

A Work Project, presented as part of the requirements for the Award of a Masters Degree in Management from the Nova School of Business and Economics, Lisbon



# **WAYNERGY "THE WAY FOR ENERGY HARVESTING"**

## **BUSINESS MODEL DESIGN**

João André da Costa Coimbra Rodrigues  
Number 594

A Project carried out on the Field Lab in Business Model Design, with the supervision of:  
Professor Filipe Pamplona de Castro Soeiro

June, 2011



## INDEX

<b>0. EXECUTIVE SUMMARY</b> .....	3
<b>1. INTRODUCTION</b> .....	5
<b>2. DESCRIPTION OF THE BUSINESS</b> .....	6
2.2.1 Vision.....	7
2.2.2 Mission .....	7
<b>3. ENVIRONMENTAL CONTEXT</b> .....	7
3.1 PEST Analysis.....	7
3.2.1 Market Analysis & Trends .....	8
3.2.2 Market Size and Growth.....	9
<b>4. COMPETITIVE ASSESSMENT</b> .....	10
4.2 Definition of Competitive Advantage, VRIO Analysis .....	11
4.3 Porter Five Forces Model.....	11
<b>5. INTERNAL SCANNING</b> .....	12
5.1 SWOT Analysis .....	12
5.2 TOWS Matrix.....	13
5.3 Strategic Objectives .....	13
<b>BUSINESS MODEL</b>	
<b>VALUE PROPOSITION</b> .....	14
<b>6. PRODUCTS &amp; SERVICES</b> .....	14
6.1 Product Description.....	14
6.2 From Market Needs to Product Features .....	15
6.3 Different Values for the specific Targets .....	17
<b>7. TARGET</b> .....	19
7.2 Long Run Targets.....	20
<b>8. REVENUE MODEL</b> .....	21
<b>OPERATIONAL MODEL</b> .....	21
<b>9. COST STRUCTURE</b> .....	22
9.2 Evolution according to Strategic Objectives .....	23
9.3 Sustainable Outsourcing .....	24
<b>10. VALUE CHAIN, DYNAMIC ANALYSIS</b> .....	24
<b>11. PARTNERSHIPS</b> .....	26
<b>IMPLEMENTATION</b> .....	26
<b>12. MARKETING MIX, 4 P´S STRATEGY</b> .....	26
<b>13. PROCESS OPTIMIZATION STRATEGY</b> .....	28
<b>14. KEY SUCCESS DRIVERS AND IMPLEMENTATION PLAN</b> .....	29
<b>15. RISKS ANALYSIS &amp; RECOMMENDATIONS</b> .....	30
<b>15. BIBLIOGRAPHY</b> .....	31
<b>16. APPENDICES</b>	

## ***0. EXECUTIVE SUMMARY***

Waydip is a project recently started in Portugal, for the setup and design of activities that allow the development of innovative and modern solutions using Renewable energies and innovative Technologies, talented to support the required energy efficiency in the Markets. As complement to the existing developed Harvesting Technologies, Waydip is pioneer in providing the opportunity to the Companies, Institutions to create their own clean and friendly energy to consumption or distribution.

Following the win of “Prémio Inovação EDP Richard Branson 2010” supported on Waynergy invention, system developed to generate electricity through People and Vehicle motion, converting kinetic into electrical energy, an increasing number of project opportunities arise, driven from the futuristic approach that the product presented to potential Investors such as EDP Corporation, Public Institutions or major players within Retail Industry. The present Economic and Financial context compose also a boost for this opportunity, since at a Global level there is a high permeability to the Oil Market fluctuations, affecting the most diverse macroeconomic fundamentals. Hence, Waynergy solution is a steady and alternative Investment, contributing to a decrease in the previous anomaly, as long allowing the diversification on the portfolio of assets presently available in the market, leading to superior levels of Social Welfare.

Knowing that the product is able to create 10W per People and 240W per Vehicle motion, and due to meticulous studied intrinsic characteristics, the first segments that Waynergy will evolve are the Shopping Centers and Urban Infrastructures, leading those to obtain the maximum level of Value with our solution. The optimal investment is in order of 300.000€ to Shopping Centers and 120.000€ to Urban Infrastructures given an average payback period of 6 years, and a positive NPV using the current WACC as discount factor, for each one of the Industries, of 174.435€ and 47.386€ respectively.

The adequate implementation of this solution on specific pavements will allow the Institutions to benefit from a very high and wide range of Value Creation, due to the correspondent excellent level of Energy Cost Savings, with an equal IRR in both segments of 14%, clearly higher than most of the existing Financial and Specific Industry investments available in the Market. At the same time providing the chance to decrease the level of CO<sub>2</sub> emissions to the Companies, mandatory in the European Union 20-20-20 Regulations, futuristic services should be created, converting these places more attractive to the citizens, final customers, by its contemporary and leisure atmosphere, leading to an exponential increase in the benefits driven from the project to the target consumer.

The Implementation will be based on a logical of hedging the risk usually associated with these novel alternative technologies, by providing the Innovators in our Project (Lisbon Airport, Crosswalks and a National Road) the chance to take utility from our product benefits at a price level very near from our costs' structure. The assessment of the success in this stage will give our Early Adopters, chosen according to Waydip's strict parameters, Sonae, Chamartin and Estradas de Portugal, more confidence to acquire and implement Waynergy, driven from the already confirmed product advantages.

The International Market is our main and final objective, considering that the average level of people and vehicles is much higher in those countries, in opposition to the required natural conditions to implement the present harvesting energies, that are not as favorable as at a Portuguese level, giving them the opportunity to be part of the predicted World Energy Revolution.

Be the leader in the B2B Micro Generation Market attaining almost 70% of total revenues, that represent 5.108.880€ in 2016, as long contributing to the expected market potential growth until 2020, and provide a new and modern way of producing electricity to any Individual or Organization in the market, not just by natural resources, usually seasonal and more expensive, are clear the main drivers within Waydip Organization.

## **1. INTRODUCTION**

The main objectives of this section is to point out what will be our line of action during the Business Model, giving insights about the different methodologies used through the various stages. Waydip is an entrepreneurial innovative Firm that basis its activity on a portfolio of Renewable technologies where it is included Waynergy, a solution that through our competitive assessment have clearly worldwide competitive advantage in terms of product potentiality to generate cost savings, benefits related with energy creation to the consumer.

Innowattech.Ltd, company based on Israel and with superior network worldwide, is clearly our main threat, although is not operating in the Portuguese Market, have already launch a project in Italy for the implementation of a system based on Piezo Technologies, that allow to generate electricity to different devices in a Highway Road, such as road signs along the lanes and electronic signs that enable the drivers to read the present traffic conditions.

Based on a correct trade-off between the required protection strategy and the raise of product potential awareness through the Society, the Business Model is designed focusing the product diffusion in more attractive markets, such as Highways, Crosswalks and Roads, connected with the necessary future improvements on linking complementary solutions with Waynergy, such as Traffic Control devices, Speed Bumps, Electric Vehicles batteries supply or efficient Distribution to the Energy Grid.

Our mission, is to develop the best Strategy in order to attain a correct and efficient implementation of activities based mainly in differentiation and innovation, through a careful and weighted plan of expenses incurred along the Project, reinforcing the investment on R&D and Product Development, that would lead to enter in these future competitive markets with high level of skills, know-how and flexibility to overcome the predicted challenges

## **2. DESCRIPTION OF THE BUSINESS**

Francisco Duarte and Filipe Casimiro, two young entrepreneurs with Master in Electro Mechanical Engineering, founded Waydip in 2009, a technology based company that acts on renewable and efficiency energy R&D Technologies. Designing and improving the most innovative projects in this area, allowing the creation of new technologies and products of power generation, actually have nine new technologies under development, along with two patents already registered.

One of the products in the Company Portfolio, Waynergy, system that is applied on the pavement capturing the kinetic energy associated to people and vehicle motion and converts it into electric energy, attained to win the EDP Richard Branson Innovation Award and also ISCTE-IUL MIT Portugal Venture Competition (Energy and Transportation Sustainable Systems area) Awards. The decision from the International judge, obeyed not just on scientific parameters, but most of all, on the way how this technology could feet in the current Energy Technologies Evolution, with the possible future essential role in contributing to the worldwide required energy efficiency standards.

The segment of Waynergy is clear the B2B, in opposition to the Microgeneration, targeted to Households' production, since it allows a set of consumers that were not involved by the energy harvested through Solar and Wind, to produce their own electricity to consumption or distribution, with clean features and long term financial benefits. Probably this will lead to a decrease on the price of equilibrium to the final customer in the electricity sector, predicted to increase in the next years, driven from regulations and lack of efficient distribution channels related with Renewable Systems.

Based on these opportunities, the two young engineers set up Waydip, responding to the predicted increase in the market demand for these novel technologies, basing their advantage on the superior competences to develop new products or improve the existing registered ones.

### **2.2.1 Vision**

Be the leader in the B2B Micro Generation Market attaining almost 70% of total revenues, contributing to the expected market potential growth until 2020, designing the most efficient strategy Nationally, to enter in the International Market in a sustainable, competitive way in a five years time.

### **2.2.2 Mission**

To provide a new and modern way of producing electricity to any Individual or Organization, creating an environmental and economic cyclical advantage in the Market, leading to better and cleaner environment, and to the Portuguese Economic Growth.

## **3. ENVIRONMENTAL CONTEXT**

### **3.1 PEST Analysis**

The objective of this section is to give brief insights about the present Macroeconomic conditions that could influence the Waydip level of activity. The Energy Market assumes an increasing importance on the concerns, not just from the worldwide decision makers, but also to the common citizen, by the high influence in fundamental economic variables to lead to discussion and understanding of key factors and market trends.

**Politics**→ The European 20-20-20 Protocol which demands from the Companies, Institutions certain targets in reducing the CO2 emissions and improve the efficiency level in 20% until the year 2020, have a clear influence on the present Portuguese Policy related with Energy. Traduced in new laws supporting the production and distribution of Renewable Energy, setting certain strict targets for each of the sources of Energy, and knowing that Portugal is European leader in terms of favorable conditions in harvesting these technologies, the objective is to raise the efficiency level on the market, in which Renewable sources assuming a future percentage on all electricity produced in order of 45%.

**Economics**→ The high dependency on energy produced through fossil sources, turn globally the Macroeconomic´ performances very vulnerable to the fluctuations on oil price, by the connected low price elasticity to demand and poor level of negotiation with OPEC Countries. Concerning the present Portuguese Crisis, and the related fluctuation on Portuguese Bond interest rate and increasing External



Deficit, the reinforcement by the Government on weighted and sustainable expenses related with efficient Harvesting Technologies, could be one of the solutions to foment the level of exportations in the future and decrease the current dependency to the International Context circumstances.

**Social**→ The recent very encouraging response by Portuguese population to the new trend of Alternative Technologies along with the need to decrease the CO<sub>2</sub> emissions from the companies, Corporate Social Responsibility, are signals of the increasing conscience to the threats of pollution. Also the expected increasing inefficiency in the Energy Markets, with effects in raising the price of electricity to end customers in the near future, will emphasize the previous relationship.

**Technological**→ Connecting the fact that Energy consumption will increase worldwide at a compound rate of 3,6% a year until 2030, the present high level of innovation in new and modern technology devices will be crucial for worldwide Economic development and sustainability. The raise in demand of IT experts specialized on the Renewable field, is clear a signal of this increasing need.

### **3.2.1 Market Analysis & Trends**

The B2B Renewable Energy Market is yet in a embryonic stage, with only one project implemented worldwide. A major stake in this technological innovation lies in the capacity of Waydip to imagine the value creation potential to the new demand, as it result in a “New Market”. The connection between recent trends in the Energy Sector and forecasts of future Social Behaviors, with the previously referred element, is essential to predict the possible Market Potential to Waynergy solution. Following Regulations driven from EU 20-20-20, Portugal is reinforcing the Investment on the Micro Generation Segment, B2C for own production of energy, with a value in order of 60million€, leading to a predicted Market Potential of 100million€ in 2015, targeting 50.000 new systems until the end of 2011. The awareness for the benefits to end consumers is being raised through public campaigns and guarantees based on State programs, setting also mandatory use of these technologies in Real Estate new Infrastructures. This new policy is expected to decrease the effect of a raise of 50% on Energy Consumption, not just in Portugal, but worldwide until 2030, being 75% demanded within the cities.

The Urbanization trend, with the expected increase in the percentage of people living in cities, 60%, will provide the conditions to the raise of new ways of harvesting energy, where Waynergy is included, for the high level of people and vehicle involved in the intraday activities. Also the rise of electric cars in the next few years, with a expected percentage on the total of cars produced in order of 5% in 2020, should create a cycle in which the individuals could raise the current welfare by filling up the new generation of cars with energy produced by themselves, through new ways of harvesting energy like Waynergy, along Highways or Urban roads.

The present level of inefficiency in the Energy Market is expected to rise in the near future, mainly through new regulations and lack of modern distribution channels related with Renewable Technologies. It is reflected not just in the price of electricity that is expected to increase to the end consumers, but also by the yearly growth of energy consumption (1,7%) in Portugal, below the growth of Renewable capacity installed (20%) with only 25% of total capacity used to production, due to sources' seasonality and misunderstood complementary devices. The path to the equilibrium could lead to the bid in new ways of harvesting energy, not just by Solar or Wind, such as Waynergy solution.

### 3.2.2 Market Size and Growth

Predicting the potential for the B2B Renewable Technologies, assume a very high component of risk, although Waydip have clearly confidence on the assumptions made to assert the possible Value of the Market. Driven from a very realistic approach, based on the current optimal Investment for each of the target Segments, Waydip's Sales Forecast until 2016 is stated below:

MARKET POTENTIAL	WAYNERGY SHOPPING	Growth Rate	WAYNERGY URBAN	Growth Rate
	<i>Investment</i>	300.000€		120.000€
<i>Capacity Installed</i>	22KW		6KW	
2012	300.000€		-	
2013	1.200.000€		120.000€	
2014	1.320.000€	10%	240.000€	
2015	1.584.000€	20%	288.000€	20%
2014	1.900.800€	20%	345.600€	20%
<i>Market Potencial until 2016</i>	6.304.000€		993.600€	

Figure 1 - Waynergy Market Potential

The already established contract agreements, along with obligations from major Companies to attain certain target standards of efficiency until 2020, and Corporate Social Responsibility new trend, acquiring new and modern harvesting technologies, with the much higher potentiality in International markets like Turkey or USA, should lead to biased underestimated Sales Forecast in our Project.

#### 4. COMPETITIVE ASSESSMENT

In the Portuguese market, there is only one competitor dedicated and customized to the same segment as Waydip. Based on a Piezo Electric System, is targeted specifically to Shopping Centers and Crosswalks, due to limitations in creating energy through vehicles. Waydip have clearly advantage in terms of product potentiality, taking in reference the capabilities of Energy creation by m<sup>2</sup>, Cost per W and the correspondent Energy/Cost relationship. The established Partnerships in the market, along with novel services that Waydip already implement within the solution, as Advertisement, Marketing and E-portals, raising future benefits to the customer, confirms Waynergy Unique Selling Proposition.

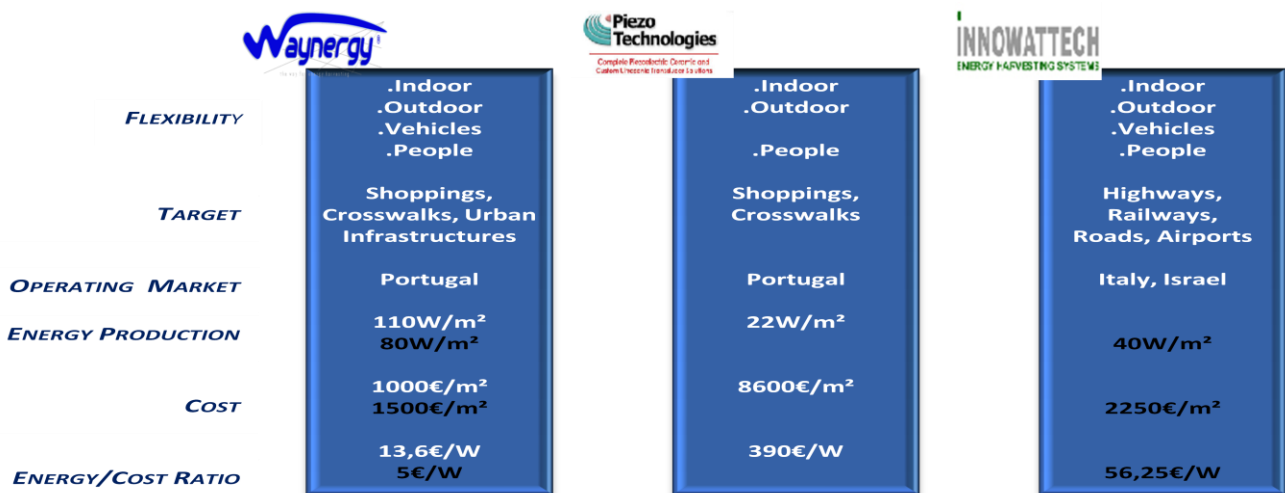


Figure 2 - Competitive Assessment

Innowattech Ltd, a Company based in the R&D Technion Institute of Haifa, Israel, is already implementing the same kind of technology in an Italian Highway, in a project evaluated in 225 million€ on total. It is included on it, the installation of Piezo Electrics in the pavement, in order to create electricity to lighting road signs along the lanes and electronic signs that enable the drivers to read the present traffic conditions. Although Waynergy have clear advantage in energy creation through vehicles in its technology, 80W/m<sup>2</sup> to 40W/m<sup>2</sup>, the complementary devices that the Israeli

Company’s solution already provide in these kind of Infrastructures, increasing the price by W to customer, but also exponentially the benefits taken from the project, along with a prior pilot test successful implemented in Israel in 2010, make Innowattech.Ltd a really strong future competitor. Emphasized by the strong commitment from Israel Government in this technology and the network already established worldwide, Waydip future tactics of product diffusion have to follow strict requirements of benchmarking the current innovative solutions in the Infrastructures’ segment.

#### 4.2 Definition of Competitive Advantage, VRIO Analysis

An extensive analysis of current Waynergy advantage is essential to define future orientations, giving the opportunity to overcome some issues related with the embryonic stage of the project, as long allowing an easier and astute competition through future Markets. Waydip use the VRIO Analysis Model, based on the principle that any resource the firm possesses, should develop in an efficient capability that along with a correct protection strategy leads to superior competitive advantages.

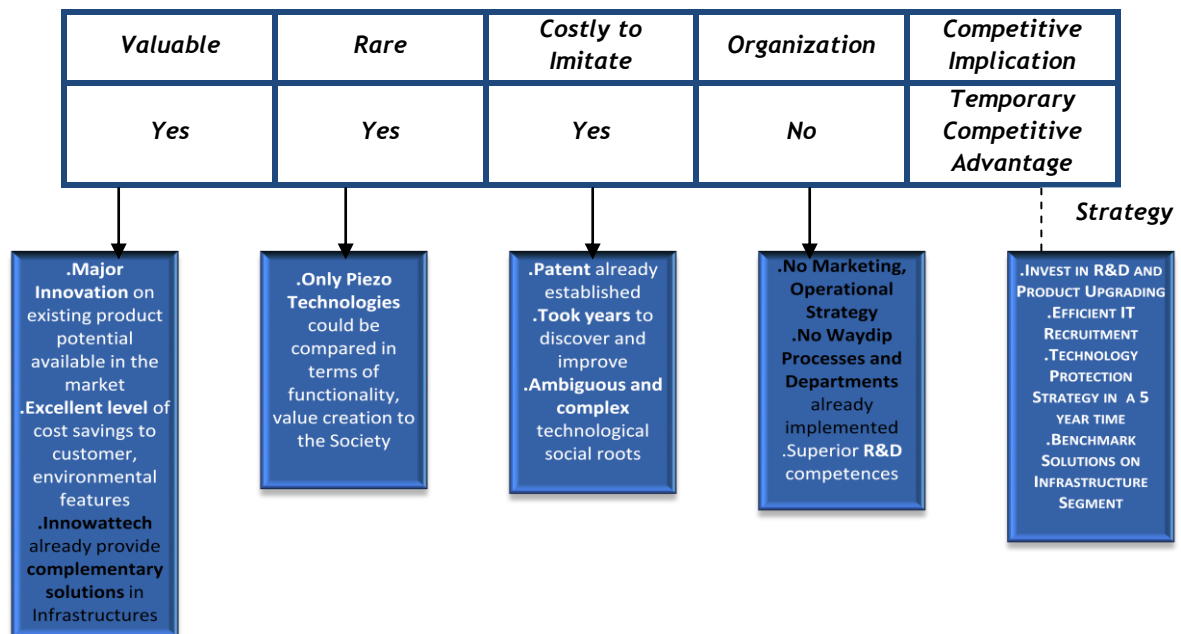


Figure 3 – VRIO Analysis

#### 4.3 Porter Five Forces Model (Appendix 1, Porter Five Forces Diagram)

**Buyers’ Bargaining Power → HIGH** The Target, usually large Market players, detain great power to pressure, reinforced by the high profit margins and present low importance of Waynergy to the intraday performances. Therefore there is a high threat of forward integration, attenuated by the clear

product differentiation in comparison with the competitor, together with high switching costs to use similar solutions and the predicted raise of Waynergy potentiality awareness in the market.

**Suppliers' Bargaining Power → LOW** The purchase process of components and services from Waydip, obeys to strict programs in which usually three suppliers compete to sell the product at the best price. Along with low Waydip threat of backward integration and switching costs, the position of Waydip at this level is clearly positive.

**Threat of Substitute Products → LOW** In the present Market, there is a much higher relative price in terms of Cost/Energy by the technology from the competitor. Along with the high switching costs to the Buyer and current product differentiation, unique selling proposition from Waydip, the substitute products threat exercise clear low pressure.

**Threat of New Entrants → MEDIUM** Waynergy is not easily copied, and have a Patent already established. As Incumbent, the protection is reinforced by the high requirements of Capital to enter in the Market, product differentiation, high switching costs to the Buyer, along with current price penetration strategy set by Waydip, leading to efficient barriers to entry in the Market. However, the inexistence of Scale Economies, along with high incentives from Israel Government to develop the current Innowattech technology based on Piezo Electrics, leads to increase this threat in near future.

**Market Rivalry among Market Firms → MEDIUM/HIGH** As it was announced in the Competitive Assessment, Waynergy have clear advantages in the current Portuguese market. However, there are some International players, with great reputation and strong operational power, that through innovation of the current Piezo Electrics Technology and choice of correct partnerships, could make the rivalry intensify.

## **5. INTERNAL SCANNING**

### **5.1 SWOT Analysis**

Pretending to improve the strategic overview in the Business plan, we will specify the main internal and external, favorable or unfavorable factors that have influence on our mid-term objectives.



Figure 4 - SWOT Analysis

**5.2 TOWS Matrix** Taking into account the analysis made on SWOT, with main External and Internal Factors referred, the connection between those, will drive to design an action plan in later stages of the Project. The idea is to improve Waydip skills and resources with correspondent effect in Strategic Objectives, alongside with the development of an accurate Marketing Strategy and Implementation.



Figure 5 - TOWS Matrix

### 5.3 Strategic Objectives

The main drivers, taking in reference the previous analysis made in the Project, allowing Waydip to grow and attain success on the Market on a five year time, are divided in three main stages:

**1<sup>st</sup> stage (2012,2013) → Improve Brand and Product Awareness**, due to lack of knowledge in the present Society to our Potentiality; **Efficient Partnerships deals**, allowing agglomerate resources and optimize costs related with main activities within Waydip, at the same time establishing good

financial deals that could provide the required initial Capital to start the Project; **Enter in B2B Shopping Centers Market**, through a planned and weighted mode of entry, along with constant Product development, improving present Waynergy features; **Establishment of Waydip specific Departments**, required for this stage, in order to enable and sustain the future growth on sales.

**2<sup>nd</sup> Stage (2014,2015) → Increase the Sales volume**, contributing to the expected Market growth evolution until 2020; **Implement Waynergy Urban in B2B Infrastructure Market**, minimizing the possible increase in costs associated with to this segment, at the same time establishing **new partnerships** with more information and network within this Industry.

**3rd Stage(2016) → Begin Internationalization Process**, increasing the predicted volume of sales and revenues; Raise activities of **promotion of brand and product Awareness worldwide**; Maintain and sustain **Product Advantage**; Increase the expected **growth on Sales at a National level**.

## ***BUSINESS MODEL***

### **VALUE PROPOSITION**

Taking in account the analysis made in the Competitive Assessment and Environmental Context, Waynergy Value Proposition analysis takes an essential role in success of our Business Model. This study is not just to understand exactly the potential of our solution through the current Market needs, but to design a strategy that strength the present relationship of innovation and differentiation to the Customers. Although Waynergy have clearly product advantage worldwide, an exhaustive analysis is needed by Waydip, in order to evaluate how present features feet the customer requirements, always complemented with an ongoing improvement of the solution that should provide extra value to the target segments, through mainly new services and access to complementary devices.

## **6. PRODUCTS & SERVICES**

### **6.1 Product Description**

Waynergy Product is clearly considered as one of the most innovative and modern technologies in the Renewable Energy sector worldwide. Although is not implemented yet, the successful registry of new

patents globally and the win of several prizes such as EDP Richard Branson Innovation Award and ISCTE-IUL MIT Portugal Venture Competition confirm the idea of excellence in Waydip R&D.

The technology basically consists of a set of blocks that are applied on (or replacing the existing) floor, containing within it a system of electric power generation developed that each time a person or vehicle moves over the block area, it will generate electricity: 10W with the passage of a common person (each step) and 240W with the passage of vehicle in the block. Waynergy People have a dimension of 0,4 x 0,4 meters, and Waynergy Vehicle have a dimension of 3 x 0,25 meters.

The main innovation consists on the system developed to generate electricity, which converts the kinetic energy associated to the motion into electrical energy: when a person or vehicle passes on the surface of Waynergy, this will have a small displacement on the vertical axis (1-3mm), enough to power the electromagnetic system, which will create electricity.

## 6.2 From Market Needs to Product Features

Being segment leader in terms of product modernity and capabilities is not a condition per se for Waynergy successful diffusion through the Market. To evolve this rigorous assumption, Waydip creates a cycle that begins in an extensive research for specific market requirements, defining priority factors, in turn influencing the R&D activity. As a competitive start-up, Waydip is able to create a win-win situation, in which the Client obtains the best technology available in the Market, and the firm gain insight over future guidelines to improve the present product.

Following Waydip model<sup>1</sup>, there are five main axis in the Product strategy: 1) Cost savings, financial benefits to the customer; 2) Product feasibility along the future; 3) Environmental requirements; 4) Possible complementary links and applications; 5) Utility that Investors could provide with the solution to final Consumers (leisure, design, attractive solutions).

**Cost Savings**, the Price available and the Electricity created by our system are the most important factors to focus in this specific field. Waydip currently set an average price of 13,6€/W to Shopping

---

<sup>1</sup> Appendix 2 for From Market Needs to Product Features Diagram



Centers and 5€/W to Infrastructures, being able to create 10W per step and 240W per Vehicle motion. Protecting the current worldwide advantage, the investment on R&D and Solution Upgrading is still needed, mainly thinking in a long term strategy. The objective is to decrease the risk associated with the move to new segments, providing tools, skills to compensate the natural low level of negotiation.

**Feasibility**, examples of recent failures in the implementation of Alternative technologies, through variable sources, is a signal that Waynergy have to meet strict requirements in terms of Durability and Maintenance. Waydip already provide to the customer more than 20 years of Guarantee, setting a future guideline to correct application. Is yet water and dirt protected, following a recent set of exhaustive tests. Aiming the high standards required, superior Post-Sales Service are already established to support the client, leading to efficient implementation and future utility of the solution.

**Environmental Friendly Requisites**, although the current Waynergy potential is clear differentiating from the existing products in the Market, the upgrading of technology and essentially Waydip future inventions, have to follow strict rules related with clean, efficient and Environmental standards. This relationship is reinforced by the fact that the Environmental concerns of Companies will grow, as we approach the deadline of EU 20-20-20, leading to better perspectives of Market growth until 2020.

**Complementary Solutions attached to Waynergy**, as it is very important to Waydip understand that customers not only buy the product to take instant value, but also acquire it with a long term benefit strategy in mind. The possible cycle created with the “boom” of electric cars, the possibility to sell the electricity to the existing Market, advantages taken by connecting the energy created to the existing grid and links to new and futuristic devices are just few examples. Although the current high standards of flexibility, as Waynergy could be implemented in indoor or outdoor pavements, through either vehicles or people motion, the novel segments will demand from Waydip new improvements in testing the product in new conditions and atmospheres, with new solutions.

**Utility to the End Consumer**, as a step ahead Firm, we will focus on the creation of modern and leisure features, along with modern services attached to Waynergy, in order to attract the final customer to the pavements. Leads to the creation of excess benefits to our customers, as we are able to increase the affluence of individuals on those places, contributing to an increase in the revenues, at the same the energy created by our solution is expected to be higher, leading to superior levels of cost savings and higher profit margins to our direct Customer.

### 6.3 Different Values for the specific Targets

Waydip is currently offering a product with a high and diversified level of Value Creation. Even in a downturn cycle of the Economy, where the investment on any kind of intangible or tangible assets is very risky, Waynergy assumes an important role in diversifying the current portfolio of the Investors. Following Firm superior procedures, the analysis of Product Potentiality in terms of total financial benefits driven to the customer, requires the optimization of Models like NPV, IRR, Payback Period and ROI, in order to give insights on how Waydip could provide superior value to the customer, based on the previous stage analysis, with creation of solutions and services complemented to Waynergy.

#### SHOPPING CENTERS

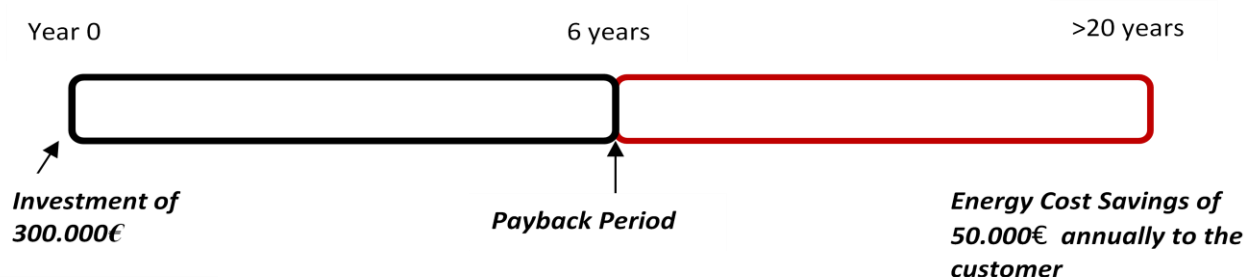


Figure 6 - Value for Shopping Target

Combining the most efficient set of Waynergy People and Vehicle, the ideal investment, with Post Sales and Product Upgrading included, is in order of 300.000 €, covering an area of 300 m<sup>2</sup>, with 22.000W of energy capacity installed. The expected yearly Cost Savings annually are in order of 50.000 €, during all life of product which is expected to be 20 years. The payback period is expected to be around 6 years. Using a discount rate of 7%, the Weighted Average Cost of Capital provided by

Bloomberg<sup>2</sup> to the Portuguese Retail market, we will provide to our customer a positive NPV of 174.435 €. The Return on Investment will be in order of 196%, as well the IRR is higher than most of Investments presently available in the Financial Markets, 14%, at the same time that is clearly higher than WACC, Risk and respective Return required by the Investors on Retail Industry.

Through improvement of the existing Services, leading to attract more people to the target places, providing extra harvesting energy and related revenues driven from to the customers, the NPV and IRR associated with the Project is expected to increase. At the same time, reduce the Payback Time in large scale, from the cash flow increase effect, if the services created are efficiently implemented.

The services that Waydip is planning to implement are based on Brand Advertisement above the pavement where Waynergy is installed, Marketing Activities, Web-portals where people could connect and create networks, funny games where through the step motion a light is shine on and the energy created is shown on some screen device, or even some special sounds created when the people walk on the pavement, allowing to do create some funny, leisure and creative environment. Also the intangible value created by Waynergy is a very important vector, allowing the Companies to meet the environmental regulations driven from EU 20-20-20, contributing to the Energy efficiency in the Market, at the same time decreasing the equilibrium price level of electricity to final customers.

### URBAN STREETS, BRIDGE

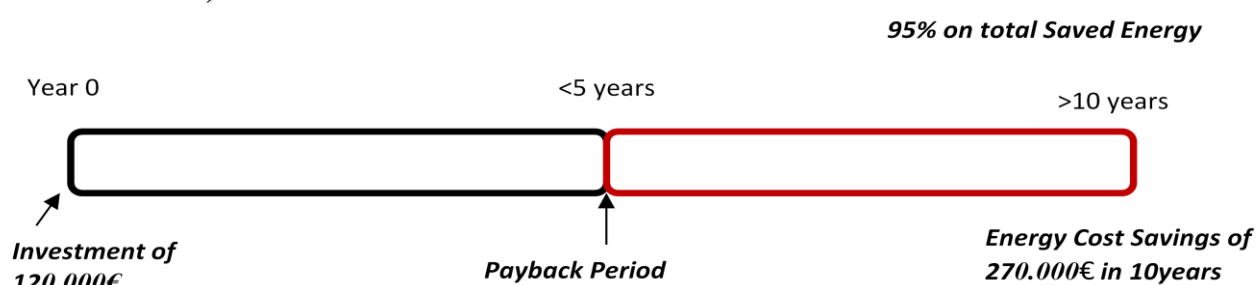


Figure 7 - Value for Urban Targets

The present optimal investment is about 120.000€, covering an area of just 300m, providing a estimated global savings to the customer of about 270.000 € in 10 years. Along with 95% of saved energy during this period, the predicted payback time is around 5 years, without subside from

<sup>2</sup> <http://www.bloomberg.com/>

Government or other Entity. Considering that our first target, Ponte 25 de Abril, Lisbon, just have a consumption of energy 30.000€ yearly, this is clearly a good investment to Estradas de Portugal.

The IRR for this project is extremely attractive, around 14%, with a Return on Investment of 85% and a positive NPV in order of 47.387€, even when we have used a WACC clearly high for this industry, 6%. To increase these values to the target segment, we propose that the project should be subsidized by the Government as present low risk and weighted investment requirements, and could be very valuable to the future welfare in the Portuguese Society. This would decrease the initial investment taken by the customer, increasing even more the NPV and IRR of our project.

Also the solutions associated to this segment, could be very important to increase the cash flows associated with Waynergy, even if demands more initial investment. Connection to Tolls electricity consumption, Speed Bumps, Fuel Stations, Traffic Control devices supply, Electric Vehicles batteries charging would provide an extra value to our clients, not just by the associated financial benefits, but also from the know-how and experience driven from the successful implementation, turning these companies our possible partnerships in the International Markets, with much more prospects in terms of Sales volume. Environmental intangible benefits, are also value that we provide to the customer as we are able to reduce around 100 tons of CO2 emissions yearly to the Companies.

## **7. TARGET**

The target for Waydip solution will consist of entities that consume electricity and that have a place with large affluence of people or vehicles, pretend to acquire economically viable solutions to generate electricity and reduce the cost of purchasing it to the national grid. Hence, a model driven by a logical of cost efficiency will be used, trying to target the best possible companies, the ones that are more prone to obtain value from our solution, as long having the required standards in the chosen drivers for our research. Recent Financial results are one of the drivers for this extensive research, due to the related confidence that players with higher profits, are more able to contribute to our predicted growth on sales until 2016. Recent practices related with Environmental concerns is also a very

important variable, as the way Companies are enhancing actions related with efficient energy policy, acquiring new and alternative technologies, is a clear signal of possible future successful agreements. The final factor considered for our model is the Companies’ intrinsic characteristics that allow the maximization of the benefits obtained with Waynergy. The amount of people and vehicles in certain period of time and the yearly energy consumption, are essential vectors to understand how companies could maximize the benefits taken from our solution. After an extensive research by Waydip Board<sup>3</sup>, it has been considered that Chamartin and Sonae Industria, are the most suitable companies to target in the Waynergy Shopping, as well Estradas de Portugal in the Waynergy Urban segment.

<i>Target</i>	<i>Firm Results</i>	<i>Env. Policy</i>	<i>Vehicle/ People Motion</i>	<i>Vehicle Motion</i>	<i>Energy Consume</i>
<i>Chamartin<sup>4</sup></i>	✓	✓	<i>40.000 daily</i>	✗	<i>500.000€ yearly</i>
<i>Sonae<sup>5</sup></i>	✓	✓	<i>45.000 daily</i>	✗	<i>570.000€ yearly</i>
<i>Estradas de<sup>6</sup> Portugal</i>	✓	✓	✗	<i>100.000 daily<sup>7</sup></i>	<i>30.000€ yearly</i>

Figure 8 – Targets’ Definition

## 7.2 Long Run Targets

Assuming the continuous improvement and revision of the Business Model, the main driver that will signal the success of our strategy, are the long run customers that Waydip will be able to evolve in a 5 year time. Not just go to an Internalization Process, but by providing superior benefits to clients that today seem unrealistic, but with great potential to superior levels of value creation. Waydip know exactly the target for the future, and the extra benefits that could be created for them. In the Waynergy Vehicle sector it is clearly believed that Highways, Roads (Tolls, Speed Bumps), Fuel Stations and Parking Zones will be perfect users of our product, with devices associated like Illumination, Traffic Control devices supply, Electric Vehicles batteries charging, Security Systems supply and Electricity Sold to the Grid. In the People Motion segment there are also very suitable targets to the future, and

<sup>3</sup> Appendix 7 for detailed Potential Targets’ Research

<sup>4</sup> <http://www.chamartinimobiliaria.com/sustentabilidade> accessed on May 2011

<sup>5</sup> <http://www.sonae-industria-tafisa.com> accessed on May 2011

<sup>6</sup> <http://www.estradasdeportugal.pt> accessed on May 2011

<sup>7</sup> <http://www.waydip.com/> accessed on May 2011

upon that, able to create a new demand such as Crosswalks, Side Walks, Public Transport Stations, Gyms, Night Clubs through Electric Devices Supply, Electric Bills Reduction, Floor Design effects, and Advertisement.

### **8. REVENUE MODEL**

At an initial stage, the customer will be able to pay the product in the following procedures: 25% in the acceptance of the Agreement, 50% at the beginning of Installation (thirty days term) and the latter 25%, 30 days after the start of Waynergy operation. In a more advanced stage of Waydip Activity, since structure and capital improvements are required to this new Revenue Model, the customer will pay 30% from the total Investment by accepting the proposal, and then incurring in a monthly fee related with the cost savings obtained, during the twenty years of Waynergy.

Also the Maintenance is included in the initial agreement with the Customer, following the existing high Quality standards followed by Waydip, with a predicted fee every five years of a maximum of 25% from the initial Investment, directly correlated with the level of utilization and friction in the system. A plant widely used, phenomena more prone to happen in Waynergy outdoor applications, predictably require a higher fee, in order to get the best performance during the lifecycle of the product. The actual company's Revenues come from the clients who actually buy the product or require the existing services provided by Waydip. Following an extensive research, allowing to set the optimal combination of Waynergy Vehicle and People, two categories of Price are available to the customers depending on their intrinsic characteristics<sup>8</sup>. 85% of total price is actually destined to the Product itself, Post Sales Service, and future Upgrading, and 15% is due to Implementation costs over client responsibility.

### **OPERATIONAL MODEL**

As part of our line of action, is essential the most concise prediction of costs that the project will incur in a mid-term approach. Knowing the synergies that could be created through a correct choice of

---

<sup>8</sup> Appendix 3 for Waydip Revenue Model

increasing investments in certain activities, Waydip interprets this operational area, not as a static prediction of expenses, but as part of a carefully weighted strategy taken to reach certain objectives.

All the costs in the company are previously planned, following a model that include all Departments and Processes associated to it, as well the profit margins and correspondent sensibility attached to increasing values in Waydip expenditures. The dynamic value chain assumes a primordial role on the Operational model, as long Waydip get real notion of the variation in components of the Organization, determined by the attachment of the structure growth strategy to the increase on Sales and Revenues.

## **9. COST STRUCTURE**

The expenditures within Waydip are divided in three main areas, composed by five Internal Primary Activities, supported by two Processes along with two External Outsourced ones. The Primary activities start with R&D, Product Development and Testing, where the technologies are developed and designed according to the Market needs. Production, Services, Distribution are the other fundamental stages in order to provide Waynergy, along with Marketing activities that include Promotion and Advertisement, in order to overcome awareness issues

Given some insights by Waydip, the weight of the expenditures related with these activities in the total revenues for 2012, are 20% for Production (60.000 €), 15 % for R&D, Product Development and Testing (45.000€), 5% for Services (15.000€), 1% for Distribution and 2% for Marketing corresponding to 6.000 €. The second area on our Cost Structure is the Outsourced activities, in which it is included the Implementation and Logistics Processes. Our Client will be responsible for these activities, driven from current advantages in the Market and the possibility to decrease costs in a mid-term period driven from scope and scale economies. The sum of total weight is about 15%, given 13% to Implementation (39.000€) and 2% to Logistics with the correspondent 6.000€.

Firm Infrastructure and Procurement are the current Supporting processes, considered as variable costs, concerning requirements related with the future increase on the Business level activity. Presently, these expenditures correspond to 51.000€ together, with a percentage of 17% on total

revenues. The present Margin on Waynergy is 25%, corresponding to a value of 75.000€ at the end of 2012. The evolution of costs until 2016, follow a rule of raise in the Organization efficiency, making possible future success on sales and revenues, not having instantly and positive effect on the profit margins, but in strengthen the required consistency within Waydip to respond to Market challenges.

## 9.2 Evolution according to strategic objectives

As previously considered all the Sales progress have direct effect in improving Waydip Organization, being the predicted growth on sales rate until 2016<sup>9</sup>, the main vector in forecasting the increase on expenditures along the five year plan<sup>10</sup>. It seems a negative approach, but we clearly have confidence that is the best method in order to attain even higher performances in the near future.

**Increase Value Proposition**, we clearly have to reinforce the Investment in activities that should provide extra value within the solution to the customers. Demand more expenses in R&D and Testing, in order to create new services and complementary devices to the current Waynergy product. The yearly increasing Investment related with these activities, will be always above the yearly growth rate observed in Sales and Revenues.

**Structure Growth Strategy**, requires the establishment of two new Departments in 2013 as Financial and Human Resource Management, and reinvestment in the present level of Infrastructures. The bid on these specific areas within the Organization will sustain the predicted spread of Business Activity. The Human Resource Department will demand an initial investment of 26.400€ in 2013, related with labor costs, increasing the value in 2015 to 53.800€, driven from the Internationalization Plan. The Infrastructure expenditures will grow at a higher rate than the sales, with a value of 73.829€ in 2016.

**Increase Sales and Brand Awareness**, the investment related with Marketing will increase until 2016 at an average rate, always above the sales growth, being the total expenditures within this activity of 121.818€, mainly directed to the Marketing Plan developed in the final stage of our Business Plan.

---

<sup>9</sup> Appendix 9 for Waydip yearly Revenues

<sup>10</sup> Appendix 10 for Waydip yearly Cost Structure



**Protection of Waynergy Technologic Advantage**, will require Investments in continuous R&D and Product testing, as well IT recruitment, and Marketing efforts to obtain a correct Industry benchmarking. In this analysis, we take the assumption that the future effect of Scale Economies and superior Negotiation Power in certain processes should be higher than the reflected on increased costs positively correlated with sales and revenues. We predict that our advantages will have a effect in short term period in the Procurement and Production Activities due to the referred effect.

ACTIVITY	2012	2013	2014	2015	2016
PRODUCTION	60.000€	264.000€	311.784€	358.551€	408.478€
R&D PRODUCT DEVELOPMENT	45.000€	198.000€	257.400€	334.620€	435.006€
SERVICES	15.000€	66.000€	77.946€	93.535€	116.306€
DISTRIBUTION	3.000€	13.200€	15.589,20	18.707€	22.261€
LOGISTIC	6.000€	26.400€	30.096€	34.911€	39.499€
IMPLEMENTATION	39.000€	171.600€	193.908€	219.116€	247.601€
HRM	-	26.400€	53.800€	53.800€	53.800€
FINANCIAL	-	26.400€	26.400€	39.600€	39.600€
FIRM INFRASTRUCTURE	6.000€	40.000€	49.200€	60.516€	73.829€
MARKETING	6.000€	66.000€	85.800€	111.540€	139.425€
PROCUREMENT	45.000€	198.000€	233.838€	266.575€	303.895€
REVENUES	300.000€	1.320.000	1.560.000	1.872.000	2.245.800
PROFIT MARGIN	75.000€	224.000€	224.238€	280.527€	370.785€

Figure 9 - Waydip Cost Structure

### 9.3 Sustainable Outsourcing

The Outsource of Implementation and Logistics, will clearly be maintained, following a logical of Competitive advantages. Knowing the present capabilities of Sonae, Chamartin and Estradas de Portugal, usually Companies with high level of revenues, great experience in the Implementation stage and negotiation power along all players in the market, the idea is to create a sustainable relationship with these entities, possibly leading to more advanced stages of involvement, as becoming our Partners in future markets with much greater potentiality, Nationally or Internationally. Creates a win-win situation, as long these Entities have the opportunity to decrease costs associated with Waynergy, promote long term equity to our Brand, possibly leading to an increase on our predicted sales forecast. Waydip take the commitment in order to improve the efficiency level of Implementation and Logistics, to provide superior Post Sales Service and Product Upgrading.

## 10. VALUE CHAIN, DYNAMIC ANALYSIS

Waydip find relevant to differ three different Value Chains during the five year plan: 1<sup>st</sup> Value Chain diagram refers to the initial stage of Waydip; the 2<sup>nd</sup> is designed have in account the mid-term strategy

connected with Waydip Time Line Development Plan; 3<sup>rd</sup> Value Chain Diagram have already in account the predicted costs related with the Internalization Plan starting on 2015

### Differences from 1 to 2, Cost contribution of Activities

**Human Resource and Financial Management**, are introduced on our Processes' Structure, as we will recruit for the HRM two specialized workers in order to coordinate the Waydip Operations and Recruitment at a wage of 13200€ yearly. The same reasoning for the Financial Department, with the recruitment of an expert in the Accountancy Area, earning a wage of 13200euros yearly; **Implementation**, decrease in percentage, as we think in two years time the Customer's advantages in the Market, will lead to scoop and scale economies, decreasing the related costs; **R&D + Testing**, increase in absolute and relative value, as the recruitment of IT experts, Product solution upgrading and extensive Research will be essential to attain the required mid-term objectives; **Marketing**, increase, in order to attain the most successful Waynergy diffusion, with recruitment of Marketing experts, along with Promotional efforts and Advertisement, following our Marketing Plan.

ACTIVITY		2012	2013,2014	2015,2016
PRIMARY INSORCE ACTIVITIES	PRODUCTION	20%	20%	18%
	R&D + TESTING	15%	17%	19%
	SERVICES	5%	5%	5%
	DISTRIBUTION	1%	1%	1%
	MARKETING	2%	6%	6%
EXTERNAL ACTIVITIES	LOGISTIC	2%	2%	2%
	Implementation	13%	12%	11%
SUPPORTING ACTIVITIES	HRM	0%	2%	2%
	FINANCIAL	0%	2%	2%
	FIRM INFRASTRUCTURE	2%	3%	3%
	PROCUREMENT	15%	15%	14%
MARGIN		25%	14%	17%

Figure 10 – Waydip Dynamic Value Chain

### Differences from 2 to 3, Cost contribution of Activities

**Implementation and Logistics**, decrease to only 11% and 2% of the total revenues, as the relationship previously stated is expected to increase; **Production**, in the third stage, the Scale Economies are more prone to happen in our Production stage, so we predict a decrease in the activity relative costs; **Procurement**, decrease as we truly believe that our negotiation power relating to the suppliers will be higher; **R&D + Testing**, as part of the Internationalization Plan, the costs related with these activities will increase even more in relative value.

## 11. PARTNERSHIPS

Partnerships<sup>11</sup> are crucial for Waydip, as they contribute to agglomerate more Resources and complementary capabilities, turn the Recruitment process more efficient as some of the related Institutions detain some of the most capable IT young workers, contribute to decrease costs related with Operational dynamics, share know-how and increase the present levels of IT information. Also allow the diffusion of Waynergy in the Market through more efficient networks, while contribute to improve the current Brand level of awareness.

Partner	Process Development	Function
Dep. Electromecânica, Universidade Beira Interior	R&D, HRM	Boost Innovation, Attract talent, Product Differentiation
EDP Inovação, R&D for Renewable Energies	R&D, Product Testing	Efficient Distribution Channels, Boost Innovation
Estradas de Portugal, Road Infrastructures	Logistic, Implementation	Decrease Implementation Costs, Share Know-how
Fab Lab EDP Open Favrication Factory	Production, Infrastructures	Decrease Infrastructure Costs, Share Know-how
ISCTE IUL	R&D, HRM	Attract talent, Product Differentiation
PAN Gemedia Global Digital Communication, Web Design and TV Net	Marketing	Web Site Design, Advertisement, Logo Design
NOVA School of Business and Economics, Lisbon	Financial, HRM	Managerial Consulting, Attract Talent

Figure 11 - Waydip's Partnerships

## IMPLEMENTATION

### 12. MARKETING MIX, 4 P'S STRATEGY

#### Target

#### Innovators & Early Adopters

Knowing that Renewable Technologies require a very rigorous set of quality standards and guarantees, the possibility to test Waynergy in real environments, giving insights of improvements in terms of product feasibility and maintenance, along with the required financial benefits driven to the user, turns crucial to Waydip understand what players could take the Innovator function.

Lisbon Airport, a Crosswalk and National Road will take the challenge, allowing the implementation of a Pilot Test in the pavement. At the same time turning possible the assessment of Waynergy level of performance in the field, gaining a first "touch" with market, crucial to later stages of Implementation, Waydip provide to the Innovators all the potentiality of the solution, at a price level very near from the costs' structure, decreasing the usual risk associated with these tactics. Perhaps the

<sup>11</sup> To a more concrete overview of Partnerships' function, consult Appendix 4 for Industry Map

main objective of this strategy is to create the ideal conditions in order to hedge the risk associated with the Early Adopters, by the confidence that is transmitted by the successful pilot test.

The Early Adopters will take the first role in the connection that is needed between the chosen Companies that take advantages from our solution, and the mission in diffusing awareness along all the Industry players. The previously referred Targets (Chamartin, Sonae and Estradas de Portugal), as respectable Companies, opinion leaders, usually trying out new ideas in a careful and planned way, specially the Shopping Centers, that in the contemporary societies are seen as example of Modernity and Innovation, lead to word to mouth effect among the society, overcoming the initial awareness issues and contribute to increase the expected growth on sales forecasted in our Business Plan.

### **Product**

Unique Product in terms of harvesting clean energy through Vehicles and People Motion, with worldwide superior standards of electricity created, 10W by step and 240W by Vehicle, based on an electromagnetic technology in which the energy could be stored or consumed by the customer. Applicable on indoor/outdoor pavements, with no discomfort or extra effort to the users, allowing the future update and the installation of complementary services in order to maximize its current potential.

### **Price**

The Price decision is a crucial vector in Waydip strategy. By its influence in the sensibility on the value proposition provided to customers, the effect on our desired growth on sales and revenues, that in turn influence the cost structure evolution, and also the capability on favor the product diffusion through the Market, the chosen process of this variable have to follow Waydip rigorous standards.

In the first stage of the Business, Waydip will follow a Penetration Strategy, setting a price well below from what is practiced by the competitor in the Market, 13,6€/W for the segment of Shopping Centers and 5€/W in to the Infrastructures. The objective is to obtain a fast Waynergy diffusion through the Portuguese Market, even if sacrificing fast profit margins in the short term, clearly predicting that this price level will lead to aim the goodwill among the early adopters, stimulating the word to mouth effect, contributing to increasing awareness through the Society.

As incumbents, the barriers to enter in the Market will be even higher, discouraging possible new entrants, taking an aggressive tactic toward our competitors given their clear disadvantage in terms of differentiation and innovation. Equally with this price level. bellow from the one that is more prone to create fast high profits, we are claim our mission in contributing to improve the energy efficiency in the Portuguese Society, by decreasing the electricity price of equilibrium in the near future.

### **Place**

The product will be distributed through two main channels: Waydip established Partnerships, based on their network and prestige, promoting and showing Waynergy to their clients or via the Firm Website, where is possible to contact the two young entrepreneurs in order to obtain an Agreement.

### **Promotion**

To the best Advertisement strategy, is essential a clear and efficient message, that evolves the Quality and Differentiation presented on Waynergy. Some partnerships will have a central role in this process, as PAN Gemedia, holder of strong capabilities in order to develop Waydip current Website, improving the existent interface and level of information available to the interested potential customers. Also dynamic Organizations, like Nova School of Business and Economics or Ignite Entrepreneurship Conference, could have an important mission in increase the awareness of the product by showing its potential to the audience, aiming the increase of conscience from the young society to the opportunities that Waynergy could lead to. Also Institutions like Champalimaud Foundation and Centro Cultural de Belém, Lisbon, could be essential, by their function in the Society, flags of modernity and contemporary values in Portugal, with usual opening mind for this kind of technologies and innovations.

## **13. PROCESS OPTIMIZATION STRATEGY**

To the efficient implementation of Waynergy during this 5 year plan, and the role that certain processes will have in the Business success, is essential to understand that not just the increase of Investment is needed, but also the optimization of performances, identifying the core processes that could lead to better results with the connected Strategic Objectives. Our Strategy is stated below:

Core Processes/ St.Objectives	Increase Sales	Brand, Product Awareness	Product Advantage	International Strategy	Total Impact	Present Quality (A-E)	Spender Process
R&D+Testing	Improve Product Features and Services		Creating and Sutaing Comp. Advantage	Adapt the Product to International Requirements	3	A	€€€
Marketing	Create Demand	Raise and Strength Brand Awareness	Market Research	Benchmark possible International Features	4	E	€€
HRM			Recruit the Best Young Workers	Design the International Implementation Plan	2	E	€
Services	Customer Satisfaction		Understand Customer Trends		2	B	€€

Process and KPI's

Core Processes	Objective	KPI	Target
R&D	Create and Sustain Competitive Advantage	Customer Satisfaction Survey about recent Updated to the Product Other: Time between Updates	>80%
Marketing	Raise Brand Awareness and Increase Sales	Percentage of monthly growth on Sales Other: Number of similar technologies identified	>10%
HRM	Design Internationalization Process and Recruit the best IT Young workers	Number of Partnerships established for each Process Other: Compare the present level of Updates	1 per process
Services	Maintining Profitable Customer Relationships	Surveys to measure Customer Support Service Other: # of Claims	>90% positive Reviews

Figure 12 – Processes' Analysis and KPI's

### 14. KEY SUCCESS DRIVERS AND IMPLEMENTATION PLAN

R&D and Innovation: like in any Business related to IT, will have an essential role in the success of Implementation; Promotion through Partnerships: will allow a better brand recognition and take advantage of possible synergies with players already established on the market.; Planned hedging risk associated with Innovators and Early Adopters: with the pilot test and the correspondent assessment essential to the respective following stage; Collaborative relationship with the Clients: allowing a win-win situation crucial to a better understanding of Waynergy possible improvements. The sequence of Implementation stages during the next three years of Project is stated below:

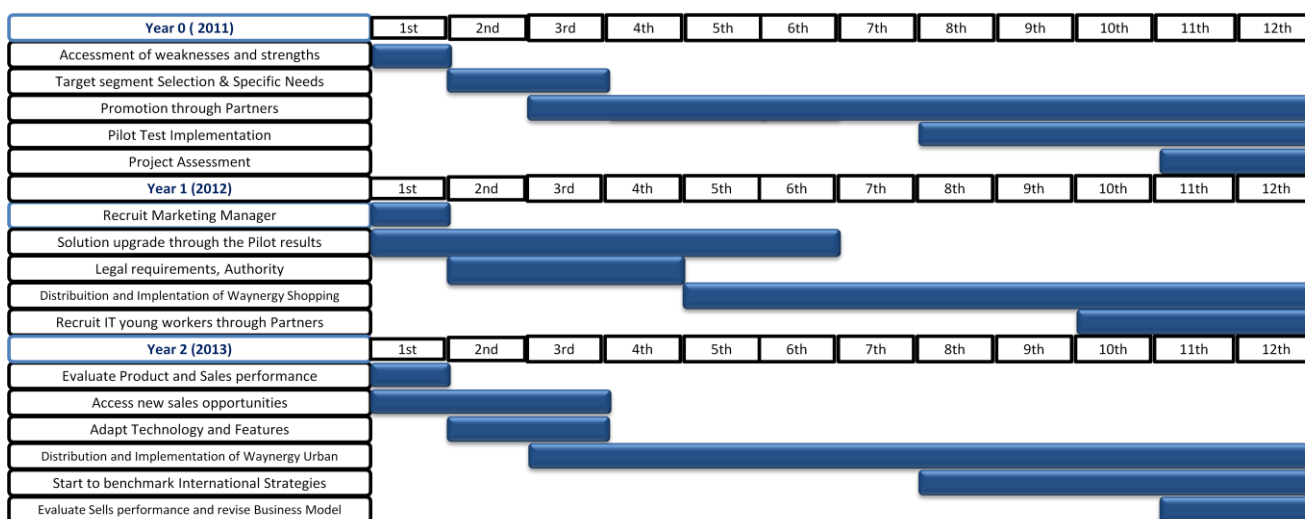


Figure 13- Waynergy Implementation Plan

## **15. RISKS OF THE PROJECT & RECOMMENDATIONS**

**Business Model**, as Waydip activity depends highly on the current product advantage, the need for constant improvement and upgrading should not be jeopardized. The possible development of the Competitor's current product features in terms of Cost/Energy, could lead to synergies with already Innovattech.Ltd solution's diffusion in world markets and complementary implemented solutions in the Infrastructures segment, that will turn the future competition in the market difficult to overcome. As it is difficult to predict how energy technology will evolve in the near future, the risk exists that Waynergy will not be able to keep up the pace of the Market and loose its competitive advantage.

**Financial**, there will be some pressure to generate revenues in the short term, and possible limitations to company's expenditures in other activities that could generate extra cash flows in the long term. The present level of Unit Contribution Margin, driven from Waydip's Price Penetration Strategy, with direct effect in short term profits, and possible poor quality perceived in the marketplace, for the Price Quality relationship effect, should lead the Firm to reflect in a two years time, if an increase in this variable is needed, in order to overcome the referred issues.

**Operational**, as a small company it could be difficult in the short term to face the demand in the market, which should grow at a higher rate than we have predicted in the Business Model. It is recommended as contingency action, the hire of specialized Vendors or establishment of new future Partnerships, focusing the efficiency in the Commercial area, leading to the required standards in Distribution. Also from the embryonic stage of the Firm, the implementation of activities can be not as efficient as desired in the designed Strategic Plan, leading to an increasing importance on the continuous assessment of the KPI's previously defined.

**Implementation**, the possible failure in Pilot Test stage, assumes a very high component of risk, as the future product diffusion within the market highly depend on it, demanding from Waydip superior Customer Relation Support, in order to access future improvements on the Product, and possible anomalies occurred in this stage.

## **15. BIBLIOGRAPHY**

- Robert D. Hisrich, Michael P- Peters, Dean A. London**, “Entrepreneurship”, McGraw-Hill, 2008
- J. Bessant, J. Tidd**, “Innovation and Entrepreneurship”, 2007
- Michael E. Porter**, “What Is Strategy?”, Harvard Business Review November, December 1996
- Robert S. Kaplan and David P. Norton**, Strategy Maps: Converting Intangible Assets into Tangible Outcomes, Harvard Business School Press, 2004
- Daniels, J. D., Radebaugh, L. E. and Sullivan**, International Business: Environment and Operations, Pearson, Prentice Hall, 2007.
- Lane, H. W, et al., Handbook of Global Management**, a Guide to Managing Complexity, The Blackwell, 2004
- Alexander Osterwalder**, Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers , 2010

### **PUBLISHED STUDIES :**

**Rita Cruz Alves, Joao Joanaz de Melo**, Avaliação Ambiental, Estratégia do Potencial de Microgeração em Portugal, Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa, 2008

### **WEBSITES :**

<http://www.bloomberg.com/>

<http://www.chamartinimobiliaria.com/sustentabilidade>

<http://www.sonae-industria-tafisa.com>

<http://www.estradasdeportugal.pt>

<http://www.waydip.com/>

<http://www.edp.pt/>

<http://www.worldwatch>



Work Project, presented as part of the requirements for the Award of a Masters Degree in Management from the Nova School of Business and Economics, Lisbon



# **WAYNERGY ”THE WAY FOR ENERGY HARVESTING”**

## **BUSINESS MODEL DESIGN**

*Complementary Appendices to the Project*

João André da Costa Coimbra Rodrigues

Number 594

A Project carried out on the Field Lab in Business Model Design, with the supervision of:  
Professor Filipe Pamplona de Castro Soeiro

June, 2011

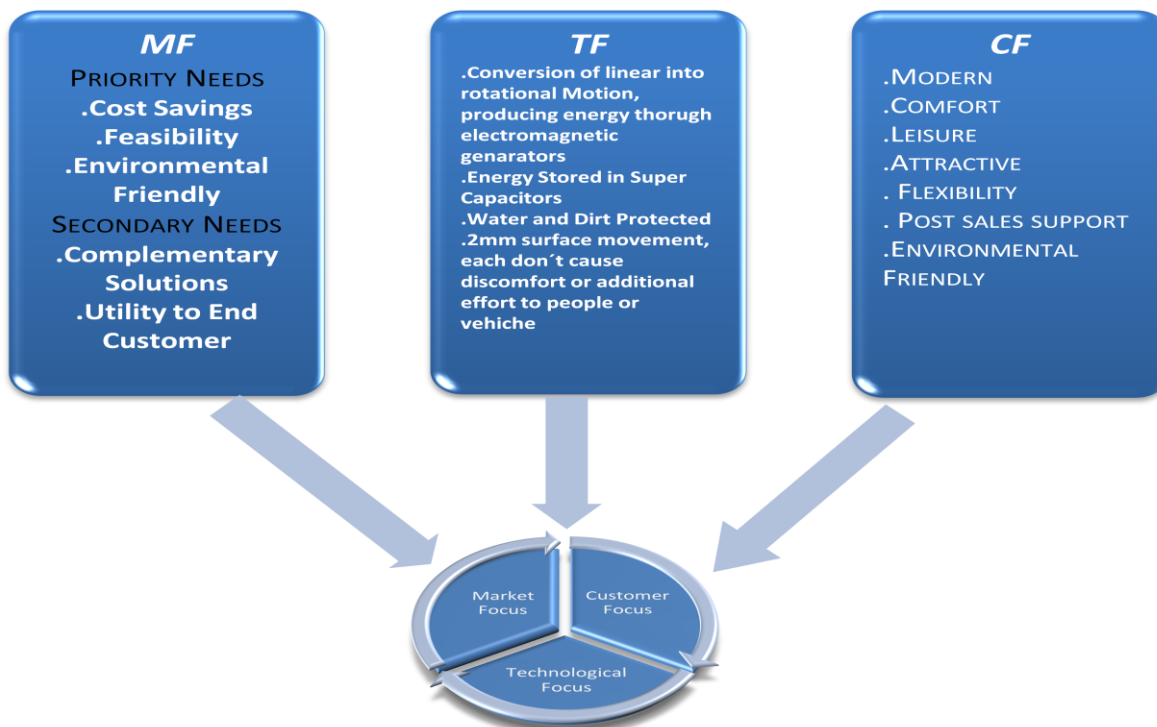
## 16. APPENDICES

### APPENDIX 1 - PORTER FIVE FORCES DIAGRAM



### APPENDIX 2 - FROM MARKET NEEDS TO PRODUCT FEATURES DIAGRAM

Current Product Development's Methodology used by the two young Engineer Entrepreneurs within Waydip :



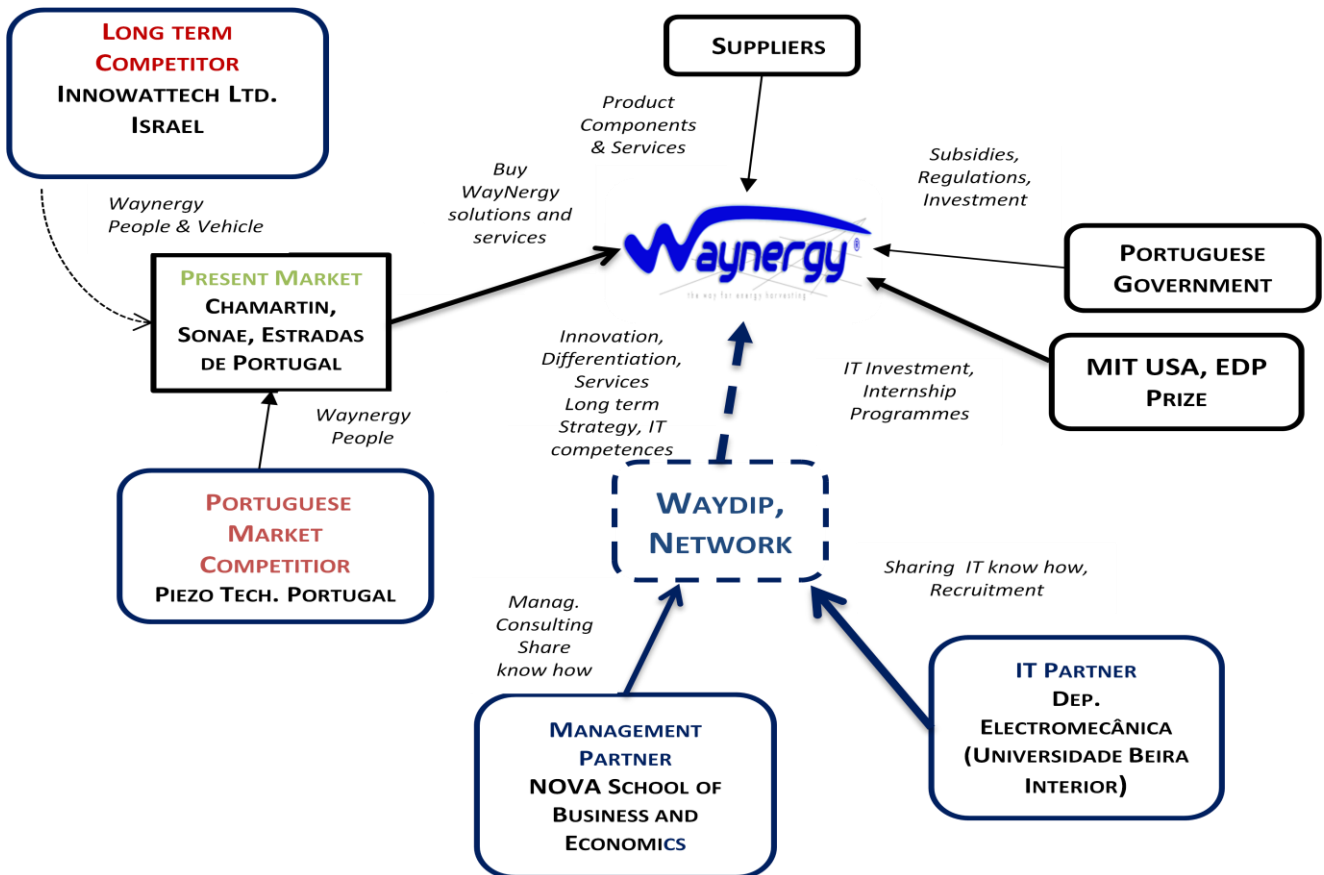
### APPENDIX 3 - REVENUE MODEL

WAYNERGY SHOPPING	Price	Value	Including	Future Fees	Optimal Investment	Area
			.Product	Maintenance		
			.Services	.Max 15% of initial price		
	Price/W	11,48€	Product Upgrading	every five year	300.000€	300 m <sup>2</sup>
			.Implementation		Installed Potency	Guarantee
	Price/W	2,02€e	.Logistic			20 years
	Total Price/W	13,50€			100 KW	

WAYNERGY URBAN	Price	Value	Including	Future Fees	Optimal Investment	Area
			.Product	Maintenance		
			.Services	.Max 25% of initial price		
	Price/W	4,25€	Product Upgrading	every five year	120.000€	300 m
			.Implementation		Installed Potency	Guarantee
	Price/W	0,75€	.Logistics			20 years
	Total Price/W	5€			100 KW	

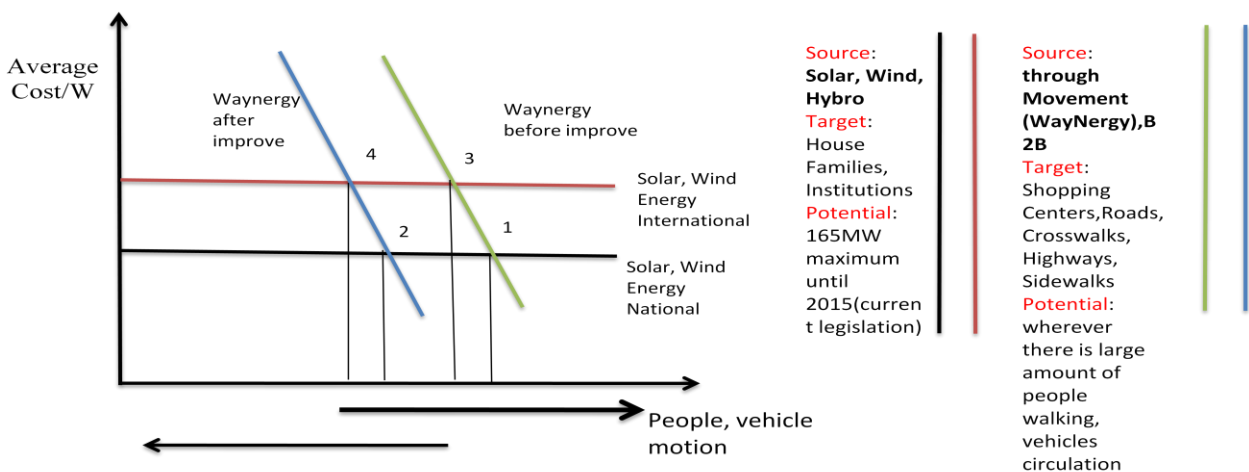
### APPENDIX 4 - INDUSTRY MAP

The main relationships among the key stakeholders are represented by the following diagram. We have defined several main entities that can have a direct or indirect relation with Waynergy:



## APPENDIX 5 - DIFFERENTIATING WAYNERGY FROM THE CURRENT MICRO GENERATION TECHNOLOGIES

Taken by assumption that Portugal is European leader in terms of favorable natural resources to Energy harvesting, the diagram represents Waydip general overview about the complementarily function that Waynergy could have with present Alternative Technologies worldwide, contributing to the path of efficiency in the Energy Markets, at the same time providing an easier International product diffusion. The analysis is divided in four main stages: 1) at National level, with the current solution, the benefits taken by the Waynergy potential target are highly positive correlated with the amount of people and vehicles in its place, instead of the present harvesting technologies that depend only in the seasonality of natural sources; 2) Waynergy relationship previously exposed is attenuated by improvements on the technology leading to superior levels of energy production by Vehicles or People, making possible to target new customers that previously were more prone to obtain benefits from Solar or Wind Technologies; 3) in International Markets, where the solution itself have clear advantages in Energy/Cost features, the relationship is emphasized by lower conditions in European Union countries to harvest technologies through natural resources, and mainly from the much higher average amount of people and vehicles in Streets, Highways or Urban Roads leading to excellent prospects of Market Value 4) the same reasoning as in the second stage, with a predicted increase in Waynergy potentiality to the International customer, due to product development.



## **APPENDIX 6 - FUNDING**

The initial investment required from Waydip in order to start the activity is about 200.00 €, which in part have already been obtained through partnerships established with the win of several IT Awards as EDP Richard Branson and ISCTE-IUL MIT Competition. Some external investments related with the entry in the Market on 2013 are still needed, about 100.000€, with the predicted investment of Business Angels or EUA MIT Institution in order to obtain those values.

## **APPENDIX 7 - POTENTIAL TARGETS ´ RESEARCH**

**Sonae**, one of the major Corporations in Portugal, is enhancing a policy related with Environmental issues following the recent trend of Corporate Social Responsibility, taking the commitment to reduce the impact of the respective activity, in a Strategic vision that align Economical, Social and Environmental contexts. It includes the rational and efficient use of natural resources for energy consumption, strengthen the commitment to reduce the emission of residuals and pollution.

Following the stated Policy, Sonae is currently installing 15 new centrals of autonomous energy production, through renewable energy, due to a objective in reducing 6% the total energy consumption between the years of 2008 and 2012. traduced in 1% of electrical energy reduction in each store, along with the related 7 % reduction in CO2 emissions. Concerning Financial Results, Sonae is currently setting a margin of 12% in units sold, with a EBITDA growing at a rate of 9% yearly. The Business Volume is increasing at a rate of 5% yearly, with a present value of 5,8 thousand million€, with gains in the market share of Retail and non Retail Business. The Results distributed to shareholders increase 13% in 2010 to 192 million€.

**Chamartin**, Company based in Madrid, operating within the Real Estate Industry, is currently reinforcing the Investment on the Portuguese Markets. With presently eleven Shopping Centers in the territory, representing a gross area on total of 163.000 m<sup>2</sup>, the current Policy followed by the

Chamartin in Portugal includes the publication of yearly Sustainability Reports concerning Financial Results and Environmental Practices. In 2008 the Company have invested more than 213 million€ on the Portuguese Real Estate Market, with creation of 632 direct jobs, with total sales from the connected Operators representing 345 million €. The profit on assets are in order of 67 million€, being the contribution of Retail share in the total Business of 45%. With a high level of affluence of people in their place in order of 45,8 million yearly, Chamartin has been considered by IPD Portugal Studies the best Real Estate Company within the National Industry.

Concerning the Environmental Policy, presently the Company obeys every stages of activity to a Environmental Plan, traduced in the decrease of energy consumption in 2010 of 12%, being Dolce Vita Douro (11,3%) and Dolce Vita Coimbra (9,7%) the ones with best performance at this level. The reduction of CO<sub>2</sub> is also being accomplished a decrease of those emissions comparing with the last year of 6%, representing yet 13.317 tons.

**Estradas de Portugal S.A.**, Corporation that operate within Infrastructure Industry, is currently starting to have more concerns relating to Environment Requirements with new actions related to the decrease of noise pollution, along with 50% raise on Environmental research projects since 2006 with special focus on the efficient management of Cultural heritage and Landscaping. Considering Financial results, the recent Investment of the Portuguese Government of 130 million€, raised the total equity within the company to 645 million€. The current EBITDA is in order of 390.010€ with a ROE of 24,9% and ROA of 2,8%. The Financial Debt is being raised during the recent years to 1.978.551€, with a total increase of 31%, although the high levels of results created to the Portuguese Government, one of the major Corporate shareholders, in order of 31 million €, . The total operating income in 2010 has been 1.666.912€, an increase of 12% since 2009.

**APPENDIX 8 - NPV, IRR, PAYBACK PERIOD AND ROI CALCULATIONS FOR WAYNERGY SHOPPING AND WAYNERGY URBAN**

<i>Waynergy Shopping</i>																					
Period	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Cash Flow(€)	-300000	50000	50000	50000	50000	20000	50000	50000	50000	50000	20000	50000	50000	50000	50000	20000	50000	50000	50000	50000	20000
Discount Rate (r)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Discounted Cash flow(€)	-300000	46729	43672	40815	38145	14260	33317	31137	29100	27197	10167	23755	22201	20748	19391	7249	16937	15829	14793	13825	5168
NPV (€)	174435																				
IRR	14%																				
Payback period	6 years																				
Return on Investment	196%																				

<i>Waynergy Urban</i>											
Period	0	1	2	3	4	5	6	7	8	9	10
Cash Flow(€)	-120000	27000	27000	27000	27000	3000	27000	27000	27000	27000	3000
Discount rate (r)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Discounted Cash Flow(€)	-120000	25471,698	24029,904	22669,721	21386,529	2241,7745	19033,935	17956,542	16940,134	15981,259	1675,1843
NPV (€)	47386,6796										
IRR	14%										
Payback period	5 years										
Return on Investment	85%										

### APPENDIX 9 - WAYDIP YEARLY REVENUES

Waynergy Shopping	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	2013	2014	2015	2016
Price/m²	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Growth Price	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
Sales	23750	23750	23750	23750	23750	23750	23750	23750	23750	23750	23750	23750	1140000	1254000	1504800	1805760
Services +																
Product Upgrading	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	60000	66000	79200	95040
<b>SubTotal</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>25000</b>	<b>1200000</b>	<b>1320000</b>	<b>1584000</b>	<b>1900800</b>
												Subtotal 2012	300000			

Waynergy Urban	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	2013	2014	2015	2016
Price/m²	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800
Growth Price	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sales	-	-	-	-	-	-	-	-	-	-	-	-	114000	228000	273600	327750
Services +																
Product Upgrading	-	-	-	-	-	-	-	-	-	-	-	-	6000	12000	14400	17250
<b>SubTotal</b>													<b>120000</b>	<b>240000</b>	<b>288000</b>	<b>345000</b>

Total Revenue	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	2013	2014	2015	2016	
(€)	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000	1320000	1560000	1872000	2245800	
													Growth rate	3,4	0,181818	0,2	0,199679



**APPENDIX 10 -WAYDIP YEARLY COST STRUCTURE**

	Production	R&D+Testing	Services	Distribution	Logistic	Implementation	HRM	Financial	Firm Infrastructure	Marketing	Procurement	Growth Sales
2014	0,181	0,3	0,181	0,181	0,14	0,13			0,23	0,3	0,181	0,181818
2015	0,15	0,3	0,2	0,2	0,16	0,13			0,23	0,3	0,14	0,2
2016	0,14	0,3	0,19	0,19	0,13	0,13			0,22	0,25	0,14	0,199679

Cost Structure(€)	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	Total 2012	2013	2014	2015	2.016
<b>Margin</b>	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	6.250	75.000€	224.000	224.239	280.527	370.876
<i>Primary Activities</i>																	
<b>Production</b>	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	60.000	264.000	311.784	358.552	408.749
<b>R&amp;D +Testing</b>	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	45.000	198.000	257.400	334.620	435.006
<b>Services</b>	1.250	1.250	1.250	1.250	1.250	1.250	1.250	1.250	1.250	1.250	1.250	1.250	15.000	66.000	77.946	93.535	111.307
<b>Distribution</b>	250	250	250	250	250	250	250	250	250	250	250	250	3.000	13.200	15.589	18.707	22.261
<i>Primary Activities/Outsource</i>																	
<b>Logistic</b>	500	500	500	500	500	500	500	500	500	500	500	500	6.000	26.400	30.096	34.911	39.450
<b>Implementation</b>	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	3.250	39.000	171.600	193.908	219.116	247.601
<i>Secondary Activities</i>																	
<b>HRM</b>	-	-	-	-	-	-	-	-	-	-	-	-		26.400	53.800	53.800	53.800
<b>Financial</b>	-	-	-	-	-	-	-	-	-	-	-	-		26.400	26.400	39.600	39.600
<b>Firm Infrastructure</b>	500	500	500	500	500	500	500	500	500	500	500	500	6.000	40.000	49.200	60.516	73.830
<b>Marketing</b>	500	500	500	500	500	500	500	500	500	500	500	500	6.000	66.000	85.800	111.540	139.425
<b>Procurement</b>	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	3.750	45.000	198.000	233.838	266.575	303.896
<b>Total</b>	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	25.000	225.000	1.096.00	1.335.761	1.591.473	1.874.924

**APPENDIX 11 -WAYDIP YEARLY COST PERCENTAGE**

<i>Cost Percentage</i>	<b>M1</b>	<b>M2</b>	<b>M3</b>	<b>M4</b>	<b>M5</b>	<b>M6</b>	<b>M7</b>	<b>M8</b>	<b>M9</b>	<b>M10</b>	<b>M11</b>	<b>M12</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
<b>Margin</b>	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	17%	14%	15%	17%
<i>Primary Activities</i>																
<b>Production</b>	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	19%	18%
<b>R&amp;D Product Development+Testing</b>	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	17%	18%	19%
<b>Services</b>	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
<b>Distribution</b>	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
<i>Primary Activities/Outsourcing</i>																
<b>Logistic</b>	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
<b>Implementation</b>	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	12%	12%	11%
<i>Support Activities</i>																
<b>HRM</b>	-	-	-	-	-	-	-	-	-	-	-	-	2%	3%	3%	2%
<b>Financial</b>	-	-	-	-	-	-	-	-	-	-	-	-	2%	2%	2%	2%
<b>Firm Infrastructure</b>	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%	3%	3%
<b>Marketing</b>	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	5%	6%	6%	6%
<b>Procurement</b>	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	25%	15%	15%	15%	14%	14%
<b>Total</b>	100%											100%	100%	100%	100%	100%