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MASTER THESIS

TITLE: Renting AC Variable frequency power transformer manufacturers by Cable

MASTER DEGREE: Master in Science in Telecommunication Engineering & Management

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Abstract

The goal, in addition to presenting the final dissertation, is to transfer all this knowledge acquired to professional and personal life through the implementation of this project, which is creating a business: Renting Test Machine. To do this, we have made a Business Plan that will lead us to define the key factors of the project from all points of view.

The methodology is based on the definition of the business model and environment analysis to determine all the factors surrounding the potential market we want to reach. I had to investigate and know what kind of potential customers will shape the future of our company and understand what they need to offer the best product with the best service possible. the search for viable solutions for a clear business idea in my mind has been necessary. Solutions both economically and logistically, which in some cases have not been easy to find.

After defining, explain, implement even some of the project and to calculate, I can say that Test Machine Renting is focused on a niche market very specific that there is no competition and if a great need by customers to cover this type needs and that makes the viability of the project can become a reality.

It has been necessary to make a realistic and methodical Financial Plan, where we concluded that the impact of the initial investment will be strong, but if we overcome, we have shown that this is a profitable business that can generate profit.

In conclusion, Test Machine Renting has a clear business idea and has some potential customers with important needs and we cannot waste the opportunity and why we chose this topic as a final dissertation.

Tu em vas ensenyar
que si els altres podien,
jo també.

Tu em vas educar
dient-me que els límits
se'ls posa un mateix.

I jo et vaig dir que
aconseguiria allò que volia
a la vida, lluitant cada dia.

Tu fas de mi una
persona millor cada dia
Tu fas que la vida sigui
més fàcil i amena
Tu has impulsat les ganes
de tancar aquest capítol
de la meva vida.

Gràcies família.
Sense vosaltres això
no hagués estat possible.

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INTRODUCTION

I designed this final project as an exercise that brings together the knowledge acquired during the Master with other activities and complementary disciplines themselves, as the Master in Management by EAE (EMBA), which have been developing for some time in my daily work, both in the industrial world and the position of Plant Manager an important industrial company in the metal sector.

The goal, beyond presenting the corresponding Work Master's Thesis is to incorporate all this knowledge in my DNA, both personal and professional, through the process of preparation of this work, including the additional activities required to complete and, and why not the development of the business idea itself, as well as propose attractive solutions to a market generally unknown.

It has followed a standard method Business Plan to develop the project. I have analysed the proposed business model, analysis of the environment through various tools to place the company in a special context and have conducted a market survey to meet the concerns and needs of major potential customers.

Then, has proposed a strategy chapter to define and guide the project and the study of the marketing mix of our business where we define the product and its price.

In the chapter on Human Resources we have defined the structure, main functions and personnel costs required to start this project and Operations Plan defined the provision of customer services and platform requirements and the procurements to refine the product and services that Test Machine Renting will offer.

Finally, in the Financial Plan an exercise feasibility of the project, which is part of Plan expected sales, the investment plan, the balance sheet, income statement and the Treasury is made.

After performing the Business Plan, we can conclude that Test Machine Renting can be a profitable business if it exceeds the first year of life, the year will be complicated by the need for a large initial investment.

Likewise, it is a project that brings me ingredients I need in my daily professional work, continue developing myself professionally, but also personally.

CHAPTER 1. EXECUTIVE SUMMARY

The executive summary is the first part of a business plan. It serves to provide an overview of the project to the reader, so you can have a correct understanding with a quick reading of it, about the business and how it will work. In addition, the objective is to achieve capture the attention and interest of the reader for the entire project, and that, consequently, continue reading the rest of the project.

It is quite common that the reader of a business plan decides to read only the executive summary, to decide about whether you are interested in learning more about the project, or, on the contrary, he decides he does not care business. Therefore, we will translate at this point all the essentials of the project, trying not sweetened or decorate at all the concept of company that we want to undertake.

Test Machine Renting (TMR) aims to be an innovative option of renting test equipment for medium-voltage cables for manufacturers in the electricity sector, to provide them security to perform all those mandatory testing without worrying about the high cost of acquisition or maintenance of test equipment.

Currently manufacturers find great difficulty finding specialized equipment manufacturers for their products and especially for testing medium voltage cables long lasting as they must perform a custom design and manufacturing costs thereof they are very high. Also found that during a trial may be the case of equipment failure and left without options to continue, hauling them significant losses because without these tests cannot open markets, approved with potential customers or make innovation about their products.

Test Machine Renting offers the option of renting test equipment responding to their needs of the moment: in this way, the manufacturers will not be in the dilemma of having to acquire highly specialized equipment which subsequently no longer serve them for other tests, in addition to response through service maintenance and troubleshooting, and replacement equipment if it could not be repaired.

Test Machine Renting is a start-up company that aspires to be in liaison with its clients with a delocalized and difficult market where there are no solutions of moderate costs.

CHAPTER 2. BUSINESS MODEL

In this chapter based business model that is based Test Machine Renting and reasons why I think it is necessary it will be explained.

2.1. Business idea

The value proposition is relatively simple and will detail it below.

I think there is now a real need to provide service professional attention to all manufacturers of electrical medium voltage cables seeking professional help to continue to develop through innovation of its products without the need to make large outlays of money and facilitate the resolution their problems with computers that do not have the "Know How" necessary.

The technological evolution of its products is necessary for them, opening markets, future customers and creating an image of its global business.

To do this, it is essential to have the most advanced testing equipment, which allow testing the product and extrapolate its behaviour over time. Only then they can ensure that your product will have the expected behaviour in the market and its customers will choose their product before the competition. The current problem of manufacturers lies in the design of such equipment, which must be made to measure the test, the high purchase cost of components and lack of knowledge to deploy personnel of the company.

Specifically, Test Machine Renting, uses its technology to develop type test equipment for electrical cables medium voltage variable frequency, so this allows us to unify the needs of our customers and offer the best equipment leasing for your needs.

Our company makes a thorough check of equipment before being sent home client and a periodic maintenance, which guarantee full functionality. We also have additional services such as turnkey, where the customer does not care about the installation, connection and commissioning facilities, renting ancillary facilities that are necessary for the test or service Express breakdowns where repairs or equipment is replaced in minimal time.

Based on the above we should ask what would be the main reasons for use and consequently, what would be our competitive advantage. The answer is to cover a current unresolved need. Went on to detail the competitive advantages:

- Difficulty in designing and implementing equipment medium voltage variable frequency: high power at high frequency.
- High cost of components generates a high investment.
- Know How low electrical manufacturers for this type of equipment. Ignore this technology.
- Incompatibility of these in several trials: depending on the test voltage and the length of the test sample equipment characteristics change. This

translates to manufacturers in a long depreciation of the equipment, as they can only cover part of all possible trials.

- As implementers of this technology, we can design more versatile equipment for various clients. This allows us to make an investment in the long run, lower than our own customers.

However, if our range of equipment is not enough, we can redesign equipment have returned to our facilities after a service and adapt to other customers with less investment.

Other competitive advantages are derived from our fault resolution service to the customer.

Normally, a manufacturer of electrical cable, makes the design of the test equipment and purchase components, manufactures and puts it up, yet when a major fault, Test Machine Renting occurs, offers lower resolution time fault, because of our experience and knowledge of this technology and our park components and spare parts.

Our value creation will be aimed at solving a current unmet need, which is for all those manufacturers of electrical medium voltage cables, which by their lack of knowledge, dedication and / or investment capacity has a solution for perform this type of testing that open new markets, new customers and help improve their knowledge of the product itself.

2.2. Previous analysis

Once conceived the idea, it is necessary previously to analyse it and check it against the current reality.

The prospects of success or not of the same depend heavily on the real need in the market, to find a blue ocean in which a lack of competition and the ability to fill a need give the real possibility of creation and growth of the project.

CHAPTER 3. ANALYSIS OF THE ENVIRONMENT

This chapter aims to analyse using two tools like Pestle analysis and Porter's 5 forces, all types of internal and external factors around our business idea.

3.1. Analysis PESTEL

PESTEL analysis is a tool for strategic planning to define the context of a campaign or business idea. Then we will analyse the contexts that are going to influence the development of our business idea.

3.1.1 Politicians

The current political situation is currently somewhat uncertain by the confluence of different events:

In Spain, the existence of a government ousted in Catalonia due to the so-called "Procés" by applying Article 155 of the Spanish Constitution until a few weeks ago has paralyzed decision-making in many areas of life and business.

There have been cuts in all business areas, so that investments have been hampered by the political context. This affects companies studied in detail the investments to be made and the returns they make to the company. Seen from this perspective, our business idea becomes necessary to offer an alternative to a real problem.

In Europe, the UK departure of the European Union (BREXIT) generated many uncertainties. This decision will influence the movement of people and trade relations. We'll have to wait to see how the process and possible agreements that are reached between the UK government and the EU develops. Again, the above affects the difficulty of choosing job offers, being necessary to work .... While this entails difficulties in reconciling personal and professional life.

Internationally there is also political factors of uncertainty and change, as the new president in USA creates a climate of confusion and uncertainty affecting all decisions and markets. We understand that this situation does not directly affect our business idea form, but any economic movement of this magnitude in the United States, will affect one way or another to the world. Therefore, we must be aware of the possible implications in Spain.

3.1.2. Economic

We have assessed current economic issues that could affect our business idea and, consequently, their real or not viable.

The economic situation in Spain has not been ideal for most companies remains critical for many in the last ten years. In the current context, everything it indicates that the country is beginning to emerge from the crisis. This implies positive and negative factors that we will detail:

Negatives: Many companies still need our services, do not have the financial capacity to afford it. The macro economic situation in Spain, makes many companies are not sufficiently sanitized. Here again we will not be a business option.

Positives: Companies that are improving their results begin to need professionals to facilitate their solving new challenges to help them open market and deepen the current and are willing to make small investments for it. This assumes that there are more likely to need by our target customers.

3.1.3. Social

An important barrier that we find is the socio - cultural reality Spanish.

DNA businesses and Spanish families is the predilection of buying vs. renting. The most influential case we find ourselves in the real estate sector, where even today, consumers prefer to invest in buying than renting.

Extrapolated to the business sector, although to a lesser extent, investment companies initially contemplated as a purchase, although the market is evolving and increasingly are seeking new ways to reduce costs and investments that are not entirely necessary.

Test Machine Test will have to deal with this social context and convince them that the equipment leasing is a better option compared to purchasing them through the ROI. This will be key factor for the company.

3.1.4. Technology

There are currently many technological advances that will help us provide reassurance and confidence to companies that require our services.

From remote connections to computers, called VoIP, data transfer tests, Big Data, among many other options depending on the requirements of our customers. At all times, despite the distance, from mobile devices or computers, we can connect with the customer and with our equipment to provide the best and fastest possible response.

Recent technological factors help and facilitate our work, both daily and our business idea.

3.1.5. Legal

Our relationship with customers will be flexible and comprehensive. A legal level we must consider the drafting of contracts for services and products we offer.

Any contract of renting has in common and we have a format that satisfies both our customer and our company.

It is important that the contract very well set the duration, the products and services offered in compliance with it, services that are excluded and the cost of renting.

3.2. Porter's 5 Forces

This analysis is a model that establishes a framework for analysing the level of competition within an industry, and to develop a business strategy. Figure 3.1 shows to mention the factors involved and within the chapter had to be detailed more specifically.

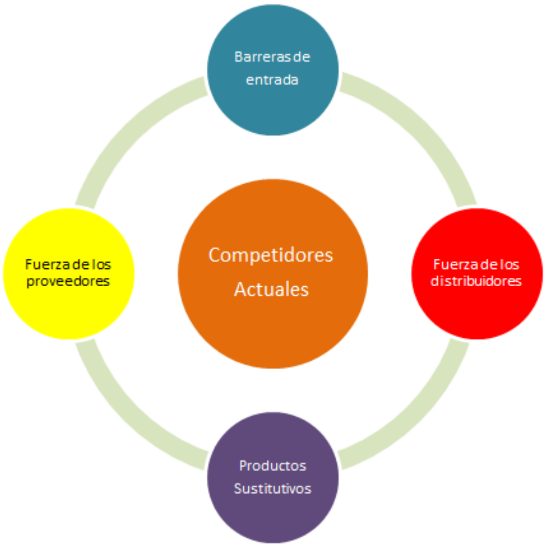

Fig. 3.1 five forces model of Porter (see [1])

3.2.1. Bargaining power of buyers or customers

In Spain, there is no official provider of the service we provide; therefore, costs and conditions are not subject to a comparison with other companies and are not fixed by the sector.

Bargaining power cost is not in the hands of customers.

3.2.2. Bargaining power of suppliers or vendors

In our case, our suppliers may be those manufacturers of electronic components or equipment suppliers with whom we negotiate a good cost and service their products.

Much of the success of our business idea may lie in a good negotiating costs and delivery times of components, equipment and spare parts for our equipment. If we want to give a high-quality service, we have some suppliers that meet our needs.

3.2.3. Threat of new entrant's competitors

Currently there is no known in our business, especially focused on test equipment cable medium voltage very specific competition. If, in addition, our idea is based on the renting of these equipments, differentiating our product and service is clear and creates a barrier in the face of potential competition.

3.2.4. Threat of substitute products

Our company is based on differentiation or specialization, and in the absence of competition for similar or substitute products.
There are international companies that offer similar at a much higher cost technology, but never offered any related service or substitute our service leasing.

3.2.5. Rivalry among competitors

The rivalry defines the profitability of the sector and in our case, our activity.

The analysis of the previous four forces, in our case makes us think that there is no real competition in the niche market that we intend to cover.

This leads us to believe that well-managed business can be profitable.

CHAPTER 4. MARKET RESEARCH

This chapter is intended to investigate the needs of our future customers and see if our business idea such as we conceive may have a niche market, for now, not covered. It has conducted a market study and analyse all results and conclusions out of it.

4.1. Survey design

For the design of the survey it is necessary to consider several factors that go trying according to the following phases:

- Formulate objectives and hypotheses
- Set the intermediate variables (dimensions we want to analyse)
- Operationalize the intermediate variables, leading to questions serve as indicators
- Complete list of questions and answers
- Data collection and tabulation
- Assessment and analysis of results.

4.1.1. Goals

The objective of this survey is to do a market study that allows us to know the intentions, opinions, preferences and habits of our potential customers and even how to approach certain issues so that they can discuss together and draw conclusions that allow us to demonstrate product differentiation that we will offer it attractive enough for consumers.

The survey I have prepared for the market study to introduce our product is focused on companies in the electricity sector and more particularly to manufacturers of medium voltage cables.

4.1.1.1. Intermediate variables to establish the situation

The survey was sent to a group of some 50 companies. Through platforms such as Linkedin I have been able to contact the purchasing, CEO's and CCO's and has passed the following link them to answer the survey. Due to time constraints, the participation rate has not been as expected, but I think it is a good starting point and the results may be valid enough for this project. Then the link shown to the survey (see [2]).

The questions are focused with an initial portion of the status of the respondent company, part of its status inquiry on similar equipment and a portion of inquiry into variable frequency equipment.

Questions have been raised as follows:

1. Does your company manufactures electric cable MV?
    a. Yes
    b. Do not

2. If you answered yes to the previous question, how many years have you been in the manufacturing sector MV cables?
    a. Less than 10 years
    b. Between 10 and 20 years
    c. More than 20 years

These first two questions are focused on making sure we are doing the survey to persons or suitable companies and know the status of the same as the product we offer.

3. Which equipment must perform electrical tests for MV cables?
    a. AC transformers
    b. DC transformers
    c. resonant equipment
    d. High Frequency Transformers
    e. Variable frequency transformers
    f. Any

4. If you have these equipment's, what purpose use equipment which has?
    a. To access new customers
    b. R & D
    c. For orders
    d. To achieve / maintain Certifications

5. Do you have an external service or support for this test equipment?
    a. Yes
    b. Do not
    c. In some cases

These three questions are intended to know the status of our future client as park equipment you have, and for what purpose, and inquire about their strategy.

6. Do you know of variable frequency equipment and how it can benefit your company?
    a. Yes
    b. Do not

7. Does your company have a design department of electrical test equipment for MV cables?

    a. No, it is not necessary
    b. No, but we are proposing
    c. No, its own maintenance department
    d. Yes

These two questions are focused on whether our future client knows the technology we offer and if you have internal resources to meet current and future projects.

8. What investment you are or would be willing to perform for a variable frequency equipment?
    a. Under 50.000 €
    b. Between 50.001 and 100.000 €
    c. Between 100.001 and 200.000 €
    d. More than 200.000 €
    e. Any

9. How important these tests believed to have for the future of your business? (Rate of 0 to 10, with 0 being none and 10 the highest)

These two questions are intended to meet the scale of respondents as the economic level of a potential investment and the importance they give to this type of testing and equipment company, so we know the approximate starting point of the market.

10. How do you assess to hire the services of a leasing company of electrical equipment MV?
    a. Very satisfying
    b. Depending on the cost
    c. Depending on the value
    d. I'm not interested

11. What else would value a service like this?
    a. The quality of equipment
    b. Time breakdown assistance
    c. The cost of service
    d. Runtime commissioning
    e. Distance

Finally, the last two questions are aimed at obtaining the views of respondents on the approach of renting the equipment they need and really know what our customer needs.

4.2. Presentation of results

To view the results as a graph displayed, see Annexe A. Note that the group consists of responses 30 companies of the 50 that the survey was sent.

4.3. Conclusion of the study

To draw the conclusions of the study, we will conclude the results of each question.

In the first question, we see that it has come largely to the right people, with 86.7% accuracy. That means that the answers to these questions can be conclusive.

In the second question, it is seen that 63% of the companies surveyed are relatively young companies regarding manufacturing MV cables, between 10 and 20 years. That makes us think that, as such, are companies wanting to undertake and learn more about your product and the potential they can get. For companies with more than 20 years, with 22%, we assume they will have more experience and alternatives already agreed for this project.

In the third question, we see that the dominant equipment of the manufacturer is a DC transformer, with 27%, followed by AC transformer, with 20% and 20% for companies that do not yet have any such equipment. From these results, we can draw several of the companies surveyed do not have the latest equipment and adapted to the needs of the current market, so the business potential is great. As seen, 10% has a variable frequency equipment. These customers are the first we should go see to offer a change of scenery.

In the fourth question, we see that the answers are matched. Certainly, all such purposes have a certain weight. The least out with 17.3% is the goal of getting new customers and more, get orders, with 34.5%. That means customers can appreciate the effort in this project from its suppliers. What matters, ultimately, it is that they get their purposes.

In the fifth question, we see that 41.7% of companies surveyed already outsource companies to deal with their test equipment, most, like the third question implies, are transformers AC and DC. That tells us who value good maintenance and servicing of this equipment and prefer to do it in the hands of specialists.

In question six it is where we realize that most of them do not know the technology of variable frequency tests or do not know the potential for their businesses. While this initially seems not good news, it may be important if we go with our product, explain its advantages over other equipment on the market.

In question seven, we see that 45% of companies who responded using the maintenance department responsible for this type of equipment, although it has been surprising that 24% of respondents have him as a future option. That means that companies are realizing that it is very specialized equipment and maintenance resources are drifting without Know How. These two values make us think that it is possible a change in philosophy on this issue.

In the eighth question, we see that most respondent’s investment would be around 50.000 to 100.000 €. With this investment in terms of the trial it would not be enough. This equipment is around 100.000 to 200.000 € and therefore the decision to make an investment of this importance without a guaranteed return, it is unintelligent. For this reason, TMR facilitate our customers to have this technology in renting a simpler way.

In the ninth question, we see that the score of 6, including up, groups over 50%. That means that our respondents know variable frequency equipment or have any or have heard talk about the advantages. That's a good starting point for business, seeing these results, we should be able to do business.

In the penultimate question, 35% of the companies surveyed are very successful there is a leasing service equipment. This is our entry gap in the market. Although it is noteworthy that 25.9% and 17.1% would be interested depending on price and price-quality, basic parameters of our activities.

Finally, the last question, would value with 32.3% the cost of the service, with 27.2% of breakdowns and assists with 24.4% the quality of our equipment.

After the survey, we can conclude that there is a market for our business, but success will eradicate at reasonable prices, quality equipment and fast services.

CHAPTER 5. ESTRATEGY

In this chapter, we will discuss the strategy proposed for Test Machine Renting. We are going to focus on defining our mission, vision, goals and values and ethical codes to stop performing a DAFO analysis of proposed business.

5.1. Mission

The mission of our company will be:

Give an innovative high quality service to companies engaged in the manufacture of electrical cables with development needs and growth of its business, by renting equipment and testing facilities to measure providing them confidence and promoting maximum care service to make your satisfactory experience always.

5.2. View

The vision of our business will be as follows:

"Test Machine Renting" wants to be present initially in Spain and in the future in Europe, closer to our customers, giving them facilities flexibility and maximum confidence to opt permanently in our services to give them the technical support they need to manage better opportunities in expanding their business.

5.3. Goals

The objectives must be sensible, clear, measurable and challenging. Let's separate the overall objectives specific to achieve them best:

Specific objectives

- Being a recognized brand in the field of test equipment MV in Spain for the innovative service we offer.
- Increase sales by 5% the first year.
- Achieve a market share of 25% in the first year.

overall objectives

- Achieve a return of 20% annually over the next 3 years
- Increase sales in the next two years 10%
- Achieve a stable market share and growing

5.4. Values and ethical codes

This is important for achieving success in the Test Machine Renting because we want to transmit these values to our customers and we are confident that our customers will be able to value them and appreciate them through the services we offer.

Our values will be:

- Learning
- Innovation
- Trust
- professionalism
- Flexible schedule
- Responsibility

5.5. DAFO

Then the DAFO shown for the proposed business.

Table 5.1. Table DAFO Test Machine for Renting

STRENGTHS	WEAKNESSES
- Broad and flexible schedules attention. - Activity monitored remotely via the Internet - Personalized quality care - Professionals in the electricity sector - differentiated technology of our competitors	- Gain the trust of customers - very innovative product to be introduced into the electricity companies. - Small market niche
OPPORTUNITIES	**THREATS**
- Very innovative product and service - The cost of our services against investment purchase is lower - Trend booming markets - Possibility to have monitored the equipment always to solve any unforeseen. - Possibility of lower costs for returning customers.	- Ignorance of whether the business can succeed. - Capital needed to build the park renting equipment

External analysis

Opportunities:

- Very innovative product and service. Spain officially there is not a service of this nature since it has not opted for such a strategy strongly.

- The cost of our services against investment purchase is inferior. The financial outlay involved in purchasing this type of equipment is very high.

- Trend booming markets. Is country is emerging from a deep crisis.

- Possibility of equipment monitored always to solve any unforeseen. Our customers are in our hands and we have all the information to give excellent service.

- Discounts for returning customers. Customers who often count on our services will benefit from a reduced fee.

Threats:

- Being such an innovative service and product, our business model has a major uncertainty factor.

- Capital to build the park equipment is high. Although we design our equipment with different technology to the one in the market for such equipment, the cost remains high.

Internal analysis

Strengths:

- Broad and flexible schedules attention. The fact that we have the power equipment via the Internet, makes wherever we are can give quality service. We can respond 365 days a year.

- Supervised activity remotely via the Internet. We follow the evolution of our premises equipment to give our customers the security they require and ours.

- Personalized quality care. Our customers can contact the engineer who designed and implemented the equipment with the knowledge of it will be totally personalized and effective.

- Professionals in the electricity sector. I know this sector in which I developed my career for over ten years and understand the needs of a manufacturer of electrical cable in terms of this type of equipment.

- differentiated technology of our competitors. While we use, a technology based on transforming high frequency signals, our competitors use a more obsolete technology.

Weaknesses:

- Gain the trust of customers. It is a challenge to show our future clients we have what we need and our aim is to be fully carefree.

- Very innovative product to be introduced in companies. It is a service and product that many of them known to be based on legislation of the Netherlands.

- Small market niche. There are many companies that manufacture MV wires but not many contemplate the need to evolve through knowledge and improving their product.

CHAPTER 6. MARKETING

Our product such as variable Marketing Mix, aims to satisfy the need of customers, while give them a value to the extent they deem necessary, beneficial and / or useful to use it.

The basic benefits of our services are aimed at the needs of open market and improve the product of our customers.

The components of our service / product are Quality, Brand, name and logo. We will analyse each.

6.1. Quality

A hallmark of our society must be and appear as a product and service quality. People who consider the idea of using our service must clearly perceive that offer quality in all aspects that make up our service professionals, facilities, and equipment care.

6.2. Brand

We expect that our brand is identified with several defining ideas of what we are and want to be: safety, reliability and service

6.3. Name - Logo

The name chosen for our future Test Machine company is Renting (TMR) in defining what we do. We have created a logo that we will identify from now ensuring that our image is displayed.

Fig. 6.1 Logo chosen to represent our brand (see [3])

6.4. Marketing Mix

In this chapter, we will treat all viewpoints relative to the reference product that sets us apart from other potential competitors. Also, we try to make a base price that will later be endorsed with the financial plan.

6.4.1. Product

Within the product chapter, we will focus on the variable frequency transformer 500Hz and all requirements of main and auxiliary system. APPRAISAL will make a proposal and define the solutions adopted.

At ANNEX B, we find the basic electrical fundamentals of a medium voltage electrical cable, recommended to do a good approach to the project.

6.4.1.1. System Requirements and description of the initial problem

The system we are evaluating should enable us to standardize several materials at the same time reducing the testing time by at least 70% and can test all the configurations described in the regulations.

These objective poses problems of a technical and economical then evaluate.

To evaluate the long-term behaviour of the materials used for the manufacture of medium voltage cables there is nothing better than to observe and analyse a wire service during his lifetime. This milestone is not feasible because the life of a cable is estimated at 20 years.

Therefore, it is necessary to simulate the aging undergone with time and conditions of service. There may be differences between the actual final aging and aging with no real parameters and conditions. We simulate aging and achieve the same result.

The standard HD 605-10E (Spanish par with European regulations) describes a test that aims to see the degradation of the material by applying heat and tension in the cable itself. This essay has a total length of 17.500 hours.

Therefore, the assessment of the final state of the material is not possible to last more than two years, greatly hindering approval of new materials. In Annex C, you can consult the regulations for this test contained in the HD 605.

It is very important that the temperature and constant tension persist throughout the aging process, allowing 60h at maximum voltage without samples. This requirement is very important for the system because it requires a very stable technical solution where the duty cycle is very high.

6.4.1.2. Evaluation of proposals adopted solution

In the search for a system that was more efficient in terms of time needed to simulate the final state of a material test and considering the long-term established in the European standard described, has evaluated the possibility of work with different variables on the same test system:

- Frequency
- Low
- Chemical conditions of the water
- Temperature gradient
- Electrical stress

There is a direct relationship between these variables and aging produced, except for the frequency.

Therefore, the solution adopted is to maintain the same test today but looking a frequency appropriate to reduce test time.

First proposed solution: System 50kV AC 500Hz 100KVA

As we have said before is to find conditions that simulate real aging of the cable. Considering that the trial 50Hz 17000h and has been designed with this idea, we must do is find the combination of frequency and time making the final aging is equal to or greater than that described in the UNE HD 620 -10E.

Kema (see [4]) was the first to study to reduce the time to increase the frequency to 500Hz. Found time because the conditions established in 3000H AC to 500Hz, it seemed that we had solved the technical problem but opened the issue of the economic viability of the project: the high cost of a transformer of 100KVA and 500Hz AC 50kV, if necessary we wanted to make several approvals at once, so we had to rethink the technical problem and rejected this option.

Second proposed solution: System 50kV AC 300Hz 100KVA

If the source of the problem is economic only could try to solve it looking a frequency that would allow us to put some less expensive items as the increased frequency of testing directly affects the final cost of the project.

In search of another rate applies in all areas of the project has been proposed 100KVA transformer, 50kV and 300Hz. Reducing the aging time is not the same as 500Hz but still be acceptable for the project (the decrease would continue fulfilling 70% of the time)

To view the technical and economic viability of this option we chose to study the possibility of transforming all elements of 50Hz to 300Hz also were compatible. Thus, the two would fulfil project requirements. Finally, this option was rejected as being 50Hz transformer did not give sufficient guarantees to work continuously in time at a frequency higher than the strength of its design and on the other hand, some of the control equipment as the regulator were also designed to 50Hz. This generated a lot of uncertainty about the response of the equipment at the time, since there is no certainty that the equipment was sufficiently varied substantially stable output frequency.

<u>Third proposed solution: System 40kVA 20kV AC 500Hz</u>

After the first two solutions bankruptcies, due to the technical and / or economic, we had to rethink the project objectives. Only in this way we would be able to find a solution. Opt in this third proposal to maintain the frequency and time proposed by Kema.

Had to give up more than one material approved to reduce significantly the distance of samples and measure it more. It has also been able to give up to age 4.5 and isolates 5,5mm corresponding voltages 27kV and 36kV.

This change goals we have reduced the size of the transformer markedly, from 40kVA to 100KVA and 50kV to 20kV. What if we kept the intensity high secondary transformer required cable length again.

Despite this reduction in the size of the transformer, if we held the current technology to the market that we must do this type of testing, the cost fell well below expected.

So, we decided to look for another different technology to implement the transformer, which is the most delicate of the project.

Known objectives and requirements as well as the solution adopted must now design the whole system to carry out the project.

in Annex D specifies the design submitted by the thermal bath, which is indispensable to test the sample immersed in water at a given temperature. It also sets out the other elements of the test auxiliary elements such as humidity control, the test site, the control unit, transformer and voltage connection.

6.4.2. Price

Revenues basically come for society to receive income from companies that want our services.

Cost differentiation will be given depending on the days of using our service and the contracted service (various forms).
We want to reach price agreements and term component suppliers will need to build our equipments.

We see it in detail:

Table 6.1 Table Price (€ / day except turnkey service € / renting)

	Year 1	Year 2	Year 3
DC Hipot Renting	250	275	300
Renting AC Var. Frequency	1350	1450	1550
Aux leasing products.	100	105	110
Support Express Service	150	160	180
keys in hand service	500	525	550
Renting C & Tan Delta	125	140	150

Based on the price of competition: there is currently no competition as such our product and service, so it is not possible to make a real comparison with the market.

Based on user perceived value: our initial objective involves positioning brand image in the industry and recognition as a leader to meet a latent unmet need.

This requires that our service is used and known by a significant number of people.

We refer to us as a leading company that offers quality service and satisfaction guarantee.

DISTRIBUTION:

Our presence must be in all possible means and platforms in the industry, allowing us to reach as many potential future customers.

social networks, standard advertising and press, will be our communication channels.

COMMUNICATION:

Communication objectives are:

- Market positioning as a leader and innovator in its sector.
- Our logo and brand company identified as quality, reliability and safety.
- Getting SEO, search engines and social networking platforms.

Actions:

Print media advertising specialist, and monthly publications or certain periodicity, aimed at an audience that needs to know new technologies (such magazines as ElectroIndustria, Tecnoenergia, Electric Constructor. See [5]).

In either case, advertising on-line and appearance on all social networks will be critical to our knowledge and brand positioning.

CHAPTER 7. HUMAN RESOURCES

In this chapter, we define the constitution of the company and the organization of it. Also, we delve into the manual functions of the most important positions in our business.

7.1. Constitution of the company

Our company will have to comply with the basic rules of a Limited Company, form with which we will record, which include:

- They must keep a book of inventories and annual accounts, a newspaper (daily log of operations) and a book of minutes to collect all the resolutions adopted by the General and Special Meetings and other corporate bodies of the company. - also, partners shall record book, which shall be recorded the original ownership and transfers of shares.

- Liability limited to the capital contributed. The founders, people who have the status of partner at the time to remember the capital increase and those who acquire any interest paid by non-cash contributions jointly and severally liable to the society and against social creditors of the reality of such contributions and the value attributed to them in writing.

- The main rights of the partners are involved in profit-sharing and equity resulting from the liquidation of the company and participate in social decisions and to be elected as directors.

We grant the registration of our society before a notary and the commercial register. Depending on the capital we will submit our request electronically and paying the associated costs (see [6]).

7.2. Organizational structure

Since we are at the beginning of the formation of the company we want to limit the structure and resources of it. initially two areas differ:

- Operations and Marketing: responsible for the service itself, including logistics, customer service, quality, purchasing and IT.

- Financial and management control: responsible for accounting, treasury management, management control and human resources.

The organizational structure of the proposed company would be:

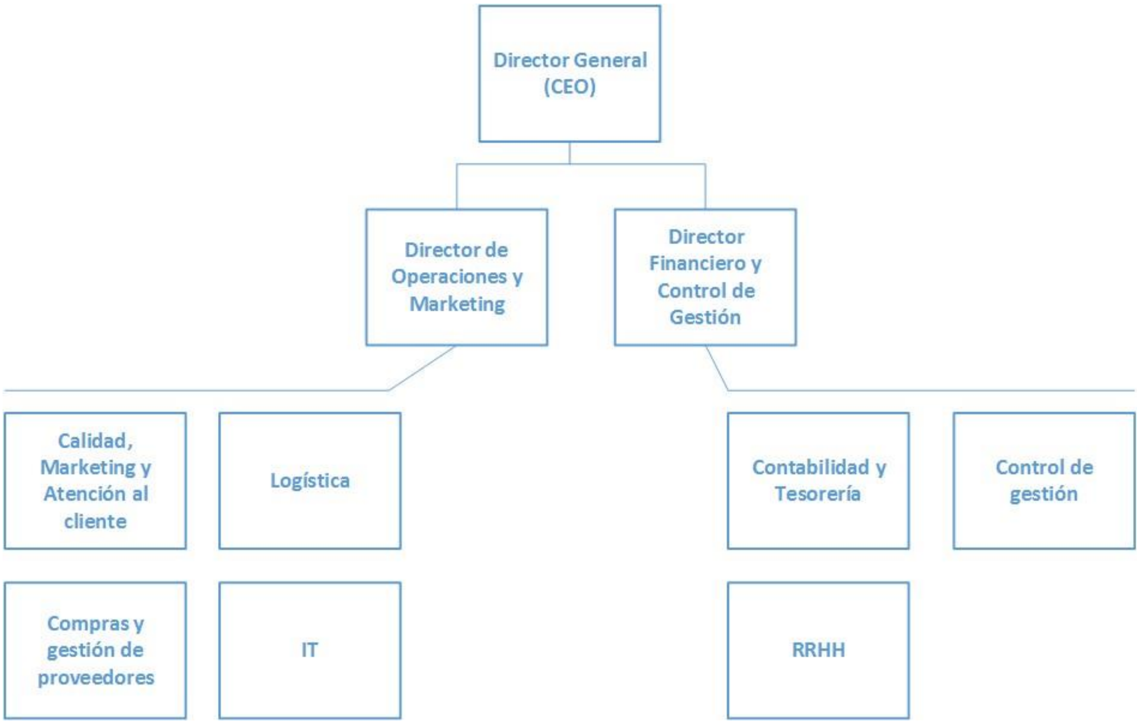

Fig. 7.1 Proposed initial organizational chart

The CEO position will be occupied by myself, Laura Sala. The post of Director of Operations and Marketing would occupy my fellow EMBA, Javier Sanchez, director of operations Assembled Group. The remaining positions will be vacant new hire.

7.3. Function's manual

Below, we list the main functions of key positions within the company.

7.3.1. Executive staff

In this section two manager’s profiles more relevant, except at very CEO described.

<u>CFO - Chief Financial Officer - Functions:</u>

- Coordination of the preparation of accounting and financial statements in accordance with current regulations.

- Design and implementation of a System Management Control including the definition of administrative procedures to ensure the accuracy of the information provided and control thereof, design of budgetary processes, variance analysis, reporting to general management and the board management of the economic and financial situation of the company.

- Economic and Financial Control: Dynamic Analysis of fundamentals profitability, financial situation and assets of the company

- Cash Control: Establishing a control system that allows cash-flow determine at any time the financial needs of the company and possible sources of funding in the short, medium and long term depending on the objectives set by the company, as well as management of any surplus cash.

- Negotiation with financial institutions

- Location of possible grants and subsidies.
- Establish procedures for billing and customer collection and payment terms to suppliers.

- Optimization of fiscal policy of the company.

- Monitoring the relationship with third parties such as financial institutions, external auditors, government or external consultants.

- Feasibility analysis of investments or projects needed to meet company objectives and strategic reorientation.

- Human Resources Management: policy design company personnel management, selection, training and team development.

- Optimization of systems management and coordination of general services.

CMO/COO – Chief Marketing Officer / Chief Operating Officer - Functions

- Define the policy and marketing strategy for the whole of the services offered by the company in the medium and long term.

- Create, define and implement the Plan of Marketing of the company at national level, ensuring compatibility and synergy with the company strategy.

- Anticipate market developments and adapt your marketing strategy to achieve the overall objectives of the company.

- Make a budget forecast for the services offered: definition of commercial margins, sales volume, the distribution of promotional budgets, the budget for advertising, studies, etc.

- Implement operations with the external agency and develop new tools for sales support adapted to a constantly changing market.

- Agreeing marketing actions supported by the data provided by clients and experience with external collaborators.

7.3.2. IT staff

This section describes the functions of IT personnel who will be responsible for implementing much of the objectives of the company, focused on the technical side is described.

Electronics Engineer - Functions

- model, analyse, design, build, program and evaluate circuits and digital systems.

- Analyse, model, selecting, designing, operating and maintaining electronic control systems for industrial processes.

- Select, analyse, simulate, evaluate, calculate and design means for transmitting electromagnetic signals.

- Select, analyse, simulate, evaluate, calculate and design systems and communication networks of electromagnetic signals.

- Select and purchase necessary components to implement the designs resulting from the above functions.

7.4. HR cost structure

This section aims to define the necessary staff and salaries for the first three years.

The company will have a Director of Operations and Marketing also perform the tasks of quality, marketing and customer service.

A Financial and Management Control Director will also direct responsibilities of the Accounting and Treasury Management and Control itself.
Two engineers made designs and assembly and tuning of equipment to be leased.

There will also be a dedicated logistics, both internally and externally, and Shopping.

Finally, the company will have the CEO that will additionally functions and HR director.

With this structure, we will define the initial remuneration.

Table 7.1. Table wages (€ / annual gross)

	Quantity	Year 1	year 2	year 3
CEO	1	45.000	47.000	50.000
CFO	1	39.000	41.000	43.000
COO	1	35.000	37.500	40.000
Engineer	2	28.000	30.000	31.500
Logistics & Purchasing	1	25.000	25.000	26.500

A part of the cost of workers must consider the investment plan the cost of Social Security worker that the company must pay, which is between 32% and 38% depending on the contribution bases of the SS (see [8]).

CHAPTER 8. PLAN OF OPERATIONS

8.1. General process

In this chapter, we will define the operational plan we should run for the provision of product / service to customers.

Our business is in the industrial sector, specifically focused on manufacturers of electrical medium voltage cables.

We offer the service of renting test equipment and are specialized in variable frequency equipment. We can design equipment of up to 1000Hz and 100kV. These equipment's are designed and implemented by our electronic engineers who, based on their experience in the sector have succeeded in unifying the types of tests and create more flexible equipment which allows our client does not make an investment that will return due to the rigidity of current designs and the needs of our customers change and this makes them obsolete with the equipment purchased.

Divide our leasing activity in different types of equipment:

- Power Factor Test (C & Tan Delta) (see [10]).
- DC power transformers for MV and HV cables (HI Pot) (see [11])
- Power transformers for MV variable frequency cables.

The first two types are equipment purchased in the market and will make the service of renting and maintaining them. The third, as we have said, being a equipment with specifications determined by customer needs, we will be responsible for the design and implementation.

8.2. Providing customer services

The service / product will be undertaken as follows:

The customer transmits your needs. Information your project or goal

Customer information, TMR, makes a customer specification:
- Test variables (frequency, power, duration ...)
- Equipment / technology to use: depending on test variables.
- Express service troubleshooting (differential cost): yes / no
- Renting type: only equipment or turnkey (differential cost turnkey).
- Need for auxiliary elements (differential cost): thermal baths, protections, cables, etc.
- Deposit: deposit left by customers to rent any of our equipment is to be returned upon completion of the contract and return the equipment in perfect condition.

Customer specification, TMR checks the options available in your field inventory.

If you have compatible equipment in stock to customer needs, we calculate Renting price and what we provide the customer with the term.

If you have compatible equipment, but this is making another renting:

- We inform the customer of possible equipment availability and the possibility discount if you accept the term.
- If it does not match the customer, we will calculate the cost and time to adapt one of our equipment to be compatible to your needs.
- In any case, we will calculate the price and inform our customer.

If the customer accepts our offer, IT engineers prepare the equipment to be sent depending on the mode, and prepare to go to the customer premises.

8.3. Platform Requirements

This section will explore the requirements of the platform. Location, facilities, and supplies the size of the project will be critical to the success of the company.

8.3.1. Location

The location, in our case, is not a determining factor as most of our clients will be state-wide and hopefully Europe. While it is true that you must meet certain minimum requirements.

With the task of expediting the issuance of our equipment at customer premises, if it's important to have a location that is not isolated from the main roads, good to reach by road or by boat, if necessary and make it easy access for heavy vehicles or semi-heavy.

Another element to consider is the extent of space required. Being low volume equipment, more space of 400m2 not be necessary, at least a beginning.

Therefore, I have considered that serious a good location in the Vallès Occidental. After a selection of industrial buildings in this area, I opted for a ship located in the town of Sabadell.

Fig. 8.1 Location map road of Sabadell (Spain)

As you can see on the map, Sabadell direct input to the C-58, near the AP-7 (France - Valencia) and C-16 (Andorra, France)

The selection of ships in this area and because of our initial budget, I opted for a ship situated in the polygon Can Requite 400m2.

Fig. 8.2 Polygon Can Roqueta situation regarding the city of Sabadell

Fig.8.3 400m2 industrial building in Can Roqueta (Sabadell)

Given the importance of our equipment is monitored at any time, it is vital that the polygon is equipped with pre-installation of fibber optic and reach the pit entry of the ship. Verified this, we consider localized.

8.3.2. Facilities

The facilities that we achieve and maintain our warehouse must be able to accommodate the capacity of staff of the company and the requirements necessary to carry out the activity. These installations must be exclusively used for this purpose must have direct access from the street, conditions of minimum spaces and certain hygiene and facilities like water, electricity, air conditioning, heating or heat pump, Internet and Wi-Fi using optical fibber, bathrooms zone and area offices. Later, it may be located a dining area with a microwave, tables and chairs.

8.3.3. Dimension

To determine the initial size of our business, we must consider that initially it is a service that can be seen by our target audience as timely use.

The dimension of space, with the listed facilities and ship presented is sufficient.

With these people and this space, we can accommodate the construction of up to 5 PCs variable frequency while also houses a space for the maintenance and overhauls of returned customer equipment, in addition to offices and public spaces.

Depending on the financial perspective studied in the next chapter and the size of the business park equipment needed during the first three years will be:

Table 8.1. Forecast table acquisition of annual equipment

	Year 1	Year 2	Year 3
Power Factor Test (C & Tan Delta)	1	1	0
DC Power Transformer up to 80kV (HiPot)	3	1	0
Variable Frequency Power Transformer	1	1	1
thermal bath	1	1	1

The acquisition of this equipment will be the main part of the initial investment along with staff salaries.

8.3.4. Procurements

Our company will be key to the timing and quality of supplies and purchases.

For DC and AC transformers, given our experience, we will go in search of solutions brands such as HAEFELY / Hipotronics or HIGH VOLTAGE. They are the equipment with more quality of the market. Delivery times are not very good. They may be about 6-8 weeks. Will contact their representatives to explain our business and negotiate prices and terms with them.

For components of variable frequency equipment, they will be multitudinous and varied. Since electronic components, motherboards, to circuitry, Siemens S7, etc. To achieve all this, we plan to have several generic suppliers (Cetronic, Diotronic and RS) to negotiate prices and terms as it is very important here not to stay out of options.

8.4. Quality management and environmental

A level of quality management and environment we put our biggest goal in ISO 9000 and ISO 14000 certification will be key to position ourselves as a high-quality product:

ISO 9001: 2015: The specific part of the ISO 9000 standard where the requirements for the orientation of the use of quality management system described - SGC. It is an international standard that focuses on all elements of quality management with a business must have to have an effective system that allows you to manage and improve the quality of their products or services.

Fig.8.4 Logo whereby AENOR certifies the accreditation of a company according to ISO 9001: 2015 (see [7]).

CHAPTER 9. FINANCIAL PLAN

To define the sales plan, it is necessary to note several variables that need to be clear and have been defined throughout the project. Let's raise a pessimistic scenario because our service will have a market penetration of rather slow market.

9.1. Sales plan

The aim of this chapter is to define the sales plan for our products and services the next three years considering several variables that we will detail below.

9.1.1. DC Power Transformer (HiPot)

DC Hipot equipment for the parameters to be considered are the price of rental equipment, the rate of market penetration and we estimate the number of equipment are going to have.

Specifically, and in accordance with the operational plan before the release we will acquire 3 equipment. We will offer the service of renting 250 € / day and estimate the rate of penetration in our target market at 35%.

In the second year, we will buy a fourth DC Hipot and estimates that the penetration rate is 40% with a price of 275 € / day.

Finally, in the third year we will not make any investment for this type of equipment because we believe that the penetration rate will be maintained. Still, the price will go up to 300 € / day.

This plan sales, leads us to the first-year revenues of 95.813 €, the second 160.600 € and 175.200 € the third (see Annex E).

9.1.2. Power Factor Test (C & Tan Delta)

Parameters for this equipment to watch are the same as in the case of DC HiPot: Monthly Rent Price, ratio of estimated market penetration and number of computers available.

Before the release, we will acquire such equipment. The rental price will be 125 € / day, the estimated penetration rate is 40%

In the second year, we will acquire a second computer. The price will be 140 € / day with a penetration rate of 40% to maintain the market.

In the third year, the price will be 150 € / day, with a penetration rate of 45% and we estimate not acquire more equipment for the moment.

With this plan, revenue in the first year for this concept will be 18.250 €, in the second of 40.880 € and the third 49.275 € (see Annex E).

9.1.3. Power transformer variable frequency

For these equipment's the calculation is more complex than the others, due to various additional services we offer. We also consider the price of equipment rental and penetration ratio thereof, the rental price of auxiliary equipment and its penetration ratio, the price of service express support and penetration rate and the price of the service turnkey and penetration rate. Below.

Table 9.1 Table of estimates for the sales plan for Power Transformers with variable frequency

	Year 1	**Year 2**	**Year 3**
Price renting equipment	1350 € / day	1450 € / day	1550 € / day
penetration ratio	25%	30%	35%
Price renting auxiliary	100 € / day	105 € / day	110 € / day
penetration ratio	70%	70%	75%
Price Service Support	150 € / day	160 € / day	180 € / day
penetration ratio	45%	50%	55%
Price turnkey	500 € / renting	525 € / renting	550 € / renting
Penetration ratio	70%	80%	85%

In the investment plan, it is estimated annually buy a computer for the first three years. The sales plan for this type of equipment will bring us the first-year revenues of 133.238 € in the second of 361.554 € and the third 701.552 € (see Annexe E).

If we consider the total annual income, we enter the first year we estimate 247.300 €, 563.064 € the second and the third 926.027 €.

9.2. Investment plan

In this chapter, we will detail the investment plan contemplated for this business during the first three years.

For this investment plan, we have taken account of the purchase of equipment investment to make before going to market, renting the venue where we develop our activity, investment in software and hardware necessary for the proper development of our services and the costs of incorporation and licenses. In addition, within this plan also it has considered the initial investment in staff, necessary before starting the activity. Virtually all investment must precede the start of the development of the activity. In the tables below is detailed for years' different investments.

Table 9.2. Annual investment table

Investments	YEAR 1	YEAR 2	YEAR 3
Purchase equipment	84.374 €	83.348 €	90.000 €
Rent office	24.000 €	24.000 €	24.000 €
Software and hardware	10.000 €	5.000 €	2.500 €
Establishment Expenses / Licenses	5.000 €	4.000 €	4.000 €
TOTAL	123.374 €	116.348 €	120.500 €
Wages	267.390 €	281.440 €	297.490 €
TOTAL	390.764 €	397.788 €	417.990 €
TOTAL MS + 2%	**398.579 €**	**405.744 €**	**426.350 €**

As can be seen in the table above, we calculate a safety margin of 2% since calculations is based on the personal profile and negotiations with suppliers can vary.

For the purchase of equipment has been set up cost is as follows depending on the equipment purchased for years and power frequency transformer.

Table 9.3. Table costs investment in €

description equipment	**YEAR 1**	**YEAR 2**	**YEAR 3**
Variable transformer AC power frequency	50.000	65.000	85.000
Power Factor Test (C & Tan D)	5.335	5.335	-
DC Power Transformer (HiPot) (see [12])	8.013	8.013	-
Warm Pool	5.000	5.000	5.000

In the section on wages, it has been considered a base salary depending on the position and responsibilities. In addition, the calculations have been considered Social Security to pay for the company for each worker.

Table 9.4. annual gross salaries of staff considering the SS paid by the company

	Units	YEAR 1	YEAR 2	YEAR 3
Engineers	2	74.480 €	79.800 €	83.790 €
COO	1	46.900 €	50.250 €	53.600 €
CFO	1	52.260 €	54.940 €	57.620 €
Logistics / Purchasing	1	33.000 €	33.000 €	34.980 €
CEO	1	60.750 €	63.450 €	67.500 €
TOTAL	**6**	**267.390 €**	**281.440 €**	**297.490 €**

9.3. Financing plan

In this chapter, we will identify the source of our funding seen the investment plan.

Let's explore formulas like Crowdfunding and Business Angels but still we seek credit and loans. We'll do it by three formulas are the revolving line, the Crowd lending and ICO loans.

We will detail annually and will be our financing plan.

Table 9.5. Annual funding table

	YEAR 1	YEAR 2	YEAR 3
Own resources	**150.000 €**	**155.000 €**	**150.000 €**
crowdfunding	20.000 €	15,000 €	15.000 €
contribution partner's founders	30.000 €	40.000 €	35.000 €
Business Angel	100.000 €	100,000 €	100.000 €
Credits and loans	**250.000 €**	**250.000 €**	**280.000 €**
Revolving Line	70.000 €	50.000 €	60.000 €
Crowd lending	75.000 €	70.000 €	70.000 €
ICO loans	105.000 €	130.000 €	150.000 €
TOTAL	***400.000 €***	***405.000 €***	***430.000 €***

As we can see, the project financing is based on the needs of investment covering them entirely and considering a safety margin of 2%, as we previously discussed.

9.4. Balance Sheet

In this section, we will present the balance sheet given the variables of the Financial Plan that we have discussed in this chapter.

To emphasize the departure of technical facilities and other fixed assets in the asset, where we consider the equipment purchased, and the line of advance required the first year to start our business.

Liabilities, include the loss for the year of the first year, because this year is where much of the equipment, personnel are acquired and still do not have a stable market share.

Seeing the result of the balance, we can begin to conclude that the three-year business that is profitable from the second year starts getting benefits.

ACTIVO	Año 1	Año 2	Año 3
NO CORRIENTE	**110.374**	**181.722**	**269.222**
Inmovilizado intangible	**10.000**	**5.000**	**2.500**
Aplicaciones informáticas	10.000	5.000	2.500
Inmovilizado material	**95.374**	**171.722**	**261.722**
Fianzas	6.000	0	0
Instalaciones técnicas y otro inmovilizado	84.374	167.722	257.722
Gastos de apertura (licencia, constitución y marketing)	5.000	4.000	4.000
Inversiones inmobiliarias	**5.000**	**5.000**	**5.000**
Mobiliario y enseres	5.000	5.000	5.000
CORRIENTE	**233.102**	**655.608**	**1.258.188**
Existencias	**21.437**	**16.891**	**37.041**
Materias primas y otros ap.	4.946	16.891	37.041
Anticipos de (será a) proveedores	16.491	0	0
Efectivo y otros activos liquidos	**211.664**	**638.717**	**1.221.147**
Tesoreria	211.664	638.717	1.221.147
TOTAL ACTIVO	**343.476**	**837.330**	**1.527.410**
NETO + PASIVO	Año 1	Año 2	Año 3
NETO	**93.476**	**384.952**	**867.410**
Fondos propios	**150.000**	**155.000**	**150.000**
Reservas	**0**	**-56.524**	**154.952**
Resultado del ejercicio	**-56.524**	**211.476**	**542.304**
(Dividendo a cuenta)	**0**	**75.000**	**20.153**
PASIVO NO CORRIENTE	**180.000**	**402.378**	**600.000**
Deudas a largo plazo	**180.000**	**402.378**	**600.000**
Deudas con entidades de crédito	180.000	380.000	600.000
Otros pasivos financieros	0	22.378	0
PASIVO CORRIENTE	**70.000**	**50.000**	**60.000**
Deudas a corto plazo	**70.000**	**50.000**	**60.000**
Deudas con entidades de crédito	70.000	50.000	60.000
TOTAL NETO + PASIVO	**343.476**	**837.330**	**1.527.410**

Fig. 9.1 Results of the first three years of Test Machine Renting

9.5. Income statement

This section will present the income statement (profit and loss) for the first three years of life of the company. To do this, we have relied on the investment plan in the sales plan and financing plan.

Notably depreciation have been considered 10 years, correct for the type of equipment that we have period.

In the case of consumption of raw materials, it is linked to replacement components that have estimated will be needed to have our equipment in perfect condition.

	AÑO 1	Rel.%	AÑO 2	Rel.%	AÑO 3	Rel.%
OPERACIONES CONTINUADAS						
Importe neto de la cifra de negocios	**247.300**	100,00	**563.034**	100,00	**926.027**	100,00
Consumos de materias primas	4.946	2,00	16.891	3,00	37.041	4,00
Margen Bruto	**247.300**	100,00	**563.034**	100,00	**926.027**	100,00
Gastos de personal	**-267.390**	-108,12	**-282.810**	-50,23	**-298.860**	-32,27
Sueldos y salarios	-267.390	-108,12	-281.440	-49,99	-297.490	-32,13
Cargas sociales	0	0,00	-1.370	-0,24	-1.370	-0,15
Otros gastos de explotación	**-43.784**	-17,70	**-85.866**	-15,25	**-145.901**	-15,76
Arrendamientos	-24.000	-9,70	-24.000	-4,26	-24.000	-2,59
Subministros	-12.365	-5,00	-33.782	-6,00	-64.822	-7,00
Servicios profesionales independientes	-4.946	-2,00	-16.891	-3,00	-37.041	-4,00
Primas de seguros	-1.237	-0,50	-2.815	-0,50	-5.556	-0,60
Pérdidas, deterioros ops comerciales	0	0,00	-5.000	-0,89	-8.000	-0,86
Publicidad y propaganda	-1.237	-0,50	-3.378	-0,60	-6.482	-0,70
Amortización de inmovilizado	**8.437**	3,41	**16.772**	2,98	**106.772**	11,53
Deteriores y resultado de enajenacion de inmovilizado	**0**	0,00	**56.303**	10,00	**92.603**	10,00
Resultados por enajenaciones de inmovilizado	0	0,00	0	0,00	0	0,00
Otros resultados	**0**	0,00	**0**	0,00	**0**	0,00
RESULTADO DE EXPLOTACION	**-55.437**	-22,42	**267.433**	47,50	**680.640**	73,50
Gastos financieros	**-19.929**	-8,06	**-32.460**	-5,77	**-42.635**	-4,60
Por deudas con terceros	-19.929	-8,06	-32.460	-5,77	-42.635	-4,60
RESULTADO FINANCIERO	**-19.929**	-8,06	**-32.460**	-5,77	**-42.635**	-4,60
RESULTADO ANTES DE IMPUESTOS	**-75.366**	-30,48	**234.974**	41,73	**638.005**	68,90
Impuesto sobre beneficios	18.841	7,62	-23.497	-4,17	-95.701	-10,33
RESULTADO DEL EJERCICIO	**-56.524**	-22,86	**211.476**	37,56	**542.304**	58,56

Fig. 9.2 P&G for the first three years of Test Machine Renting

As we have seen and discussed in the previous section, the result of the first exercise is negative because most of the investment is generated in the first year, but in the second and third, the result for the year is positive.

9.6. Treasury Plan

In this section, we will present the annual plan of cash during the first three years. Within this plan if it has considered the SS of contracted workers, as explained in the investment plan, but nevertheless we have ruled out consider VAT to simplify the exercise.

Then the Treasury plan is detailed.

	AÑO 1	AÑO 2	AÑO 3
SALDO INICIAL	**0**	**211.664**	**638.717**
OPERACIONES	**-45.033**	**170.860**	**385.564**
Ingresos	247.300	563.034	926.027
Ingresos por ventas	*247.300*	*563.034*	*926.027*
Pagos	-311.174	-368.676	-444.761
Sueldos y salarios	*-267.390*	*-281.440*	*-297.490*
Cargas sociales	*0*	*-1.370*	*-1.370*
Otros gastos de explotación	*-43.784*	*-85.866*	*-145.901*
Impuestos	18.841	-23.497	-95.701
INVERSIÓN	-123374	-116348	-190500
Ingresos	0	0	0
Pagos	-123374	-116348	-190500
Inmovilizaciones materiales	*-118374*	*-112348*	*-186500*
Inmovilizaciones inmateriales	*-5000*	*-4000*	*-4000*
Impuestos			
FINANCIACIÓN	380.071	372.540	387.365
Ingresos	400.000	405.000	430.000
Recursos Propios	150.000	155.000	150.000
Recursos ajenos	250000	250000	280000
Pagos	-19.929	-32460	-42635
Recursos Propios			
Recursos ajenos	-19.929	-32.460	-42.635
CASH FLOW PERIODO	**211.664**	**427.053**	**582.429**
CASH FLOW ACUMULADO	**211.664**	**638.717**	**1.221.147**

Fig. 9.3 Treasury plan the first three years of Test Machine Renting

All treasury plan concepts are broken down in the investment plan, the financing plan and the income statement.

9.7. Ratio analysis

Financial plan to finish we considered important to analyse the ROI and ROE Test Machine Renting and EBITDA and EBITDA ratio. We'll start detailing the latter.

EBITDA = (EBIT) - Amortization Immobilized - Deteriorations **(9,1)**

EBITDA ratio = EBITDA / Net turnover **(9,2)**

Table 9.6. Result EBITDA ratio and EBITDA for the first three years

	YEAR 1	YEAR 2	YEAR 3
EBITDA (€)	- 46.999	340.509	880.015
EBITDA ratio	- 0,19	0,60	0,95

As you can see, the first-year EBITDA is a negative result. However, in the subsequent two it is that EBITDA is not only positive, but also to EBITDA ratio grows and it concludes that the business generates profit.

ROI = earnings before interest and taxes / Total Assets **(9,3)**

ROE = Net profit / equity capital **(9,4)**

The results of these calculations are presented below.

Table 9.7. ROI calculation result and ROE

	YEAR 1	YEAR 2	YEAR 3
ROI	- 0,16	0,32	0,45
ROE	- 0,38	1,36	3,62

If the ROI indicates that the higher the value of the asset increased productivity is obtained. As we passed from a negative to a positive one year and third it continues to grow.

In the case of ROE, we measure the net profit generated in relation to the investment of the owners of the company. As we see, during the first-year ROE is negative, which clearly no benefits. However, in the second-year ROE has also risen significantly in the third. Therefore, we can conclude that, if we get past the first year of life, the chances that our business is viable are high.

CHAPTER 10. SUSTAINABILITY CONSIDERATIONS

In this chapter, we are going to reflect on the environmental impact that Test Machine Renting can have.

Specifically, it is a business of renting test equipment, all manufactured by electronic plates, housings and circuitry, in addition to some battery in some cases. These are durable equipment, but even so, these have a useful life and, therefore, at the end of this, we must consider these residues. Like all electronic waste, there is a known environmental impact and for this reason, we must manage your landfill in a very aware manner. If we do so, most of these components can be recycled and used as part of new equipment.

According to Ecolec (see [13]), recovering them requires less energy (10% less in the case of copper) and generates less waste (potentially 98% less) than, when extracted from nature, without forgetting that many materials (copper, gold, silver or aluminium) are valuable.

In our case, most of our equipment can be broken down into different elements and materials that can later be reintroduced into the market as recycled raw materials, thereby reducing the impact on the environment, energy cost and pollution, since

In Catalonia, where Test Machine Renting is located, there is a company dedicated to the integral management of waste electronic devices, called ACS Recycling, authorized by the Waste Agency of Catalonia and located in the belt of Barcelona. Even so, there are many companies dedicated to this purpose.

Right now, ACS Recycling, would be our first option when taking out a machine in Test Machine Renting, since we are committed to safeguarding the environment and they are specialists in doing so.

CONCLUSIONS

Before finalizing the project, I want to refer to the ethical and social impact that these may have on the market. This type of equipment has no impact on the privacy of those who use them or of the lessee company. Nor do they affect the economy or the human rights of people. They are computers that do not move private data. Anyway, one might think that they could be susceptible to industrial espionage, although in the contract of renting with Test Machine Renting this possibility is totally ruled out, leaving in writing in the contract the confidentiality of the manipulated data.

After completing this Final Master Project as a Business Plan, I ended up believing in the feasibility of the Test Machine Renting project, seeing the results of both the market study and the financial plan, as highlights of the project. As I went deeper into each chapter, I could recognize the strengths of this project and understand the weak points to be able to work on in the future.

It is a business still to be exploited in the market and not very difficult to start up, although it should be noted that there is an initial barrier in investment mode, necessary to start working. It is an ambitious project that I believe could come true.

This work has helped me to carry out this type of project, which enthuses me from many perspectives of my professional and personal life.

ACRONYMS

TMR	Test Machine Renting
MV	Medium Voltage
HV	High Voltage
C & Tan Delta	Capacity and Tan Delta
COO	Chief Operating Officer
CEO	Chief Executive Officer
CFO	Chief Financial Officer
SS	Social Security

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ANNEXES

TITLE: Renting AC Variable frequency power transformer manufacturers by Cable

MASTER DEGREE: Master in Science in Telecommunication Engineering & Management

AUTHOR: Laura Sala Dot

DIRECTOR: Jesús Segura Alcober

DATE: February, 21rd 2018

ANNEX A: Graphical results of the market survey

Then complete each question posed in the survey results is attached graphics market.

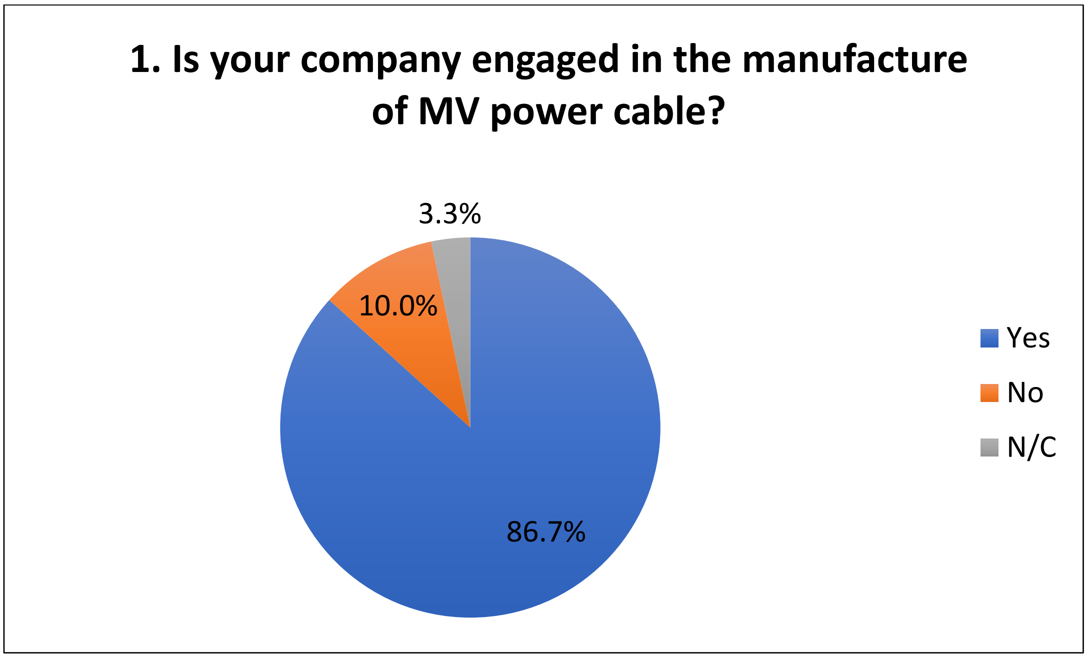

Fig. A.1 Percentage answer to the first question

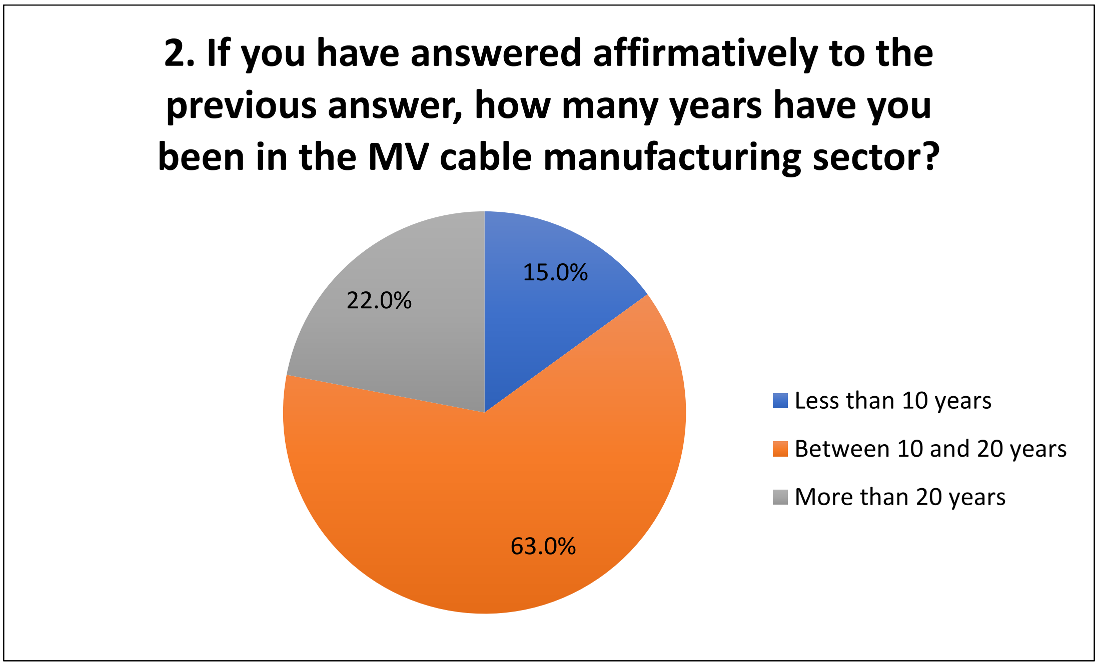

Fig. A.2 Percentage answer to the second question

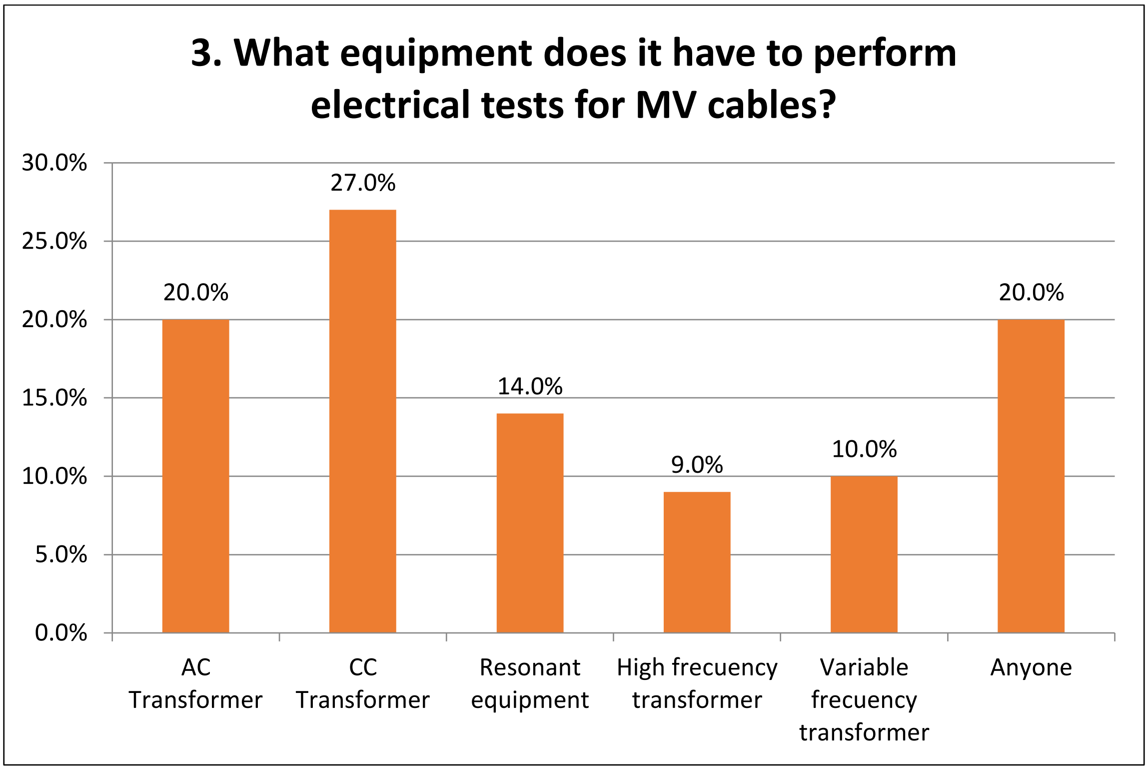

Fig. A.3 Percentage answer to the third question

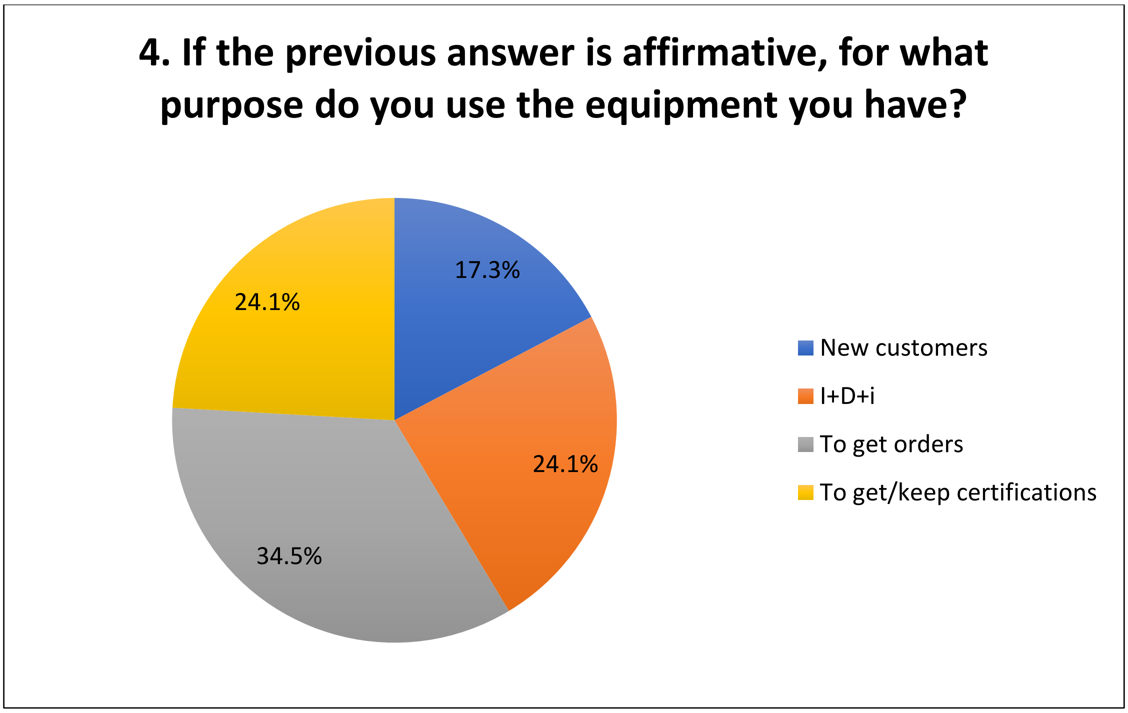

Fig. A.4 Percentage answer to the fourth question

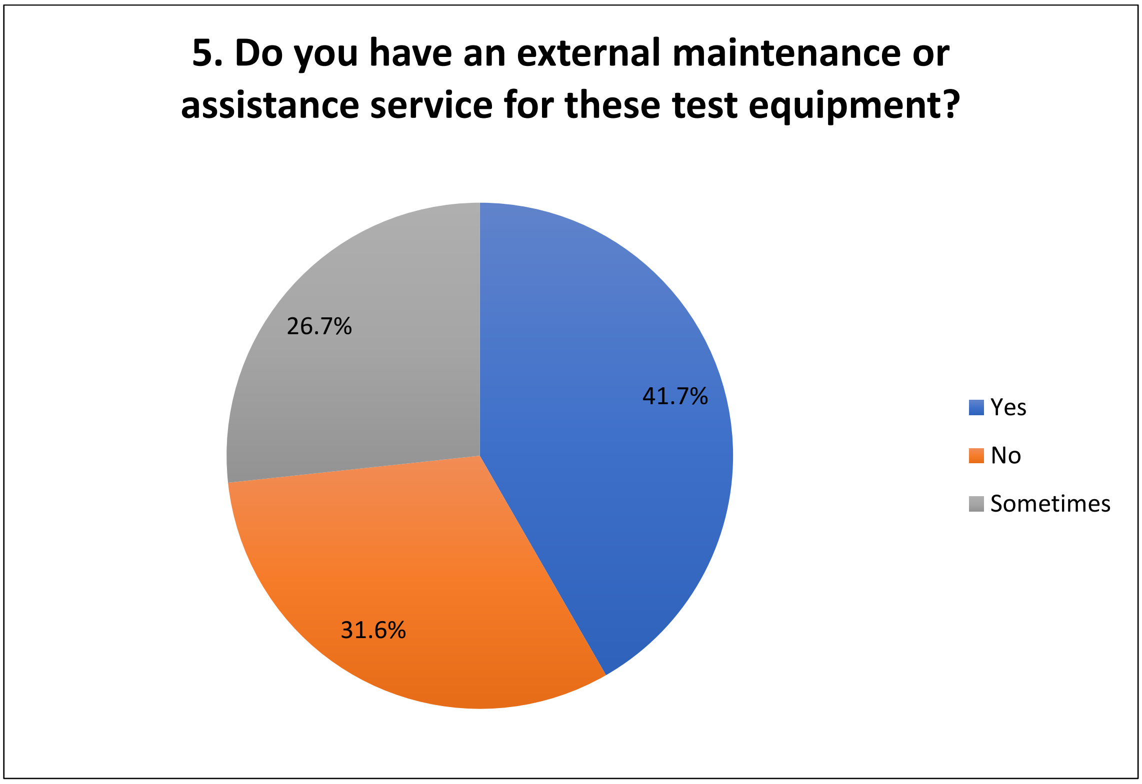

Fig. A.5 Percentage answer to the fifth question

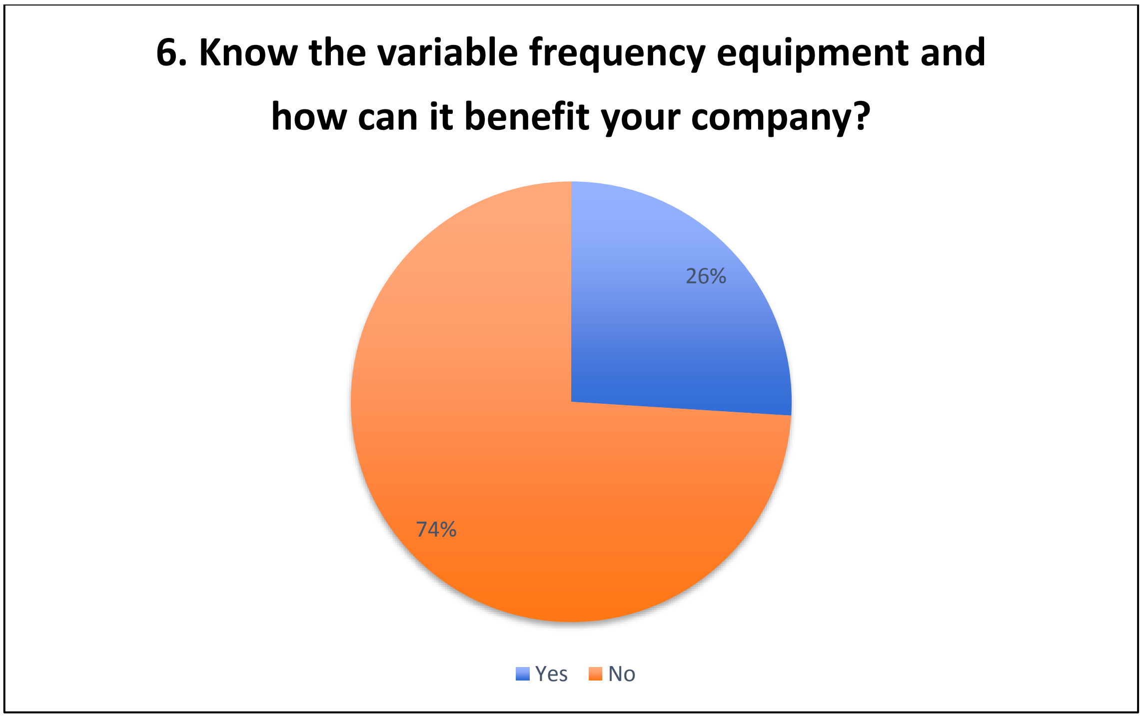

Fig. A.6 Percentage answer to the sixth question

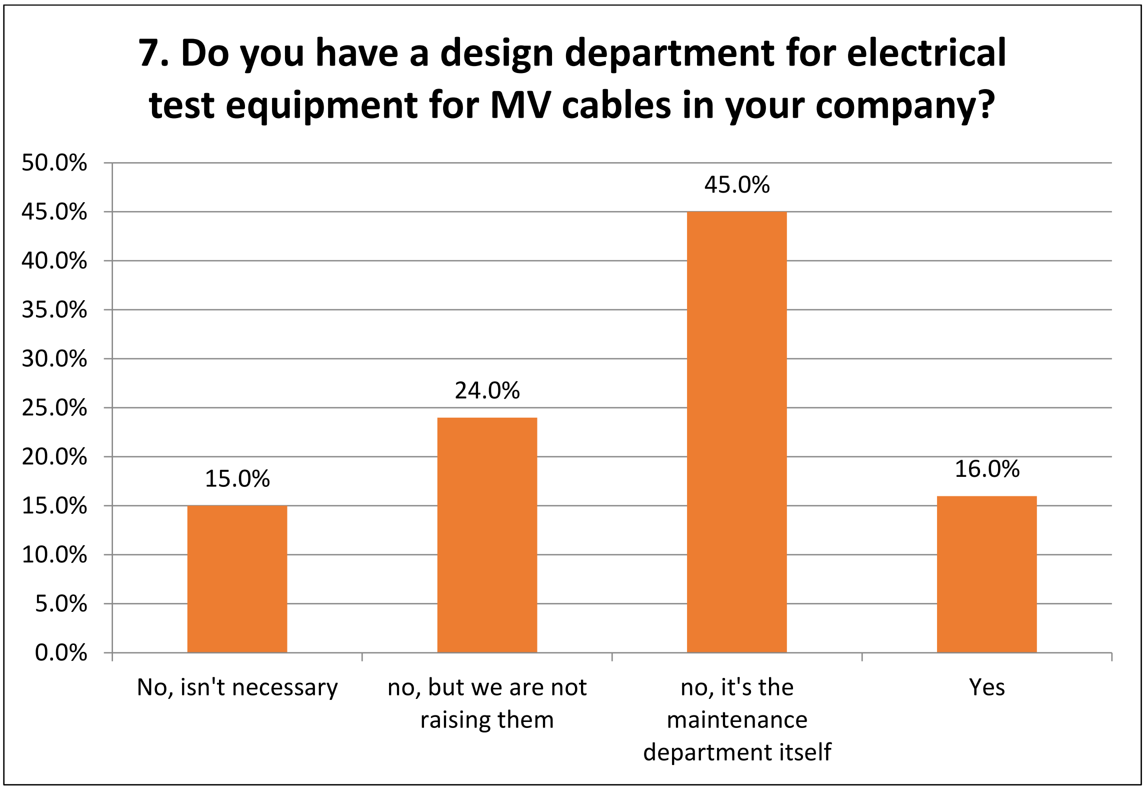

Fig. A.7 Percentage answer to the seventh question

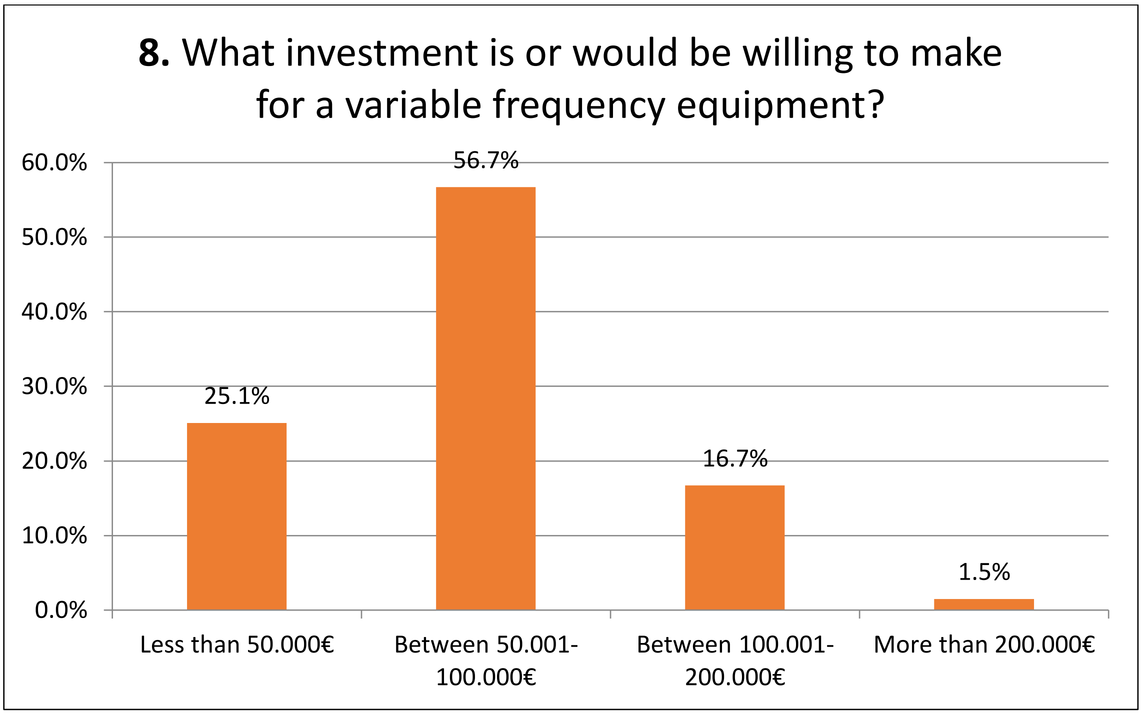

Fig. A.8 Percentage answer to the eighth question

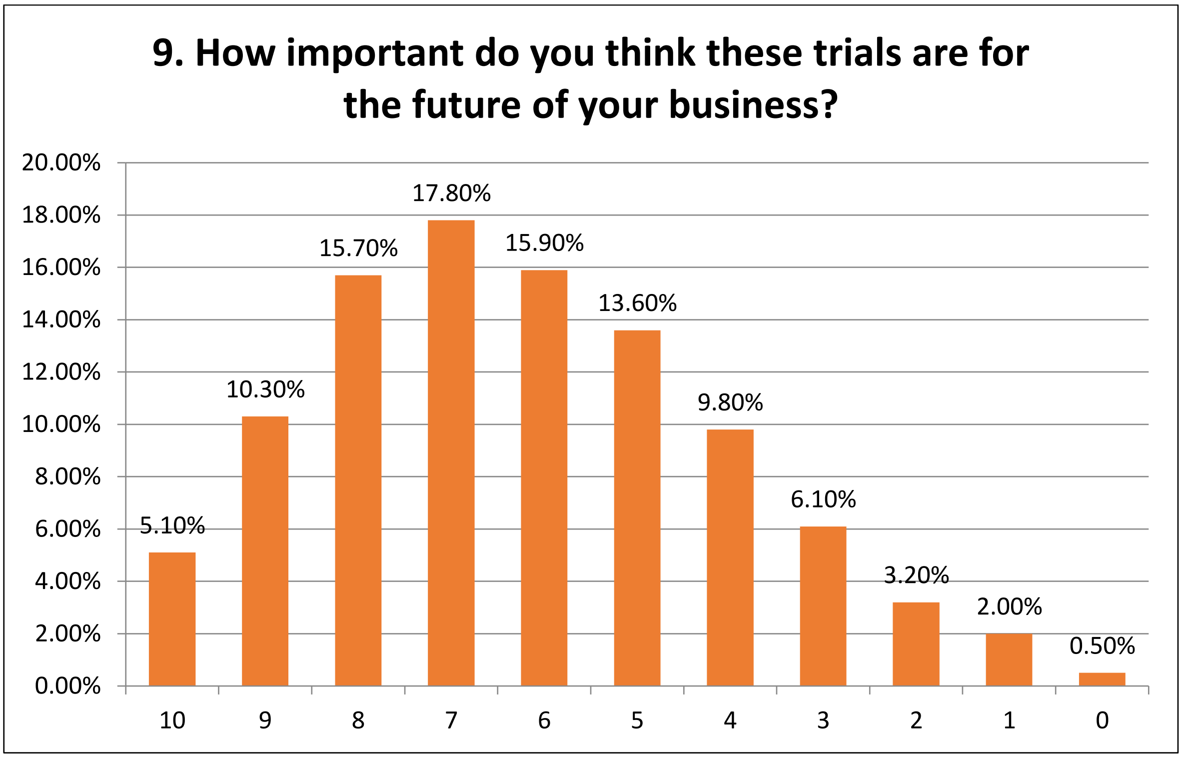

Fig. A.9 Percentage answer to the ninth question

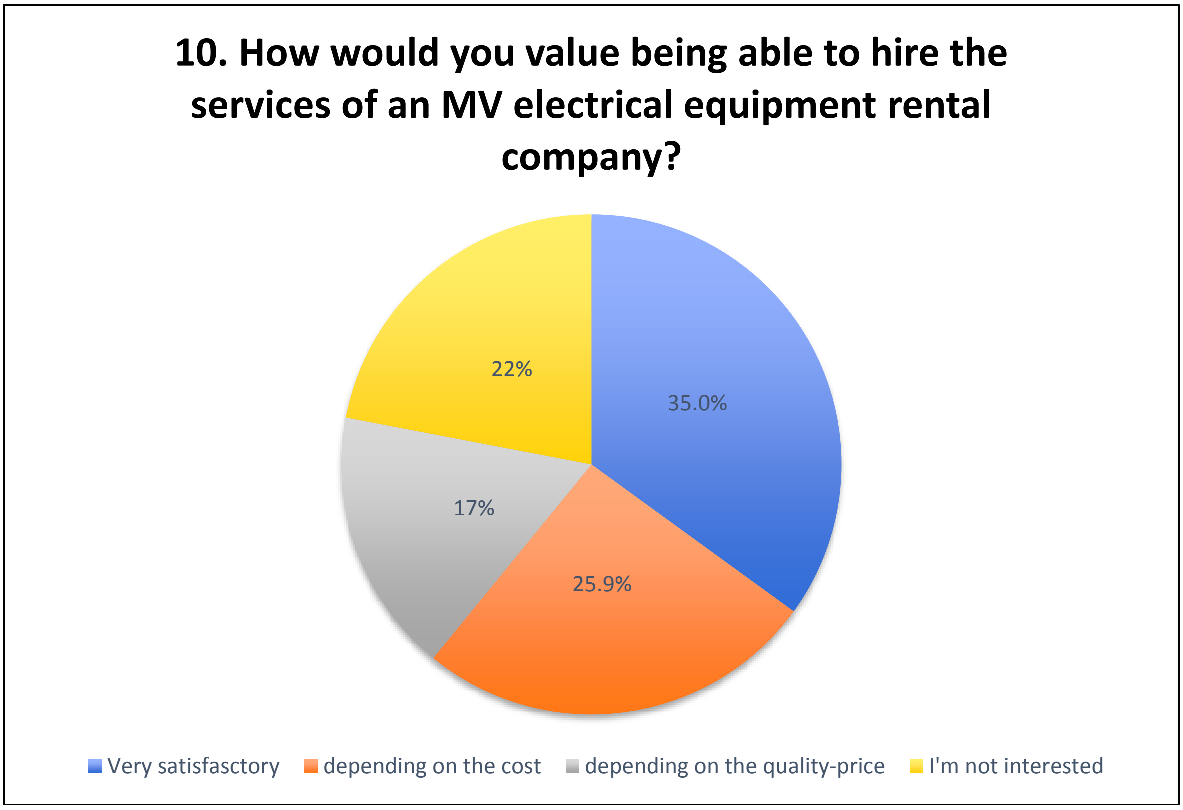

Fig. A.10 Percentage answer to the question dozen

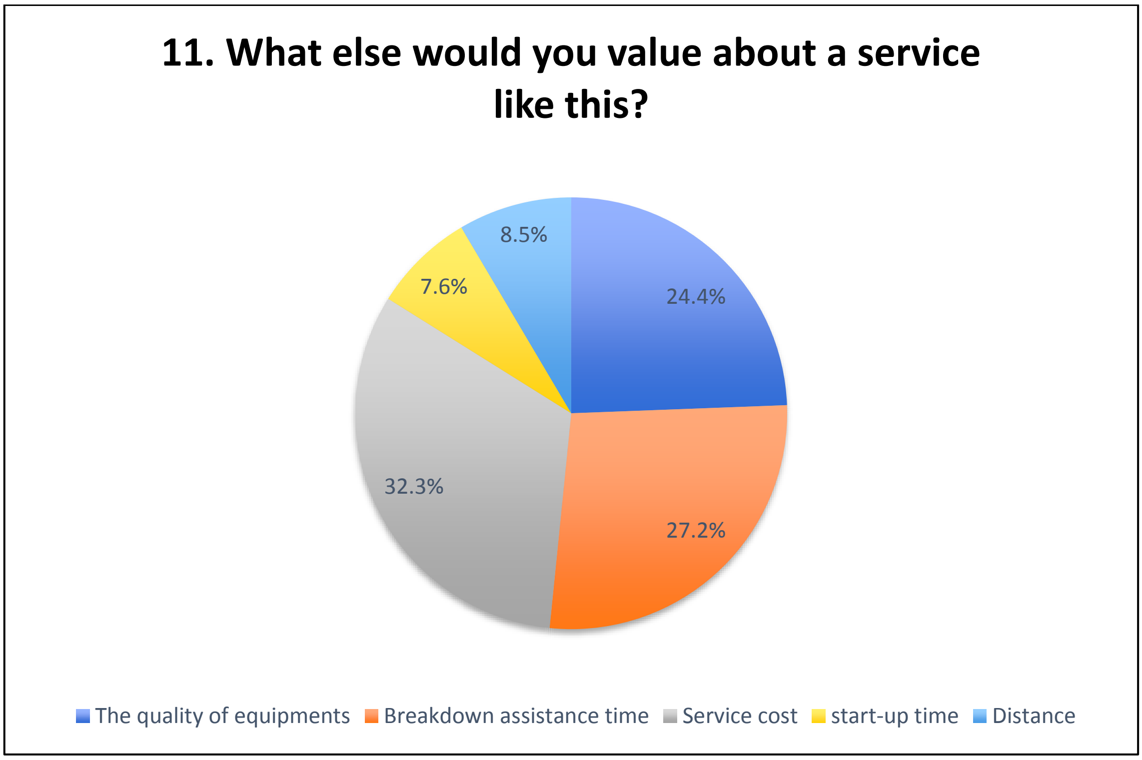

Fig. A.11 Percentage answer to the eleventh question

ANNEX B: principles of operation of a medium voltage electrical cable

A medium voltage electrical cable comprises a core conductor, usually copper or aluminium, geometric sections varies depending on the amount of energy we want to carry.

On the core, we have three elements: the semiconductor interior, exterior insulation and semiconductor.

The interior is a semiconductor layer that allows the homogenization of the electric field generated around the conductor. The isolation as its name suggests is the element that isolates and contains the electric field. The semiconductor exterior meanwhile has a function to homogenize the electric field, although much will depend on the voltage and may not get to be indispensable. Moreover, the latter element provides the power cable of a highly capacitive component.

To create a potential difference in a cable medium voltage is indispensable that has a field radio, and so on semiconductor abroad must put a conductive element called screen, which is usually of the same nature as the driver (aluminium or copper).

All items that can get above are only for mechanical protection of the cable itself. Below is a recreation in 3D (see [9]).

Fig. B.1 3D image of an electric cable medium voltage distributions

All material must withstand voltage and therefore classifies him with a gradient of electrical work and electrical gradient drilling.

The gradient electric drill is one that a given thickness of insulation and voltage generated, follow this formula:

$$U\ [kV / mm] = V\ [kV] / E\ [mm] \qquad \textbf{(B,1)}$$

Where V is the voltage drilling, ie, when the material has a power disruption and E is the thickness of the layer that is enduring tension.

The gradient of an electrical cable occurs on the inner or internal semiconductor isolation and insulation on where the gradient happens to have taken the maximum value to its minimum value respectively.

Medium voltage cable, due to the radial field design that also has resistive behaviour, has a very high capacitive component, ie, it behaves like a capacitor. This feature will be very important in determining the characteristics of the system. However, the inductive component is not remarkable. So, we can express the behaviour of a cable impedance such that:

$$Z = R + Ci \qquad \textbf{(B,2)}$$

Where R is the real part and corresponds to the electrical resistance of the cable and C is the imaginary part corresponds to the capacity.

<u>Materials</u>

The material on which this study is based are known as XLPE (Cross-Linked Polyethylene) and HEPR (High Ethylene Propylene Rubber).

Both materials come in their final state through a process called cross-linking where the material in question along with other essential reagents allowed to occur chemical bonds necessary. This transformation allows the material to reach the properties that are suitable for transportation of energy.

These materials are evaluated by the manufacturer using the gradient drilling, which in the case of XLPE must be> 22 kV / mm in the case of HEPR.

Indeed, in addition to the insulation material and as explained in the previous chapter, are necessary semiconductors. This material consists of an EVA base that contains, among other additives, a specific proportion of black smoke that gives ownership of semiconductor.

In the medium voltage cables is different than the semiconductor internal and external, as in the case of internal calls for a non-strippable, while in the case of external calls strippable. This differentiation is important because in the case of the semiconductor strippable were internal, be separable from isolation would soon be a phenomenon called partial discharging conclude a power disruption or perforation.

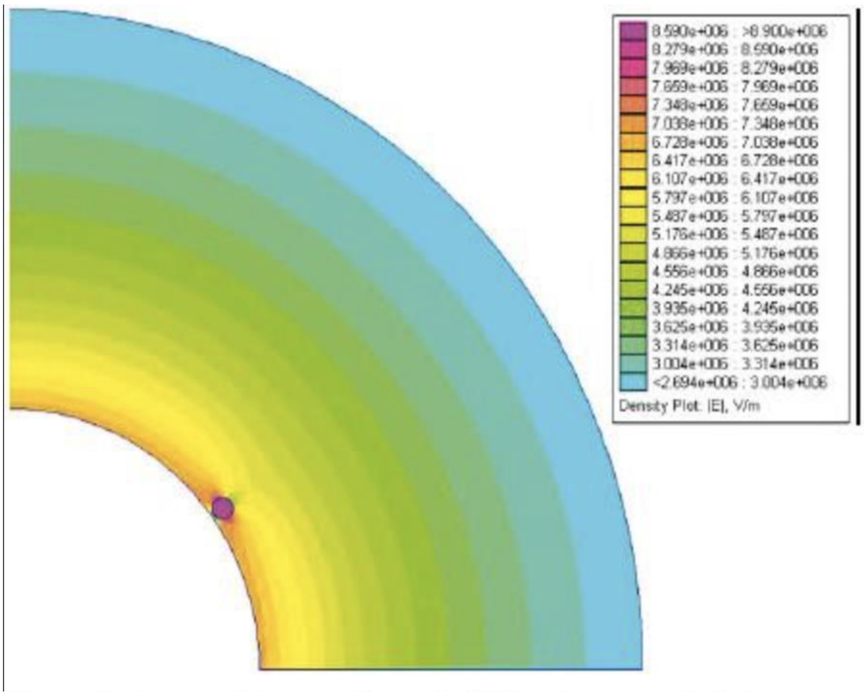

Fig. B.2 Simulation by finite elements of the evolution of electric gradient of a cavity adjacent to the semiconductor layer inside

As for the semiconductor outside, tensions between phase and earth of 18kV, this phenomenon is evident even strippable long as the manufacture of cable has been done correctly. However, there are countries that can apply external strippable semiconductor regardless of whether the tension. Normally one of the most important criteria when applying it has more to do with the installation in their own technical criteria, which leans noticeably to the semiconductor strippable not. The installers have finished separating the semiconductor external insulation to make the connection correctly in the "bottle", therefore, greatly facilitates the work that is strippable.

APPENDIX C: Description of test conditions HD 605 in the long term

The minimum length test sample is 120m under triple extrusion. If making sections must put 12 tranches of 12m each to compensate each sample must bring endings to connect the tension.

The phase of preparation the samples are placed in water at 55 °C in temperate phage 500h. After you enter the phase of aging on after this time, the temperature drops to 40 °C and placed the samples in tension between the driver and the screen, if you have it. If there is no screen, the water will land. The value of voltage is defined according to the thickness of insulation nominal sample: 3.5 mm corresponding to 18kV, 27kV corresponding to 4,5mm or 5,5mm corresponding to 36kV AC industrial frequency.

After 8500h conditions continued aging will remove the first six samples. Drill samples will have to find the material gradient drilling. The other six samples will be removed 8500h later than the first, ie, 17000h after starting the phase of aging.

APPENDIX D: Description auxiliary parts of test

ANNEX D.1. Thermal Bath or Warm Pool

The thermal bath is one of the important elements of the project, since it must ensure a stable temperature throughout the test to cause a constant aging materials.

Therefore, when making this facility had to design the size, format, capacity of water, the method of heating water recirculation, among other factors, we will be discussing in this section.

Format and material

To decide on the format used and the material to be used, had to be clear what the format of the cable to be tested. In this case, we are talking about a stretch of about 70m cable in a single piece. Therefore, dismissed rectangular bath due to the inability to make the distance and not to implement any such return (the diameter of curvature required would make the width of the tub was very large, and therefore end up having a rectangular tub, little optimized with respect to the capacity in m3 of water and we generate a lot of spending power to keep it at a certain temperature.

Therefore, the best option and chosen to perform more efficiently this part of the installation was a hot donut circular format, ie a central part without water. This format allows us to save considerable water consumption and heat recirculation.

Moreover, we chose two materials when running it: make it work or make the steel.

Since the format was decided that it was circular, that would work, an increase of additional cost. Moreover, the fact of making it work also meant other disadvantages, such as mobile but it was not static and that the leak was greater heat. The fact that it was fixed, posed a major problem especially when riding the cable inside the cockpit, as for weight and space was not feasible to do it in situ. Moreover, the dispersion of heat meant an increase in the cost of energy to keep the water temperature constant.

Therefore, it was decided to make a hot donut type steel wheels and isolation. To isolate the cockpit fiberglass was used to isolate thermal 90ºC.Es placed across the walls of the tub with a thickness of 5 cm.

Also consider making the tub deep enough so they could make two floors if necessary to put more than one cable at a time. The second floor is optional. You can remove or put the support plates.

Initially designed tub with a lid to prevent the effects of evaporation and loss of water volume temperate phage. However, later dismissed because most of the water is 40ºC and this temperature evaporation consider it negligible or at least assumed the small-consumption of water and energy to maintain volume and flow of water.

The other important point to decide on the design of the tub was what volume of water is required to have at least two sections to perform two tests simultaneously and therefore, this gave us a few levels with respect to height, which should be limited to manoeuvre and charge cable in smooth or over-physical efforts, since the weight of the cable to be tested is approximately 0.5 kg / m, ie a total of about 35kg.

Heating and water circulation

To conduct the electricity to maintain the water at a constant temperature, it was decided from the beginning to an electrical resistance of power 20W and a closed water circuit.

Electric ground bath and trial

This element is one of the most important of the trial. Do not forget that we are doing a test of aging through a chemical effect on the material using water and a temperate phage electric current through a physical effect. To create the potential difference is necessary to create an electrical ground. To do this it was necessary to drill to a depth of 2m to the soil physical and copper bars to get a value less than 5 ohms. This is not the desired one, who would speak about 2 ohms, but will be sufficient to support a drilling with a maximum leakage current of 2A (maximum output current of the transformer). However, later discuss security measures that make a perforation in the case of not ever give maximum output current to avoid damage or return elements coming.

Therefore, to create this earth, has placed a copper bar diameter of 20mm each corner of the enclosure and bath located on the transformer, and a total of four copper rods joined each other by more copper bars of the same size.

Then joined the tub in one of these bars by another copper bar of the same size. In this way, we ensure a correct laying on the ground.

ANNEX D.2. Moisture Control

One of the risks that can be found during testing is increasing the moisture it dispersed among an arc voltage and ground. Clearly there must be a safety distances, however, we cannot forget that water evaporates and therefore, it is essential to make a humidity control to prevent risks.

To implement this control has been a humidity sensor in the ceiling, specifically on the bath as well as a fan. In general Amari Electric have implemented a regulator that allows pre-set relative humidity inside the enclosure you want.

This controller activates the fan if the humidity is higher than the pre-determined and therefore, thanks to that we can control the humidity

Currently we have no security system that makes stop the trial if there is a substantial increase in humidity or the fan cannot diminish it, but it would be no problem to connect the alarm or later if deemed appropriate.

ANNEX D.3. Enclosed by tests

One aspect is to implement limited the site to locate the test. Being a test current and long-term thinking on security issues, it was necessary to limit and close the enclosure.

Closed by panels and leaving a central window to see inside the room always.

Has been able to enter and exit the bathtub and therefore has become a double door that opens out of the room. For the space available, the two doors had to take a hinge allowing the opening of 180 each and take advantage of maximum openness.

At the same time, has also had to implement a safety interlock as important, acting on the output transformer when the door opens. In other words, if someone opens the door when the trial is underway, the transformer is placed on the ground immediately and for the trial to avoid risks. It has incorporated a bright sign on the door indicating when the trial is underway and therefore can prevent inadvertent entrance to the enclosure.

However, it has also equipped the door locks to limit entry to unauthorized persons.

ANNEX D.4. Power Transformer

We got one of the key parts of the project, together with the control unit.

The transformer is designed for an output voltage of 20kV and maximum current of 2A, ie 40kVA and a variable frequency between four predefined positions 50, 400, 500 and 600Hz.

The choice of frequency was based on the need for a transformer with industrial frequency, 50Hz, as other European regulations require that frequency. On the other hand, it is obvious that the study is based on 500Hz. The other two frequencies chose considering the possible projection of R&D that could give further pe and therefore sought the nominal frequencies close to the project.

Certainly, it would have been more interesting to implement them one at 1kHz, but the cost of the transformer does not fall within the parameters of the project.

To carry out the project, in fact, had to give up all the possibilities to implement the rule sets, as is also possible to 27kV and 36kV testing, provided that the thickness of the sample is 5,5mm and 4.5 respectively. This made necessary a 100KVA transformer with an increase of approximately 300% of the final cost of the project, totally unattainable.

Therefore, we had to calculate whether a power of 40kVA and a maximum output of 20kV transformer was sufficient.

As we said then, despises the test voltage of 36kV and 27 and stayed with that of 18kV. Thus, a maximum voltage of 20kV transformer output is correct, also considering that uncertainty will limit the output voltage.

As to whether they were sufficient to prove 40kVA 70m or calculate how many meters can be tested for a particular type of cable, it has taken several following calculations do not show the complexity.

On the other hand, to implement the transformer has been necessary to consider the maximum frequency of 600Hz. Since the variation between the maximum and minimum frequency is quite large, modular design has been applied to prevent a spiral drill and stop internal power test.

What has been done is therefore divided into four transformer transformers that have been set yet requested a transformer parts. Thus, if a transformer suffers an internal perforation, we can change it immediately without the need to carry a full repair the transformer.

The packaging is made of iron and have two fans to cool the transformer for each side. On one side has been out of power cable that connects to the control unit (3G35 mm2 cable) and ground equipment, which will be attached to the floor of the room and turn the ground the cockpit. The same side also has been out of communication cable shielded to avoid interference nearby which sends the signal control equipment.

As for the output voltage, the insulator has been vertical to face the connection to sample air and avoid other side of insulators placed in the bath and decrease the chances that there is an arc.

ANNEX D.5. Control Unit and registration

Another important part is the control unit which in turn also contains the log.

The control unit has approximate dimensions of 1,20x0,5x0,5m with an approximate weight of 40kg and moves on wheels that can be fixed later.

It consists of two doors to come, front and back that were controlled by a lock and key. The front stood control equipment, while the rear one can see the architecture and access it if necessary.

The control unit is powered from the cabinet usually through a hose power cable 5G16 mm2

Software: Registration and data extraction

To record data continuously throughout the duration of the trial, the control unit is equipped with a dynamic memory which is accessed through the menu on the LCD that incorporates the equipment.

The data dump will be carried out at any time, even during trial. No need to be completed to make an extraction. The method is implemented for extraction through a USB output.

This unit supports two independent fans register to avoid a lack of refrigeration.

APPENDIX D.6. Connection to voltage

The connection voltage may seem something easy and unimportant, but when we are working with high voltages is important to leave a safety distance so that there is no one laying on the ground unwanted. Therefore, in this aspect will design the best option.

First proposed option: PVC insulators

The insulators are designed so that components at one end may be in tension and the other end connected to zero potential. To carry out this objective insulator usually a very insulating material, usually ceramic. Due to the economic term, this raises the possibility of using PVC insulators used in other similar applications.

The great advantage of these insulators is the cost, but they have a major drawback to this application: they must maintain properties throughout the duration of the test, ie, 3000H.

As an insulator does not maintain its insulating properties starting to be created gradually in a way that the material itself from one end to another until a bow and jumps are laying on the ground accidental system. After this, it is necessary to stop the trial, come and see the consequences of this accidental laying on the floor that can affect several elements of the system.

While certainly the rated voltage is 18kV and therefore the impact is less than in other cases, it is still a risk that does not want to run this project.

Second proposed option: The air as insulation

The second option proposed and elected to make the connections between the transformer and the output element of proof, ie cable, is by air and safety distances established for works in tension.

As explained the rehearsal room is equipped with a recirculation system which allows air but the air is ionised due to the tension that is, the distance between the zero voltage and the potential is high enough you cannot create a physical way and become accidental laying on the ground. However, as a precaution should not make the connection on the tub to keep the proportion of evaporated water does not become the way electricity required for the setting accidental ground. It has therefore been designed outside the perimeter of the tub.

In this case, we also have the advantage that the tension is very high and therefore is sufficient distance which is designed than 1cm / kV, ie 18cm. The actual distance is about one meter, more than enough to carry out secure connections.

ANNEX E. Sales Plan

We will detail all the sales plan annually during the first three years.

							AÑO 1							
Capacidad de alquiler (días)			30	días/mes										
Equipos DC Hipot			3											
Precio alquiler DC Hipot			250	€/día										
Ratio penetración producto			*35%*											
AC variable frec			1											
Precio alquiler Var.Frec			1350	€/día										
Precio alquiler auxiliares			100	€/día										
Precio servicio asistencia exprés			150	€/día										
Precio llaves en mano			500	€/alquier		2	alquires en año 1							
Ratio penetración producto			*25%*											
Ratio penetración productos auxiliares			*70%*											
Ratio servicio llaves en mano			*70%*											
Ratio servicio asistencia exprés			*45%*											
Equipos C&Tan D.			1											
Precio alquiler C&Tan D			125	€/día										
Ratio penetración producto			*40%*											
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
DC Hipot		7.984	7.984	7.984	7.984	7.984	7.984	7.984	7.984	7.984	7.984	7.984	7.984	95.813
	Acumulado	7.984	15.969	23.953	31.938	39.922	47.906	55.891	63.875	71.859	79.844	87.828	95.813	
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
AC VarFrec		11.103	11.103	11.103	11.103	11.103	11.103	11.103	11.103	11.103	11.103	11.103	11.103	133.238
	Acumulado	11.103	22.206	33.309	44.413	55.516	66.619	77.722	88.825	99.928	111.031	122.134	133.238	
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
C&Tan D.		1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.521	1.521	18.250
	Acumulado	1.521	3.042	4.563	6.083	7.604	9.125	10.646	12.167	13.688	15.208	16.729	18.250	
														247.300

Fig. E.1 Plan first full sales year.

							AÑO 2							
Capacidad de alquiler (días)			30	días/mes										
Equipos DC Hipot			4											
Precio alquiler DC Hipot			275	€/día										
Ratio penetración producto			*40%*											
AC variable frec			2											
Precio alquiler Var.Frec			1450	€/día										
Precio alquiler auxiliares			105	€/día										
Precio servicio asistencia exprés			160	€/día										
Precio llaves en mano			525	€/alquier		4	alquires en año 1							
Ratio penetración producto			*30%*											
Ratio penetración productos auxiliares			*70%*											
Ratio servicio llaves en mano			*80%*											
Ratio servicio asistencia exprés			*50%*											
Equipos C&Tan D.			2											
Precio alquiler C&Tan D			140	€/día										
Ratio penetración producto			*40%*											
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
DC Hipot		13.383	13.383	13.383	13.383	13.383	13.383	13.383	13.383	13.383	13.383	13.383	13.383	160.600
	Acumulado	13.383	26.767	40.150	53.533	66.917	80.300	93.683	107.067	120.450	133.833	147.217	160.600	
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
AC VarFrec		30.130	30.130	30.130	30.130	30.130	30.130	30.130	30.130	30.130	30.130	30.130	30.130	361.554
	Acumulado	30.130	60.259	90.389	120.518	150.648	180.777	210.907	241.036	271.166	301.295	331.425	361.554	
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
C&Tan D.		3.407	3.407	3.407	3.407	3.407	3.407	3.407	3.407	3.407	3.407	3.407	3.407	40.880
	Acumulado	3.407	6.813	10.220	13.627	17.033	20.440	23.847	27.253	30.660	34.067	37.473	40.880	
														563.034

Fig. E.2 Plan sales in the second full year.

AÑO 3				
Capacidad de alquiler (días)	30	días/mes		
Equipos DC Hipot	4			
Precio alquiler DC Hipot	300	€/día		
Ratio penetración producto	*40%*			
AC variable frec	3			
Precio alquiler Var.Frec	1550	€/día		
Precio alquiler auxiliares	110	€/día		
Precio servicio asistencia exprés	180	€/día		
Precio llaves en mano	550	€/alquier	6	alquires en año 3
Ratio penetración producto	*35%*			
Ratio penetración productos auxiliares	*75%*			
Ratio servicio llaves en mano	*85%*			
Ratio servicio asistencia exprés	*55%*			
Equipos C&Tan D.	2			
Precio alquiler C&Tan D	150	€/día		
Ratio penetración producto	*45%*			

		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
DC Hipot		14.600	14.600	14.600	14.600	14.600	14.600	14.600	14.600	14.600	14.600	14.600	14.600	175.200
	Acumulado	14.600	29.200	43.800	58.400	73.000	87.600	102.200	116.800	131.400	146.000	160.600	175.200	
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
AC VarFrec		58.463	58.463	58.463	58.463	58.463	58.463	58.463	58.463	58.463	58.463	58.463	58.463	701.552
	Acumulado	58.463	116.925	175.388	233.851	292.313	350.776	409.238	467.701	526.164	584.626	643.089	701.552	
		enero	febrero	marzo	abril	mayo	junio	julio	agosto	septiembre	octubre	noviembre	diciembre	
C&Tan D.		4.106	4.106	4.106	4.106	4.106	4.106	4.106	4.106	4.106	4.106	4.106	4.106	49.275
	Acumulado	4.106	8.213	12.319	16.425	20.531	24.638	28.744	32.850	36.956	41.063	45.169	49.275	
														926.027

Fig. E.3 Full sales plan in the third year.