

## Explicit climate investments as a tool for societal advancement

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### Abstract

A sustainable society has to uphold a sustainable resource base and culture that promotes sustainable behaviour. The principle way to enhance the usefulness of the resource base and improve the capability to promote adequate behaviours is dependent on investments. This paper assesses how delimited investments can be used to promote sustainable development of the wider societal system, wherein the investments are made. The paper builds on five case studies of investments in new technology, innovation oriented networks and leadership training. The result focuses the links the positive externalities and shows that there are structural similarities between economic, networking and leadership investments. To support serious actors and to be able to detect various kinds of misbehaviour, it is suggested to develop transparent systems that visualise the relations between what the businesses do and external and future effects. The paper clarifies how local business systems promote mutual understanding and provide meaningful employment. This transparency alleviates the risk of businesses cheating their sub-suppliers and depleting the renewable resource base and the societies where the customers live.

*Key words: Green job growth, tragedy of the commons, global business development, global warming, CDM, carbon trade*

### Introduction

Global warming means that it is important to invest in reduction of carbon emissions and several kinds of efficiency improvements. It is a main ambition of climate investment to enhance the use, and usefulness, of renewable energy supplies, as well as, renewable resources and recycling, see Figure 1. In a traditional business development perspective, most investments aim to develop more effective and efficient companies. A company uses available resources, normally from a number of sub-suppliers, as a means to enable production and services that customers want to buy. Renewable energy systems and sustainable production systems use natural energy flows as a base to provide freedom of action.

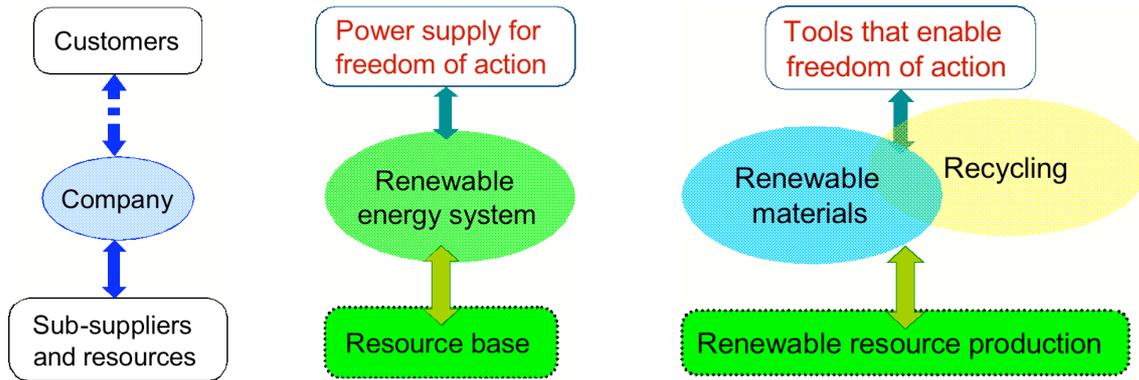


Figure 1 Companies and production systems as interrelating links between services for consumers and their base of resources.

At one level, the business activities in Figure 1 import resources in order to transform them into something that is useful for and appreciated by customers. Additionally, it is mainly the material that is transported from the resource base to the customers. The payments, and also an important part of the information, are transferred in the other direction. Within a free market, business system operations are fuelled by the willingness to pay among the customers. To be sustainable, the businesses must make use of information about the customer interests as a guide for production planning and business development.

One part of the climate-oriented investments is made as specific environmental ventures; an example that illustrates this is build up of renewable energy production. However, most investments are made to produce a wide variety of customer values, of which the main service is something other than the reduction of an environmental load. In these cases, the climate aspect is “only” of secondary interest for business actors. The primary business interest for most companies is to make and sell products and services that attract customers’ interest for other reasons than the climate aspect. Four of the cases in this paper deal with environmental and societal aspects of investments in various kinds of “ordinary” products and “ordinary” business development processes.

### Sustainable development

In 1987, the Brundtland Commission articulated a now widely accepted definition of sustainable development (SD).

*Sustainable development aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. [1]*

The same report also includes a more descriptive explanation:

*Sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technical development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. [1]*

It is fundamental for long-term development to realize the effects of present activities. In a free market perspective, a company’s interrelation with other economic actors is considered to be relatively straightforward. In economics, the connection to the future is accounted for through investments and depreciation of capital, see Figure 2. In Environmental Economics theory, the main part of the environmental load is described as externalities, i.e. external impacts that are not included in standard accounting.

## Theoretical foundation

### Externalities

Negative externalities depreciate the value of the surrounding systems and future conditions. The tendency to overuse resources, where one does not have ownership, is a fundamental issue in the utilisation of common resources, as described in the *Tragedy of the Commons* [2]. One explicit example of overuse is the overfishing of the seas. We are also overusing fresh-water resources and clean air, when the total emissions become too high. Overuse of land area may result in deforestation and desertification.

Production that is based on non-renewable resources tends to expend its resource base. Furthermore, renewable production may also exhaust its resource base. For example, the use of wood and bio-fuels should be based on sustainable forestry. It is also important that the sub-suppliers can uphold their production capability and level of competence. The level of payment should enable sub-suppliers and the maintenance system for the resource base to work and learn in a sustainable way.

Furthermore, a successful company should enable their customers to become richer; otherwise they will not be able to afford to buy more advanced future products. In a macro perspective, both the suppliers and the customers are part of society. Consequently, it is a societal sustainable development interest that the suppliers and the customers can continue to develop themselves in a sustainable way.

### The basic principle for investments

Sweden's industrial history includes a number of investment processes that has lead to development of more advanced technology in concert with societal enhancement. The progress was driven by investment thinking that promoted a qualitative development of technical parts in concert with a systems development that made the resulting systems ever more useful for the customers and the society. One example is that, the ASEA development of electrical equipment was made in concert with investments in the electrification and industrialisation. Another example is that the LM Ericsson development of telephone system equipment was made in concert with investments in the telephone network. Both these development processes were important for the growth of the respective business systems as well as for the modernisation of the Swedish society. This paper uses renewal oriented systems thinking where the assessment of delimited investments includes their potential positive and negative effects in a wider systems perspective.

In economics, the connection to the future is accounted as investments and depreciation of capital, see Figure 2. For investments in green technology, such as renewable energy production, one growing aspect of their advantage can be accounted by means of traditional financial accounting. Environmental "accounting", e.g. LCA (Life-Cycle Assessment), focuses on the negative impact on future conditions. Resource depletion is assessed, but resource improvements are normally not specified explicitly. The general environmental view does not observe the Figure 2 cell that is marked "?". Consequently, many resource improvements tend to be unseen from sustainability point of view.

Coverage with respect to time <u>Accounting</u>	Effect during the time span under study	Change of situation from before to after	
		Deterioration	Improvement
Economic	Utility, profit	Production capacity changes Depreciation	Investment
Environmental	Emissions, waste	Resource depletion	?

Figure 2 Application of an analogy to the economic investment perspective in the environmental dimension. From [3]

In LCA, the output of a recyclable material is assessed as the avoided “load” in terms of alternative production activities that otherwise would have been needed. Formula 1 shows this principle illustrated by Figure 3, depicting closed-loop recycling [4]. The recovered resource value (R) can be higher than the resource value (N) of the “natural” resource which is used as virgin raw material. The enhancement of the value level, from N to R, can be conceptualised as an investment of present environmental load to reduce the future environmental load.

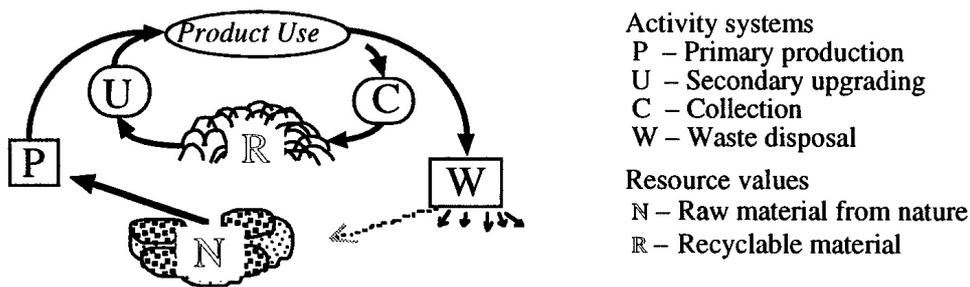


Figure 3 Basic flow diagram of a closed loop material market with recycling.

$$R = N + P - U \quad (1)$$

R = Sustainability resource value for recyclable material

N = Environmental resource value of raw material from nature

P = Environmental load from primary production

U = Environmental load from re-upgrading of recollected matter

The R-value is dependent on the future gain, not the historic “cost”. In open loop recycling the sustainability value of the recovered material is dependent on the avoided load and resource consumption, in the receiving system; see Figure 4 and Formula 2 [4].

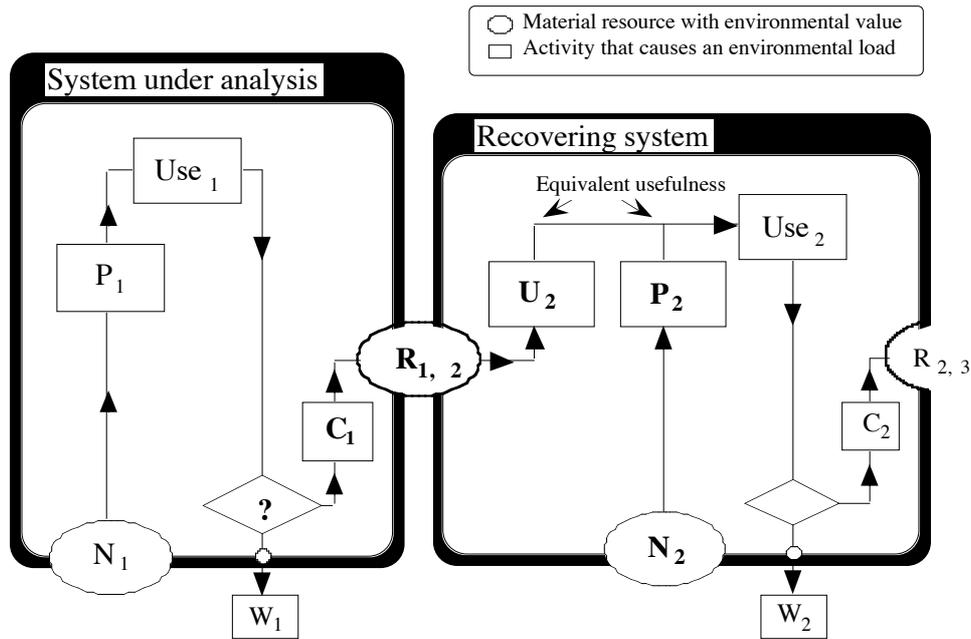


Figure 4 Sustainability potential for product remains in open loop recycling and, specifically, the parameters in Formula (2).

$$R_{1,2} = N_2 + P_2 - U_2 \quad (2)$$

$R_{1,2}$  = Sustainability value for the material that is recovered from System 1. All losses and handling up to the storage must be included in the assessment of System 1.

$N_2$  = Environmental value of the resource from nature which is used for the alternative production of an equivalent utility value, in System 2.

$P_2$  = Environmental load from the primary production evaluated as an alternative to the assessed recycling of the evaluated matter.

$U_2$  = Environmental load from the future re-upgrading (in System 2) of the recovered matter, starting from the storage at the end-point of the System 1 assessment.

$R_{1,2}$  is dependent on the qualitative properties and the usefulness as a raw material in the receiving, recycling-based production, in comparison to a non recycling-based alternative in System 2. If there is an abundance of alternative natural resources  $N_2$ , which are readily useful, then  $R_{1,2}$  is low. If the alternative is to use rare resources and environmentally “costly” refinement, then  $R_{1,2}$  is high. The upgrading from the quality of  $N_1$  to a higher  $R_{1,2}$  quality can be conceptualised as a sustainability investment.

Looking deeper, the above formulas only depict a part of the picture. It is common that there is quality degradation from the primary material ( $Use_1$ ) material to the secondary material ( $Use_2$ ) [4]. It is also difficult to know if the residual material will be recycled to something truly useful. The ambition here is to illustrate the analogy that investment thinking is relevant also within the environmental dimension.

There is a rich set of methods for economic assessment of investments. Analogous ways of thinking can also be applied in social and environmental dimensions:

- Money is invested to reduce future costs and to improve production.
- Reflection of social considerations can improve future social situations.
- Environmental load is often unavoidable in sustainability oriented investments.

The analogy and links between the three sustainability dimensions means that the investment thinking is relevant also for the social dimension. Furthermore, in Figure 4, difference in value between the delivering and receiving system perspectives is relevant also for social considerations. There is no certain proportion between the amount of investment and the resulting capital value.

## Models for innovation

Looking at history, the industrialisation has gone through a number of change waves, as described by Kondratieff [5]. Three of the earlier development peaks are associated with the introduction of steam power (mid 19<sup>th</sup> century), electricity (early 20<sup>th</sup> century) and mass production (1960s). The changeovers between the different development drivers have resulted in periods of financial recession. Ideas about the next peak of renewal mention the embrace of Information and Communication Technology (ICT) and the knowledge society.

The first wave of the marketing of industrial products focused on inventions and technology. In terms of today's terminology, the escalation of the mass production in the 1950s and 60s was driven by a technology push [5], focusing on R&D. In the 1970s, it became apparent that it is crucial to have a large enough market. The companies started to study the market and to use the information as a main guidance for the planning of R&D, i.e. market pull. In the 1980s more companies started to involve both R&D and marketing in more integrated business growth processes. The combination of push and pull were refined in interactive models, and in recent years it has become popular to focus on collaboration in networks [5].

Within the dynamic systems thinking approaches, Barabba [6] suggested that there is a need for a meeting of minds, between marketing and technical expertise. He suggested that marketing ought to be conceptualised as a state of mind that all parts of the company ought to be involved in. Furthermore, the technology experts, i.e. the persons with deep insights in the characteristics of resource base should be involved in the active contact with the customers. The assessments of market development potentials ought to be made in such a way that the company's most knowledgeable persons are truly involved in the business intelligence.

## Research method

The sustainable development subject area is multidisciplinary and in a sense most research areas are connected to some sort of sustainability aspect. There is no single theoretical basis for studies of how climate investments can be used as a tool for societal advancement. Consequently, it is difficult to use deductive and inductive research methods.

The authors are working with case studies and interviews, in a somewhat hermeneutic way. The ambition is to contribute to the development of a generic sustainable development theory. Such "theories" can hardly be scientifically verified in the positivistic natural science sense. This means that it may be more scientifically appropriate to use the denomination "hypothesis", instead of "theory". One might say that we are working with an abductive method [7] that produces hypotheses that can be used as "theory". Abductive reasoning starts from a set of accepted facts and infers their most likely explanation in a process whereby a

hypothesis is generated as a best explanation. The abductive thinking is somewhat analogous to Popper's [8] and Kuhn's [9] evolutionary perspective on how scientific theory evolves and how all theory is more or less temporary and uncertain.

The main case study method is action research with open interviews, aiming to clarify if and how the examined preliminary "theory" corresponds with or deviates from the respondents' experiences and if there are any real life contradictions between different aspects of the tested "hypothesis". This paper suggests a theoretical perspective that aims to clarify the potential role of explicit climate investments as a tool for societal advancement.

The five case studies include involvement of the five authors, which have been and are working in leading roles for the five different development projects. Paulsson's studies focus on bio-energy and he is working as project leader for the Lusaka case study research. Johansson's PhD thesis focuses on mechanical wood processing and he is a project leader for the wood scanner part of a Vinnova business system development project for trees Swedish hardwood. Backman is senior research fellow at International Institute for Industrial Environmental Economics IIIEE and a leading person in Øresund Environment Academy the sustainable development part of the Øresund Region Innovation system. Karlsson has extensive experience from the time-honoured investment culture in major Swedish companies and is professor of Ecodesign. He is involved in all the five case studies and project leader for the Expert Mobility case. Djupenström is Business Excellence Specialist in Stora Enso Oyj, Finland and she was project leader for the European Foundation for Quality Management (EFQM) leadership training pilot study. The paper focuses on assessments of the principal structures, and the relevance of the result is dependent on the authors' general experience rather than the single explicit answers during the interviews.

## The five case studies

### 1. Bio-reactor

Like many other fast growing cities in the developing countries, Lusaka - the capital of Zambia, is experiencing a multitude of challenges. The population increases faster than infrastructure can be extended. Housing, electricity, water supply, sanitation and waste collection are all stretched beyond capacity. Ever more people move to already overcrowded urban districts, increasing the population density, thereby worsening the solid waste dumps and decreasing sanitation etc. Life expectancy is being reduced due to low income and repeated outbreaks of diseases.

The Lusaka City Council and UNICEF are now trying to alleviate the problems in one compound by building a small-scale biogas plant, a *bio-reactor* as a motivation to keep the compound clean [10]. The plant is to produce biogas for local cooking and for generation of electricity, from local waste. The more reliable access to energy facilitates local business development. From the authorities' point of view the most important effect is that the development of the system around the biogas plant demonstrates how the local people can benefit from production of biogas, through reduced need for charcoal, less deforestation, increased availability of electricity and thereby, also once again having clean water. The process is a means to empower people in the local community to help them to take control of their situation.

## **2. Wood scanner**

In January 2005 Southern Sweden was hit by a severe winter storm that felled millions of coniferous trees. The discourse after the storm highlighted a conflict of interest between business and sustainability priorities. It was apparent that the industry-related experts had a tendency to continue to recommend for the forest land-owners to continue with the plantation of spruce, for its timber price track-record. This disturbed many stakeholders, and led to a renewed interest in more diverse forestry concepts and processes. Renewal-oriented seminars were organised with scientists, business persons, network actors and forest land-owners. The Swedish Innovation Research Funding Authority, Vinnova, is now funding a EUR 1 million business development project to enhance the utilisation of birch, a hardwood tree that constitute 10% of forests in the South part of Sweden. One part of the project is to introduce a more advanced wood scanner technology.

From a broader perspective, the *wood scanner* is not only a tool for sorting pieces of wood, within an existing flow. The automatic wood sorting ability also facilitates a more advanced business development. The scanner improves the possibility to sort the wood according to more complicated grading rules. Thereby the raw material may be utilised to a greater extent through new products. Further, the customer requirements may be met in a more precise way. This can promote renewal oriented thinking and a more clear and open-minded dialogue, within the business system and with customers and various stakeholders. The confidence in actual development opportunities mobilises development and investment interests. The more multifaceted ability to make use of various wood qualities can enable a higher added value and a more diverse forestry, i.e. a more sustainable forestry and countryside business development.

## **3. Innovation system**

The Øresund Region Innovation System has become a European hot spot for research, education, innovation and growth. In this cross-border region, the Øresund Science Region [11] has developed the Øresund Model - a “Double Triple-Helix” model. ØSR bring together regional authorities, businesses and universities, from Denmark and Sweden, with their different administrative and legal cultures, industrial landscapes and languages. The Øresund Model aims to combine the forces of twelve universities in collaboration with the public sector and numerous companies. One activity is the promotion of the Øresund Region as an attractive place to invest and live. In 2008 ØSR was honoured with a European Commission RegioStars Award for Regional Innovative Projects, in the category *Support clusters and business networks*.

## **4. Expert mobility and networking**

The Expert Mobility Pilot Project was an action research and regional development project [12]. It promoted the mobility of experts on cleaner technology and health and safety. The goal was to enhance the renewal-oriented ability of the regional companies and innovation systems. One objective was to enable persons to act as sustainability-oriented change agents. The project included lectures and local seminars. The dialogues were designed to provide mutual understanding, conceptual clarification and networking, between local small and mid sized enterprises (SME), regional universities and national competences centres.

## **5. Leadership training and management capability**

A leadership training pilot study was made at Stora Enso Fors Mill in Dalarna, Sweden. Djupenström [13] evaluated an EFQM leadership capability enhancement program, Pegasus, as a tool for sustainable business development. Amongst EFQM members some people were identified as “top talents” and were then assigned to take part in a Leadership Capability Training including an assessment of a host unit, Fors Mill in this case. The training and assessment were facilitated by an external EFQM consultant. The material that the Pegasus assessors requested from the host included general information about the company and the business environment, as well as the prospective plan and strategy, especially considering the challenges that the company is facing. A site visit was planned and dialogue ensued with the Pegasus team and coordinators at Fors Mill.

EFQM’s Fundamental Concepts of Excellence are:

- Results Orientation
- Customer Focus
- Leadership and Constancy of Purpose
- Management by Processes and Facts
- People Development and Involvement
- Continuous Learning, Innovation and Improvement
- Partnership Development
- Corporate Social Responsibility

The Fors evaluation resulted in 18 suggested improvement areas, whereof, Djupenström [13] found that 16 are related to sustainable development priorities.

## Case study results

Table 1 presents the investment framing for each of the five case studies. The structure of links between the investments in focus and the community effects are summarised in Table 2. The first two cases focus on investments in new technology, case three and four focus on the development of innovation oriented networks and case five focuses on an investment in leadership training. Table 1 show the explicit investment focuses and their respective framing in terms of wider societal development considerations.

*Table 1 Investment and societal sustainable development comparison of five sustainable innovation case studies*

	<b>Bio-reactor</b>	<b>Wood scanner</b>	<b>Innovation system</b>	<b>Expert mobility</b>	<b>Leadership</b>
Main goal	City waste management	Hardwood business developm.	Innovation system	Regional business development	Management capability
Investment focus	Bioreactor to make use of organic waste	Scanner and sorting tech. to improve yield	Development of networks and support tools	Seminars and networking activities	Leadership training for the company's executives
Project work	Installation of reactor as a part of societal sensitisation process	Adaption of scanner as a part of a business development process	Promotion of Triple-Helix partnerships & regional attractiveness	Networking linking eco-design experts with regional business people	Benchmarking by experienced reviewers, as a basis for open dialogue
Sustainable Development Effect	Utilisation of energy potential. Motivated people improves living conditions	Swedish hardwood can be environmentally better than alternative materials	More openness for wider systems thinking & more chances to try new ideas	Hardly any known explicit business development effect	EFQM goals include sustainability aspects Empowered people can achieve more
Societal progress ambition	Demonstration of the energy value of waste promotes motivation	Positive example promotes wider business development interest	The visible innovation support encourage entrepreneurs	Awareness of availability of expert knowledge	Positive example stimulates motivation among a wider group of persons
Time frame	Explicit start-up of bioreactor within 1.5 years	Explicit business development within 2 years	Long-term collaborative process	Seminars and networking in a 1 year project	Swift personal motivation, years for major results
Process owner	UNICEF and Lusaka city	Companies in a Vinnova project	12 universities & reg. authorities	Vinnova project and universities	The company itself and EFQM
Research Method	Action research supporting the venture	Action research supporting the adaption	Active driver for collaboration and networking	Action research as project leader for networking	Action research as process leader for internal training

Explicit investment activities interact with their environments; as resources are being used. The activities in focus can also contribute to positive development of their societal environments. A bioreactor can enhance the motivation to handle the city's waste in a better way and an innovation system can make the whole business region more motivated and attractive. Furthermore, a more motivated society is crucial for the outcome of the investment, serving as a basis to enable further investments. This can result in self-reinforcing feedback loops involving the explicit investments and their direct and indirect societal benefits, and back, through the improvement of the resource base. There can also be a reverse loop when the investment results in better activation of the resource base, e.g. enhanced use of competence through employments that leads to further development of the market and back to

further investments. Figure 5 illustrates a two-way feedback loop for the wood-scanner case.

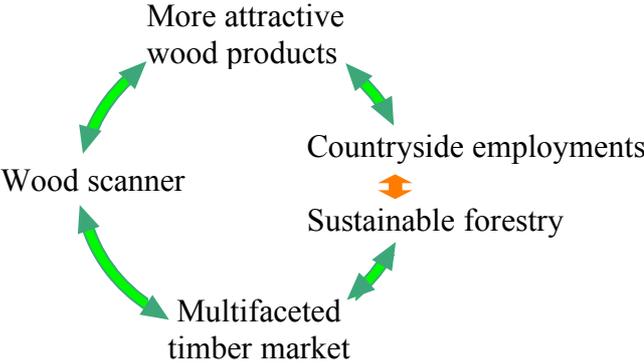


Figure 5 A wood scanner investment interacts with a societal advancement in a two-way reinforcing feed-back loop.

When the Figure 5 loop is cut vertically, at the right hand side, it forms a linear chain of links from social aspects, through the market and down to the resource base. Table 2 shows the explicit investments in the middle and the societal aspects at the top.

Table 2 Conceptual comparison of the goals, methods and outcomes in four sustainable innovation case studies

Society	People living in Lusaka city	Swedish countryside residents	Øresund region residents	Regional residents	Stora-Enso workers
Link	More attractive city environment	More green job opportunities	More advanced job opportunities	More knowledgeable businesses	Better organisational development
Customers	“Customers” and beneficiaries of bio-gas	Customers for wood based products	Entrepreneurs & entrepreneurial companies	Regional development oriented companies	Company executives and top-talents
Link	Reliable energy supply	Quality and unique design	Identity as part of something wanted	Contacts with experts	Business development training
Investment	<b>Bio-reactor</b>	<b>Wood scanner</b>	<b>Innovation system</b>	<b>Expert mobility</b>	<b>Leadership</b>
Link	Motivation for development	Motivation for development	Involvement in real life action	Contacts with regional actors	Training as business leaders
Resource supply actors	Waste management actors	Forest management actors	Universities and regional development actors	Environmental and ecodesign experts	Reviewers and competence developers
Link	Motivating to avoid littering	Diverse and well managed	Capability and attractiveness	Motivation to learn	Motivation to study QM
Resource base	Sustainable city development	Sustainable forestry	Sustainable regional development	Environmental competence	Quality management competence

In the Table 2 view; the investment, customers and the resource supply actors are the primary economic business actors. The resource base primarily relates to the environmental dimension and the society represents the social and cultural sustainability dimensions.

The table shows a structure of links between the investments in focus, the primary business actors and the wider environmental and social considerations. The study focuses on positive links. The *bioreactor* case links are considered to be relevant and important at the community

level, by the Lusaka city stake holders and by the regional UNICEF representatives. According to surveys the potential biogas customers are also interested. The *wood scanner* investment is a motivating factor within the group of stakeholders that are involved in the hardwood business-system development. The interest in development of the hardwood businesses is considered to be positive by a number of stakeholders in the wider community. The *innovation system* is supportive for the regional entrepreneurs and universities, and thereby also for regional development. The contacts with the *mobile experts* were considered to be interesting by the people that participated in the meetings. *Leadership training* was considered to be valuable by the involved persons and by the host company. The *wood scanner*, *expert mobility* and *leadership training* cases are largely driven by ambitions to improve the identity of the system in focus. The *bio-reactor* and *innovation system* cases have clearer links to community development interests.

## Discussion

“The human face of climate change has tended to be obscured by technical and scientific issues.” [14]. Recently, the human rights aspect has come into focus, e.g. in a UN report that will be made available at COP15, United Nations Climate Change Conference in Copenhagen in December. “Measures to address climate change should be informed and strengthened by international human rights standards and principles” [15]. One side of this challenge is to avoid the negative externality problem which was emphasized in *The Tragedy of the Commons* [2].

The other side of the challenge is that it is necessary to strengthen the sustainable, i.e. renewable capability to produce the food, energy and the quality of life that humans need and want. There is a need to enable human communities to sustain themselves. Investments involve costs for the society and tend to increase the use of resources. However, investments also have a positive effect in that they enable people to have a larger freedom of action. Sensible investments are also important to enhance the kind of capabilities that are needed to achieve sustainable development.

The World Bank Group President, Robert B. Zoellick, states that “We have seen over the last six decades how markets can lift hundreds of millions of people out of poverty while expanding freedom. But we have also seen how unfettered greed and recklessness can squander those very gains,” [16]. The companies in the Table 2 chain between customers and resource base can enrich themselves, in particular when there is a long distance between the customers and the resource base. There is a large risk with freedom of action and also, fantastic potential.

Many of the present supply chains have a long distance between the product market and the resource base. The evolution of this global business structure has been driven by the large efficiency gains of specialisation and economics of scale. The concentration of power has enabled advanced developments and large investments. However, the freedom of action, that the global business actors have, can also be used to enrich themselves, e.g. through large bonuses. The public press in relation to the recent financial crisis indicates that numerous businesses and powerful persons have been enriching themselves in a questionable way, i.e. they have become ‘Greedy Businesses’, as illustrated in Figure 6. The five levels in Figure 6 have the same structure as the five stakeholder levels in Table 2. It should be noted that all kinds of organisations have to earn money and make ends meet to be sustainable. Both greedy and green businesses have to make a short-term profit to be able to investments for the future. The difference is dependent on how large the profit is, and even more how the surplus is used and the company’s behaviour towards other actors.

In this view, a Green Business should enrich both the sub-suppliers and the customers, and also the society and the resource base. It should promote suppliers to become more intelligent and effective and the product services should enable a better freedom of action and quality of life for the customers, so that that they can enhance their own situation. In the case of forestry, the development of the business system should promote a development of a more sustainable and productive forestry. In principle, a sustainable productive forest is a living, bio-diverse and beautiful forest that uphold numerous eco-system services. Many Swedes also enjoy forest based activities and the scenery of well managed forests and forest based value adding activates also forms a basis for country side employment, i.e. a more living society.

In this perspective a green company should promote enrichment of all the levels in the system, see left system in Figure 6. However, the main-stream businesses of today focuses on the own company’s profitability. The general manager’s normal principal responsibility is to promote development of the own company. In a number of unsustainable business systems this has resulted in situations where some global business actors are enriching themselves and impoverishing both the customer society and the resource base.

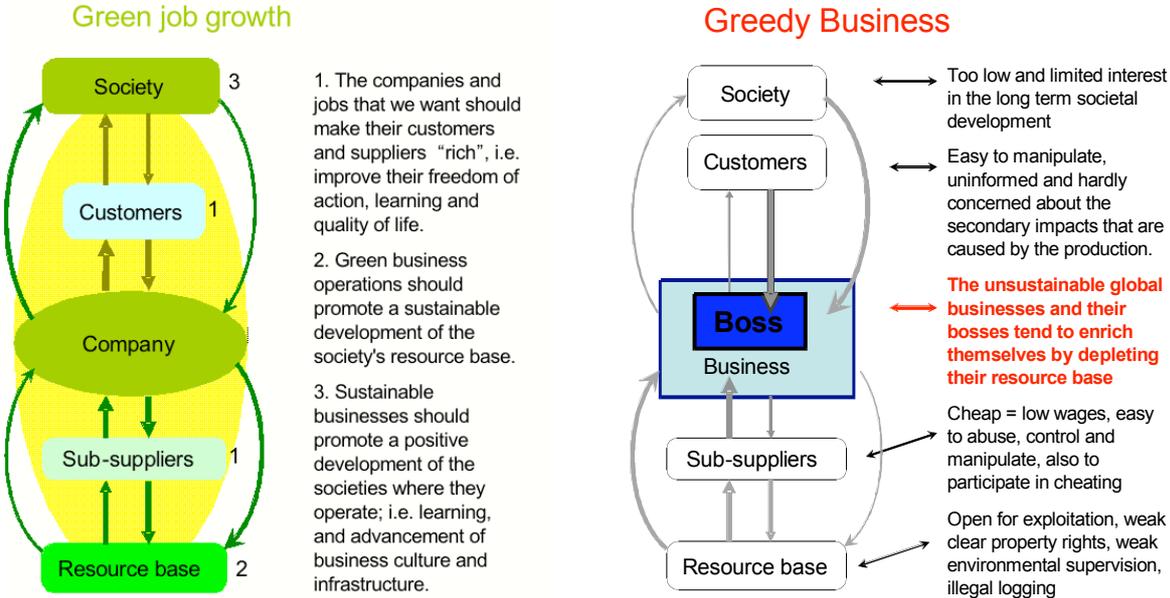


Figure 6. A green business system aiming for concerted growth of all levels and a greedy business that primarily tries to enrich itself.

The most noted *Tragedy of the Commons* [2] is that the nature resources without clear property rights tends to be overused and damaged. However, we now also have another kind of tragedy of the commons in that the customers’ society is severely influenced by what the customers in the own society does. When the Swedish customers buy the cheapest possible products, from wherever they are produced, the resulting effect includes a shutdown of the respective Swedish production. If the old system has been making use of a part of nature’s renewable resource production, then there is a risk that the value production that enabled maintenance of the old “natural” system will disappear. To be sustainable, a society has to invest in the development of its resource base and also in the development of the society itself. However, this is difficult, the society and the resource base are large, complex and fairly open systems, with a number of peculiarities, e.g.:

- The world we are living in is changing all the time, and nowadays at a rapid pace. When something is built the resulting value is dependent on its future usefulness, not the amount of money that is invested – i.e. spent on the investment, see Figure 4. This is particularly challenging for the creation and degradation of large complex systems.
- The risk that a greedy company enriches itself and degrades the resource base and takes a too high price from the customers is high if it controls a market monopoly where the competition is imperfect.
- Furthermore, it is interesting to study environmental organisations in the light of the Figure 6 is perspective. It is not obvious if an environmentally driven organisation (“company” in green job figure) enriches its society and the renewable resource production system, from human point of view.

The inefficiency problems with monopolies have been analysed in the business literature [17] and monopolies are also questionable from a sustainability point of view. For example, if there should be only one company that buys beef from Brazil, they are able to manipulate the farmers in a questionable way. A similar risk still applies if there are a number of companies that are trading the same material, as long as the farmers are overly dependent on production of the single kind of material. One suggestion to alleviate this risk is to develop a diverse production and a multifaceted market. From this point of view, the farmers should have connections with market actors in a number of different spheres.

The tendency that people are aiming for influence is not isolated to big business bosses. All kinds of organisations are aiming for power, also environmental organisations. The risk that environmental organisations may become “greedy” and make their societies poorer is hardly discussed within the environmental literature and it is not opportune for the business literature to pose such questions. From a financial enrichment point of view, it is reasonable to think that a profitable business company that employs people for its “own” earnings is enriching its society (green jobs in Figure 6) and that an environmental actor that is dependent on some kind of subsidy tends to make its society poorer. In theory, an environmental organisation and its boss could be “greedy” in that it is trying to get resources and interest from others primarily to increase its own power.

A positive investment should make the community (the top line in Table 2 and Figure 6) richer in terms of ability to achieve a better freedom of action and quality of life. It should also make the community richer in terms of a more valuable and sustainable supply of resources (the bottom line) and more meaningful employments. These human aspects and the right hand inter-connection in Figure 5 can be interpreted as constituents of the kind of **Flow** that has been described by Csikszentmihalyi [18]. The productivity and quality of life values of activity are vital, but still, a larger freedom of action and more activity tend to lead to additional consumption of resources.

The sustainability view emphasizes that the earth is finite in many important physical resources. This was highlighted in Limits to Growth [19] and it is still a decisive sustainability issue. Nature does not allow an endless growth of material volumes [20]. On the other hand, the development oriented business perspective tends to suggest that when one resource becomes scarce and expensive, innovative business people will find alternative solutions.

## Resources are not, they become

In environmental sciences, resources tend to be conceptualised as if they have always existed in nature. To a large extent, this is correct for the matter itself, but it is not correct for its human resource value. The resource concept has been examined by Gregori [21], who clarifies how the materials in nature get their human values when they start to be used by humans. For example, iron ore became valuable when humans started to use iron. Such build up of value is related to business development investments. As an explanatory example, let's take a look at the Swedish forest sector.

The trees get a more explicit human value when they start to be appreciated by humans. In the hardwood case study project dialogues, Albert Eliasson, Business Development Manager, at the large forest company Södra, [www.sodra.com](http://www.sodra.com), has elucidated how larger parts of the Swedish forests became more valuable when a number of business development entrepreneurs built larger sawmills to export the Swedish timber. Before, most of those forests were considered to be less valuable from economic point of view.

The hardwood case dialogues suggest that, it has been a main driver for the historic development of the Swedish forestry that, the forest land-owners thought that there would be a future market for the timber production they invested in, when they were planting and managing their forests. One reason for their trust was that Sweden had clear and appropriately working property rights for the forest-land and that the societal system and business culture was stable. Consequently, the forest land-owners trusted that they and their children would get the benefit from the outcomes of their forest improvement investments. The development was also promoted by laws and regulations, e.g. a forestry law requirement for mandatory replanting after logging was introduced in 1903. The Swedish institutional setting has also promoted a business culture where the small actors should have fair conditions for their affairs with big companies. For example, the public system for measurement of timber has had an ambition to protect the small forest owners.

The hardwood case study has highlighted that the expansion of softwood production has resulted in negative external impacts on the forests' scenery and ecology. As interpreted from the interviews, the growth of the volume oriented low-cost production correlates with a reduction of the number of countryside jobs. The volume oriented production takes its raw material from the forests, but it does not pay for the work needed to keep the forests beautiful and resilient.

Looking at history, the earlier build up of large volume oriented sawmills correlated with an enhanced ability to make productive use of the forests production as a renewable resource base. That growth of interest, a hundred years ago, also resulted in a mandatory replanting and an early form of a reasonably sustainable forestry. When the larger sawmills and the pulp and paper industries were introduced, it resulted in higher demand for wood and enhanced forestry management, i.e. more countryside employment. Numerous international customers gained access to paper and construction wood and it became possible for Sweden and the Swedes to earn more money on forestry related work. Nowadays, construction wood and paper are global commodity markets with hard competition. The profitability is lower and, relatively seen; there is less money available for forestry related wages. Consequently, there is a risk that the forestry will become limited to a select few species and therefore, less sustainable.

At the time when the larger sawmills were established, the access to softwood as a construction material was new and had an increasing added value. For the forest landowners, the evolving market for softwood timber provided an opportunity to earn more money and

thereby a stronger motive to manage their forests in a more productive and, hopefully, more sustainable way. The growth of the sawmill businesses correlated with development of higher values for both customers and forest land-owners (see Figure 7). Now there are a large number of big softwood sawmills, and softwood has become a regular commodity. It is more unclear how much distinctive value the softwood usage is delivering to the customers and there is a risk that the forests are exploited in an unsustainable way. The ability to make enhanced use of soft-wood and the value adding employments and the replanting made the society of those days “richer”.

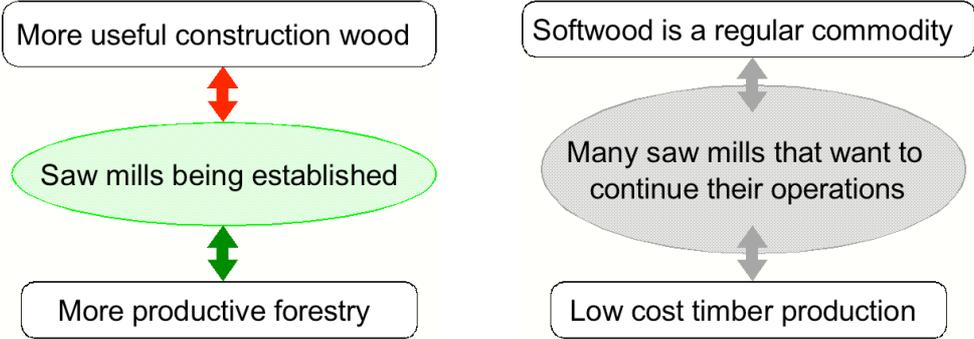


Figure 7 Saw mill companies as positive or negative developers of customer interests and forests.

Depending on the circumstances and how it is done, the use of wood may be positive or negative for forest related employments and for the development of forests. When the market for timber is motivating forest landowners to manage their forests in a productive and simultaneously sustainable way, wood is a very interesting renewable resource supply.

One way to create a transformative change is that entrepreneurs can create higher added-value than most of the established activities. Some jobs are lost in a sector that becomes obsolete, but more jobs can be created by the new added-value parts. According to Schumpeter [22], radical changes tend to involve a considerable amount of creative destruction. From a rational point of view, a significant changeover could be done through restructuring of the established sector.

To enable a higher total forestry related value production, there is a need for renewal oriented entrepreneurship. To build motivation to engage in transformative development, it is important to clarify what kind of higher added value it is that can be achieved. To make the new prospect understandable, there is a need for open-minded consciousness, e.g. methods for rethinking, like the U-model suggested by Senge et al. [23]. One method to clarify the potential of a new vision may be to use *Idealized design*, as suggested by Ackoff et al. [24]. It is important to try to accomplish a higher level of total value production. But it is difficult to assess radical ideas. The reframing into a new perspective means that it becomes more difficult to make reliable assessments. It is difficult to assess the real sustainability effect of initiatives that surpasses the boundaries of established experience. The reframing means that the sustainability assessments have to relate to a systemic and diverse knowledge, with an interdisciplinary, wide and long-term framing. Change is not easy, but it is essential to do a sufficient number of experiments with sustainability oriented changes.

## Clean Development Mechanisms

The ambition to emphasize the linkage between specific actions and wider community effects is noted in promotion of land-based climate change mitigation activities. “The CCB Standards identify land-based projects that are designed to deliver robust and credible greenhouse gas reductions while also delivering net positive benefits to local communities and biodiversity.” [25]. Eliasson and others with deep insights in the Swedish forestry sector reminds us that productive, fast growing forests are sequestering more CO<sub>2</sub>.

To enable radical change, there is a need to raise funds to invest in rather unproven solutions and transformative entrepreneurship. The principle method to raise funding for new businesses is to establish some kind of market, e.g. the stock exchange. Earlier there have been no markets for environmental and social externalities. Now there is a lot of interest, e.g. in clean development mechanisms (CDM), to enable more effective investments in reduction of green house gases.

The CDM appears to be straightforward for investments in renewable energy and carbon sequestration, e.g. through reforestation. It is also used for investments in cleantech and efficiency improvements that are directly related to reductions of the use of fossil fuels. In principle, the same thinking can be used for many kinds of efficiency improvements, also for the product use phase when evaluated in a product life cycle perspective. However it is rather difficult to assess how this relates to the external systems, i.e. the top and bottom levels in Table 2 and Figure 6.

As mentioned above, one basic challenge is that activity leads to increased resource use and environmental load. However, activity also enables learning and it is essential to invest more actively in renewable production, in particular when the alternative is to consume more non-renewable resources. It seems to have great potential to work with explicit climate investments as a tool for societal advancement.

The thinking about the influences on society’s freedom of action and basic resources does not provide any clear-cut answers about future paths. Still, it is important to remember that it is possible to achieve positive external effects. This paper has not evaluated if and when the positive external effects are larger than the negative external effects. Table 2 indicates that investments in delimited explicit actions are important to make things happen. To be able to make reliable assessments of the societal sustainability effect, it is necessary to relate to a wide interdisciplinary long-term framing.

## Conclusion

It is important to clarify the interconnections between local investments and their wider societal effects. But, it is an ethical issue if that knowledge is used to enrich oneself through short term depletion of the society, or if the knowledge is used to promote a sustainable systemic development. To support serious actors and to be able to detect various kinds of misbehaviour, it is important to develop transparent systems that visualise the relations between what the customers, other stake-holders and the wider community actually receives and the true effect on the development of the resource base.

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