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**Master's Final Thesis**



**Project:**



**ONE ROOF NO CEILING**

**MERME**

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## I. Abstract

In Spain we have one of the most developed electrical systems in the world and we are a leading reference in the development of renewable energy. Transport of primary energy to consumption centres, that is, households, companies and SMEs, local shops, is one of the things we pay the most for in the electricity bill, it can be around 40-60%. What if we could avoid this payout percentage? According to the latest research people are increasingly willing to convert to self-consumption, since there are fewer and fewer barriers that favour its installation. First there is an economic motivation in which in the medium-long term we save money, secondly there is another rational component such as caring for the environment. But it is true that self-consumption is not within everyone's reach. What about those who cannot afford it but want to reap the benefits of consuming renewable energy? What about those who due to infrastructure cannot install solar panels but also want to save money in their electricity bill?

One Roof No Ceiling was born with the purpose of solving these problems. In doing so, this start-up will focus on informing people about the advantages of being a solar energy producer and sharing that energy with your neighbour, so you can both enjoy cleaner and cheaper energy.

How are we going to tackle this problem? Solar communities is the answer. By installing solar panels in the roofs we are going to be able to provide energy to the house. But also the excess is going to be transferred to commercial areas or consumption points in a 500 meter ratio. The new RD244/2019 allows us to send this energy without having to pay any fee for it. This opens up the possibilities to important savings in the electricity bill. For the commercial contract (matcher) and for the one who gets the panels installed (roofer).

The disparity between the electricity consumption and production behaviour shown by the roofers, creates a gap of time where the electricity generated isn't being used immediately. Before ORNC was born, this excess was sold into the grid at a ridiculously low price, or captured in expensive batteries. We have solved this problem. ORNC allows roofers to send energy to matchers, putting their roof to work, saving money with no risk involved. And we will show you how during the project.

The deployment of rooftop solar PV systems has increased significantly in recent years. Spain has Europe's best solar irradiation levels although is not optimizing its potential. Solar energy and the self-consumption market has suffered two positive effects. The decrease in the prices of Pv modules and a new regulation that boost the deployment of self-consumption after eliminating the "sun tax" reducing administrative barriers.

Spain is building a great scenario for self-consumption, in 2019 the sector has doubled its installed capacity reaching 459 MW. The sanitary crisis of Covid-19 has impacted the sector by slowing down PV system installations and creating an atmosphere of uncertainty from a client point of view. Nevertheless, relevant actors of the sector agree on the fact that this break will be just temporary and that there is going to be a fast recuperation of the industry.

For drawing the perfect marketing plan we first need to understand more about our situation in the photovoltaic house systems business. We have decided to go through different analysis tools. First, the swot analysis which is the perfect opportunity to first get in touch with our business proposal towards the market and find out if our start-up is really feasible from a technical and economical point of view. Then the PESTEL analysis is a tool, used to analyse and monitor the macro-

environmental factors that may have a profound impact on an organisation's performance. This tool is especially useful in our case where we plan starting a new business. And last but not least, the Porter's 5 forces analysis, is a simple but powerful tool for understanding the competitiveness of our business environment, and for identifying our strategy's potential profitability.

Once we know at what point One Roof No Ceiling is, we will try to move forward with our business idea, enhancing our strengths and trying to overcome all the different threats we are likely to find in our path to succeed.

Nevertheless, we will need to fix another important matter concerning the marketing plan. What kind of approach towards the clients will we use? We will argue about the different kind of final approaches we have settled, basing all our results on different study cases, interviews to possible clients and final solutions (Web, App, etc...).

The Financial behaviour of this company is very investment oriented. The solar panels investment is shared between the client that wants to self-consume green energy, and ORNC. The main decision that we, as a company, had to make was the percentage of investment that was assumed by us.

In order to have a profitable company while being competitive against the rest of the players in this game, we decided that a 30% participation in the initial investment is right about the correct number.

Assuming a Market Penetration of around 12,5%, we calculated that the savings that ORNC as a company will be able to provide in comparison to the other marketers is up to 8%. We are able to provide this service to the consumers without an extra cost for them.

The way we do that is by taxing the energy that is transferred with a fair fee. So the more energy that the roofer hasn't used for himself, the more we will earn.

The company has a solid revenues base that adds up over the years as we keep installing more and more Solar panels. The return on investment for the company, assuming a realist growth is around 11%. Using this business model we are able to earn money in a stable way, providing savings for roofers and matchers.

To conclude, ORNC will achieve:

- Savings for matchers and roofers
- Cheaper solar panel systems (low initial investment)
- Profitability at a low risk for years to come

Want to know more about us? Read our full business plan! We detail exactly each steps and we analyse the market deeply, in order to provide the most reliable information possible.

## II. Internal Analysis

### a) Problem explanation

According to how the Spanish electrical system is designed, the electrical power is forced to be generated at the same rate as it is consumed at every moment and it is necessary to ensure electrical continuity. To achieve these two characteristics, a complex electrical system has been designed which we can see below in the graphic:

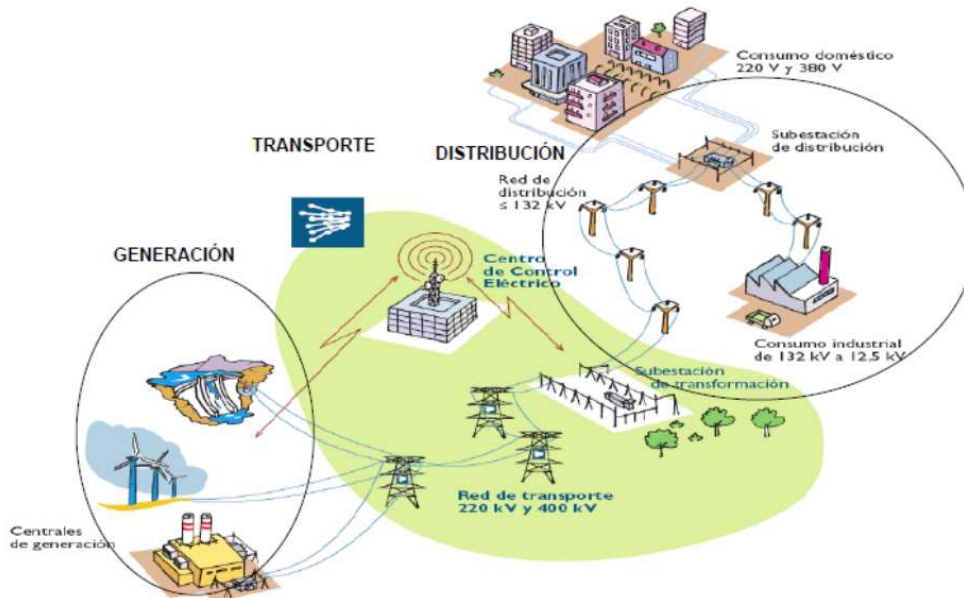


Figure 1. Basic diagram of the Spanish Electrical System. (Source: REE)

#### Why do we explain this?

We do not want to explain the stages through which energy passes from the moment it is generated in power plants until we consume it in our homes. But it is necessary to understand that generating and sending energy through an electrical grid has associated that **part of that energy is lost in the process**, and also has associated an **economic cost which will be reflected in the electricity bill**.

This structure, maintained practically unchanged since the middle of the last century, is undergoing a process of change caused by an increase in small generation plants located close to consumption, **distributed generation**, which connects directly to the distribution grid and next to consumption. However, regardless of where and by which ways electricity is produced, it will always be necessary to have an electrical grid that connects production and consumption centres.

Earlier we mentioned the *"electricity bill"*, which can be difficult to understand if we read it carefully. In summary we can say that the electricity bill includes two main concepts:

- **Contracted power (kW)**, it is a fixed term, depends on the contracted kW, you pay it even if you do not turn on the light.
- **Consumption (kWh)**, it is a variable term, depends on your electricity consumption.

If we were much more accurate, we could complicate the formula:

- What we pay for energy, according to the *Comisión Nacional de los Mercados y la Competencia* (CNMC), it represents around 37,48% of the invoice.
- What we pay for the access fees (tolls): includes what transportation and distribution costs. It is the part of the bill that is paid for the transport of that energy and for using the infrastructure that brings the light to its destination. According to the CNMC, it represents around 41,14%.
- Taxes: it supposes 21,38%. Here is the VAT, the electricity tax.

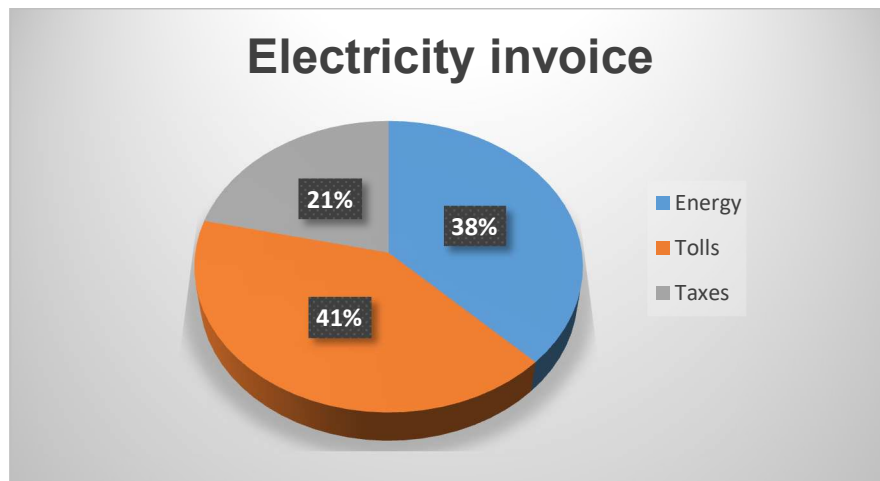


Figure 2. Pie chart representing the electricity invoice

As you can see, the **toll fees** represent the biggest portion of what we pay for electricity.

In order to reduce the distance between the power plants and the final consumption centers, and therefore reduce the toll fees which highly increase the electricity invoice, we want to promote PV self-consumption in a particular and different way.

In addition to this, Spain has a high radiation index compared to other countries in Europe that have more W per capita installed. For this reason, we have a lot of surface, which is not being fully used, to produce solar energy near consumption centers.



Figure 3. Self-consumption of photovoltaic houses

## b) ORNC solution

In this situation, *One Roof No Ceiling* wants to go one step further with self-consumption, we pretend to take advantage of the solar energy generated on your roof to share it between communities. So, our business idea is to create shared self-consumption communities, in which the **producers** generate solar energy from photovoltaic panels installed on their roofs and they are able to share this energy with small & medium size companies and with small local business, also known by the name of **consumers**, in an intelligent way based on their consumption and the distance that they are placed.

We want to open the path to distributed generation by creating small solar communities located in the suburbs of big cities, such as *Las Rozas, Majadahonda or Pozuelo de Alarcón* in Madrid. We are going to create smart grids of photovoltaic installations in these places and share the energy generated between other producers and consumers. So, we are sharing and providing cheaper and cleaner energy.

### How does it work?

Explained in detail, our idea is to create mini-power grids where everyone who takes part will pay a percentage of the installation depending on their power needs. In this way we manage to find a method to split the cost and make the initial investment more affordable to each client.

Our business model also allows us to share energy with those buildings that do not have photovoltaic installation. In the kind of client that we know as **consumers** we include companies, SMEs and other family homes, they will be connect to the smart grid in order to consume the energy that produce the solar panels of the **producers**.

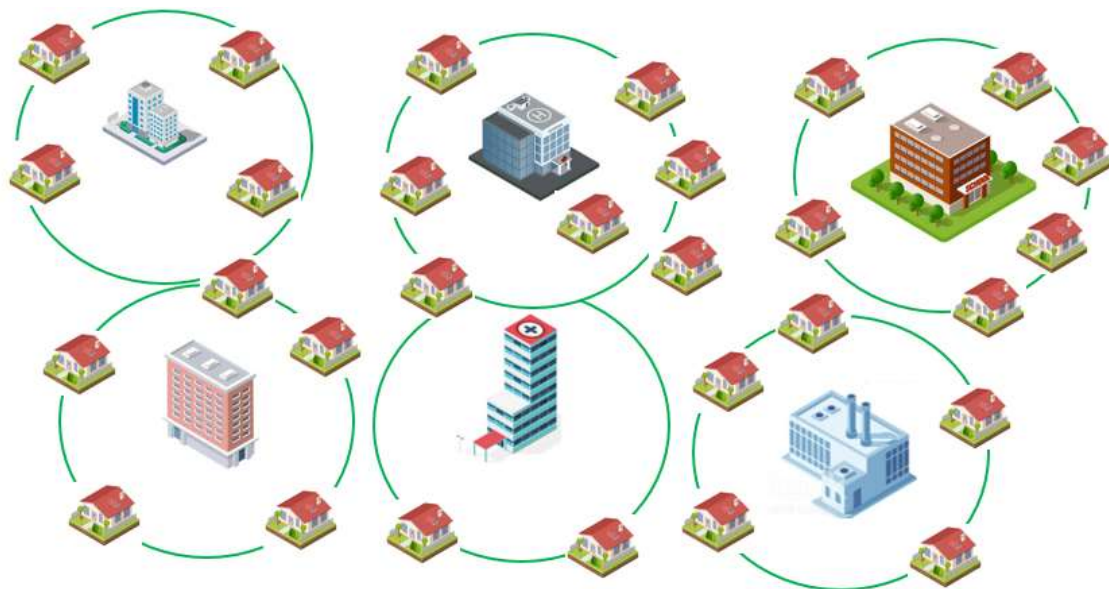


Figure 4. Smart grid representation of the business model

### **c) Design and business model validation**

#### How did our idea come about?

In one of the first Venture Launchpad workshops, we were asked to think of several innovative ideas that could be valid as a solution to the problems of citizens, and also, with the aim of complying with the *Sustainable Development Goals* (SDG) initiatives.

As our team consisted of four students from the *Master in Renewable Energy*, the first thing that came to mind was always about the same topic: renewable energy, self-consumption, and smart cities. We started to think about how we can contribute to society, considering these guidelines and our decision was to create a model of sustainable and connected city in which a few could take advantage of the renewable energy that others generated. The challenge was huge.

#### How can we create this type of city?

Solving the problem is complicated and ambitious, it has been a long time talking about the creation of smart cities and we all have a small vision of what it would be like in the future and from our start-up we want to get as close as possible to a real model, contribute by proposing a viable alternative that can be develop.

We were aware that we had a potential idea, so we decided to conduct a small survey to receive feedback and to see what interest people would have in participating.

Survey results can be found on the next page:



Feb 2020 Report

# ONE ROOF NO CEILING

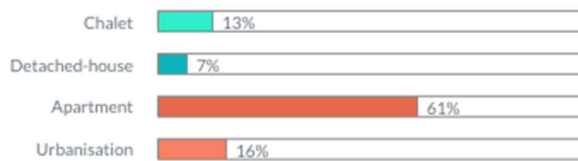
## Business Model Feedback

Survey



- 88 Answers
- 36 Years old (average age)
- University students and working people

### Kind of homes



Do you consider that the measures in favor of energy decarbonization are enough?



Do you know the economic and environmental benefits of using renewable energy?



Are you satisfied with your electrical bill?



Do you have any kind of renewable energy technology at home? (solar panels, mini wind turbines, biomass boilers...)

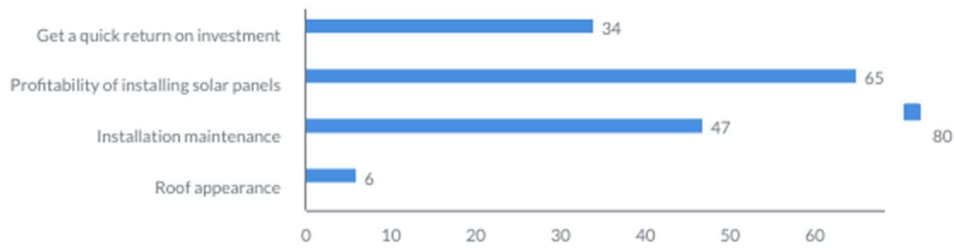


Would you be in favor of the installation of solar panels in your urbanization/building?



## Main concerns

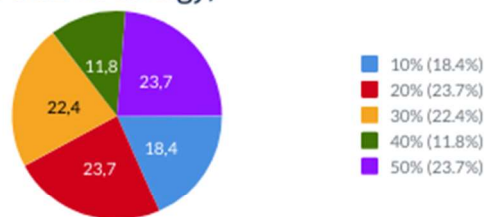
If you install solar panels, what would it be your main concern?



Would you be willing to assume an initial investment when installing solar panels in your home to be part of the start-up?



If so, what percentage would you assume, taking into account that the installation in a house is around 4000 and 6000\$? (These expenses would be agreed proportionally to the profits generated from the sale of energy)



Would you be willing to maintain a medium-long term agreement for the entire lifetime of solar panels (20-25 years)? The benefit is usually obtained after the first 5-7 years



After the survey we were able to draw some conclusions:

- In general, people have mainly economic but also environmental motivations and everyone would be in favour of installing solar panels.
- Most respondents are not satisfied with what they pay on the electricity bill. This is an important feedback such as our start-up is focused on decreasing these payments.
- And finally, those willing to install solar panels would be willing to assume a percentage of the initial investment.

Considering that the future users or those who would be willing to participate in the future showed interest, we decided to start developing our idea. But in parallel, we conducted a second round of telephone interviews, which would be designed to get to know our future client and their problems in more depth. It will be quantitative study.

Furthermore, the interviews had to target potential clients and from ORNC we want to learn and confirm the following:

- Upper-middle class users are willing to spend 5.000 to 10.000€ in a solar installation.
- Department stores want to save money on their electricity bill if this does not cause them an indirect cost overrun.
- The general population is unhappy with their electricity bill
- Context: household type and attitudes towards climate change.
- Perception of photovoltaic energy
- Current penetration and potential

Having said that, on the next page you can find the result of the interviews conducted:

March 2020 Report

# ONE ROOF NO CEILING

## Business Model Feedback

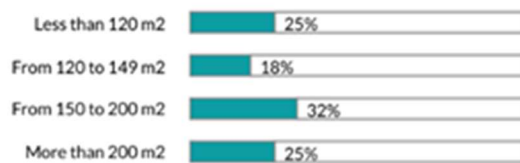
Interviews



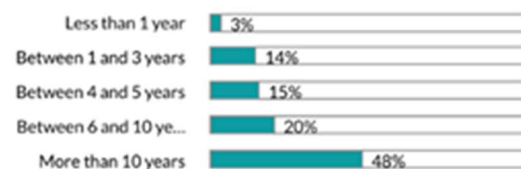
- 50 interviewed
- 30 - 60 years old
- owners/co-owners of their homes
- They reside in municipalities with less than 100.000 habitants

### Housing type

**Q1.** Approximately, how many square meters do you have at your current home?

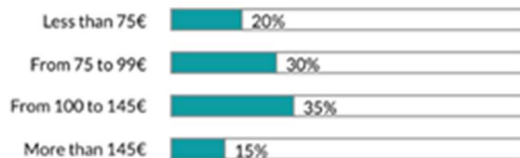


**Q2.** How long have you been living in that residence?



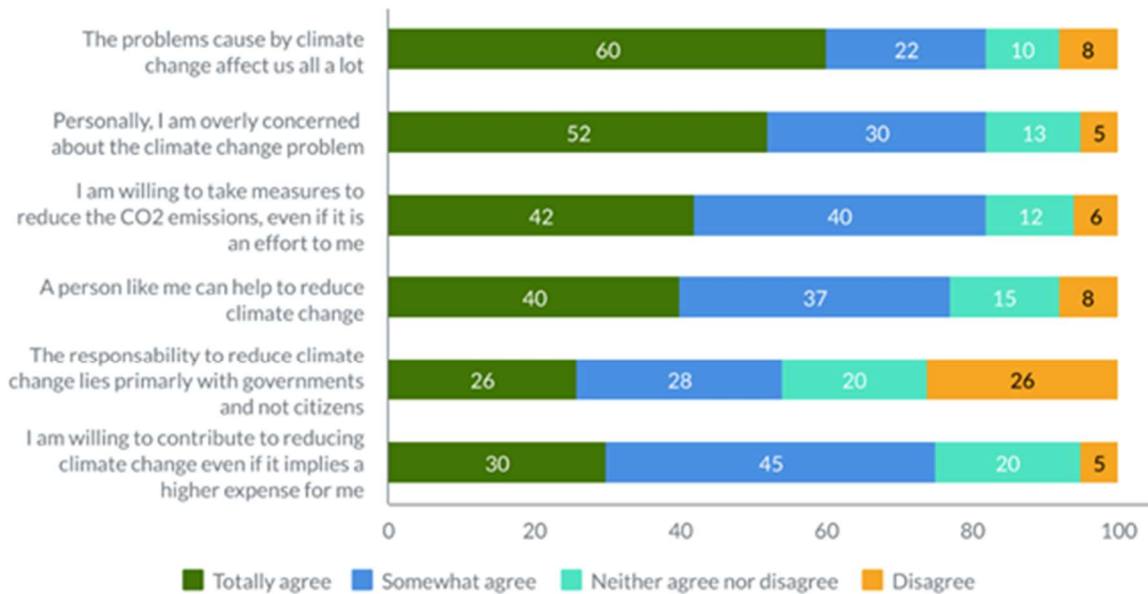
### Spending on electricity

**Q3.** Thinking now about your electricity bill, aproximately how much do you usually pay?



## Attitudes towards climate change

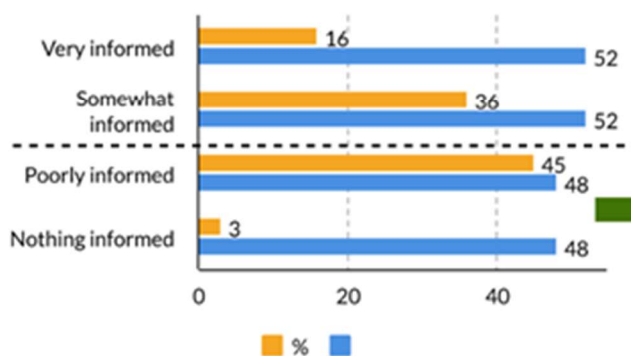
**Q4.** Changing the subject, please, indicate your degree of agreement with each of these statements:



## Perception on the photovoltaic energy

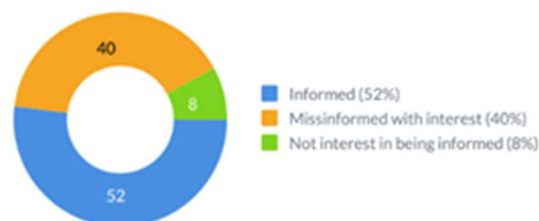
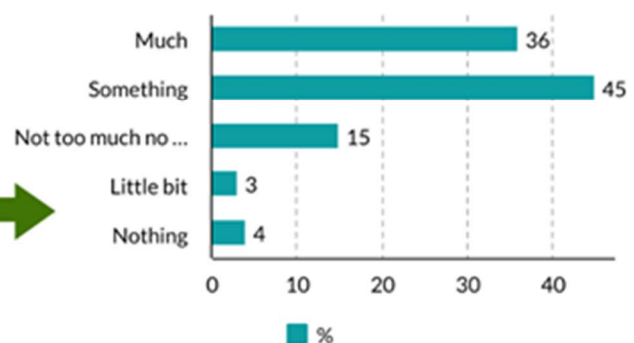
**Q5.** To get started, to what extent do you think you are informed about this type of energy?

Degree of information

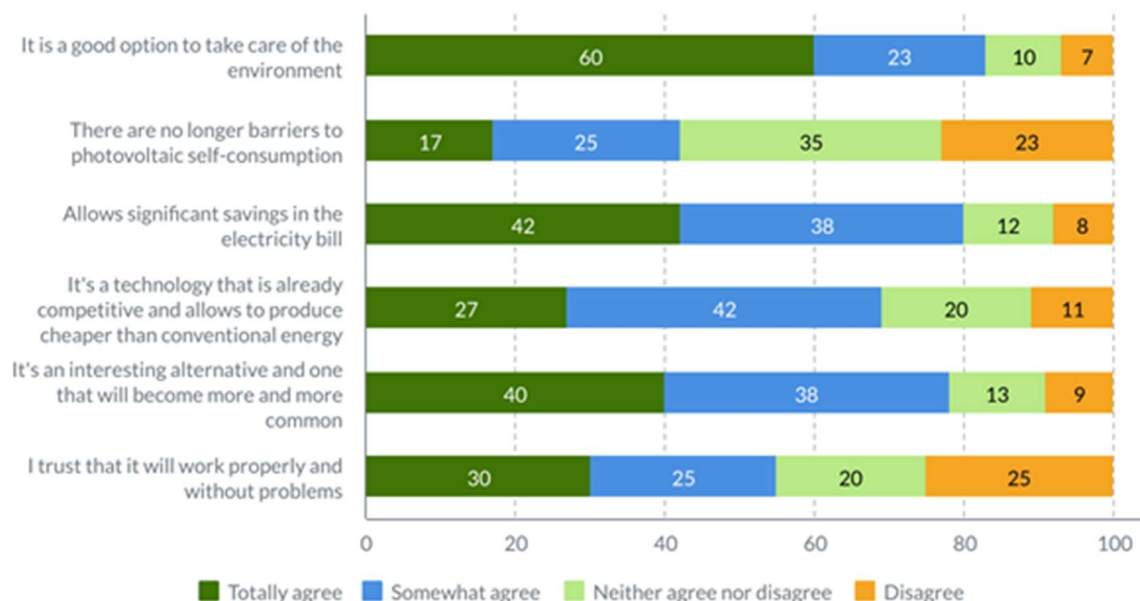


**Q6.** To what extent would you like to know more and have more information about this type of energy?

Interest in being informed



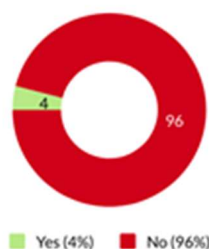
**Q7.** Below you will see a series of statements about photovoltaic energy and the installation of solar panels for self-consumption



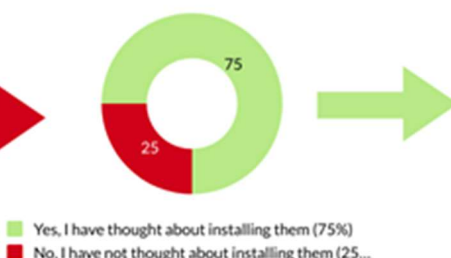
## Reasons to think about the installation

**Q8.** Do you have solar panels for self-consumption installed in your home? Have you ever thought about the possibility of installing solar panels to produce and manage the energy consumed in your home?

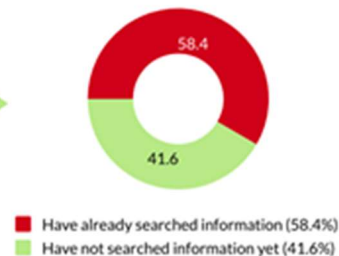
**Current installation**



**Interest in the installation**

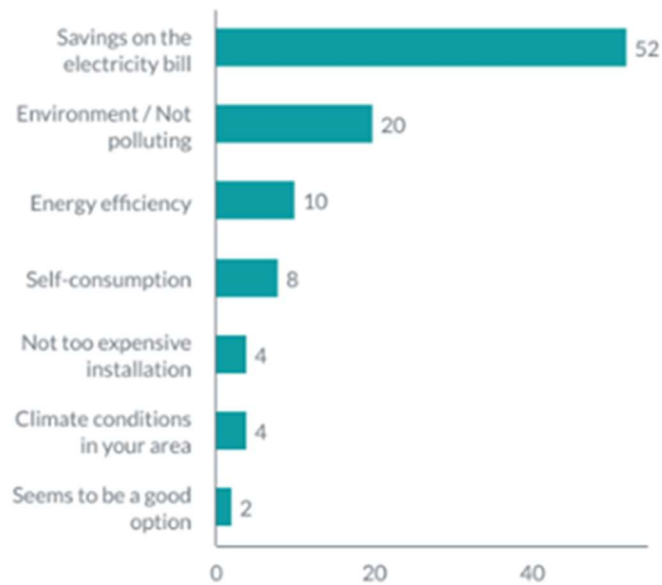


**Information search**





**Q9. What has led you to think about installing solar panels in your home?**



After conducting the interviews, we were able to have a better understanding of the real interest that our target had about self-consumption, the reasons why they would be willing to assume an investment in solar panels in order to save money in the medium-long term.

We can draw some conclusions from the study:

- **There is a high interest**, a high percentage of the interviews admit to being informed somehow about this technology or at least have an interest in being informed.
- **There is a great potential in the short-medium term**, most of which do not have photovoltaic panels installed, confirm having thought about the possibility of the installation. Almost 60% admit having searched information.
- This is no longer a secret, but **the motivation is mainly economic** since the savings in the electricity bill has been the most popular response, but **the environmental motivation also plays an important role**.

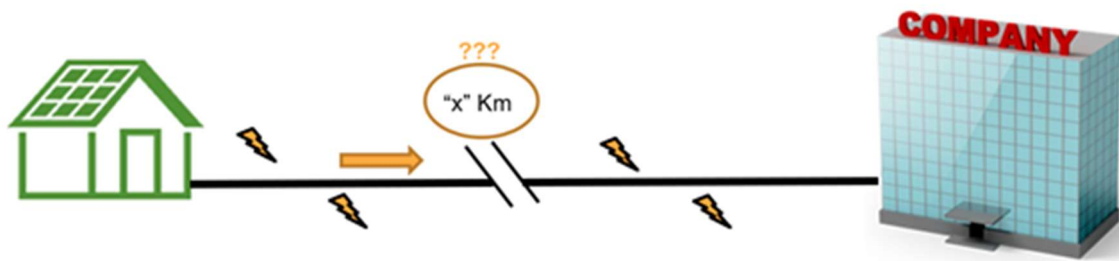
As a result of this study, we realized that our idea was providing solutions to user problems and we lay the foundations of our business model. In doing so, we went through different hypothesis in which we had to pivot in order to find a valid model in legislative terms and to be competitive.

## d) A walk through the different hypothesis

### HYPOTHESIS 1

It was simple, to generate electricity in a house roof with a photovoltaic installation and send the excess of energy to another building anywhere in Spain with higher power needs, just sending the electricity through the grid.

The problem was the toll fees would increase exponentially and it would be impossible to compete with the biggest companies, considering that we could only produce during the day.



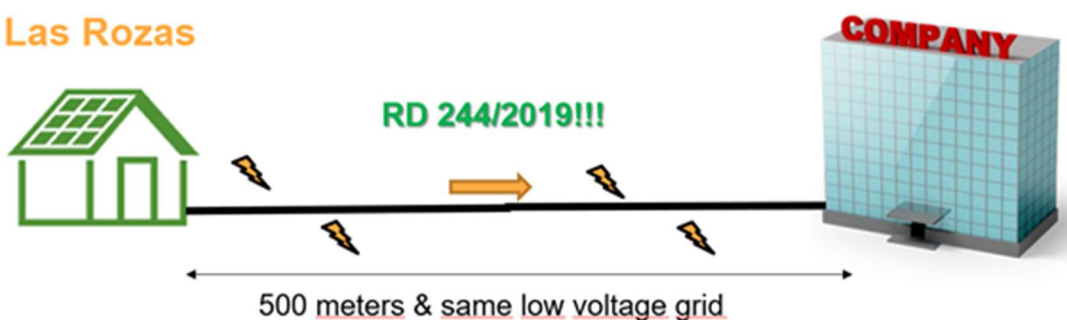
### HYPOTHESIS 2

We decided to start our business in locations with high house density, such as Madrid's suburbs. At this point we discovered the **royal decree 244/2019**, which allows us to send energy and create connexions between producers and consumers keeping in mind a few restrictions: 500 meters between generator and consumer, being in the same low voltage grid, etc.

The problem was that we still have a high cost investment for our first clients, so once again we did not validate this hypothesis.

**Madrid's Suburbs:**

**Las Rozas**



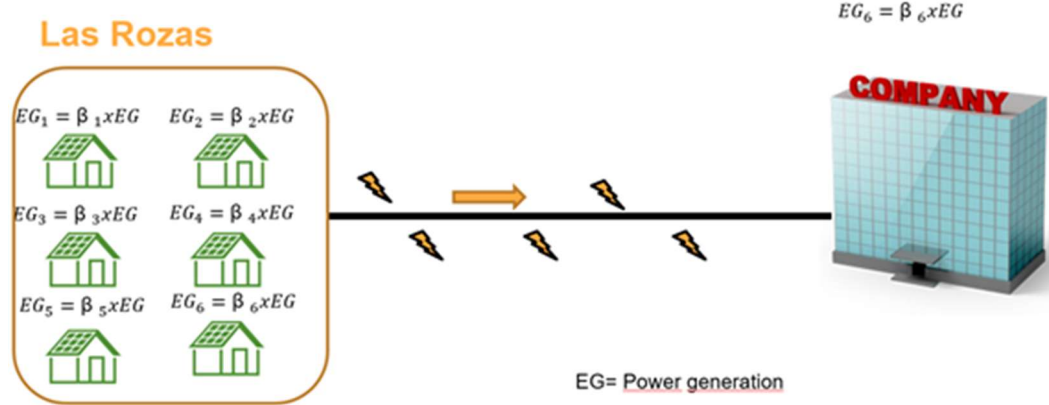
### HYPOTHESIS 3

The final solution seems to be the creation of mini power grids where all the components will pay a part of the solar panel installation depending on their power needs, which is a good way to split the cost in order to make it more affordable. In addition to this, we studied more deeply the royal decree mentioned before we came up with a formula that can split the power supply depending on our needs. Furthermore, we would be able to share energy with those buildings that do not have solar panels.



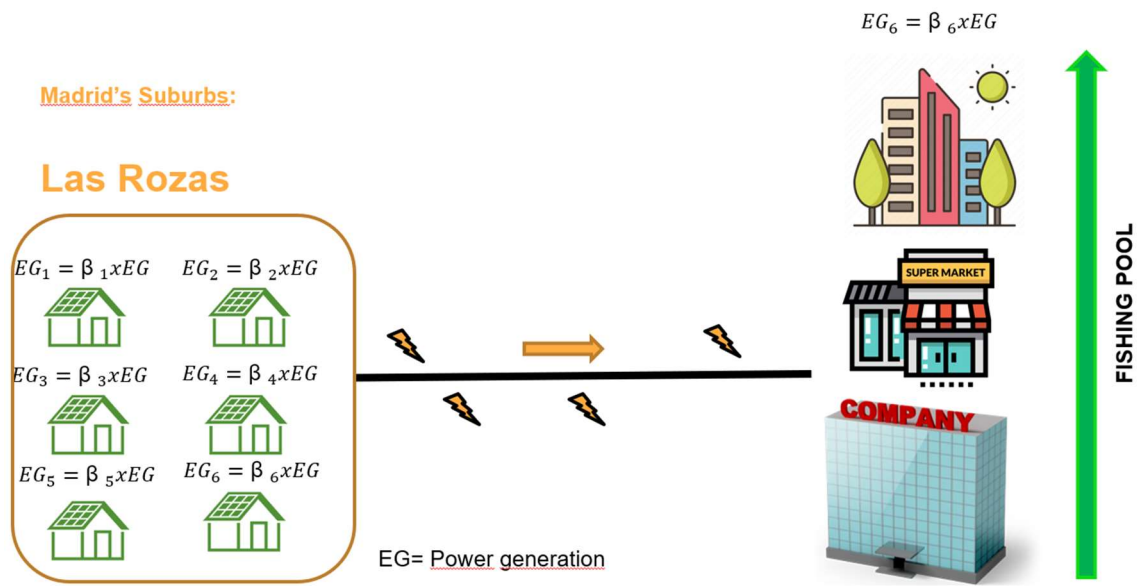
The problem, that we realized by conducting the first economic studies with real market penetration data was that our fishing pool was not big enough. We needed more consumers per mini power grid of producers.

Madrid's Suburbs:



**HYPOTHESIS 4 (THE FINAL ONE)**

It is the same principle of the previous one but with the difference that we increase the number of consumers by adding types of customers, not only companies but also SMEs, local shops and other homes without photovoltaic installation at their roofs.



### III. Market study

Any business requires a market analysis if the goal is to succeed. In this section, we will assess the residential PV market from a quantitative and qualitative point of view to show both value and volume. Not only will we consider market size but also customer segments, political support and promotion, regulation barriers, economic situation and environmental aspects.

Among renewables, solar energy is expected to make a significant contribution to achieving EU energy and climate goals for H2030. Joint Research Centre states that PV technology has the largest scope for cost reduction and efficiency gains. Solar energy provides up to 5 % of the EU's final electricity demand. This industry has experienced a rapid increased, from 40 GW of installed capacity up to 130 GW by 2019 [1]

The deployment of rooftop solar PV systems has increased significantly in recent years. Self-consumption during the last years has been very popular in many European countries such as Italy, the UK, France and Belgium for its potential and competitiveness.

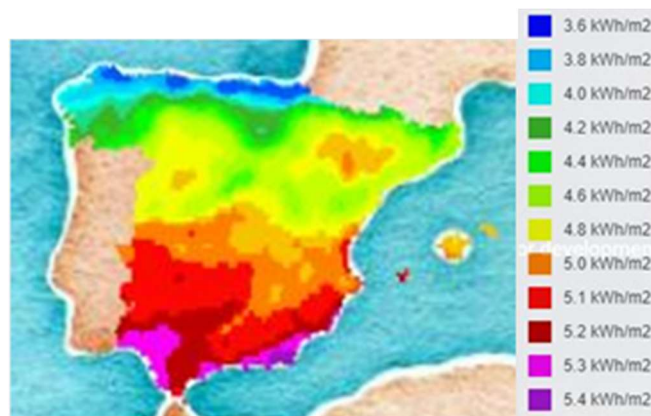


Figure 5: Global Solar Irradiation (Source: IRENA)

Countries with less potential irradiance like Belgium, 3 kWh/m<sup>2</sup> compared to Spain with 4.5 kWh/m<sup>2</sup> has managed to have more watts installed per capita (150) compared to Spain (15). As we can see, there is no doubt about Spain's solar energy potential compared to other countries. However, Spain is not optimizing this potential because there are fewer watts per capita installed than in any other country.

Luckily, there has been a change in two key factors that helped to boost the deployment of self-consumption in Spain. First of all, the massive price drop solar PV panels have experienced is one of the most relevant. Second of all, the new regulation helps to support and encourage PV self-consumption by eliminating the "sun tax" and has paved the way and influenced positively by reducing administrative restrictions.

According to UNEF (Unión Fotovoltaica Española) Spanish PV Association, changes in the Spanish regulation have been key for the deployment of self-consumption in the country. UNEF stands that self-consumption has proven its competitiveness as many industrial and commercial companies have chosen PV installations to cut down their electricity costs in order to be more competitive.

Last year the first "Spanish Observatory of Residential Photovoltaic Self-Consumption" was presented by Solarwatt and Grupo AiE and said that in three years Spain could deploy approximately 1.5 GW of residential PV capacity.

The figure below shows data released by UNEF where self-consumption almost doubled the installed capacity from 235 MW in 2018 up to 459 MW in 2019. According to data, 10 % of the 459 MW correspond to off-grid and 90 % to connect to grid self-consumption installations sector. As for sectors, UNEF estimates that most of this new capacity, between 50-60% corresponds to the industry sector, 30 to 40% corresponds to commercial sector and 10% to the residential sector. [2]

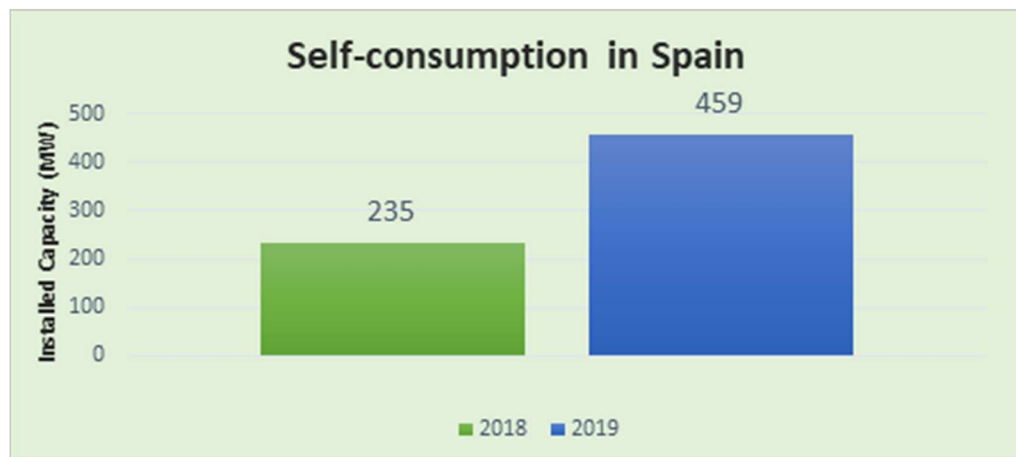


Figure 6: Self-consumption installed capacity in Spain (Source: UNEF)

PV self-consumption installations have clearly convinced citizens, companies and representatives of the Public Administration to be the best technology to cut down their energy costs and the carbon footprint of their activity, thus contributing to the fight against climate change.

### a) Context analysis

#### Political, Regulatory and Legislative:

Renewable energy and PV self-consumption is heavily supported and promoted by politicians because there is a social and European (SDG, Paris Climate Agreement) demand for it. In fact, Spain has Europe's best solar resource that is why Spain's National Climate and Energy Plan (PNIEC) for 2030 foresees that a 24.2 % of Spain's energy mix will come from PV solar energy. [3]

Financial benefits and incentives offered by governments such as paying self-consumers for the exported energy to the grid in Germany and the UK or reducing clients' electricity bills by the exported solar energy they produce in Italy and Chile or using net metering (allows consumers to feed electricity to the grid when they do not need it and consume from the grid when they do) like in Portugal and Australia are some examples.

In Spain, these advantages are motivating and encouraging users to self-consume from their households PV installations. The so-called sun tax mentioned before has been repealed by the new Royal Decree 244/2019 which regulates the administrative, technical and economic conditions for energy self-consumption.

- No more than 500 m between generator and consumer
- Or Being in the same Low Voltage Grid
- Or being in the same cadastral reference

It includes different types of self-consumption such as collective consumption and a simplified payment mechanism for any surplus energy injected to the grid or a proximate consumer using a concept similar to net metering. The most relevant aspect of this Royal Decree is that it provides a simplified regulatory framework and bureaucracy process.

**Economic:**

During the last decade, PV panels market have experienced a huge price drop. The International Renewable Energy Agency (IRENA) states that prices have fallen around 80% since 2009. One of the main characteristic of the PV industry is its competitiveness in cost compared to other electricity generation technologies.

In many markets self-consuming PV electricity is already more attractive from an economic point of view than buying electricity from the grid.

The decrease in the price of the materials has been key to the growth of self-consumption in Spain. What was once a big investment within the reach of a few people now turns out to be the perfect and affordable opportunity to convert an expense (PV installation cost) into an investment that provides savings in electricity bills.

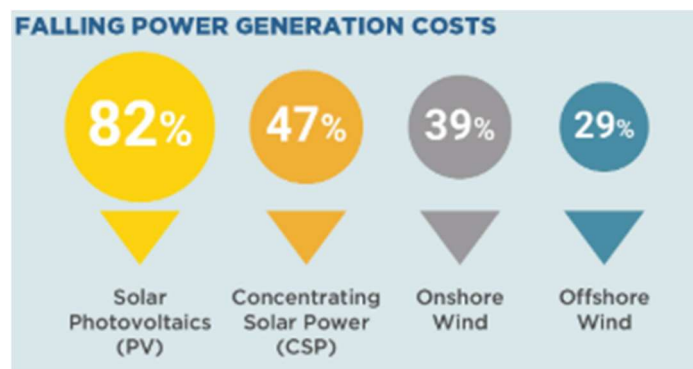


Figure 7: Cost-competitiveness of renewable energy 2010-2019 (Source: IRENA)

**Technological:**

Producing energy by using PV modules placed on rooftops is mature and feasible technology. Nevertheless, the PV industry is highly innovative. Manufacturers and developers are continuously

producing new products (bi-facial panels or perovskite solar cells) but also researching and innovating to improve some of the components and materials required in solar energy installations.

Progress in R&D is continuously being made in both existing and emerging technologies, with the aim of achieving further significant cost reductions and performance improvements. Efficiency improvements, modules refrigeration to increase its lifetime and different solar panel cleaning technologies for maintenance are some examples.

### **Social:**

The widespread public opinion about self-consumption hold it's not only beneficial for consumers but also the electrical system and to fight climate change. Self-consumption is the most popular way of taking advantage of solar energy with rooftops photovoltaic installations.

Self-consumption of PV electricity generated on site can be an opportunity for consumers to reduce electricity costs, grid charges and other fees for electricity supply. Another benefit is that grid costs for the transmission of electricity are also saved and CO<sub>2</sub> emissions avoided thanks to the clean electricity generation of PV.

Moreover, self-consumption has a positive social impact because not only it reduces the demand on the grid and energy poverty but also reduces energy imports and increases a country's energy independence. These contributes to a lower amount of energy circulating through the transmission network, which decreases energy losses.

Allowing citizens to self-consume from PV rooftops provides them with the right to participate actively in national energy transition plans. The more people involved in the energy transition, the greater its public acceptance and the lower its cost.

### **Environmental:**

Solar energy and self-consumption have played a key role in fighting climate change. Generating electricity with solar energy instead of fossil fuels can significantly decrease greenhouse gas emissions (CO<sub>2</sub>) to the atmosphere and support energy transition. It helps cities to improve their air quality and reducing respiratory diseases.

Studies suggest that citizens who self-consume (prosumers) from their PV system become more energy aware which changes positively their way of consuming energy providing full control of the electricity consumption. Distributed generation will make it possible to improve demand management.

Europe's Sustainable development goals, Paris Agreement and PNIEC (Spains National Climate Plan) for 2030 are all aligned together to provide better information to users on how to perform responsible consumption and help building sustainable cities. This will create local jobs and economic growth thus affordable and 100 % clean energy to fight climate change.



Figure 8: ORNC Sustainable Development Goals

## b) Covid-19 Impact in the photovoltaic industry

This section aims to describe the current situation of solar energy and self-consumption in Spain after the sanitary crisis caused by Covid-19 and how is going to impact in the short and medium-term from several points of views (manufacturers, suppliers, investors and clients).

In order to describe the current panorama and what will be the impacts of Covid-19 on self-consumption, UNEF have gathered highly relevant individuals in the photovoltaic and self-consumption sector to clarify and forecasts the future of PV industry. Firstly, Juan Carlos Jadraque representing INGETEAM, a company specialized in the manufacturing of energy conversion systems. Secondly, Power's CEO, José Benjumea representing self-consumption industry. Finally, Jordi Vega, construction manager at GRS, company specialized in the construction of photovoltaic plants and their connection to grid.

All of them agree on the fact that renewables and photovoltaic sector will play a key role to exit this crisis. The following aspects describes the situation perfectly.

- Price of materials will be the same as before (med and long-term supply contracts)
- China as world's PV modules supplier
- Government support is key to an early recuperation of the sector.
- Self-consumption clients are not as keen as before to install PV panels.
- Covid-19 has slowed down the construction of big plants and self-consumption.
- Slowdown billing.
- Optimism and confidence that solar industry will have a fast recuperation due to its medium and long-term market potential for investors.

### Covid-19 impact on industrial self-consumption

There has been a temporary break although PV potential and savings still remain. For this reason Power's CEO strongly believes that despite the situation, industrial self-consumption should not be

affected because now is the time to save money, be self-sufficient and sustainable and more competitive for the future.

#### Covid-19 impact on financing

Promoters state that banks have decreased and slowed down their investment whilst investment funds are still interested and keen in financing renewable energy projects.

#### Covid-19 impact on residential self-consumption

During isolation, this sector has suffered more than others. Construction reduced its installation pace forced by authorities due to employees safety reasons. However, business relationships have been very active, says Powen's CEO.

The main problem in this industry has been the client and political uncertainty. It is crystal-clear that Spain has opted for renewable energy. Despite this, there are still some fiscal, administrative and communication issues that the government should assess to keep supporting and promoting self-consumption PV systems.

### c) Competitors

Using renewable energies to produce electricity is a world trend. Self-consumption gives users the chance of generating their energy to increase their autonomy and reduce costs.

For this reason, self-consumption market is full off competitors. Among the five big marketers (Endesa, Repsol, Naturgy, Iberdrola, EDP) they offer their clients photovoltaic self-consumption solutions to produce electricity using PV panels. All of them offer more or less the same solutions such as:

- Technical feasibility study
- Installation and administrative process
- Electricity bill savings
- Benefits for injecting power to grid
- Full control and monitoring of PV system
- Operation and maintenance

In the other hand, there is a wide range of residential and industrial self-consumption companies that are also big competitors as they offer the same services as mentioned before. Here are some examples of our competitors:

<b>Holaluz</b>	<b>EDP Solar</b>
<b>EDF Solar (Energia Innovacion Y Desarrollo Fotovoltaico)</b>	<b>Revosolar</b>
<b>SotySolar</b>	<b>Powen</b>
<b>Solar Profit</b>	<b>Perfecta Energía</b>

**Figure 9: Self-consumption business competitors**

Distribution companies will be able to modify the access contracts of small consumers simply by obtaining the prosumer’s consent and measurement configurations have been simplified such that in most cases a single meter at the distribution network border will be sufficient.

Some of them like Repsol offer distributed generation solutions (Solamtech) by using PV rooftops installations in some buildings while at the same time others are connected to this PV system and consume part of the energy generated.

In Zaragoza, EDP, ECODES and Zaragoza city hall have already taken a step forward in distributed energy. They will deploy the first “solar neighbourhood” in Spain during the summer. Neighbours will be able to join their Solar Neighborhood without having to make any kind of prior investment or installation in their homes, provided they are less than 500 meters from the municipal building where the plates will be.

The service will be available to both EDP marketer clients and other companies by contracting service with a monthly fee, more advantageous than having to make an initial investment. Participation in Barrio Solar will save 30% on the electricity bill for some 150-200 homes and small businesses.

In One Roof No Ceiling clients will benefit from this innovative, environmental and social solution of distributed generation that will bring economic savings and climate action providing competitiveness.



2019 Marketers two price model	€/kWh during peak hours	€/kWh during off-peak hours
Lucera	0,148	0,073
Endesa	0,1586	0,0794
Holaluz	0,17	0,099
Repsol	0,149	0,074

**Figure 10: Economics and competitors**

The above table represents the electricity (kWh) price that energy distribution companies or marketers offers to users depending on the moment of the day they consume the electricity. During the day, electricity prices vary significantly. Marketer offer different tariff depending on the hour. Most of them offer two prices, one for peak hours (higher expense) and other for off-peak hours (lower expense). ORNC proves its competitiveness during the peak hours were we offer clients the cheapest prices per kWh consumed (0,14 €/kWh).

#### d) Target client

Solar PV self-consumption sector can cover any client. We have a big client portfolio because there are many ways to self-consume solar energy. Clients with medium-high incomes and environmental awareness are our target client. These are some examples of self-consuming PV solar energy:

- **Private self-consumption**, where only one individual or family consume the PV electricity they produce.
- **Collective self-consumption**, where a group of individuals or neighbours consume electricity from their shared PV installation
- **Virtual self-consumption**, where generation (PV system) and consumption of electricity happens in different locations but very close to each other (RD 244/2019 restrictions).

As we can see, virtual self-consumption is a mix between a) and b) because it involves both actors, producers (PV system) and consumers. For this reason, our target client could be almost everyone who has a rooftop. However, we want to reach as many residential clients (household and communities) as possible without forgetting about the industrial and commercial sectors. The next list helps to describe how both parts (producer/consumer) get involve between each other.

- **Schools and universities** can benefit either from consuming solar energy they produce on their rooftops or consume the electricity produced by the nearby houses with their rooftop PV systems.

- Medium-small size **industrial and commercial companies** (restaurants, gym centre, workshops, office buildings and industry) can take part in any of the examples mentioned before. Self-consumption help companies to be more sustainable, lower their costs and improves their image towards clients.
- **Malls or shopping centres** such as clothing shops, supermarkets, bars, restaurants or any other small shop of the mall can benefit from solar PV consumption.
- **Public and municipal buildings** like town halls, sports centres, public schools and health centres are beneficial to enrol citizens and promote individual or shared rooftop PV systems.
- **Households** represent 1/3 of residential buildings and it can vary from individual houses, chalets, apartment buildings, urbanization or town houses with available rooftops.

## IV. Marketing Plan

In order to understand more about our situation in the photovoltaic house systems business, we have decided to go through different analysis tools. The first one is the SWOT analysis, which will help us to give a clear understanding of our situation and the related internal and external factors of our possible strengths, opportunities, threats and weaknesses.

Once we know at what point One Roof No Ceiling is, we will try to move forward with our business idea, enhancing our strengths and trying to overcome all the different threats we are likely to find in our path to succeed. In that case we have used two different business analysis tools, the PESTEL analysis and the 5 Porter's forces analysis.

We will be able then, to suggest new solutions for our business idea.

Nevertheless, we will need to fix another important matter concerning the marketing plan. What kind of approach towards the clients will we use? We will argue about the different kind of final approaches we have settled, basing all our results on different study cases, interviews to possible clients and final solutions (Web, App, etc...).

### a) SWOT analysis

This SWOT analysis is the perfect opportunity to first get in touch with our business proposal towards the market and find out if our start-up is really feasible from a technical and economical point of view.

Just for a mind refresh, we are basing our business on the power self-consumption with photovoltaic systems using the new modalities which the RD 244/2019 offer us, such as the collective self-consumption. We will now start with the SWOT analysis, bringing up first the internal aspects of ORNC, and finally the external aspects:

#### **Internal aspects**

Strengths:

- Photovoltaic business it is a really mature market, with reliable and enhanced technology. In fact it is aimed to be the second biggest power producer technology in Spain in 2030.
- Due to its technological reliability, it has become one of the cheapest technologies in the market. Prices have decreased significantly since the 90's (around 99% of its original price). And prices are continuing to follow a downward trend.

Weaknesses:

- Even if prices have decreased during this last years, prices are still high and this kind of energy production is steel considerate expensive. About 5000€ a standard installation.
- Low single-family homes density. In Spain most of the residential building are flats and apartments. Only one third of residential building are single-family homes.
- Our business idea is based to create binding long contracts with clients. It can make it less attractive towards the house owners.

**External aspects**

Opportunities:

- RD 244/2019. As explained at the beginning of the report with the different self-consumption modalities.
- Energy Supply formula depending on the energetic needs.
- We can reduce the investment costs. Using another splitting formula and depending on what are the consumer needs, this house owner will have to pay a proportionate part of the investment.
- It will avoid the so called “Peaje” fee, which is actually about the 60% of the power bill.

Threats:

- ORNC will only provide energy when its photovoltaic systems will be able to work (when the sun is shining during the day). Big companies can also provide energy from the grid 24/7 during cloudy days and even during night.
- Royal decree restrictions. No more than 500m between generator and consumer Or Being in the same Low Voltage Grid Or being in the same cadastral reference.
- Hard to find consumer clients. It might be easy to set a smart grid of clean energy production but for each grid we need a big consumer which will consume most of the electric generation.

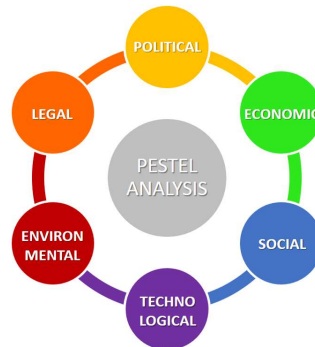
SWOT summary:



Figure 10: SWOT analysis

## b) PESTEL analysis

A PESTEL analysis is a tool, used to analyse and monitor the macro-environmental factors (Political, economic, social, technological, environmental and legal aspects) that may have a profound impact on an organisation's performance. This tool is especially useful in our case where we plan starting a new business.



### **Political & Legal**

These factors are all about how and to what degree government intervenes in the economy of our industry.

The Spanish government has always had the final decision concerning solar self-consumption. For instance the solar fee or “Impuesto al sol”, was a fee enacted by Spanish high institutions, which affected each solar power producer. This fee was the heart of the matter regarding the decreasing photovoltaic industry since 2010. However, this fee has been repealed and a new Royal Decree (RD 244/2019, previously mentioned) has been launched since 2019 in Spain, in order to support and encourage new solar power producers to participate in that industry in a medium/small-scale. Self-consumption, is nowadays largely free of government restrictions and fees. Nevertheless there still have not yet done, a specific kind of remuneration, when investing in such a clean energy as solar power for house systems.

### **Economic**

Economic factors are determinants of a certain economy's performance.

As photovoltaic technologies are getting a higher level of maturity, prices are decreasing. Especially in the self-consumption market, where 10 years ago a standard installation investment was about 30.000€ and nowadays it is about 4.000 to 6.000€.

Our business is also affected by Electric Power Marketers, which are in charge of supplying energy 24/7 to the homes. They are used to supply energy from the grid, and they have to sell their energy with a power transportation fee, which is about 60% of the consumer power bill.

### **Technological**

Technological factors pertain to innovations in technology that may affect the operations of the industry.

Even if the technological aspect is already mature, it is not yet perfect. Each installation have a different performance, due to different, sun orientations, roof inclinations, the total available roof surface for the installation, or even shadows projected to the panels.

## **Social**

This dimension of the general environment represents the demographic characteristics, norms, customs and values of the population within which the organization operates.

It is at this point, where we decided to interview 100 people of different ages and parts of Madrid. Each question we asked was concerning our business model, using their feedback for the start-up validation. Here are some of the results:

- 69.3% lives in an apartment. The remaining 30.7% live in houses or sort of single family-homes (national representative sample –INE)
- 72% of them, claim to know the economic and environmental advantages of using clean power production.
- 76% are not agree regarding their power bills.
- Only 10%, have a renewable power installation at their homes.
- 100% of our survey respondents, claim being agree to install a solar system at their homes.

We also ask them about their main concerns and preoccupations regarding the installation of photovoltaic house systems. In this case they had many options to add:

- Almost 80% of them, were really concerned about the profitability of the investment (Payback, TIR) and the huge initial investment.
- 40% were worried about the maintenance of the photovoltaic system.
- Only 7%, claim to be concerned on the visual aspect of the house.

## **Environmental**

These factors include ecological and environmental aspects such as weather, climate, environmental offsets and climate change.

Our business is based on the renewable power generation with solar resource. It is a clean way to avoid CO2 emissions in the energetic sector. Furthermore, Spain has the highest solar radiation average in all Europe. A good opportunity to generate cheap energy on our own.

In the following sheet, we can see a summary with all the points of each main aspect from the PESTEL analysis. We will try to give each point a different grade, depending if it is a positive or negative aspect for our business, so that we will fight to overturn them with the 5 porter's analysis.

### **PESTEL analysis grading:**

Factor		Detail	Impact
Political & Legal	Government changes	Slow transition in the energetic politics	Negative
	RD 244/2019	Distance self-consumption. No need to have our own roof to consume clean energy. Avoids “peaje” fee. New modalities.	Extremely Positive
	Administrative simplification procedures	Less demanding administrative procedures.	Positive
	Self-consumption economic retributions	None.	Negative
Economic	Self-consumption installation costs	Costs of photovoltaic devices are constantly decreasing.	Extremely Positive
	High investment costs	High initial investments.	Negative
	Electric Power Marketers	The electric power marketers, have the obligation to sell the energy considering the “peaje” fee which is about 60% of the fee. It will be hard for them to improve their prices if we can offer 60% cheaper energy.	Extremely Positive
Social	Homes	Only 1/3 of the population leaves in single-family homes.	Negative
	Disagreements with the power bill	They claim to pay more than they should	Positive
	People willingness to install any kind of renewable installation	100% of our survey people.	Extremely Positive
	Main concerns	Investment risks.	Negative
Technological	Mature technology	High technological feasibility.	Extremely Positive
	Less efficient installations	Depends on orientation, inclination, shadows, ...	Negative
Environmental	Eco-friendly business	Clean energy which avoids CO2 emissions	Positive

Figure 11: PESTEL analysis

### c) Porter's 5 forces analysis

Porter's 5 forces analysis, is a simple but powerful tool for understanding the competitiveness of our business environment, and for identifying our strategy's potential profitability. This is useful, because, when we understand the forces in your environment or industry that can affect our profitability, we will be finally able to adjust our strategy accordingly keeping in mind all the PESTEL weak points.



#### **Competitive Rivalry**

This aspect is the sum of all the other "forces".

So far, our market is not a market with an intense rivalry. At least in Spain. Comparing with other European countries, for instance Belgium or Germany, with 8 more times photovoltaic self-consumption installations in residential buildings than we have. We could highlight this data due to the fact that in Spain the solar resource intensity is higher and it can be more predictable and easy to manage in a planned way, comparing to those countries. The main reasons which explains the Spanish photovoltaic market situation, is because of politics, and the well-known "sun fee" ("impuesto al sol"). Nevertheless this situation is about to change, with the arrival of the new Royal Decree RD244/2019. This latter decree, offer us different self-consumption modalities. It can be a good opportunity to fit each kind of installation considering the consumer needs. That heterogeneity translates into a divided market. A good opportunity for big companies, with higher economic resources, to deal with all modalities. That will make smaller companies to adapt and choose only one modality.

Solution: Offering our clients only one differentiated service: Collective consumption, with mini power grids, and sharing that excess of cheap energy with other potential consumers.

#### **Buyer Power**

Here, you ask yourself how easy it is for buyers to drive your prices down.

We have two different clients, as our business model is B2B2C. Our first clients are the house owners, where we plan to install the photovoltaics systems. We have to keep in mind the SWOT analysis. Only 1/3 of the residential buildings are single-family homes, we have then a really low house density. Furthermore, even if the initial investment has decreased the last years, it is still expensive for such a mid-low-income country, as Spain.



Solution client 1: Targeting our business to high-income neighbourhoods located near big cities, where we are able to find more single-family homes, so that we can solve both problems (for instance, Pozuelo de Alarcón, Las Rozas, Villanueva de la Cañada, ...). Plus finding how much we can help them with the initial investment.

The second clients are final power consumers (supermarkets, office, malls, etc.). This client is the most difficult to reach. We can only connect with them bearing in mind the RD244/2019 restrictions.

Solution client 2: For each consumer client, we will have to model a map with the different producer scenarios. This client will be somehow, the “heart” of that map, where all the photovoltaic installations will be in a radius of no more than 500 meters. And last but not least, as we will be following the Royal Decree rules, consumer will be able to avoid to pay the power transportation fee mentioned in the PESTEL analysis.

### **Supplier Power**

This is determined by how easy it is for your suppliers to increase their prices.

Since the beginning of the century, nearly all of the photovoltaic panels and other electrical devices have been supplied by Chinese companies, because of their low prices and high-quality technologies. Due to the high competitive rivalry between them, it may not be a problem for ORNC. Nevertheless, it could be a good option to sign a binding contract with one or only two suppliers in order to get some discounts when buying in bulk. It shall not be difficult to find stable prices for the supply.

### **Threat of new entrants & Threat of substitutes**

Our position can be affected by people's ability to enter our market and finding a different way of doing what we do.

It can be strongly related with the competitiveness. As mentioned before, with the brand new royal decree arrival, we cannot accurately determine how this market is going to evolve. What we know so far, is that we are new entrants but we are also certain that we won't be alone. The simplification of the administrative procedures, will motivate new entrants on their willingness to participate in this business, with substitutes self-consumption services. The main problem would be if big companies, create start-ups like ours with the added value, that they can offer energy 24/7.

Solution: Offering to clients, financial advantages. As mentioned before we agree to reduce part of the installations budgets (Up to 40% of the total amount). Plus there will be no need to pay the total amount of the investment on a one payment.

#### d) Marketing approach: Web & APP

Once most of the weaknesses have been fixed, we have to draw a business approach towards clients.

We can't properly target potential clients for our business without first reviewing our existing customer persona, which is a thorough summary of our ideal customer. It is also important to learn where to find our potential clients so we can reach them with our marketing plan. It can also sound obvious, but we must have a thorough knowledge and understanding of your products and services. And once, Armed with the necessary tools and knowledge, we can now directly attract clients through our marketing techniques. There are several approaches we can take when we are reaching out to new clients. One method is to reach out to potential clients by sending them email newsletters that include discounts, promotions and relevant information about your business.

As a summary of the theory set out above, applied to our business model, we have the following client approach (keeping in mind that we have two different clients, Producer and Consumers):

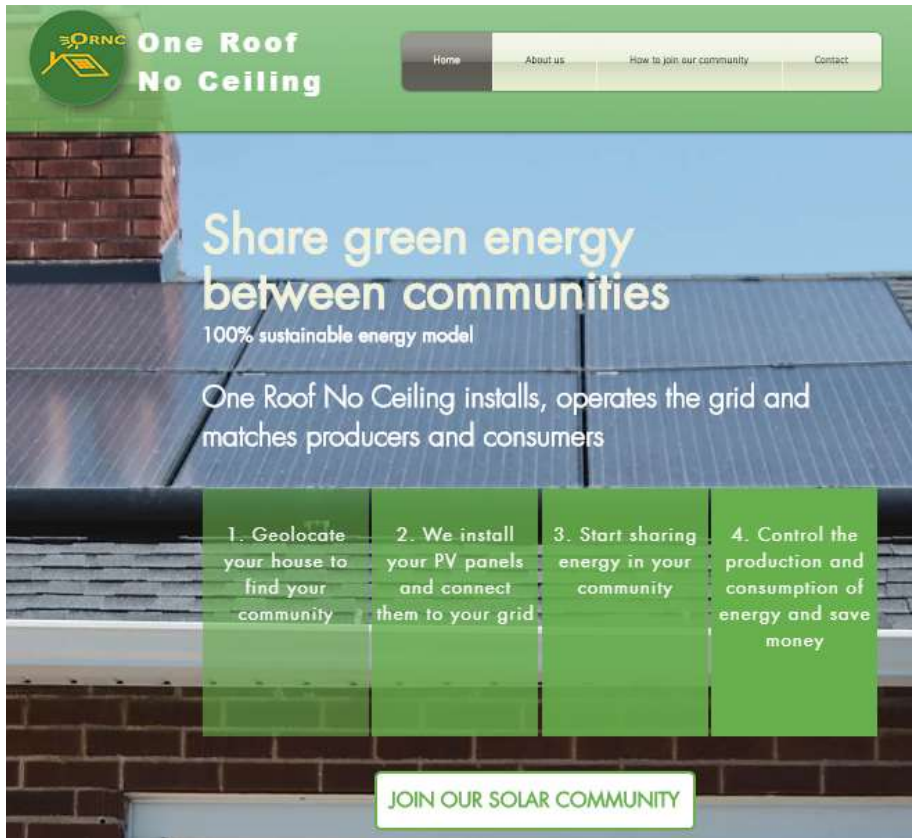
- **Producer clients** are single-family homes owners. They live in Madrid suburbs, they are usually young families, with a couple of children, with mid-high incomes. As big cities suburbs have relatively, young population, they are always in touch with new technologies, especially with the internet in smart devices. However, they are not really aware about different kind of self-consumption services, technicalities, and advantages. They would need a tool for instructing them, the basics of solar power generation at home, such as a web, explaining to them all the economic and technical advantages. Initial investment for a standard photovoltaic home system, will surely seem high form them. That is why we plan up to 40% reduction for new clients during the first years.
- **Consumer clients** are malls, supermarkets, offices,... owners without photovoltaic installations in their roofs. They must be located near producer clients. Their facilities are part of their business, therefore they are constantly watching out for reduction prices, for instance a lower power bill. They will only need a basic instruction of our business, explaining them advantages of using our power generation, such a 60% power bill reduction. They have needs of information about the real profitability.

We have then decided to set two different platforms for our potential clients. The first one is a webpage, with all the information regarding One Roof No Ceiling: story, ideals, and business idea... but also with a quick review of how this technology works and what the economic and technical advantages of joining us are. As our producer client, can also work as a consumer client, we will set this web in common, between both clients. In the "joining us" part, they will need to choose what kind of service they want (they can choose both in their case).

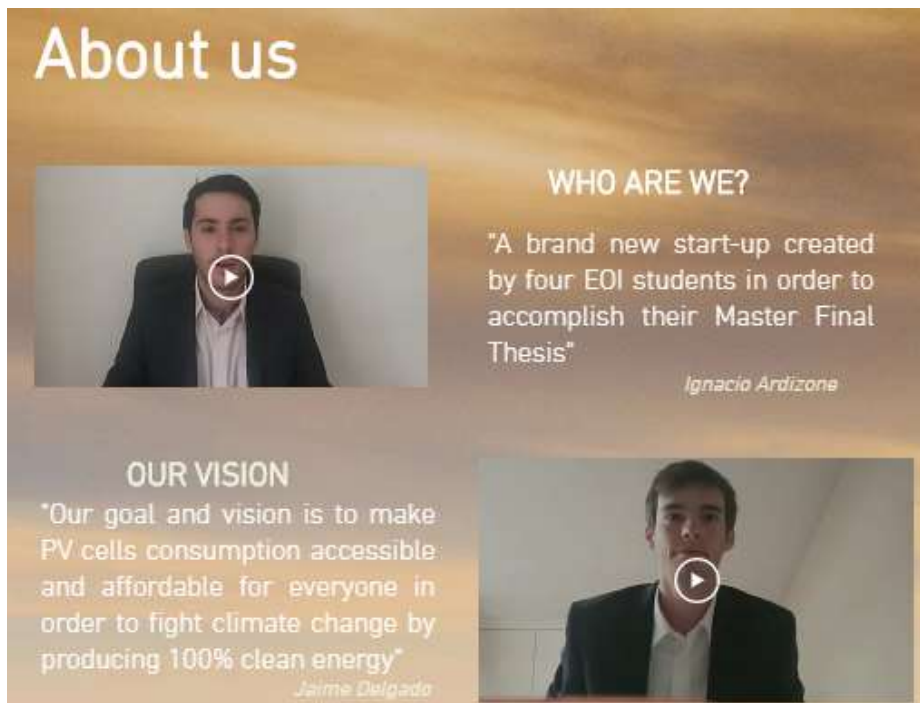
The second platform will be an App. This App aims to inform producer or consumer clients, how is the grid working and how much are growing their savings at the moments, and what are the forecasts for the next day, months, year. So that we can offer a high degree of transparency to our clients. They will be able to know their real profitability in live.

We will now deeply review both platforms, starting with the web page.

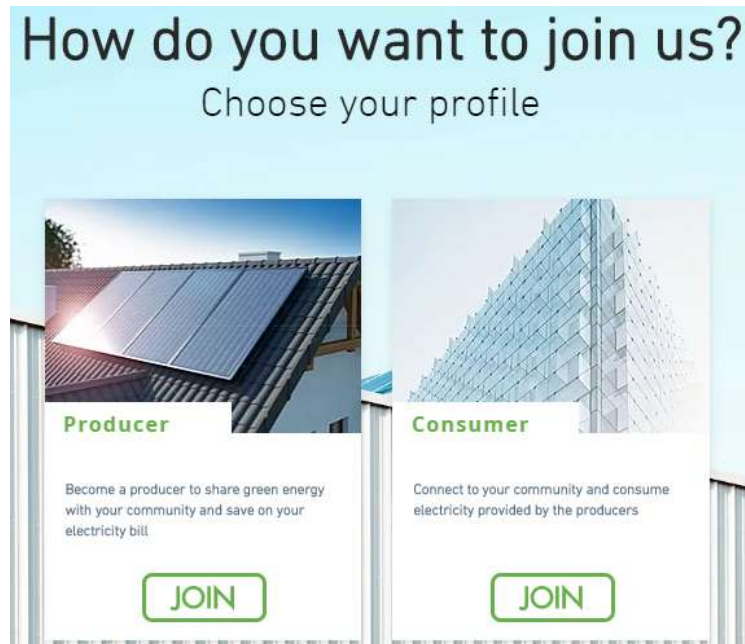
WEB review



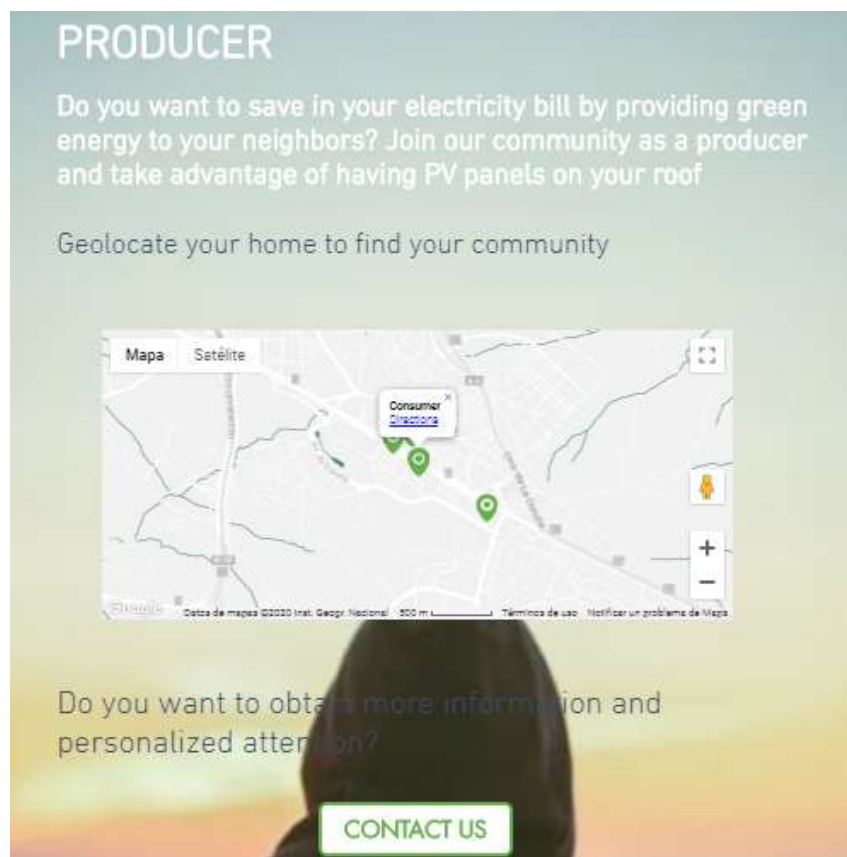
This will be our web front page. We will be able to access all the sub contents through it.



“About us” will teach our customers who are we, our vision, our goals and all the aspects ORNC can offer. It has short videos about the main aspects of our company.



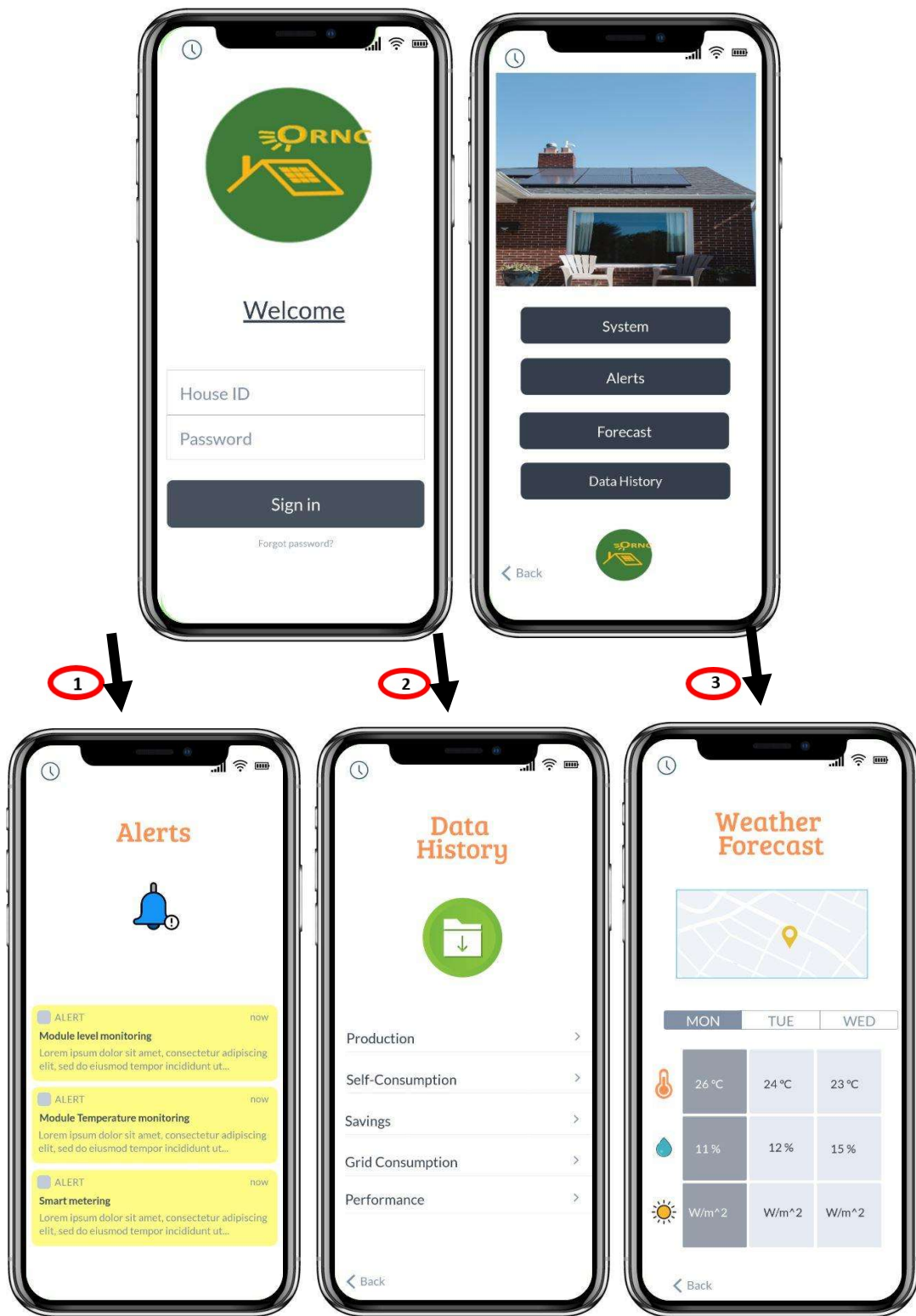
“How do you want to join us” will be the point where customers are selecting how they want to join us. They will get different information depending on what they have choose.



For instance, if we choose to participate as a “Producer”, we will be able to see how many potential consumer we have in a radius of 500 meters. And how much will be this profitability. There is another “contact us” option, in order to contact the company depending on your function.

**App review**

App front page



- 1 Alerts:** It show us, if the system is working properly. All kind of O&M alerts.
- 2 Data History:** Production data and savings for consumer and producer clients.
- 3 Forecast:** Weather and production forecasts through data science.



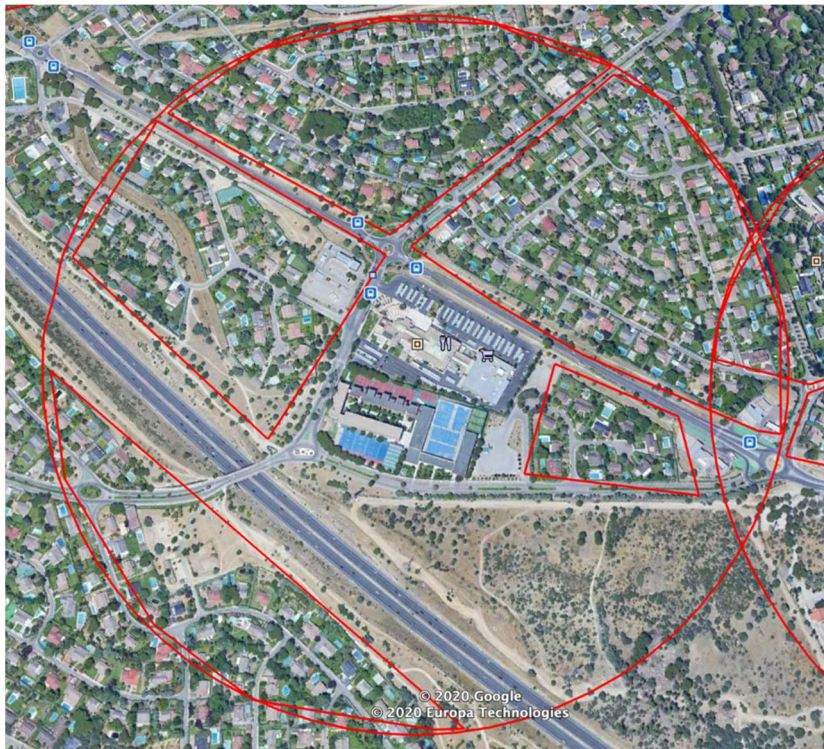
## V. Financial Model

This Financial model has 3 main parts. First one is the *MonteClaro* analysis, the second part is the ORNC economical projection and we finish it up with the different countability sheets.

### a) First Steps (Monte Claro mall study Case)

We wanted to start our financial model by analyzing a specific project. This project matches all our requirements for the profitability of the company. Getting to know this scenario really well, we will use that data for the extrapolation to others project that we will acquire throughout the years.

This project revolves around a shopping center that is located in Pozuelo de Alarcon, called Monte Claro. It is the perfect location, as we have mentioned during this document. It has a great (roof area/habitant) ratio, located in a high-class neighborhood. One of the main characteristics of these mall is there is located around 227 houses there are potential clients for our company. This is one of the main reasons why this project is attractive.

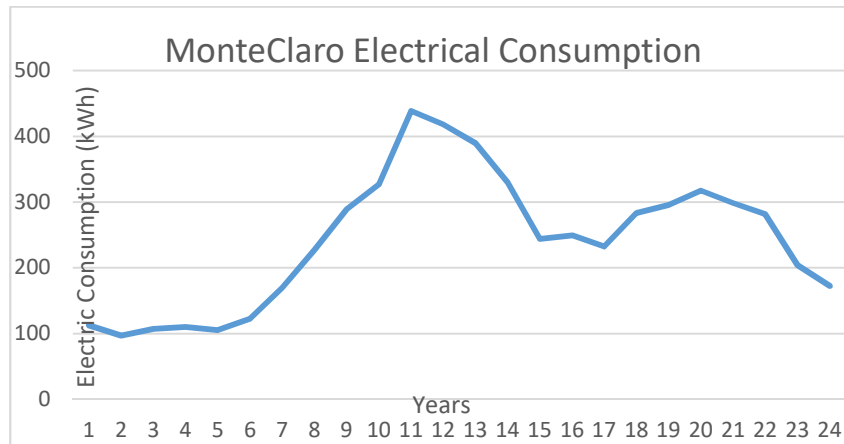


*Monte Claro Study Case*

To design the perfect project, it is crucial that we have the consumption of the matcher. The matcher is the one that is going to use the energy provided by the roofers. With this information we will be able to set up the foundation for the rest. Also, with this number we will be able to give the customer a realist savings number that we will be able to provide.

During the course of this project we've asked this Shopping Center for more specific data about their electric consumption around the year but we've since all the coronavirus was pretty demanding during these days, we haven't been able to contact them. So, what we've done is used a more generic type of consumption and we've adapted that, depending on the number of square meters of such area that the shopping center has (we know that area).

In order to do that, we have used some of the most accurate predictions made, some of them being made by the Valencian Energy Organization. [ADJUNTAR PDF EN BIBLIO]



**Figure 12: Electric Consumption for MonteClaro Shopping Center**

The graph shows two main hills and one valley. This is the expected behavior. This is how the most part of the commercial buildings behaves.

Once we had the matcher part of the project clear, we needed to complete it with the roofer part. We needed the other part of the equation. One part needs the other. It's a perfect symbiosis that feeds ORNC.

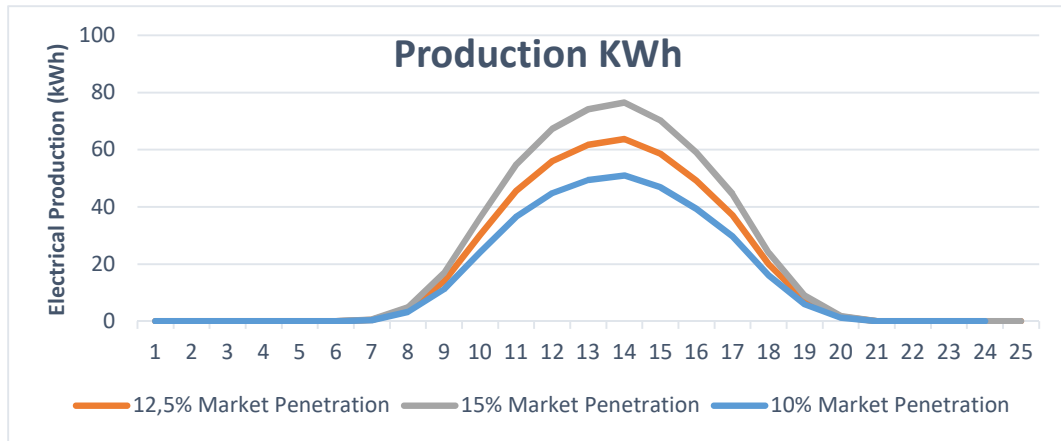
In order to Develop a correct estimation on the amount of energy achievable to by system we need to use the proper software. One that is trustworthy and safe.

For this matter, we have used NREL software which we will leave his one of the best around the globe because it provides very needed data which is hourly production around entire year. [<https://pvwatts.nrel.gov>] REFERENCIA

This software works with an advanced satellite weather behavior. High tech involved. ORNC takes advantage of the possibilities that the ICT provides.

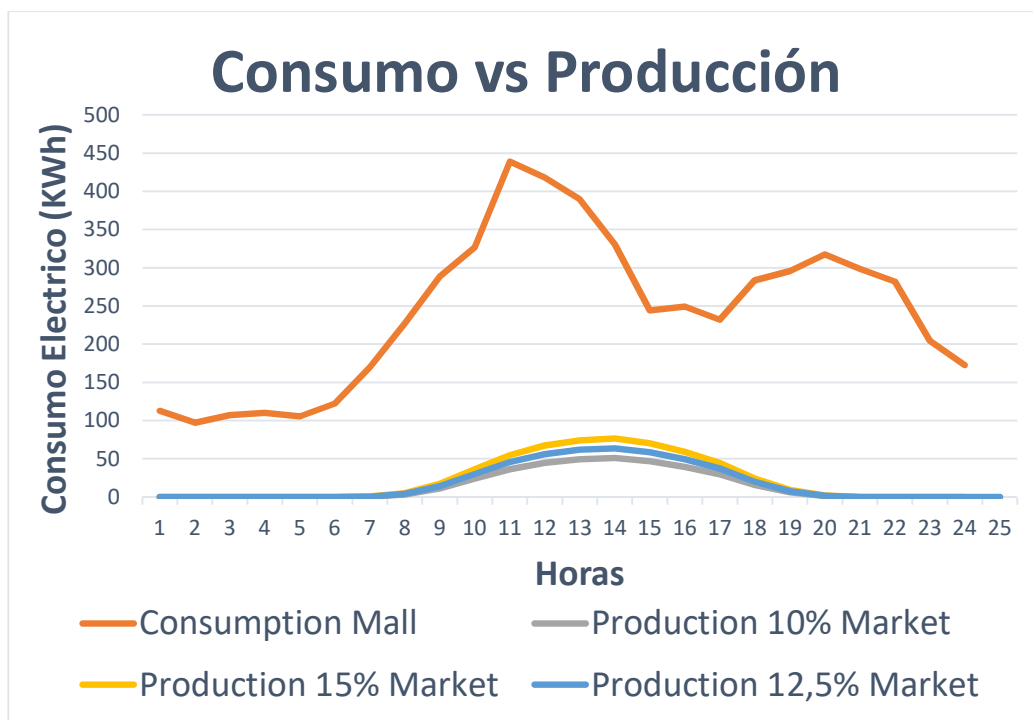
Once we know the solar potential of the place, we have to make decisions. We needed to estimate the market penetration that we could achieve in this project in the first year. Not an easy task. We have researched and studied the market and we know that the number has to be in the 10 to 15% gap. Knowing that MC has 227 roofs (counted one by one on google earth), a 10% of MP results in 23 installations made. 15% would pump up those numbers to 34.

The Market Penetration issue will be explained until satiety.



**Figure 13. Production depending on market penetration**

Once we have the correct estimation of consumption from the mall and the correct estimation of production from the houses, we can mix it up and see how it works. See how both shapes compenetrates. The differential behavior between the graphs is what plants the seed for revenues.



**Figure 14. Electrical Consumption and Generation with % of Market Penetration.**

Numbers are on the table. We can see how all the energy generated, would be easily evacuated. No danger of overlapping.



So applying general mathematics in calculus we came to the conclusion that we are able to save the shopping center almost 8% of their electric consumption over 365 day period, without extra cost.

This means that we will provide 8% of their annual electricity at a lower cost.

***Amount of energy we are capable to provide depending on the market penetration.***

<b>ANUAL SAVINGS IN ELECTRICITY CONSUMED</b>	
<b>Production 113,5KW(10%)</b>	6,34%
<b>Production 141,87KW(12,5%)</b>	<b>7,92%</b>
<b>Production 170,25KW (15%)</b>	9,50%

When the roofer is not using the electricity, it will flow to the Commercial area. That’s clear. But, at what price? That’s a question that we asked ourselves. Is usually a headache for many companies to set the price for their products. We aren’t different.

ORNC researched the prices that many marketers charge for their electricity. This was already mentioned in another exhibit.

Though the technical study we performed regarding the solar panels production, we obtained that the LCOE “Levelized Cost of Energy” is around 0,1 cents per kwh. This is an indicator of the real costs of the energy that the solar panel is going to produce. This data sets the absolute floor for the price we have to set. The ceiling is settled up by the average price of the competence. We have to stay in between these two points. Doing this we can provide savings to our customers and have some benefits for ourselves.

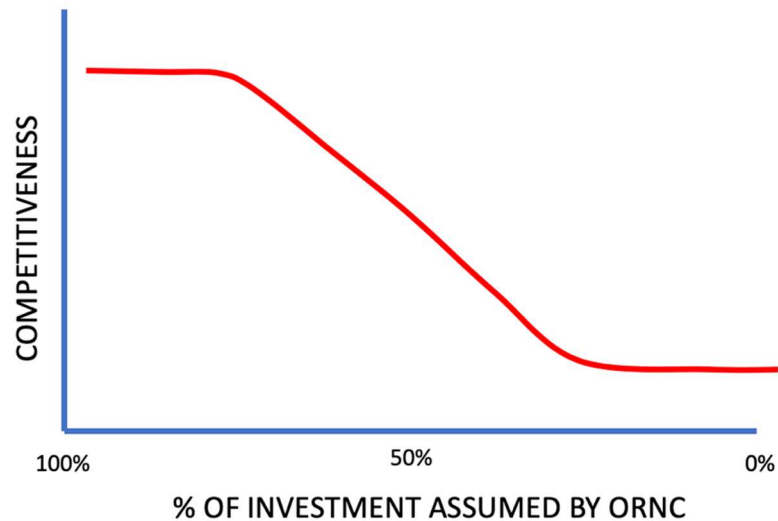
As we commented in the market study before, the ceiling is at 0,156 euros. The corporative decision is to have a 0,14 euros price. This ensures benefits from both parts.

This price is obviously movable, depending of the grid situation or corporative changes. The market prices might move up or down a little bit depending on the weather or the month, but it will serve us as a reference point.

**b) Economical projection for MonteClaro**

So in order to calculate what is the best way for us to earn a decent amount of rentability , while being competitive against the rest of the players in this game, we've done several sensibility cases where we put under the microscope the amount of initial investment that we are able to bear without compromising the future of the company.

One of our main concerns is adapting the right strategy to have the perfect mix between being competitive and profitable. We know using the statistics that this type of market behaves like the following curve.



*Figure 15. Competitiveness Vs % of initial investment (ORNC)*

We want to discover which the perfect range of this graph to operate is.

The sensibility studies can become incredibly complex as you introduce variables.

If you want to achieve realistic usable results, you may need high computing power.

For our case, we have considered 2 variables. Market Penetration and Percentage of paid investment.

- Market penetration:

Through a lot of investigation, market studies and calls, we believe that a realistic number is going to be around 10 and 15%. This means, that for every project that we start, we believe that we are going to be able to sign around 10 to 15% of the houses around.

As we want to check the penetration we should be aiming for, we will assume that a 10% of market penetration is the worst case, a 12.5% will be the realistic assumption, and lastly a 15% for the most optimistic case. We are trying to maximize our profit, without losing market share to other companies like us.

- Investment splitting percentage:

So for the first case we tried to pay the entirely of the investment ourselves in trying to see the rentability of the client and our instability of the project on what came after that wasn't good enough for us because we wouldn't be able to pay our employees and other costs.

We decided to pump those numbers up a little bit trying to be more aggressive while keeping in mind then we are in a very competitive sector at this point in the geography we're trying to get into.

We decide to go to the other end of the spectrum where we wouldn't pay anything of the initial investment, as we were running the numbers of our financial model, we realized that not paying

any of the initial investment wasn't realistic. If we wanted to have the trust of our clients, we needed to take part on this.

We are going to stick with the more assertive or moderate type of approach where we pay 30% of the initial investment. We obtain a number which we believe is enough for us to make good money out of this company but also is competitive, and a price that people definitely can afford.

We are going to discuss the numbers using graphs, but the source can be found in the annexes.

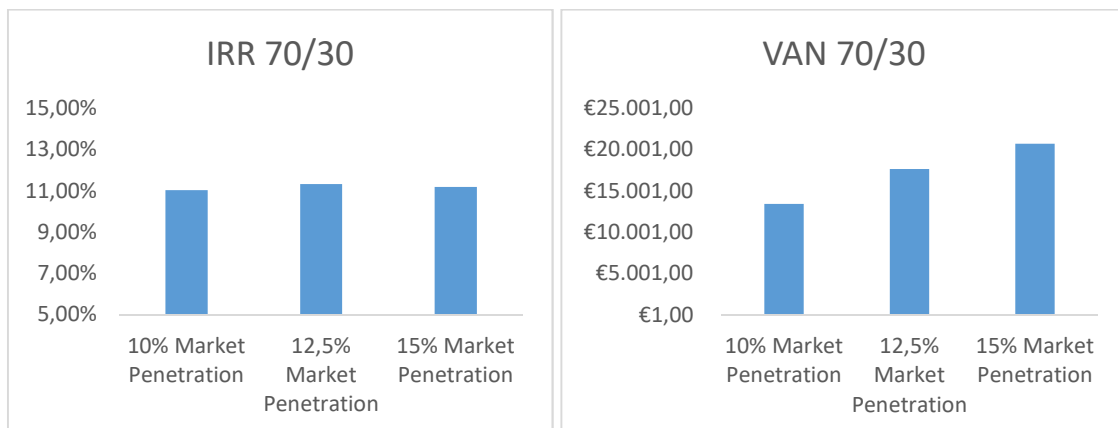
### c) Official numbers for ORNC in Monte Claro

Graphically we can see the different scenarios. The change of the Market Penetration doesn't change the Return on Investment a lot. This happens because increasing the Market Penetrations also increases the initial investment. But the Net Value of the project is heavily affected. It almost doubles comparing the best and the worst scenarios.

Knowing the market as we do, we have decided that a good round number for a solar installation is 5kW of power. This is average. Bigger roofs will be able to hold more power. Since we are buying the material in the wholesale market, we will be able to have great prices.

The average cost for 5kW is around 5000€. This would mean that if we are paying 30% of this investment, we are paying 1500€. Therefore, the other 3500€ will be roofers' issue to pay.

As a company strategy, in ORNC we decided to make the estimations with rounded numbers. They are easily scalable as we increase the number of installations done.



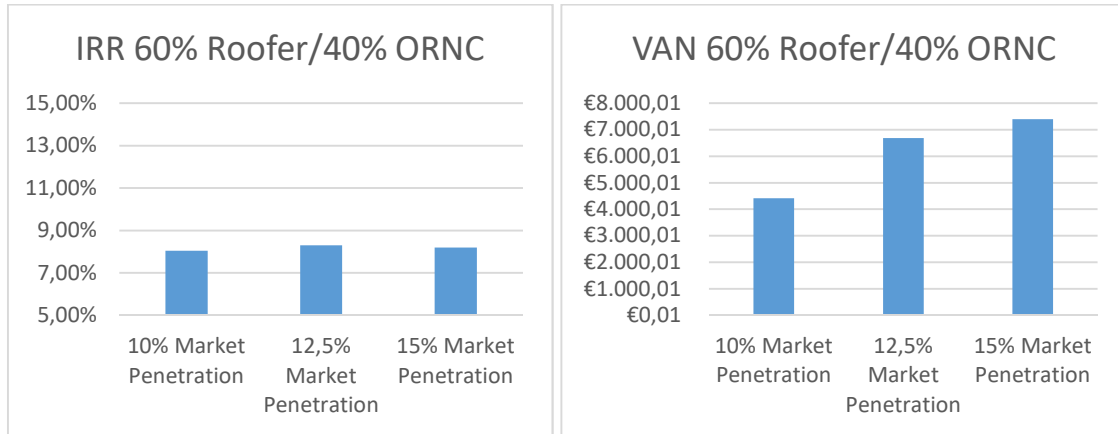
**Figure 16. IRR and VAN 70/30**

In order to analyze the expected performance of the company, we used the two main economic indicators that exist. IRR and VAN.

We are assuming that the penetration we are going to achieve is 12.5%. The IRR we will achieve is 11,3% por this particular project. This is a realistic number that we believe we can achieve over the duration of this company. It's a very low risk company. Payments are going to come year by year no matter what.

The Net value of this project is 17.639,90 €. Remember that this is just one project. ORNC is projected to do several projects of this kind every year. One after the next. This value is going to be piling up, giving rentability.

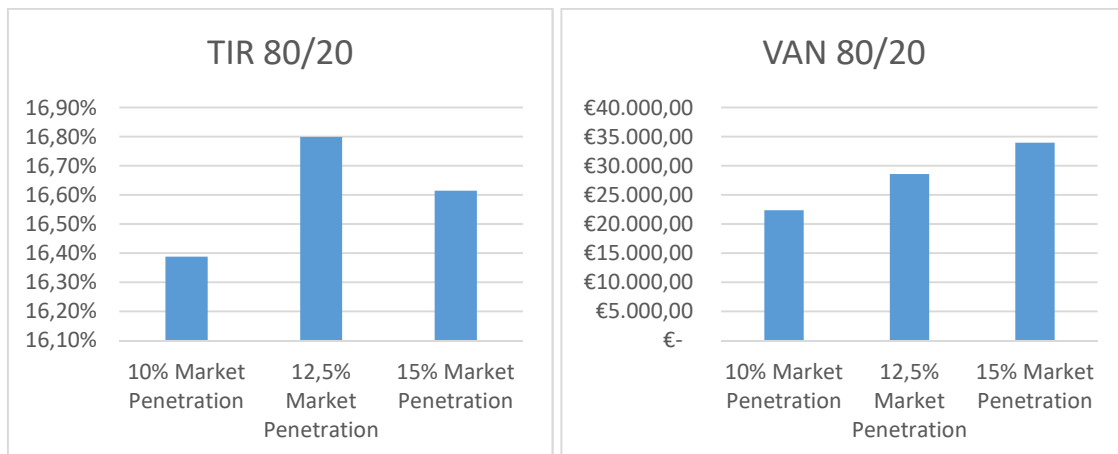
**Pessimistic Case Scenario:**



**Figure 17. IRR and VAN 60/40**

If the business doesn't go as expected, if we misestimated, is not going to caught us off guard. We know how low we can fall without losing money. In case the competitiveness in the market becomes insane, we could increment the investment. We could pay 2000 € of the total 5000€. This would drop our numbers down. We could handle it, but we should try to avoid it at all costs.

**Optimistic Case Scenario:**



**Figure 18. IRR and VAN 80/20**

In ORNC we are optimists by nature. That's our DNA. But not that much. We believe that this is achievable but not probable. We would need to do plenty of installations in the first year. Right out of the gate. We don't close the door to this kind of success, but we will have it as a secondary option.

With the 12,5% and the 30/70 case, which is the one we are going to be implementing in this company, we have calculated a 10-year revenue for MonteClaro project. This scenario will be used as a base for the other projects that this company will carry on during the years.

#### d) MonteClaro 10 years projection

We have done an exercise where we isolate this project from the other projects of the company.

Why? We wanted to know how many times it would take a project to pay itself, taking into consideration taxes and other costs. This graph shows exactly that. As we can see the payback is 9 years.

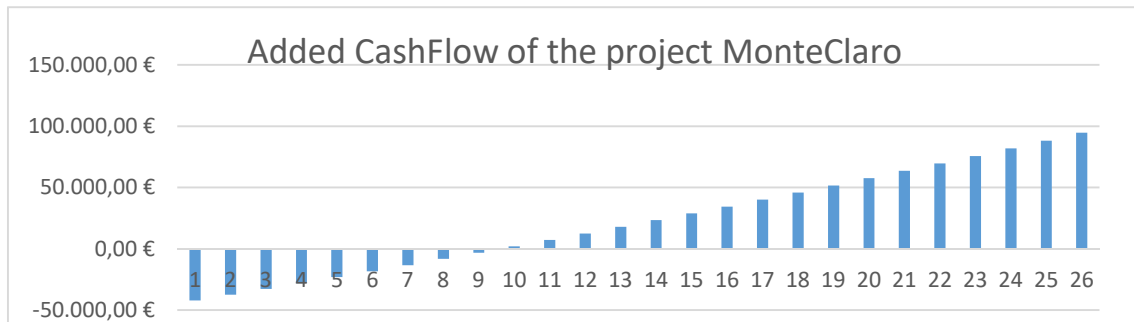


Figure 19. MonteCarlo CashFlow

The payback time is longer than what someone might consider optimal, but we have to take into confirmation that the **addition of other projects, will speed up that time.**

#### e) Sales prediction for ORNC

For the most part of startups is a typical exercise to try to estimate the amount of sales you will have. Doing that takes proper data and in most cases blind faith. Usually start-ups are risky. Nobody really knows if your assumptions are right.

Even though ORNC is not apart from that general rule, we are a bit different. Our revenues are going to come. Since it's a investment based type of business, as far as we are able to install the solar panels, we will have those daily revenues for 25 years.

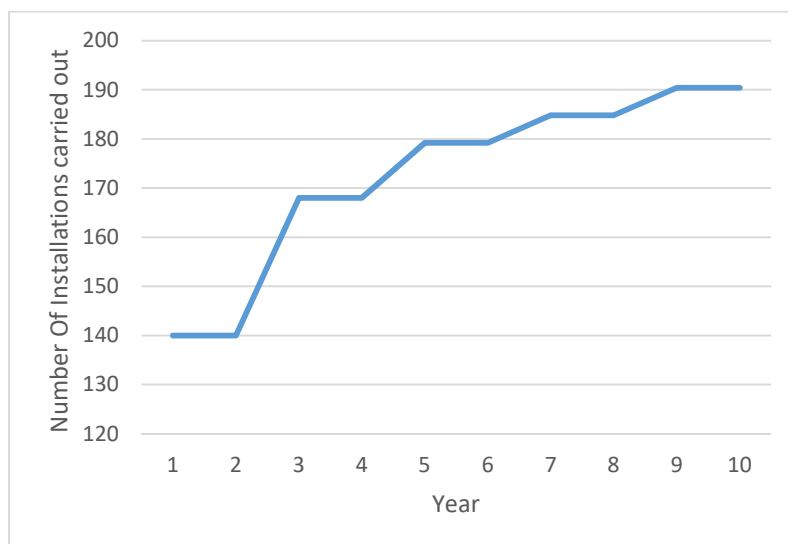
The financing plan is extended to 10 years ahead, time that we believe is enough to check the evolution of our idea from the beginning to implantation, to the preparation to our jump to the market.

The number of installations/projects made through the years follows a stable line. In order to maximize the revenues, we have to keep investing more and more through the years. Acquiring more projects. It may seem like a suicidal move, because you are digging a bigger hole of debt those early years, but we have hawk vision. We look at the future revenues those investments will give us. Willing to simplify the model, we haven't changed the prices of the installations, since we believe that the reduction in the solar panel prices will be equaled to the inflation rate, and it will remain pretty similar.



**Figure 20. Investment in projects in a 10 years period**

The number of house installations per year starts in the 140 and builds up to almost 200 per year. We believe this are realistic numbers that can be achievable with just 2 installers. In case that the workload would be extremely high, we would have to hire one more, which would mean changing the cost structure.



**Figure 21. Number of installations carried out per year**

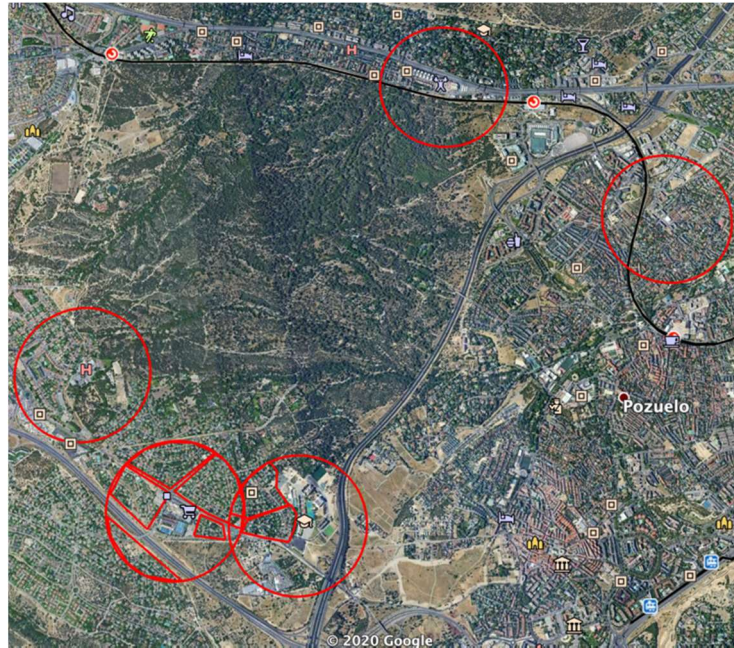
These two graphs walk hand by hand. They scale at the same rate. We believe that the number of installations made by year is feasible. It would mean we would have to perform between 3 to 4 installations per week. Most companies can do that. And we will too.



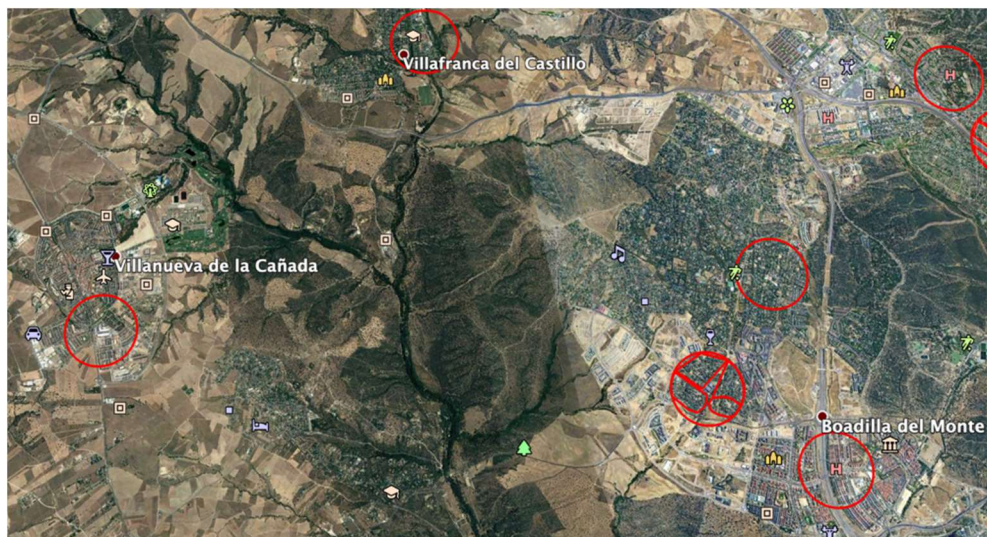
We can say this because we have properly studied the zone. We know that there are dozens of feasible projects close MonteClaro with similar characteristics.

In the following pictures we can see some examples of feasible projects that we will attack in the following years.

*Map 2. Feasible zones close to Pozuelo de Alarcón*



*Map3. Feasible zones close to Boadilla del Monte*





**ORNC Cost Structure:**

We have created a cost structure that is cheap but realistic at the same time. we have separated them into two main groups. Variables and Fixed.

One of our main goals was to reduce as much as possible the fixed costs, in order to reduce risk. We believe that we need very little properties to run this business model. We decided to rent as many services as we could. This enables us to require less debt. Making the project more attractive to investors.

In order to reduce the amount of staff that we have to hire ourselves, we have also externalized other services, such as transportations and installations.

We need a small warehouse where we can keep the solar panels and other electrical equipment, but it has a very high rotation index, therefore it doesn't need much room. The offices where we work are in the same spot as the warehouse, to reduce the rent, and also to be closer to that part of the business.

We have performed a detailed research about the prices of the warehouses and rents for office buildings and we believe we can achieve economical process that will help us reduce the payback time as much as possible. On the warehouse part, a good strategy is fundamental. The best organized the warehouse is, the less space you need and the less you pay.

Keeping that in mind we will use an organization software for that regard. We have assumed that all we need for our goals, having as quick of a rotation of the materials that we have, are 40 sqm.

Once again, we will be running some interactions in order to know the running cost we can bear, in order to have a filter regarding the budget we have in order to acquire personnel and other services. The costs are expected to evolve during the years. We want to have a flexible model able to adapt to the new circumstances.

The fixed costs are introduced in the initial investment, so we already had them into consideration. The variable costs have been a struggle to manage and to try to reduce them as much as possible, finding ways to be more competitive.

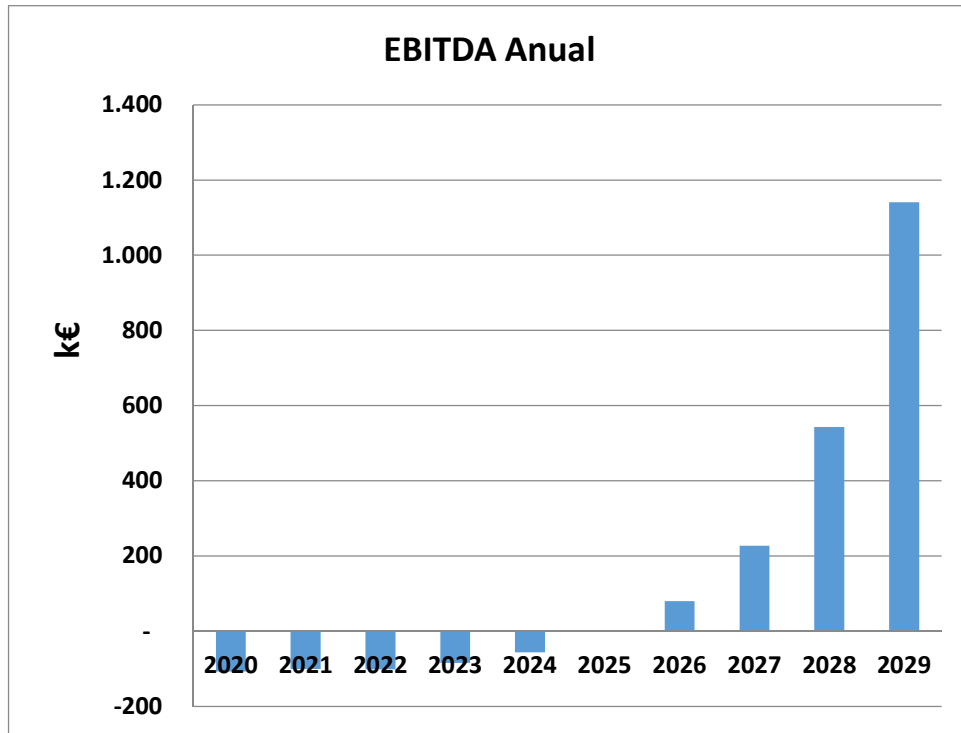
*Fixed costs per year*

<b>Fixed Costs per year</b>	
<b>Description</b>	<b>€</b>
<b>Office Renting</b>	6.000,00
<b>Light, Internet</b>	1.000,00
<b>Salary</b>	50.000,00
<b>Vans (x2)</b>	5.000,00
<b>Computers, licences</b>	4.000,00
<b>Alquiler Almacén</b>	3.780,00
<b>TOTAL</b>	<b>69.780,00</b>

**EBITDA Prediction:**

We finally got the most important moment of this document. All the data that we have studied, all the assumptions we made boils down to this.

We would like to show you how the future of the company looks like.



*Figure 22. Annual EBITDA*

The inflexion point of this company is around 2025. From that point on we got to the point where we start making benefits. Prior to that point we depended on banks and other corporations to survive.

The main flaw of our business model is the payback time. Even though it's a pretty safe business, because there's almost no risk involved, it takes quite a while to get the money back for all our projects. Is that something that makes the project unfeasible? Not at all. There are many other companies that work in the same way. Many big constructions companies, such as wind and solar promoters, have to make big investments the beginning, in order to build the foundations for future almost passive income.

This model requires some sort of finance muscle. The financing has to be achieved externally, acquiring debt. As the years go by, the rents obtained will pay the new projects and the business will skyrocket. As we are a brand-new company, that can't absorb as much debt as we want, we will be picky with the projects that we start working on at the beginning, making sure we can cut off the most investment at the early stages.

**Finance origin and key economic partnerships:**

As a corporative decision, ORNC has decided to put 25% of the total passive account in equity. Studying other companies similar to us, we believe this is a percentage that is adequate to the market.

In order to be able to fulfil the strategy they were that we had planned we need great financial muscle at the beginning because it is a high investment market/business. These situations won't last long. As soon as our paybacks start coming, we will be getting money in a passive intelligent way, without having to spend more on it. And being able to expand our company geographically, getting more penetration, and more revenues.

We are going to get the money from a couple of banks another type of credit companies such as investment fund. In order to reduce the risk of this complex financial action we don't want put our eggs in the same basket regarding banks so we will this split our loans into different banks organizations.

In the financial model, we are going to estimate a 1,5% of interest in the debt. This is a typical value for loans. The debt is not as big as in many other companies, that's the main reason why the interest is not as big as others.

We have estimated the amount of debt that we are going to need to assume.

*Debt acquired by the company and distribution between external and owners*

<b>Total debt</b>	-	<b>440.390,92 €</b>
<b>25% Equity</b>	-	110.097,73 €
<b>75% External</b>	-	330.293,19 €

We would need a loan for the external debt. 330k€ doesn't seem much to us. And it isn't. Most companies require way more than that in order to operate in the first years.

ORNC

## Balance Sheet

Date:

Assets	2021	2020
<b>Current Assets</b>		
Cash	13.040	6.239
Bank Accounts receivable	130.240	137.041
Inventory		
Prepaid expenses		
Short-term investments		
<i>Total current assets</i>	€ 143.280	€ 143.280
<b>Total Assets</b>	€ <b>143.280</b>	€ <b>143.280</b>

Liabilities and Owner's Equity		
<b>Current Liabilities</b>		
Accounts payable	14.835	14.835
Short-term loans		
Income taxes payable		
Accrued salaries and wages	37.500	37.500
Unearned revenue		
Current portion of long-term debt	31.500	31.500
<i>Total current liabilities</i>	€ 83.835	€ 83.835
<b>Long-Term Liabilities</b>		
Long-term debt	31.500	31.500
Deferred income tax		
Other		
<i>Total long-term liabilities</i>	€ 31.500	€ 31.500
<b>Owner's Equity</b>		
Owner's investment	27.945	27.945
Retained earnings		

Other

<i>Total owner's equity</i>	€	27.945	€	27.945
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<b>Total Liabilities and Owner's Equity</b>	<b>€</b>	<b>143.280</b>	<b>€</b>	<b>143.280</b>
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### Common Financial Ratios

<b>Debt Ratio</b> (Total Liabilities / Total Assets)	0,80	0,80
<b>Current Ratio</b> (Current Assets / Current Liabilities)	1,71	1,71
<b>Working Capital</b> (Current Assets - Current Liabilities)	59.445	59.445
<b>Assets-to-Equity Ratio</b> (Total Assets / Owner's Equity)	5,13	5,13
<b>Debt-to-Equity Ratio</b> (Total Liabilities / Owner's Equity)	4,13	4,13

**PROFIT AND LOSSES:**

**EBITDA**

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Sales	6.239	13.040	21.113	37.711	68.966	124.865	240.830	451.452	905.261	1.758.611
Sales Costs	-42.000	42.000 <sup>-</sup>	50.400 <sup>-</sup>	50.400 <sup>-</sup>	53.760 <sup>-</sup>	53.760 <sup>-</sup>	55.440 <sup>-</sup>	55.440 <sup>-</sup>	57.120 <sup>-</sup>	57.120 <sup>-</sup>
<b>Brute Margin</b>	<b>-35.761</b>	<b>28.960<sup>-</sup></b>	<b>29.287<sup>-</sup></b>	<b>12.689<sup>-</sup></b>	<b>15.206</b>	<b>71.105</b>	<b>185.390</b>	<b>396.012</b>	<b>848.141</b>	<b>1.701.491</b>
Staff Costs	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000
Other Costs	19.780	19.780	19.780	19.780	19.780	19.780	19.780	19.780	19.780	19.780
Finantital Earnings/Costs	208	208	145	145	120	120	108	108	95	95
Depreciation	1.978	1.978	1.978	1.978	1.978	1.978	1.978	1.978	1.978	1.978
<b>EBIT</b>	<b>-107.727</b>	<b>100.927<sup>-</sup></b>	<b>101.190<sup>-</sup></b>	<b>84.593<sup>-</sup></b>	<b>56.672<sup>-</sup></b>	<b>773<sup>-</sup></b>	<b>113.525</b>	<b>324.146</b>	<b>776.288</b>	<b>1.629.638</b>
Taxes(30%)	-	-	-	-	-	-	34.057 <sup>-</sup>	97.244 <sup>-</sup>	232.886 <sup>-</sup>	488.891 <sup>-</sup>
<b>EBITDA</b>	<b>-107.727</b>	<b>100.927<sup>-</sup></b>	<b>101.190<sup>-</sup></b>	<b>84.593<sup>-</sup></b>	<b>56.672<sup>-</sup></b>	<b>773<sup>-</sup></b>	<b>79.467</b>	<b>226.902</b>	<b>543.402</b>	<b>1.140.746</b>

ANEXES:

12,5% market penetration												
Susceptibility Testing			Initial Investment	TIR inversors	VAN	TIR Con. Basic	TIR Con. Standar	TIR Con. Premium	PAYBACK inv	Payback Con. Basic	Payback Con. Standar	Payback Con. Premium
40/60	Payment ORNC	2.000,00 €	-56.000,00 €	8,30%	6.690,46 €	9,05%	11,90%	16,35%	11	11	9	6
	Payment Client	3.000,00 €										
20/80	Payment ORNC	1.000,00 €	-28.000,00 €	16,80%	28.589,34 €	6,35%	8,81%	12,55%	6	14	11	8
	Payment Client	4.000,00 €										
30/70	Payment ORNC	500,00 €	-42.000,00 €	11,33%	17.639,90 €	7,56%	10,18%	14,22%	9	12	10	7
	Payment Client	3.500,00 €										