On the relevance of large carport installations for future deployment in urban areas

(Part 2)

A Master's thesis submitted for the degree of
"Master of Science"

supervised by

Prof. Dr. Reinhard HAAS

Christian Geiling

Student ID No. 8856799

Cham, 28Th of February in 2012

Affidavit

I, Christian Geiling, hereby declare

1. that I am the sole author of the present Master Thesis, "On the relevance of large carport installations for future deployment in urban areas – part 2", 220 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted this Master Thesis as an examination paper in any form in Austria or abroad.

Cham, den 28.2.2012 _____

Signature

Preface

As of today most photovoltaic (PV) power plants are either large scale installation on the country side or mainly small size roof mounted installations on private houses. There are only few mid-size installations in urban areas. Hence, the objective of this master thesis is to prove the technical and economic feasibility of such power plants in the first step. Convenient areas might be public buildings and factory halls in combination with large parking sites from shopping malls and business centers being covered with PV panels producing electricity for self-consumption or hosting charging stations for electric vehicles in the future. Beside technical, legal and financial clarifications, the acceptance of such a solution shall be evaluated by a survey of selected carrier and supplier. The focus is set on potential clients located in the DACH region (Germany, Austria and Switzerland). In the second step the results of this work shall be used as a basis for the formulation of a business case delivering a proof of concept and for validation of the business idea to set up and establish a start-up company projecting PV power plants as explained above. Hence the focus of that part will be set on the definition of the green field strategy, the marketing plan, the financing model and other related topics. Thereby the following major questions and subjects are going to be addressed in two parts, since the topics to be evaluated would exceed the frame of a single master thesis:

Part 1 covers mainly external subjects as:

1. Evaluation of the appropriate technology to be used
2. Overview of legal and regulatory obligations to be met
3. Determination of economic measures relevant foe the business case
4. Description of the different constraints in the DACH countries

5. Brief introduction to the E-cars market development and deployment

6. Survey of potential clients and analysis of the results

Part 2 covers mainly internal subjects as:

1. Characterization of optimal legal form of the company and evaluation of possible co-operations with suppliers, construction firms and others

2. Formulation of the financing model and definition of the start-up structure regarding budget, business plan, organization and marketing approach

3. Risk analysis of the project realization and the implementation of the start-up company

4. Analysis of the competition with focus on D and CH

5. Analysis of major market entry barriers

6. Formulation of the exit strategy, the outlook and next steps

Even though each part presented is comprehensive and significant by itself, the aim of the two co-authors (Samir Al-Wakeel and Christian Geiling) focusing each on one part is to deliver one big picture, following a jointly developed model and method of approach to deliver a proof of concept, validate the business idea and prepare a business plan to establish a start-up company projecting PV power plants as explained above.

The following figure illustrates the split of the two master's thesis and shows the focus of part 1 and part 2 respectively. However, some overlaps in the proceeded explanations can't be avoided and are partially intended to ease reading and for completion of each part.

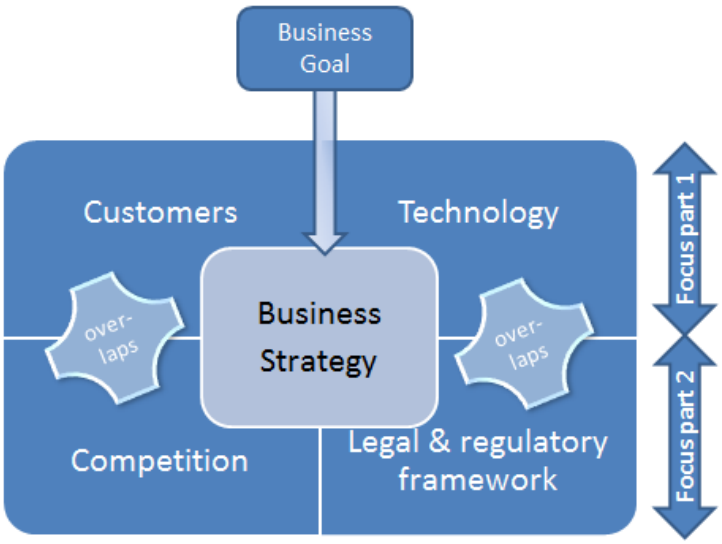

Figure 1: Overview of focus areas

Abstract

The motivation for issuing this work is to make a small contribution to the energy turnaround in Germany and Europe with the project PV carport by the start up enterprise Energy Vision .
The central issue is to be seen summarized in whether the market can be worked on for PV carports in the Federal Republic of Germany by Energy Vision in an economically successful manner and how the optimum juridical form, cooperation possibilities, tax possibilities, the financing, the marketing, the organization, risks, the competition, market entry barriers present themselves for the responsible managers of Energy Vision.

A literature-centered attitude was chosen for the treatment and intensive secondary research was pursued.

The intention of Energy Vision, to project and sell PV carports in Germany on parking bay surfaces is to be classified as probably economically successful. The ascertained market entry barriers and the risks are controllable.

The product life cycle of PV carports is to be seen positive and there is a whole series of future synergetic effects which will influence the plan of Energy Vision positively, so that Energy Vision with the conversion of this plan should be successful economically.
Furthermore is to be held on that Energy Vision by the product PV carport makes also a positive contribution to the further propagation of electric mobility and also a modest contribution to the climate protection and environment protection.

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Acronyms

A	.....	Austria
AfA	.....	Abschreibungen für Anlagegüter (depreciation of fixed assets)
BayBO	.....	Bayerische Bauordnung (Bavarian building regulation)
BIPV	.....	Building integrated Photovoltaic
CEO	.....	Chief Executive Officer
CH	.....	Confoederatio Helvetica (Switzerland)
CO_2	.....	Carbon-dioxide
CSR	.....	Corporate Social Responsibility
D	.....	Germany
DACH	.....	Germany – Austria - Switzerland
DAX	.....	Deutscher Aktien Index (German stock index)
E-car	.....	Electric car
EEG	.....	Erneuerbare Energie Gesetz (German renewable energy act)
EnG	.....	Energie Gesetz (Swiss energy act)
EPIA	.....	European Photovoltaic Industry Association
EStG	.....	Einkommenssteuergesetz (income tax act)
EWZ	.....	Elektrizitätswerke Zürich (Swiss power utility)
FIT	.....	Feed-in tariff
GbR	.....	Gesellschaft bürgerlichen Rechts (company constituted under civil law)
GF	.....	Geschäftsführer (general manager)
GmbHG	.....	GmbH Gesetz (limited liabilities companies act)
GRI	.....	Global Reporting Initiative
GewStG	.....	Gewerbesteurgesetz (German Trade Tax Act)
HW	.....	Hardware
IEA	.....	International Energy Agency
IPCC	.....	Intergovernmental Panel on Climate Change
IR	.....	Interest rate
IRR	.....	Internal rate of return
KG	.....	Kommanditgesellschaft (limited commercial partnership)
kW	.....	Kilo Watt (10^3 Watt)
LCOE	.....	Levelized cost of electricity
MW	.....	Mega Watt (10^6 Watt)
OHG	.....	Offene Handels Gesellschaft (general partnership)
PEST	.....	Political, Economic, Social and Technological

		(analysis)
PV	…….	Photo Voltaic
PVP	…….	Photo voltaic plant
RE	…….	Renewable Energy
RES	…….	Renewable Energy Sources
SE	…….	South East
SW	…….	South West
SWOT	…….	Strengths, Weaknesses, Opportunities and Threats (analysis)
UNEP	…….	United Nations Environment Programme
UNO	…….	United Nations Organization
UStG	…….	Umsatzsteuergesetz (Value Added Tax Act)
W	…….	Watt (derived unit of power)
WACC	…….	Weighted average cost of capital
WEF	…….	World Economic Forum
WMO	…….	World Meteorological Organization

1. Introduction

The use of renewable energy and here in particular of solar energy has got after the nuclear disaster in Japan an even stronger meaning. This impact was recognized just during the last years increasingly in Germany but also in other european countries.

According to the German federal ministry of the environment the removal aim is probably outperformed for renewable energy up to 2020 to which Germany has committed itself in the EU. Then instead of 18% in the final energy consumption even 19.6% would be generated regenerative. In the power sector the federal ministry of the environment expects a contribution of the renewable energy from 38.6%. This positive forecast of the federal ministry of the environment in Berlin is still exceeded by the Leipzig institute of energy, because this institute comes to the result that already in 2016 the portion of the renewable energy clearly lies more than 30%. The production capacity rises clearly stronger than the reimbursement according to the renewable energy law.

The forecasts and scenarios made during the last years have underestimated the potentials of the renewable energy systematically as in the review is to be ascertained.

In Germany renewable energy is promoted with different measures. It is to point out, on this occasion, the law about the priority of renewable energy in 2000 is remitted. This legal regulation was decisively positive for the electricity production in Germany.

In 2011 the final energy consumption in Germany was covered from renewable energy with 11.9% of the whole consumption.

The portion of the renewable energy in the whole power consumption amounted to 20.1%. In the electricity sector a total of 122.3 TWh electric energy were generated regenerative. The wind energy had the biggest part in it, there followed hydro power and then the photovoltaic with 18.5 TWh.

Now it is a matter to increase the portion of the renewable energy in Germany, to achieve the final aim step by step, namely that renewable energy covers the final energy consumption completely.

Before this background the plan of the start up company Energy Vision is lighted up within the scope of this work.

An enterprise should be constructed which essential component is the distribution and the installation of PV carports.

“ Energy Vision “ is the working title for this new company.

1.1 Motivation

The present energy supply bases above all on fossil energy sources and on fuels as for example uranium. Nevertheless, the range of these resources is limited. Thus the global oil conveyor maximum is dated, for example, by the international energy agency for 2020. After the maximum it is calculated on sinking outputs with at the same time rising world power demand.
These resources are spared by the use of renewable energy sources, as for example of the photovoltaic by PV carports. An untimely intensive removal of the renewable energy extends the transition period and could avoid thus an economic crisis and distribution conflicts in this world.
Thus the renewable energy in Germany saved in 2011 fossil fuel imports to the value of 11,000,000,000.00 €. This is a huge sum!

Further large amounts of CO 2 are emitted with the energetic use of fossil energy sources, while renewable energy emits as a rule clearly small quantities of greenhouse gases.

Renewable energy has varied positive effects and before this background the motivation for this work is to be seen .
Because of the fact that Energy Vision plans in future to install PV carports on already fastened parking bays, another positive aspect is connected with this matter of fact.

Since no other land surfaces are sealed through the installation of PV carports, rather already asphalted parking bays are used.
Also this is a positive circumstance which speaks for the use of PV carports.

It is a matter of an extremely interesting subject area which leads to a high motivation by handling the economic possibilities of the use of PV carports within the scope of the possible start - up enterprise Energy Vision.

1.2 Core objectives

In this connection is to be sent on ahead that part 1 and part 2 of this whole master thesis deal with the economic possibilities of the use of PV carports within the scope of a potential start up enterprise, the EnergyVision.
In the part 1 of the master thesis one of the main focuses lies in particular on technological questions.
In the part 2 of the present draft in particular internal questions of the possible start-up enterprise EnergyVision should be lighted up to the economic use by PV carports.

Hence, the following main questions are to be called in view of the economic use by PV carports by EnergyVision which are treated by this draft:

- Which optimum juridical form is suited for Energy Vision taking into account risk averse strategy of the future companions?

- How are possible suppliers of PV carports of the Energy Vision analyzed to protect a qualitatively high-quality supplier's structure for the start up Energy Vision?

- Which cooperation possibilities arise to Energy Vision in the early stage of her activity in view of the fact that high start investments would like to be avoided?

- How will be developed the profitability of an investment in a PV carport under consideration of an external financing or a self financing but also in view of important tax aspects ?

- How does the model look for the financing, the marketing and the organization of the Energy Vision taking into account risk averse strategy of the companions concerning the PV carport project ?

- Which aspects of the risk analysis are important for Energy Vision to consider in particular the lack of professional employees at this time in Germany?

- On which competition has the Energy Vision to position itself in particular in Germany and with which suppliers in view of the distribution of solar carports in Germany can Energy Vision work together and which essential market entry barriers are to be considered, on this occasion, by the Energy Vision?

- Which strategy for the exit of Energy Vision from the market for the distribution of PV carports is conceivable and which next steps are to be taken by the responsible manager of Energy Vision to the conversion of the intention of selling and projecting PV carports ?

1.3 Citation of the main literature

The following main literature intended to be used in the master thesis according to different topics:

1.3.1 Technology

- Ursula Eicker: Solare Technologien für Gebäude , Stuttgart, 2001.
- R. Haselhuhn: Photovoltaik – Gebäude liefern Strom, TUEV-Verlag, 2005.
- H. K. Köthe: Stromversorgung mit Solarzellen, München, 1994.
- U. Rindelhardt: Photovoltaische Stromversorgung, Stuttgart, 2001.

1.3.2 Finance

- W. Jürgens: Projektfinanzierung: neue Institutionslehre und ökonomische Realität, Wiesbaden 1994
- W. Schmitt: Internationale Projektfinanzierung bei deutschen Banken, Frankfurt am Main 1989

1.3.3 Marketing & Strategy

- K. Friedrich: Erfolgreich durch Spezialisierung, München (redline Wirtschaft), 2003
- W. Mewes, K. Friedrich: EKS- Unternehmensstrategie, 1995
- J. Becker: Marketing-Konzeption, München, 1993
- H. Meffert: Marketing, Wiesbaden, 2000

1.3.4 Business Modeling & Project Management

- H. Hinterhuber: Strategische Unternehmensführung, Berlin/New York 1977
- H. Hinterhuber: Wettbewerbsstrategie, Berlin/New York, 1982
- H. Koch: Aufbau der Unternehmensplanung, Wiebaden, 1977

1.3.5 Legislation & Regulatory Framework

- Palandt: Bürgerliches Gesetzbuch, 2001
- Roth-Altmeppen: GmbHG, 1997
- Rowedder: GmbHG, 1997

1.4 Structure of work

As already in the preface described, it is the aim of both co-authors from both single parts of the master thesis to develop a big picture on account of which the potential start-up enterprise Energy Vision can create a successful business strategy.

Hence, before this background in particular the juridical sphere, questions of the financing, the marketing, the organization, the competition and other internal questions in view of the project Energy Vision, how the following figure demonstrates is worked on in the part 2 of the common master thesis:

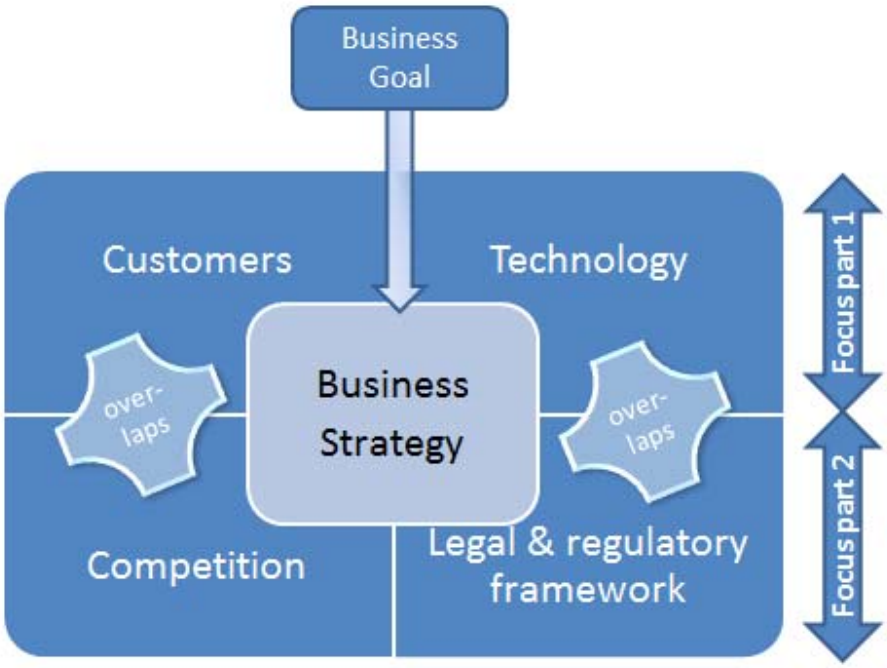

Figure 1: Overview of focus areas

2. Background information

As already in the introduction explained, it is the deliberate aim of the project of Energy Vision to distribute PV carports in bigger extent at the market.

In this connection the draught of the product life cycle is also to be seen which describes the process between the market launch of a product and his removal from the market .

The PV carport is currently in the introduction phase and it is also drawn the attention by other market participants on this new product by advertisement and public relations.

The following figure show the different phases of the product life cycle which can find use also on the product PV carport.

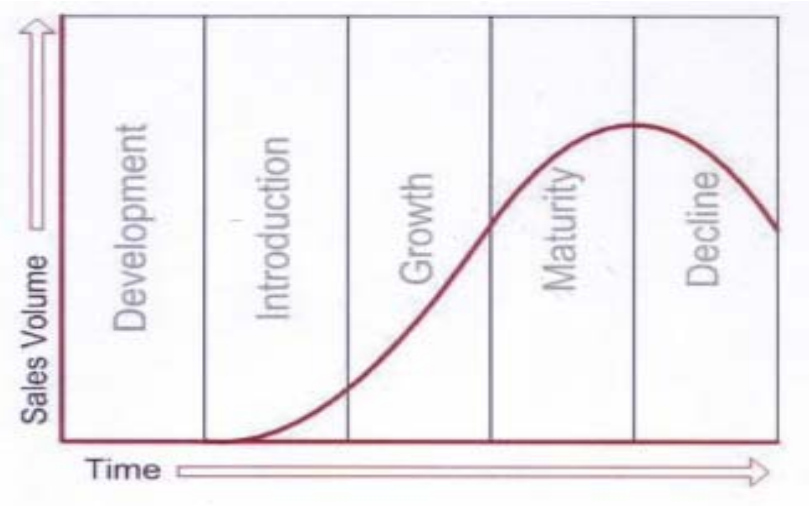

Figure 2: product life cycle (Ehrmann, 2002)

Current the phase of the development has been left with PV carports and the products are introduced on the market.

This should be for the plan of the Energy Vision a positive aspect, because it could turn out that this product is a sales hit.

Then an increase of the electric mobility is also possibly conducive here to accelerate the introduction phase of the product PV carport.

After then if the Break-Even Point is reached, the growth phase begins. The phase is marked by strong growth that PV carports sales can be still accelerated by advertisement for the product.

The following ripe phase is the longest market phase. The phase is as a rule also the most profitable phase, because here the profit curve is the highest. This phase can be also protected by a suitable preservation marketing for the PV carport or by product variations.

Then after the ripe phase the saturation phase follows sometime.

The product PV carport has at this phase no more market growth and the turnovers decrease.

Then there follows the last phase of degeneration. At this stage the product PV carport would lose bigger shares of the market and after this there will be a negative growth the product will die, so to speak.

These phases of a product life cycle are substantially in the observation of the project PV carport for Energy Vision and it is important to make itself deliberate that this product has currently left the development stage and has gained the market launch.

Energy Vision would have big chances to work on an interesting product, presumed the questions in part 1 and part 2 of this master thesis presented by two Co - authors can be answered positively.

3. Description of method of approach applied

Present is to be considered that here it is a matter of a literature-centered thesis (Stickel-Wolf, Kiel 2009).

Therefore, this attitude was chosen, because for the intention of Energy Vision in particular questions are worked on to the legal form of the start up company, to the organization, to the marketing, to risk analysis etc.

Hence, the following figure describes the handling of the main questions named in the introduction of the project of Energy Vision:

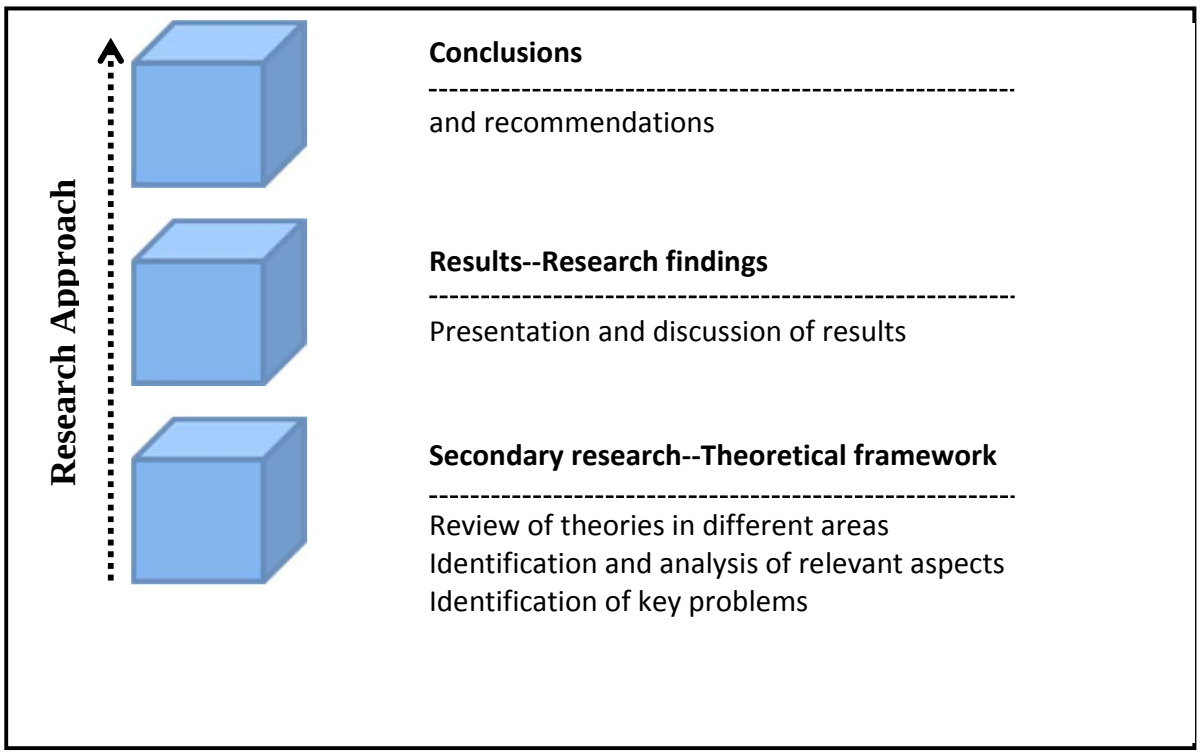

Figure 3: Overview research approach

3.1. Theoretical Framework

Secondary research is a important basis for handling the questions of the project of Energy Vision.
Secondary research includes plenty publications as a possible source of information.

The following sources belong to it:

- state institutions
- Web pages
- Press
- Specialist books
- Theses
- Dissertations
- Studies
- Discussion papers
- Pamphlets
- enterprise - internal data banks
- publications of scientific institutes
- Business reports of enterprises
- Prospectuses of enterprises
- and other relevant literature

3.2. Model Creation

As a further step with the validation of the project of Energy Vision it was worked on a model.
The model arises as a result on three steps.

The first step is the definition of the parameters, the second step is the conversion of the model and the third step is the definition of the results. This also arises from the figure cited below :

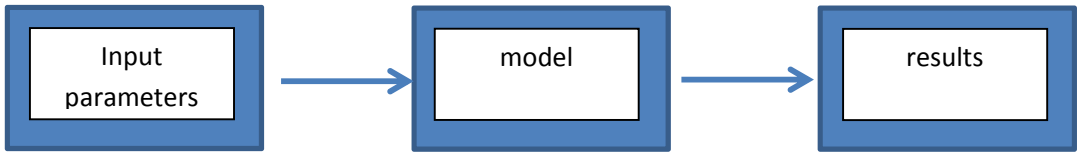

Figure 4: model creation

3.3. Profitability analysis including taxes

It was carried out a profitability analysis including taxes under point 4.1.11 of this work.

As a dynamic decisive criterion serves the capital value after taxes.

The examined scenarios enclose the financing of the investment in a PV carport with own capital or outside capital as well as the alternatives of the net feed in and the own consumption of the self-generated electricity, in each case taking into account the consequences according to tax law and results.

The acceptances for this decisive situation arise from point 4.1.11.1 of this work.

Further a sensitivity analysis was provided within the scope of this model and in this connection the question was put on which parametric situation lead to positive capital value.

On this occasion, in particular the interest rate, the tax rates, the planning horizon, the yearly resulting operating expenses, as well as the costs were varied.

3.4. Research findings and conclusions

Then the results of this model and the results of the secondary research are found basically under point 5 of this work or they were pointed out for reasons of the clarity and stringency also in point 4 partly.

4. Optimal legal form for the start-up plans of Energy Vision, possible cooperation with suppliers, juridical sphere for the plan of Energy Vision

4.1. Possible legal type for startup Energy Vision

One of the basic and essential decisions in connection with an business plan, is the choice of the right legal form.
Thus is also in the case of the concept of Energy Vision of fundamental importance to take no wrong decision in this decisive space.

In the everyday life a huge number of company names came upon. Nobody can grasp immediately what is hidden behind the single logogram of the enterprise name. Someone will maybe also make no difference between the legal form of an enterprise. Nevertheless, in business relations it is essential for business partners to know who is his opponent and how the liability questions are regulated. Also questions according to tax law are for an enterprise of great importance.

Before this background for the start up intention of Energy Vision an analysis of the available legal forms was set up, in order to present the proposal for the best of all suitable legal forms at the end of this chapter.
In this connection is to be noted that this presentation focuses basically on the German company and tax law.

And it has to be considered that also the company law for an other alternative location for the intention, namely of Switzerland, has similar structures. We deal in Switzerland with related legal forms. Therefore it was renounced for the avoidance of repetitions on the presentation of the company law for the possible alternative location Switzerland for the given start up plan.

In Germany the term " Enterpriser " is defined in § 14 Civil Code. Furthermore defines § 2 UStG the enterpriser with following words: „*Enterpriser is who performs a commercial or professional activity independently*".

Nevertheless, there is no uniform legal concept of the enterprise, because this concept is defined according to the purpose of the law which uses him differently.

Often enterprises are led in the form of a company. The company concept is fixed in §17 HGB and calls the juridical naming of a running business.

4.1.1. Limited commercial partnership

One of the legal structures which are possible for the intention of the Energy Vision is the legal form of the limited commercial partnership.

The KG (= limited commercial partnership) assumes a business with at least two companions from whom at least one sticks completely (Complementary) and at least one other which sticks by height of his capital solution fulfilled, until this is completely by him (limited partner).

The legal exclusion of the management (dispositive right) and the representation of the company corresponds to the limited liability of the limited partner outwardly (compelling exclusion). Nevertheless, procuration can be given to the limited partner. The limited partner has certain examination rights in the annual balance, the books and papers. Sequential insights into the deals of the company are not permitted to him on the legal basis of HGB.

At personal partnerships a outside management is not possible in contrast to the capital companies. Therefore the management must lie in the hands of the shareholders itself and cannot be transferred to a manager outside of the company.

The following performed aspects are to be considered at the KG:

- Every limited partner can contradict actions which go out the usual operation of the company.
- Every limited partner receives according to HGB from the annual profit up to 4% of his capital portion available at the beginning of the year. The rest profit is distributed in adequate relation.
- Every limited partner can require according to HGB a copy of the annual accounts after §166 in order to check the commercial books and papers.
- Every limited partner is involved in the liquidation proceed in adequate relation between the partners.
- Every limited partner can give notice to his partnership on the end of the business year under observance of a term of 6 months.
- Every limited partner is obliged to perform the agreed capital contribution in time.
- Every limited partner sticks up to the maximum height of the capital contribution.
- Every limited partner is involved in the loss in adequate relation of the capital contribution.
- A publicity duty exists for the KG only if she is a large-scale enterprise according to the publicity law.
- Above all the KG is for smaller and middle-size family enterprises suitable

- Advantageously for complementary is the fact that they can get, in addition, sponsor with limited liability and without management competence and right of representation.
- Because of united, unrestricted and immediate liability the KG is highly loan-worthy .

There is a relative dependence of the complementary together, disputes can endanger the KG.

Legal source of the KG are §§161 German HGB

KG is a modified OHG:

* Complementary = personally liable shareholder
* Limited partner's position
    * They are merely investors
    * No businessmen
    * regularly excluded from the management (dispositive)
    * Always excluded from the representation of the company
    * Controlling right, §166 HGB
    * No prohibition of competition, §165 HGB, however: if agreed is valid §§138 Civil Code, 1 GWB
    * Participation in the profit and loss, §§167 - 169 HGB
    * Liability limits by entry, §173 HGB
    * Liability before registration in the commercial register unrestrictedly also with the personal property, §176 HGB

The following table 1 shows essential points of the limited partnership .

Besides the general commercial partnership (OHG) is also to mention. Essential difference of the OHG to the KG is the fact that at the OHG all companions stick personally.

Furthermore the ordinary partnership (GbR) is also outlined in the following table 1 . And the GbR is often called the small sister of the OHG.

	GbR	**OHG**	**KG**
Independence	high	high	high
Formalities	none	yes	yes
Liability	every companion unrestrictedly	every companion with Companion's property and private property	complementary: whole Limited partner: Insert
Taxes	every companion individually	ESt, USt, GewSt	ESt, USt, GewSt
Accountancy duty	yes/no	yes	no
Publication duty	no	yes	yes
Capital application	No minimum capital	No minimum capital	no minimum capital
Image	medium	high	high

Table 1: comparison of GbR, OHG, KG

4.1.2. Limited liability company (Ltd)

An other legal structure which is suitable for the intention of Energy Vision is the Ltd. The company is directed upon any legally allowed purpose and originates as a legal entity from the registration in the commercial register. The companions are involved with capital contribution on the capital disassembled in different shares.

In contrast to the personal companies the companions stick at corporations only with height of her capital contribution, aside from exceptions. This is one of the essential differences (Roth,1997).

The Ltd is the most often chosen legal structure. It is equipped with own juridical personality and she is a legal entity. The Ltd acts by organs, i.e., by her manager. As own juridical personality the Ltd originates with the registration in the commercial register.

The German law prescribes a minimum capital of 25,000 €. Already at the foundation all companions have to deposit half of the whole contribution capital. The companions are involved by shares in the property of the company.

Compared with business partners the company sticks only to the extent of the joint stock, therefore the addition " limited ". Besides, the single companions stick with her respective portion in this joint stock (Rohwedder, 1997).

But compared with the house bank this restriction is not valid . The creditworthiness is clearly lower as with a GbR or OHG and this is also an important aspect which is to be followed by sides of Energy Vision.

In practice credit grantors, in particular the financial institutions insist, as a rule, on the fact that private securities of the companions are offered to them with the admission of loans. The companions must vouch for the repayment regularly, so that the advantages of the liability limitation do not affect on the company property, in any case, concerning the business dealings with bank institutes.

A Ltd offers above all when the financial risk linked with the enterprise to be founded is so high that none of several partners involved in the foundation wants to allow to come on a personal liability .

4.1.2.1. Relevance of the Ltd

* Often chosen company structure, in particular with small and middle-size enterprises
* Low capital expenditure
* Liability limitation on the company property
* Adaptable possibilities concerning the inside relation of share holders
* Tax advantages
* Suitability for one person-and family businesses
* It can be founded for every legally allowed purpose, it is not necessary that the Ltd pursues a full-business trade: so also for small businessman etc.

4.1.2.2. Advantages compared with a personal partnership

* Liability only with the company property
* Liability of the companions limits to the capital contribution
* Companion and manager position are possible independently of each other

* Management and commercial representation lie only at the manager, not at the shareholders
* Companion's change does not touch the continuance of the company
* Hereditary regulations often easy

4.1.2.3. Disadvantages compared with a personal partnership

* Duty for the registration in the commercial register
* Duty for the publication of the annual accounts
* Higher taxes
* High costs with the liquidation
* Worse reputation at the banks in comparison to the OHG

4.1.2.4. Liability dangers for companion and manager in the single foundation phases of a Ltd

* Prefoundation company as a rule is a Civil Code society
    * Companions and managers stick personally and unrestrictedly

* Presociety (pre-Ltd, „Ltd in foundation“)
    * Companions stick personally to the extent of the not yet fulfilled contribution
    * Companions stick besides for a perhaps failure of the contribution of the cocompanions
    * Manager sticks for obligations of the pre-Ltd personally

* registered Ltd.
    * Liability freeing by achievement of the capital contribution
    * Care on payment of the capital before the notarial act

4.1.2.5. Organs of the Ltd from the first sight

* Manager
* share holders meeting
* Supervisory board or advisory board
    * Optionally, from 500 employees obligatorily

Manager of the Ltd

The position of the manager can be signed with the following aspects:

* Manager = organ (regulation moreover in the statute of the Ltd)
* Manager = employee (regulation moreover in the manager's contract)
* Is defeated by direct influence of the shareholders
* Order and registration in the commercial register
* shareholder's meeting, an easy majority decision
* Representation power
    - With several managers only collective representation; other arrangements are possibly
    - Can be limited in the internal relationship
    - exemption from §181 Civil Code must occur through the shareholders's meeting and be put down in the commercial register
    - Injury leads to compensation claims, perhaps to the cancellation of the representation power

* Manager's competence

- Concerns only the internal relationship
- e.g., definition of an approval catalogue

* Recall of the outside manager is at any time possibly
* Differentiate: Recall as organ (GF) or notice of the employment
* Recall of the managing partner only for important reason

Manager's contract

The following aspects are to be considered with the manager's contract:

* Juridical classification
* Industrial safety regulations find often no use
* Dominating managing partners are defeated by no social compulsory insurance (employee's pensions, Jobless and accident (BG) assurance)

* Written form is usual for the contract
* Salary is to be regulated
* Fixed salary is the basis for the remuneration
* Share in profits as an adaptable element
* Pension assents
* Ending of the salaried employment
* Abolition contract or notice
* Protection against unlawful dismissal / compensation
* Prohibition of competition
* Liability for the activity as a manager
* Duty injury
* Bankruptcy abduction is to be followed as a risk

Shareholder meeting

Position of the shareholder meeting:

* shareholder meeting = the uppermost company organ
* Decision-making process by corporate's decision

Duties of the shareholder's meeting:

* Statement of the annual accounts and use of the result
* Collection of payments on capital contribution
* Repayment of reductions
* Division and collection of shares
* Order, recall and discharge of managers
* Check and supervision of the management
* Order of authorized attorneys and agents
* Assertion of claims for damages of the company against the manager or the companions
* Representation of the company in processes against the manager

Shareholder of the Ltd

* Legal position of the share holders
* Is directed according to the companies contract / following §§ 45 ff GmbHG
* Shares freely contagiously
* Companion can be excluded for important reason from the company
* Rights and duties of the companions beyond the sahreholder's meeting :
    * Duty of the capital application

* Duty to the capital preservation
* Additional payment duties

* Rights and duties of the companions beyond the shareholder's meeting :

* Right to be informed of the share holders (§ 51a GmbHG)
* Information and examination right
* Withdrawal right of the share holders
* Profit payments, also advance payments
* Adequate payment of interest
* Prohibition of competition of the shareholders
* Loyalty duty analogously §112 HGB
* Privileges from the company contract

Supervisory board or advisory board of the Ltd

* voluntary organ of the Ltd, from 500 employees obliging

* Moreover in the statute arrangements are made
    * otherwise are valid the share-juridical regulations

* Statute / agenda
    * Statute must contain regulation for the installation, occupation, the duties, order and recall

* Competence
    * Supervision and consultation function
    * Approval competence

* Members
    * Completely in the judgement of the companions
    * Doubtfully whether manager can be a well-arranged member

* Reimbursement
    * In the judgement of the companions; but: pay attention to propriety, because otherwise suspicion of the concealed profit payment is obvious

4.1.2.6. Increase of capital

* Actual rise of the joint stock :
    * Other cash investment or material contributions
    * Change of the statute with ¾ majority decisions and notarial registration
    * Only with registration in the commercial register efficiently

* Increase of capital from companion's means :
    * Rise by change of reserve
    * Balance sheet items capable of change
    * Only capital and profit reserves of the (mostly) last annual balance
    * Purpose-certain reserves may be pulled up only after previous resolution of the purpose
    * Are not able of change: Special posts with reserve portion, retained profits brought forward, companion's loans
    * Ban of paying back of the contribution

4.1.2.7. Shareholders's advances

For an adequate financing of a Ltd are beside bank loan also companion's advances of great importance. In particular in economically heavy times the financing possibility of the Ltd about companion's advance is significant (Roth, 1997). The following essential aspects are listed in the area of the companion's advance compared with the Ltd:

* Considerable, constant liquidity difficulties
* Conditions of the grant of credit (e.g., no interest for the companions)
* Discrepancy between company capital and outside capital
* Crisis advances
* Differentiation to company capital-substituting advance and guarantee capital advance
* Care with constant business connection between companion and company
* Payment of interest differently, depending on whether company capital-substituting advance or guarantee capital advance
* Rank resignation arrangements
* Spouse advances are not company capital-substituting

4.1.2.8. Elimination of shareholders

The companion's circle of a Ltd is not always marked by the same acting people. There is also the possibility that companions of a Ltd retire. The reason for this is varied, thus, e.g., by personal problems in the companion's circle or in connection with another, professional orientation of a companion.

The elimination of companions is stamped by the following aspects:

* Notice
    * to regulate in the companion's contract, because GmbHG shows no own notice regulations
* Exclusion of a companion
    * No legal regulation
    * Exclusion, however, for important reason possibly, exclusion complaint necessarily; companion's decision is not sufficient
    * Payment of a compensation necessarily
* Disposal of the companion's portion
    * Free disposal possibly
    * Notarial registration of the disposal contract
    * Compensation i. H. of the true value of his participation

4.1.2.9. Reasons for liquidation of the company

* Reasons for the liquidation:
    * By expiry of the time in the company contract
    * By companion's decision by ¾ majorities
    * By judgment, if companion (mind. 10% of the joint stock) complain on liquidation
    * By decision of the register court, if a lack is ascertained in the statute
    * By insolvency opening
        - Reasons: non- solvency or overextension
        - Manager must make insolvency application immediately (3-weekly term) and is defeated afterwards by the instructions of the receiver in insolvency

- With bankruptcy abduction the manager makes himself liable for damages

4.1.2.10. Liquidation

The liquidation is the end of the activities of the Ltd.

* Steps of the liquidation:
    * liquidation is to be announced for the registration in the commercial register
    * In the insolvency case the registration occurs officially
    * Liquidators must announce the resolution at three different time in the company sheets
    * Ending enters only with property distribution and deletion from the commercial register

* Liquidators:

    * Step to the place of the manager
    * Set up liquidation opening balance and liquidation final balance
    * Running deals to finish
    * Payment of the property to the companions occurs only at the end of the locking year; begins with the announcement of the liquidation

4.1.2.11. One-man Ltd

In view of the companion's circle the Ltd is formed very adaptably. There is the possibility that the companion's circle consists of two or several people.

However, there is also the possibility that the Ltd has only one single share holder.

* Signs
    * All shares in the hand of one companion

* 2 possibilities of the origin
    * Foundation of a one-man Ltd
    * reunion of the shares in the hand of one share holder

* Companion's decisions must be fixed in written form
    * If form requirement is absent, the decision is ineffective towards third persons
    * Perhaps there originate compensation claims

* No prohibition of competition

4.1.3. The GmbH & Co. KG

A combination of personal company and corporation offers the GmbH & Co. KG.
She offers the advantages of a corporation (liability limitation) and a personal company (flexibility).
The Ltd takes over the role of the general partner as a personally liable companion, while the companions of the Ltd act as limited partner (partner).
The decision-making power lies at the complementary (Roth, 1997).

Tax and juridically the GmbH & Co. KG is treated like a normal limited partnership.

* Juridically personal company (limited partnership)
* Ltd takes over, as a rule, merely the position of the general partner
* Limitation of the full liability on the property of the Ltd

The following table 2 shows the differences between GmbH and GmbH & Co. KG:

	GmbH	**GmbH & Co. KG**
Independence	low	high
Formalitities	high	high
Liability	limits to inserts, completely compared with banks	how with GmbH
Steuern	GeSt, KSt	Est, Gew.St, KSt
Accountancy duty	yes	yes
Publikationspflicht	yes	yes
Capital application	25.000 EUR	25.000 EUR
Image	medium	medium

Table 2: comparison GmbH or GmbH& Co KG

4.1.4. Suitable legal form for the project of Energy Vision

The above aspects have shown for every type of company the advantages and disadvantages which come up from the different corporate form.

With consideration of these advantages and disadvantages of the different corporate forms for the start-up of Energy Vision the structure of the Ltd as an adequate legal form is highly recommended.

With the present start-up plans of Energy Vision the future risks are not to be excluded in the expiry of the activity and, therefore, the restriction of liability of the activity for the protection of the share holders is an very essential aspect.

Unforeseeable risks can be mastered accordingly better, than, e.g., within the scope of the legal form of the OHG which sticks the companions always with her whole property, so also to her personal property for the enterprise risks.

The Ltd is able to be converted in the further progress also in a GmbH & Co. KG in order to take up limited partners in the company with other needs for the change of the capital structure.

4.1.5. Supplier's management of Energy vision

The supplier's management is for the start-up enterprise Energy Vision of considerable importance.

Since through a well done suppliers management system the dependence of the enterprise is prevented, furthermore it allows the specific control of procurement volume and the untimely setup is allowed by possible alternative suppliers; it allows further on an objective comparability of the supplier's achievements.

Hence, the essential basic data are shown in the following description for the supplier's management of Energy Vision:

4.1.5.1. Strategic aims of the supplier's management of Energy Vision

The strategic aims of the supplier's management of Energy Vision deal with the medium-term to long-term optimization of the supplier's base of the enterprise.
Outgoing from category strategies it is a matter of defining exact development measures which allow a continuous rise of the quality of delivery or a lowering of the acquisition costs (Hinterhuber 1977) .

The care risk can be also reduced by the collaborative optimization of enterprise-covering processes with lasting effect. The untimely setup of possible alternative suppliers net works and the specific control of the procurement volumes bends forward the dependence of the enterprise Energy Vision.

Besides, the relation to strategically important suppliers should be enforced by co-operative and integrative measures and the competitiveness of own enterprise Energy Vision could be protected therefore.
On grounds of the long-term adjustment all measures should be checked for the reaching of the strategic aims within the scope of a continuous process which is adapted if necessary.

4.1.5.2. Operative aims of Energy Vision

The operative aims of the supplier's management of Energy Vision refer primarily to raise the achievement of suppliers and to lower the acquisition costs.

A clear supplier's base and the objective comparability of the supplier's achievement enable the enterprise Energy Vision to concentrate upon the best suppliers, phasing out not to competitive suppliers and to weigh existing supplier's relations against potential ones.

The concentration of procurement volume on the most competitive suppliers and the reduction of the supplier's base opens grouping potentials which are connected always also with positive cost effects.

Besides, exact information about single aspects of the supplier's achievement delivers valid arguments for the supplier's negotiations and improves thus the negotiations position of Energy Vision.

Also uncovering of optimization potentials within the scope of the supplier's assessment allows the definition of exact development measures which lead to an improvement of the supplier's achievement for the purposes of the enterprise Energy Vision .

4.1.5.3. Supplier's selection by Energy Vision

The supplier's choice is the process in which an enterprise identifies potential suppliers, for example, with regard to quality.

This process becomes time-consuming and expensive if it was not carefully planned. Hence, this selection has for Energy Vision great importance!

Therefore it is a matter of forming this process so efficiently as possible (e.g., by standardization and automation measures), so that the expenditures keep low for the purchase department.

The criteria for a supplier's choice are derived, on this occasion, from the different demands of Energy Vision.

The different departments of Energy Vision often have quite different claims in connection with the product, the matching service, or also the modalities of delivery. However, influence also outside conditions, often given by the market , the selection criteria (e.g., only low number of suppliers, legal prescribed high-class standards, observance of directives, etc.).

4.1.5.4. The process of a supplier's selection of Energy Vision

The selection process of Energy Vision begins with a supplier's identification which can be passive as well as active.

The passive supplier's identification describes a process which the supplier applies from own initiative at the enterprise Energy Vision.

With the active supplier's identification, however, potential suppliers are identified by the enterprise Energy Vision and are asked to provide information.

In both cases the supply of information usually occurs above an IT entrance about which the potential suppliers can make available data about her enterprise and product port folio. To this information count for example:

- Company name, address
- Legal form
- Number of the employees
- Location of the enterprise

- Information to the turnover
- Product spectrum and service spectrum
- High-class certifications
- Environmental standards

An active supplier's identification can be initiated, for example, in the form of a RFI `see (Request for information).

This request around information usually still shows no intention to award a concrete order, rather she serves to attain certain "Market Intelligence". Because the answer of a RFI `shows a certain expenditure for the supplier, it is absolutely possible that not all chosen enterprises react to the inquiry.

Enterprises often answer only a RFI if they expect that the customer dispatches, finally, also a RFP (Request for Proposal) or RFQ (Request for Quotation) to them. The return rate can be raised, for example, by an automated reminder function within the IT main entrance. The process of the supplier's choice can run up to this point for all trade groups immediately.

Afterwards the first assessment of the provided information takes place. With this coarse filtering those suppliers are excluded first from the other application process who are registered, for example, on so-called „black lists“.
There are negative lists in many areas, they can give, for example, information about the fact which enterprises portion out to the protection of the environment only little meaning, or allow to produce her products under extremely bad terms of employment.
This is an important aspect for Energy Vision, because there is a high responsibility towards environmental conditions.

In addition, enterprises formulate often own lists of this kind which certain business relations exclude.

If this first screening has occurred, it can begun with the query of more detailed information. For this purpose standard questionnaires are dispatched to the suppliers .

Therefore in part 1, chapter 4.9.2. of this master`s thesis there is described such a questionnaire and the process for aims of Energy Vision.

In the connection a functional-covering assessment of the suppliers can be carried out. On this occasion, it is important to consider the appraisals of the different departments of Energy Vision and to bring them together. In the course of this process the first supplier-screening also takes place. The aim of this activity is to minimize the likelihood of a bad supplier performance.

In addition the following steps can be taken into consideration by Energy Vision:

- Active examination of the references by establishment of contact with other customers of the supplier
- Query of financial status information
- Requirement of product tests
- To guarantee capacity check around security of delivery with inquiry variations

It is to be mentioned that this process is often not enough if it is about the procurement of direct materials.

Should the results of all assessments and screening activities have been positive, the supplier can be released in a final step as a potential supplier in the electronic data bank

of the enterprise Energy Vision (Hinterhuber, 1977). This release can be based on the preceding assessments and can be valid for everybody or for only certain trade groups.

4.1.5.5. Supplier's qualification by Energy Vision

The supplier's qualification by Energy Vision describes the active examination from the supplier during the choice process to provided information.
Such an investigation mostly takes place in the form of an exactly structured audit which processes are valued in the enterprise of delivery with regard to her fulfillment by enterprise standards and directives.

In many cases lies the priority focus of an audit on the check of high-class management systems, however, it can also be a matter of valuing the abilities of the supplier with regard to logistics or his achievement in view of environment protection. The last aspect is very important for Energy Vision.

The general points for Energy Vision which are a matter to check with a supplier's audit :

- Availability of high-class certifications (ISO certification, CSR regulations, GMP directives etc.)
- Recordings about regular employee's trainings
- Measures to the quality assurance (e.g., availability of a Corrective and Preventative action (CAPA) plan)
- Documentation concerning servicing and calibration of machine arrangements
- Directives for the manufacture of documentation
- Archiving directives

At the end of an audit it is decided by Energy Vision, whether the supplier can be certificated by the enterprise and may also supply Energy Vision therefore in future.

The decision is usually explained in a detailed audit report which summarises the circumstances at the time of the visit and indicates in which areas if necessary finishing touches are necessary on the part of the supplier (Steinbuch,2001).
Then this report also serves later audits as graduation in order to ascertain which changes were with the supplier in the time expiry. The supplier should show to himself in general co-operative towards audits, because they also give him the possibility to bring in experience as his products are used at the end and by which later demands they can be defeated. This information can be helpfully for his other product development.

Considering which huge expenditures (cost for recall actions, guarantee costs, image damages etc.) for the Energy Vision can originate from inferior or not correspondent product materials of suppliers, this underlines the enormous significance of an actual supplier's qualification and their important position in the process of the supplier's management.

4.1.5.6. Supplier's assessment by Energy Vision

The supplier's assessment is an instrument to the regulation of the efficiency of existing suppliers by Energy Vision. This process of the monitoring, measuring and scoring is carried out to recognize risks early and to prevent the causing of costs by a bad supplier performance.

Defined criteria are pulled up for the clearly measurement. Although these criteria are always similar to themselves in general, nevertheless, they are from trade group to trade

group of different relevance for the enterprise. To be equitable to this fact, it would seem to do the setup and the application of assessment models. In these assessment models criteria can be put together and be weighted sensibly.

Sensible criteria can be:

1. **Logistics:** Conditions of delivery, packaging, adherence to delivery dates , general transaction
2. **Quality:** Complaint management, quality management, documentation, early warning systems
3. **Commercial points of view:** Prize transparency, guarantee terms,behavior concerning choice of products, market position
4. **Risk:** Financial stability, supplier's independence, availability
5. **Cooperation:** Flexibility, accessibility, common projects
6. **Sustaniability:** Environment protection
7. **Technology:** Know-how, innovation potential

To ascertain the achievement of a supplier in the called areas, different sources of information can be used.

The facts of the matter like adherence to delivery dates or quality objections can be easily measured with the help of identification numbers which are documented in the ERP system, e.g., number of complaints in a certain period.
These data show so-called system-based "hard facts". To be able to measure the performance of the supplier in categories for which no identification numbers are given, it requires the judgement of enterprise employees from different departments, as for example of the purchase department. These so-called "soft facts" could be set up with

the help of specific questions within a scorecard investigation, which are answered by the relevant departments .

The assessment periods can vary considerably depending on the trade group and their importance for the business of Energy Vision (Ehrmann,1995). It is obvious, evaluation of suppliers whose goods put out a big portion in the total expenditures of Energy Vision and which are from considerable importance for the everyday production have to be carried out in shorter time intervals than those suppliers who deliver only sporadically tiny amounts of relatively uncritical materials.

A consistent and regular supplier's assessment should enable for Energy Vision to produce transparency and comparability within his supplier's base and deliver therefore the basis for the post stored processes of the supplier's management.

4.1.5.7. Supplier's classification by Energy Vision

Based on the results of the supplier's assessment a classification of the suppliers can occur by Energy Vision in supplier's classes. With the definition of the classes it is obvious to choose a division which is aimed directly at the performance.

A classification could look as follows:

Assessment result	Possible classification	
80 - 100 scores	Excellent performance	A
60 - 79 scores	Average performance	B
40 - 59 scores	bad performance	C
0 - 39 scores	insufficient performance	D

To be able to derive the right measures from the occurred supplier's classification, there must be ascertained which importance comes up to the suppliers concerning own production. The relevance of a bad supplier performance increases for Energy Vision considerably if the concerned supplier provides products which are only hardly substitutable. So a linking of the performance with the strategic role of the supplier is essential.

For suppliers who have already received an optimum assessment a removal and an intensification of the business relations can be aimed. At the end of the supplier's classification the communication of the results is relevant. There will be informed internal stakeholder as well as the suppliers itself.

4.1.5.8. Supplier's development of Energy Vision

Within the scope of the supplier's development strategic decisions are made by Energy Vision with regard to the future intensity of the relation with a supplier.
Moreover exact objectives and measures which should improve the achievement potential and the cooperation with strategically important suppliers are defined, based on the results of the preceding supplier's assessment and supplier's classification.
Reasons for such development measures are able to be more surgically (e.g., quality problems, delays of delivery) as well as more strategically (e.g., high strategic significance of a supplier, setup of suppliers to counteract dependence) .

4.1.5.9. Active supplier's development

At the supplier's development there can be distinguished between two models:

On the one hand the active supplier's development and on the other hand the supplier-self development.

The first variation places on the common definition and realization of individually formed measures.

Active suppliers development needs a big engagement on the part of Energy Vision and is applied, primarily, with suppliers whose products have a high strategic significance for own production. Enterprises often furnish even teams or departments whose steady major task is to pursue supplier's development.

Measures of the active supplier's development can contain:

- Developing teams are send to the supplier

- To transfer / generate realization of common workshops to transfer know-how
- Training of employees in the partner - enterprises
- Initiation of common research projects or development projects
- Partial integration of the supplier (e.g., Joint venture, acquisition)

4.1.5.10. Supplier-self development

By self-development the suppliers optimize independently her performance towards Energy Vision, the measures limit themselves therefore to objectives and progress in future. This method finds use in general with strategically less important suppliers.

For both forms of the supplier's development it is essential to define the concrete aims which it is a matter to achieve in a given period.
Besides mechanisms must be installed for successful control which permits it to counteract, in case of undesirable trends or delays . The measures of the supplier's development can be an advantage for both parties. Energy Vision can expect an improved performance of the supplier and therefore also improvements in own achievement production. Moreover, there comes up the possibility to accumulate know-how with regard to development measures and to arise best of all practices.

Although a supplier may not welcome it primarily that a customer intervenes in his processes, nevertheless, also come up for him varied possibilities to increase his know-how, to use synergies for himself and to bind the customer better to himself.

4.1.5.11. Phasing out of a supplier

A phasing - out of a supplier is called the planned and structured ending of the commercial relation between Energy Vision and supplier.

This procedure is to be understood as a long standing process.

It mostly begins with a slow reduction of the order volumes and is completely carried out only when it is unambiguously sure that the supplier shows no more strategic significance for the enterprise.

Possible reasons for a supplier phasing-out :

- Identification of better suppliers within the scope of the supplier's selection
- Negative classification within the scope of the supplier's assessment and the supplier's classification occurred
- Misconduct of objectives in connection with the supplier's development.

Although this process shows the last step in a supplier's relation, his realization must be also planned carefully in order to recognize early possible negative effects or interaction. The process should begin with a proposal of the potential candidates are listed. It must be exactly checked in the following which effects would have the elimination of the supplier from the supplier's base (Ehrmann,1995). Questions after the compensability and the monetary implications must be cleared here finally.

Important aspects in this connection are:

- Can it come to contract punishments?
- How high are the costs to set up completely a new supplier?
- How grave is the loss of know-how and any synergetic effects ?
- How is the behavior of the supplier to be estimated if he anticipates the decision for phasing-out ?

After the decision for phasing-out of a supplier it is a matter of defining the exact time and to fix the responsibilities for supervision of phasing - out.

It must be made sure by the responsible purchase department that no new orders are generated for the concerned supplier and the supplier's number as well as necessary material numbers are deactivated in the data banks.

The final step exists in the official communication of the decision by Energy Vision to the supplier.

4.1.5.12. Advancement of the supplier's management

The above performed aspects show very clearly that for the start-up intention of Energy Vision the supplier's management is of great importance.

Just in the solar area you can find volatile markets and during the last weeks and months numerous market participants have disappeared or had to announce insolvency (Koch,1977).
Hence, also before this background it is important, to analyze stable suppliers and to develop the relation with these selected suppliers further on.

Since the supplier's sphere is an extremely important impact for the intention of Energy Vision.
Without highly qualified suppliers the project plan of Energy Vision is not moveable and at last condemned to the failure.

4.1.6. Cooperation

Under the term cooperation we understand networks with long-term respect between two or several, mostly juridically enterprises. However, the involved enterprises deliver a part of her economic sovereignty to the cooperation.

Cooperation are very important just for small and middle companies, the cooperations in her horizontal or vertical manner. Cooperation lead to the fact that small enterprises remain competitive and are protected in her existence .

The advantages of a cooperation for Energy Vision can cause , in any case, a high benefit. It has to be remembered, for example to protect purchase price advantages within the scope of purchasing associations . There are such purchasing associations already in the area of the solar industry.

Furthermore it has to be remembered that cooperation are also entered in this respect when just in the early stage enough personnel capacity is not available to the project of Energy Vision.
Hence, within the scope of suitable cooperation can come know-how of external companies who are connected in frame of a cooperation with Energy Vision.

Also at the expansion of the activities in a later period of running Energy Vision, for example, in other countries, it is very well to enter suitable cooperation with other companies . In particular under the point of view of the intercultural management this is of great importance.

4.1.7. Joint-venture

As special type of a cooperation can be seen at the joint-venture.

Within the scope of a joint-venture several companies unite within the scope of an independent organization to achieve together one or several aims.
In connection with the plan of the Energy Vision it can make sense to take up the legal form of the joint-venture as special cooperation form.

For example when in a new country market should be opened a successful cooperation with a foreign partner on a strengthened juridical base (Ehrmann,2002).
Long-term aims should be pursued by the joint-venture.
Through this it is avoided that short-term cost disadvantages will originate.

Therefore the joint-venture shows also a reasonable cooperation type, which should be taken up by Energy Vision, as soon as a suitable opportunity will arise.

4.1.8. Juridical sphere of the start-up intention of Energy Vision

Besides the legal structure of the start-up of Energy Vision and the setup of stable supplier's relations an other component is also essential in the sphere of the start-up , namely the distribution of PV carports .

In this connection just in Germany the juridical sphere is of great importance for Energy Vision.

Because suitable conveyor possibilities have to be focused which subsidize the economic efficiency according to a PV plant in a heavy manner.

Hence, before this background it is unavoidable to make clear to itself also the juridical basic conditions of a start-up in the energy sector.

4.1.8.1. Photovoltaic installations in or on buildings

Small arrangements on house roofs, for example PV carports must also correspond - although regularly no planning permission is necessary for their equipment - to the building law. Otherwise their removal can be claimed (article. 76 BayBO).

Particular importance attains the building code-juridical defacement ban (Art. 11 BayBO).
Nevertheless, the technical regulations with regard to the used products and the expert installation are also to be followed by photovoltaic installations which are free of approval.

In the undeveloped outskirt area photovoltaic plants are not privileged. Neither own claim of privilege exists for arrangements to the energetic use of the solar energy nor is appropriate one of the customary privilege rights of §35 paragraph 1 BauGB.

4.1.8.2. Property and lease law

With the conversion of the project by the start-up Energy Vision it is also necessary to consider the property-juridical and lease-juridical interests (Palandt, 2009).
Because it is a question which show an essential base for the installation of suitable photovoltaic plants.

A failure in this area would mean the complete loss of an investment and, hence, would have drastic, negative aspects for the young start-up enterprise Energy Vision.
Before this background an exact check and consideration of the property-juridical aspects is indispensable.

Important circumstances often remain outside before, e.g.

- the requirement of the financing bank or
- existing charges in the land register.

In addition, it is important for the protection of the property of the plant operator to clarify that the photovoltaic plant on a continuing basis remain on the property, but only for the period of the reimbursement according to the renewable energy law (EEG), so twenty years and the year of the introduction. Otherwise the danger insists that the arrangement becomes an essential component of the property and goes over in the property of the lessor. Energy Vision has the plan to install large PV carports on public ground and therefore this legal aspect is of great importance for the company.

Further the obligation of the lessor is to be brought in the land register. This serves the protection of the plant operator Energy Vision in particular in case of the forced sale of the property.

The servitude has the content that the plant operator is entitled to pursue the photovoltaic plant on the property. The approval of the servitude must be signed with the notary in a public manner. It is advisable to include the text of the servitude already as an attachment of the lease contract.

Plant operators, but also financing banks think mostly of a top-flight servitude. This means, already registered charges like land charges or mortgages must withdraw behind the new servitude.

For the protection of the property in the arrangement it is to be recommended to establish in the lease that the arrangement must be diminished at the end of the fixed contract term. Sometimes also exists the possibility to make a connection arrangement. This can concern the purchase of the arrangement by the lessor .

Also the admission of the obligation is to be recommended in the contract that the clauses of a contract on any legal successors must be transferred. Hereby it is guaranteed, e.g. that at possible sales act of the property the rights and duties from the lease are imposed on the buyer and he must tolerate the running of the arrangement for the agreed rest term of the contract.

4.1.8.3. Guarantee with faulty profit forecast

For the young start-up enterprise Energy Vision it is also essential to make clear to itself the legal results which can be due from a defective installation of a photovoltaic plant in connection with solar carports.
Then different interests bang on each other between Energy Vision and the buyer of a photovoltaic plant.

It is for the operator of a photovoltaic plant in the first line about the yield of his arrangement. As far as the manufacturer advertises - depending on the solar irradiation - with guaranteed revenue account, the prospective buyer can get to know how much electricity should generate the arrangement during the next twenty years and which yield is connected with the operating of this arrangement.

If the actual yield of the photovoltaic plant falls short of the forecast yield, the mistake lies often in a in wrong parameter of profit forecast. Often the number of the annual solar hours will calculate too optimistically and inclination divergences too slightly.

Faulty forecast factors are not always to blame for a profit divergence. It is possible also that the photovoltaic plant does not function optimally.

A faulty interpretation, problems with the converter or profit-weak modules can lead to the negative fact that a PV carport takes a short-cut than forecasts. If this is the case, the buyer of the PV carport can assert a lack of the arrangement and require finishing touches, possibly also compensation.

4.1.9. Economic aspects by the EEG

However, the renewable energy law also contains a whole series of economic aspects which are to be considered with the conversion of the project of Energy Vision. Beside the juridical aspects also economic aspects are to be analyzed and to be incorporated at least in the start-up plans of Energy Vision.

4.1.9.1. Universal aspects

Kicking of the renewable energy law (EEG) at 01st of August, 2009 released in the photovoltaic branch in Germany an unexpected push. In 2009 an increase occurs in photovoltaic plants in Germany with a whole achievement of 3,800 megawatts (MWp), This was an increase about more than 60 percent in comparison to 2008. The solar electricity achievement installed all together in Germany rose in 2009 on 9.785 MWp.

In the EEG of 2009 the feed-in compensation rates are regulated for one kilowatt hour electricity from a photovoltaic plant in dependence of the assembly, so roof - or free

surface plant, and the efficiency (to 30 kW, 30 - 100 kW,> 100 kW). In 2011 the compensation rate lies for a photovoltaic plant on roof with a size up to 30 kW with 28.74 ct.
As another incentive the height of the feed-in compensation rate is established on 20 years.

So an investment in photovoltaic plants leads to a positive financial result, there are some bases which must be followed before the installation and by the planning.

4.1.9.2. Acquisition costs and production costs

For the profitability of a photovoltaic plant is beside the natural and technical conditions, above all also the cost side of essential meaning.

Modules (incl. converter and assembly) are currently in range of an area of € 1.700 - 2.900 / kW plus VAT and the differences are dependent above all on module type and manufacturer.
Therefore the investment in a photovoltaic plant, for private individuals as well as for enterprisers can still gain a satisfactory yield.
But beside the economic efficiency it is a matter of thinking that a bigger investment binds a lot of capital in a photovoltaic plant which is required, perhaps, later for another operational investment.

After the investment sum is mostly substantial and the photovoltaic plant should "run" the next 20 years, an investment should be well considered and be calculated.

4.1.9.3. Amended EEG in 2009 from 1/1/2009

The German Bundestag has decided on the 06th of June, 2008 with the amendment of the renewable energy law (EEG in 2009) an other lowering of the feed in tariff and by smaller arrangements to 100 kW in 2009/2010 8% of degression and from 2011 9% of degression . By bigger arrangements the degression amounts between 9 - 11%.

Other changes in the overview:

- New reimbursement class by roof arrangements PV> 1,000 kW
- "Facade bonus" was stroked
- Bonus for self used PV electricity (for arrangements <30 kW)
- Introduction of an investment register and a compulsory registration
- Introduction of an "feed in management" for arrangements from 100 kW

In the meantime the EEG was amended in 2009 for photovoltaic once more. Here above all the reimbursement conditions for so-called free surface arrangements were extremely aggravated, so that only in special areas (conversion surfaces) an EEG reimbursement is possible for electricity from free surface plants.
Furthermore the bonuses were changed to the incentive of the direct consumption by own generated PV electricity.

The following table shows the different feed-in tariffs:

year of the introduction	< 30 kW (ct/kWh)	ab 30 kW (ct/kWh)	ab 100 kW (ct/kWh)	ab 1.000 kW (ct/kWh)
	9 % p. a. in 2010 13 % ab 2011	9 % o. a. in 2010 13 % ab 2011	9 % o. a. in 2010 13 % ab 2011	9 % o. a. in 2010 13 % ab 2011
2009	43,01	40,91	39,58	33
2010	39,14	37,23	35,23	29,37
2010^	34,05	32,39	30,65	25,55
2010^^	33,03	31,42	29,73	24,79
2011	**28,74**	**27,33**	**25,86**	**21,56**

Table 3: feed in management

4.1.9.4. Economic efficiency calculation of a PV arrangement

One of the main activity scopes of the start-up plan of Energy Vision is the establishment of PV-arrangements on roofs especially on carports.

In this connection the project of a roof arrangement with a volume of 30 kW should be shown exemplarily:

Project: Roof arrangement PV 30 kW

Investment: 75,000 € (2,500 € per kW)
Expected yield: 1,000 kWh / kW and year
Annual profit loss: 0.5%

Assurance:	15 € / kW
Other operating expenses:	1% of the cost
Company beginning:	June, 2011
Outside capital:	5.2% interest with 80% of outside capital portion
Company capital:	3.5 % interest beginnings with 20% of EK portion
Inflation:	2%

The yield for the abovementioned object lies at 5.8%, covered to the whole capital. The whole price of the arrangement has a big influence on the economic efficiency of course (Haselhuhn 2005).
This is why the total capital payment of interest is shown in the following presentation for different building cost:

	Complete price PV arrangement												
	1800	**1900**	**2000**	**2100**	**2200**	**2300**	**2400**	**2500**	**2600**	**2700**	**2800**	**2900**	**3000**
GK-payment of interest	11,3 %	10,4 %	9,4 %	8,6 %	7,8 %	7,1 %	6,4 %	5,8 %	5,2 %	4,6 %	4,1 %	3,5 %	3,0 %

Table 4: total capital payment of interest

In connection with an investment in a photovoltaic plant the following aspects are important:

- the circumstances locally
- the investment plan has to be set up deliberately

4.1.9.5. Consumption of the self-generated PV electricity

The own power consumption of PV arrangements is another essential and positive aspect for the business success of Energy Vision.

The German Bundestag has also issued new feed-in compensation rates for the own consumption of the self-generated PV electricity.
Hereby a stronger incentive should be set up for the use the produced electricity independently of feed-in into the public net. Besides, the possibility also insists after §33 EEG that third parties use the electricity in nearness to the PV plant.
Now the height of the reimbursement for the own electricity depends on the size of the PV arrangement and on portion of the self-spent electricity. Here the difficulty is to be faced also in case of the consideration of the single-operational economic efficiency of this measure. The variations in the day course and annual course with the electricity production, as well as with the power consumption make a reliable prediction extremely difficult about the own consumption portion to be expected.

Under which conditions does the own consumption of produced electricity make sense?

From the biggest meaning for the profitability it is that more than 30% of the electricity produced all together with the PV arrangement are taken from the consumer without having been feed-in to the public net before.

The time of the electricity production and the power consumption must be fit together and this not only in the day course, but also in the whole annual course. It puts the question for the optimum power consumer. The consumer should use during the day possibly a lot of electricity and this consumption should sway during the whole year and within one day as little as possible.

These conditions are well fulfilled in particular by smaller trade companies or industrial companies in the rural area.

Companies are suitable which work with highly competitive electric motors: For example, carpenter's workshops, saw works and particularly also fermentation gas arrangements. Just the combination fermentation gas arrangement plus PV arrangement is to be found relatively often in immediate spatial nearness.

Example: 30 kW of PV arrangement in combination with high power consumer

In this example the different power consumers are assigned to a 30 kW PV arrangement who take the PV electricity from 0% to 100%. See in addition the following figure:

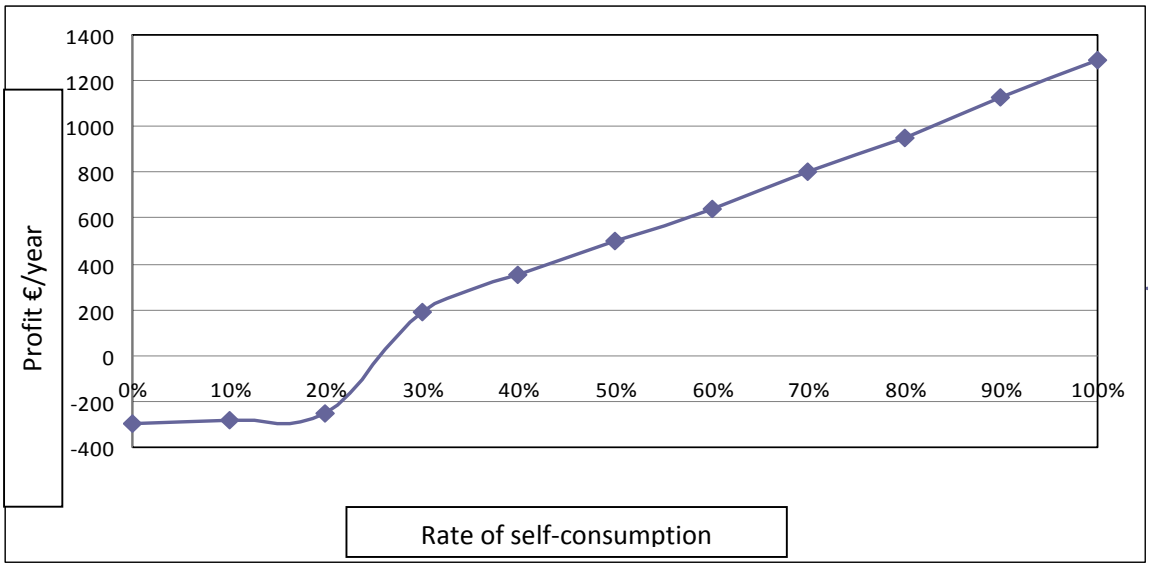

Figure 5: rate of self-consumption versus profit

From these graphic becomes evident that an own power consumption should be reached from the produced electricity of at least 30%, this is an important size for the economic

efficiency of the personal use (Hanus 1995) . Besides the size of the PV arrangement and the electricity amount taken of the consumer plays a big role.

Because in the dwelling house relatively little electricity is used, it is difficult to win back the add-on costs for the second electricity meter and the installation of the own consumption equipment (Jäger 1990).
Besides, a private household with a power demand of 3.800 kWh and 5.5 kW of PV arrangement would enter an annual disadvantage of approx. 260 €.

These exemplary calculations should indicate under which conditions the personal use of PV is advisable for customers of the Energy Vision.

4.1.10. Tax aspects for PV carports as an energy source for the costumers of Energy Vision

In connection with the representation of the juridical sphere of the intention of the Energy Vision it is also essential to get clarity about the sphere according to tax law in which Energy Vision in future will move.

Since questions according to tax law play with the conversion of suitable projects also in the area of the renewable energy a very big role.

A good example in this connection is the situation in Czech Republic as it has presented in 2011.
Since the year 2011 a regulation which caused quite considerable disadvantages according to tax law was dismissed by sides of the parliament in Prague. Thus in particular the privilege was abolished for photovoltaic plants by which during the first five years the production was released from solar power tax.

Among the rest, the abolition of this privilege according to tax law leads beside other aspects to the fact that the market has broken down for photovoltaic in Czech Republic totally.

Therefore this negative example shows very well that the sphere according to tax law is an essential aspect for the project of Energy Vision and has, therefore, by the planning big importance.

The German EEG regulates among other things the obligation to buy the electricity through the net operator and the reimbursement of the operator of the PV arrangement which comes from a renewable energy source and which is feed-in to the public power net (Schanz,2011).
Besides, the height of the reimbursement as a legal agreed compensation rate per kWh depends on the time of the introduction of the arrangement. Besides, the net operator is obliged to pay this fixed reimbursement per kWh for a period of 20 years plus of the year of the introduction.

Originally became PV arrangements with an achievement to 30 kW privileged with 57.4 cents/kwh which are established in or on a building. Alternatively to the feed in the net the private electricity producer can use the produced electricity for himself.

The legally attached reimbursement have considerably sunk since 2010.
Figure 6 summarizes the reimbursement rate into the case of the feed in the public electricity net as well as into the case of the own consumption:

Time of the consumption	feed	Δ	own
Introduction	Cent/kWh		Cent/kWh

01.01. – 30.06.2010	39,14	16,38	22,76
01.07. – 30.09.2010	34,05	12,00	22,05
01.10. – 31.12.2010	33,03	12,00	21,03
since 01.01.2011	28,74	12,00	16,74

Investment achievement ≥ 30 KWp (Kilowatt-Peak); own consumption> 30%

Figure 6: compensation rate of the self-generated electricity

Although the reimbursement rate are lower for the own consumption than the reimbursements with feed in of the generated solar power in the public grid net, the own consumption is still financially advantageous, because no power costs from the outside relation originate to the plant operator in this respect.

A fictive reimbursement rate arises as a sum of the pure reimbursement rate with own consumption plus the saved electricity costs.

If you go out from an average price of the net electricity of 20 cents / kWh, arises for a PV arrangement which was put into operation after the 12/31/2010, a fictive reimbursement rate from (16.74 + 20 =) 36.74 cents / kWh.

This fictive reimbursement rate always exceeds the reimbursement rate with the net-feed in. In the present example a net gain arises from (36.74 - 28.74 =) 8 cents / kWh.

4.1.10.1. Income tax

The operation of a photovoltaic plant shows - on condition of the profit achievement intention - from income-tax view a business enterprise for the purposes of §15 EStG.

Therefore, the own consumption of the self-generated power is according to §6 I No. 4 EStG a withdrawal which has to be valued with the going concern value. The going concern value corresponds to the market price of electricity.

Roof plants are movable economic goods and therefore deprecation is possible.

For PV arrangements the investment deduction amount can be taken up according to §7 g I EStG.
Then can be already drawn off in the approach of the investment up to 40% of the prospective acquisition costs or production costs as fictive business expenses. The private individuals who become active enterprise first by the operation of a PV arrangement there is not necessarily in the end of the financial year preceding the introduction enough business property.
Therefore, the claim of §7 g EStG requires enough ascertainment of the investment project, what can be booked by an obliging order of the arrangement.
The investment deduction amount must be dissolved in the year of the introduction then profit-raising, indeed, can be depreciated immediately a countermove up to 40% of the cost of the PV plant.
In addition to the investment deduction one more special depreciation from up to 20% t can be asserted in the year of the introduction in addition to the regular depreciation.

The regular AfA is calculated in the year of the acquisition on the initial cost reduced by the investment deduction amount. After official AfA - table PV plants have a business-usual life of 20 years what implies an annual AfA rate of 5%.

4.1.10.2. VAT

Every operator of a PV plant according to §3 till §11 EEG acts after A 18 paragraph 5 UStR as an enterprise, as far as he feeds in the generated power completely or at least partially, regularly and not only sometimes into the electricity net.
Basically the whole solar power of the plant operator is valid for the purposes of the VAT as to be delivered to the net operator .
The own consumption of the plant operator after §33 II EEG is treated for reasons of VAT-tax as a back delivery of the net operator to the plant operator.

In practice most private plant operators as a small enterpriser are to be classified at §19 UStG, because her whole turnovers have not amounted in the previous year more than 17,500 € and also will not exceed probably in the current calendar year 50,000 € .
Because the prior tax amounts are often essential from the acquisition of the PV plant, it is advisable for the operators to exercise the option for the normal taxation.

4.1.10.3. Trade tax

The operating of a PV plant is to be subjected according to § 2 I GewStG as a business establishment for reasons of trade tax.
Indeed, the private plant operators do not have to pay trade tax because they produce very often low electricity and therefore they become a tax free amount after §11 GewStG.

Also the addition of the financing expenditures plays very often no role according to §8 No. 1 GewStG which offers a tax free amount of 100,000 €.

Besides the trade-tax load is neutralized by the charge of the trade tax on the income tax according to §35 EStG.

4.1.11. Profitability analysis including taxes

In the following part it is shown the profitability of the installation by private PV plants in particular in the years 2010 and 2011 under special consideration of the taxation. This situation is highly important for the intention of Energy Vision in order to sell PV car ports to customers.

As a dynamic decisive criterion serves the capital value after taxes.
The examined scenarios enclose the financing of the investment with company capital or outside capital as well as the alternatives of the net feed-in and the own consumption of the self-generated power.

4.1.11.1. Acceptances

As a decisive situation it is supposed that a private individual invests in a PV plant with an achievement of 5 kWp (Kilowatt-Peak) on own house roof. This could be also the roof of a carport.

With an investment sum ready for occupancy of 3,000€ / kWp whole acquisition expenses will arise 15,000 € plus 19% VAT. In these costs all other cost are already included .

One assumes from the fact that in the year of the introduction a electricity yield of 900 kWh can be achieved per installed kWp. The degradation of the modules is grasped about an output decrease of the annual power yield about 1%.

Furthermore it is assumed from the fact that the operating expenses will increase on account of the ageing of the plant. In the year of the acquisition it is calculated with expenditures in the height of 2% of the initial cost. For the subsequent years is expected an annual increase of the expenditures of 2% per year.

The plant operator also renounces the use of the small enterpriser's regulation according to §19 UStG. Hence, the turnovers are subjected by the normal taxation. He weighs between the net feed in of the self-generated solar power and the own consumption. According to demand of the plant operator can cover conventional power from the public net for a price of 20 cents / kWh plus VAT.

For profit-tax purposes a combined tax on profit rates is used, from the border tax rate s_{ek} = 42% as well as the solidarity tax i. H. from 5.5% on the border tax rate exists. The combined tax on profit rates has an amount of s_{ek} = 42% x 1,055 = 44.31%.

It is subordinated that the plant operator covers other income on account of which an immediate entire loss balance from any losses is possible by the PV plant. Simplifying it is supposed that inpayment and outpayment result in each case at the end of the period.

Furthermore it is supposed that the plant operator puts profits from the operating of the PV plant privately at the capital market. The calculation interest rate before taxes for this should amount i = to 5%. The running yields from the capital market put income from capital assets according to §20 I No. 7 EStG and are subjected after §32d I EStG of the payment tax with 25% plus SolZ. Therefore, the calculation interest rate after taxes proves i_s = 5% x (1 - 25% x 1,055) = 3.68125%.

Concerning other tax benefits it is gone out from the fact, that the investor in the year before the introduction an investment deduction amount according to §7 g EStG in the height of 40% of the acquisition payment has taken up profit-diminishing which is dissolved in the year of the installation again profit-raising.

The difference between the initial cost and the investment deduction amount forms the basis for assessment for the regular AfA and the special deprecation according to §7 g EStG in the height of 20%.

The planning horizon of the investor amounts 21 years. The operating life of the PV plant amounts 20 years. The deprecation occurs basically with 5% p. a. By installation in 2010 the degressive AfA comes to use which corresponds to an annual AfA rate of 12.5%.

It is believed that the arrangement produces no electricity at the end of the planning horizon. A subsequent investment is neglected. Costs of any dismantling at the end of the planning horizon remain disregarded.

4.1.11.2. Outside financing of the PV carport

In the following it is subordinated that the PV plant becomes external-financed to 100%.

In addition a redeemable loan is accepted by height of the initial cost taking into account the discount with a term of ten years to a nominal interest rate of 3.39% p. a. and a payment to 96%.

For the financing of the initial cost of 15,000€ a loan i. H. of 15 000/0,96 = 15.625€ has to be taken up.

Interest and redemption payments occur every three months and begin after one year. Hence, the quarterly redemption rate amounts to 15 625 / (9x4) ≈434,03 E. Therefore the annual redemption (TIL) from t = 2 amounts to 1.736.11€. The discount is depreciated in the year of taking up of the loan t = 0 immediately.

Table 5 shows exemplarily the inquiry of the profit in the case of the entire own consumption of the self-generated electricity with entire outside financing and introduction in the 1/1/2011. In table 6 the actual cash value of the annual payment profits is determined on the basis of the profit from table 5.

The business expenses (BE) in t = 0 exist of the investment deduction amount (IAB) as well as the discount.
The business expenses in t = 1 pass of the lowering of the initial cost according to §7 g EStG by height of the IAB, the AfA, to the operating expenses of the arrangement - which rise yearly by 2% - the back delivery plus VAT as well as the debtor interest.

The extra-AfA according to §7 g EStG is determined on the basis of the cost diminished around the IAB (9,000€ x 20%). The linear AfA proves 5% of 9,000 €.

year	0	1	2	3	…	19	20	21
receipts								
IAB		6.000,00						
+ net reimbursement$_t$		1.293,30	1.280,37	1.267,56	…	1.079,28	1.068,48	1.057,80
Investment achievement		100%	99%	98%	…	83%	83%	82%
+own consumption		900,00	891,00	882,09		751,06	743,55	736,12
= BE		8.193,30	2.171,37	2.149,65		1.830,34	1.812,03	1.793,92
expenses								
IAB	6.000,00	6.000,00						
linear AfA		450,00	355,26	355,26	…	355,26	355,26	0,00
Extra AfA		1.800,00			…			
AfA		2.250,00	355,26	355,26	…	355,26	355,26	0,00
Remaining book value$_t$	9.000,00	6.750,00	6.394,74	6.039,48		355,26	0,00	0,00
Operating expenses$_t$		300,00	306,00	312,12	…	428,47	437,04	445,78
Back delivery$_t$		540,00	534,60	529,25	…	450,64	446,13	441,67
VAT on it$_t$		102,60	101,57	100,56	…	85,62	84,76	83,92
Disagio	625,00							
RBWK$_t$	15.625,00	15.625,00	13.888,89	12.152,78		0,00	0,00	0,00
TIL$_t$		0,00	1.736,11	1.736,11	…	0,00	0,00	0,00
interest$_t$		529,69	507,62	448,76	…	0,00	0,00	0,00
BE$_t$	6.625,00	9.722,29	1.805,05	1.745,96	…	1.320,00	1.323,20	971,37
P$_t$	**-6.625,00**	**-1.528,99**	**366,32**	**403,69**	**…**	**510,34**	**488,83**	**822,55**

Table 5: Inquiry of the profit and loss statement

year	0	1	2	3	…	19	20	21
- AK	15.000,00							
+ K_0	15.000,00							
EZ_t		1.550,69	1.535,19	1.519,84	…	1.294,08	1.281,14	1.268,33
- $interest_t$		529,69	507,62	448,76	…	0,00	0,00	0,00
- TIL_t	0,00	0,00	1.736,11	1.736,11	…	0,00	0,00	0,00
- BK_t	0,00	300,00	306,00	312,12	…	428,47	437,04	445,78
Z_t	0,00	721,00	-1.014,54	-977,15	…	865,61	844,10	822,55
- $S_t = s_{er}$ x G_t	-2.935,54	-677,49	162,31	178,88	…	226,13	216,60	364,47
= $Z_t - S_t$	2.935,54	1.398,51	1.176,85	1.156,03	…	639,47	1.627,49	458,07
Cash value$_t$	**2.935,54**	**1.348,85**	**-1.094,76**	**-1.037,21**	**…**	**321,75**	**304,51**	**214,40**

Table 6: Inquiry of the capital value with outside financing and own consumption

The back delivery i. H. of (4500 kWh x 12 cents / kWh =) 540€ is a business expense , also the prior tax is cancelled to the amount which is not refunded on account of the own consumption.

Because the first year is free of redemption, the debtor interest determines to themselves al (3.39% x 15.625€ =) 529.69€. The residual book value of the loan in t (RBWK) arises from the residual book value from t-1 minus the redemption rates in t.

The business receipts (BE) in t = 1 exists of the IAB which is to be included according to §7 g EStG in the year of the acquisition, as well as the net feed in (4 500 kWh x 28.74 cents / kWh =) 1 293.30€ and the own consumption which is valued with the part value (4 500 kWh x 20 cents / kWh =) 900€. The income sinks from t = 2, because a reduction of the investment output (degradation) of the 1% per year is accepted.

The profit (P) determines itself as a difference of the business income and the business expenses.
The inquiry of the capital value in table 6 occurs as a pure payment calculation. Hence, in the finance plan in table 6 there are merely used the amounts of same payment. The initial cost (IK) amounts to 15,000€ and corresponds to the paid out loan (K_0). The inpayments (IN) exist of the reimbursement rate for the own consumption plus the saved (fictive) additional purchase minus the VAT on the own consumption. In t = 1 the payments arise as:

Payments show the debtor interest, the redemtion contribution, the operating expenses as well as the tax payment. The tax payment determines (44,31%) and the profit to themselves as a product of the combined tax and profit

Reimbursement of the own consumption (16,74 Cent/kWh x 4 500 kWh =)	753,30
Saved additional purchase	
+ (20 Cent/kWh x 4 500 kWh =)	900,00
./. ./. VAT (540 € x 19 %=)	102,60
= IN_1	1550,70

Table 7: Reimbursement of the own consumption

The capital value after taxes (KW_s) arises from the sum of the discounted payment profits after taxes (actual cash values) and amounts to 436.78€.

In table 8 the capital values are shown in the case of the outside financing with net feed-in or own consumption. It appears that the outside financing is advantageous in connection with the own consumption in all examined cases. The capital value with own

consumption is completely bigger than with feed. In the case of the feed in the investment is not worthwhile by introduction from the 10/1/2010 .

Time of introducion	reimbursement*		KW_s	
	FI	OC	FI	OC
01.01.2010	39,14	22,76	2 269,75	2 438,57
01.07.2010	34,05	22,05	192,03	2 479,20
01.10.2010	33,03	21,03	-321,41	2 140,10
01.01.2011	28,74	16,74	-1 464,82	436,78
*In Cent/kWh; FI = feed in; OC = own consumption				

Table 8: Capital values with outside financing

Because the debtor interest is lower after taxes (i_s^{soll}) than the deposit rates after payment tax (i_s), the capital value of the loan is positive. That's why the capital values with outside financing exceed the values with self financing.
The positive rate after taxes exceeds the debt rate after taxes if is valid:

$$i_s = i \times (1 - 0.25 \times 1{,}055) > i_s^{soll}$$

$$i > \frac{i^{soll} \times (1 - s_{er})}{(1-0{,}25 \times 1{,}055)}$$

With $i_s^{soll} = i^{soll} \times (1 - s_{er})$. For $i^{soll} = 3.39\%$ is bigger of the positive rate after taxes than the debt rate after taxes if i> 2,564%.

4.1.11.3. Self financing

In the following entire self financing and full feed in of the generated electricity is subordinated in the public power grid by operating a PV carport.

In table 9 the capital values of the investment are used in the PV plant with self financing and full feed in the public net.
It appears that merely the introduction is advantageous by the 1/1/2010. This lies above all with the high reimbursement sentence in connection with the maximum conveyor duration of 21 years. By the introduction in 2011 it was considered that in this case none more can be taken up degressive AfA any more.

Time of introduction	reimbursement*		KW_s	
	FI	OC	FI	OC
01.01.2010	39,14	22,76	1 070,83	1 239,65
01.07.2010	34,05	22,05	- 1 006,90	1 280,27
01.10.2010	33,03	21,03	-1 520,33	941,18
01.01.2011	28,74	16,74	-2 663,74	-762,14
*In Cent/kWh				

Table 9: Capital values with self financing

The difference of the capital values with feed in and own consumption by introduction in the 1/1/2010 is lower with 168.82€ than the difference by later introduction
(1 901.60€).
This is due to the fact that the reimbursement rates were lowered for the own consumption only mezzo, while the reimbursement rates were considerably lowered for the feed in.

4.1.11.4. Sensitivity analysis

For the sensitivity analysis it is gone out in the following calculation from the acceptances for the introduction of the plant from the 1/1/2011.

In this connection the question positions itself which parameter situations lead to positive capital values.
In particular there are varied the positive rate, the border tax rates, the planning horizon, the annual operating expenses, the degradation as well as the initial cost.

The results of total eight case constellations are used in table 10.
The change of the parameters occurs in each case in comparison to the inital case.

case	Parameter change c. p. to the inital case	Capital values after taxes Self financing		Outside financing	
		FI	OC	FI	OC
	Source case	- 2 663,74	-762,14	- 1 464,82	436,78
1)	i = 3 %	- 1 402,08	778,94	- 1 377,27	803,75
2)	S_{ek} = 30 %	- 2 767,98	-434,09	- 1 976,66	357,23
3)	T = 25	- 2 425,30	-653,79	- 1 226,37	545,13
4)	T = 30	- 2 247,84	-608,53	- 1 048,92	590,40
5)	BK_0 = 1 %, Δ BK = + 1 %	- 1 094,51	807,09	104,41	2 006,01
6)	BK_0 = 1 %, Δ BK = + 1 %, i = 3 %	433,59	2 614,61	458,40	2 639,42
7)	degradation = 0,5 %	- 2 249,71	-265,71	-1050,79	933,21
8)	acquisition cost = 12 000 €	-220,09	1 681,51	978,84	2 880,43

Table 10: capital values after taxes with differentiated parameter situations

The capital market interest was subordinated up to now with i = 5%.
This acceptance is very optimistic in comparison to the yields attainable currently, e.g., by federal treasure bonds. However, it was supposed that the calculation basis remains steady about the planning horizon .

In view of the low level of interest rates ruling currently may be calculated on a future increase. In this respect the acceptance from i = 5% seems justified.

Nevertheless, it is shown in *scenario 1)* what happens if i = is valid 3%.
How was to be expected, the capital values rise after taxes, indeed, the feed in is still disadvantageous.
By the lower calculation interest rate the difference of the capital values decreases after taxes between equity capital and outside capital.

In *scenario 2)* the border tax rate from originally s_{ek} = 42% is lowered upon 30%. The capital values with outside financing sink by the low tax shield, while the capital values rise with self financing.

The best decision remains the own consumption with outside financing. The fact that the capital values rise with self financing, lies with the lower taxation now of the real investment in comparison to the finance arrangement which is taxed on 25%.

In the *cases 3) and 4)* the planning horizons are varied.
In spite of the substantially higher planning horizons the capital values change after taxes only a little bit. It was considered that from the 22nd year of the introduction no more raised reimbursement rates are granted. It became subordinated therefore the market price i. H. from 20 cents / kWh.

The parameter constellations of the *scenarios 5) and 6)* take the fact into account that the running operating expenses can vary as a function of the quality in terms of technical differences between the PV modules.

The operating expenses in the first year in dependence of the initial cost (BK_0) as well as the annual increase of the operating expenses (Δ BK) were lowered in each case about 1 % point.

In *scenario 5)* appears that the capital value becomes positive after taxes with self financing and own consumption.
If, in addition, a calculation interest rate is subordinated before taxes of 3%, all capital values are positive after taxes. This is illustrated at *scenario 6).*

In *scenario 7)* the degradation of originally 1% is lowered upon 0.5%. Of course the capital value thereby rises after taxes. Indeed, no conversion can be observed.

At least the initial cost is lowered in *scenario 8)* about 20%.
Nevertheless, it appears that also in the case of a considerable lowering of the initial cost in all cases positive capital values cannot be generated. The self financing in connection with the net feed in remains disadvantageous.

It appears about all scenarios that the feed in becomes positive with self financing only in the case of the acceptance of low operating expenses in connection with a low calculation interest rate. Even with a lowering of the inital cost about 20% the feed in would not be advantageous.
In the case of the own consumption the results are unequivocal.
It is interesting, that with extended terms c.p. an investment exclusively in the case of the outside financing with own consumption of the self-generated power seems advantageous.
With outside financing the investment is always advantageous in the case of the own consumption; in particular also in the case of the low calculation interest rate before taxes with scenario 1.

With feed in the public electricity net the investment in comparison to the self financing and feed in, in addition, with lower cost (scenario 8) and lower operating expenses (scenario 5) becomes advantageous.

4.1.11.5. Result to the sphere according to tax law

Comprising it is in view of the decisive situation of a potential customer of the Energy Vision, who would like to invest in a PV carport under special consideration of tax law, the following remarks of these potential investments could be made:

The profitability of the investment in a PV carport depends on the subordinated parameter situation.
Outgoing from the sensitivity analysis presented in table 10 it has to be recognized that under the given acceptances the outside financing is better in direction than the self financing.
Besides, the own consumption of the self generated power is to be preferred basically to the feed in the public electricity net.

This is due to the fact that the reimbursement rates are higher in the result in the case of the own consumption.

The investment in the case of the self financing is not worthwhile even if lower interest, a lower income tax rate, longer terms or lower operating expenses are subordinated.

Only with very low operating expenses in connection with low deposit rates or with a lowering of the inital cost about 20% an investment would be advantageous.

The profitability of future investments in PV carports depends above all on the development of the module prices.

If the module prices sink comparatively stronger than the reimbursement rates agreed by the EEG, an investment can be worthwhile furthermore for potential clients of Energy Vision.

4.2 Start up structure regarding budget, business-plan, organization and marketing approach of Energy Vision

4.2.1. Marketing planning

4.2.1.1. Conceptual clarifications

Essentially it can be stated that the market oriented guidance of the enterprise is marketing, whereby planning, coordination and control of all enterprise activities are in the foreground (Meffert, 2000).

Let`s assume the fact that in our time as a rule the sales market shows the bottleneck, marketing concerns a concept which lines up at the sales market (Becker 1993).

The concept of marketing planning is understood by two aspects.

If you catches him closely, marketing planning is only sales planning. By an enlarged view you understand by marketing planning a market oriented planning which contains the considerations which are necessary to achieve the marketing aims, as well as the necessary measures for reaching the aim.

Marketing planning is a rational penetrating of the future events at the market and in the enterprise with the intention to derive from it directives for the behaviour in the

marketing area. This other view of the marketing planning will represented here furthermore.

If marketing planning is a bottleneck planning, it becomes not only in the strategic area, but also in operative area the central topic; the remaining operative plans will orientate themselves at the marketing planning.

4.2.1.2. Possible planning methods

Starting point of the marketing planning is the aim of planning. Besides, several attempts are possible (Friedrich 2003). Here should be entered on two often used planning attempts, besides, it is a question of:

- planning of sales
- planning of profit

If you assume from planning of sales , the marketing planning presents itself as in figure 7:

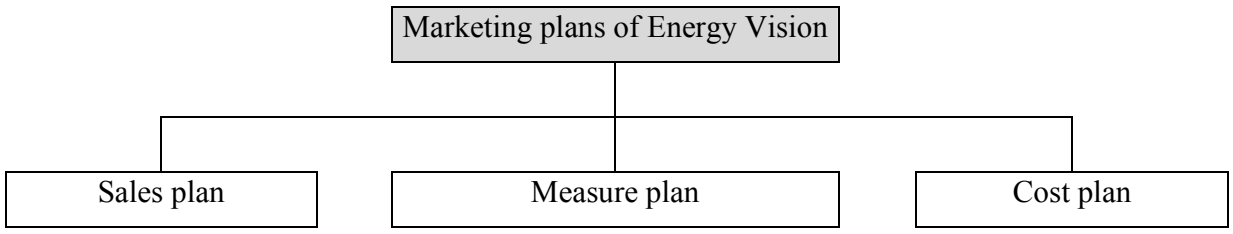

Figure 7: Marketing plans of Energy Vision

This probably most often used approach starts out from a certain mix of sales related or value related forms of sales planning which are the basis for the measure planning and expense budgeting (Koch 1977). This approach is treated in detail in this chapter.

Another very interesting approach is the planning of profit **.** This concept is preferred above all in a product oriented organization.

The enterprise management fixes a certain profit aim or the product manager recommends such an aim which is oriented in the whole profit objective of the enterprise and the expected gross margins of product or the product group. On the base of this objective the product manager carries out the marketing planning.

Besides, the following steps arise:

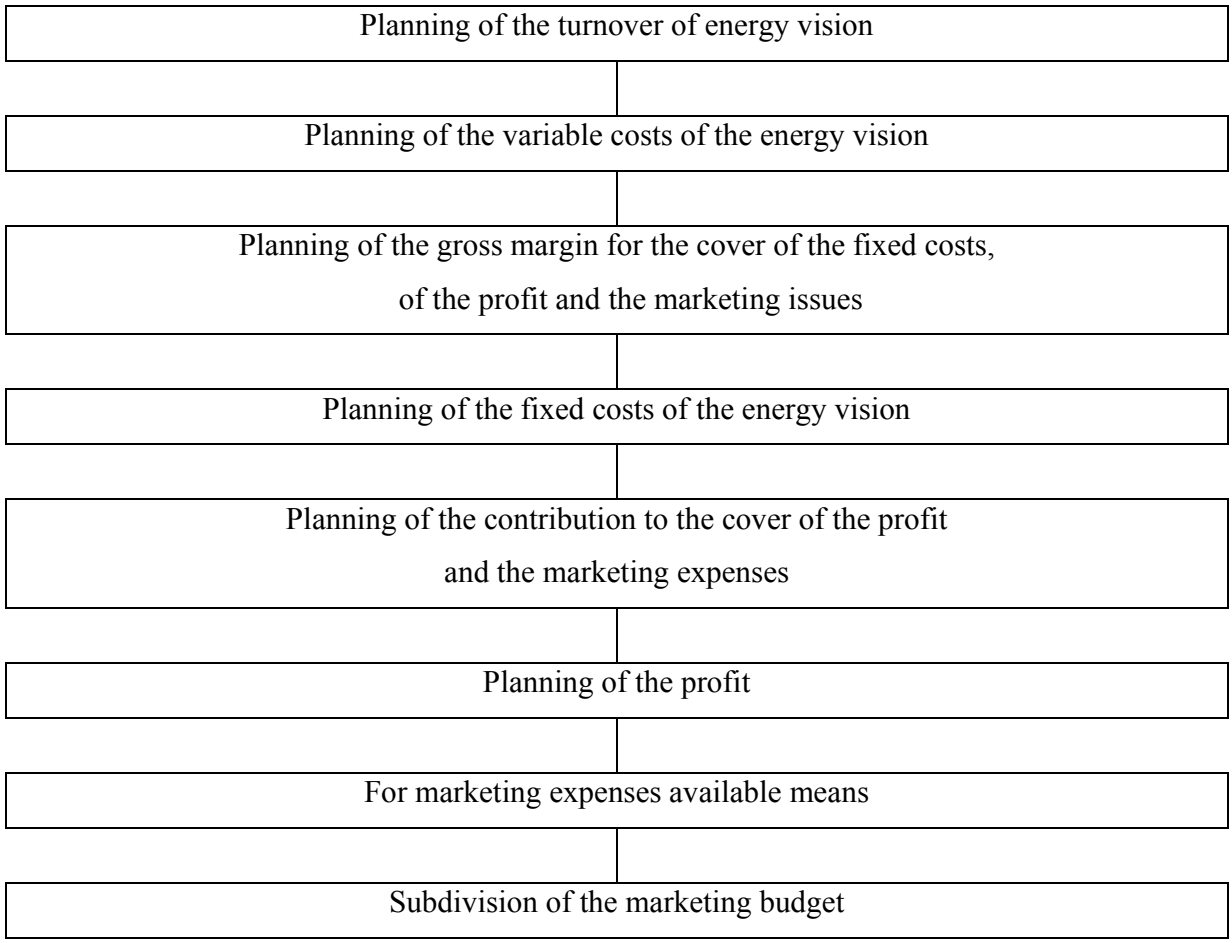

Figure 8: different steps of marketing planning of Energy Vision

4.2.1.3. Marketing strategy with partners

The Energy Vision is to adopt a conservative approach in implementing the project plan.

In this context, it is one of the essential elements of a successful start for Energy Vision that under point 1.6. described cooperation on the part of Energy Vision will be realized.

One of the potential partners in this context could be the company Volthaus GmbH from Germany.

The company Volthaus GmbH has a very long experience in the installation of PV carports and also makes use of technical products that are manufactured in Germany (see appendix 9.1.)

The cooperation with this company allows the Energy Vision on many stages in the value chain to accelerate their business.

Furthermore the different elements of service would cause a significant capital requirement for Energy Vision, and therefore it is advisable to avoid this risk and to fulfill these levels of service delivery together with a partner (Mewes, 1995).

4.2.2. Organizational form

The concept of the organizational form is the organizational correspondence to the "Legal form". In both cases are combined essential features to one system, once an organizational attribute, the other a juridical features.

Nevertheless, an essential difference consists in the fact that legal forms are legally prescribed systems which cannot be influenced in her basic structure. On the other hand

there are organizational forms, they are only typical i.e. particularly distinctive forms which can be changed, however.

The organizational structure is determined by the organizational form of the enterprise in main features. This contains primarily the kind of the hierarchical structuralization of the upper authorities, so the creation of the hierarchy of enterprise.

4.2.2.1. Organizational structure as a system

Positions and committees are the system elements of the organization of an enterprise. The relations existing between these system elements structure the enterprise to a regular structure.

This causes, because the system elements are basically similar in most enterprises that the organization forms are marked by the system relations. Consequently the system relations are the characteristic signs of the organization forms.

If one examines the existing organization forms in German enterprises, you can recognize three characteristic signs for the system relations:

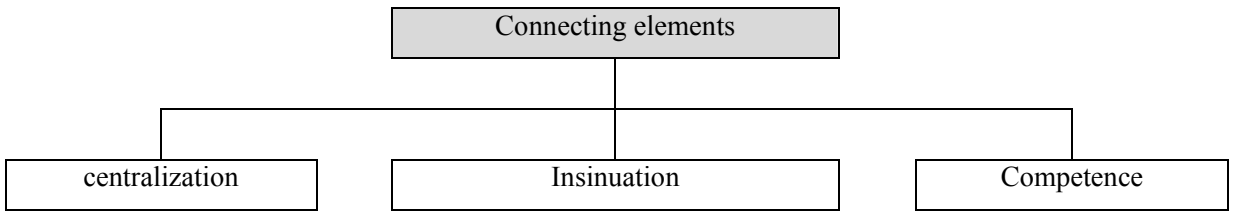

Figure 9: connecting elements of Energy Vision

Other elements do not show obviously the same importance as these three elements above.

4.2.2.2. Centralization

The centralization and also the decentralization marks the structuralization of an enterprise in view of pooling of positions and superordination of management positions. This structuralization process was called setup creation.

The following centralization types are used predominantly with the creation of the higher hierarchy levels :

(1) Performance centralization

New Areas originate from the pooling of the same activities in the uppermost management level which is also called functional arrangement :

- Logistics
- Manufacturing
- Distribution
- Management

In small and middle-size enterprises the performance centralization is prevailing.

So in the first step of Energy Vision this type of organization is to be avised.

(2) Object centralization

At this type of centralization all duties are summarized which refer to a certain product, a product group, a procedure technology or a certain customer circle, it is also called production arrangement.

This centralization of the uppermost management level causes an arrangement in areas, with concepts are called:

- Division
- Business division
- Section
- Enterprise area

(3) Regional centralization

With this kind of centralization the organizational structure is formed after geographical points of view. It is to be found in particular at international enterprises with a geographically wide-scattered number of subsidiaries. The centralization occurs here, for example, after continents or countries:

- Western Europe
- USA and Canada
- Central America and South America
- Developing countries
- Former Eastern bloc countries
- Asian industrial countries

(4) Personal centralization

Here the structuralization of the enterprise occurs at the function of a person, know how, experiences or predilections of the available managers.

(5) Process centralization

The organization of the commercial processes stood during the last years in the center of the organization process. This process organization is often called business reengineering. Because the setup of an organization is subordinated to the organization of a process , it seems reasonable to structure enterprises corresponding her commercial processes. Because of that new process organization forms have developed during the last years.

A centralization by one of the above mentioned types on the highest level recommends on the next lower level to choose another kind of centralization.

The following figure 10 is typical for this step changing centralization.

Example: Varying centralization

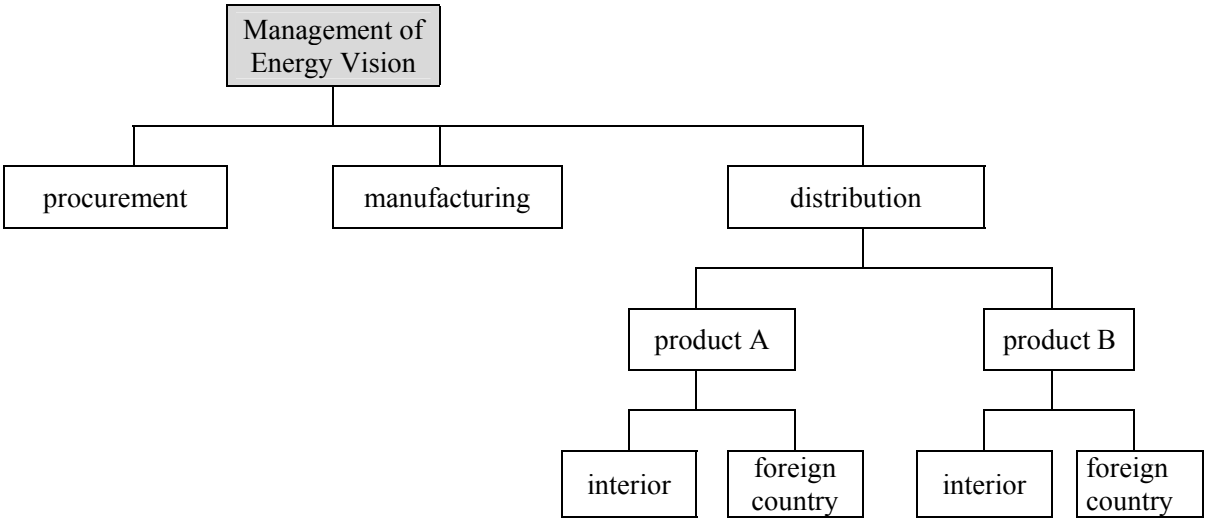

Figure 10: centralization management of Energy Vision

A retention of the performance centralization shows the following figure :

Example: Constant performance centralization

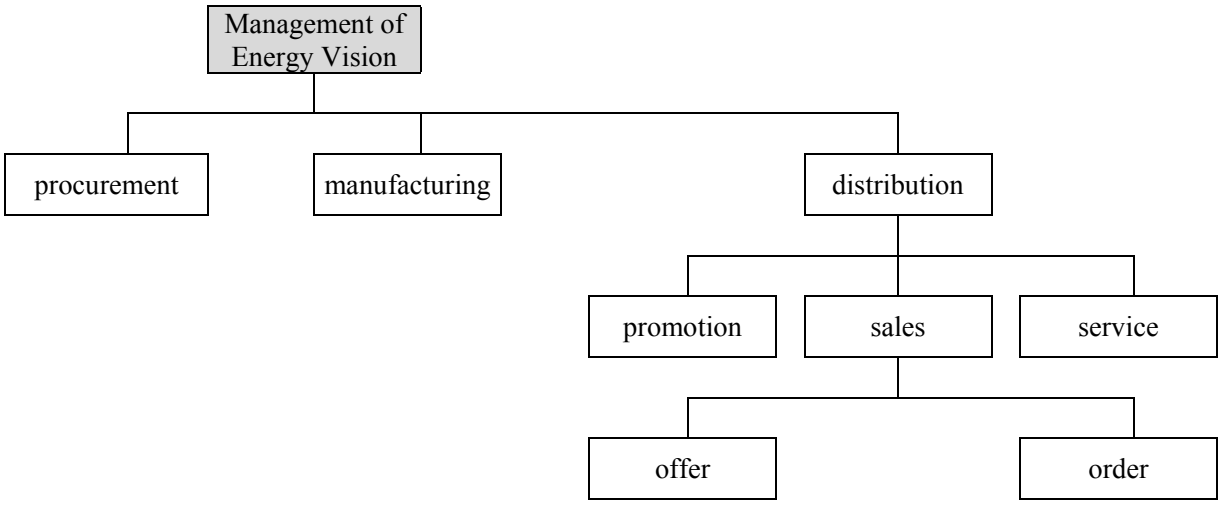

Figure 11: performance centralization of Energy Vision

4.2.3.Budget planning of Energy Vision

Every business venture, including the project of the Energy Vision needs money for equipment, furniture, computers, and for the salaries of employed people.
The budget plan seeks to ensure that such business activities and processes are aligned to common goals.

This allows the following different purposes of a budget plan :
He describes, first, what benefits the company as a whole and to provide in some areas. It shows what resources are necessary. And it formulates the expected future revenues and expenditures.

The budget is therefore an instrument of the most profitable, cost-, performance-based management and liquidity of the company Energy Vision.

4.2.3.1. Revenues

The activities of the Energy Vision in connection with the business PV carport based also on a distribution plan that is supported in the initial phase of the activities of the Energy Vision for a demand planning in the Federal Republic of Germany.

As the marketing plan of Energy Vision is to be found in the appendix 9.2, on the part of Energy Vision different types of solar carports will be sold. In range of Energy Vision are sold different types of carports, for example “carport taifun “, carport Athen”, “carport Roma “ and further different types of PV carports.
These carports will be configured in collaboration with Volthaus GmbH. The company Volthaus GmbH has a long experience in the field of solar carports and their technical

configuration.

These includes carports of different size characteristics, and therefore they vary with regard to the extent of their operational area.

It is of course a difference if a parking lot of a large department store with a complete PV carport system is to be provided or only a small office park.

Based on the distribution plan of Energy Vision there is obtained for the year 2012 a turnover of € 2,253,071 €, for 2013 a turnover of 5,994,951, - €, for the year 2014 a turnover of 7,746,034 €, for the year 2015 of 9,502,294, - € and finally for the last plan year 2016 a turnover of 12,875,118, - €.
Shown in the figure below, after negative results in the first months of planning from the mid of the first year, a positive balance in terms of the liquidity situation will occur:

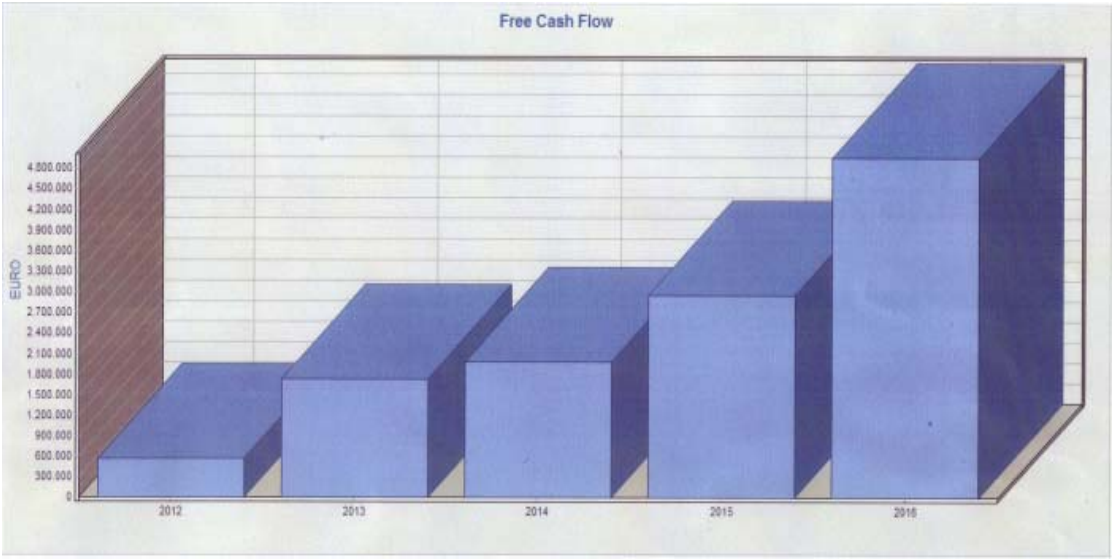

Figure 12: Free cash flow Energy Vision of the first years of activity

Thus, at this point is to state that in the first planning year due to the revenues recorded a positive operating result will occur, which then climbs into the following planning years upward, so that in the last planning year 2016 operating profit due to a net profit of 39.96 % is given, as it is referred in the following figure.

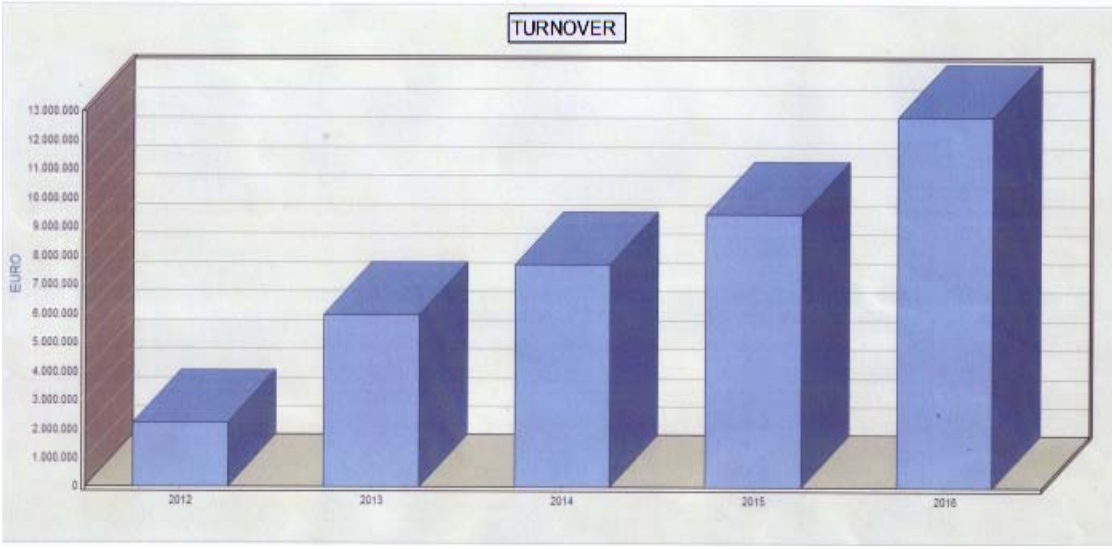

Figure 13: Turnover Energy Vision first years of activity

4.2.3.2. Profit and loss statement

Due to the projected revenue alone for the Federal Republic of Germany, which will be developed in collaboration with technical partner Volthaus GmbH, it is then given a positive profit and loss account for the projected annual 2016.

In this context it is of course difficult to determine at this stage, the personnel costs. But also in this respect it was planned conservatively.

The profit and loss statement of Energy Vision is included in the Annex 9.3.

4.2.3.3. Liquidity plan of Energy Vision

As already mentioned, there is a positive outlook due to the friendly legal environment for the construction of PV carports in the Federal Republic of Germany regarding the liquidity plan.

In the annex number 9.4. you can find the liquidity plan for years added to 2016.

This provides a positive liquidity.

This is also very much related to the fact that under the proposed policy only previously been developed carport solar systems are installed.

This ultimately leads to the fact that there is no liquidity stress due to large stocks.

4.2.3.4. Planned balance sheet of Energy Vision

Regarding the planned balance sheet is to be noted that in light of the planned conservative strategy, which includes as important element that no substantial pre inputs are made, also shows a positive balance plan until 2016.

In particular, the balance position " equity" of Energy Vision is here to be seen positive for the planning years 2016, because already in the beginning of the second plan year there is a positive equity of around 600,000 € , like in the attached annex 9.5 is to be marked until 2016.

4.2.3.5. Rating figures of the Energy Vision

In the annex 9.6 rating figures document a very positive relationship, particularly with regard to the outside capital.
This is particularly due to the fact that they want to work from the start with skillful cooperation models and with no borrowing, in this regard also to minimize the risk on the part of Energy Vision.

4.2.3.6. Rating Index

As the figure below it can be seen that the development of solvency index of Energy Vision is very positive.
This ultimately leads to the fact that in the future, a further expansion of business activities of Energy Vision will be easier.
For this it should be easier in this context, for example, if the need will occur to raise capital or take up in the company outside stakeholders.

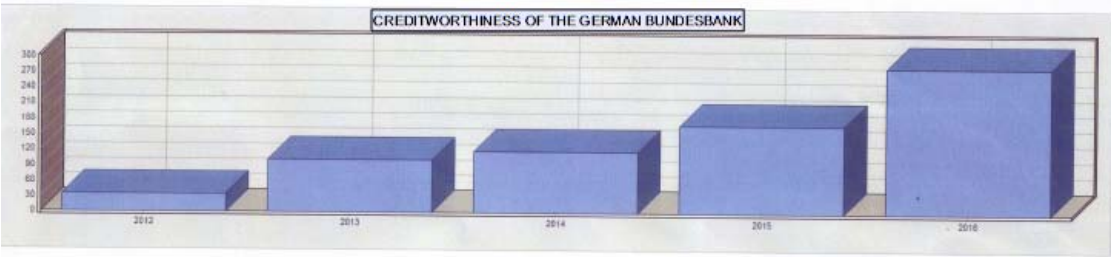

Figure 14: rating index of Energy Vision

4.2.3.7. Economic indicators of Energy Vision

The economic indicators that are included in the annex 9.7. the positive view of future Energy Vision is significant.

This is mainly due to the high equity share of Energy Vision.

4.2.3.8. Break-even of the Energy Vision

As the below figure shows, the break-even point for Energy Vision is achieved at very short notice.

This is confirmed by the fact that a conservative and careful planning is beneficial.

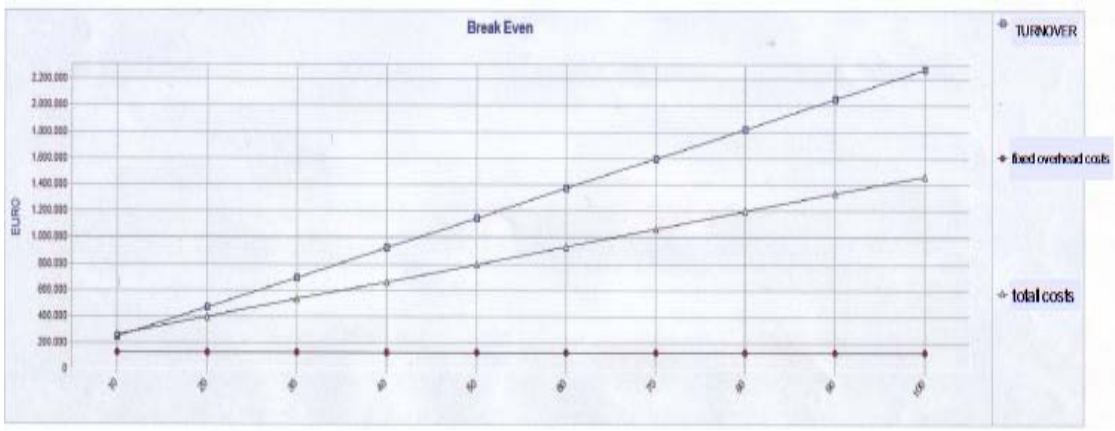

Figure 15: Break Even Energy Vision

In summary, therefore, at this point it can be stated that the concentration of Energy Vision in the initial phase on one of the largest solar markets in the world, namely Germany, should be a successful strategy.
Also the fact that Energy Vision will not setup a production of solar modules in order to prevent associated risks, leads to the above-described positive outlook Energy Vision.

4.2.4. Financing

In today's world are promoted constantly new financing models .
This is due to the fact that companies need adequate finance for their investments and the liquidity of the company. But the companies are faced to back going funding opportunities and a lack of willingness of banks to loan .

Before this background, the Energy Vision has a conservative approach of financing.

It should be noted that the funding covers all the operational processes for the provision and repayment of the funds needed for investment.

The following figure 16 shows the possible forms of financing for the sources of funds, the external financing and internal financing and structures according to the legal position of investors.

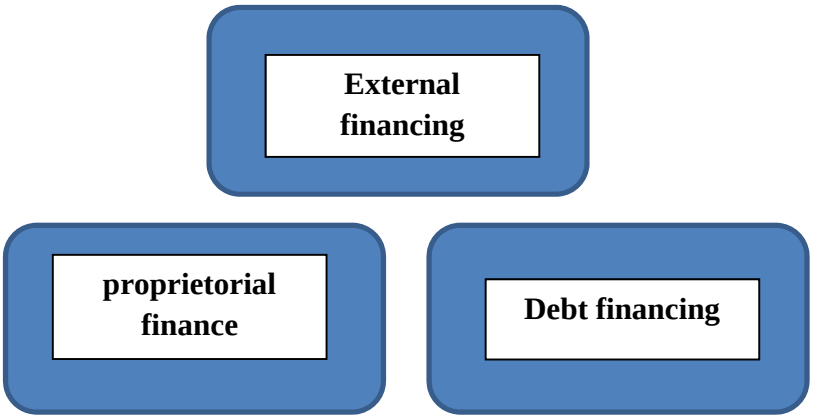

Figure 16: External financing

We are dealing then with a credit financing, an equity financing, a self-financing and financing from reserves.

The Energy Vision is pursuing the goal of internal financing as cash flow or excess funding.

This type of internal financing is defined as follows:
Inflow of financial resources resulting from the proceeds of sold goods and services

provided by operating business, if these proceeds exceed the expenses which occur at the production of goods and the provision of services (Schmitt, 1989).

Figure 17 shows the various elements of internal financing:

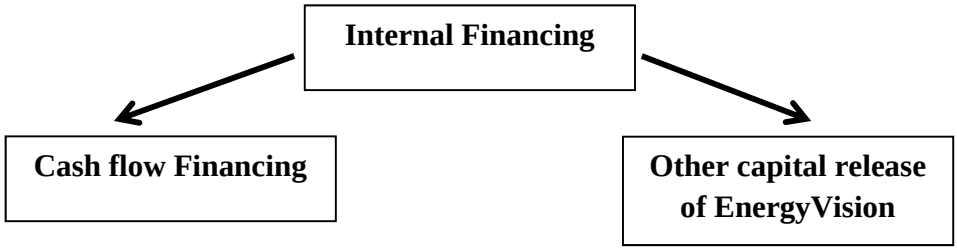

Figure 17: Internal Financing

As noted above Energy Vision cares not the objective of outside capital.
Rather it should be avoided through appropriate partnerships, a high initial demand for liquidity (Jürgens,1994).

Through the provision of appropriate services by the Energy Vision in the following years a considerable inflow of liquidity will result.

The funds are then incorporated into the internal financing of Energy Vision.

4.3. Risks and implementing at Energy Vision

4.3.1. Recognition of risks

Every enterprise, thus also the Energy Vision, is put out to risks. Risks lurk in the enterprise itself, and they also originate incessantly in the market sphere of the company.

Risks are nothing static: Risks are to be judged over and over again as new, new risks must be recognized early. Enterprisers must be watchful (Ehrmann 1996).

Where risks lurk, here are some examples:

In the enterprise:

- The loss of the prototype of a supplier of the Energy Vision delays the market launch?
- The respected production costs are much higher actually?
- An important know-how bearer of the Energy Vision is poached by the competition?
- A material defect in the final production causes high costs and delays the delivery to the customers?

In the sphere:

- It is able only a half will sold as expected?
- A competitor of the Energy Vision puts on the market a cheaper alternative product shortly after product introduction?
- The Energy Vision receives no patent for a technical procedure?
- A distributor finishes the cooperation?
- A raw material for the product unexpectedly goes up?
- The planned production method becomes by stricter regulations negative?

4.3.2. Scenarios

4.3.2.1. Assessment of risks and future consideration

The assessment of risks is a future consideration. Risks are never absolute, but are rateable only on the basis of acceptances. These are normally decorated model-like in the form of scenarios which allow to simulate the future business under varying acceptances.

Are usual:

- The "normal case" (base case scenario) - this is after the best knowledge and conscience case to be expected
- The „most favorable case“ (best of all case scenario) - this is the accepted chances and positive conditions enter by the majority
- The "inconvenient case" (worst case scenario) - this is the accepted risks and most unfavorable conditions enter by the majority

4.3.2.2. Sensitivity analysis

The above plans were made in consideration of sales success and it is clear that there are many factors why the planned figures of Energy Vision can not be achieved, as presented above in Chapter 2.
In a sensitivity analysis, therefore different components with respect to their impact on the business results of the Energy Vision are studied.

One of the most sensitive factors is that the plan adopted in sales figures can not be achieved by management of Energy Vision.

Should there be a recession in the light of the current euro crisis or the crisis in Greece et cetera, and the projected sales figures had to be corrected down by 50% , this has a direct impact on sales.
The revenues of the Energy Vision then decline in 2012 to 863.641,- €, in the following years the decline in revenues causes appropriate consequences, namely the impact on the liquidity situation of Energy Vision.

How can be seen in the attached liquidity plan, the positions are on the current account in 2012 reduced, down to the amount of 459. 220, - € (see annex 9.7.).
In addition the profit and loss account in 2012, net income of 312,063 € of Energy Vision becomes worse (see annex 9.7.) .

Thus, care must be taken within the framework of the strategic orientation of the energy vision that any decrease of sales in Europe will be offset by other geographic markets, such as for example the United States or Asia.

A further critical factor may turn out that the initial expense of Energy Vision will much more higher as expected.

Should there be an increase of the initial cost about € 600,000 in the first year, this ultimately leads to the fact that the Energy Vision will gain a net loss of 266.249, - € in the starting period (see annex 9.8.)

This has also an impact on the profit and loss statement of the company, because the net loss is carried forward in the ongoing years and this has an effect on the excess of the following years (see annex 9.8.).

This has also a direct effect on the liquidity - planning of Energy Vision, because the balance of current account has for the first year, in this case a negative balance of 210 503, - € (see annex 9.8.).

Therefore also the first year there is no free cash flow available, such as the figure can be seen in the annex 9.8.

In light of these differences it is necessary to be aware that a significant cost discipline is administered, to avoid that in the initial phase, the costs will run out of control and will cause significant start-up losses at Energy Vision.

4.3.3. Employee's risk of Energy Vision

The discontinuation of a highly qualified employee is for Energy Vision one of the big risks in the future.
Because it is very difficult in these times of full employment in Germany to find good and certified employees.
So Energy Vision has to take high care on this problematic aspect.

The quantification of the employee's risk occurs on basis of a simulation procedure. In this manner it is possible to combine different statistical distributions and to carry out thus an appraisal of the employee's risk for Energy Vision.
The assessment of the chance of loss occurs in each case on annual base, i.e. the likelihood of the entry of a special risk is determined for the period of one year.
The appraisal of the amount of damage can be also carried out on basis of an annual value. However, there is also the possibility to carry out an appraisal of the amount of

damage on the basis of the actual cash value of the damage to be expected (Rippe, 1974).

By the appraisal of the amount of damage on annual base only the damages which appear within one year as a result of a certain event of damage are grasped.

This approach is suited, for example, very well to meet an adequate prevention of risk to the next year within the scope of the liquidity planning. The appraisal of the amount of damage on the basis of the actual cash value also incorporates secondary damages which will enter only during later years.

This approach takes as a basis the thought that the value of an investment is reflected in the future backflows of this investment. This approach is suited, e.g., as a basis for investment decisions in the personnel area.

Thus the Energy Vision finds a support in answering the question whether it is reasonable under risk points of view to train an other employee for a certain activity or whether the costs of the education could be expected about the value of the amount of damage (Rippe 1974).

In addition, there is the possibility to define the amount of damage as an amount of the expected costs. If the enterprise has decided on the declaration as costs, the main focus of the investigation lies in the inquiry of the influence of the employee's risk on the liquidity of the enterprise. The investigation of the amount of damage under cost aspects is suitable again rather to support investment decisions in the employee's area.

There are four possibilities which can lead to an undesirable result, for a longer period to loss of an employee and therefore human capital.

This is on the one hand the death, the invalidity, the voluntary fluctuation of the employee and the pregnancy of an employee. In the following some of these failure possibilities should be examined briefly.

4.3.3.1. The mortality risk

The appraisal of the mortality risk of the single employee orientates itself by the mortality statistics of the Federal Republic of Germany.
She is published age-specific and sex-specific regularly and is based on the number of the died people and population of preceding three years. Though these data consider no changes of the future mortality as it, for example, the mortality statistics of the life insurance companies present, however, they show a better estimation for the mortality risk to be determined , because they reflect the topical state of the mortality (Rippe 1974).
These data create the base for a deeper risk classification. On this occasion, it has to be stated, to what extent certain qualities of the employee influence his mortality risk. Besides, the smoking behaviour and drinking behaviour (alcohol), the eating habits (body weight) and the education of the employee flow in onto the classification.
In this manner a total of 72 different age-specific risk groups to which the single employees are assigned can be identified. The mortality risk ascertained in this manner is corrected finally still around an age-specific and sex-specific healthy worker effect. This considers that the mortality risk of the employees is lower, than they to the non-employee. The cause for this effect can be seen in the fact that employed people on an average are "more ill" as not working persons.
Furthermore it was considered that specific qualities do not appear independently of each other. Thus there are, for example, about 90% of the alcoholics also smokers.

All together a quite strong influence of the individual lifestyle on the respective mortality risk can be ascertained.

Therefore the management of Energy Vision has to influence the employees to care a healthy lifestyle.

It is useful to establish a concrete program in the company in order to prevent sick risk from employees .
The expenses which are caused by this health policy are well done.

4.3.3.2. The invalidity risk

The beginning of the quantification of the invalidity risks orientates itself by the average rate of invalidity of the legally pension-insured population (Rippe 1974). On this occasion, is to be considered that with the „law of the reform of the pensions because of decreased acquisition inability“ from the 12/20/2000 the terms occupational disability and acquisition inability were substituted with the concept reduction in earning capacity.

It is the fact that it can be distinguished for the appraisal of the specific invalidity risk between partial and full reduction in earning capacity. For the appraisal of the rate of invalidity within the scope of the analysis of the employee's risk it is subordinated that only the full reduction in earning capacity should be looked as an invalidity risk. The full reduction in earning capacity enters when a person is unable for not foreseeable time (i.e. at least 6 months) to be gainfully employed daily at least 3 hours.

The business model of Energy Vision does not create under normal conditions high risks concerning the invalidity of employees. There are no dangerous production processes which will occur at Energy Vision with the risk to injure the employees.
Therefore the invalidity risk for employees at Energy Vision is quite low.
This risk estimation could change, if Energy Vision will set up PV carports with own workers.

4.3.3.3. The fluctuation risk

For the appraisal of the fluctuation risk specific qualities of an employee as well as the specific of an enterprise has to be considered.
The fluctuation rate in an enterprise depends therefore on externally given or inside created basic conditions and on the readiness of the employees to change her job.

The externally given basic conditions are determined, for example, by the number of the alternative job opportunities for the employee. If the company acts in a region in which a high inquiry for skilled workers exists, the fluctuation risk should be higher as if this inquiry does not exist. The alternative chances to earn money of an employee also have a strong influence. If the enterprise pays, for example, subnormal wages, it is put out all together in direction to a higher risk than an enterprise which carries out an above-average reimbursement.
The company culture and the work climate is to be understood as much as possible by inside created basic conditions. Enterprises with those the employees feel closely linked and work with pleasure, certainly have lower problems with the employee's fluctuation .

The single employee reacts to these basic conditions according to his individual fluctuation inclination.
Thus, for example, the question which enterprises are possible for him as alternative employers depends strongly from the individual readiness for changes. For example, a young unbound person is certainly rather ready to move farther to perceive a career possibility, as an older person with family.

Afterwards it should be briefly shown how the basic conditions as well as the individual fluctuation inclinations of the employees can be considered by Energy Vision and be joined then to the individual fluctuation likelihood.

4.3.3.3.1. Inclusion of the basic conditions

The capture of the external basic conditions of a certain enterprise in a certain region, would be probably very costly and was certainly measurable in many cases also hardly for a single enterprise, because the information for it is not easily available . The judgement of the internal basic conditions would be connected probably also with a relatively high expenditure. A fact which should be avoided by Energy Vision.

For the procedure introduced here to the analysis of the employee's risk a beginning was chosen which subordinates that the external and internal basic conditions are reflected in the fluctuation behaviour of the past. This approach can lead under circumstances to a misjudgement of the future fluctuation behaviour.
Nevertheless, the advantage lies in the easy checking of the necessary information, because only the fluctuation cases and the number of the employees of the past years must be confessed.

From this information and knowledge with regard to the general fluctuation behaviour a density function and with it an interval can be determined for the actual fluctuation likelihood.

The size of this interval depends on the number of the employees considered in the investigation. If only few employees can be considered in the investigation, the insecurity about the actual fluctuation likelihood of the enterprise is relatively big. This connection should be made clear in the following figure 18.

It is subordinated that the actual - unknown - amount of fluctuation is 10%. If only 50 employees are included in the investigation from what 5 are fluctuated, you receive as a density function of the fluctuation likelihood the blue curve.

If one includes 150 employees in the investigation under whom 15 fluctuation cases were to be observed, you receive as a density function of the fluctuation likelihood the mauve coloured curve.

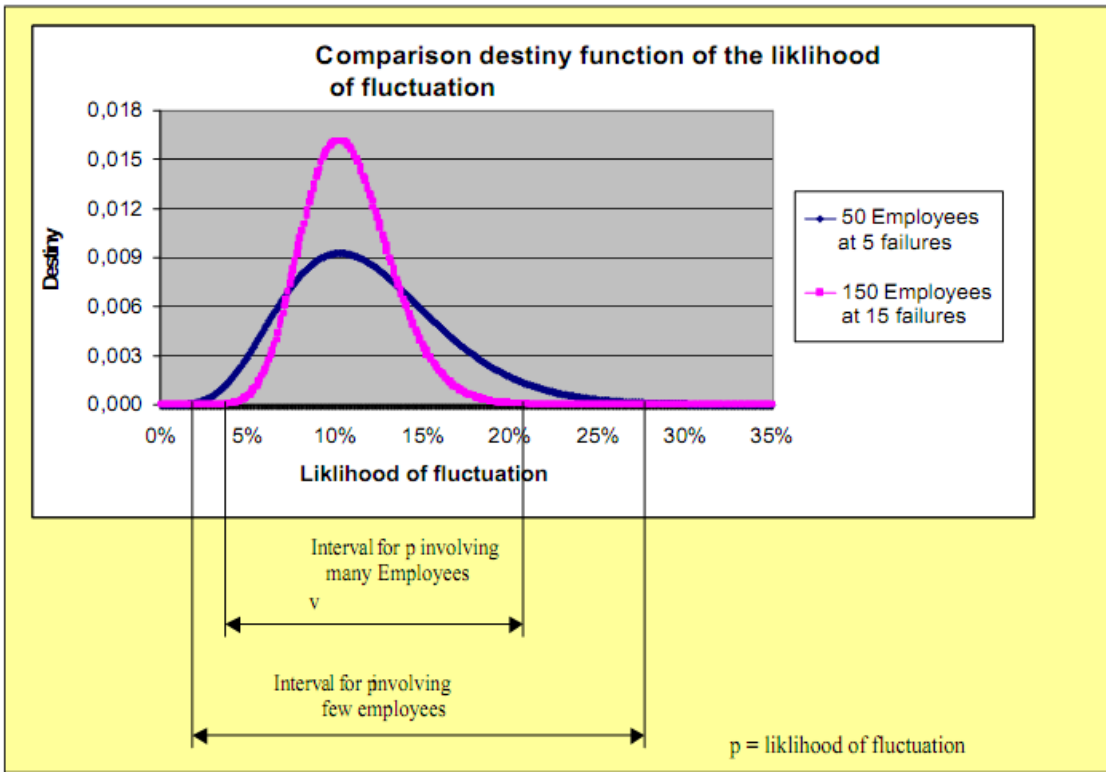

Figure 18: Comparison destiny function of the likelihood of fluctuation

It becomes clear that the mauve coloured density function can illustrate the fluctuation likelihood in a smaller interval, than the blue coloured curve.

The cause for it is to be seen in the fact that the insecurity of the actual fluctuation likelihood is reduced by the consideration of a bigger employee's number and therefore a better forecast is possible.

4.3.3.3.2. Inclusion of the qualities specific for employee

Beside the basic conditions individual qualities of an employee also influence his readiness for a change of the enterprise. Besides, as significant are judged age and gender of the examined person. Criteria like education degree, nationality, union membership, kind of the employment, kind of the employment contract, show etc. partly no enough significant influence on the fluctuation behaviour or seem inexpedient for classification, because the checking is not protected e.g. union membership (Rippe 1974).

4.3.3.4. The pregnancy likelihood

The pregnancy and the maternity vacation can show for an enterprise under circumstances a risk. That's why this possibility should be also considered.
But it has to be considered that now also men take up the fatherhood vacation and are not available for the enterprise for this time any more.
However, all together it is supposed that enough time is available to prevent possible damages, so that the pregnancy will pose no problem in most cases probably from enterprise view.

All in all it was shown by different aspects above, that employees are in times of full employment a strange risk for the future development of Energy Vision.
Management of Energy Vision has to take heavy care on this issue.

4.3.4. Implementing on the base of an analysis of the strengths / weaknesses and chances / risks

The risks, however, also reversely the given chances of young enterprise like Energy Vision can be implemented best of all within the scope of a SWOT analysis .
This analysis shows a good base for the implementing, because through this a strong consciousness is created in particular for the chances, however, also for the risks in the enterprise (Ehrmann 1996).
A SWOT analysis encloses a strengths weakness analysis and a chance risk analysis (Opportunities-Threats).
She summarizes the essential results of the investigation of the internal processes and the knowledge of external factors of influence on the enterprise. It is the aim of the SWOT analysis, to find out, to what extent the present strategy of the enterprise would be successful with the given environmental factors.
As a result, moreover, the strengths specific for enterprise like Energy Vision and weaknesses should be examined whether they are suitable enough to react to changes of the enterprise environment.

4.3.4.1. Identification of the determining factors of success

Helpfully for the strength weakness analysis is a previous identification of the determining factors of success. They are well known as a rule in the enterprise and can be outlined fast.
Then in relation to the determining factors of success all strengths and weaknesses can become checked. Possibly there are also hidden strengths which could be developed to new key success factors.

4.3.4.2. Regulation of the strengths and weaknesses

The strengths are the factors which help the enterprise like Energy Vision to a relatively strong competitive position, while the weaknesses are the points which stop the enterprise from achieving competitive advantages.
The position (ability and resources) of own business division / is examined in a strength weakness analysis undertake in the comparison - relatively - to / to the strongest competitor (s).
With the search for comparative factors in the area of the strengths and weaknesses should be paid attention to the fact that also really comparable points (on the basis of figures and values which are also accessible) are pulled up. It is to be noted that all identified strengths and weaknesses are relative. They win only by a benchmarking (comparison with competitors or branch standards) a logical value.
There is no standard-SWOT, but a huge number of stamping possibilities which can be used by way of comparison because they must be derived from the circumstances of the isolated case.

In the following frequent comparative factors are performed to the regulation of the strengths and weaknesses of internal enterprise processes (inquiry of the business segment strength).
Then the Energy Vision must decide in the procedure which criteria are necessary for her analysis, for her objective.

General enterprise characteristic features

- Turnover
- Shares of the market
- Cash Flow

Offer potential (products and service)

- Product quality (life span; durability)
- Product program
- Age of the product program (life cycle phases of the products)

Distribution

- Distribution canals
- Readiness of delivery / ability of delivery
- storage

Market communication

- Advertisement
- Corporate Identity/Corporate design
- Image

Prices and conditions

- Price policy
- Discount system; special conditions
- Terms of delivery and payment terms

Functional-political potential / services

- Production method (singles, series, mass manufacturing)
- Flexibility
- Productiveness

F&E-Potential

- Height of F&E-investment
- Patents and licences
- Access to external F&E-cooperation

Procurement

- Purchase prices
- Quality
- Reliability

Finances

- Capital structure
- Cost of the outside capital
- Liquidity

Staff

- Remuneration system
- Social benefits
- Fluctuation

Cost position/-structure

- Wages and salaries
- Raw materials / pre products
- Energy

Management and organization

- Organizational structure
- Style of leadership
- Planning, controlling instruments and control instruments

Management of information

- State of the office communication
- State of the manufacturing control
- Degree of the linking of in-plant information

4.3.4.3. Regulation of the chances and risks

This part of the SWOT analysis uncovers chances and risks which arise for the enterprise Energy Vision from trends and changes in her surroundings.
As external factors for the purposes of the SWOT analysis the factors are important on which the enterprise has no direct influence.
For example, a high customer loyalty is to be arranged as an internal strength. If the trend uses in the branch, nevertheless that traditional customer connection becomes less important, this is an external risk to which it is a matter to react.
To identify the chances and risks of the enterprise Energy Vision, it is important to find a balance between very obvious factors and the further distant factors but also not to lose the look for the essentials.

In the following frequent comparative factors are performed to the regulation of the chances and risks of external enterprise processes (inquiry of the market attraction / market and competition).
Chances of real meaning are those which can be also used by the enterprise, because they can be brought in harmony with the strategic resources and values. Real risks are which the enterprise must deal without delay.

Micro-perspective of an enterprise like Energy Vision:

Market structures

- Entry barriers (see below 4.6.2.)
- Escape barriers
- Structure and strength of the buyers and the competition

Market potential/-volume

- Number of the potential buyers

- Market growth
- Investment behaviour / consumer behaviour (life cycle phases of the products)

Customer structure and customer wishes

- Customer structure (size; branch)
- buyer power
- Customer standards / Key Buying Factors (KBFs)

Competition / competition

- Number of the competitors
- Structure of the competitors (size)
- Shares of the market of the competitors

Macro-perspective of an enterprise (general sphere)

Legal /state basic conditions

- Legal situation
- Subsidies / conveyor politics
- Social legislation

Social basic conditions

- Demography
- mindset / values
- Leisure behaviour

Ecological basic conditions

- Air and water quality

- Waste disposal and avoidance
- Rational use of raw materials

Technological / Technical development

- New product technologies
- New manufacturing technologies
- New materials

Other (economic) basic conditions and environmental conditions

- Economic situation
- Inflation
- Availabilities of raw materials and energy

4.3.4.4. Interrogative list for the SWOT analysis of Energy Vision

In the following list questions are performed which the enterprise Energy Vision could / should answer, in order to get the desired results of the SWOT analysis (Find out of the strengths and weaknesses as well as possible chances and risks). To the aims of Energy Vision it is released complementing the list with further questions .

What ran up now well at Energy Vision?
On which we are proud at Energy Vision?
What we are able to do better at Energy Vision than other enterprisers ?
Further questions

In the result the enterprise should be able to judge whether and how it is able with the given resources to react on - present and future - changes.
The questions on which the SWOT analysis gives no answers, however, useful causes for thought are:

Interrogative list for management of Energy Vision:

- Is our present strategy suitable enough to react to the changes to be expected?
- Around chances or to minimize risks - which strengths must we develop and on which weaknesses must we work?
- Our present strengths and core competences still fit in the world from tomorrow?
- Can become today's strengths tomorrow weaknesses if we do not develop them?
- How we can all of our strengths to take new chances?
- How we can react on the basis of our specific competence to external changes better than the competition?
- Can be derived from SWOT analysis new core competences / business segments / service offers?

To be able to derive the bases to the answer of these and other questions with the SWOT analysis, it matters not to look at the tool as a mere arrangement of internal and external factors. Rather the identification of essential driving forces and the concentration on it is the real principal item. Therefore, a comprehensive investigation of every detail should be avoided, just as the reduction of the tool on a mere check list.
As practicable it has turned out to outline possible strategic orientations on account of the present considerations (identification of the strengths / weakness and risks / chances) in a scenario.

By this analysis the Energy Vision gets a good overview about the risks and chances which are given in the enterprise. Through this the risks are also analyzed and implemented by this analysis also in the consciousness of the enterprise and in particular of the employee.

4.4. Competitive analysis and market for solar carports in Germany and Switzerland

By the chapter below should be entered in the competitive situation to be found for the start-up enterprise Energy Vision.
As on top already demonstrated, the Energy Vision sees her business area in particular on account of the juridical, economic and tax circumstances as shown under point 1of this thesis in the sector of the PV roof plants in the urbane sphere and in the niche segment of solar carport systems.

4.4.1. Duties of the competitor's analysis

The competitor's analysis can be looked as a special form of the environmental analysis. She encloses the analysis of all data of the competitors of the Energy Vision who matter to own decisions within the scope of the strategic planning.

The results of the competitor's analysis enable to Energy Vision to get to know the service offer and the determining activities of the competitors in order to estimate the own possibilities at the market properly.

A false allocation of own resources can be prevented only by the competitor's analysis efficiently; nevertheless, she may serve by no means to resign with a putative superior strength of the competition and to renounce rash own activities in the concerning market segment.

4.4.2. Object of the competitor's analysis

As already mentioned, the competitor's analysis has the job to collect a lot of information about the competitors of the Energy Vision and to value them.

Investigation objects are, primarily, the most important competitors of the Energy Vision, however, the searches should also aim at smaller competitors, because these companies know market niches and how to take them.

Beside present competitors also potential competitors should be included as far as possible in the analysis. At markets rich of chances can be absolutely calculated on the fact that competitors appear who dispose of certain resources which are not available to the own enterprise presently. The competitor's analysis should help to prevent that novices take certain market segments.

The competitor's analysis encloses all areas which reveal the strengths and weaknesses of the competitors. The major task of the competitor's analysis is to produce a comparison of own possibilities with those of the competitor, for this reason the information should be included also in the analysis which is an object of strengths and weaknesses analysis of own enterprise.

In detail the competitor's analysis applies on :

- the number of the competitors
- the locations
- the size of company
- the recognizable strategies
- the use of the marketing instruments
- the market position
- the outlets

- the customer structure
- the assortment
- Sales dimensions and sales dimensions all together
- the profit situation
- the cost structure
- the financial situation
- the innovative efficiency
- the technical efficiency
- the quality of the management
- the quality of the employees
- the quality of the planning
- the quality of the organization
- the ecological engagement

4.4.3. Sources of information

It will be not always very easy to procure the needful information for a careful analysis; besides, some information will not have the desired precision degree, the enterprises should not still avoid the efforts of the procurement of information and use the available sources of information, the importance of the competitor's analysis justifies this.

As most important sources of information can be stated :

- Enterprise reports from technical newspapers and technical periodicals
- published annual accounts
- Press conferences

- Internal memos of the competitors
- figures from company comparisons
- Association communications
- Chamber communications
- Memos of leading employees of the conferences
- Bank references
- Specific questionings
- Indiscretions
- Field service reports
- Data banks.

A particular importance is attached to both last-named sources of information.

4.4.4. Practical realization of the competitor's analysis

By the realization of the competitor's analysis check lists are used in practice, the results are shown as competition profiles.

4.4.5. Solar carport systems as a new project category

Caused by the adaptation of the EEG with exposure of the feed in tariff for PV plants on arable land the establishment of solar power stations is not representable in a scale more than 1 megawatt except on conversion surfaces and big industrial roofs in the present form economically quite difficult.

Potential for the establishment of great PV plants arises on parking bays of enterprise, shopping centers and event sites.

Beside the sensible linking with the in future probably clearly increasing electric mobility a high acceptance in the population also seems plausible, because it concerns anyway already sealed surfaces.
Under the point of view of the electric mobility the establishment on business parking bays wins a special value, because the vehicles of the employees stand as a rule during the daylight phase unused on the parking bay.

Just with it an area of application can be indicated for electric vehicles with today's reach attributes, because primarily the distance flat / working place has to be covered.

The enlargement of the use spectrum of photovoltaic plants on parking lots for passenger car seems trendsetting before the background of a trend towards the electric mobility.

Also under today's decisive criteria for the realization of a photovoltaic projects which lies in the essentials in the attainable yield from the feed in of the generated electricity amount carports win in Germany increasingly in meaning, because considering certain editions after EEG the feed in tariff is granted for roof installations.

As a basic demand is valid that the carports must be able to perceive the function of the protection of vehicles also without solar modules. This assumes a water-leading roof skin below the module level. As another condition the development site must be designated in the land-use plan as residential area or industrial area.

At enterprises as well as shopping sites and event sites the number of the provided parking bays must stand in proportion to the subjective need, so that for the specific project a main focus cannot be subordinated in the production by solar electricity. This

question should be cleared within the scope of the project engineering with the local energy provider.

As target groups for PV carports bigger parking bay arrangements are considered beside the own home. The following Figure 19 makes clear the use cases of single carports and great parking bays at the example of a supply depot of new vehicles.

Figure 19: carport for a supply depot (http://www.cleanthinking.decategory/mobilitaet)

In comparison to typical open land arrangements carports arrangements differ by significantly bigger dimensions of the assembly rack.

Besides, the use as a parking lot for automobiles requires a defined railway loading gauge with the consequence of a bigger distance to the ground. The inclination of the modules and the adjustment of the carports orientate itself by aesthetic demands and the arrangement of the parking bay.

Also the distance of the substructure can be varied only partly for the optimization of the costs for the substructure, because the dimensions must be kept for single parking lots or their multiple.

The disadvantages from building or geometrical compulsions as well as the possible add-on costs from the size of the assembly units must be compensated by the roof reimbursement to achieve comparable attractive yields.

Within the scope of large-scale projects rational rack solutions with high preassembly degree and foundation solutions are necessary to be able to achieve a comparable construction progress with open land arrangements.
Following figure 20 points an example of an open land carports project.

Figure 20: carports surrounding a stadium (http:/www.gcpr.de/1-1/suntech_Hoffenheim_160811.html)

While open land arrangements started in 2003 by dimensions below 1 MWp, bigger and bigger projects developed during the subsequent years.
The first carports projects are realized in the end of 2008. Also a trend towards bigger and bigger projects stands out. In the fourth quarter a carport arrangement with a whole achievement was established, e.g., in Italy by 6.0 MWp.

The trend line for the size of the carports projects runs roughly parallel with the regression line of the open land projects what concludes by a comparable development of the project dimensions.
The project category carports starts only 5 years later. Because carport projects depend, however, in the essentials on the available parking bay surface, it must be calculated on former flattening of the curve. Realistically seen can be calculated on a project spectrum in a scale between 0.5 and 10.0 MWp (Neumann, 2011).

4.4.6. Intention for PV carport projects

Solar carport arrangements show beside the function of the solar electricity production for the investor a considerable added value for the operator of the parking bay and the users:

- Rain protection / snow protection
- Solar protection
- Hail protection
- Basis for electric mobility

Observations in already conducted carports projects prove that with rain and snow as well as on highly summery days with strong solar irradiations carports parking lots are also preferred if other run ways have to be accepted. In these cases comfort signs cause a high acceptance. At the example of supply depots of vehicle manufacturers or parking lots of car dealers the hail protection function which can lead in the consequence to a significant sinking of the insurance premiums is to be emphasized.
In the sum it concerns the decisive factors which can also justify lower yields on account of the added value. For single trading venture a comfortable parking lot situation can

look absolutely sales-supporting, particularly as regenerative energy production is also conducive for the image of the enterprise.

Figure 21 shows an electric vehicle in a loading column to stress the future vision of the electric mobility. The supply from (if necessary free) loading possibilities during the purchase or the working hours could become an essential component of the customers motivation.

Figure 21: carport (hhtp://www.mein-elektroauto.com)

4.4.7. Rival firms

With regard to the rival firms is to be marked that in these niches segment of the solar carports this aspect is relative.
Since on the one hand are companies who produce solar carports, not only competitors which trade with PV carports about her distribution canals.
On the other side these companies are also potential suppliers of the company Energy Vision as under point 5 of this work is shown.

Basically the following rival firms can be ascertained:

With the carport system Park@Sol of the company Schletter Solarmontage GmbH were installed during the past 24 months projects with a whole output of approx. 20 MWp. Therefore the company Schletter is one of the big manufacturers of solar carports systems in Germany.

Other rival firms are listed in the following table:

supplier	**Product name**	**for private housholds**	**for large parking lots**	**Module**	**System of stillage**
MP-Tec	Quick-Line Carport	yes	yes	crystalline (Sovello u. a.) Thin layer (Nexpower u. a.)	steel (for Large parking lot) or aluminium (for private households)
Solarworld	SunCarport	yes	no	crystalline (Solarworld)	Steel and aluminium
Brandenburger Carportwerk	Solarcarport	yes	yes	crystalline (Sovello)	Wood of douglas fir
G-Tec	Voltaport	yes	yes	crystalline (Voltaport Sun)	steel
Gehrlicher	gehrtec PV-Carport	yes	yes	Crystalline (Yingli, Sunowe, Sharp	steel and aluminium

				u. a.) (First Solar)	
Schletter	Park@Sol	yes	yes	By costumer wish	steel and aluminium
Solar-Perfect	Solar-Carport	yes	yes	By costumer wish	steel
Enerix	Solarplusport	yes	yes	By costumer wish	Spruce wood, steel

Table 12: competitive firms in Germany

4.4.8. Summary with regard to Germany

It is to be expected that solar carports arrangements might become the new project category for large-scale projects. Beside the unequivocal added values like solar protection and active protection and a high acceptance for projects on the surfaces which are already sealed, new manufacturing methods and a rationalized installation delivers the condition for the economic efficiency of carport projects.

With it attractive projects are already realizable in the present stage. A good possibility which can be used in future by Energy Vision.
The increasing trend towards the electric mobility, the additional comfort by roofed parking bays and the image profit by application of regenerative energy for the operators of single trading venture and production and service companies indicate a perspective

for solar carports projects which an increasing interest allows to expect in this project category and can be used by the Energy Vision.

4.4.9. Competition and market for PV carports in Switzerland

After the market could be lighted up for solar carports in Germany positively, now another alternative market is described in the following, namely the situation in Switzerland.
According to the 1994 Swiss land use statistics , parking lots cover 2647 ha or 0,06 % of the national territory.

This equals to roughly 1.200.000 parking spaces.

Because of Switzerland`s growing population and prospering economy, the size of the parking areas has almost certainly increased since the last survey.

Furthermore, only lots with 20 or more parking spaces are identified as parking areas. Smaller lots are treated as part of the surrounding land use. (e.g. housing area, industrial area), so the statistics systematically underestimate the overall surface area for parking.

	Vehicle kilometers traveled [km]	Energy demand [MJ/km]	Specific consumption	Final energy demand [GWh]
ICE vehicles	48 127 000 000	1,86	5,2 l fuel/100 km	24 865
Electric vehicles (heavy weight)	48 127 000 000	0,72	20 kWh/100 km	9624
Electric vehicles (light weight)	48 127 000 000	0,27	7,5 kWh/100 km	3610

Table 13: effects of different propulsion systems on the transport energy demand in Switzerland

4.4.9.1. The energy demand of road transport in Switzerland

Cumulatively, private motor cars drive about 52. 851 million kilometres on the road of Switzerland per year.

About 91 % or 48 127 million of these vehicle kilometres can be attributed to cars that are registered in Switzerland itself. As there are 4 009 602 cars registered in the country, the average travel distance per car is 12 003 km per year .

The typical passenger car of today has an energy demand of 1,86 MJ or 0,52 kWh per km (Neumann, 2011). This means that every car consumes, on average, about 22 326 MJ or 6 202 MWh of energy per year. For the whole country, this equates to an energy demand of 98,4 PJ or 24 865 GWh.

If fossil fuels were to be replaced by renewable transport energy, the transport energy demand would change, depending on the energy carrier (e. g. renewable electricity, biodiesel, ethanol renewable hydrogen) and the type of the vehicles introduced.

If today`s cars` fossil-fuelled internal combustion engines were replaced by electric propulsion systems, transport energy demand would drop to 9.624 GWh. Additional reductions could be achieved if the weight of the vehicles was reduced.

4.4.9.2. Possibilities for carports in Switzerland at the example of town Frauenfeld

To which extent can the surface that is covered by parking lots in Switzerland be used to generate PV solar electricity?

There is the example of Frauenfeld, the capital of the Swiss canton of Thurgau, which is situated 40 km northeast of Zurich. It is a typical medium-sized Swiss city with 22 665 inhabitants. In the study by Neumann, there was assessed the potential of surface parking lots for the PV generation of solar electricity and compared with the energy demand by road passenger transport of the city (Neumann 2011).

4.4.9.3. Solar carports: types and technologies

Technically, there are two options when installing PV panels on parking lots.

Option 1 is to cover only the parking spaces (i.e. the area immediately above the parked vehicles but not the access lanes) with a roof resting on beams (Köthe 1994). On the roof, PV panels are installed. This type could be called “PV carport”.

Scenario in Option 2 is to cover the whole parking lot, including the parking spaces and the access lanes. In this case, the PV modules usually rest on cables that are drawn across the parking lot. Solar wings is one system of this type.

Both options have specific advantages and disadvantages.
Option 1 provides not just PV electricity but also shade for the vehicles in summer and protection against snow and ice in winter as mentioned above.
This is not the case for option 2. As there are gaps between the PV elements they do not form a closed cover. On the other hand, option 2 needs less material and also less space. The only elements of the construction that are fixed to the ground are a small number of beams. Also, there is no need to align the PV panels with the parking spaces, which makes it easier to orient them towards the sun.
In option 1, the orientation of the PV panels is technically determined by the orientation of the parking spaces.
In general, option 2 will have a slightly higher PV power compared with option 1 in the range of about one quarter, but this depends on the transparency, overall size, as well as geometry of the parking area.

4.4.9.4. Performance of the photovoltaic carports in Switzerland

A typical parking space in Switzerland has an area of 2.5 x 5 m. In the case of solar carports, one has to install not only the PV element, but the base construction of the carports itself. Hence, the investment cost is high than in the case of a module that are fitted on existing roofs. To investigate the potential of this approach, PV module of about 19% efficiency were used in calculations/simulations, representing the current market standard for highest efficiency at a reasonable price . Thus, so the generation cost by kWp might be slightly high than in the case of usual PV rooftop installation (Jakobs 1989).

By using these highly efficient of module installed with an inclination of 15 ° above each 2.5 x 5 m parking space, a nominally modules PV power of 2 050 Wp can Be achieved.

Feature	Module	Inverter
Type	Crystaline silicon, HIT type module	Transformer-less topology
Efficiency	18,6 % (STC)	97,6 % (max. efficiency)/97,3 % (Euro)
Nominal power	235 W	
MPP trackers	0	3
Dimensions	1580 x 798 mm	

Table 14: Feature of the photovoltaic (PV) module

The above Table 14 shows the feature of a PV module and the PV inverter used for the analyses where two car port slots are related to a PV carport rooftop size of 10 x 5 m or 19 pieces of the 235-W PV modules (inclination angle of 15° and shading angle of 20° for Switzerland)

4.4.9.5. Analysis of the parking lots

First, 48 big parking lots were identified by Neumann on an aerial photography of the town of Frauenfeld.
Ranging in size from 112 to 6080 m^2, these parking lots cover an area of 125 140 m^2. They provide parking spaces for about 4240 cars.

Considering the different horizons, the yield, the efficiencies, and the performance of the PV carport at the given parking place were calculated. Then, according to their simulated yield, the parking spaces were assigned to one of the following three categories:

- Category A contains all PV carports that have a solar yield of at least 95 % of the yield of a non-shaded and optimally aligned PV carport. This is equivalent to an output of at least 929 kWh/kWp per year and module.

- Category B contains all PV carports that have an output of at least 90 % but less than 95 % of the solar yield of a non-shaded and optimally aligned PV carport, that is, at least 880 kWh/kWp but less than 929 kWh per year and module.

- Category C contains all PV carports that have an output of at less than 90 % of a non-shaded and optimally aligned PV carport, that is, less than 880 kWh/kWp per year and module.

	Category A (95 - 100 % Yield)	Category B (90 - 95 % Yield)	Total	Unit
Total area of the parking lots			4748	m²
Total number of parking spaces			137	
Number of suitable parking spaces	52	9	61	
Percentage of suitable parking spaces	38%	7%	45%	
Percentage fot the surface used for solar carports	13%	2%	15%	
Annual yield per nominal power	946	905	940	kWh/kWp/a
Overall system efficiency	15-24 %	14-78 %	15-17 %	
Performance ratio	81-8 %	79-3 %	81-4 %	
Nominal power	115	20	135	kWp
AC yield	108-67	17-99	126-66	MWh
Average yield per parking place	5-73	5-48	5-69	kWh
Number of electric vehicles supplied per parking place	0-83	0-78	0-81	
Total number of supplied electric vehicles	43	7	50	

table 15: Classification of photovoltaic (PV) carports on the supermarket lot by performance and size

The price for PV carports depends on their nominal power and the performance. A 5 % lower amount of produced PV electricity increases the costs by 5 %. Currently, investments in solar carports seem to be reasonable as long as the yield is at least 90 % of the nominal power.

Hence, only the solar carports listed in the categories A and B provide economic benefits.

For parking spaces listed in C, the economic incentive to put up a solar carport it too low at the moment.

This might change in the future, as PV elements are becoming both cheaper and more efficient. The increase in module efficiency is expected to be in the range of about one tenth, compared with the values in table 15, within this decade.

4.4.9.6. Further progress

Of the 48 parking lots that have been analysed, 29 receive sufficient solar radiation for PV electricity generation, fulfilling category A or B. A total of 17 parking lots have a nominal PV power of less than 200 kWp, 10 lots are between 401 and 600 kWp .

The 29 parking lots that are suitable for solar carports comprise 3005 parking spaces, which is 58 % of the total (4239). Parking lots of all sizes have been identified as suitable. Their sizes span from 6080 m2 to just 601 m2, comprising between 12 and 245 parking spaces. The number of parking spaces that are suitable for solar carports is always above 50 %. In almost one-third of the cases, all parking spaces can be used for solar carports.

Nineteen parking lots can generate an electricity output that ranges between 95 % and 100 % of the nominal power of the solar modules installed; thus, they are categorized as “A”. In this category, the simulated yield per module ranges between 929 and 964

kWh/a. Depending on the size of parking lot, this leads to an AC yield of 15 to 510 MWh. The total yield of the parking lots categorized as A is 3718 MWh.

The remaining 10 parking lots belong to category B, that is, their energy output ranges between 90 % and 95 % of the nominal power installed. In category B, the simulated yield per module ranges between 891 and 922 kWh/kWp/a, leading to a yield per parking lot between 33 and 309 MWh. The total output of the 10 lots amounts to 1342 MWh.

On all parking lots that have been analyzed by Neumann, a nominal power of 5410 MWh can be installed. The total simulated AC yield is 5061 MWh or 93,5 % of the nominal power.

The PV potential of 48 larger parking lots in the Swiss city of Frauenfeld has shown, that installations on these parking lots can cover between 15 and 40 % of the energy demand of private motor car use in the future, depending on which type of cars will be introduced.

It can therefore be concluded on the basis of the above described study of Neumann that PV carports could be a promised option for the generation of renewable electricity for transport purposes in Switzerland and therefore also for the business intention of Energy Vision.

4.4.9.7. Competitors in Switzerland

It is to be held on at this point that there is an interesting market for solar carports in Switzerland.

The following figure gives an overview about potential competitors in Switzerland for solar carports:

supplier	Product name	for private housholds	for large parking lot	Module	System of stillage
Solarworld	SunCarport	yes	no	crystalline (Solarworld)	Steel and aluminium
G-Tec	Voltaport	yes	yes	crystalline (Voltaport Sun)	steel
Gehrlicher	gehrtec PV-Carport	yes	yes	Crystalline (Yingli, Sunowe, Sharp u. a.) (First Solar)	steel and aluminium
Schletter	Park@Sol	yes	yes	By costumer wish	steel and aluminium
Solar-Perfect	Solar-Carport	yes	yes	By costumer wish	steel

Table 16: competition in Switzerland

4.5. Overview about potential suppliers

In the following an overview about potential suppliers is given for the project plan of the Energy Vision.

As already in the area of the introduction under point 1.6 shown, the supplier's management is one of the core duties of the management of the Energy Vision and decides substantially on the business success or the business failure.

Hence, the analysis is significant within the scope of the overview about potential suppliers accordingly.

4.5.1. Scope of performance and analysis of potential suppliers

Solar carports offer not only cars protection, but also solar modules to roof surface. Several manufacturers deliver meanwhile complete systems of solar passenger car shelters - to own home owner just as in enterprise which want to roof her employee's parking bays or customer parking bays.

In this way more and more enterprises and public institutions are thinking. An Edeka supermarket in Lower Franconia, the Eurospeedway in Saxonia, a police station in Berlin, a parking bay in Passau: Everywhere in Germany new carports with photovoltaic roof were established.

Besides, the operators have not only the comfort for customers or employees as well as the electricity yields in the eye, but also the ecological image which the solar modules lend them.

Also private house-owners can do with solar modules on her autoshelter something for the environment and earn the same reimbursement rate for electricity like for customary roof installation.

The system supplier MP-Tec from Eberswalde has presented a calculation for one of his products: Then the costs for a carport with three parking lots as well as a 7.2-kilowatt arrangement with polycrystalline modules of Sovello including converter, cables and accessories amount to 26,750,- euros.

The operator achieves with it according to MP-Tec an annual yield of approximately 6,480 kilowatt hours. If the arrangement goes after the 01st of October 2011 to the net, he receives for the electricity per year 2,140 euros. The investment has amortized after about 12.5 years. After 20 years the arrangement has earned about 42,800 euros - a whole profit of 16,000 euros. With it the operator achieves an annual yield of a little bit more than three percent. And, besides, gets in addition virtually for free a shelter in which he can protect a small carfleet against wind and weather.

Mostly these are manufacturers of assembly systems of free surface arrangements or roof arrangements, which bring the solar carports as "a by-product" of her development in the rack technology on the market.

MP-Tec, for example, has developed a shelter with crystalline or thin layer modules on the basis of his Quick Line-rack series. This modular system from high-grade steel or aluminium can be used for single parking lots as well as to the roof installation of big surfaces. Thus the Brandenburg enterprise has established a carport with place for 26 cars which generates yearly 42,500 kilowatt hours electricity on own company area.

Also Park@Sol- carport from Schletter which is distributed in cooperation with the project developer Juwi is based on an open land-assembly system. This carport is also conceived after the modular concept. Schletter is especially proud of the fact that the carports arrangements get by with very narrow, filigree concrete-finished part foundations which require only little place.
The foundations are anchored with small posts certainly about state in the subsoil. On the carports rack all current photovoltaic modules, whether crystalline or thin layer, can be mounted. Per parking lot crystalline panels with about two kilowatts of output are installed, with thin layer modules the output is a little lower. The costs for the grounding - of course without modules, cables or converter – account for 400 euros per kilowatt including drainage by bigger installations. Then in addition still the costs come for the assembly and the foundation. Schletter has installed about 25 shelters up to now, most of it as great plants.

Company Gehrlicher Solar wants to use her assembly technology also for PV carports. Probably in the fourth quarter 2011 a shelter will come on the market for four cars which can be equipped either with crystalline modules or with cadmiumtellurid-panels .

Besides some installation companies as for example Solar-Perfect from Freiburg or the enterprise Enerix also offer solutions for photovoltaic parking bays.

Also Solarworld offers an own complete PV carport system.

4.5.2. Listing of potential suppliers

There is already a whole series of companies which deal for several years with the subject solar carports.
These companies can be shown as potential suppliers for the Energy Vision.
The Energy Vision has to establish the contact to these companies.

Afterwards Energy Vision has to set up a well done a supplier – selection as it was described above.

The following companies who are performed in the following listing could be ascertained at the market:

supplier	**Product name**	**for private housholds**	**for large parking lot**	**Module**	**System of stillage**
MP-Tec	Quick-Line Carport	yes	yes	crystalline (Sovello u. a.) Thin layer (Nexpower u. a.)	steel (for Large parking lot) or aluminium (for private households)
Solarworld	SunCarport	yes	no	crystalline (Solarworld)	Steel and aluminium
Brandenburger Carportwerk	Solarcarport	yes	yes	crystalline (Sovello)	Wood of douglas fir
G-Tec	Voltaport	yes	yes	crystalline (Voltaport Sun)	steel

Gehrlicher	gehrtec PV-Carport	yes	yes	Crystalline (Yingli, Sunowe, Sharp u. a.) (First Solar)	steel and aluminium
Schletter	Park@Sol	yes	yes	By costumer wish	steel and aluminium
Solar-Perfect	Solar-Carport	yes	yes	By costumer wish	steel
Enerix	Solarplusport	yes	yes	By costumer wish	Spruce wood, steel

Table 17: potential suppliers of Energy Vision

4.6. Analysis of the most important market entry barriers

With the conversion of the start-up plan of Energy Vision it is important to consider also the market entry barriers in particular for the niche market of the solar carports.
Market entry barriers can lead very fast to the fact that a business plan is already condemned in the early field to the failure.

4.6.1. Criteria to the systematization of the market entry and market treatment strategies

First once the aspects should be worked out which are important for the market entry. The single strategies of the market entry and the market treatment can be systematized with the help of numerous criteria as follows:

Added value main focuses of the engagement of Energy Vision: Which added value areas are to be considered with a certain engagement?

Resource demand of the engagement of Energy Vision: In which magnitude are generally own resources required ?

Kind of the resource transfer of Energy Vision: From which kind (e.g., are capital and/or management achievements) own resources transferred in the foreign countries?

Magnitude of the resource transfer of Energy Vision: In which magnitude (extent) will resources transfer with a certain engagement into the foreign countries?

Amortization of the resource application of the Energy Vision: How long does it last, until the resources used by the engagement amortize?

Juridical restrictions with the engagement: To which magnitude the engagement of the Energy Vision is limited by juridical regulations?

Risks of the engagement: Which risks brings the engagement with itself (e.g., capital risks, management risks)?

Reversibility of the engagement: In which mass can a certain engagement of the Energy Vision be cancelled?

Flexibility of the engagement: In which mass can a certain engagement be transferred in another form of the engagement?

Duration of the engagement: For which period is a certain engagement laid out all together?

Controlling possibilities of the engagement: Which degree of influence does the enterprise have with a certain engagement in the way of the realization of activities?

Property with the engagement: In which magnitude does the engagement occur through sole property i.e. in which magnitude capital portion or vocal portion are in own hand?

Cooperation with the engagement: In which magnitude is Energy Vision dependent with the engagement on the cooperation with other people or enterprises?

Support of the engagement: In which way and in which magnitude is the engagement promoted by government, authorities and population?

Scale effects with the engagement: In which magnitude does a certain engagement allow to achieve scale effects (Economies of Scale)?

Group effects with the engagement: In which magnitude does a certain engagement enable to reach group effects (Economies of Scope)?

Speed of the engagement: How fast can the desired aims be reached with a certain engagement?

Profit potential with engagement of Energy Vision: Which profit potential is connected with a certain engagement?

From this list it becomes evident that there is a nearly boundless list in criteria to systematize the market entry and market treatment strategies.

The mentioned criteria can be pulled up not only to the systematization by market entry and market treatment strategies, but also help to grasp the possible risks and essential aspects by the market entry and to judge them.

4.6.2. Market entry barriers for Energy Vision

Before the background of the aspects shown on top, the following essential market entry barriers are to be called:

Quite an essential factor for the market entry is the permanent support of the use of the solar energy for solar carports by the renewable energy law. In this connection there is also in Germany a whole series of voices to limit the support drastically.

In this context is to be seen that there is a whole series of negative examples in Europe. Thus the support in Spain was limited, for example, for the solar energy quite considerably. But also in other countries, as for example in Czechia, France and England the financial means were considerably shortened during the last months for the use of solar energy.

The already established companies show of course another barrier for the market entry, as it was pointed out at chapter 4 at this draft. Established competitors occupy the marketplace for solar carports and are already known at the consumers and as a consequence at the potential customers of Energy Vision.
Hence, before this background it is difficult for a new company to enter into this market for solar carports.

The capital risks show of course also another market barrier, because already for a long time at the market active companies dispose, perhaps, after an initial public offering already of a very respectable capital structure. A young enterprise, as for example the Energy Vision does not have such funds.
This better capital structure of established enterprises presents itself as another barrier for the market entry of Energy Vision.

Further on another risk and market entry barrier is the aspect that the Energy Vision must build up a circle of suppliers.
In chapter one of this draft was indicated the ways which Energy Vision has to follow in order to set up a reliable number of suppliers.
Reliable suppliers are very significant in particular for the punctuality of the deliveries and for the quality of the products which will be trade by Energy Vision
Because the quality of the products should be negative, this aspect is also reflected very negatively on the image of the Energy Vision.

Another market entry barrier can arise for Energy Vision by the fact that the juridical frame gets worse with the conversion of the intention of Energy Vision.
Unfortunately, it is a fact that it becomes more and more difficult on account of the increasing bureaucracy in Europe to move projects.

It must be calculated on a deterioration of the juridical situation which leads then special to the fact that the term of a proceeding relating to permission is drastically extended. This can lead at last to the fact that the investor would not like to move the plan any more.

This are for sure only some market entry barriers which are to be considered by Energy Vision in connection with the planned project.
But in the course of the further conversion of the plan of Energy Vision further market entry barriers will become important.

4.7. Exit strategies, outlook, the next steps of the Energy Vision

4.7.1. Possibilities of the exit for Energy Vision

There are many occasions to come along already now in this stage of the plan of the Energy Vision thinking about the possible exit. Thus it is conceivable, for example that solar carports do not find any more the necessary support on account of the worldwide economic crisis or a sponsor / companion retires for personal reasons.

That's why a consideration of the exits is for Energy Vision also important. Besides there are several strategies for getting out the enterprise (so called exit strategies). These strategies are already considered in the approach of an investment in an enterprise and influence the decision for and against an investment.

There are the following exit possibilities:

- Going public
- Trade Sale
- Secondary Purchase

- Liquidation or notice

The different exit possibilities also bring different yields for the sponsor with themselves as well as different advantages and disadvantages for sponsor and portfolio enterprise. Also for the future of a portfolio enterprise the choice of the exit strategy plays a crucial role.

4.7.1.1. Going public

The way of an enterprise to the stock exchange is called going public or initial public offering (IPO). This option is termed as the "royal road" of the exit.

For the shareholder of Energy Vision the highest yield is to be achieved with this variation, in any case. Another advantage for the shareholder is the flexibility of this exit variation, because the time of the exist can be used adaptably. The sponsor has to participate with this variation also at the possibility in the further appreciation of value of the enterprise, while he holds parts of his shares furthermore.

For the Energy Vision the possibility arises from an initial public offering to be able to renounce the invitation of great investors in view of the further development of the enterprise for which they would have to put away controlling rights.

It is advantageous also that no capital is taken away from the enterprise by the initial public offering. By the initial public offering Energy Vision can raise the company capital rate. Also after the initial public offering the option exists, for example, by the issue of loans. Moreover, by an initial public offering Energy Vision receives a wide owner's base what strengthens the independence of the enterprise. Also for the marketing

of Energy Vision an initial public offering has a positive effect, because the name recognition of the enterprise increases and leads to a respect profit towards customers or suppliers.

As a countermove the costs which an initial public offering with itself brings come up to Energy Vision. Besides, other running costs originate, for example, for a regular general meeting. There come extensive publicity and calculation lapping duties. Also the danger of a takeover is given.

Not for every enterprise this exit is advisable. A way to the stock exchange makes certain demands for the Energy Vision which express themselves, for example, by the height of a minimum net property.

On account of this target this exit variation can be chosen even by especially successful enterprises.

4.7.1.2. Trade Sale

Trade Sale means the sale of Energy Vision to another investor from the industry. Such an enterprise which comes from the same branch buys on this way knowledge, patents and technologies. These enterprises want to acquire as a rule a majority or buy up the enterprise even completely. Besides, for the buyer plays a role by the purchase decision whether the enterprise has already brand name in the market.

Concerning the yield a trade Sale is the second-best solution, in some cases even a higher yield than with the initial public offering can be achieved. With a trade sale above all prize negotiations can turn out as the biggest problem. However, in general a trade sale is the quicker and also cheaper solution compared with an initial public offering.

Possible buyers are mostly already known in smaller markets, with it a protracted search is cancelled also.

However, with this exit variation the danger insists that between the new owners and the present management conflicts arise, for example, on account of the independence loss of the enterprise. Hence, a trade sale mostly entails the getting out of the founders from the enterprise.

4.7.1.3. Secondary Purchase

Secondary purchase is defined as the disposal of the participation in Energy Vision to a finance investor.

This investor can direct his focus upon special financing phases of an enterprise or can raise bigger participation sums. Besides, he is seldom interested in the products of the enterprise, but above all in the growth possibilities of the enterprise.

This way of exit is for the companions of the Energy Vision as a rule, however, only from low interest, because the expected yield is not very high here. Reason for the fact is that the new investors would like to pay as a rule no high prices, because they themselves are interested in a profit achievement with the enterprise.

4.7.1.4. Liquidation

By liquidation it would come for an end of the project of the Energy Vision by legal methods.

No more capital is made available to the Energy Vision, because no view of success exists. The exit can occur either through a liquidation of the enterprise or, e.g., through a stop of action on the part of the sponsor. Then subsequently the enterprise is insolvent.

For the sponsor this exit possibility means the loss of the introduced capital and, hence, this possibility is to be avoided if possible at all.

4.7.2. Outlook

As on top under point 4 of this draft already in detail mentioned, the outlook can be marked very well for the establishment of solar carports .

In the course of the further expansion of the electric mobility a steadily growing need also exists for solar carports.

Besides, solar carports which are attached on parking bays by shopping centers and houses, show for the long-term future of the operators of these industrial companies a positive marketing effect. Since while the customer in the shopping center makes his purchase he can supply his electric-car before the shopping center with electricity.

In the age of rising electricity prices the own consumption of the shopping centers and industrial buildings can be also covered by solar carports.

This is a considerable contribution regard on the economic efficiency of these enterprises which is connected with the application of solar carports

4.7.3. The next steps of the Energy Vision

To the conversion of the plan of Energy Vision many single steps are necessary during the next months and years, because the process of the conversion is perpetual.

But on account of the very well market views in particular in connection with solar carports this way is sensibly and the following next steps have to be done which are exemplarily performed here:

1. step

Mission statement of Energy Vision
Enterprise principles
Principles concerning the markets to be worked on and products
Claims concerning market position and competence
Conversion of the example: appropriately, for all employees understandably
Without temporal restriction

2. step

Corporate concept of Energy Vision
Ascertainment of the corporate concept, strategic successful position (SEP)
Ascertainment of the enterprise principles and priorities with regard to the geographical
markets, to submarkets and market segments
strategic business segments
CI (Corporate Identity)
Business goal (quantitatively and qualitatively)
To all enterprise areas like marketing, organization, finance. investment,
purchase, production, logistics, etc.
milestones

3. step

Part draughts of the Energy Vision

Marke-ting-concept	Organiza-tion-concept	Finan-cing-concept	purchase concept	Personnel-concept	Logistics-concept	Quality -concept	Market-concept

4. Step

operative plans / concepts of Energy Vision
Example marketing concept: Product and service concept, prize and condition concept
Communication concept: Advertising concept, sales conveyor concept, sales concept
PR concept, event marketing concept etc. distribution concept

5. step

Tactical planning and realization of the planned measures
Examples of tactical planning in the marketing; planning of sales presentation (Measure, etc.)
or other short-term actions

Figure 25: next steps of Energy Vision

5. Description of results

How already stated for reasons of the stringency of the presentation, the results of the research were shown partly already in the chapter 4 of this work after the treatment of the respective questions .

Thus, for example, the question concerning the suitable legal form for the project of the energy vision was answered under point 4.1.4.

The question concerning a suitable supplier's management under point 4.1.5.12 and the profitability analysis under inclusion of points of tax law was focused under point 4.1.11.5.

Nevertheless, it should be outlined in the following the essential results to the main questions, as they were described in the introduction to this work.

5.1 Which optimum juridical form is suited for Energy Vision taking into account risk averse strategy of the future companions?

In view of the aspects which are under point 4.1. of this draft concerning the optimum legal form of the intention of the energy vision were explained and the statement of the different legal structures which are suitable for this project, the following statements let themselves again fixed:

5.1.1 Risk aversion

The concept of risk aversion calls in theory the quality of a market participant to prefer the alternative with the lower risk concerning the result and with the least possible loss with a choice of between several alternatives.
Risk-shy market participants prefer a possibly sure profit, even if this thereby precipitates smaller.

The following figure show the use function of risk averse market participants:

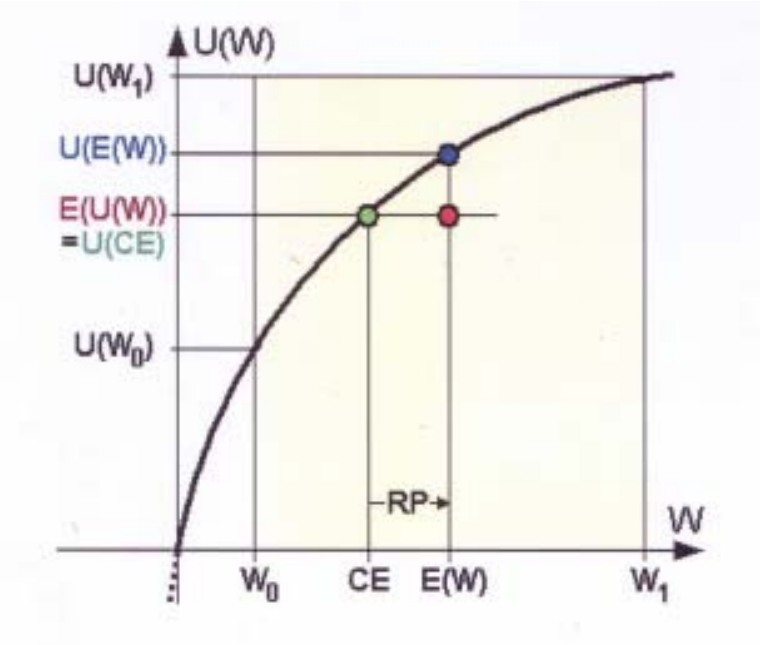

Figure 26: function of risk averse market participants (Perridon,Steiner 2009)

5.1.2. Optimum legal form

How under point 4.1.4. of this draft in detail demonstrated, the legal form of the Ltd is under the point of view of the risk aversion the suitable legal structure for the plan of Energy Vision.
The essential aspect of the Ltd is the restriction of liability of the shareholders, provided that the company gets in economic problems.

5.2. How are possible suppliers of PV carports of Energy Vision analyzed to protect a qualitatively high-quality supplier's structure for the start up Energy Vision?

The results to this question are based on the implementation under point 4.1.5. of this draft and can be described with the following headwords:

It is essential that first the operative aims and the strategic aims of the supplier's management of the energy vision are defined.
Then there follows the supplier's selection on the part of Energy Vision.

Afterwards the supplier's qualification takes place, so an active examination from sides of the supplier during the choice process provided information. Then the supplier's assessment will follow and the single criteria for this assessment was demonstrated in detail under point 4.1.5.6. of this draft.

After the supplier's qualification there has to be a strong concern of Energy Vision to an active supplier's development.

A certified supplier with excellent quality in his products is very important for the successful development of Energy Vision .

The sequence for the Energy Vision of the essential process of the analysis and development of a high-quality supplier's structure also shows the following figure:

Figure 22: supplier selection by Energy Vision

5.3. Which cooperation possibilities arise Energy Vision in the early stage of her activity in view of the fact that high start investments would like to be avoided?

For Energy Vision it is obvious for the avoidance of high start investments to enter intensely vertical and horizontal cooperation.

One of the localized cooperation partners is the company Volthaus GmbH which already acts for several years in the field of photovoltaic and this company is suitable for the further development of the market field PV carport also for geographic reasons. Because Volthaus is also situated in Germany (see the implementation moreover under point 4.2.1.3.)

This cooperation with the company Volthaus leads to the fact that the Energy Vision must pursue no storage position for PV carports, which concentrates the Energy Vision with her activity on the development of projects and their conversion in this respect.

In addition, there are other cooperation possibilities in particular with purchasing associations, which were also set up in the area of the solar industry during the last years.

5.4. How will be developed the profitability of an investment in a PV carport under consideration of an outside financing or a self financing but also in view of important tax aspects ?

In connection with the market penetration by Energy Vision the question is essential whether the outside financing or the self financing of the acquisition of a PV carport makes sense for customers of Energy Vision.

With reference to the implementation on top under point 4.1.11 and the results under point 4.1.11.5. the following could be marked:

In the view of the decisive situation of a potential customer of Energy Vision who would like to invest in a PV installation under special consideration of the treatment according to tax law of the potential investment t different aspects are important.

In the result the profitability depends on the subordinated parametric situation. Outgoing from the sensitivity analysis presented in table 10 it is to be recognized that under the given acceptances the outside financing is better than the self financing. Besides, the own consumption of the self -generated power is to be preferred basically to the feed in the public electricity net.

This lies above all on the fact that the reimbursement rate is higher in the result as in the case of the own consumption.

The investment in the case of the self - financing is not worthwhile even if lower interest, a lower income tax rate, longer terms or lower operating expenses is subordinated.

Only with very low operating expenses in connection with low deposit rates or with a lowering of the cost about 20% an investment would be advantageous.

The profitability of future investments in PV installations for carports depends above all on the development of the module prices.

If the module prices sink comparatively stronger than the feed in tariffs agreed by the german EEG, an investment can be worthwhile furthermore.

5.5. How does the model look for the financing, the marketing and the organization of Energy Vision taking into account risk averse strategy of the companions concerning the PV carport project ?

5.5.1. Financing

Concerning this may be referred at this point to the detailed implementation of budget planning , turnover and result planning for Energy Vision how they were shown under point 4.2.3. in the above implementation of this work.

Is to be held on at this point, that Energy Vision pursues the model of the inside financing how of the following graphic illustrates:

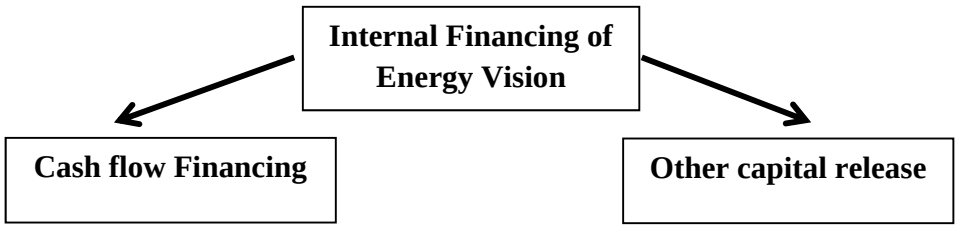

Figure 23: Internal Financing of Energy Vision

5.5.2.Organization

In view of the organization is to be marked at this point, that Energy Vision naturally in the early stage follows the model of the centralization.

As shown under point 4.2.2. in the above implementation, the centralization leads to a well-balanced creation of the enterprise organization.

It would be obvious the so-called performance centralization for the intention of Energy Vision in this connection how the following graphic prove:

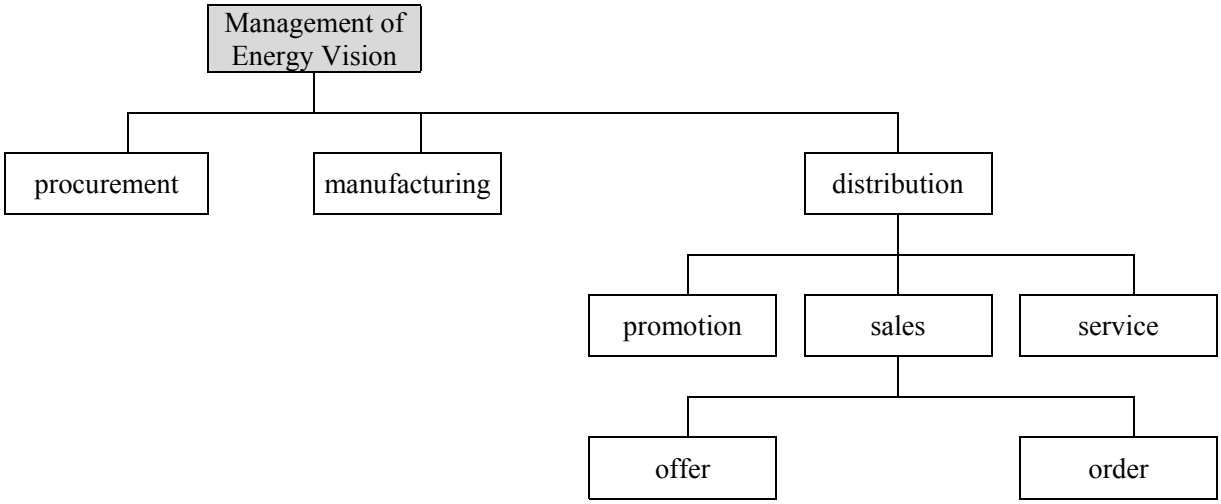

Figure 27: organization model for Energy Vision

5.5.3. Marketing

With regard to the marketing planning of Energy Vision is to be held on as a result that Energy Vision should pursue a suitable marketing mix with her plan, is performed here in the cited figure:

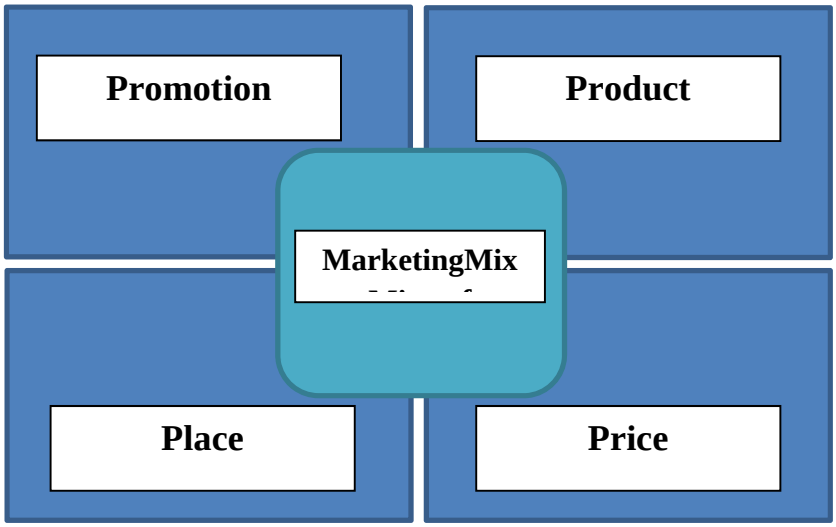

Figure 24: Marketing-Mix of Energy Vision

All these aspects performed on top are to be moved further under the point of view that risky points are to be neglected.
This is called in the future work of Energy Vision that in the area of the marketing no expensive advertising campaigns are driven to spare the liquidity of Energy Vision.
In view of the organization of Energy Vision is to be paid attention to the fact that a reasonable personnel structure is created to form none high fixed costs which can show also a menace for Energy Vision in the early stage

The fact cited on top also, however, serves the risk aversion strategy of the companions that by an intensive use of cooperation the initial costs load of Energy Vision is held low.

5.6. Which aspects of the risk analysis are important for Energy Vision to consider in particular the lack of professional employees at this time in in Germany?

As already on top under point 4.3. explained, it is important to recognize the risks and to analyze the risks.

In this connection the employee's risk is extremely significant in the Federal Republic of Germany.
Since there is in Germany in many regions full employment and, therefore, the correct appraisal of the employee's risk is of great importance.

How on top under point 4.3.2.3. is shown in particular also the fluctuation risk is knowingly.

Therefore it is essential to create an interesting working sphere for highly qualified employees.

This can happen by several effects.
Here are to be called in particular:

- Suitable career possibilities
- Integration of older employees
- Creation of children cradle places
- clear information in the enterprise
- pleasant work climate
- Continuing education possibilities

- Stay abroad
- certified projects

With the abovementioned measures and other measures it is important for a positive project result with the intention of the Energy Vision to prevent the employee's fluctuation.
If this does not succeed, the big risk on the part of the Energy Vision insists that an further expansion is not possible in the absence of certified employees.

As other risks are to be called then a recessive development which affects the launched distribution plan and the sales figures of Energy Vision.
Furthermore would be also to be seen as a critical factor and risk that the start investments of Energy Vision are higher than planned.
Moreover sensibility analysis were carried out whose results were worked out under 4.3.2.2. of this work.

5.7. On which competition has the Energy Vision to position itself in particular in Germany and with which suppliers in view of the distribution of Solar carports in Germany can Energy Vision work together and which essential market entry barriers are to be considered, on this occasion, by Energy Vision?

5.7.1.Competitor's analysis and result

Under point 4.4. of this work the competitor's analysis was shown and the sources of information necessary for this were performed.
Under point 4.4.9. the rival firms which are demonstrated in the following table they were again listed:

supplier	Product name	for private housholds	for large parking lot	Module	System of stillage
MP-Tec	Quick-Line Carport	yes	yes	crystalline (Sovello u. a.) Thin layer (Nexpower u. a.)	steel (for Large parking lot) or aluminium (for private households)
Solarworld	SunCarport	yes	no	crystalline (Solarworld)	Steel and aluminium
Brandenburger Carportwerk	Solarcarport	yes	yes	crystalline (Sovello)	Wood of douglas fir
G-Tec	Voltaport	yes	yes	crystalline (Voltaport Sun)	steel
Gehrlicher	gehrtec PV-Carport	yes	yes	Crystalline (Yingli, Sunowe, Sharp u. a.) (First Solar)	steel and aluminium
Schletter	Park@Sol	yes	yes	By costumer wish	steel and aluminium
Solar-Perfect	Solar-Carport	yes	yes	By costumer wish	steel
Enerix	Solarplusport	yes	yes	By costumer wish	Spruce wood,steel

Table 11: competitors of Energy Vision

The energy vision deals it with a considerable competition in this interesting market sphere.

However, on the other side is to be marked that these also brings considerable chances for Energy Vision.

5.7.2.Cooperation with company Volthaus

With regard to a cooperation it is at this point to mention the company Volthaus which disposes of a certified range of products and can pursue together with Energy Vision a positive market treatment strategy.
Under point 4.2.1.3. this cooperation with the company Volthaus was described.

5.7.3. Market treatment strategy

In view of the market treatment strategy under the market entry barriers for Energy Vision the following is to be called:

One of the essential factors is the permanent support of the intention of Energy Vision by the state law about the renewable energy especially the feed in tariff system in Germany.
Furthermore capital risks are to be called as entry barriers and problems in the juridical frame with the conversion and with setting up a circle of suppliers.

The relevant market entry barriers were also shown on top under point 4.6.2. in detail and were described and it may be referred at this point .

5.8. Exit strategy and next steps of Energy Vision

One of the core questions is the aspect,which strategy for the exit of Energy Vision from the market for the distribution of PV carports is conceivable and which next steps are to be taken by the responsible manager of Energy Vision to the conversion of the intention of selling and projecting PV carports ?

5.8.1. Exit strategy

In view of the exit strategy is to be marked with reference to the implementation under point 4.7.4.7. , that a possible exit of Energy Vision could be done by going public as well as by a trade sale.
In today's difficult market sphere it is to be assumed the fact that a possible exit as trade sale could occur.

The following figure points out the differences and the development of the number of acquisitions and IPOs of the European technology sector in the last years.

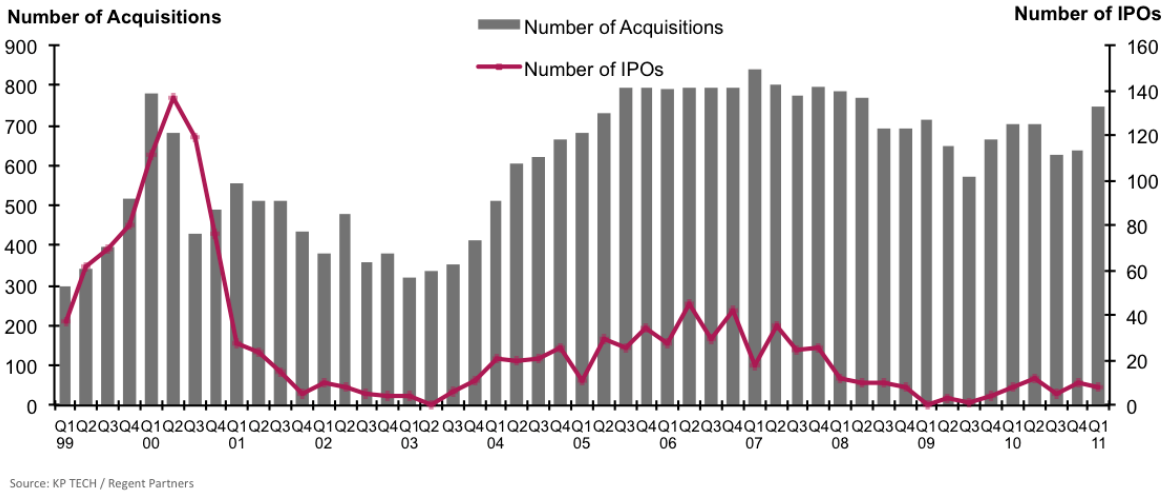

Figure 28: Number of acquisitions and IPOs (Source: http://www.tech-corporatefinance.de/blog/allgemein/kp-tech-analyse-anstieg-europaischer-ma-transaktionen-im-technologiesektor-um-17-im-q1-2011)

5.8.2. The next steps of Energy Vision

In this connection is to be marked that the following graphic outlines the next steps with the conversion of the plan of the energy vision very well :

1. step

Mission statement of Energy Vision

2. step

Corporate concept of Energy Vision

3. step

Part draughts of the Energy Vision							
Marke-ting-concept	Organiza-tion-concept	Finan-cing-concept	purchase concept	Personnel-concept	Logistics-concept	Quality -concept	Market-concept

4. Step

operative plans / concepts of Energy Vision

5. step

Tactical planning and realization of the planned measures

Figure 29: next steps of Energy Vision

6. Conclusions

In view of the plan of Energy Vision beginning in Germany to market and project PV carports, is to be held on following for the future:

6.1. Positive market sphere in Germany

A positive juridical sphere was created in the Federal Republic of Germany by the renewable energy law for the use of renewable energy.

This positive juridical sphere causes a sustainable development of the renewable energy in the interest of climate protection and environment protection.

The following figure explains the progressive electricity production from renewable sources in Germany for the next years. Also photovoltaic will increase in a strange manner and therefore the basis for the future use of solar carports will be also positive.

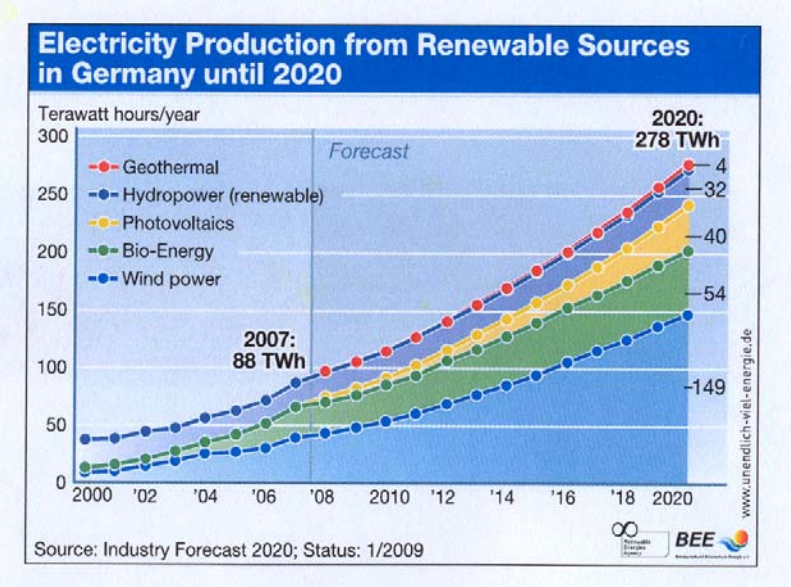

Figure 30: electricity production from renewables in Germany until 2020 (Agentur für Erneuerbare Energien, 2009)

At last Energy Vision with her intention also profits from this positive juridical sphere, projecting successful PV carports on parking areas for shopping centers and other parking surfaces.

Then, on this occasion, there are also synergetic effects with the owners of the parking areas, because these have, among the rest, a positive image profit if they make available her customer Solar Carports.

6.2. Rising electric mobility

After the energy turnaround in Germany an increasing electric mobility is to be observed.

Leading German and European vehicle manufacturers want to develop electric cars in immediate future and put them on the market.
In addition, American and Japanese car manufacturers also want to build electric cars for the European market.

This increasing electric mobility is also a future medium-term aspect for the plan of Energy Vision to project PV carports on parking areas.

Therefore it is to be assumed from the fact that increasingly commercial companies will discover the subject electric mobility as a positive marketing effect for themselves and their customers.

Since they can lure there customers into her department stores also with the fact that they can offer a power station to the buyers who drive an electric car.
Therefore the increasing electric mobility will also mean a positive factor for the economic success of the intention of the Energy Vision.

The following figure shows the sales development of electric cars and points out the differences between China, United States and Germany.

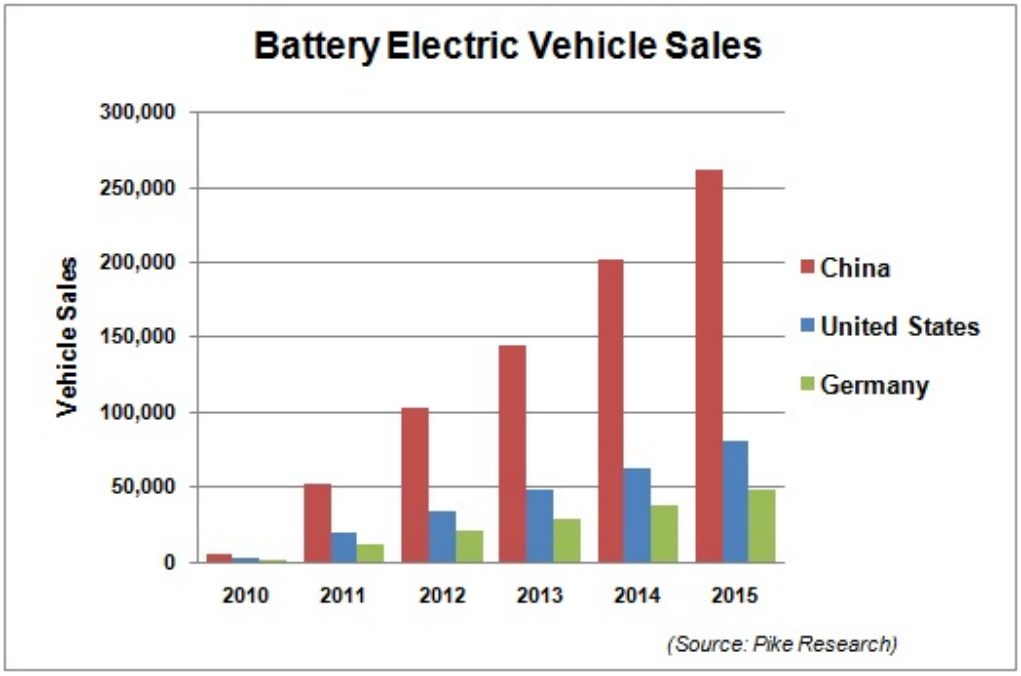

Figure 31: Battery electric vehicle sales
(source:http://www.pikeresearch.com/research/plug-in-electric-vehicles)

6.3. Own consumption of industrial firms

Another essential aspect is the fact that the enterprises who provide her parking bays with PV carports, because there produced power can also be of use for her own operational purposes.

The energy consumption only in these department stores by the lighting which is also necessary during the day is multiple very high.

As in this draft could be ascertained, the own consumption is also a very interesting option for these enterprises under tax and juridical points of view (see 4.1.10.)

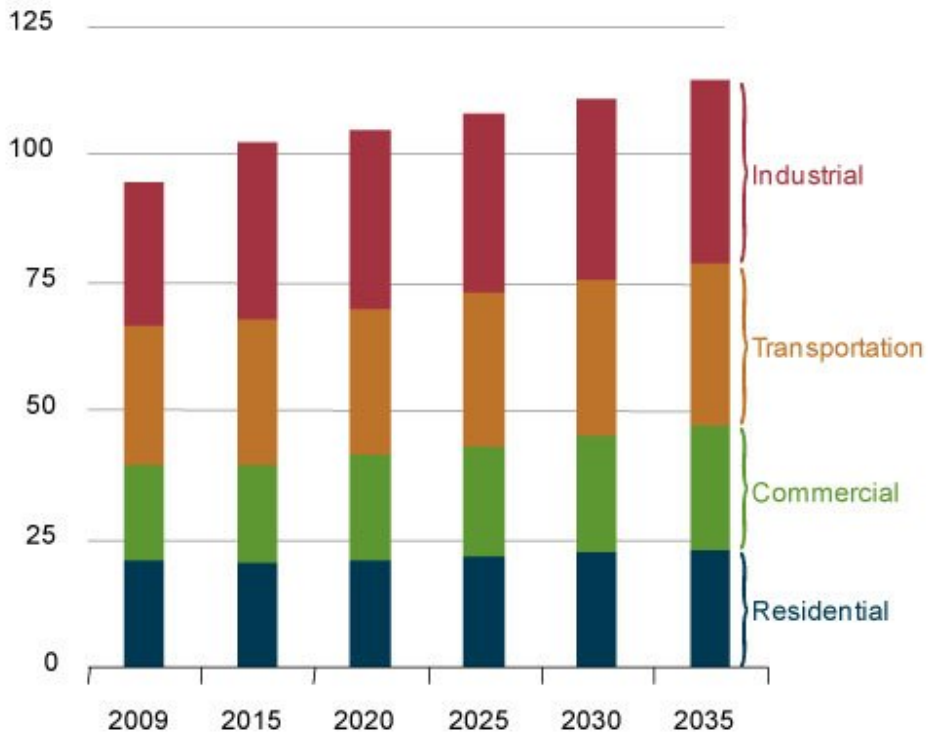

Figure 32: Primary energy use by end-use sector
(source:http://205.254.135.7/forecasts/aeo/MT_energydemand.cfm)

6.4. Cooperation strategy for the market treatment

As an other important aspect of this draft is to be held on that because of the fact that Energy Vision is a start up enterprise , it is very advantageous to enter cooperation.

These cooperation have varied advantages. An essential advantage is the minimizing of the starting risk for Energy Vision.

A concrete cooperation partner was already described for Energy Vision, namely the company Volthaus. Now it is a matter for Energy Vision, to analyze further on these cooperation and to deepen this contact.

6.5. Outside financing

Further is to be considered that the profitability analysis, as it was carried out in this draft under point 4.1.11, the result came that as a rule an investment is better in a PV carport by outside financing than by self- financing.

Because there are interesting state aid programs just in the Federal Republic of Germany, this is to be seen as for example by the KfW (a German state bank). For the plan of Energy Vision this fact is positive. These state aid programs are provided with favorable interest rates which offer an additional incentive to carry out investments in a PV car- port.

The KfW has invested considerable amounts of money in the German solar economy during the last years and it is to be assumed before the background of the energy turnaround that this loan strategy of the KfW is further continued .

The following figure gives an overview of the commitments of the KfW in the years 2006 to 2010:

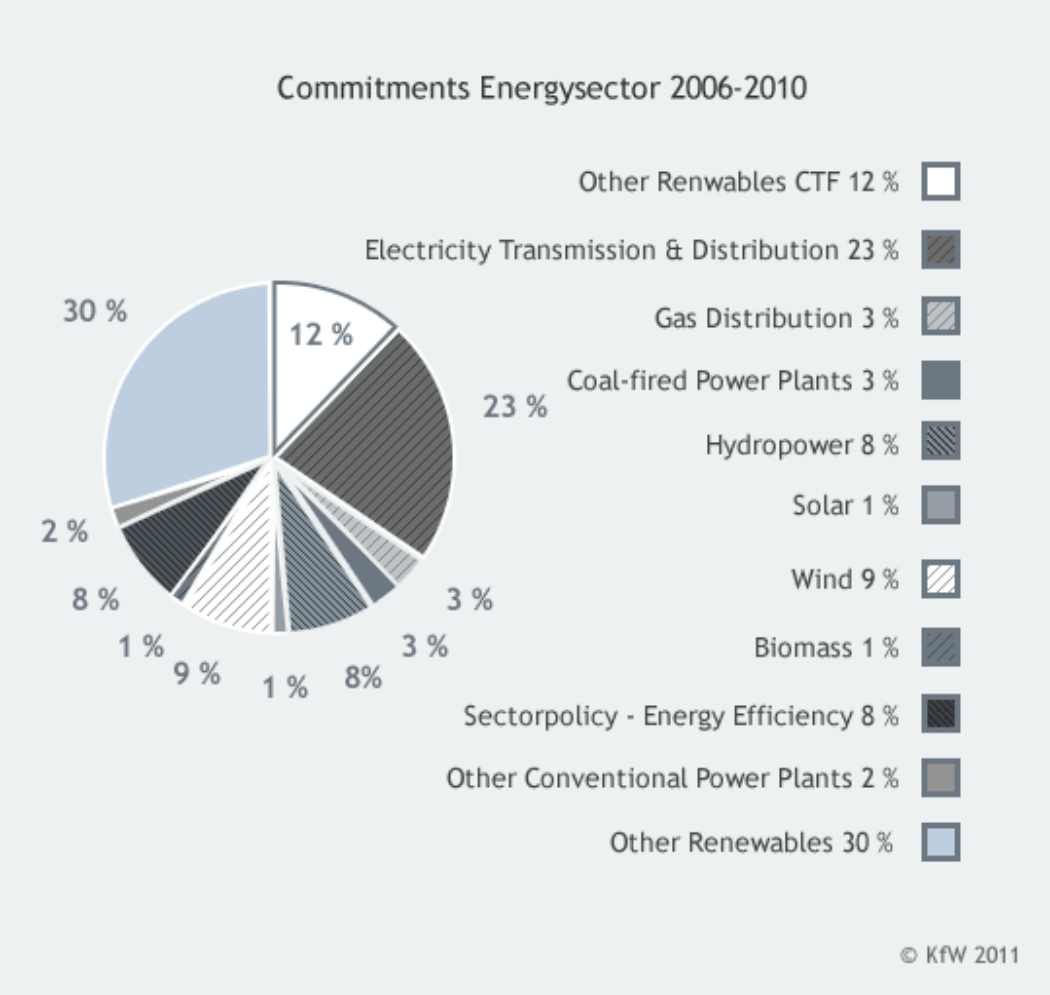

Figure 33: Commitments energy sector of the KfW (source:http://www.kfw-entwicklungsbank.de/ebank/EN_Home/Sectors/Energy/Action_by_KfW_Entwicklungsbank/index.jsp)

6.6. View for the future of Energy Vision

Taking into account the results of this work is to be held on that the product solar carport is in the product life cycle in an introduction phase and can be developed on account of the huge market potential to a gainful product.

There will be positive in the future also the aspect that there should be a constant increase of electric cars.
German government expects that in year 2020 there will be 1 Mio electric cars up to 40 Mio electric cars in year 2050.

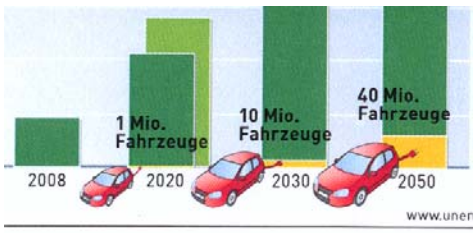

Figure 34: numbers of electric cars up to 2050 (Agentur für Erneuerbare Energien, 2010)

Before this background the economic views are to be considered positive in connection with the conversion of the project " PV carport " by Energy Vision.

The Energy Vision will make through this also a small contribution to the energy turnaround in Germany and in Europe!
Because electric cars which use power from renewable energy sources contribute to the improve of the climate balance. If electric cars would use electricity produced by atomic power stations this will cause a negative impact concerning the climate protection.
The following figure underlines the aspect that electric cars and therefore also PV carports distributed by Energy Vision will support the climate protection in the future.

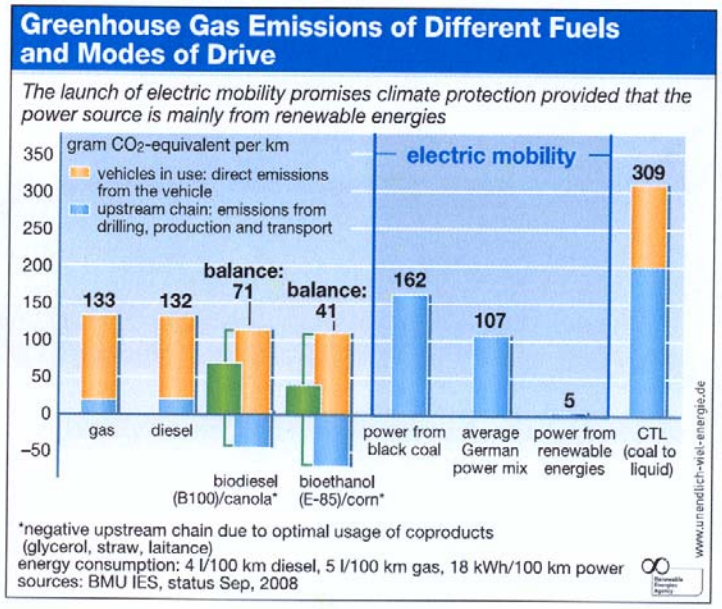

Figure 35: Greenhouse gas emissions and electric mobility (Agentur für Erneuerbare Energien, 2008)

Nevertheless there is also a statement by the German government concerning the future of electric mobility and the positive effects of renewable energy sources for the labour

market in the next 10 – 20 years. Industry assumes that the number of jobs will increase to 500.000 employees by the year 2020, which is twice todays figure.
So the project of Energy Vision is also concerning these effects in a positive surrounding.
The use of RES and therefore also of PV carports will reduce the import of fossil energy sources and as the figure below demonstrates there will be a reduction of imports of fossil energy sources up to 2020 in the amount of 22,6 billion Euro.

Furthermore there will be expected avoided external costs by reduction of climate damages in the height of 6,3 billion Euro.

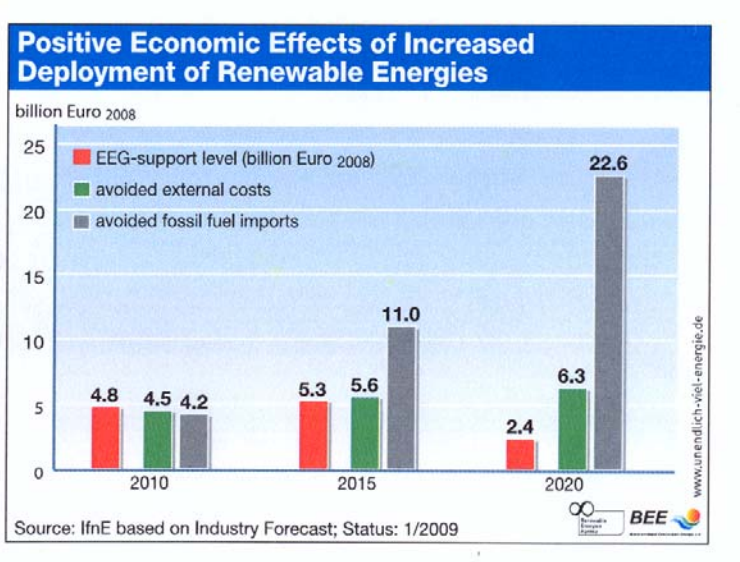

Figure 36: Positive economic effects of increased deployment of RES (Agentur für Erneuerbare Energien, 2009)

All these facts underline that RES are a good business in future and RES have a positive balance sheet with regard to the economic aspects.

Therefore PV carports managed within the project of Energy Vision should be part of this excellent outlook.

Acknowledgements

At this point I may owe all advisers and in particular the management of this course at the TU Vienna, Mr. Prof. Dr. Haas, very warmly for the patience and the intensive care.

Furthermore, I would also like to owe my co-author, Mr. Samir Al Wakeel for the creative and interesting talks in connection with the common production of this thesis.

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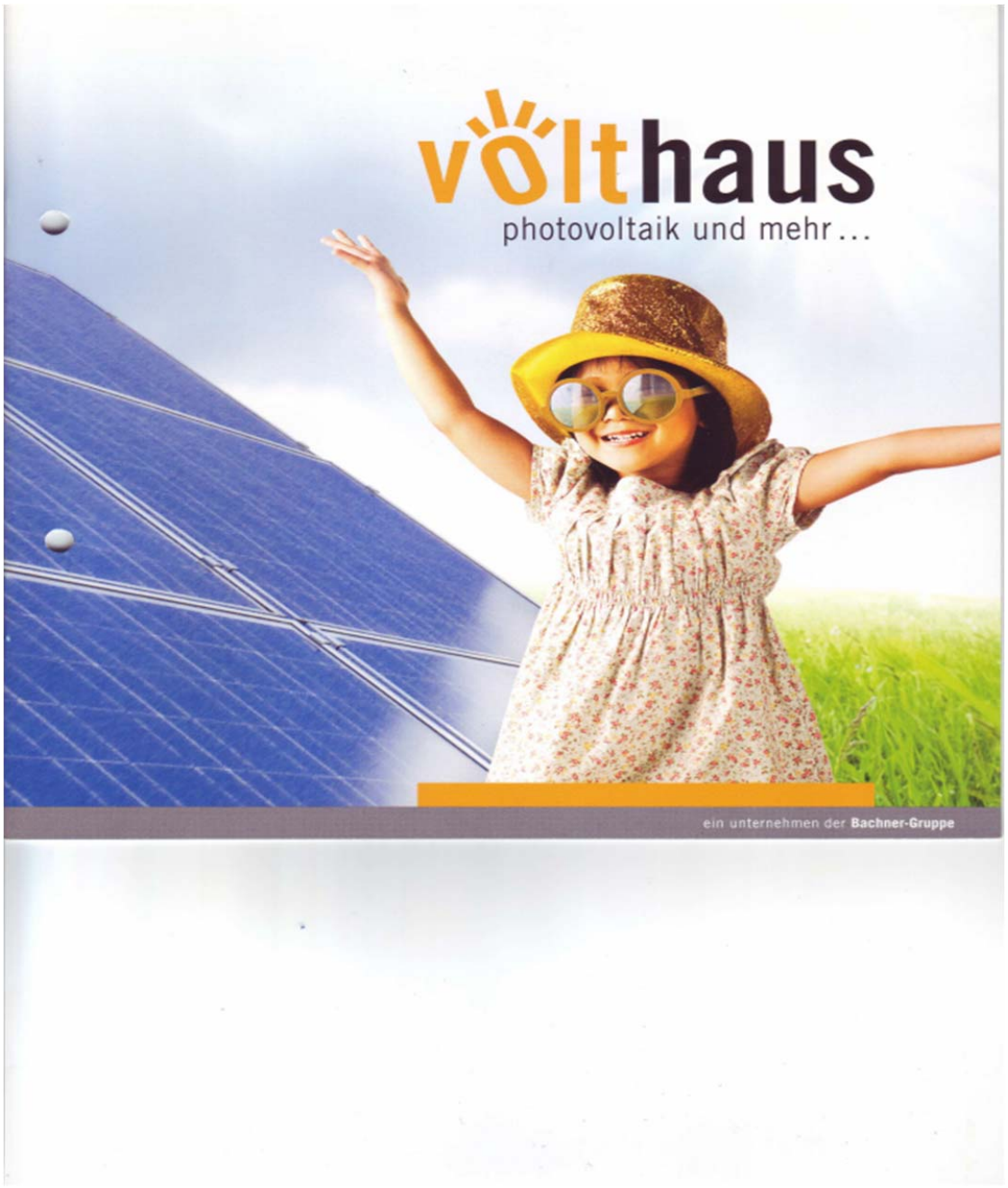
Annexes

Annex 9.1


völthaus
photovoltaik und mehr...
ein unternehmen der Bachner-Gruppe

Sonne tanken.

Die Mobilität der Zukunft steht vor der Tür.

„Ein Elektroauto mit Solarcarport – warum eigentlich nicht? Ich bin ein Überzeugungstäter und möchte andere neugierig machen."

Lothar Eichenlaub, Fachlehrer

Die Anlage

Ort:	Haslach
Gesamtleistung:	4,8 kWp
Ausrichtung:	Südsüdost
Module:	CNPV
Anzahl Module:	24
Wechselrichter:	Kaco
Jährlicher Ertrag:	4.565 kWh

Lothar Eichenlaub ist ein Pionier. Nicht nur, dass er aufgrund der eingeschränkten Parksituation eines der ersten Solarcarports in der Umgebung plante. Obendrein erweiterte er seinen Fuhrpark um ein Elektroauto für den Arbeitsweg, Einkäufe und andere Kurzstrecken. Angesichts steigender Spritpreise und der Endlichkeit der Ölquellen ist Eichenlaub überzeugt, dass der Batterietechnik die Zukunft gehört. Mit seinem Carport und dem E-Fahrzeug will der Haslacher seinen Beitrag leisten: „Es ist ein Schritt in die richtige Richtung. Wenn nicht mehr einsteigen, geht die Forschung nicht weiter", sagt er. Seine Ökobilanz stimmt. Gemeinsam mit der 2004 in Betrieb genommenen Photovoltaikanlage produziert er den Strom für den Tank selbst.

Annex 9.2

Distribution plan-Sales planning (piece) - Germany

	Products / Services	Date of payment (0-360	retail price net	Currency	% USt	Jan-12 (piece)	Feb-12 (piece)	März-12 (piece)	April-12 (piece)	Mai-12 (piece)	Juni-12 (piece)	Juli-12 (piece)	Aug-12 (piece)
1	Carport Sunsurprise	21	4.679,00	EURO	19,00 %			3,00	14,00	14,00	16,00	16,00	17,00
2	Carport Nizza	21	5.689,00	EURO	19,00 %		1,00	2,00	12,00	16,00	17,00	19,00	20,00
3	Carportanlage Taifun	21	185.000,00	EURO	19,00 %								
4	Carportanlage Athen	21	386.000,00	EURO	19,00 %								
5	Carportanlage Superiore	21	978.000,00	EURO	19,00 %								
6	Carportanlage Roma	21	1.534.564,00	EURO	19,00 %								
7	Carport Sunsuper		3.900,00	EURO	19,00 %			1,00	3,00	5,00	12,00	14,00	14,00
8	Development	21	130,00	EURO	19,00 %				1,00	2,00	3,00	3,00	3,00
9	Consulting	21	130,00	EURO	19,00 %					20,00	30,00	30,00	30,00
10	Design	21	130,00	EURO	19,00 %				1,00	1,00	2,00	2,00	3,00

Distribution plan-Sales planning (piece) - Germany

	Products / Service	Sep-12 (piece)	Okt-12 (piece)	Nov-12 (piece)	Dez-12 (piece)	2012 (piece)	2013 (piece)	2014 (piece)	2015 (piece)	2016 (piece)
1	Carport Sunsurprise	19,00	21,00	23,00	24,00	167,00	180,00	190,00	230,00	250,00
2	Carport Nizza	18,00	22,00	26,00	29,00	182,00	190,00	210,00	240,00	260,00
3	Carportanlage Taifun						2,00	3,00	4,00	5,00
4	Carportanlage Athen						1,00	2,00	3,00	4,00
5	Carportanlage Superiore						1,00	2,00	3,00	4,00
6	Carportanlage Roma						1,00	1,00	1,00	2,00
7	Carport Sunsuper	16,00	15,00	20,00		100,00	190,00	196,00	178,00	199,00
8	Development	4,00	5,00	5,00	5,00	31,00	43,40	52,08		
9	Consulting	40,00	50,00	50,00	50,00	300,00	403,00	523,90		
10	Design	4,00	4,00	4,00	4,00	25,00	32,50	42,25		

Annex 9.3

Profit and loss account

[EURO]

	Bezeichnung	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12	Nov-12
1	Revenues		5.689	29.315	145.734	179.020	222.927	242.105	252.603	259.943	289.587	341.201
2	Activated self-service											
3	Other operating income				600	1.200	1.800	2.400	1.800	3.000	3.600	3.600
4	Direct cost		3.413	17.589	87.284	105.618	131.026	142.533	148.754	152.222	169.150	200.119
5	Gross profit		2.276	11.726	59.050	74.602	93.701	101.972	105.649	110.721	124.037	144.682
6	Other operating expenses				20.368	12.068	11.918	12.418	12.418	14.193	12.918	12.918
7	Valuation allowance for account				729	895	1.115	1.211	1.263	1.300	1.448	1.706
8	Depreciation				4.422	422	422	422	422	422	422	422
9	Warranty											
10	Active RAP expenditure											
11	Provisions											
12	Total Expenses				25.519	13.385	13.455	14.051	14.103	15.915	14.788	15.046
13	Operating profit		2.276	11.726	33.531	61.217	80.246	87.921	91.546	94.806	109.249	129.636
14	Interest income											
15	interest expense				17							
16	interest result				-17							
17	Extraordinary income											
18	Extraordinary expense											
19	AO result											
20	Preliminary earnings before taxes		2.276	11.726	33.514	61.217	80.246	87.921	91.546	94.806	109.249	129.636
21	Taxes E/E				17.581	22.650	29.691	32.531	33.872	35.078	40.422	47.965
22	Net income / -deficit		2.276	11.726	15.933	38.567	50.555	55.390	57.674	59.728	68.827	81.671
23	Distributions											
24	Reserves											
25	Balance sheet profit		2.276	11.726	15.933	38.567	50.555	55.390	57.674	59.728	68.827	81.671

Profit and loss account

[EURO]

	Bezeichnung	Dez-12	2012	2013	2014	2015	2016
1	Revenues	284.947	2.253.071	5.994.951	7.746.034	9.502.294	12.875.11
2	Aktivated self-service						
3	Other operating income	3.600	21.600	30.240	36.288		
4	Direct cost	166.366	1.324.075	3.559.616	4.599.398	5.701.376	7.725.071
5	Gross profit	122.181	950.596	2.465.575	3.182.924	3.800.918	5.150.047
6	Other operating expenses	12.918	122.137	159.031	189.549		
7	Valuation allowance for account	1.425	11.090	29.975	38.730		
8	Depreciation	422	7.800	6.233	10.467	6.292	5.233
9	Warranty						
10	Active RAP expenditure						
11	Provisions	1.800	1.800	2.500	3.000		
12	Total expenses	16.565	142.827	197.739	241.746	6.292	5.233
13	Operating profit	105.616	807.769	2.267.836	2.941.178	3.794.626	5.144.814
14	Interest Income			30.131	68.190		
15	Interest expense		17				
16	interest result		-17	30.131	68.190		
17	Extraordinary income						
18	Extraordinary expense						
19	AO result						
20	Preliminary earnings before taxes	105.616	807.753	2.297.966	3.009.368	3.794.626	5.144.814
21	Taxes E/E	39.078	298.868	850.248	1.113.469		
22	Net income / -deficit	66.538	508.884	1.447.718	1.895.899	3.794.626	5.144.814
23	Distributions						
24	Reserves						
25	Balance sheet profit	66.538	508.884	1.447.718	1.895.899	3.794.626	5.144.814

Annex 9.4

Liquidity plan

[EURO]

	Designation	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12
1	Opening balance bank			-2.031	-4.509	25.358	80.128	166.789	243.295	312.260	403.706
2	Revenues/ cash receipts from receivables		2.031	18.453	90.249	202.221	262.044	285.972	293.230	323.598	325.966
3	Valuation allowance for account				-729	-895	-1.115	-1.211	-1.263	-1.300	-1.448
4	Deposit interest income										
5	income from divestments										
6	Deposit of loan										
7	Deposit other requirements										
8	Extraordinary income										
9	Change of equity				50.000						
10	Total Cash In		2.031	18.453	139.521	201.325	260.929	284.761	291.967	322.298	324.519
11	Disbursement personnel expenses				6.100	6.100	6.100	6.100	6.100	6.100	6.100
12	Disbursement material		4.062	20.931	51.934	114.777	140.803	162.768	173.316	179.080	191.216
13	disbursement expenses				12.695	11.207	6.923	7.518	7.518	8.203	9.541
14	Disbursement interest expenses				17						
15	Disbursement investment				31.773						
16	Disbursement repayment										
17	Disbursement taxes				6.703	12.243	16.049	17.584	18.309	18.961	21.850
18	Disbursement sales tax net				432	2.228	4.392	14.284	17.760	18.508	18.463
19	Other disbursements										
20	Distributions										
21	Total Cash Out		4.062	20.931	109.654	146.556	174.268	208.254	223.003	230.852	247.171
22	Periods overlap/deficit		-2.031	-2.478	29.867	54.770	86.661	76.507	68.964	91.446	77.348
23	Closing balance bank current account		-2.031	-4.509	25.358	80.128	166.789	243.295	312.260	403.706	481.053
24											
25	Credit line										
26	Overdraft credit line		2.031	4.509							
27											
28	Amount received guarantees/sureties										
29	Credit line with received guarantees/sureties										
30	Overdraft credit line incl. received guarantees/sureties		2.031	4.509							

Liquidity plan

[EURO]

	Designation	Nov-12	Dez-12	2012	2013	2014	2015	2016
1	opening balance bank	481.053	581.703		626.102	2.386.995	4.432.092	7.387.470
2	Revenues/ cash receipts from receivables	382.878	321.717	2.508.359	7.150.027	9.218.376	11.180.94	15.092.94
3	Valuation allowance for account	-1.706	-1.425	-11.090	-29.975	-38.730		
4	Deposit interest income				30.131	68.190		
5	Income from divestments							
6	Deposit of loan							
7	Deposit other requirements							
8	Extraordinary income							
9	Change of equity			50.000				
10	Total Cash In	381.172	320.292	2.547.268	7.150.183	9.247.836	11.180.94	15.092.94
11	Disbursement personnel expense	6.100	6.100	54.900	73.200	94.740		
12	Disbursement materia	219.715	218.058	1.476.661	4.158.434	5.421.728	7.012.691	9.192.834
13	Disbursement expenses	8.113	8.113	79.834	101.822	112.690	628	
14	Disbursement interest expenses			17				
15	Disbursement investment			31.773	3.570	16.303		
16	Disbursement repayment							
17	Disbursement taxes	25.927	21.123	158.750	599.712	992.530	511.594	
18	Disbursement sales tax net	20.667	22.498	119.232	450.753	562.248	700.652	946.191
19	Other disbursements				1.800	2.500		
20	Distributions							
21	Summe Cash Out	280.522	275.893	1.921.166	5.389.290	7.202.740	8.225.565	10.139.02
22	Periods overlap/ deficit	100.650	44.399	626.102	1.760.893	2.045.096	2.955.378	4.953.920
23	Closing balance bank current account	581.703	626.102	626.102	2.386.995	4.432.092	7.387.470	12.341.39
24								
25	Credit line							
26	Kreditlinienüberziehung							
27								
28	Amount received guarantees/sureties							
29	Credit line with received guarantees/sureties							
30	Overdraft credit line incl. received guarantees/sureties							

Liquidity plan

[EURO]

	Designation	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12
31											
32	Vat		1.081	5.570	28.760	35.485	43.760	46.789	47.927	51.127	55.932
33	Input tax		649	3.342	24.368	21.201	26.000	28.282	29.464	30.460	33.434
34	Disbursement sales tax balance				432	2.228	4.392	14.284	17.760	18.508	18.463

Annex 9.5

Balance

[EURO]

	Designation	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12	Nov-12	Dez-12
1	Fixed assets					22.278	21.856	21.433	21.011	20.589	20.167	19.744	19.322
2	Investments				26.700								
3	(accumulates) depriciation				-4,422	-422	-422	-422	-422	-422	-422	-422	-422
4	total fixed assets				22.278	21.856	21.433	21.011	20.589	20.167	19.744	19.322	18.900
5	Stocks												
6	Requirements		4.739	21.171	111.650	132.880	146.714	156.192	164.936	164.553	192.495	219.246	237.361
7	Other requirements												
8	Cash				25.358	80.128	166.789	243.295	312.260	403.706	481.053	581.703	626.102
9	Outstanding deposits												
10	Deferred taxes activated												
11	Active RAP Expense												
12	total current assets		4.739	21.171	137.008	213.008	313.503	399.487	477.196	568.259	673.549	800.949	863.463
13	Total assets		4.739	21.171	159.286	234.864	334.936	420.498	497.785	588.426	693.293	820.272	882.363
14	Subsricbed capital				50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000
15	Reserve assetes												
16	Accumulated profit/ deficit			2.276	14.002	29.935	68.501	119.056	174.447	232.121	291.849	360.675	442.346
17	Net result current period		2.276	11.726	15.933	38.567	50.555	55.390	57.674	59.728	68.827	81.671	66.538
18	Total equity		2.276	14.002	79.935	118.501	169.056	224.447	282.121	341.849	410.675	492.346	558.884
19	Pension provisions												
20	Other provisions												1.800
21	Long-term liabilities												
22	Total long-term liabilities												1.800
23	Current account		2.031	4.509									
24	Liabilities L/L				56.218	63.021	78.139	84.986	88.687	92.178	100.823	119.249	99.166
25	Other liabilities				5.635	13.380	20.770	24.925	24.570	33.715	38.505	38.505	36.105
26	Sales tax liabilities		432	2.660	6.620	18.676	32.044	36.268	36.971	39.130	43.165	48.008	46.289
27	Tax liabilities E/E				10.878	21.285	34.927	49.873	65.436	81.553	100.125	122.164	140.118
28	Personnel liabilities												
29	Deferred tax passivated												
30	Passive RAP income												

Balance

[EURO]

	Designation	2012	2013	2014	2015	2016
1	Fixed assets		18.900	15.667	18.900	12.608
2	Investments	26.700	3.000	13.700		
3	(accumulates) depriciation	-7.800	-6.233	-10.467	-6.292	-5.233
4	total fixed assets	18.900	15.667	18.900	12.608	7.375
5	Stocks					
6	Requirements	237.361	364.712	484.642	611.429	839.873
7	Other requirements					
8	Cash	626.102	2.386.995	4.432.092	7.387.470	12.341.39
9	Outstanding deposits					
10	Deferred taxes activated					
11	Active RAP Expense					
12	Total current assets	863.463	2.751.707	4.916.733	7.998.898	13.181.26
13	Total assets	882.363	2.767.374	4.935.633	8.011.507	
14	Subsricbed capital I	50.000	50.000	50.000	50.000	50.000
15	Reserve assets					
16	Accumulated profit/ deficit		508.884	1.956.602	3.852.501	7.647.127
17	Net result current period	508.884	1.447.718	1.895.899	3.794.626	5.144.814
18	Total equity	558.884	2.006.602	3.902.501	7.697.127	
19	Pension provisions					
20	Other provisions	1.800	2.500	3.000	3.000	3.000
21	Long-term liabilities					
22	Total long term liabilities	1.800	2.500	3.000	3.000	3.000
23	Current Account					
24	Liabilities L/L	99.166	176.993	228.682		
25	Other liabilities	36.105	131.186	201.974	201.974	201.974
26	Sales tax liabilities	46.289	59.437	87.883	109.406	141.724
27	tax liabilities E/E	140.118	390.654	511.594		
28	Personnel liabilities					
29	Deferred tax passivated					
30	Passive RAP income					

Balance

[EURO]

	Designation	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12	Nov-12	Dez-12
31	Total short-term liabilities		2.463	7.169	79.351	116.362	165.880	196.051	215.664	246.577	282.618	327.926	321.679
32	Total liabilities		4.739	21.171	159.286	234.864	334.936	420.498	497.785	588.426	693.293	820.272	882.363

Annex 9.6

Economic indicators

	Designation	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12
1	Profibility indicators										
2	Return on sales (%)		40,0	40,0	10,9	21,5	22,7	22,9	22,8	23,0	23,8
3	operating results/turnover(%)		40,0	40,0	23,0	34,2	36,0	36,3	36,2	36,5	37,7
4	Annual surplus/ total assets (%)		48,0	55,4	10,0	16,4	15,1	13,2	11,6	10,2	9,9
5	Operating results/ total assets (%)		48,0	55,4	21,1	26,1	24,0	20,9	18,4	16,1	15,8
6	Return on equity(%)		100,0	83,7	19,9	32,5	29,9	24,7	20,4	17,5	16,8
7	Operating results/equity (%)		100,0	83,7	41,9	51,7	47,5	39,2	32,4	27,7	26,6
8	Liquidity indicators										
9	Current ratio (%)		192,4	295,3	172,7	183,1	189,0	203,8	221,3	230,5	238,3
10	Quick ratio(%)		192,4	295,3	172,7	183,1	189,0	203,8	221,3	230,5	238,3
11	Cash ratio(%)				32,0	68,9	100,5	124,1	144,8	163,7	170,2
12	Stability indicators										
13	Financial Leverage		1,1	0,5	1,0	1,0	1,0	0,9	0,8	0,7	0,7
14	Equity (%)		48,0	66,1	50,2	50,5	50,5	53,4	56,7	58,1	59,2
15	Debt capital (%)		52,0	33,9	49,8	49,5	49,5	46,6	43,3	41,9	40,8
16	Interest-sensitivity (%)				202.820,2						
17	Long-term debt capital/ total assets (%)										
18	Short-term debt capital/ total assets (%)		52,0	33,9	49,8	49,5	49,5	46,6	43,3	41,9	40,8
19	Working Capital / turnover (%)		40,0	47,8	39,6	54,0	66,2	84,0	103,5	123,8	135,0
20	Working Capital / total assets (%)		48,0	66,1	36,2	41,1	44,1	48,4	52,5	54,7	56,4
21	Operating activities indicators										
22	Revenue change (%)			415,3	397,1	22,8	24,5	8,6	4,3	2,9	11,4
23	Change operating results(%)			415,3	186,0	82,6	31,1	9,6	4,1	3,6	15,2
24	Debtor terms(days)		25,0	21,7	23,0	22,3	19,7	19,4	19,6	19,0	19,9
25	Credior terms(days)				16,6	16,9	17,1	17,1	17,2	17,2	17,2
26	Duration of storage (days)										
27	Net cash value										
28	Free Cash Flow		-2.031,0	-2.477,8	-20.133,1	54.769,8	86.660,9	76.506,6	68.964,2	91.446,1	77.347,6
29	Free Cashflow cash value (10 %)		-1.997,7	-2.417,4	-19.483,6	52.579,0	82.534,2	72.289,7	64.653,9	85.066,1	71.397,8
30	Free Cashflow comulated cash value		-1.997,7	-4.415,1	-23.898,7	28.680,3	111.214,5	183.504,2	248.158,1	333.224,3	404.622,0

Betriebsw. Kennzahlen

	Bezeichnung	Nov-12	Dez-12	2012	2013	2014	2015	2016
1	Kennzahlen zur Rentabilität							
2	Umsatzrentabilität (%)	23,9	23,4	22,6	24,1	24,5	39,9	40,0
3	Betriebsergebnis / Umsatz (%)	38,0	37,1	35,9	37,8	38,0	39,9	40,0
4	Jahresüberschuss / Gesamtkapital (%)	10,0	7,5	57,7	52,3	38,4	47,4	39,0
5	Betriebsergebnis / Gesamtkapital (%)	15,8	12,0	91,5	81,9	59,6	47,4	39,0
6	Eigenkapitalrentabilität (%)	16,6	11,9	91,1	72,1	48,6	49,3	40,1
7	Betriebsergebnis / Eigenkapital (%)	26,3	18,9	144,5	113,0	75,4	49,3	40,1
8	Kennzahlen zur Liquidität							
9	Liquidität 3. Grades (%)	244,2	268,4	268,4	362,9	477,3	2.568,9	3.835,1
10	Liquidität 2. Grades (%)	244,2	268,4	268,4	362,9	477,3	2.568,9	3.835,1
11	Liquidität 1. Grades (%)	177,4	194,6	194,6	314,8	430,2	2.372,5	3.590,8
12	Kennzahlen zur Stabilität							
13	Financial Leverage	0,7	0,6	0,6	0,4	0,3	0,0	0,0
14	Eigenkapitalanteil (%)	60,0	63,3	63,3	72,5	79,1	96,1	97,4
15	Fremdkapitalanteil (%)	40,0	36,7	36,7	27,5	20,9	3,9	2,6
16	Zinsempfindlichkeit (%)			4.886.025				
17	Lfr. Fremdkapital / Gesamtkap. (%)		0,2	0,2	0,1	0,1	0,0	0,0
18	Kfr. Fremdkapital / Gesamtkap. (%)	40,0	36,5	36,5	27,4	20,9	3,9	2,6
19	Working Capital / Umsatz (%)	138,6	190,1	24,0	33,3	50,2	80,9	99,7
20	Working Capital / Gesamtkapital (%)	57,7	61,4	61,4	72,0	78,7	96,0	97,3
21	Kennzahlen zur Betriebstätigkeit							
22	Umsatzveränderung (%)	17,8	-16,5		166,1	29,2	22,7	35,5
23	Veränderung Betriebsergebnis (%)	18,7	-18,5		180,8	29,7	29,0	35,6
24	Debitorenlaufzeit (Tage)	19,3	25,0	37,9	21,9	22,5	23,2	23,5
25	Kreditorenlaufzeit (Tage)	17,3	17,2	25,7	17,5	17,5		
26	Lagerdauer (Tage)							
27	Netto-Barwert							
28	Free Cash Flow	100.649,7	44.399,1	576.102,1	1.760.893	2.045.096	2.955.378	4.953.920
29	Free Cashflow Barwert (10 %)	92.198,2	40.362,8	537.183,0	1.455.283	1.536.511	2.018.563	3.075.994
30	Free Cashflow Barwert kumuliert	496.820,2	537.183,0	537.183,0	1.992.466	3.528.977	5.547.541	8.623.535

Annex 9.7

Liquidity plan

[EURO]

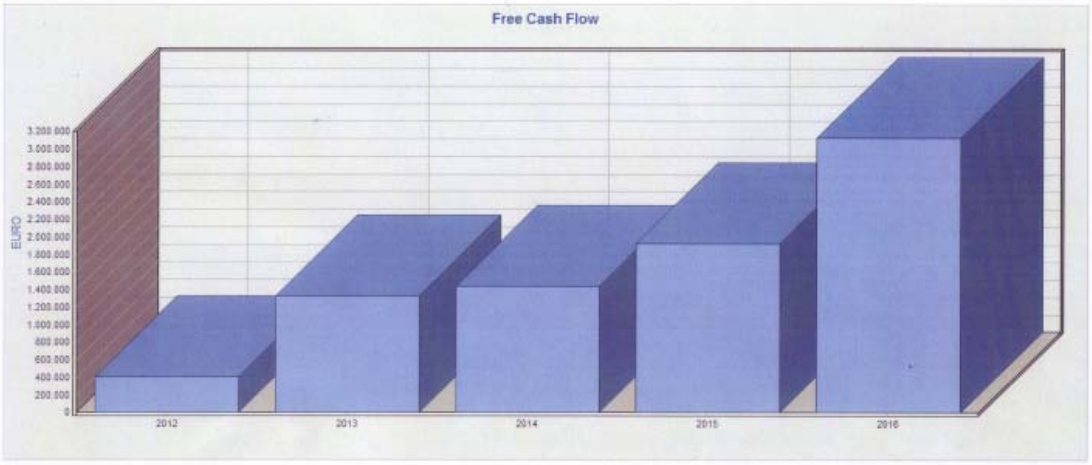
	Designation	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12
1	Opening balance bank	492.588	471.140		459.220	1.809.028	3.301.013	5.230.510			
2	Revenues/ cash receipts from receivables	4.992	2.136	1.091.323	3.196.102	3.924.696	3.962.503	5.363.447			
3	Valuation allowance for account	-6	-6	-4.143	-13.496	-16.114					
4	Deposit interest income				22.682	51.100					
5	income from divestments										
6	Deposit of loan										
7	Deposit other requirements		163	1.283							
8	Extraordinary income										
9	Change of equity			50.000							
10	Total Cash In	4.986	2.293	1.138.463	3.205.288	3.959.682	3.962.503	5.363.447			
11	Disbursement personnel expenses	6.100	6.100	54.900	73.200	94.740					
12	Disbursement material			302.287	906.742	1.124.032	1.233.273	1.637.648			
13	disbursement expenses	8.113	8.113	79.834	101.822	112.690	628				
14	Disbursement interest expenses										
15	Disbursement investment			31.773	3.570	16.303					
16	Disbursement repayment										
17	Disbursement taxes			101.726	436.701	729.874	363.796				
18	Disbursement sales tax net	12.221		108.724	331.645	387.557	435.310	594.633			
19	Other disbursements				1.800	2.500					
20	Distributions										
21	Total Cash Out	26.435	14.213	679.243	1.855.480	2.467.697	2.033.006	2.232.281			
22	Periods overlap/ deficit	-21.448	-11.920	459.220	1.349.809	1.491.985	1.929.496	3.131.166			
23	Closing balance bank current account	471.140	459.220	459.220	1.809.028	3.301.013	5.230.510	8.361.676			
24											
25	Credit line										
26	Overdraft credit line										
27											
28	Amount received guarantees/sureties										
29	Credit line with received guarantees/sureties										
30	Overdraft credit line incl. received guarantees/sureties										

Liquidity plan

[EURO]

	Designation	Nov-12	Dez-12	2012	2013	2014	2015	2016			
1	opening balance bank				7.988	54.782	154.708	290.316	376.169	457.279	438.346
2	Revenues/ cash receipts from receivables		2.031	18.453	90.249	202.221	261.904	220.533	157.523	46.641	84.639
3	Valuation allowance for account				-729	-895	-1.113	-936	-4	-450	-6
4	Deposit interest income										
5	Income from divestments										
6	Deposit of loan										
7	Deposit other requirements										1.120
8	Extraordinary income										
9	Change of equity				50.000						
10	Total Cash In		2.031	18.453	139.521	201.325	260.792	219.598	157.519	46.192	85.752
11	Disbursement personnel expense				6.100	6.100	6.100	6.100	6.100	6.100	6.100
12	Disbursement materia		2.031	10.465	25.967	57.388	70.402	71.638	32.657	15.869	15.869
13	Disbursement expenses				12.695	11.207	6.923	7.518	7.518	8.203	9.541
14	Disbursement interest expenses										
15	Disbursement investment				31.773						
16	Disbursement repayment										
17	Disbursement taxes				15.435	22.805	29.074	24.171		10.241	
18	Disbursement sales tax net				757	3.899	12.684	24.318	30.133	24.712	
19	Other disbursements										
20	Distributions										
21	Summe Cash Out		2.031	10.465	92.726	101.400	125.183	133.744	76.409	65.125	31.510
22	Periods overlap/ deficit			7.988	46.795	99.925	135.608	85.853	81.110	-18.934	54.242
23	Closing balance bank current account			7.988	54.782	154.708	290.316	376.169	457.279	438.346	492.588
24											
25	Credit line										
26	Kreditlinienüberziehung										
27											
28	Amount received guarantees/sureties										
29	Credit line with received guarantees/sureties										
30	Overdraft credit line incl. received guarantees/sureties										

Free Cash Flow



Annex 9.8.

Liquidity plan

[EURO]

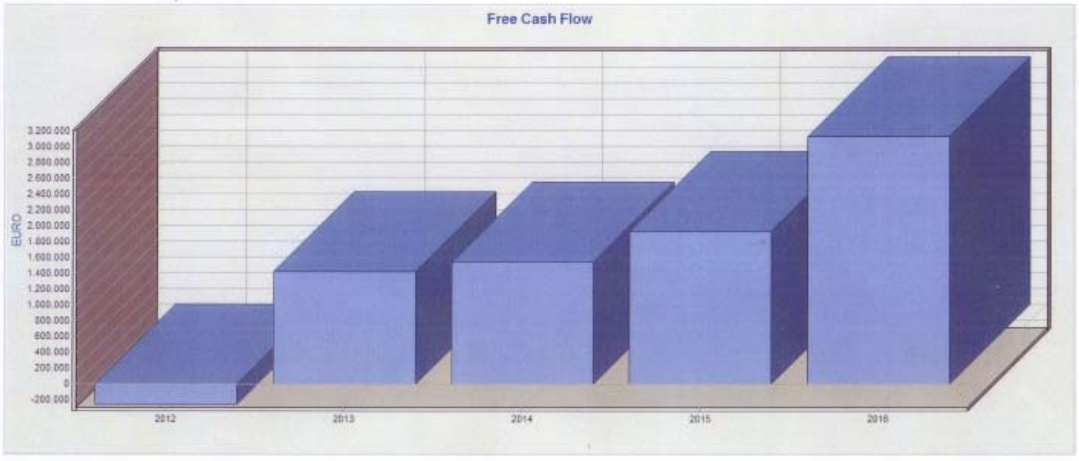
	Designation	Jan-12	Feb-12	März-12	April-12	Mai-12	Juni-12	Juli-12	Aug-12	Sep-12	Okt-12
1	Opening balance bank				7.988	-108.622	-165.336	-151.767	-192.957	-263.470	-255.436
2	Revenues/ cash receipts from receivables		2.031	18.453	90.249	202.221	261.904	220.533	157.523	46.641	84.639
3	Valuation allowance for account				-729	-895	-1.113	-936	-4	-450	-6
4	Deposit interest income										
5	income from divestments										
6	Deposit of loan										
7	Deposit other requirements						15.806	4.173		3.778	29.610
8	Extraordinary income										
9	Change of equity				50.000						
10	Total Cash In		2.031	18.453	139.521	201.325	276.598	223.771	157.519	49.970	114.243
11	Disbursement personnel expenses				6.100	6.100	6.100	6.100	6.100	6.100	6.100
12	Disbursement material		2.031	10.465	25.967	57.388	70.402	71.638	32.657	15.869	15.869
13	disbursement expenses				191.135	189.648	185.364	185.959	185.959	8.203	9.541
14	Disbursement interest expenses				398	1.005	1.163	1.264	1.674	1.903	1.576
15	Disbursement investment				31.773						
16	Disbursement repayment										
17	Disbursement taxes									9.861	
18	Disbursement sales tax net				757	3.899			1.643		
19	Other disbursements										
20	Distributions										
21	Total Cash Out		2.031	10.465	256.130	258.040	263.028	264.961	228.033	41.935	33.086
22	Periods overlay/deficit			7.988	-116.610	-56.714	13.570	-41.190	-70.514	8.035	81.157
23	Closing balance bank current account			7.988	-108.622	-165.336	-151.767	-192.957	-263.470	-255.436	-174.279
24											
25	Credit line										
26	Overdraft credit line				108.622	165.336	151.767	192.957	263.470	255.436	174.279
27											
28	Amount received guarantees/sureties										
29	Credit line with received guarantees/sureties										
30	Overdraft credit line incl. received guarantees/sureties				108.622	165.336	151.767	192.957	263.470	255.436	174.279

Liquidity plan

[EURO]

	Designation	Nov-12	Dez-12	2012	2013	2014	2015	2016
1	opening balance bank	-174.279	-197.089		-210.503	1.214.880	2.799.984	4.731.343
2	Revenues/ cash receipts from receivables	4.992	2.136	1.091.323	3.196.102	3.924.696	3.962.503	5.363.447
3	Valuation allowance for account	-6	-6	-4.143	-13.496	-16.114		
4	Deposit interest income				12.149	40.148		
5	Income from divestments							
6	Deposit of loan							
7	Deposit other requirements		163	53.530				
8	Extraordinary income							
9	Change of equity			50.000				
10	Total Cash In	4.986	2.293	1.190.710	3.194.755	3.948.730	3.962.503	5.363.447
11	Disbursement personnel expense	6.100	6.100	54.900	73.200	94.740		
12	Disbursement materia			302.287	906.742	1.124.032	1.233.273	1.637.648
13	Disbursement expenses	8.113	8.113	972.036	101.822	112.690	628	
14	Disbursement interest expenses	1.362	1.495	11.838	9.262			
15	Disbursement investment			31.773	3.570	16.303		
16	Disbursement repayment							
17	Disbursement taxes			9.861	341.331	625.804	361.932	
18	Disbursement sales tax net	12.221		18.520	331.645	387.557	435.310	594.633
19	Other disbursements				1.800	2.500		
20	Distributions							
21	Summe Cash Out	27.796	15.708	1.401.213	1.769.372	2.363.626	2.031.143	2.232.281
22	Periods overlap/ deficit	-22.810	-13.414	-210.503	1.425.383	1.585.104	1.931.360	3.131.166
23	Closing balance bank current account	-197.089	-210.503	-210.503	1.214.880	2.799.984	4.731.343	7.862.509
24								
25	Credit line							
26	Kreditlinienüberziehung	197.089	210.503	210.503				
27								
28	Amount received guarantees/sureties							
29	Credit line with received guarantees/sureties							
30	Overdraft credit line incl. received guarantees/sureties	197.089	210.503	210.503				

Free Cash Flow



Return on sales %