett fåtal riskkapitalister som investerar i sektorn så väljer majoriteten att stå utanför. Denna motvilja att investera sägs till stor del grunda sig i de risker som en CleanTech investering är associerad med.

### Syfte

Syftet med den här uppsatsen är att beskriva och analysera hur riskkapitalister reducerar risker när de investerar i ett företag verksamt inom CleanTech.

### Metod

I den här uppsatsen har ett abduktivt tillvägagångssätt används, till största delen baserat på primär- och kvalitativ data. Data som har använts har samlats in genom sex stycken personliga intervjuer med svenska riskkapitalister aktiva inom CleanTech sektorn.

### Teoretiskt ramverk

Först presenteras de risker som är associerade med en investering i CleanTech, dessa är grupperade i tre riskgrupper; Agent risk, Affärsrisk och Innovationsrisk. Sedan följer ett ramverk bestående av de verktyg och metoder som kan användas av en riskkapitalist för att minska riskerna. Dessa är: Konvertibelt kapital, Syndikering, Information- och bevakningssystem, Milstolpar, Straffkonsuler, Aktieoptioner, Stegfinansiering samt Patentskydd.

### Slutsats

De medverkande i denna uppsats håller inte med om de allmänt uppfattade höga riskerna associerade med en CleanTech investering. De håller med om att riskerna finns där men att de är desamma oavsett bransch. För att skydda sin investering använder sig de medverkande av allmänt kända metoder och verktyg. Dessa är valda för att skydda investeringen i sin helhet hellre än att minska en specifik risk. Det är inte enbart verktygen i sig som reducerar risker utan dessa i kombination med riskkapitalistens och entreprenörens kunskaper och erfarenheter.

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# 1 Introduction

*“A well-defined problem is half the way to a solved problem”.*

- Charles Franklin Kettering

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In this chapter the reader is introduced to the areas of focus followed by a discussion concerning the problem addressed in this thesis. The chapter ends by stating the purpose and provides the reader with a disposition of the thesis.

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This thesis handles a combination of venture capital and CleanTech. The authors interest in this origins from a project, where the authors on the behalf of a CleanTech entrepreneur outlined the venture capital industry. CleanTech is interesting partly because of the many opportunities this fast moving business environment pose but mainly due to the positive effect when it comes to reducing the environmental damage. Venture capital is likewise receiving ever more attention and is a way to foster important entrepreneurial activities in Sweden. The two areas are interesting separately but even more interesting where venture capital encourages innovations less damaging for the environment.

This thesis gives attention to the risk associated to such investments and it is written at Jönköping International Business School. The thesis is intended to be educational for students interested in the area of venture capital. Entrepreneurs searching for venture capital can also beneficially read it, as they would then get an insight in how the venture capitalist they try to attract reason and behave. Additionally, venture capitalists curious to see if they have got what it takes to invest in the CleanTech sector can have an interest in the thesis.

## 1.1 Background

Today, 2007, not a single day is going by without the issue of climate change being discussed. There are trends indicating a need of fundamental change, as:

*“Climate change will affect the basic elements of life for people around the world – access to water, food production, health, and the environment. Hundreds of millions of people could suffer hunger, water shortages and coastal flooding as the world warms”*

-Nicholas Stern

As a response new technologies are invented. These technologies are intended to satisfy the human need in a way less harmful to the environment. The technologies belong to the sector known as CleanTech<sup>1</sup>, in Sweden previously known as “Energy and Environmental related Technologies”. CleanTech consist of a wide range of products, processes and services designed to reduce or eliminate environmental impact. CleanTech is a US-based

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<sup>1</sup> CleanTech is defined as: “The concept of “clean” technologies embraces a diverse range of products, services and process that are inherently designed to provide superior performance at lower costs, greatly reduce or eliminate environmental impacts and, in doing so, improve the quality of life. Clean technologies span many industries such as agriculture, energy, manufacturing, transportation and water.” (NUTEK 2006, page 84)

concept originating from “clean technologies”. The concept was introduced to Sweden in 2007 and brought an increased interest for technologies aimed at reducing the environmental damage. In Sweden the expectations on these technologies are extremely high. Indicators, the driving forces of these technologies, also point at the long-term and stable demand for the technologies. However, to be able to grow and expand external capital is needed, and the interest in these technologies can unfortunately not be seen in the capital available to the CleanTech companies. (Energimyndigheten, 2007)

CleanTech are said to be a high-technology sector, meaning that the technologies are innovative, technical and capital intensive (Reid & Smith, 2008). Additionally most companies within CleanTech in Sweden are in their early phases (Energimyndigheten, 2007). Capital often invested in early phase companies in such high-technology sectors is venture capital. In Sweden, the venture capital industry began during the second half of the 1970’s. This investment form has since then experienced a gradual increase and has become an important source of funding for newly started companies. (Dealflower, Springwise & Hifab, 2003) The interest that the Swedish venture capitalists have in CleanTech as an investment area can be seen in a report made by NUTEK, Innovationsbron & SVCA (2007). In this report it is stated that 74% of the Swedish venture capitalists view the CleanTech sector as the most interesting sectors to invest in. But during the first three quarters of 2007, 5.2% out of the total invested venture capital was invested in CleanTech (J. Gretzer, SVCA, personal communication, 2007-12-18)

According to a study made by Energimyndigheten (2007) there has been a risk related hesitation towards actually investing in CleanTech. In their study, it is argued that CleanTech is, by the venture capitalists, seen as an exceptionally risky sector, something also being verified by other studies<sup>2</sup>. The risks stated in Energimyndigheten’s (2007) study as particularly high in CleanTech was demonstration-, exit-, management-, market-, political-, regulatory-, and technical risk. Where the demonstration-, political-, and regulatory risks are further emphasized.

The underlying cause of these risks can to a certain extent be that the demand for these technologies, are largely influenced by regulations and political decisions, which then can alter the business environment. The emphasized focus of the research & development made in this area has been to meet the society’s demand of these technologies, and not to enable a commercialization. This may result in a business setting that differs from other sectors being invested in. (Energimyndigheten, 2006)

To conclude, CleanTech is pictured as a highly risky but interesting investment sector for venture capitalists. While the majority has preferred to stay out, some venture capitalists have been brave enough to enter.

## **1.2 Problem discussion**

The activities in the first part of a venture capitalists investment process are divided among finding the actual capital to be invested and an appropriate investment object. Thereafter the investment object is evaluated and a deal is structured. During the evaluation of the

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<sup>2</sup> CleanTech – Svenska riskkapitalisters syn på branschen. Bachelor thesis written by A. Jansson & N. Wågström. Uppsala University 2007

investment object a due diligence<sup>3</sup> is carried out, intended to result in the avoidance of an investments object associated to a higher risk than accepted by the venture capitalist. (Fredriksen, 2003) The venture capitalist's general believe is said to be that when entering a CleanTech investment an excessive amount of risk concerning exit possibilities, management and market uncertainties, political and regulatory decisions, and technical issues including the demonstration aspects is taken on. The same reports also argue that the high risk perception can be a result of the venture capitalists inability to correctly evaluate the investments possibilities in CleanTech, especially with regards to the risks. Reflecting in the venture capitalists set a too high risk premium with the consequence of an avoidance to invest in CleanTech. (Energimyndigheten, 2006; 2007) Nevertheless there are venture capitalists that do invest in CleanTech, meaning that there is a possibility that their viewing of these risks, on the contrary to the general opinion, favors an investment.

*How do venture capitalists investing in CleanTech view these stated risks?*

However, another possibility is that these venture capitalists agrees on the high risks, but view them as either manageable or at least reducible. When the investment is entered the venture capitalists engage themselves in the management of this investment (Fredriksen, 2003). This continuation of the investment process opens up the possibility for the venture capitalist to reduce risk associated to the investment. Most research conducted focuses on how venture capitalists create value in their portfolio companies. The venture capitalist is said to contribute with competence and networks. These contributions can create value and likewise reduce the risk for the portfolio company, external as well as internal. By being an active owner the venture capitalist gains powers over and can influence the company in several ways. These powers and influences have their origin in the capital being infused, the skills held by the venture capitalist, time spent with the company as well as the contracts made with the entrepreneur. The way that the venture capitalists make use of these different powers facilitates the venture capitalist safeguarding of their investment, by reducing risks. (Fried & Hisrich, 1995)

CleanTech supposedly differs from other investments made by venture capitalists, and is an area in which the venture capitalists has been said to lack the appropriate knowledge needed to make a successful investment (Energimyndigheten, 2006). When listening to the discussion concerned with the risks related to a CleanTech investment, one would easily get the impression that the business environment in CleanTech is very difficult to invest in, with respect to the risks.

*What methods and tools do these venture capitalists make use of to reduce risk?*

*How do these venture capitalists use these tools?*

### **1.3 Purpose**

The purpose of this thesis is to describe and analyze how venture capitalists reduce risks when investing in a CleanTech company.

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<sup>3</sup> "Due diligence is the process of assembling and verifying the information related to an investment decision, whether on behalf of others or oneself" (Smith & Smith, 2004, page 70)

## **1.4 Delimitations of the study**

The authors have chosen to limit the study to only involve Swedish venture capitalists investing in the Swedish CleanTech sector. Further, the thesis does not cover the aspect of how to reduce the risk of choosing the wrong investment.

# 1.5 Disposition

**Chapter 2 – Method**

Describes the methods used in order to conduct and present the study. Additionally it explains how the authors have dealt with issues concerning the quality of the study.



**Chapter 3 – Background Knowledge and Definitions**

The authors states how CleanTech and venture capital investment are defined and viewed in this thesis. This provides the reader with the appropriate knowledge base needed for a beneficial reading.



**Chapter 4 – Theoretical Framework**

Presents the risk associated with a CleanTech investment, followed by different tools that can be used in order to reduce risk.



**Chapter 5 – Empirical Findings**

First provides the reader with a presentation of the companies included in the study. Next indications of how they grade the imminence of the risks in CleanTech, after which the focus is on different methods that can help to reduce risks are presented.



**Chapter 6 – Analysis**

The information provided by the respondents are combined with theory and analyzed by the authors of how risks are reduced.



**Chapter 7 – Conclusion**

The authors arrive at a conclusion based on the analysis in addition to conduct a discussion around the problem. This in turn allowed for the answering of the purpose of the thesis, and suggestions of further studies.

## 2 Method

*“Every man's life ends the same way. It is only the details of how he lived and how he died that distinguish one man from another.”*

- Ernest Hemingway

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In this section the authors will describe how the study was conducted, what possible challenges that may arise during such work and how these was tackled by the authors.

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### 2.1 Research Approach

When conducting a research the aim is to present an as accurate picture of reality as possible through relating empirical data with theory. There are different approaches that a researcher can take to achieve this. Saunders, Lewis & Thornhill (2003) emphasize the deductive approach and the inductive approach. Patel & Davidson (2003) and Alvesson & Sköldbberg (1994) add the abductive approach to the two earlier mentioned. The choice of approach depends on what starting point with relation to theory researchers wish to take.

According to Patel & Davidson (2003) when using a deductive approach the starting point is to use existing theories and create hypotheses in an attempt to draw conclusions about an occurrence. While writing this thesis the authors started with existing theories to find out their usefulness in reality, however no hypotheses were stated as research questions were used instead which goes against the deductive approach. In an inductive approach the starting point is to first collect data without the support of existing theories and then develop a theory built on the analysis of the collected data (Saunders et al. 2003). As the authors started with already existing theories the inductive approach was not suitable even though the authors desired to acquire a deeper understanding which according to Saunders et al. (2003) the inductive approach allows for.

The abductive approach can be seen as a combination of the deductive and inductive approach but with its own characteristics too. The starting point for the abductive approach is that the researcher tries to explain an individual occurrence with theories that then is proved through additional observations (Alvesson & Sköldbberg, 1994). This can be seen by the authors observing that venture capitalists manage to deal with high risk environments. The authors then searched and found theories explaining how this could be possible. The applicability of these theories was then examined through additional observations, where the theories were used as guidelines when gathering the empirical data. One final aspect to why the abductive approach was chosen was that it according to Alvesson & Sköldbberg (1994) allows the researcher more freedom in their work compared to a strict deductive or inductive approach.

### 2.2 Data

#### Type of data

To answer a purpose and research questions data is needed and this data can be either quantitative, qualitative or a combination of both. These data categories provide the researcher with different types of data and the choice of type is of importance to enable a good quality research. Quantitative data allows for a meaning to be derived from gathered data, often based on numbers. (Saunders et al, 2003) Qualitative data on the other hand allows for a deeper understanding to be gained (Silverman 2006). To be able to best

explore how the venture capitalists reduce risks the authors of this thesis saw a need to use both quantitative and qualitative data. Quantitative data are used as the respondents are asked to grade the risk. However, the main part of the study is based on qualitative data, concerning the methods used by the respondents.

Data is also either primary or secondary, where primary data is data collected and used for the first time and secondary data is data originally collected for another purpose and then re-used (Saunders et al, 2003). The main data used in the thesis empirical part was gathered through interviews, thereby primary. As there are no earlier studies made on the topic, the authors believed interviews to be a necessity to understand how risks are reduced in a CleanTech venture capital investment. Secondary data is generally available to the public, which in a wider extent gives it some verification as it opens up for public scrutiny. The reason for not including any secondary data in the empirical part was due to the fact that the interviewed companies provide very little of this kind of information to the public.

### **Selection**

Before gathering the primary data, a thoroughly selection was made to make sure that a suitable company was contacted and that the interview was to be conducted with an appropriate person. The requirements that the company had to fulfill were; that they had at least one active CleanTech investment, to make sure that they had experience from risk reduction within the CleanTech sector. They had to be members of SVCA, a well-known Swedish association for companies active in the private equity industry, where a membership according to the authors verifies that the company is recognized in the industry. The company had to be located in a, for the authors, reachable area to enable face-to-face interviews. Thirteen venture capital companies fulfilled these requirements. These were first contacted via e-mail, and then a phone call the following week. This resulted in that six companies agreed on participating in an interview; Industrifonden, Scandinavian Financial Management AB, SEB Venture Capital, Sting Capital, Sustainable Technology Partners Nordic AB and Volvo Technology Transfer AB. Five of the interviews were held with the investment manager and the sixth with an analyst. To interviewing the analyst in one company in comparison to the investment managers in the others, the authors judged as having no or little effect on the answers and result of the interview. A presentation of each company is to be found in the empirical chapter. The authors saw six interviews to be an appropriate number when considering the benefits additional interviews would give the study. This with respect to the time needed to prepare, conduct the interviews and analyze the respondents' answers.

Due to that CleanTech as a business environment is so fast moving, the authors saw the need of having updated information in the background to the problem. Therefore Jonas Gretzer, analysts at SVCA was contacted via email in order to acquire updated information of how much venture capital as well as how many investments that was made in 2007.

### **Interview structure**

According to Saunders et al (2003) qualitative data can be derived from three different types of interviews; semi-structured, in-depth or non-standardized interviews. As the purpose of this study is to explore how the chosen venture capitalists reduce risk in their CleanTech investment, the authors found it important to be able to use both prepared questions as well as following-up questions. Therefore, the semi-structure interview type was seen as the most suitable and beneficial. Such interviews are conducted by the

interviewers having a list of questions and themes that are to be covered, however the follow-up questions varies depending on the respondent's answers (Saunders et al. 2003).

The interviews were held in Stockholm and Gothenburg and each interview lasted between one and two hours. As both respondents and interviewers are Swedish natives all interviews were held in Swedish, and instead translated into English when the data was entered into the thesis. During the interviews a tape recorder was used, after the approval of the respondent, to make sure that the authors afterwards were able to make a more accurate interpretation of what had been said in the interview. After the interviews were completed they were written down word for word and saved. The written interviews in full can be acquired from the authors. The guideline used in the interviews can be found in appendix, where also a version translated in English is provided.

The questions used in the interviews were divided into sections in order to make the interpretation of the collected data easier and more structured. These sections followed the same order in which the theories have been presented, that is, first the different risk experienced was stated. The respondent were asked to grade the imminence of the risk, as seen when standing at the investments point, after having performed a due diligence and further evaluation of the company. The risk were graded after a scale where 5 was that the risk was very imminent and 1 not imminent. The grade in between the two extremes were subjectively associated with the magnitude of imminence for the respondents. Additionally, the respondents were asked to grade the risks prior to any risk reduction methods have been introduced. However, the presence of methods might unintentionally influence the grading, therefore comments made by the respondents when grading the risks are included in the empirical data. After this the focus were on the different methods found in literature after which the respondent had the opportunity to added any other methods used to assist in the risk reduction, not previously mentioned.

### **2.3 Presentation of the empirical data and analysis**

First the risks experienced by the respondents are presented under the three risk groups, the average risk grade for each risk is presented using a bar chart. The individual grading made by the respondents can be found in Appendix C where the reader can see the span of the grads. Next, different methods to reduce risk used by the respondents are presented.

The empirical data is presented in a way incorporating all the respondents' answers under every heading were similar answers are combined. When combining the answers from all the respondents there is however a risk that some of the logic of the respondents' answers are lost. However, this approach of presenting the empirical data was chosen to give the reader a more interesting reading. As the authors are fully aware of the potential drawbacks they have been careful in how they presented the data, and believe that the logic is well preserved.

After the empirical findings the data is combined with the responding theory and analyzed. The analysis is divided into three main headings; how to reduce agency risk, how to reduce business risk and how to reduce innovations risk. This structuring was done in order to see how different tools can be used to reduce risks. By presenting the empirical data and the analysis from two different starting points the authors intend to provide the reader with an all-embracing understanding of the subject.

## **2.4 Credibility**

When conducting a research there are several issues that may cause a decrease in the quality of the research. This will lead to that the conclusion arrived at by the authors becomes questionable and less reliable (Saunders et al, 2003). These issues as well as the authors attempt to overcome them are presented under the different headings below.

### **Choice of area for the study**

A particularly large challenge that the authors faced was the fact that in the later part of 2007 CleanTech has very much been a concept in fashion. CleanTech has been mentioned and discussed in the media daily, and described as a sector under constant and rapid change. This means that it has been very difficult to keep up with the relevance of the topic.

### **Reliability**

Reliability refers to the likelihood that another researcher conducting the same research arrives at the same conclusions (Saunders et al, 2003). This is connected to what extent the findings are independent from circumstances. An issue related to the reliability of a research is to what extent the interviewers interpret the respondent's answers correctly. In addition to the issue of interpretation, is the issue that qualitative data often is revealed in a subjective way, and can vary depending on the respondent's current frame of mind (Silverman, 2006). In order to reduce the first concern a tape recorder was used to ensure that no relevant information was lost and to enable a more accurate interpretation. By emailing the outline of the interview to the respondents a week prior to conducting the interviews, the authors tried to further increase the reliability of the study as it prepared the respondents for the questions that were to be asked. This was also an attempt to reduce the second issue to some extent.

However, a limitation in the reliability of the study that the authors could not overcome was the respondents' potential reluctance to give away information. An additional issue that could have had an affect on the reliability was the time limitation of the interview, which the authors sometimes felt was too short to go as in-depth as desired. The language chosen in the interviews was Swedish, which some authors argue decreases the reliability due to possible translations errors (Patton, 2002; Silverman, 2006). However the authors believed the benefits, such as the increased likelihood of receiving the desired information, to outweigh the translation problem. Further the literature that was used as a base for the interviews had to be translated with the consequence that some of the concepts can to some extent have lost their accuracy.

### **Validity**

Validity refers to how correct the research is in terms of how accurately it reflects reality and whether the data collected really measures what it is suppose to. It is said that the validity of a study increases by using a type of interview that catches the desired data the best (Patton, 2002). In this study, to increase validity, the authors chose to have semi-structured face-to-face interviews as preferred information most likely was to be obtained by allowing for follow-up questions and a free flow in the conversation.

### **Trustfulness**

A possible concern related to the study is that the authors did not have time to address the respondents' trustfulness. It could have been done by verifying that the way the

respondents said they used the methods was in line with how the companies receiving the capital viewed it. However, the authors consider this verification to be of less necessity as the venture capitalist companies that participated in the study are all well-known with a good reputation in their areas. One aspect which could affect the trustfulness is the performance of the respondents' CleanTech investments. This however has not been assessed by the authors, due to the complexity of the task in combination to a lack of time.

### **Generalizability**

To be able to generalize a study can be seen as an external validity, that is, how valid would the result of the study be if another sample was chosen. When having a small sample Mcburney & White (2004) states the risk in trying to generalize the findings to the whole population. Therefore the data has not been used in order to achieve such generalization. Still the authors felt the need of including as wide range of companies as possible, this to provide a more accurate picture reflecting the opinions and behavior of the Swedish venture capitalists active in CleanTech. Another issue concerns how the respondents graded the risks are providing the reader with a reliable picture, that other venture capitalists would share. All venture capital investments are investments made in a company's early stages, however even in-between these stages the risks are bound to differ. Several of the companies chosen in this thesis do not limit themselves to just one out of the three phases said to be defined as venture capital phases, however they have preferred phases. These preferred phases differ between the companies chosen. The authors therefore believe to have a mix that would reduce even if not eliminate the influence of the investment phase in the grading of the risks.

### **Ethical issues**

At the time for the interview, the respondents were given the opportunity to be anonymous. It was agreed that the authors were to email each respondent's answers when written down and translated, the respondent would then make the decision of whether to be anonymous or not. All of the respondents agreed to the companies' name being referred to however not all wished to having their own name included.

## **2.5 Literature review**

The information used in the theoretical part which also forms the base for the empirical data collection is mainly taken from books and scientific journals written in English. A drawback is the lack of scientific literature combining CleanTech and venture capital. Therefore reports conducted by or on the behalf of large Swedish institutions such as NUTEK, Energimyndigheten and SVCA, where the two subjects are combined have also been used. To find the appropriate literature the authors have used JULIA, a search tool provided by Jönköping University's library, and simple Google searches on "CleanTech", "venture capital" and "risk" and a combination of these search terms. The reports have been found through the homepages of the publisher's. As CleanTech is a relatively new name for "Energy- and Environmental related Technologies" some of the reports used have more discussed the later term. However, as CleanTech is said to be a rename of the just mentioned area, the two has in this report been used as synonyms.

The authors of this thesis judged the literature as credible, mainly due to the reappearance of the same authors. This reappearance is both in terms of own work as well as being referenced to by other scholars. However, negative aspects of the sources used in the theoretical framework are that they are primary taken from US sources. The US has a

longer history of using venture capital which may cause the external conditions to be different compared to Sweden. It could have been more appropriate to use Swedish authors, although, when weighted against the possibility to have well-known approved researcher that the US sources can provide it was viewed as less important.

### 3 Background knowledge and definitions

*“All of us do not know everything.”*

- Vergilius

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To be able to fully grasp the following discussion of the thesis, the reader is here given an introduction to CleanTech and venture capital investment.

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#### 3.1 CleanTech

Clean Technologies are energy- and environmentally associated technologies developed with the purpose to decrease the harmful effect on the environment. As stated in the background of this thesis CleanTech has its origin in the US, and the name was not fully recognized in Sweden until 2007. This rename of the sector has had a large effect on the interest on these environmental technologies. The interest took off quickly after the rename, as can be concluded by a Google search. In the beginning of October 2006, Energimyndigheten did a simple Google search on Google, Sweden, on the word “CleanTech”, this search resulted in 189 hits. (Energimyndigheten, 2007) When the same search was made by the authors on the 5<sup>th</sup> of January 2008, only 14 month later it resulted in 69 100 hits. CleanTech is today, in 2008, a highly discussed topic in the media. The sector is characterized by rapid change with a constant production of new technologies (Energimyndigheten, 2007).

There are several ways in how CleanTech is defined. The European Unions definition of CleanTech is;

*“All technologies that is less harmful to the environment than existing alternatives”* (Dealflower, 2006)

It is the authors believe that, according to this definition, what today is defined as CleanTech, is not necessarily true tomorrow, if a new technology is introduced to the market. Therefore the authors of this report have chosen an, according to them, more suitable definition. This definition is given by EVCA, and goes inline with the definition used by SVCA and Energimyndigheten.

*“The concept of “clean” technologies embraces a diverse range of products, services and process that are inherently designed to provide superior performance at lower costs, greatly reduce or eliminate environmental impacts and, in doing so, improve the quality of life. Clean technologies span many industries such as agriculture, energy, manufacturing, transportation and water.”* (NUTEK, 2007, page 84)

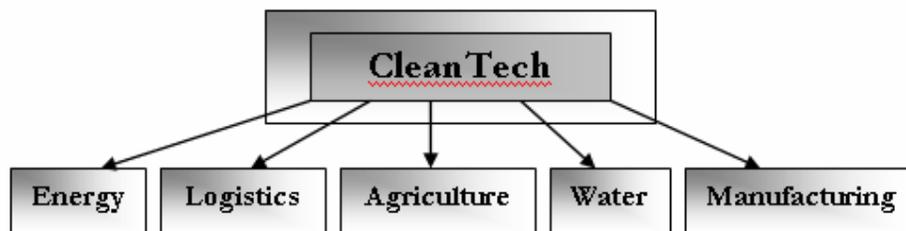


Figure 1 CleanTech

When a sector is divided the delimitation is usually made according to a certain technology. When it comes to energy and environmental related technologies however, it is the

technology demanded to solve a variety of environmental related problem that defines the area, which results in that the area cut through a vast number of traditional sectors. (Dealflower, DAKS & Resultus Affärsutveckling, 2006) Although there are several areas incorporated under one definition, the risk associated to a CleanTech investment are generalized to regard all. The risks brought up are traditional risks such as exit, management, market and technical further there are some branch specific risks; demonstration-, political-, and regulatory risk (Energimyndigheten, 2007).

### **3.2 Venture capital investment**

The authors have in this thesis chosen a definition of venture capital provided by SVCA;

*“Capital invested in unquoted companies in seed-, start-up- and expansion phase, where the contributor of the capital receives an active ownership”* (SVCA, 2007, page 9)

The capital invested in the seed-phase is contributes to the development of a concept before the actual start-up of the company. The start-up phase incorporates two stages of the company’s lifecycle. The start-up, in which capital is invested to commercialize and develop the product and the other early stage, in which the product development is finished and the funds given is used for sales and marketing. During the expansion phase a company goes through three stages. In the first, expansion, the company is provided funds to further develop the product and market, increase production capacity or to be used as working capital. The two last stages in the venture capital range are bridge financing and turnaround. In these capital is invested to first finance a transition period to go public and in the later capital is supplied for companies experiencing trading difficulties. (NUTEK, 2007)

Generally, venture capitalists conduct investments in high-technology sectors. The early phase and the high-technology investment together result in an investment which are far from exit, highly risky and difficult to control, where a dynamic active involvement is beneficial (Gompers, 1995 and Reid & Smith, 2008) Venture capital is offered in exchange for an ownership stake in the company. It is an equity financing form, where, even though financing receive the main attention the venture capitalist does not limit him/herself just too financial contribution (SVCA, 2007). Other inputs can be determined by the gap between the existing resources available for the entrepreneur and the resources possessed by the venture capitalist.

Venture capital became known in Sweden in the 1970’s when it emerged largely by the help of the government. Private investors got involved in the 1980’s when venture capital had its first peak (Dealflower, 2003). In Sweden venture capital investments has experienced a steady increase, between 2001 and 2006 the invested amount increased from SEK 2.1 billion in 2001 to a figure ending at SEK 4.1 billion in 2006. (SVCA 2007). In a survey made by NUTEK (2007) venture capitalist view the CleanTech sector to be the most interest sector for future investments, even though the interest has not yet been showed by actual investments (Energimyndigheten, 2007). During the first three quarters of 2007, 36 out of the total 415 number of venture capital investments were made in CleanTech, representing 8.7%. These investments add up to MSEK 148 which is 5.2% out of the total invested venture capital of MSEK 2 870 (J.Gretzer, SVCA, 2007-12-18).

## 4 Theoretical framework

*"All my great thoughts have been stolen by the classics"*

- Ralph Waldo Emerson

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In this chapter the authors present an overview of risks associated with a CleanTech investment divided into three broad risk groups. These risks are then followed by a section outlining the different tools available for investors to reduce risk.

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### 4.1 Risks within the CleanTech sector

Kasten and Swisher's (2005) state that risk concerns the jeopardy of losing money, underperforming and failing to reach financial goals. There are several ways in how to categorize the different risks that a venture capitalist can face. In this thesis these risks are presented in three broad categories; agency risk, business risk and innovation risk. Some of the risks are overlapping and somewhat dependant, so one risk may cause and influence another. (Reid & Smith, 2003)

#### 4.1.1 Agency risk

Agency risk is derived from the agency theory. The core problem that the agency theory addresses is the separation of ownership and control where someone, the principal, gives another, the agent, the task of performing an action on their behalf (Jensen & Meckling, 1976). The logic of the theory can be applied on the relationship between the venture capitalist (the principal) and the entrepreneur (the agent) (Arthurs & Busenitz, 2003). The underlying assumptions of the agency theory are that some of the decision making authority is shifted from the principal to the agent, and that the agent not always behaves and acts in line with the best interest of the principal (Jensen & Meckling, 1976). When an entrepreneur takes in external capital the link between effort, benefits, costs and risk are weakened which may cause the entrepreneur's behavior to change. This can result in that the entrepreneur does not meet the expectations of the venture capitalist. (Smith & Smith 2004) Another explanation of the deviation in the agents' behavior from what is desirable by the principal can be found in risk preference and goal incongruence between the two (Arthurs & Busenitz, 2003). One expression of goal incongruence in CleanTech is that the entrepreneur/management is more concerned with doing a good cause than good business (Dealflower, 2006). Goal incongruence can also be seen in how the entrepreneur allocates the capital provided by investors. If the entrepreneur is given capital at the time not needed to pursue one goal, the capital may be used for less suitable investment (Gompers, 1995). Goal incongruence may further lead to information asymmetry between the agent and the principal (Amit, Glosten & Müller, 1990). If the fact that the information between the two is asymmetric and that the incentive for each party is to misrepresent the information they know, the agency problem increases. The commitment of the entrepreneur also influences the agency risk. The commitment problem is linked to the fact that to be able to fully realize the value of the investment the often unique knowledge, human capital, of the entrepreneur need to be kept in the company. The effect of the commitment problem is more damaging early in a company's lifecycle, where the knowledge provided by the human capital has not yet been fully incorporated in the company. As long as the investment has little value without the entrepreneur, the agency problem increases. (Neher, 1999) Another risk related to the entrepreneur, are his/hers potential lack of business logic. The venture capitalist's hesitation against the entrepreneur's business logic often result in that the venture capitalist's lack trust in the entrepreneur when it comes to make sound business

judgments, causing an agency problem. (Mason & Harrison, 2004) A risk particularly present in the CleanTech sector is the management risk, which deals with the issue of management excellence in science/engineering areas but lacks business logic. This risk brings up that the management might not be capable of taking the company from innovation to the market and commercialization. The strengths are more connected to the innovation part rather than to the packaging of a concept attractive to the customer. An entrepreneur active in CleanTech are said to have a bad reputation when it comes to conducting business. (Dealflower, 2003; Energimyndigheten, 2007)

#### **4.1.2 Business risk**

Business risk can short be said to be the market side of risk and is by Barney, Busenitz, Fiet & Moesel (1989) said to be associated with the uncertainty of obtaining returns on a competitive market. A challenge facing the venture capitalist is to make a connection between the companies' business strategy and the value that particular strategy could create in the future (Frigo & Sweeny, 2005). The risks categorized under business risk arise due to the complex and competitive environment, and are consequences of the inability to accurately predict how the product can create value on a competitive market. Business risk is not only a result of the difficulty to judge the market, but can also be a result of the entrepreneurs' lack of ability to make use of the opportunities posed by the market (Reid & Smith, 2001, 2003). There are different risks that influence business risk, these risks are; market-, timing-, growth-, exit- and political risk. Market risk is that the adoption of new products or services depends on the future customer demand, over which the company has limited influence. The difficulty of introducing a new product to the market, also result in the revenues being postponed. Timing risk, involves being too late, or indeed too early, when launching a new product on the market (Wüstenhagen & Teppo, 2004). Even if the technology holds the market might not be ready for this type of technology, or reversely, there are other existing technologies having the same effect on the environment while superior to the customer (Dealflower, 2006). Growth risk arises due to the high demand on the company to grow with the market, there is generally a fairly short time horizon in which the company has to grow and develop new products (Wüstenhagen & Teppo, 2004). Exit risk refers to the part of the venture capitalist's business operation when he/she wishes to leave the investment (Cumming & MacIntosh, 2003). The risk lies in the possibility of the exit being postponed or the expected pay-off not being reached (Cumming, Fleming & Schwiendbacher, 2005). CleanTech is a sector influenced by overall unstable and shifting politics, which is said to have a negative influence of the investments made in the area (Dealflower, 2003) The companies active in the sector face a high political risk where political decision can alter the rules of the game on the market and thereby the demand factors severely (Energimyndigheten, 2007). In a report made by Dealflower (2003) it was stated that the high political risk in the CleanTech sector is a result of introduced and removed subsidizes, which accordingly changes the conditions for the company. Additionally, a change in taxes affects the market in similar ways as the subvention, as well as fees introduced for environmental damage.

#### **4.1.3 Innovation risk**

New high-technology companies are due to the complexity of the technology said to face high innovation risk (Reid & Smith, 2001). The risks related to innovation risk are usually connected to the risks that directly affect the innovation such as technology-, regulation- and demonstration risk (Energimyndigheten, 2007; Reid & Smith, 2008) Technology risk refers to the risk that the technology might end up not suitable for the intended purpose. The technology risk is also associated to when the technology, even though complying with

quality and usage demand is too expensive to develop and need more capital than budgeted for. (Dealflower, 2003) It is especially high and potentially costly when the innovation requires a lot of capital and has a long lead time (Wüstenhagen & Teppo, 2004). The risk is caused by difficulties in forecasting the development cost of a new technology product or service (Reid & Smith, 1999). The regulation risk compared to political risk discussed under business risk refers to the supply side of the technology and its product (Dealflower, 2006). This risk constitutes of restrictions or changes in the rules, these changes can affect how to produce a product or how/where to set up a new plant. This in turn can alter the products' market access or limit the possibilities to build up new profitable plants. (Cumming et al., 2005) Companies within CleanTech often need to build demonstration plants in order to verify their innovations to the potential customer. The cost of doing so is usually very high and gives rise to the demonstration risk. (Dealflower, 2006) Additionally the demonstration of a new technology often take place in a company's early phase were the risk of failing is high (Energimyndigheten, 2007).

## **4.2 Governing the investment**

To manage risk successfully a relation between the venture capitalist and the entrepreneur that best serves the company's future progress needs to be created. The relation is governed through information exchange and steered by consequences and benefits, in order to align the incentives of the entrepreneur to the goals of the venture capitalist. As the venture capitalist and the entrepreneur often have different types of knowledge, this relationship can help to reduce risks when both parties contribute with their individual comparative advantage (Landström et al, 1998).

The obligations and the rights as well as other issues agreed upon by the venture capitalist and the entrepreneur is often regulated in contracts (Landström et al, 1998). The term contract has a variety definitions and interpretations, in this thesis the authors see the contracts as the overall governance of the relationship. According to Milgrom & Roberts (1992) the contracts serve as a frame for how to deal with unexpected incidents, disputes and power to act is also included in the contract. According to Isaksson, Cornelius, Landström & Junghagen (2003) most venture capitalists use standardized covenants in their contracts. However, according to Smith & Smith (2004) it is impossible for the venture capitalist to know in beforehand on how things will unfold, therefore it can be beneficial if the contracts are not too specific. The contracts can be of a long term or short term structure, as the aim of the contract differs and so also the suitability of time frame (Bergemann & Hege, 1998).

Under the headings found below the reader is introduced to a variety of tools which can be used to reduce risks during the investment period.

### **4.2.1 How to enter an investment – Convertible equity & Syndication**

When the venture capitalist has chosen to invest in a company he/she can provide common equity or convertible equity, where the later is said to enable for the reduction of risk. The venture capitalist can also enter the company as the only investor, or choose to invest in syndication with another investor, if such investor can be found. (Gompers, 1997)

Entering a company in an early phase is seen as a risky project due to that one can not predict the future, convertible equity can therefore be used to reduce the risk. Convertible equity can be seen as a type of debt that once the company proves itself to be successful, through pre-specified milestones, yardsticks or performance, can be converted into

common equity. Convertible equity is the financial instrument that venture capitalists make extensive use of when investing under uncertainty. Convertible equity is by definition an equity investment, but if the company goes into default it is preferred in relation to the common equity. That is due to that the investor holding the convertible equity needs to be paid off before the common equity is paid off. Therefore to provide a company with capital by investing in convertible equity produces a safer investment. (Gompers 1997)

Another way of reducing the risk when entering a new investment is by syndicate the investment with another investor, when a venture capitalists syndicate his/her investment, both the risk and the pay-off is shared with the syndication partner. There are many ways in which syndication can reduce the risk, both when selecting investment but also after an investment has been made. When syndicating the venture capitalist share the company's future financing requirements with the other syndication partners. There are also increased possibility to successfully lead the company, when all syndication partners can contribute with their knowledge and skills. Syndication can also increase the negotiation power for the venture capitalists, and finally create a greater certification at the exit and so lower the risk for undervaluation. (Manigart, Lockett, Meuleman, Wright, Landström, Bruining, Desbrières & Hommel, 2006)

#### **4.2.2 How to acquire information- Information system, Monitoring & Milestones**

After investing in a company the venture capitalist must make sure that he/she obtains information and more specifically the right information needed to make sound judgment and decisions, while governing the company. For this purpose information system and milestones can be used and monitoring can be carried out.

An information system is used by the venture capitalist to obtain information about how the company is performing. This information system can be an already existing system in the company or a new system introduced by the venture capitalist. Due to the cost involved and the limited capacity of the venture capitalist to take in and process information, the information demanded should be concentrated around the key variables, needed to evaluate the company's progress. The information transferred is usually based on the conventional package of information, consisting of balance sheet, income statement and cash flow statement. However, information required by the venture capitalist usually needs to be more detailed and include additional information than provided by the financial statements. The additional information can for example be turnover provided per product line, cost broken down and figures presented in comparison to the company's budget. The normal reporting frequency of once a year is often altered to be more regularly, the frequency might also increase further in times of trouble. The venture capitalist often makes direct and effective demands on information which can help to better allocate resources, and to monitor the company. (Mitchell, Reid & Terry, 1990)

Monitoring refers to how the venture capitalists oversee the portfolio company (Gorman & Sahlman 1989). Monitoring can help to minimize the conflicts that arise between the venture capitalist and the entrepreneur (Kaplan & Strömberg, 2001). Monitoring is made either direct as when the venture capitalist is part of the board of directors or indirect as when the venture capitalist requires the financial statements to be audited by reputable accounting companies (Smith & Smith, 2004; Hellman & Puri, 2000). According to a survey made by Gorman and Sahlman (1989) venture capitalists spend roughly half their time monitoring their investments. In the survey it was stated that the average investment in which the investors had a seat in the board of directors was 5.1. The time that the venture capitalist spent on the firm was foremost divided between assisting in the search

for additional financing, reviewing along with formulating the company's strategy, building the management team and operational planning.

To keep a good track of how the company is performing venture capitalist often uses milestones. Milestones are used to handle the uncertainty in the potential success of the portfolio company (Smith & Smith, 2004). Block & MacMillan (1985) have identified ten milestones, ranging from number one being the concept completion and number ten the initial price change. They took the entrepreneur's perspective while creating the milestone approach but they also point at the usefulness of milestones as a tool when evaluating company performance. Milestones need to be formed after the different characteristics of the company, and they should be linked to significant events rather than dates, as dates are unsuitable for new ventures. The identification of appropriate milestones in a company can help the venture capitalist to gain a better understanding of the strategy and goals of the company. By recognizing the strategies the venture capitalist can make necessary changes to avoid costly errors. When the entrepreneur considers a milestone reached, the venture capitalist compare actual outcome with the company's desired and pre-stated goals. Based on the information currently gained, the entrepreneur and the venture capitalist decide on how to proceed to the next milestone. By using milestones the venture capitalist can assess the entrepreneur's learning curve and how the company's strategy is altered in compliance to new information. However, as the success of the milestone approach depends on that the milestones are company specific, it is a time consuming and costly tool. (Block & MacMillan, 1985)

#### **4.2.3 How to create incentives – Bonding & Share options**

When it comes to reduce risks, the investor can benefit from the creation of incentives for the entrepreneur (Reid & Smith, 2003). Incentives work best when tightly connected to a high level of individual benefit, due to that each person tries to increase his or hers payoff, despite of its impact to others (Smith & Smith 2004).

Bonding is used by the venture capitalist to tie and trigger the entrepreneur to perform according to an agreement. A bond refers to a penalty that will be paid by the party breaking an agreement, making that party worse off. Bonding can be achieved either formally by contract requirements or informally by using reputation or third party certification. In the contract a performance bond, or any other kind of bond, can be included. If a bond is agreed upon the appropriate tools to judge the outcome as well as the consequences of the outcome needs to be decided. (Smith & Smith, 2004)

An additional way to create incentives is to link key persons' performance to benefit by offer these persons share options, or safeguard the entrepreneurs' ownership in the company. The options will give the entrepreneur and other key persons the right to buy a certain amount of shares at a certain price at a pre-determined time in the future. The purpose of having a reward system based on the market value of the company is that this will result in that these persons will act in a way to increase the value for the shareholder. (Kjellman, Silberman & Pallas, 2003) The option approach for incentives will reduce the risk that an entrepreneur or a key person leaves the company and make him/her to work better and more efficient (Borg, 2003). If not using share option, the entrepreneur can be encouraged to keep a certain part of the ownership, where the share value is still of high importance for the entrepreneurs' self interest. Eun & Resnick (2007) states the importance of considering the ownership stake by the manager. This origin in that having a manager with a too small stake as well as a manager with a too large stake can be damaging for the company. When the manager has a too small stake in the company the effort given by the

manager can decrease. If too large the manager controls the company more and can thereby reject investor's wishes.

#### **4.2.4 How to structure the funding of the investment**

According to Gompers & Lerner, (2004) one of the most powerful tools to manage risk is stage financing. Stage financing refers to that the venture capitalist provide a company with another round of funds after accomplishment of predetermined goals, milestones or yardsticks. According to Gompers & Lerner (2004), Neher (1999) and Ruhnka & Young (1991) stage financing makes the entrepreneur committed and interested in the company's continuous progress. Through stage financing the venture capitalist gather information and monitor the development of the company, hence each time a venture capitalist reevaluate a portfolio company he/she acquires new company specific information. This helps the venture capitalist to make informed and correct investment- and valuation decisions. (Bergman & Hedge, 1998) Stage financing helps the entrepreneur to minimize the risk for big losses, as the capital is invested in portions related to the current financial need of the company (Neher, 1999). The approach of dividing the financing in several stages makes it possible for the venture capitalist to reallocate resources or even abandon a company with weak future prospect (Gompers, 1995). The reluctance of the entrepreneur to give up a bad project as long as the venture capitalist provides them with capital, adds to the value of stage financing (Gorman & Sahlman, 1989; Ruhnka & Young, 1991).

#### **4.2.5 How to protect the innovation**

To manage the sources of knowledge, which will provide technological competitiveness are of high importance (Webster & Packer, 1996). Intellectual property rights (IPR) refers to the exclusive rights for venture capitalists and entrepreneurs to protect and declare their ownership rights. Generally, intellectual property is protected through trademarks, registered design, copyrights and patenting. An IPR can be used as a tool to generate income as it guarantees a limited monopoly on market for that specific technology (Bouchoux, 2001).

### 4.3 Summary of the theoretical framework

Risk groups	
<b>Agency risk</b>	Business logic, exploitation of opportunities, allocation of capital, long-term commitment and resignation.
<b>Business risk</b>	Market risk, timing risk, growth risk, exit risk, and political risk.
<b>Innovation risk</b>	Technical risk, demonstration risk and regulation risk.
Tools available to reduce risk	
<b>Convertible equity</b>	A type of debt with the possibility of being converted into common equity, with the intention of creating a safer investment.
<b>Syndication</b>	Sharing the risk by entering an investment with another investor.
<b>Information system</b>	An arrangement used by the venture capitalist to obtain information about the situation of the company.
<b>Monitoring</b>	Refers to how the venture capitalist oversees the investment.
<b>Milestones</b>	Pre-decided smaller goals helping the venture capitalist to evaluate the development of the company.
<b>Bonding</b>	A covenant where a penalty is imposed on the party deviating from an initial agreement.
<b>Share options</b>	An incentive program created by offering the right to buy shares at a certain price at a pre-determined time in the future.
<b>Stage financing</b>	Decrease the exposure of capital through providing a company with capital in stages.
<b>Intellectual property rights</b>	A protection of the technology through exclusive ownership rights.

Table 1 Summary of theoretical framework

## 5 Empirical findings

*“Everything you say has to be true, but you do not have to say everything that is true.”*

- Göran Persson

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The chapter first provides the reader with a presentation of the companies included in the study. Next, information collected from the interviews is presented. First, how the chosen venture capitalists view risk, after which the main part of the chapter focuses on the methods used by the respondents to govern their investment.

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### 5.1 Company information

#### **Industrifonden, Stockholm**

Industrifonden was established in 1979 by governmental funds, but are now a self-financed foundation. The investors working at Industrifonden possess branch specific knowledge in the area that they invest in. Industrifonden foremost invest in the start-up and expansion phase. Industrifonden makes investments in CleanTech, ICT, Industrial Ventures and Life Science and has currently eight CleanTech investments. (personal communication, 2007-12-03). Industrifonden holds funds under management of approximately MSEK 3,400 (SVCA, 2007). The interview was conducted with an investment manager at Industrifonden.

#### **Scandinavian Financial Management AB, Gothenburg**

Scandinavian Financial Management AB (Scandinavian Financial Mgt) was established in 2002 and practices a hands-on approach when investing. Scandinavian Financial Mgt has no pre-specified sectors in which they invest in and has currently one CleanTech investment. (personal communication, 2007-12-10) Scandinavian Financial Mgt holds funds under management of approximately MSEK 40 and invests foremost in the start-up and expansion phase (SVCA, 2007; [www.sfmab.se](http://www.sfmab.se)). The interview was conducted with a co-founder and investment manager at Scandinavian Financial Mgt.

#### **SEB Venture Capital, Stockholm**

SEB Venture Capital (SEB VC) was established in 1995 and is a venture capital division of Skandinaviska Enskilda Banken. SEB VC investment focus is on Technology and Health Care and has currently five CleanTech investments. ([www.seb.se](http://www.seb.se); personal communication, 2007-12-04). SEB VC holds funds under management of approximately MSEK 2,000 and invests foremost in the expansion phase (SVCA, 2007). The interview was conducted with an investment manager at SEB VC.

#### **Sting Capital, Stockholm**

Sting Capital was established in 2002, is connected to an incubator and owned by the foundation Electrum ([www.stingcapital.com](http://www.stingcapital.com)). Sting Capital has no pre-specified sectors in which they invest and has currently two CleanTech investments (personal communication, 2007-12-06). Sting Capital holds funds under management of approximately MSEK 40 and invests in the seed phase (SVCA, 2007). The interview was conducted with an investment manager at Sting Capital.

### **Sustainable Technology Partners Nordic AB, Stockholm**

Sustainable Technologies Fund (STF) was established in 2007. STF invest exclusively in companies within the CleanTech sector and has currently one CleanTech investment. STF invests in the expansion phase (personal communication, 2007-12-05). STF holds funds under management of approximately MSEK 100 (SVCA, 2007). The interview was conducted with a co-founder and investment director at Sustainable Technology Partners Nordic AB.

### **Volvo Technology Transfer AB, Gothenburg**

Volvo Technology Transfer AB (VTT) was established in 1997. VTT is a corporate venture capital company within the Volvo Group. VTT invests in companies that has relevance for the Volvo Group and has currently nine CleanTech investments. VTT invests foremost in the start-up phase (personal communication, 2007-12-10). VTT holds funds under management of approximately MSEK 500 (SVCA, 2007). The interview was conducted with an analyst at VTT.

## **5.2 Risks within CleanTech sector**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

All respondent said that the risk is dependent on how good they choose their investment, a successful management of the risks is based on an successful and comprehensively made due diligence, resulting in that most risks are avoided and not reduced. Nevertheless, some risks are of course still existing, which calls for action. The risks were said to generally depend on the phase in which the company is, rather than if the company is active in CleanTech. According to Industrifonden, those venture capitalists arguing that CleanTech involves more risks than any other sector either lack the appropriate experience/knowledge or have not explored the area enough to have a judgment based on relevant facts. SEB VC explained that the way a venture capitalist normally assess risks is more inline with the traditional sectors delimitations rather than after CleanTech, as CleanTech includes a wide range of sectors.

The below found diagrams present how imminent the risks were viewed by the respondents. After each diagram, some of the comments made by the respondent are included to give the reader a better understanding of what the respondent based his answer on. The respondents were asked to grade the risk accordingly to a scale ranging from 1-5, where 1 was not at all imminent and 5 very imminent.

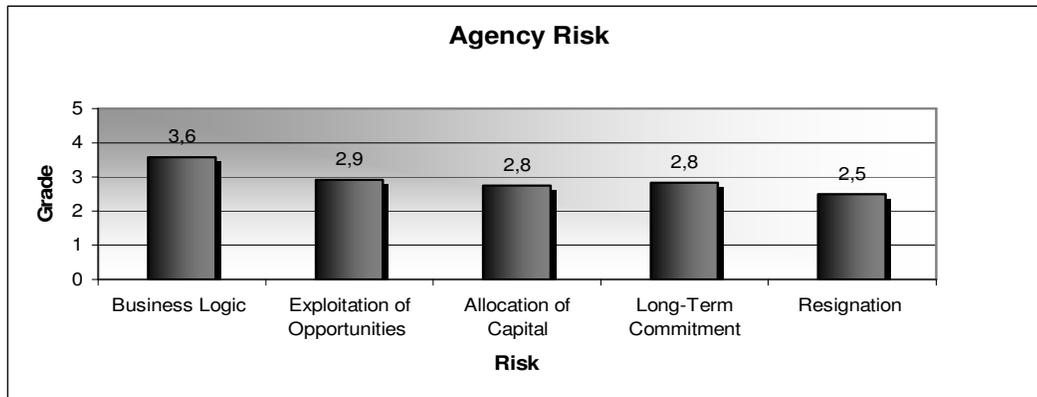


Figure 2 Agency risk

As stated all the respondents made a comprehensive due diligence in which the entrepreneur plays an important role, reducing the agency risk. Additionally, after this due diligence most of the risks in the agency risk group could easily be reduced, and are therefore not viewed as imminent by the respondents, even though commented as crucial area. That the entrepreneur's knowledge and skills is an important part of the investment was agreed upon by all respondents. Therefore it is crucial to make sure that the entrepreneur stays in the company and maintain full dedication to the tasks at hand.

When it came to business logic, there could according to VIT maybe exist some gaps in the entrepreneur's knowledge in some areas which the venture capitalist should assist the portfolio company in filling. The respondent graded the capital allocation risk as low. One of the reasons stated by STF was that the entrepreneur often is reluctant to take in more capital than needed as that makes their ownership diluted. The risk that the entrepreneur should leave the company too early, before any knowledge transfer has occurred, was stated by all the respondents as of major importance, however the tools available made this risk decrease. This risk was also seen as less imminent as the entrepreneurs, in particular in an early phase, were said to be absorbed with what they are doing and their motivation in addition to ambition level is high. According to all the respondents the risk of not using the market potential was also low as entrepreneurs generally are good at taking advantage of opportunities.

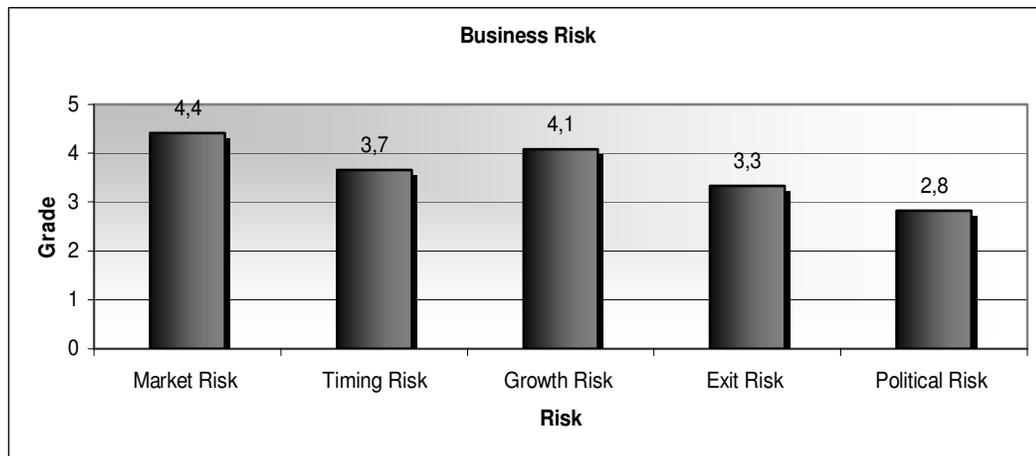


Figure 3 Business risk

Among the business risks the market risk was graded highest, according to Industrifonden it is a risk very difficult to reduce and should be addressed by the venture capitalist. VTT had the same opinion and stressed that the market risk is what they need to try to minimize. The market risk, stated by VTT, includes the changing direction of the demand. These changes in demand are according to STF among other things influenced by changes in market conditions as a consequence of new legislation creating an uncertainty in CleanTech. The timing risk, according to SEB VC, is always present as it is very hard to predict when the time is right for a product. SEB VC also saw a possibility of the timing risk being slightly higher in CleanTech due to the difficulties to know when a new technology or innovation will fit on the market. Something that VTT agreed on when stated that there is a need of maturity of the market for these product and services when they are launched. All respondents, with the general comment that expansion usually takes longer than planned for, graded growth risk relatively high. Industrifonden claimed that exit risk in CleanTech is slightly higher than in other sectors due to a longer time to exit and because it is fewer venture capitalists active in the sector. STF on the other hand stated that there is always a way of doing an exit and justified a low grading by stating that there is always someone willing to buy, especially a company with a great technical advantage. The respondents graded the political risk to be relatively low. Industrifonden said that the political risk only is a risk for people that do not possess the understanding about the political forces in the sector and justified the low grade with their thorough experience and knowledge. STF however, said that the political risk is always there as a shadow, as a risk but also as a possibility. This is due to that subventions and other policies differ, one mandate period to the other. Therefore they conduct a sustainable analysis, in which they make sure to ask the right question regarding the sustainability of the technology. The analysis is based on a model in which a vision of a future sustainable society is pictured. In this model a number of assumptions regarding the cause of the environmental problems as they are known today are stated. The technology is not allowed to break any of these assumptions as that would mean that the technology does not belong in a sustainable society. STF uses their sustainable analysis to prove that their portfolio companies comply with the vision of a sustainable society.

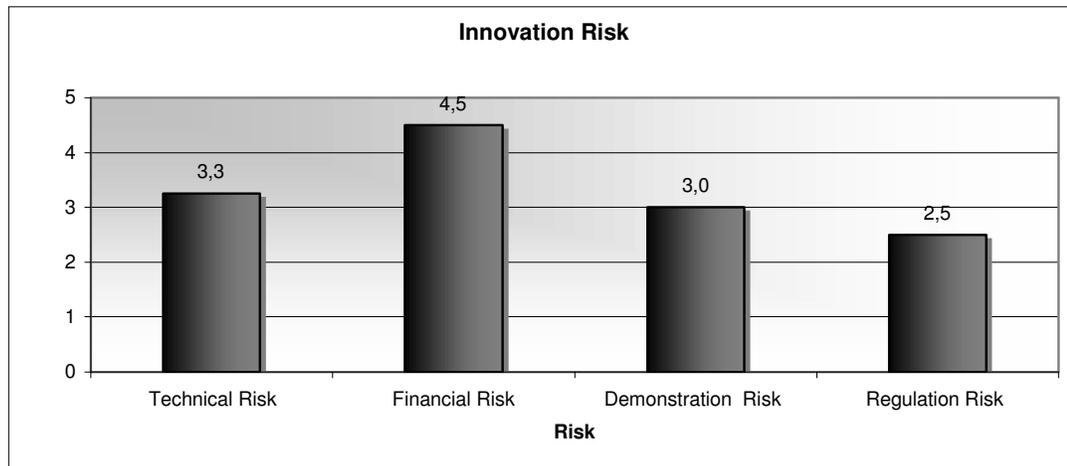


Figure 4 Innovation risk

According to Industrifonden, SEB VC, STF and Sting Capital the technology is, even though important, associated to a low risk, as a good team always works around the potential failures of a technology. Industrifonden further stated that technical risk is rarely an issue if investing in a later investment phase. On the other hand, VTT said that there is often a higher technical risk when investing in new technical areas. This is due to the reduced amount of available knowledge and experience regarding the technologies in question. Scandinavian Financial Mgt stressed the risk of a technology failure while emphasizing the possibility to build a good team on a superior technology. Financial risk was in theories incorporated under the technical risk, however during the interviews the authors realized the importance of this risk and decided to present it by its own. All the respondents saw the financial risk to be of high significance due to that the venture capitalist and the entrepreneur often make different judgments of how much capital needed. Sting Capital said that a reluctance to reinvest signals a bad project to new investors, increasing the financial risk. The demonstration risk received an overall low grading. Sting Capital said that it is a risk they are aware of but they said that once you are in an investment it means that the demonstration risk has been somewhat accepted. Industrifonden stressed the importance of the verification for a potential customer, but it was not necessarily connected to a high risk. The regulation risk was generally seen to be low for the respondent, due to that they make a careful due diligence before investing and normally are good informed about future regulations govern the market. Sting Capital reversely graded the regulation risk to be the highest among the innovation risks, important to be aware of as it can cause a drastic and sudden change on the market.

### 5.3 Tools used by the respondents to govern the investment

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

When committing to an investment the respondents set up a shareholders agreement<sup>4</sup>, the agreement is usually very detailed, comprehensive and is often a document of no less than 20 pages. In this agreement all respondents use relatively standardized covenants, complemented with investment specific covenants if found needed. The specific adjustments are however said to only differ slightly between the investments. This agreement are revised or remade in the case of new financing provided through emissions, and only used in case of negative deviations from what initially was agreed on.

The different contracts and covenants that are included with the purpose of safeguard the respondents' different rights are discussed under the heading contractual rights. The actions that the respondent can take in case that the entrepreneur deviates from what has been agreed upon are discussed under the heading bonding. The different milestones to be used, information requirement, incentive tools, how to infuse capital in addition to how convertible equity is used will be discussed under individual headings.

### **5.3.1 Contractual rights**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

The rights that the respondents require when enter the investment as a minority owner has to do with their contribution to the board of directors and veto rights. All respondents said that they use their right to be a part of the board of directors. As a member of the board of directors follows a right to, in consent, dismiss and appoint the CEO. Additionally, as owners they have the right to vote at the general meeting where the shareholders, among other things, appoint board members. This was particularly noted by VTT, that emphasizes the importance of appointing the right board member. VTT always have at least one of their own employees in the board of directors of the portfolio company. However, when there is an opportunity to, in cooperation with the entrepreneur, appoint additional board members they emphasizes the importance of appointing the right person. The right board member possesses skills and branch specific experience or other complementary experiences. For VTT an example of a right board member was someone with relevant experience and networks in the area in which the portfolio company is active, and that can add to the collective competence profile of the board.

Veto rights was said by the respondents to be a way for them to govern their investments and control risks, all of the respondents was minority owners and therefore their insight in the companies was falling short. Veto rights were included in the contract used by VTT, STF, Industrifonden and SEB VC. SEB VC stated that the veto right was required for questions related to the business model, changing the business idea and sales of assets. STF wished to have veto in issues regarding the company's use of cash-flow. VTT chose not to explicitly say which veto rights they require but emphasised that these rights are only used in case when things are taken to the extreme. The veto right should according to VTT not hinder the easiness of the company to conduct business. Sting Capital and Scandinavian Financial Mgt on the other hand found that the rights already built-in with the ownership are enough to give them the influence that they require.

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<sup>4</sup> A shareholder agreement is the agreement that has to be created in order to make the change in ownership structure to be valid by law.

### **5.3.2 Convertible equity**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

Four of the respondents, VTT, Industrifonden, STF and Sting Capital said that they made use of convertible equity, to a varying extent. It was converted after company performance or after a pre-specified termination date. One of the four respondents also used ongoing convertible equity which gave them the option to convert the equity at any point in time. VTT rarely used it but saw its usefulness on the odd occasion as the use of convertible capital can buy the venture capitalist time to decide how to continue the relationship with the portfolio company. This idea was shared by Industrifonden who considered a convertible equity investment to be a way to invest without investing. Industrifonden treated their convertible equity investment as a passive investment, meaning that they do not take a seat in the board of directors or engage themselves more than any other creditor. By using convertible equity they are not held accountable for the portfolio company's destiny nor do they have the same obligation to provide the portfolio company with additional capital, as when investing with normal equity. It reduces the risk of getting stuck with a bad investment. According to STF convertible equity made the risk horizon for the investment decrease as they are able to decide if and when to convert their convertibles. Despite the benefits of convertible equity, Industrifonden and STF said that they make moderate use of it as they are concerned with the negative influence that such "debt" has on the balance sheet of the company. The other negative aspect was the difficulty for a company in an early phase to pay the interest required. This was addressed by Industrifonden who said that they allowed illiquid companies to accumulate the interest until the company was liquid. STF however viewed these interest payments as a way of, although to a low degree, decreasing the risk of not getting anything back from the investment in case of liquidation. Sting Capital was the respondent that made the most use of convertible equity, although being fully aware of the potential danger of the negative impact on the balance sheet. This impact is addressed through a contract saying that if the debt/equity ratio drops below 0.5 the amount needed to reach the approved ratio is converted according to a pre-determined rate. In addition to the benefits stated by the other two respondents Sting Capital stated that while normal equity is consumed convertible equity is a claim on the company, which reduces the risk of ending up with nothing at a potential liquidation. This is of major importance as according to Sting Capital the most common blame for failure was not that the technology is insufficient. It is therefore often a value in the technology that according to them can be recovered in case of liquidation, investing with convertible capital can mean a preferred place in relation to other investors. Sting Capital also used convertible equity in order to postpone the valuation of the company. This is achieved by setting the conversion rate accordingly to the next investors' valuation of the company in combination to a predetermined discount. Through this Sting Capital said that they could avoid the argument with the entrepreneur, on the value of the company at a point when there may be a lack of known facts to base the valuation on.

### **5.3.3 Syndication**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

Syndication between venture capitalists is according to Sting Capital becoming more and more common. Even though all respondents have made the odd investment without a syndication partner they all discussed the importance and benefits of the existence of other investors with whom to syndicate their investment with. The respondents stated that several investors mean more time spent on the company, hence more eyes on the performance and behavior of the company. As Sting Capital along with Industrifonden said; if one investor fails to recognize a risk or a market potential, this might be identified by another of the partners. Other benefit of syndicating investments that all respondents pointed out was the gain of additional or complementary knowledge and networks. Scandinavian Financial Mgt said that they syndicate their investment with people or companies chosen due to their industry specific knowledge, to invite the right people is experienced as very beneficial in the work of developing the company. VTT shared this tactic and stated that all venture capitalists can contribute with capital but it is the intelligent capital that makes the difference in terms of reducing risk. Through a larger network consisting of customers, employees and suppliers the likelihood of a successful investment as a result of the company development increases.

Additional reasons for syndicating are according to all six respondents said to first be the possibility to lessen the initial investment as the total amount needed in the company is divided among the syndication partners. Second, the portfolio company's potential need of supplementary capital to reach a goal is divided between the partners. STF linked syndication to the level of security of the investment, where syndication is a tool to reduce the management-, technical-, market-, and financial risk. According to Industrifonden syndication could be seen as of greater importance in their CleanTech investments in order to safeguard their exit, due to the current lack of investors. By attracting more investors to the CleanTech sector in an early phase, helped them reduce the risk of standing without a buyer when wishing to exit.

### **5.3.1 Information system**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

The best way for the respondents to obtain valuable information on how the company is performing is said to be through their work in the board of directors, where their seat is a result of the ownership. However, to gain further insight of the performance of the portfolio company all respondents said that they also have other information requirements that the company has to comply with.

SEB VC stated that they asks for monthly reports from the portfolio company where some of the, according to them, more important financial aspects are covered, and quarterly a more thorough report concerning the situation of the company. They said that by obtaining information so regularly they together with the other board members have the possibility to act upon warning signals of possible upcoming problems. Sting Capital also obtained reports monthly and quarterly. The reports include an updated balance sheet showing on the current financial situation, the performance benchmarked to the budget, a prediction of how long the portfolio company's received capital will last and the most important milestones to be reached. Industrifonden said that they additionally ask their portfolio company to carry out, or purchase, a market analysis. This is however seen as unnecessary and not time efficient by Sting Capital. They rather see that this information comes automatic through the entrepreneurs' engagement and knowledge about the market

in which they are active. According to STF they require information on cash flows, customer orders, and how the finances evolve. They stressed the importance of the information being consistent over time. If not consistent the entrepreneur could provide one kind of information one month and another kind the next, choosing what information to provide and complicate STF's ability to control and judge the performance of the portfolio company. VTT requires information of the latest months' performance, a financial projection for the next coming three to six months and a cash-flow analysis. By using this kind of information system VTT said that they could maintain a better overview and avoid the risk of sudden capital need, as well as enabling them to better predict the future performance of the portfolio company.

Scandinavian Financial Mgt had a slightly different view on what information that was important and how to obtain it. They, in addition to the information received from the seat on the board of directors, obtained their desired information by spending time with the entrepreneur. They said that thorough financial reporting are of less interest to them as the companies that they normally invest in does not have any revenues or cash-flow. Instead the information interesting for Scandinavian Financial Mgt is how the technology is developing, the potential IP application, the capital left in the company and the situation of the entrepreneur.

### **5.3.2 Monitoring**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

All respondents said that they actively monitor their portfolio companies, mainly through their work in the board of directors. But also, to various extents, by actively support their portfolio companies in their daily work. They agreed that to be able to work with, and monitor, the company in a satisfying way, a venture capitalist should not be responsible for more than three to five companies. The time spent on the portfolio company depends on the current phase and situation.

Sting Capital said that their main strategy in how to reduce risks is to be connected to the incubator, where companies can stay for up to two years. Together with the entrepreneur/innovator they develop a clear view of the business plan, launching plans and provide the entrepreneur with marketing skills, customer behavior knowledge and how to analyze their competitors. They also together screen the market for potential partners, potential customers as well as spotting the portfolio company's strength and weaknesses in an early phase. According to Scandinavian Financial Mgt time spent on the company ranges from being close to full-time in the earliest phases to one or two working days a month when the company is up and running. Scandinavian Financial Mgt can be present at sales meeting, engage themselves in the search for customers and further active in the daily work of the portfolio company. They might also help with starting up the company, in exchange for a larger ownership. This hands-on approach they said especially reduces the market risk as they have the actual contact with the customers, plans the IP application, works with the business model, and helps shaping the company strategy. STF stated that monitoring and being active in the portfolio company gives possibilities to the company in terms of network and supporting long-term thinking. They however stated that they are not technical experts, therefore they do not give technical advises or tell how the product should be developed. Rather they worked with financial questions and questions related to improving sales, attract people, and build business plans for international expansions.

### **5.3.3 Milestones**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VIT, 2007-12-10).

Milestones are a method used by all respondents to align the goals between them and the entrepreneur. All the respondents stated that most of the time the milestones are based on events that the entrepreneur should fulfill within a certain timeframe. It was also said that the respondents and the entrepreneur most commonly decided the milestones together. SEB VC explains that this practice was used because they believe that the entrepreneur knows best what goals are realistic. The chosen milestones varied depending on the company's specific characteristics but some examples of the areas where milestones are common were to develop a new prototype, launch a new product, to penetrate a new market and to reach a certain volume of sales. As a company's development normally is flexible, the milestones decided from the beginning can according to all respondents be adjusted during the investment period to better suit the current situation of the company. These changes were with respect to both internal and external factors, something agreed on to be important. Scandinavian Financial Mgt mentioned with support from the other that the milestones often are linked to technical- and sales based achievements. Technical based milestones were especially common for those respondents who invested in an early investment phase. This according to VIT is due to the fact the technical issues can have a severe impact on the development of the company.

As the respondents are unable to constantly be completely up to date with what is going on in their portfolio company, the respondents said that they use milestones as a tool to control how their portfolio company performs. Scandinavian Financial Mgt saw the different milestones as control points, useful when it comes to make sure that they know how the company is performing. They also saw a clear advantage with milestones as a help to make sure that the entrepreneur is not spending more capital than projected for. VIT had a similar opinion and felt that milestones were very useful when it came to make a clear picture of how much capital required to take the company from A to B. Industrifonden said that milestones were an effective tool to keep the entrepreneur focused on the main task, with other words, makes sure that the entrepreneur does what he/she has undertaken during a certain time. STF further said that milestones help to enhance trust between them and the entrepreneur with the condition that the entrepreneur actually reaches the milestones.

All respondents were very positive towards the use of milestones and found them useful to reduce a variety of risks. However SEB VC also pointed at the potential negative side of milestones increasing the risk of goal incongruence. According to SEB VC, there is a possibility that milestones could give rise to short-term thinking as the entrepreneur wants to reach the next milestone and therefore take a course of action not optimal for the long term development of the company. This conflict was said to most likely occur if milestones in sales, growth and profitability are combined.

### **5.3.4 Bonding**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VIT, 2007-12-10).

Scandinavian Financial Mgt with support from all other respondent stated that it is not a viable option that the person being invested in all of a sudden decides to leave. As a result all respondents made use of competition clause for the entrepreneur and, to some extent, other key persons. If leaving the company this clause limits the entrepreneur to conduct business in the same area as the company is active in for a certain pre-specified time, where the time differs between the investments. In Industrifonden's case the time span for this competition clause was said to usually vary between 6 and 24 month. However, all respondents noted, that it is difficult to use this clause in practice, as it is somewhere in the grey zone of the law concerning the right to earn a living.

Industrifonden as well as the other respondent stated that they used a penalty clause which ties the entrepreneur to the company for a certain time. Meaning if the entrepreneur would choose to leave the company before the time agreed upon is reached, a penalty clause would force the entrepreneur to sell his/her shares at a discount, or the option programme, if such is entered, is expired. VTT stated the possibility to be creative with how to make the entrepreneur stay. They said that the penalties may differ depending on when during the time span the entrepreneur decides to leave the company. For example, if staying only one year the entrepreneur may keep 20% of the shares and if staying 2 years 40% of the shares and so on. SEB VC used a type of penalty clause in which the entrepreneur reversely are hindered to sell his/hers share until SEB VC does their exit. Sometimes the entrepreneur is also obligated to stay as an owner even after exit is made by SEB VC if the new owner wishes so.

Scandinavian Financial Mgt however stated that to tie the entrepreneur too much to the company is a risk in itself, as it can have a reversal effect on the motivation than intended. For the entrepreneur to be too tied up could cause a decrease in the motivation felt by the entrepreneur. The same effect may be seen if the entrepreneur is tied up by contracts but have no or little ownership left.

### **5.3.5 Share options and entrepreneurial ownership**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

Share options were by the respondents used to create incentives and as an attempt to create goal congruence between them and the people running their portfolio company. The usage however differed among the respondents, Industrifonden as well as VTT were somewhat sceptical to the usefulness of share options due to the Swedish tax system. Industrifonden was very hesitant towards the usage while VTT used it to some extent. These share options were then used in order to attract and reward future or present key personnel who contribute with valuable competence to the development of the company. Scandinavian Financial Mgt and SEB VC took a similar approach as VTT and used share options to motivate those with no or diluted ownership, however to a larger extent than claimed by VTT. STF stated that they offer share options in order to prevent key people, whom they would like to see as long-term owners, to leave. The offer gives the person an option to buy shares for a pre-determined price in three years time, and if the person leaves the company before the termination date the option expires. Sting Capital in addition offered persons that are appointed to actually run the company share options to create incentives.

The entrepreneur that was in the portfolio company from the start was by all respondents encouraged to keep a part of the ownership in order to stay focused and motivated.

Industrifonden believed that the optimal ownership held by the entrepreneur is somewhere around 10-20%. SEB VC wanted the entrepreneur to hold at least 10% of the ownership while Sting Capital preferred if this ownership is between 5-10%. However, Sting Capital agreed with VTT and Scandinavian Financial Mgt when stated the difficulty to evaluate what percentage that is the optimally held by the entrepreneur as it depends largely on how much capital being brought into the company, the size of the company and the numbers of entrepreneurs. Industrifonden stated the risk of leaving the entrepreneur with too much ownership as this may cause him/her to reject further capital in order to keep the control. To reject capital could hinder the exploitation of expansion opportunities available to the company. Therefore, according to VTT, an agreeing view in how the future will evolve, including the capital requirements is important at the time for the initial investment.

### **5.3.6 Stage financing**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

Stage financing was a common way of distributing the capital to the portfolio company among most of the respondents. However Scandinavian Financial Mgt used it to a modest extent and Sting Capital rarely used stage financing, they normally only make one or maximum two investment rounds. All the respondents that make use of stage financing stated that the total amount of capital and the amount allocated in the different rounds are decided through a negotiation between them and the entrepreneur. SEB VC said that when the budget was planned with the entrepreneur a scheduling of the capital infusions were made at the same time. The different rounds of capital infusions are usually, but not always, linked to milestones where SEB VC and STF pointed at the incentive advantage that this combination could give. They explained the incentive advantage comes from that the entrepreneur has to reach the pre-determined milestone to receive additional capital. All respondents talked about the usefulness of stage financing when it came to controlling the flow of capital and to monitor how the portfolio company uses the capital. They agreed on stage financings being a good tool to avoid the risk of exposing too much capital through a single round of financing. SEB VC noted that stage financing was mainly useful in a company that were in its earlier phases and saw less suitability in a mature company with an existing turnover.

### **5.3.7 Intellectual property rights**

This section is based on data gathered through personal communication (Industrifonden, 2007-12-03; SEB VC, 2007-12-04; STF, 2007-12-05; Sting Capital, 2007-12-06; Scandinavian Financial Mgt, 2007-12-10 & VTT, 2007-12-10).

Industrifonden's request for an IPR differs depending on the technology. SEB VC additionally stated that patent is not as widely used in CleanTech as it is in medicine, unless it comes to a solar cells technology. But if the technology is suitable for a patent, SEB VC wants this to be present. It needs to be a well-suited and thoroughly worked through patent strategy showing on the continued work of how to protect the technology. VTT agreed with Industrifonden and SEB VC when stated that an IP protection was not a criterion deciding if they invests or not. However they prefer that a possibility to apply for an IPR exists. VTT saw the patent, and other IPR, as a part of the substance of the company, together with the entrepreneur and the knowledge. According to Scandinavian Financial Mgt's one benefit of having a patent comes from the avoidance of doing a patent

trespassing, which could lead to the company being sued. For a company with no excess cash being sued for trespassing would most likely lead to default. The other benefit a patent brings is the potential impact a patent has on the value of the portfolio company. In their CleanTech investment they have involved a very capable patent engineer. STF stated that patent was not necessary the best approach to safeguard against competition. In many of the CleanTech areas today the demand is so large, and according to STF it is more about being at the right place with the right offering. STF argued that in the dynamic market that we experience today customer wants to buy now, so to make use of market potential priorities should be on finding the way to the market rather than spending time on applying for a patent.

## 6 Analysis

*"It's a damn poor mind that can only think of one way to spell a word"*

- Andrew Johnson

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In this chapter the authors have combined the information provided by the respondents with theory. They have further analyzed the methods and tools used by the respondents to see how these methods reduce risk. The tools are analyzed in the areas in which they are seen, by the authors, to have their main function.

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To best handle an investment Landström et al. (1998) advocates the need of creating a relationship where both party's are allowed and encouraged to contribute with their comparative advantage. The respondents stated that such relationship can best be created when the venture capitalist does not govern more than five investments, agreeing with Gorman & Sahlmans (1989) survey. An overall opinion among the respondents is that their expertise and network contribution in addition to capital helps to reduce risk for the portfolio company. Additionally, with their influence and control over the company the respondent can encourage the entrepreneur to run the company successfully and dedicated. Landström et al. (1998) further argues that rights and obligations between the venture capitalist and the entrepreneur are governed through different types of contracts and covenants. The contract above all contracts, the shareholder agreement, includes standardized covenants complying with Isaksson et al. (1998), but are also complemented with covenants believed to be needed in the specific investment. The covenants included, contradictory to what Milgrom & Roberts (1992) states, are most of the time very specific. The covenants that need to be flexible and adoptable such as milestones are as the respondents stated changed according to circumstances instead of being broad and unspecific.

### 6.1 How to reduce agency risk

The risks included in the agency risk are connected to the entrepreneur and concern the areas: business logic, exploitation of opportunities, allocation of capital, long-term commitment and resignation.

Separation of ownership, goal incongruence and lack of trust causes the agency risk (Jensen & Meckling, 1976; Arthurs & Busenitz; Mason & Harrison, 2003) The different risk associated to agency risk all received a fairly low grading by the respondents meaning that they do not view the agency risk as a whole as particularly imminent. The low grading indicates trust and faith in the entrepreneur whom the respondents invest in. Kaplan & Strömberg (2001) says that one of the main tasks for a venture capitalist is to build the management team. A well-composed management team reduces agency risk, however it is easier said than done, leading to the usefulness of other tools. According to Gompers (1997) convertible equity is a good tool to use when investing under uncertainty. This was emphasized by Sting Capital that invests only in early phases and strongly advocates the use of convertible equity. By investing with convertible equity, Sting Capital attempts to reduce the impact of a potential failure of the entrepreneur/management team. If the investment ends with a forced liquidation, there is often still a value left in the technology that they can retain. This benefit of convertible equity can therefore reduce the impact of the agency risk as a whole.

Energimyndigheten (2007) stated that there was a general lack of businessmen in the CleanTech sector. The risk influencing the agency risk overall received low grades but the risk that the **entrepreneurs lack the needed business logic** however received a comparative high grade. The respondents can be seen to mainly attempt to reduce the impact if a failing business logic would become a fact. The effect that a lack of business logic could cause can be reduced by several of the methods used by the respondent. All respondents carried out their monitoring by being part of the board of directors, referred to as direct monitoring by Smith & Smith (2004). This type of monitoring made the respondents better informed of how the entrepreneur conducts business and exposes a potential lack of business logic. These shortcomings can then partly be compensated for by having the right board member, which was mentioned by VTI, and so reduces the impact of a failing logic. Additionally to monitoring, Manigart et al. (2006) advocates the use of syndication, which according to them would bring additional knowledge and skills to the company. The respondents agree with Manigart et al. (2006) about the benefit that syndication brings. However, the increased numbers of eyes watching and evaluating the entrepreneur as stated by Industrifonden can be seen as the main benefit arising from syndication when it comes to spotting a failure in the business logic. Scandinavian Financial Mgt and Sting Capital additionally to reducing the impact also work actively in a way that can reduce the likelihood of failing business logic in the entrepreneur. This is done through Scandinavian Financial Mgt's hands-on approach allowing them to easier transfer their knowledge and experiences in how to conduct business to the entrepreneurs. Sting Capital takes this further by being connected to an incubator in which the entrepreneurs receives training in how to survive on the market.

The respondents view the risk that the **entrepreneur fails to spot and exploit market opportunities** as low. According to the respondents, entrepreneurs are generally good at making use of opportunities and entrepreneurs within the CleanTech sector are no exceptions. Even though the risk is seen as low, the respondents still used tools to safeguard the exploitation of the market: syndication and to some extent information systems. The respondents use syndication, which can be a way to reduce the likelihood that an opportunity is missed. To successfully spot opportunities on the market, a close observation of the market forces is needed. Through the presence of syndication partners such observation is facilitated. This then leads to a better understanding of the company's current fit in its environment and where it possesses the potential to be. Information systems are by Mitchell et al. (1990) said to provide the venture capitalist with internal information of company performance. Internal information combined with the additional market information that Industrifonden requires their portfolio company to provide can help to reduce the risk of missing out on opportunities. Mitchell et al. (1990) though stresses the importance of the venture capitalist being able to process and make use of the information obtained. That can be seen in the case of Sting Capital, who chooses not to ask their portfolio companies for any thorough market information as they do not consider it time efficient. Sting Capital rather believes that the entrepreneur knows the market and how to utilize the opportunities posed by it. As Industrifonden has a large degree of branch experience a market analysis would be more beneficial to them in assisting the entrepreneur than to Sting capital, who has more of their strength in their close relationship with the entrepreneur.

**Wrong allocation of capital** as a result of goal incongruence (Jensen & Meckling, 1976) received an overall low grade by the respondents, due to the tools available to the respondent. First, contractual rights can be used to hinder this from occurring, where the right discussed by the respondent was the veto right. SEB VC and STF used the veto in a

way that reduces the risk of associated to capital allocation. SEB VC does this by having veto in issues concerning the business model and STF by having veto in questions related to the use of the company's cash-flow. To further reduce the risk of unfavourable investments activities, incentives should be created for the entrepreneur to behave accordingly to the interest of the venture capitalist. To create incentives and in other ways preventing overinvestment the respondents applied milestones and stage financing. According to Block & MacMillan (1985) milestones assist in evaluating how the company performs which can help the venture capitalist to assess the company's capital requirements over a certain period. The respondents claimed the additional advantage in using milestones is that it helps aligning the entrepreneur's goals to their own. By creating milestones in cooperation with the entrepreneur, the incentive for the entrepreneur to work in a manner complying with these milestones may be increased. By combining milestones with additional rounds of financing the venture capitalist is able to determine the capital infusion according to the actual capital requirement of the company (Gompers & Lerner, 2004). This is confirmed by VVT and Scandinavian Financial Mgt, who state that this combination provides a clearer picture of the capital needed to take the company from A to B. As the capital is allocated according to the need of the company, this could be a way to reduce the risk that the entrepreneur wrongly allocates the capital. Sound branch experience which Industrifonden possesses, increase the ability to correctly evaluate the milestones, which further reduces the risk of too much capital being used on unsuitable investments.

The risk of the **entrepreneur losing commitment** to the company is of concern for the venture capitalist. Gompers & Lerner (2004), Neher (1999), Ruhnka & Young (1991) mean that stage financing will make the entrepreneur committed. Most of the respondents use stage financing. As there are a new valuation of the company at each round of financing this will keep the entrepreneur committed to the tasks at hand, as the cost of receiving a lower valuation is carried by the entrepreneur. Milestones are according to Industrifonden a way to make sure that the entrepreneur stays focused, this should hold true even more as the milestones are partly created by the entrepreneur and not forced on him/her. Kjellman et al. (2003), advocates the use of share options, which is used by several of the respondents. With a well-created share option programme, goal incongruence ought to diminish as the goal of the entrepreneur should be the same as the goal for the venture capitalist, to increase share value. Share options are offered by the respondents to create goal incongruence and incentives for those with little ownership in key positions in the portfolio company. A couple of the respondents though, had a doubtful relationship to share options, due to that, foremost argued by Industrifonden, the tax system decreases the effect of these programmes. It is also seen as important that the entrepreneur retain some of the ownership in order to keep his/hers ambitions. However, an optimal ownership is hard to determine. An additional way to keep the entrepreneur committed is to give him/her more control over the company. Scandinavian Financial Mgt and Sting Capital stated that the only "rights" that they require are the ones resulting from an ownership. This approach may be rewarding, depending on what type of entrepreneur and his/hers skills and previous experiences. Both these two venture capitalist has a very close relationship to their portfolio companies, so for a company not as hand-on as these two this approach may be more damaging than rewarding.

As with the other agency risks, the risk associated to that the **entrepreneur might resign** before the entrepreneur's knowledge has been transferred is not viewed as high. The respondents however, of course agreed with Neher (1999) who states the negative effect on the value that a resignation of the entrepreneur would have, but said that the likelihood

is low. This is partly due to the entrepreneurs' own ambitions and motivation level, but also due to the contracts made at the initial investment occasion and share option programmes. The respondents' used competition clauses, forced the entrepreneur to sell his/her shares and expired the option programme if the entrepreneur resigned before an agreed upon time. These actions are by Smith & Smith (2004) discussed as bonding, a way to create a penalty for unwanted actions taken by the entrepreneur, here, leaving the company. With these penalties the respondent creates a hinder for a key person to resign before it is believed that the company has an equivalent value without this person. However, the difficulty of making use of the competition clause in practice creates doubt towards the tool. VTT has different conditions in their penalties depending on how long time the entrepreneur stays. This is ought to create a feeling of being rewarded for staying rather than punished if not, indicating on suitable criterion chosen as discussed by Smith & Smith (2004). As Scandinavian Financial Mgt said, there is a risk of tying these persons to the company without any personal gains involved. This may lead to a decreased performance, increasing the other risks included under the agency risks. These penalties can therefore beneficially be best combined with the use of share options or that the person has a relatively significant part of the ownership.

## 6.2 How to reduce business risk

The risks included in the business risk are mainly connected to the market together with the commercialisation and concern the areas: market, timing, growth, exit and politics.

Business risk refers to the challenge for venture capitalists to create an alignment between the business strategy of the portfolio company and the potential future value of that particular strategy (Frigo & Sweeny, 2005). The risks grouped under business risk all received high grading, indicating that the respondents view this challenge as tough. Reid & Smith (2001) states that these risk are consequences arising from the issue of being able to correctly judge the value of a new product. If the respondents are unable to correctly predict the value of a portfolio company's product that also affects the possibility to value the company itself correctly. Sting Capital uses convertible equity to a large extent as it provides an opportunity to delay the valuation process. This reduces the risk of an incorrectly valuation that the uncertainty of the future demand of the product brings. The way Sting Capital uses convertible equity is in line with what Gompers (1997) notices about convertible capital, namely it is useful when investing under uncertainty.

According to Wüstenhagen & Teppo (2004) **market risk** is dependent upon future customer demand which is difficult for the company to influence. The respondents recognized this by grading the market risk as very high. Scandinavian Financial Mgt attempts to reduce the market risk through their hands-on approach. The familiarity with the product that such approach can give enables a better prediction of the products fit on the market. This could make it easier to assess the likely response of the market to the product, and if needed cooperate with the entrepreneur in adjusting the offering. This active monitoring, as a tool to reduce market risk can also be seen as acknowledged by STF. STF focus mainly on the strategic development and financial aspects of the company. The focus is chosen as these are the areas in which STF consider their competences to be, whereas the entrepreneur has the technology knowledge. The approach taken by STF to reduce the market risk closely relates to what Landström et al. (1998) stresses as being the benefit arising from a relationship based on the individual comparative advantages. A similar relationship as the one between the venture capitalist and the entrepreneur can also be created between venture capitalists. Keeping an eye on the market enables a more

accurate judgment of the potential shifts in customer demand on the market. As this is a challenging task, Manigart et al. (2006) points out the great potential in combining the knowledge and skills from syndication partners. VTT, and other respondents, agreed with this logic and therefore syndication can be seen as a method to decrease the market risk as it means more eyes trying to spot the changes. One additional aspect of the market risk is the need of protecting the company and their technologies against existing and potential future competitors. According to Bouchoux (2001) technologies can be protected through IPRs such as patents, through which venture capitalists and entrepreneurs declare their ownership rights over a technology. Giving, according to Reid & Smith (2008), a guaranteed limited monopoly of the technology on the market. The respondents welcomed patent and other IPR, however mentioned the drawback that patent makes the technology available for anyone. Bouchoux (2001) additionally states that patent is a good way to generate income. STF however did not fully agree with this statement as they advocate that due to the booming demand of these technologies the right offering at the right time is the best way to safeguard income. The right offering would make it easier to attract customers leading to a reduced market risk.

**Timing risk**, according to Wüstenhagen & Teppo (2004) relates to entering the market at the right time. SEB VC brought up the difficulties of correctly judging when to launch a product, causing the timing risk to be of major concern. Both SEB VC and VTT emphasized the possibility of this risk being higher when investing in CleanTech as it is particularly hard to determine when the market is mature enough. One way of reducing the timing risk could be to require a market analysis, as Industrifonden does, providing market awareness to both the venture capitalists and the entrepreneur. Monitoring helps influencing the use of the appropriate strategies where syndication helps to improve those strategies by extra skills and eyes on the market, hence reducing timing risk.

Wüstenhagen & Teppo (2004) argues that **growth risk** is related to the pressure of the company to grow with the market. However, the respondents additionally discussed the growth risk's link to the inability of the entrepreneur to judge the timeframe of expansion. A longer timeframe could cause higher costs and greater risks therefore the respondents ranked the growth risk as high. According to Block & MacMillan (1985) milestones are built on previous performance, after comparing the actual outcome to the pre-stated goals. By using milestones the venture capitalist are able to help in the assessment of the entrepreneur's learning curve and performance, and therefore better judge the time and capital requirement for an expansion. As milestones are by the respondents stated to be set up in cooperation with the entrepreneur and are altered over time, these milestones can reduce the time for an expansion but also improve the accuracy of judging the required time. Another factor influencing the grading of the growth risk is an entrepreneur's possible reluctance to take in additional capital. To allow for growth a company needs capital however, the more capital the company takes in the more diluted the entrepreneur's ownership becomes. To increase the incentive for the entrepreneur to take in additional capital to allow for expansion Scandinavian Financial Mgt offers share options to the entrepreneur whose ownership is getting diluted. At the same time if the entrepreneur receives a too high level of ownership there is a possibility that it increase the growth risk as the entrepreneur does not want to lose any ownership and therefore refuses to take in more capital.

According to Cumming et al. (2005) **exit risk** deals with a possible delay of the exit or deviation in terms of return at exit. The respondent focused on the first aspect of the exit risk. STF opinion was that there is always a buyer if the technology is good enough, in

CleanTech as in other sectors. Industrifonden reversely, views CleanTech as associated to a slightly higher exit risk as they also saw fewer potential buyers, causing their inability to exit the investment as planned, increasing the cost. According to Manigart et al. (2006) syndication gives a greater verification of the company and technology at the exit point. The verification is based on the fact that more than one venture capitalist sees the potential in the company. Industrifonden agrees when arguing the usefulness of syndication when it comes to reducing the exit risk, especially within the CleanTech sector. They additionally saw syndication as a possibility to attract more investors to the CleanTech sector and thereby increasing the numbers of potential buyers at the exit point, reducing the exit risk.

**Political risk** is according to Energimyndigheten (2007) high in CleanTech explained by the large impact political decisions is said to have on the business environment. This opinion however is not shared among the respondents, whom ranked political risk as low in comparison to the other risks influencing business risk. The way to deal with this risk is simply to be informed of the political environment surrounding the sector. This knowledge/information then needs to be transferred to the company by direct monitoring allowing the respondents to influence the strategy of the company according to political decisions. The sustainable analysis used by STF can generate benefits throughout the investment period, as it creates awareness. Again, if not possessing the political knowledge syndications helps the respondents to acquire it.

### 6.3 How to reduce innovation risk

The risks included in the innovation risk are connected to the development of the innovation and concern the areas: the technology, financial aspect of the technology, demonstration and regulations.

If the financial risk, which was said to be included under the technical risk, is separated from the innovation risks the overall grading are lower than what could have been expected when considering what Energimyndigheten (2007) states.

The **technical risk** is by Wüstenhagen & Teppo (2004) said to be very high for innovations with a long lead time and according to Cumming et al, (2005) this risk occurs due to the possibility that the technology does not meet the expectations. The main opinion among the respondents was that a failure of the technology to meet expectations could be covered by an excellent management team/entrepreneur. This reasoning resulted in a relatively low grading of this risk, in relation to what could have been expected. This risk according to Industrifonden further decrease if choosing to invest in a later phase. This is further stressed by STF who preferably invest expansion capital and so manages to keep the technology risk even lower. The exception to the low grading was Scandinavian Financial Mgt who saw the technical risk as imminent and not easily reduced by a management team/entrepreneur. By a well-working information system and by monitoring the company the venture capitalist can according to Mitchell et al (1990) and Gorman and Sahlman (1989) obtain information about the performance of the company. Scandinavian Financial Mgt emphasized the impact a failure of the technology would have, which can be further seen in what kind of information they obtain through their monitoring. By attaining information regarding the development of the technology as well as the current capital situation, they can better forecast the progress. Milestones are according to Smith & Smith (2004) a good way to keep track on the performance of the company. To set up milestones in cooperation with the entrepreneur is by the respondents said to increase the possibility to arriving at milestones that are realistic and relevant, as they make use of the

entrepreneur's technical knowledge. Milestones therefore give the respondents a better perspective if the technology will hold all the way, reducing the technical risk.

Wüstenhagen and Teppo, (2004) argues that the technical risk increases with capital intensive innovations. This **financial aspect of the technology risk** was seen as of major importance by the respondents. This is consistent with what Reid & Smith (1999) says regarding miss-calculations to be common for high-technology innovations. The financial risk originates from that the entrepreneur's financial calculations often are too optimistic meaning, more capital than budgeted for will be needed. Most respondents used information systems as suggested by Mitchell et al. (1990) and obtained reports on the financial situation of the company monthly and quarterly. The way to acquire the information differs slightly, where Scandinavian Financial Mgt obtain their desired information through direct contact, rather than frequent financial reporting. A closer personal contact with the portfolio company gives Scandinavian Financial Mgt an opportunity to more accurately predict the need of capital, hence reducing the financial risk. The information obtained enabled the respondents to be better prepared for capital requirements. This opens up the possibility for the respondents to be one step ahead in their search for additional capital which according to Gorman & Sahlman (1989) is one of the main tasks for a venture capitalist. The search for additional capital can be eased through syndication, as stated by the respondents, syndication enlarges the available network. This enlarged network can increase the chances of finding a suitable investor when additional capital is needed. Syndication are also used by the respondent as the future capital infusions can be divided among the syndication partners, complying with Manigart et al.'s (2006) statement that syndications opens up for sharing the future capital requirement. Another way to reduce the financial risk is the use of milestones in combination with stage financing. Milestones is argued by Block & MacMillan (1985) to help avoiding costly errors and stage financing is by Gompers & Lerner (2004) argued to offer a control mechanism to oversee the capital requirements. The respondents' combined use of milestones and stage financing, creates a possibility to link the capital infusions to the development of the technology. SEB VC talks about that there is a risk that milestones can cause short term thinking which can be seen a drawback for the usefulness of milestones as a tool for controlling the financial risk. If the entrepreneur becomes too dedicated to reach the next milestone instead of focusing on the long-term goal of the company, an agency risk is created.

According to Dealflower (2006) **demonstration risk** arises from the cost of verifying a new innovation. The risk is conversely given an overall low grading by the respondents. Sting Capital said that it is a risk they are aware of but that once you are in the investment it means that the demonstration risk has been somewhat accepted. This comment together with the low grading indicates on a non-focus on this risk by the respondents. It was difficult to apply the methods and tools used by the respondents to the demonstration risk. Yet, customer analysis, regulatory awareness and superior technology all helps in the work of verifying a product/technology to a potential customer. Therefore syndication can be seen as the main tool to facilitate the work. Monitoring and joint efforts as Scandinavian Financial Mgt does, give them a better insight of the customer, allowing them a better contribution reducing the demonstration risk.

When dealing with new technologies it is a risk that the restrictions and rules changes, referred to as **regulatory risk**, which according to Cumming et al. (2005) can affect the market access as well as hinder or alter the development of the technology and its future output. The regulatory risk received an in total low grading, even though Sting Capital said

this to be the highest risks associated to the innovation itself. The low grading was given with the remark that this risk was partly avoided through the due diligence, through which the respondents can avoid investments vulnerable for future legislations. As stated there are parallels to be drawn between the political risk influencing business risk and regulatory risk influencing innovation risk. The two risks are basically two sides constituting the same coin. The way to reduce this risk follows the same logic as when attempting to reduce the political risk. It is all about trying to forecast future regulatory decision, and the consequences of these decisions on the environment in which the company works. In an attempt to increase the accuracy of the forecast, syndication is the approach. In an attempt to successfully influence the company's strategy direct monitoring are used.

## 7 Ending remarks by the authors

*"There is no such thing as a self-made man. You will reach your goals only with the help of others"*

- George Shinn

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In this chapter follows the concluding remarks by the authors, as well as the authors' recommendations for further studies and readings.

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### 7.1 Conclusion

CleanTech is said to be associated to a number of risks being higher than in most other sectors, implying that the respondents in this study are active in a very risky sector. But as CleanTech span over a wide range of areas and the risks are generalized for the whole sector, a picture that cannot with accuracy be related to reality appears. Further, the respondents agree to their existence, however their opinion is that these risks are no higher in CleanTech than in other sectors that they invest in.

Risk reduction is a process that stretches from the decision to invest until exit is reached. When looking at the perceived risk within CleanTech, one could believe that venture capitalists investing in CleanTech have a specific way of dealing with risks reaching beyond the commonly known methods and tools. This turns out to not be the case as the methods and tools used by the respondents are, according to theory, commonly known and applied. The whole risk reduction process is pervaded by an active monitoring made possible through a continuous information transfer between the venture capitalist and the entrepreneur. Monitoring and information are the two main tools used when reducing risk as they are underlying criteria to be able to use or oversee the outcome of any of the other tools or methods. Syndication and convertible equity are very useful when deciding how to enter the investment without having to carry all the associated risk. Syndication further reduces many of the risks during the whole investment period as it simply means more people on the task, especially beneficial when these people complement each other. Once in the investment, the rights and obligations between the venture capitalist and the entrepreneur have been set in contracts used as a safety net in case of negative deviations. To increase the likelihood that the development of the company goes in line with what the venture capitalist wishes milestones are used as an aid. Linked with stage financing, the capital infused in the company is rather based on achievements than achievements based on capital. Stage financing has also, just like share options, an incentive function designed to create goal congruence and re-connect the link between effort and pay-off for the entrepreneur. To only rely on incentives can be dangerous resulting in the need of penalties, transferring some of the cost for unwanted behaviour to the entrepreneur. By using bonding a balance between incentives and consequences is reached. The individual method and tool are not deliberately chosen in order to reduce a specific risk but rather to safeguard the investment as a whole. Moreover, the benefits generated are often enhanced when tools are brought together.

The fact that each respondent has very different characteristics increases the belief that not one specific skill or focus is compulsory to be able to reduce risks in CleanTech. Rather it is each respondent's skills, experiences and company routines that form the way that the respondent addresses risks associated to their CleanTech investment. To conclude, it is not the methods and tools in themselves that help the respondents to reduce risks, but rather when combined with the know-how possessed by the respondent and the entrepreneur.

Methods and tools in their glory, however, the one ability repeatedly expressed, is the famed gut feeling. It is the authors' utter wish that more venture capitalists acquire the gut feeling possessed by the chosen venture capitalists, and starts to realise the value of investing in Clean Technologies.

*"The Stone Age didn't end for lack of stones, and the oil age will end long before the world runs out of oil."*

- Sheik Ahmed Zaki Yamani

## **7.2 Further research and recommended reading**

### **Suggestion for further research**

The problem that the authors chose to address in this thesis was how venture capitalists investing in CleanTech reduce risk. CleanTech has been stated to be a sector associated to high perceived risk with questionable relation to the actual risk. The respondents in this thesis did not experience the risks in CleanTech to be particularly higher than in other sectors. An in-depth study of the due diligence process, to see where and how these risks "disappear" is a possible area for further research.

A quantitative study can be done, in which the researcher test how these respondents picture of the risk can be generalised to the whole population of Swedish venture capitalist investing in CleanTech.

The success of CleanTech investment are said to be highly dependant on external factors, at the same time as it ought to differ between the areas incorporated under such a wide definition. It would be interesting to see the actual survival rate of these CleanTech companies, and how they are dependant on in which CleanTech area they are active.

It is said to be hard to find a syndication partner in CleanTech, a research on how these partners can be found would be beneficial for venture capitalists as well as entrepreneurs active in the sector. The research could additionally examine the foremost benefits of syndication an investment in CleanTech as well as the relationship between the syndication partners.

This study focuses on how venture capitalists views the risks associated to an investment in the CleanTech sector, and what possibilities they have to reduce this risk. An interesting aspect would be to take the other side of it, and then make a similar study but on the entrepreneurs active in the sector.

### **Recommended reading**

CleanTech is a very important area, and the importance of infusing more capital can according to the authors not be stressed enough. The combination of CleanTech and venture capital is interesting as both are highly topical and fast moving areas. For those interested in gaining a greater understanding of venture capital and the situation in the Swedish CleanTech sector, there are readings to be recommended. Reports covering these areas are provided by Energimyndigheten, NUTEK and SVCA. In these reports the interested reader can find interesting information although written in Swedish.

- Energimyndigheten (2007). *"Investera i CleanTech 2007"* in this report the reader is introduced to the CleanTech concept, as well as presented an overview of the situation for the venture capital in the sector.

- NUTEK, Innovationsbron & SVCA. (2007). *“Riskkapitalbolagens aktiviteter och finansiering i tidiga skeden 2007”* (third quarter). This report describes how companies in their early phases are financed and presents investments made by private equity companies the first three quarters of 2007. In this report the reader can obtain information regarding the investments made in CleanTech.

Due to that new information and findings are provided on an almost daily basis the reader is recommended to closely follow papers focusing on environmental issues, and related areas. The interested reader are by the authors suggested to read: *“Ny Teknik”* a Swedish paper concerning new technologies, in which articles concerning CleanTech often are found, *“Nya Miljöaktuellt, DagensMiljö”* a Swedish paper discussing environmental issues often in combination to the business environment.

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## **Appendix A**

### **Intervju underlag**

När grundades företaget?

Vilken position har Ni i företaget?

I vilka områden investerar Ni?

Hur många av era portföljföretag är CleanTech företag?

Vilka risker anser Ni som störst inom CleanTech med hänsyn tagen till att ni står vid investerings tillfället? Gradera dessa efter skalan 1-5 där 1 är att risken inte alls anses som överhängande och 5 för mycket överhängande.

### **Agent risken - Entreprenören**

Bristar i affärslogik

Bristar i utnyttjande av möjligheter

Använder pengarna fel, dvs. överinvesterar

Inte tillräckligt hängiven

Lämnar företaget, innan de mänskliga resurserna blivit ett med företaget

### **Affärsrisken**

Marknadsrisken – finns inget behov

Timing för lansering av produkten

Expanderingsrisk

Exit risk

Politisk risk

### **Innovationsrisken**

Teknikrisken

Demonstrationsrisken

Regulatoriskrisk

Hur och i vilken utsträckning använder Ni kontrakt?

Använder Ni er av konvertibelt kapital?

- Hur använder Ni er av konvertibelt kapital?

Syndikerar Ni när ni investerar?

- Varför syndikerar Ni?

Hur får Ni in informationen från portföljföretaget och vilken information efterfrågar Ni?

Hur kontrollerar Ni portföljföretagets utveckling?

Använder Ni er av milstolpar?

- Hur använder Ni er av milstolpar?

Hur hanterar Ni oönskat beteende från entreprenören?

Hur reglerar Ni rättigheterna mellan er och entreprenören?

- Vilken rättighet regleras?
- Ändras dessa efter företagets/entreprenörens prestationer?

Använder Ni er av incitament?

- Hur används det?

Använder Ni er av stegfinansiering?

- Hur använder Ni er av stegfinansiering?

Hur ställer Ni er till ett IP skydd?

Utöver dessa, använder Ni er av några speciella metoder/verktyg för att minska risken?

- Hur använder Ni dem?

## **Appendix B**

### **Interview framework**

When was the company established?

What position do you have in the company?

In which sectors do you invest?

How many of your portfolio companies are CleanTech companies?

Which risks do you consider as the largest ones within CleanTech with the perspective that you are at the investment point in time? Grade these according to 1-5 where 1 is that the risk is not imminent at all and 5 very imminent.

### **Agency risk – the entrepreneur**

Lack in business logic

Lack in the exploitation of opportunities

Wrongly allocates capital, e.g. overinvestment

Not committed enough

Resign from the company before the human capital is incorporated

### **Business risk**

Market risk – no demand

Timing of the commercialization of the product

Growth risk

Exit risk

Political risk

### **Innovation risk**

Technical risk

Demonstration risk

Regulation risk

How, and to what extent, are contracts used?

Do you use convertible equity?

- How do you use convertible equity?

Do you syndicate when investing?

- Why do you syndicate?

How do you obtain information from the portfolio company and what kind of information is required?

How do you monitor the development of the portfolio company?

Do you use milestones?

- How do you use milestones?

How do you handle unwanted behavior from the entrepreneur?

How do you allocate the different rights between you and the entrepreneur?

- Which rights are allocated?
- Are they altered depending on the performance of the company/entrepreneur?

Do you use any incentive program?

- How is it used?

Do you use stage financing?

- How do you use stage financing?

What is your opinion regarding IP rights?

In addition to these, do you use any specific methods/tools to reduce these risks?

- How do you use them?

## **Appendix C**

### **Grading of the risks**

#### **Agency risk**

Business logic	1, 3, 3, 4.5, 5, 5
Exploitation of opportunities	2, 2.5, 3, 3, 3, 4
Allocation of capital	2, 2, 2, 2.5, 3, 5
Long-term commitment	1, 1, 2, 4, 4, 5
Resignation	1, 1, 2, 2, 4, 5

#### **Business risk**

Market risk	3.5, 4, 4, 5, 5, 5
Timing risk	3, 3, 3, 4, 4, 5
Growth risk	3, 3, 4, 4, 4, 5
Exit risk	1, 2, 4, 4, 4, 5
Political risk	1, 2, 2, 4, 4, 4

#### **Innovation risk**

Technical risk	2, 2, 3.5, 4, 4, 4
Financial risk	4, 4, 4, 5, 5, 5
Demonstration risk	2, 3, 4, 4, 4, 4
Regulation risk	1, 2, 2, 2, 3, 5