

Urban Node Project Final Presentation

02/06/14, Vilanova I la Geltru

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Gerard Soriano – Antoine Vilain – Weronika Wojtkowiak*

16/06/2014

Urban Node - EPS - Spring 2014 –
Final Presentation

+ 6 Members, 5 Nationalities

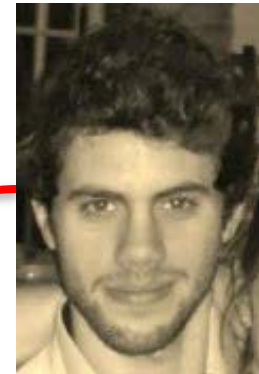


Calley, London
Product Design

Dieter, Antwerp
Civil Engineering



Weronika, Lodz
Archirctural
Engineering



Antoine, Reims
Packaging
Engineering



Gerard, Barcelona
Mechanical
Engineering

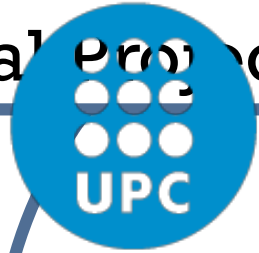


César, Grenoble
Industrial Engineering 16/06/2014

+ The Urban Node Project Scopes

Design an innovative urban element

Urban Node
Global Project



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

Escola Politècnica Superior d'Enginyeria
de Vilanova i la Geltrú

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- B

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+ Table of Content



Introduction:

- Presentation of the Project
- SWOT Analysis from previous projects

- 1) From the Design to Construction
- 2) Strength Analysis
- 3) Company and Quality Control
- 4) Marketing Plan
- 5) Cost Benefit Analysis

Conclusion & Recommendations

+ SWOT Analysis from previous projects



STRENGTHS

- Ergonomics
 - User Profiles
- Aesthetics
 - Lighting
- Function
 - Features

WEAKNESSES

- Ergonomics
 - User profiles
- Aesthetics
 - Shape
- Function
 - Lighting

OPPORTUNITIES

- Location
- Tourism
- International/Globalization
- Maintenance

THREATS

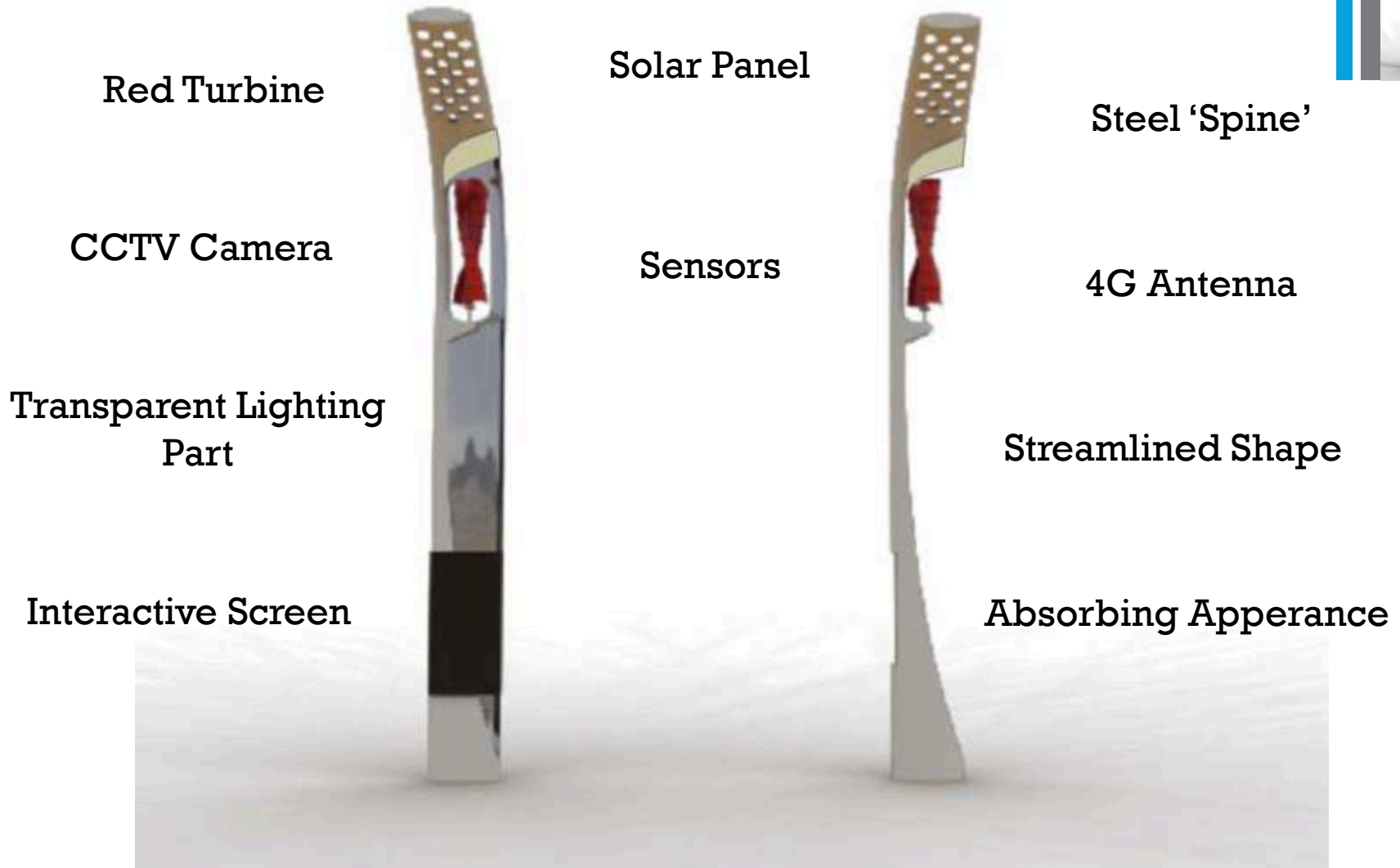
- Competitors
- Cost
- Maintenance
- Smart City



From the Design to Construction

Design, Technical drawings and 3D Printing

Design Of Urban Node



Urban Nodes in Vilanova i la Geltrú



Plaza de la Vila



Rambla Principal

Technical drawings

- Contact last

→ Get

- Analyze tho

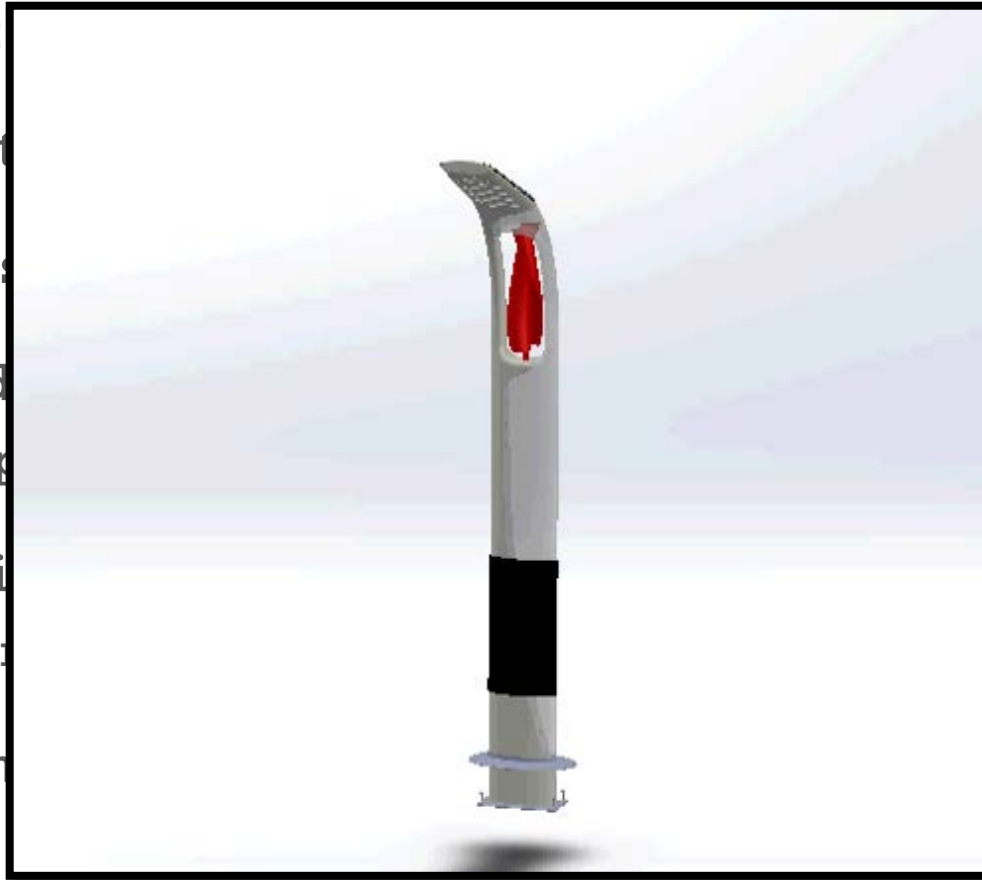
- Transform d

- .igs → .sldp

- Draw the mi

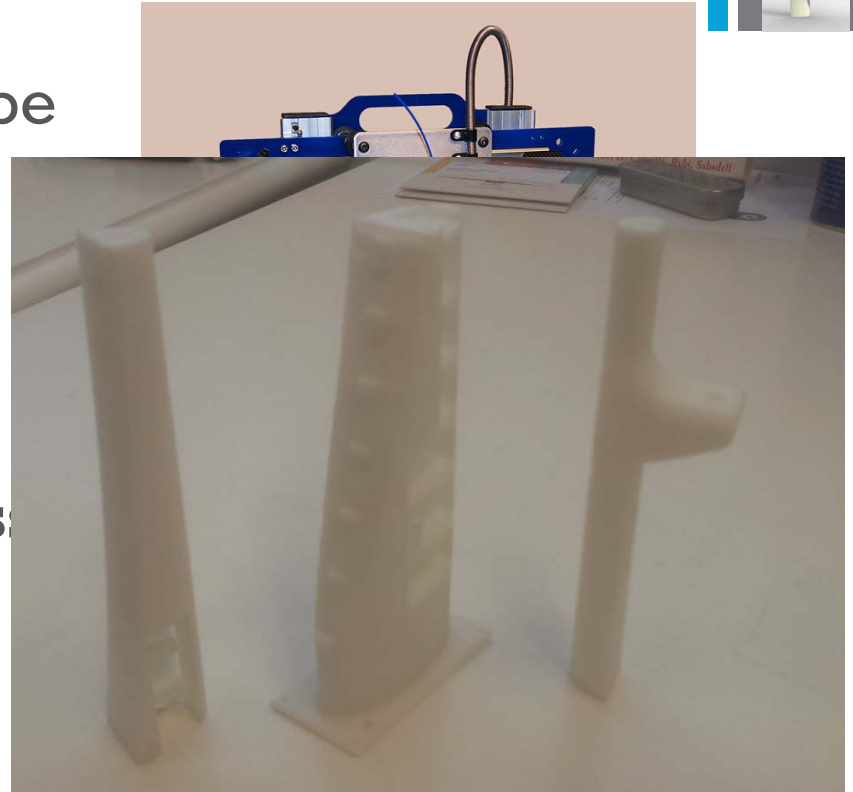
- Wind turbi

- Create anim



works

3D Printing





Strength Analysis

Materials

	Steel	Concrete	Glassfibre	Vubonite
Density (kg/m ³)	7800	2500	2550	Low
Strength	Strong	Ok	Strong	Very strong
Thickness	Thin	Thick	Thin	Thin
Cost	Cheap	Cheap	Expensive	Very expensive
Production	Easy	Easy	Difficult	Difficult
Corrosion	Possible	No	No	No

Glass fibre and Vubonite

- Very good characteristics
- Even too much for this project
- Not cost efficient

Concrete

- Good characteristics and cost efficient
- But problem with thinnest part of Urban Node

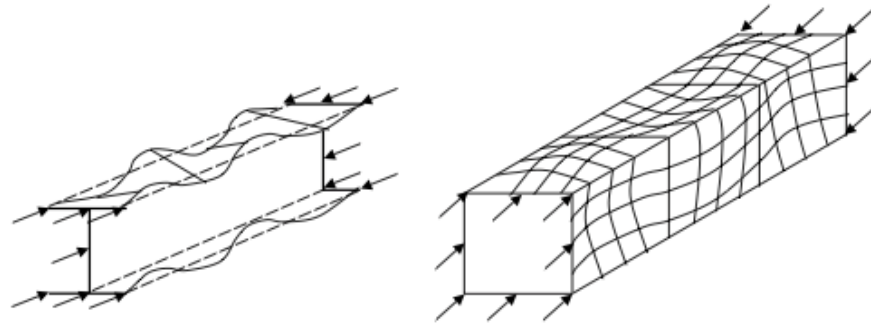
Steel

- Best solution
- Good characteristics and cost efficient
- Corrosion → Solution (protective paint, ...)

Strength analysis (Eurocode 3)

- Classification of section

- Slenderness
- Distribution of compressive forces



Interne plaatdelen		
Doorsnedeklasse	Belast op buiging	Belast op druk
1	$c/t \leq 72 \cdot \epsilon$	$c/t \leq 33 \cdot \epsilon$
2	$c/t \leq 83 \cdot \epsilon$	$c/t \leq 38 \cdot \epsilon$
3	$c/t \leq 124 \cdot \epsilon$	$c/t \leq 42 \cdot \epsilon$

→ **Classification 1**

Strength analysis



■ Control on buckling

$$X = \frac{1}{\phi + (\phi^2 - \bar{\lambda}^2)^{0,5}} = \frac{1}{6,1163 + (6,1163^2 - 3,13^2)^{0,5}} = 0,08 \leq 1$$

■ Compression load

$$N_{X,Sd} \leq N_{b,Rd} = \chi \beta_A \cdot \frac{A \cdot f_y}{\gamma_{M1}} = 0,08 \cdot \frac{2400 \cdot 235}{1,1} = 41018N = 41,08kN$$

$$N_{X,Sd} \leq N_{b,Rd}$$

$$2000N \leq 41080N$$

■ Bending load

$$M_{Sd} \leq M_{C,Rd}$$

$$M_{pl,y,Rd} = \frac{W_{pl,y} \cdot f_y}{\gamma_{M0}} = \frac{61000 \cdot 235}{1,1} = 13031818Nmm = 13031Nm$$

$$M_{pl,z,Rd} = \frac{W_{pl,z} \cdot f_z}{\gamma_{M0}} = \frac{81000 \cdot 235}{1,1} = 17304545Nmm = 17304Nm$$

$$M_{Sd,y} = 50N \cdot 0,3m = 15Nm$$

$$M_{Sd,z} = 500N \cdot 0,75m = 375Nm$$

Strength analysis - Conclusion

- Urban node
 - Steel plate: 5 mm
 - Quality: S235

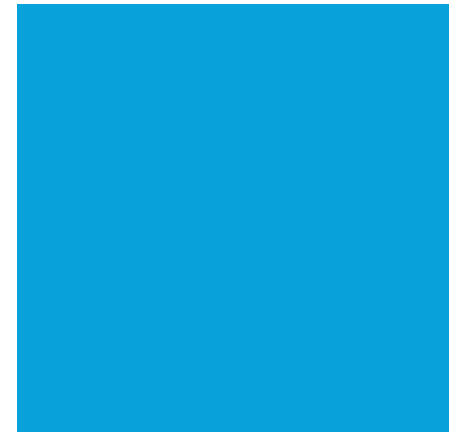
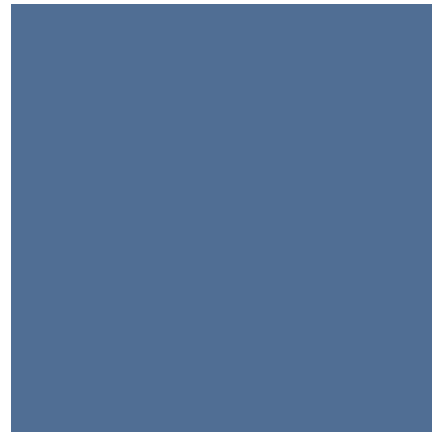
→ **Strong enough**

- Corrosion & Protection
 - Galvanization
 - Rust-resistant alloys
 - Cathodic protection
 - Coatings and painting

→ **Painting → Cheapest solution**

→ **Possibility to choose the color**





Company and Quality Control

Company Contact



- Letter
 - First Contact
 - By email

→ Have a meeting

- Presentation
 - Detailed explanation
 - By powerpoint

→ Convince & Sell

Quality Control

Urban Node Quality Controls

Common with street lamp

- Metallurgical
- Dimensional
- Resistance
- Painting
- Street situations

Specific for Urban Node

- Interactive screen
- Solar panel
- Wind turbine
- Sensors
- Antenna 4G

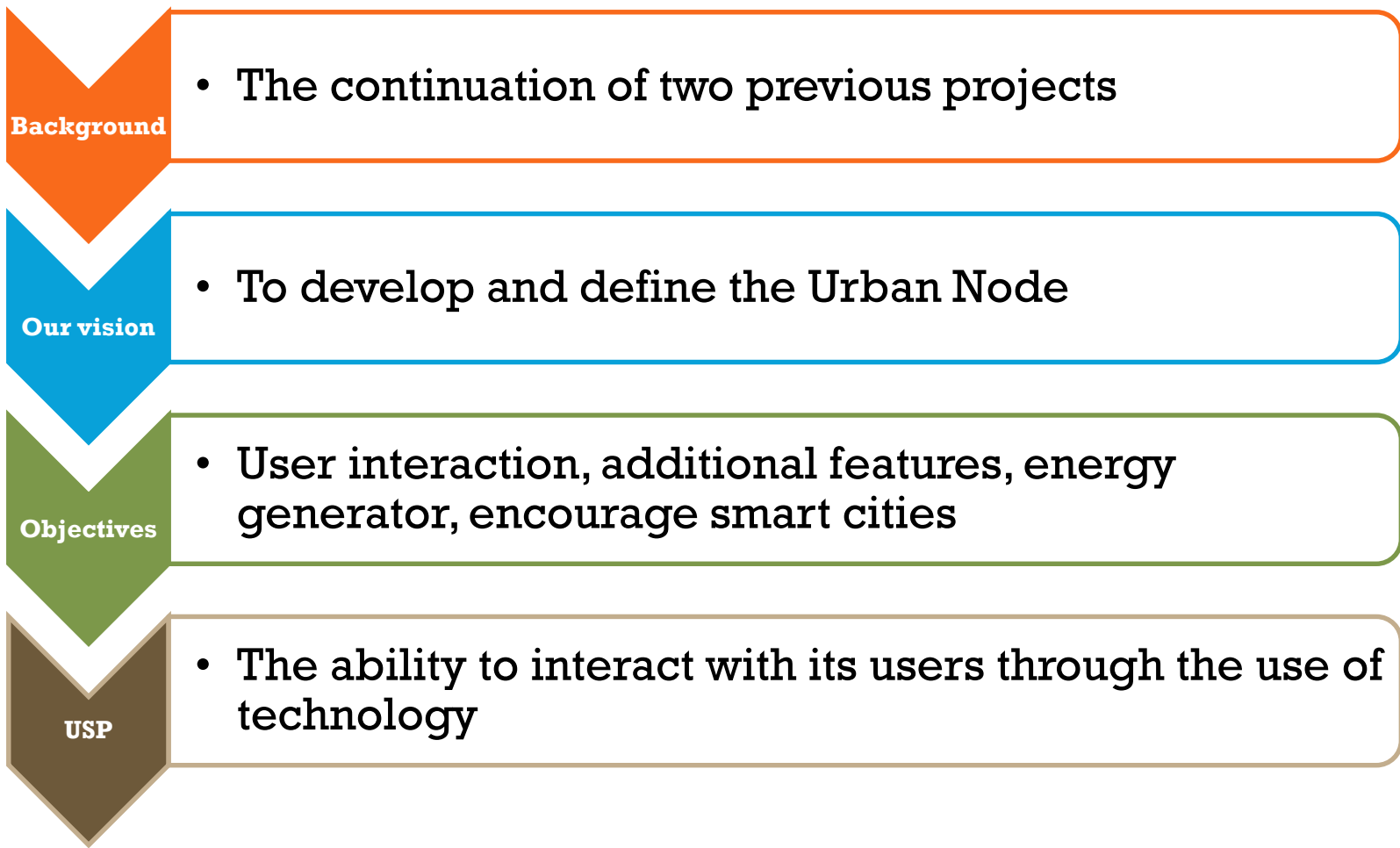




Marketing Plan



From a Vision...





Design to Construction

Strength Analysis

Company and Quality

Marketing Plan

Cost Benefit Analysis



To a Strategy

Target users

- The Urban Node has a high number of User Profiles – Mass market product

Market position

- The Urban Node will be classed as high end product

Competitors

- Research indicates that there are no immediate competitors

Promotion Strategy

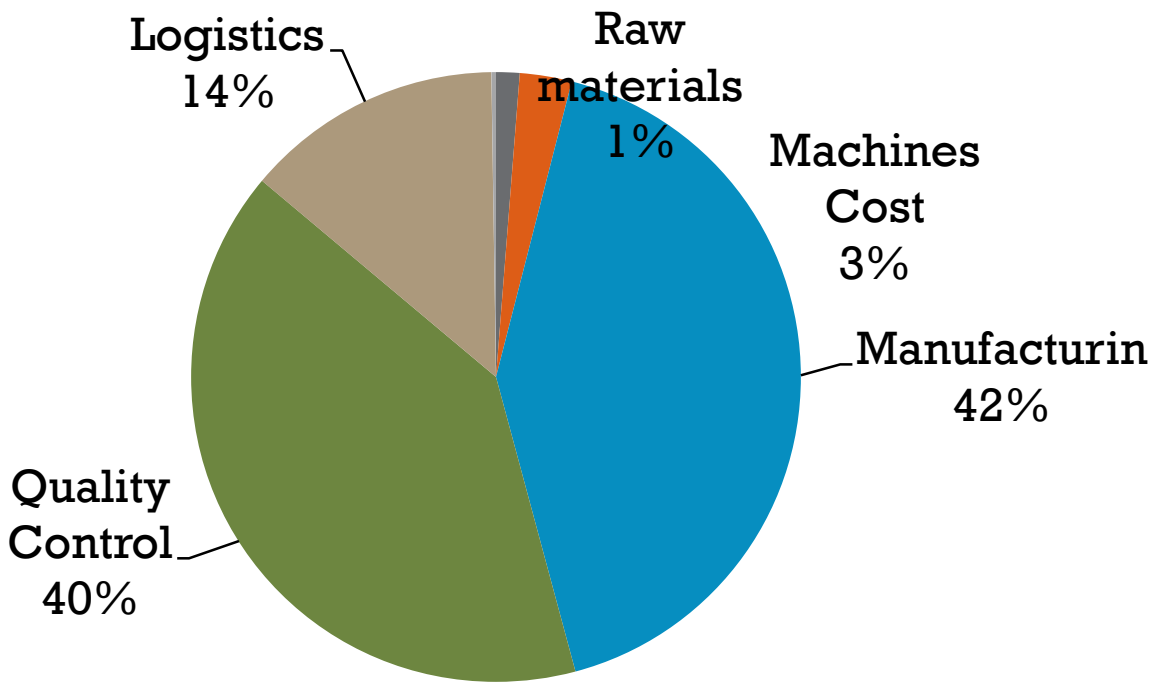
- The implementation of a Working prototype
- Creating and Distribution using marketing materials



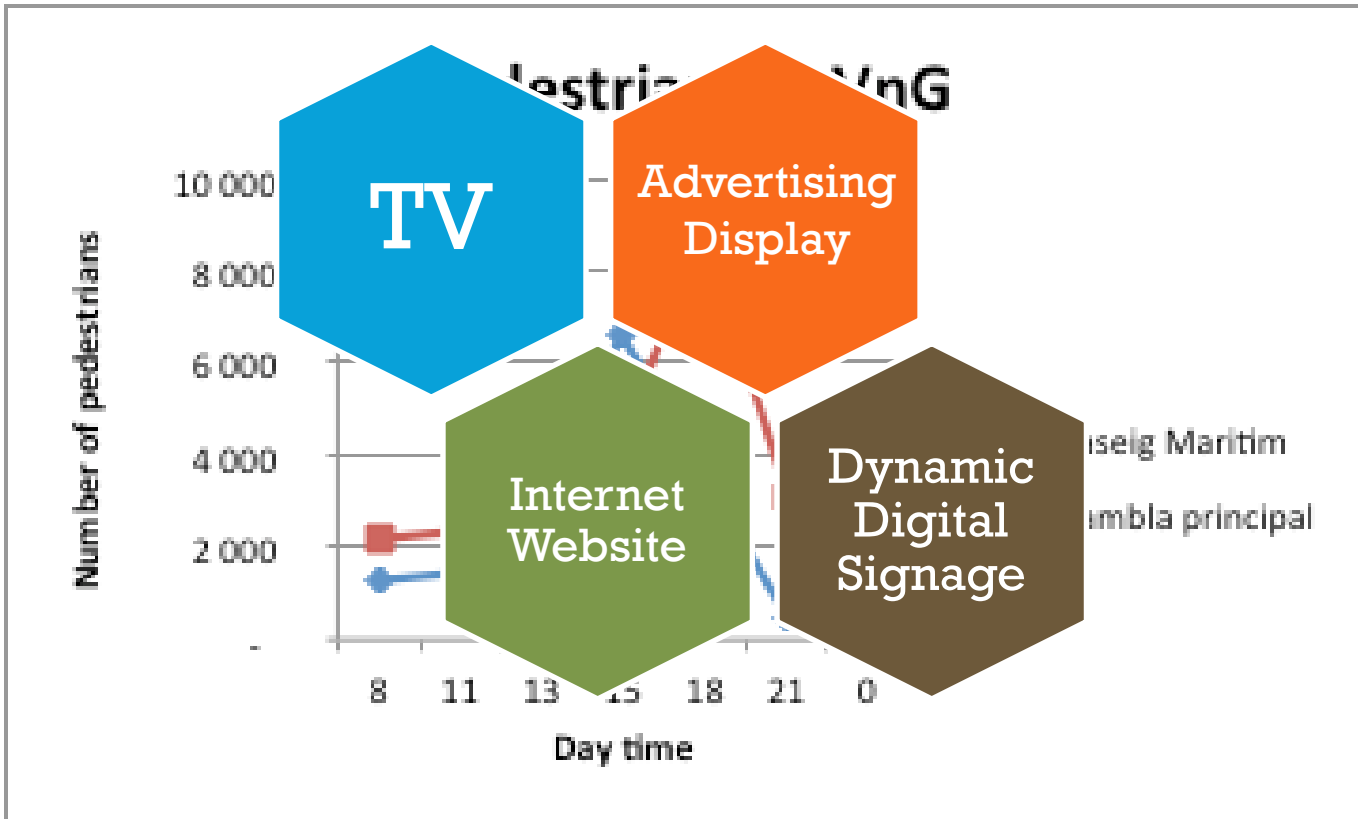
Cost Benefit Analysis



+ Expenses



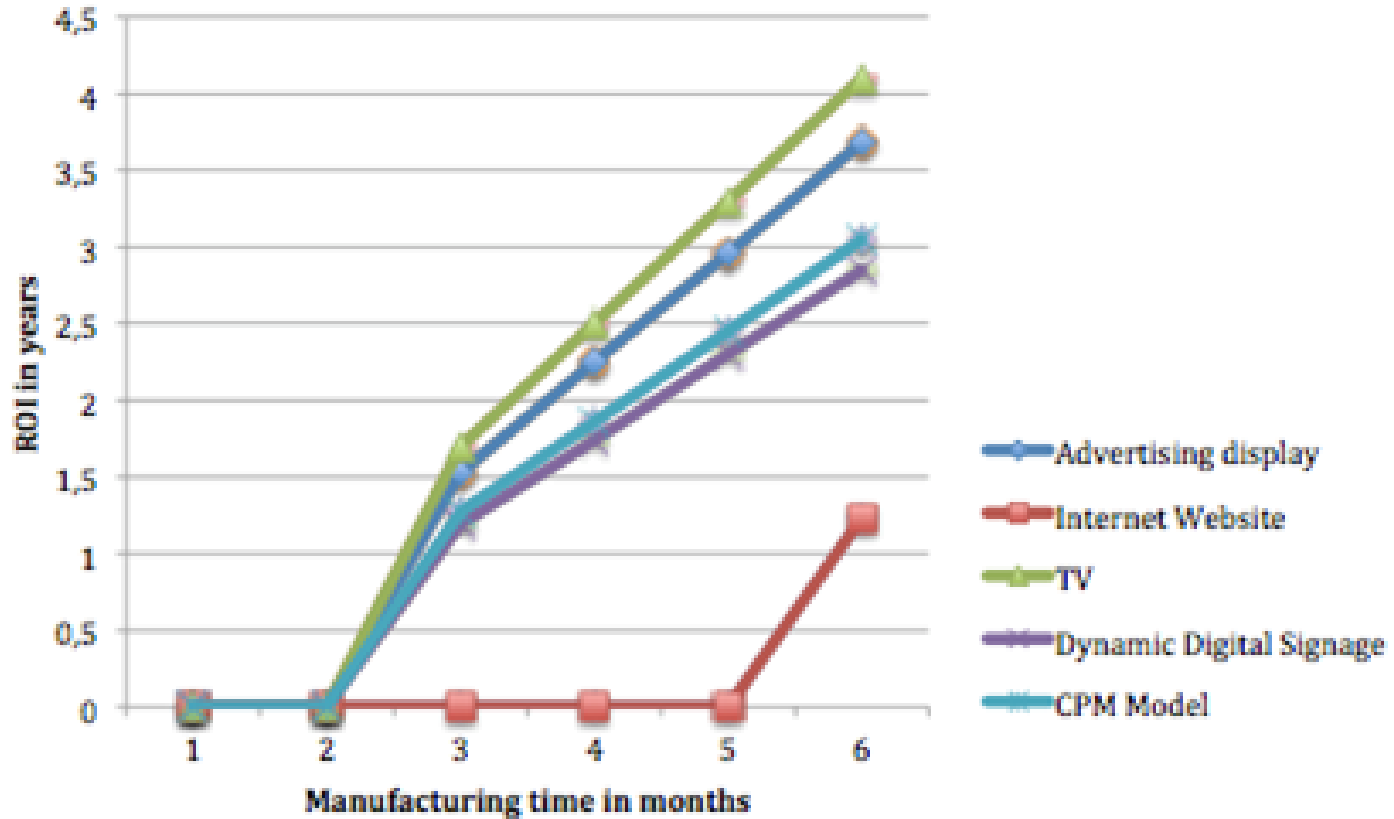
Advertising Incomes

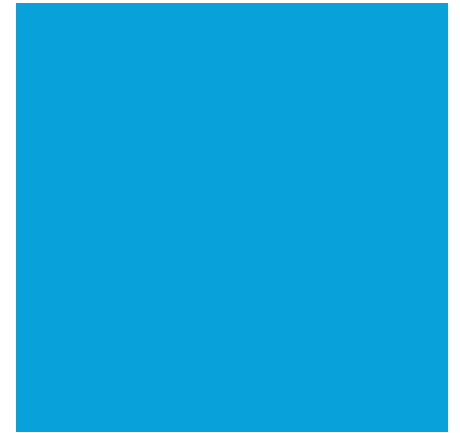


Economic Balance



ROI Evolution





Conclusion & Recommendations

+ Conclusion

■ Project as Innovative as Evolutionary

- Sensors and data gathering
- Sun power & Wind power
- Information point with an interactive screen

■ Objectives:

- ✓ Use management tools: Gantt chart, responsibility matrix, WBS, communication plan
- ✓ Define the dimensions, the shape and the modular aspect
- ✓ Define the materials
- ✓ Determine the components used for the urban node
- ✓ Find the 3D model (CAD drawings) & make technical drawings
- ✓ Company research
- ✓ Manufacturing processes
- ✓ Marketing Plan
- ✓ Cost Benefit Analysis





Recommendations



■ Next Steps:

- Work on the programming and electronics of the Urban Node
- Conduct a Marketing Action Plan with a company
- Update the Cost Benefit Analysis
- Implementation of a life size working prototype

- Profiles required for next steps:
 - Computer and Programming Engineer
 - Electrical Engineer
 - Electronic Engineer
 - Industrial Engineer
 - Mechanical Engineer

→ Arrange a partnership with a company (UPC)



Thank you
for your
attention!

