



## Objectives

Provide decision-making tools to optimise eco-efficiency, through environmental and economic analysis thus ensuring a sustainable management of the urban water cycle.

- Life Cycle Analysis (LCA) and impact reduction potential of urban water cycle.
- Life Cycle Costing (LCC) and evaluation of cost savings in the urban water cycle.
- Environmental, economic and eco-efficiency indicators to support decision making and promote sustainable use of natural resources and reuse of end products.
- User-friendly tool development to support policy-makers and public and private water managers.

## Benefits from the Aquaenvec project

- ISO 14045:2012 certification of eco-efficiency results of Betanzos and Calafell urban water cycles.
- Development of a web tool that easily assesses eco-efficiency of urban water activities.
- Communication and stakeholders implication: water utilities, administration and academia collaboration.

## Participants

### Coordinating Beneficiary



### Associated Beneficiaries



VNIVERSITAT ID VALÈNCIA

### Stakeholders



### Advisors



aquaenvec

ASSESSMENT AND IMPROVEMENT OF THE URBAN WATER CYCLE ECO-EFFICIENCY USING LCA AND LCC

[www.life-aquaenvec.eu](http://www.life-aquaenvec.eu)



LIFE10 ENV/ES/000520

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## Case studies

Environmental and economic assessment was performed in two case studies from northern Spain.

Two small-medium cities have been chosen, with different climate, water quality and water use patterns.



Betanzos



Calafell

### Betanzos

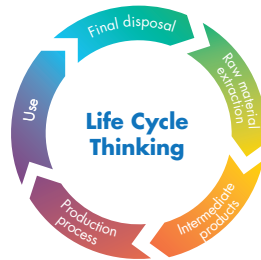


### Calafell

## Methodologies

Based on the concept of creating more value with less impact, the ISO 14045:2012 on eco-efficiency assessment links the environmental impacts with the system value.

In the Aquaenvec project, a Life Cycle thinking approach was followed to quantify both **environmental impacts** and **costs** of urban water cycle activities.



Environmental impact indicators were quantified through LCA:

- Global Warming Potential (GWP, tons CO<sub>2</sub> eq.)
- Eutrophication Potential (EP, kg PO<sub>4</sub><sup>3-</sup> eq.)
- Ozone Layer Depletion Potential (ODP, kg CFC-11 eq.)
- Cumulative Energy Demand (CED, MJ eq.)

System value was studied through LCC analysing:

- Construction costs (CAPEX and Annual Equivalent Costs)
- Operation and maintenance costs (OPEX)

## Case study results

Betanzos and Calafell carbon footprint and total life cycle costs

### Wastewater treatment:

Betanzos:  
- 725 tons CO<sub>2</sub> eq./year  
- 0.57 million €/year  
Calafell:  
- 1923 tons CO<sub>2</sub> eq./year  
- 1.22 million €/year

### Drinking water treatment:

Betanzos:  
- 716 tons CO<sub>2</sub> eq./year  
- 0.46 million €/year  
Calafell:  
- 481 tons CO<sub>2</sub> eq./year  
- 1.27 million €/year

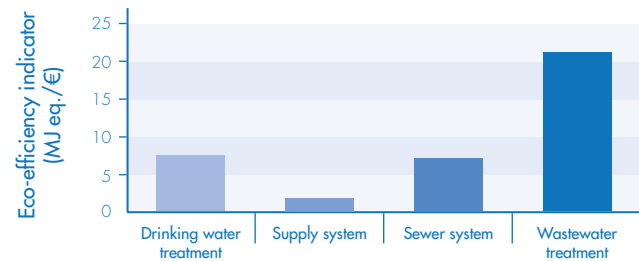
### Sewer system:

Betanzos:  
- 242 tons CO<sub>2</sub> eq./year  
- 1.11 million €/year  
Calafell:  
- 1238 tons CO<sub>2</sub> eq./year  
- 3.42 million €/year

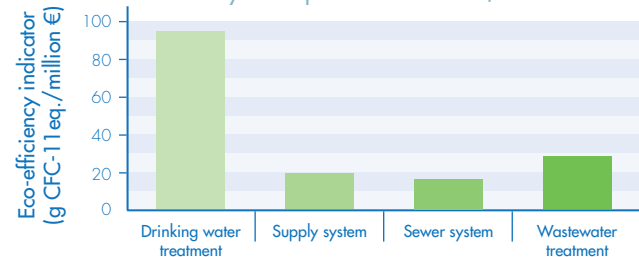
### Supply system:

Betanzos:  
- 137 tons CO<sub>2</sub> eq./year  
- 0.63 million €/year  
Calafell:  
- 328 tons CO<sub>2</sub> eq./year  
- 2.81 million €/year

### Calafell eco-efficiency: Cumulative Energy Demand/cost

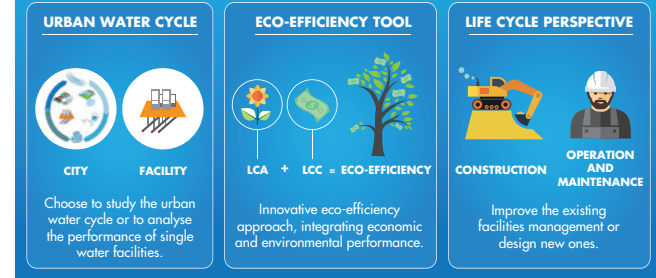


### Betanzos eco-efficiency: Ozone Layer Depletion Potential/cost

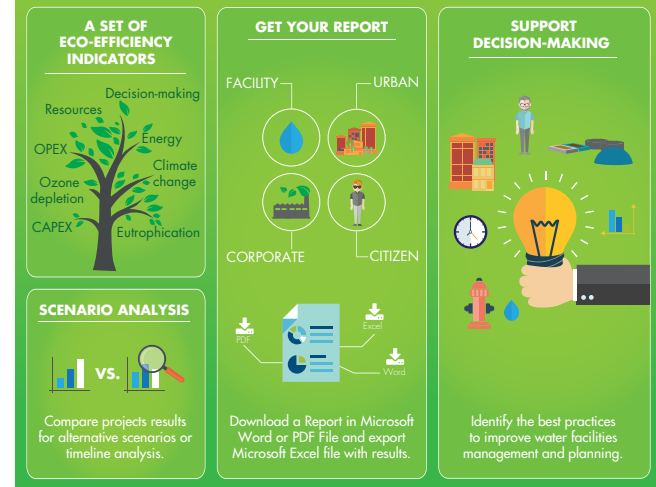


## Aquaenvec tool

What is the AQUAENVEC tool about?



What is the AQUAENVEC tool for?



How to get started?

