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

DESIRÉE MARÍN 22/11/2016
01
ABOUT CETEAQUA
About Cetaqua

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.

- **BARCELONA**
  - Founded in 2007 with the following founding members:
  - 8 M€
  - 94 Researchers
  - 76 Projects

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

- **GALICIA**
  - Foundation created in 2011 with the following founding partners:

**CHILE**
- Established in 2015 with the following founding partners:
02
SUSTAINABLE URBAN WATER MANAGEMENT
Urban water cycle management

Aquaenvec tool for eco-efficiency assessment

Environmental and economic indicators

Urban water cycle eco-efficiency portfolio / Mapa de eco-eficiencia del ciclo urbano del agua

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 m³ 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

- Energy and nutrients recovery
- Sludge valorisation
- Water extraction & drinking water treatment
- Water reuse
- Water distribution
- REDUCE
- Energy efficiency & renewable energy
- O&M processes improvement
- Digitalisation & smart operations
- Agricultural & industrial water efficiency
EMASAGRA Granada (Spain)
Goal 2020: 0 Waste & 0 Energy

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.
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.

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 792 Tn CO₂/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

ELISAVA
Barcelona School of Design and Engineering
CASE STUDY: How can a territory become economically circular?
Sant Feliu de Llobregat (Barcelona)

- 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)

11,79 km²
43.800 inhabitants
3.707,8 inh/km²
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
- Tertiary sector: services
- Domestic sector: citizens
- The environment
- 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

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

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

DATA
Results

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

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

BIG DATA MANAGEMENT & ANALYTICS

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

SUSTAINABILITY & BUSINESS MODELS

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

TECHNOLOGIES AND SOLUTIONS

Technology readiness is key for technical feasibility of reduce, recycle, reuse
WE DEVELOP PROJECTS, WE CREATE VALUE

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