DESIRÉE MARÍN 22/11/2016

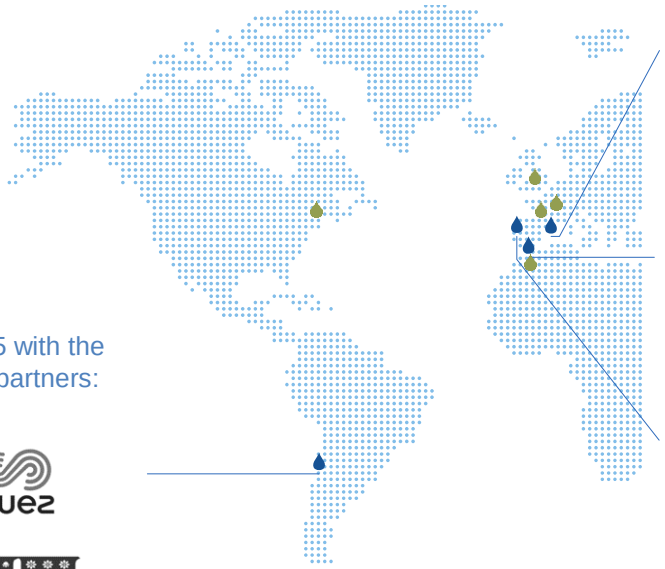
European Innovation Partnership on Smart Cities and Communities
Building a Market for Smart Cities and Communities
Action Clusters General Assembly

01
ABOUT CETAQUA

About Cetaqua

CETAQUA
NETWORK OF TECHNOLOGY CENTRES
BARCELONA

Cetaqua, as a **water technology center** of reference at national and international level, is able to create value within the **Suez Group** in the knowledge generation and technologies development and validation related to the water cycle.



CHILE
Established in 2015 with the following founding partners:

BARCELONA
Founded in 2007 with the following founding members:

ANDALUCÍA
Foundation that began operations in 2014, with the following founding partners:

GALICIA
Foundation created in 2011 with the following founding partners:

8
M€

94
Researchers

76
Projects

R&D programmes

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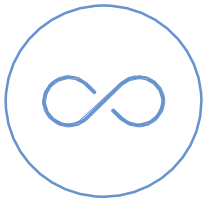
MANAGEMENT OF ALTERNATIVE WATER RESOURCES AND REUSE

- Drinking water treatment technologies
- Water Reuse
- Preservation of groundwater and aquifer recharge
- Climate services and watershed management

SANITATION AND VALORIZATION

- Aerobic treatments
- Anaerobic digestion
- Add-on wastewater treatment processes
- Recovery and valorization of energy & resources
- Treatment and recovery of gases & odours



SUSTAINABILITY

- Circular economy
- Enviromental and socio-economic impacts and risks
- Management of demands and customers
- Natural environment and biodiversity

QUALITY

- Advanced control of microorganisms
- Advanced chemical compound control
- Impact on customers and environment

WATER 4.0

- Smart solutions: IOT & Smart cities
- Big Data & Data Analytics

NETWORKS

- Monitoring, automation and control
- Smart Operations
- Smart Asset Management

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02
SUSTAINABLE URBAN WATER MANAGEMENT

Urban water cycle management

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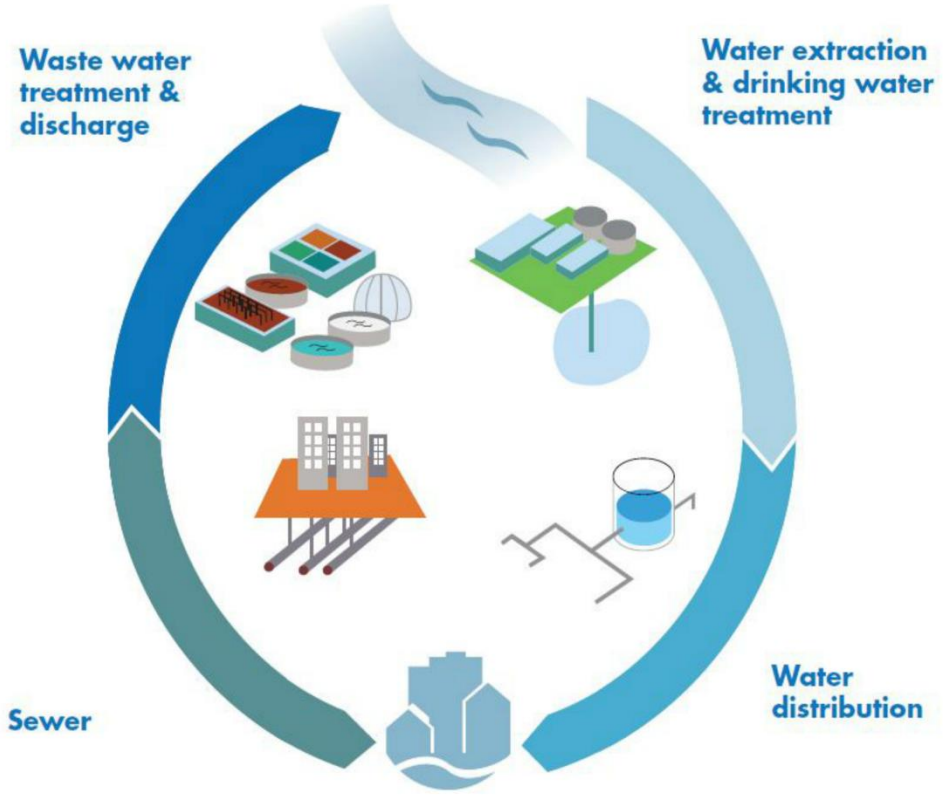

An eco-efficient urban water management assures water supply and wastewater treatment while it limits its environmental impact and minimises the associated costs.

Carbon footprint, Water footprint, Life Cycle Analysis, Life Cycle Costing, Cost-Benefit Analysis, Social Life Cycle Assessment, Ecosystem services, Circular economy

Aquaenvec tool for eco-efficiency assessment

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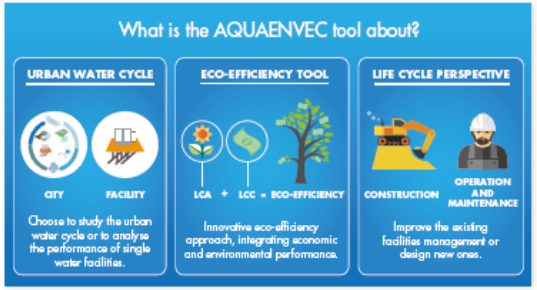
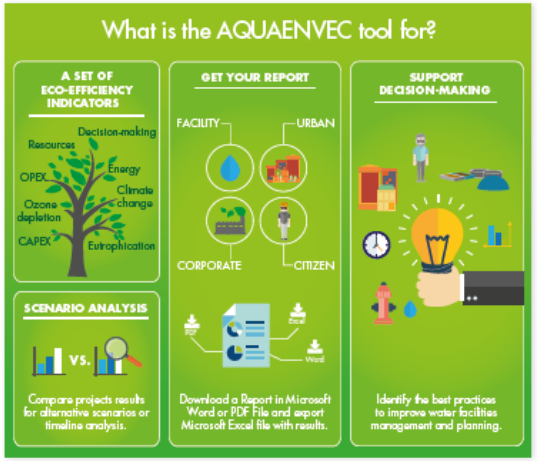
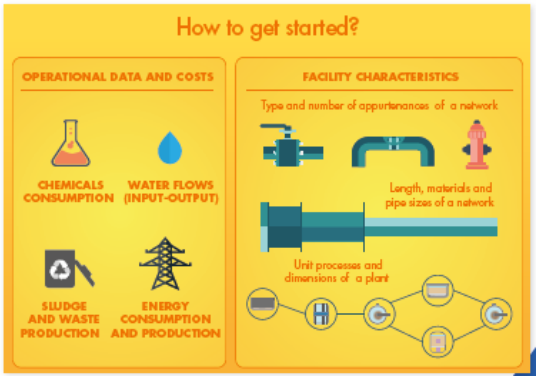
Aquaenvec tool

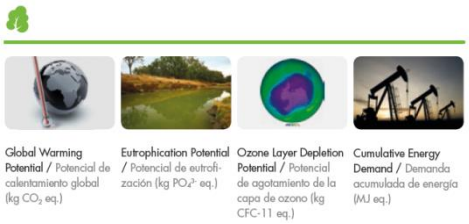


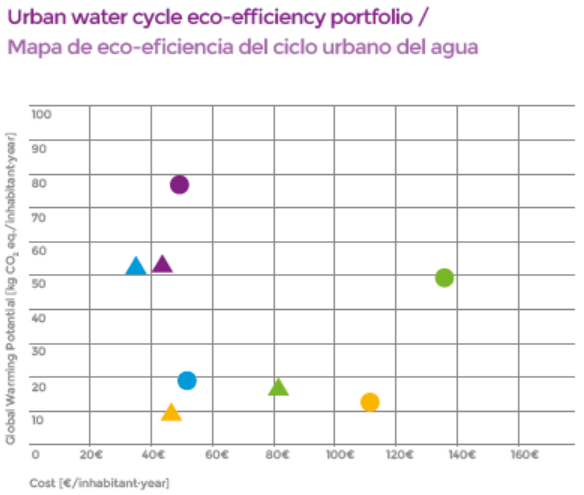


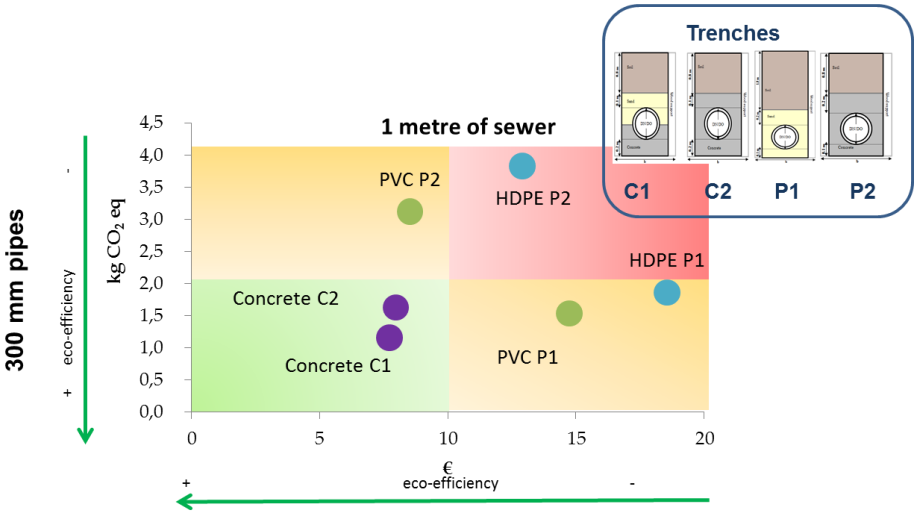


http://tool.life-aquaenvec.eu/en

Environmental and economic indicators

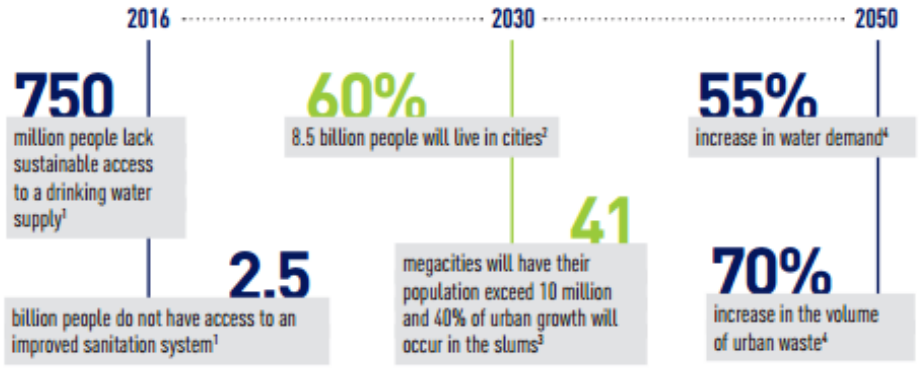


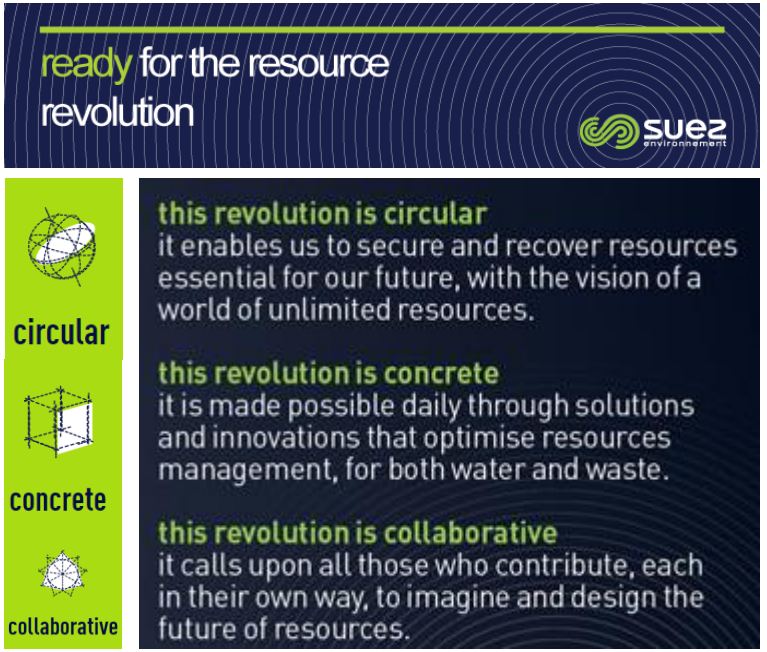




Life

Suez - Circular Economy





commitment n°3

multiply by 2 the volume of plastics recycled by 2020

- Development of partnerships with plastic-intensive industries with a view to co-building "made-to-measure" solutions producing high-quality recycled plastic.

commitment n°4

increase by 10% the production of renewable energy by 2020

- Production of 5.1 TWh of electricity and heat from waste and wastewater in 2014.
- Increase of the capacity to produce biogas from the treatment of waste and wastewater by 30% to 50% by 2020.

commitment n°6

promote the different usages of water by multiplying by 3 our alternative water production capacity

- 800 million m^3 of treated wastewater reused in 2014.
- Multiplication of the uses of water before it is released into the natural ecosystem for irrigation or to replenish water tables. Seawater desalination solutions.

commitment n°7

save the equivalent of the consumption of a city of 2 million inhabitants by 2020

- Development of smart technologies applied to the control of consumption and improvement of the performance of drinking water distribution networks.

Circular economy – Water cycle

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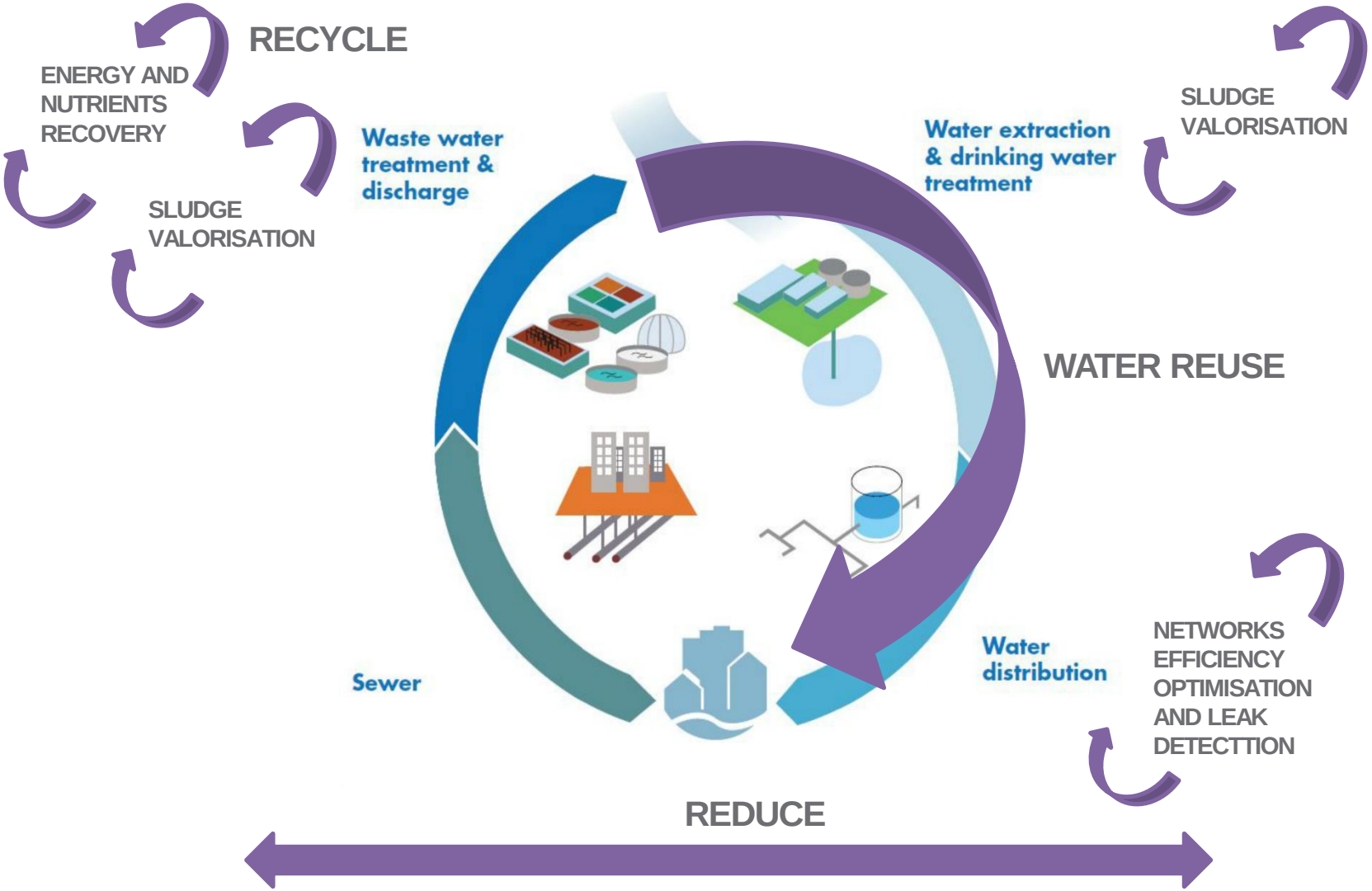
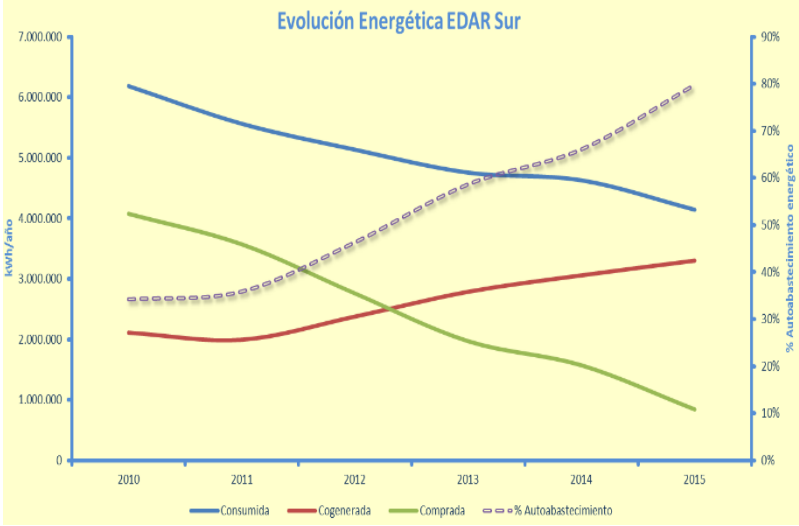


EMASAGRA Granada (Spain)
Goal 2020 0 Waste & 0 Energy

MAIN GOAL 2020: be 100% self-sufficient and transfer the excess of energy to the grid

The major goal of EMASAGRA is to implement a transformation of the current model, developing actions focused on attaining the **reuse of water, the generation of energy, as well as the recovery of the main waste produced in the WWTP.**

Achievements in energy self-sufficiency 2010-2015 in WWTP "SUR"



WASTE

- **100% of sands recovered**
  Recovery of sands removed from the WWTP pre-treatment and the rest of the sanitation system, such as the sewerage.
- **29% of greases recovered**
  Greases are recovered by a digestion process, and finally used as compost or direct application to agriculture.

ENERGY

- **46.44% reduction of energy purchase in WWTP "Sur"**
  Charging station facility (700 L diesel savings)
  Microturbines producing 750kWh from water power.
  80% energy self-sufficiency in WWTP "Sur".

EMASAGRA Granada (Spain)
Electrostation: From waste to energy

Since November 2015, we have had electric car chargers in the WWTP "Sur", with three points of connection for electric vehicles. In addition, EMASAGRA acquired 3 electric vehicles. All this infrastructure works with energy produced in the WWTP, from the biogas production.

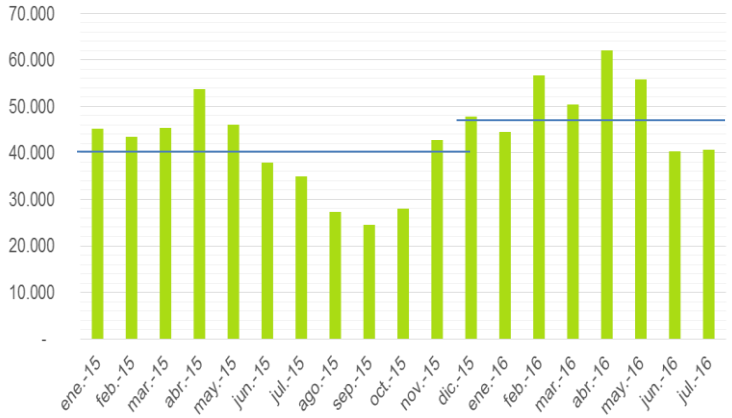
Catalonia (Spain)
Sludge co-digestion in WWTP “Vilanova i la Geltrú”

Co-digestion is defined as the anaerobic treatment of a mixture of at least two different types of substrates with the aim of improving the efficiency of the energy generation and recovery process.

ALLOWS

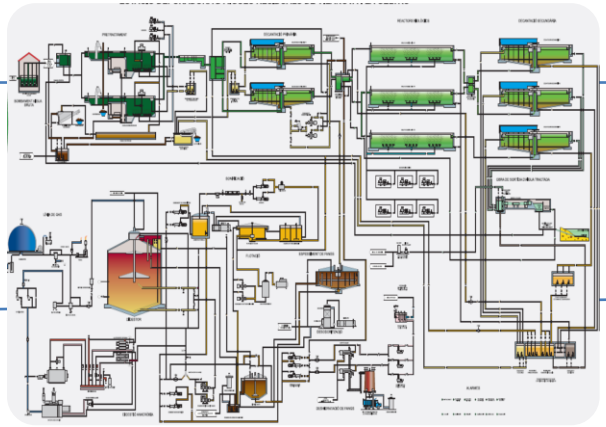
- Transformation of organic waste into an energy resource.
- Operation of cogeneration processes for a longer time and increase in energy production.
- Production of surplus steam.
- Optimization of our asset use.

Biogas production (m3)



WWTP SLUDGE

CO-SUBSTRATE
From other surrounding industries



BIOGAS

DIGESTATE

Catalonia (Spain)
Sludge plant WWTP “Pineda”

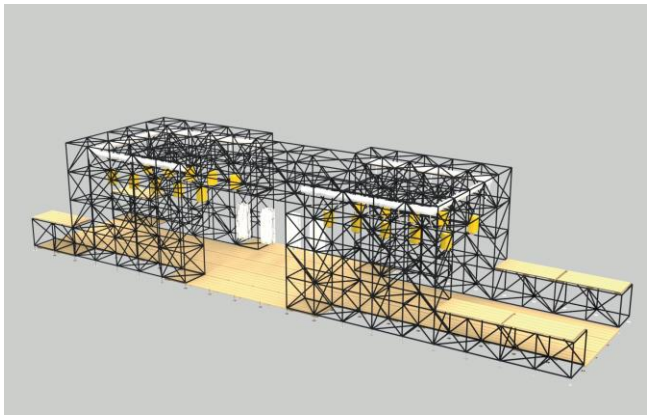
Sludge management platform consists of the adaptation of an existing sludge digestion facility so that it can receive and treat sludge from other nearby facilities. It's an environmentally and economically sustainable solution, the biogas generated can be recovered as energy and the sludge processed in the plant can be applied in agriculture.

GOAL: **Consume 0 kWh/m3, having estimated a reduction of the carbon footprint for the WWTP of 792Tn CO_2/year.**

BENEFITS

- Energy recovery from biogas generated.
- Global economic savings.
- Reduction of the carbon footprint for the whole sludge treatment from the generation until its final disposal.
- Decrease the sludge production for final disposal.
- Adaptation to the current sludge management regulations.



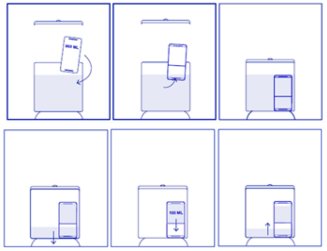



PLASTIC CYCLE

Our aim was to explore **circular economy opportunities related to our buried assets, mainly plastic pipes**.

The students worked on:

- the logistic to gather the plastic assets
- the potential treatment,
- the business profitability assessment
- the creation of a value proposition



(re)cycle Suez's pipeline
Storm Drain

PAIP!

ELISAVA
Barcelona School of Design and Engineering

suez

03

CASE STUDY: How can a territory become economically circular?

Sant Feliu de Llobregat (Barcelona)

11,79 km2
43.800 inhabitants
3.707,8 inh/km2

- 8 industrial areas
- Important regional agricultural area (3.348 Ha, 5% at Sant Feliu)
- 2.487 m2 green areas
- Collserola Park (8.295 Ha, 7% at Sant Feliu)

Objectives & Key players

1) To develop a practical guide for proposing a **Circular Economy Model** in an area
2) To implement this guide in a case study: **Sant Feliu de Llobregat (Barcelona)**

Local Players

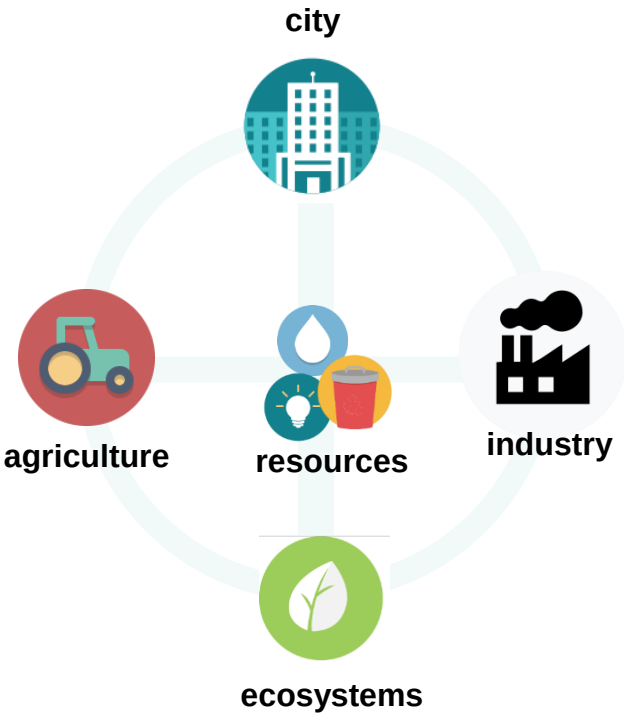
- Primary sector: agriculture and farming
- Secondary sector: manufacturing industry
- Terciary sector: services
- Domestic sector: citizens
- The environement
- Local administrations: city council, local government, etc.

Flows

- Water cycle
- Raw materials and waste
- Energy

Circular Economy

- Diagnosis of current situation
- Analysis of flows' synergies among local players
- Circular economy model: the strategy and measures that need to be implemented



Data & Participants

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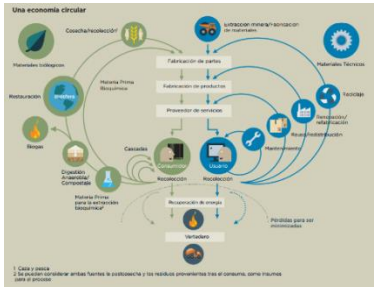

Guidelines & Concept from Ellen Mc Arthur Foundation + Life cycle inventories focused on Water-Waste-Energy

Detection of **circular economy opportunities** for "closing the loop" through the flows' **data analysis**

KEY PLAYERS





1. Urban services, including a focus on water cycle
2. Industrial areas and associations
3. Agricultural park (Parque Agrario del Baix Llobregat)
4. Natural areas (Parc Collserola)

PARTICIPANTS

Ajuntament de Sant Feliu de Llobregat
Aigües de Barcelona
CETAQUA

Indoor Karting
Aigües de Barcelona
Parc de Collserola
Almirall
dallant Aromas para la alimentación
Parc Agrari del Baix Llobregat
AMES
AE PLA ASSOCIACIÓ D'EMPRESARIS DEL POLÍGON INDUSTRIAL DEL PLA I LES GRASES
FBQ GESTOR Y TRANSPORTISTA DE RESIDUOS AUTORIZADO
Ambientalia
IBERITAL
Generalitat de Catalunya Institut Català d'Energia
NETEXPRES s.l. Neteja i Serveis Integrals
THERMO KING
FCC
Agència de Residus de Catalunya
SOLER i SAURET, SA.
Benfumat
ACC1Ó Competitivitat per l'empresa
Generalitat de Catalunya
Generalitat de Catalunya Departament de Territori i Sostenibilitat
LITHOPLATE

DATA

1. City council
2. Aigües de Barcelona
3. Data from participants through forms, interviews and technical visits
4. Public entities data from their reportings

Results

1) Practical guideline on how to identify **Circular Ecnonomy opportunities** into different areas

Ajuntament de Sant Feliu de Llobregat	**ECONOMIA CIRCULAR A SANT FELIU DE LLOBREGAT**
Mesura	**Aigües regenerades a Sant Feliu de Llobregat**
Objectius	Ús de l'aigua regenerada per a usos no potables com reg de parcs i jardins, neteja dels carrers o per a usos industrials
Descripció	Usuaris i demanda potencial Estimació de la demanda d'aigües regenerades per cada actor: – Ajuntament: neteja de carrers i reg de parcs i jardins – Urbà: reg de jardins privats – Industrial: neteja de naus, refrigeració, neteja de vehicles  Xarxa de distribució d'aigües regenerades 
Agents responsables	Ajuntament de Sant Feliu de Llobregat
Agents implicats	EDAR Sant Feliu de Llobregat Agència Catalana de l'Aigua Aigües de Barcelona
Termini ☐ Curt (1 any) ☐ Mig (1 – 5 anys) ☐ Llarg (> 5 anys)	**Viabilitat** Social Ambiental Econòmica

2) Package of **circular opportunities** in this area (**10 measures**), some examples are:

- **Water reuse for non potable uses**
- **Biomass energy recovery:** District Heating Collserola
- Use of **industrial biosludge** for increasing biogas production at local WWTP
- **Collaborative economy**: industrial waste collection and management model
- **Biowaste used** at agricultural park
- Agroindustrial cooperation for local products promotion

3) Identify **R&D gaps** and validate ideas on how to evaluate and rank circular economy opportunities from social, environmental and economic (business models involved)

05
Challenges & Next steps

Our knowledge challenges on circular economy

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Many data is involved in identifying sinergies on water-energy-resources by analysing input/output flows

Selection and prioritasion of opportunities should take into account social , environmental benefits and the business model involved

Technology readiness it is key for technical feasibility of reduce, recycle, reuse

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WE DEVELOP PROJECTS, WE CREATE VALUE

CETAQUA BARCELONA

Crta. d'Esplugues, 75
08940 Cornellà de Llobregat
Barcelona
Tel. 93 312 4800

www.cetaqua.com

https://twitter.com/cetaqua

https://www.youtube.com/user/Cetaqua

Contact:

Desirée Marín
Head of Environment, Society and Economics research programme

dmarin@cetaqua.com
+34933124823