



EL PARTNER
TECNOLÓGICO

LEITAT | Technological
Center
managing your technologies member of **TECNIO**
De tech. De competitive

SESIONES DE TRABAJO TEMÁTICAS SOBRE IDEAS DE PROYECTOS

From Green Roofs to Electrowetlands Roofs

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Índice

- **Presentación de la entidad**
- **Presentación de la idea de proyecto**
- **Concepto**
- **Objetivos**
- **Metodología**
- **Resultados esperados**
- **Convocatoria a la que se puede dirigir**
- **Consortio existente, liderazgo y perfiles buscados**



PRESENTACIÓN DE LA ENTIDAD



About us

Leitat is the brand of the institution **Acondicionamiento Tarrasense**, a private and non-profit organisation. It is recognised by the Catalan Government (TECNIO) and by the Spanish Ministry of Science and Innovation.

Since 1906



We develop and bank on development, expanding activities towards the knowledge generation and its transfer to the productive fabric.



MISSION



Create and transfer economic, social and sustainable value to companies and entities, through research and technology processes.

VISION

Be a Technology Partner to companies and Administration, by generating a corporate culture allowing sustained growth and efficient functioning.

CORPORATE CULTURE

PRINCIPLES:

We believe in

- Creativity
- Innovation
- Sustainability
- Environmental Awareness
- Diversity
- Efficiency
- Efficacy

VALUES:

We act with

- Dynamism
- Independency
- Commitment
- Confidentiality
- Market-orientation
- Global perspective
- Talent





PRESENTACIÓN DE LA ENTIDAD



Our strategy

KEY FACTORS

Best practice: **Constant improvement**

1. **Talent** incorporation
2. **Customers and results** orientation
3. Integrated and profitable business management based on the **EFQM Model** (Excellence)
4. **Corporate image and culture**
5. Entrepreneurial **Leadership**
6. Technological **capacity**
7. Technology **transfer** (R+D+2i)

DIFFERENTIATION:



Flexibility

VALUE PROPOSITION: The Technology Partner

- Promote the **technological entrepreneurial**
- Support the **“open innovation”**
- Lead **singular R+D+2i projects**
- Strengthen the **international collaboration** as value of the technological networking



TECHNOLOGY CHALLENGES



LEITAT

Knowledge divisions





PRESENTACIÓN DE LA IDEA DE PROYECTO



ElectroWetLand

GREEN ROOF + Plant Microbial Fuel Cell (PMFC)



Energy Management
Smart & Sustainable
Monitoring
Greywater Treatment



Ethernet / GPRS



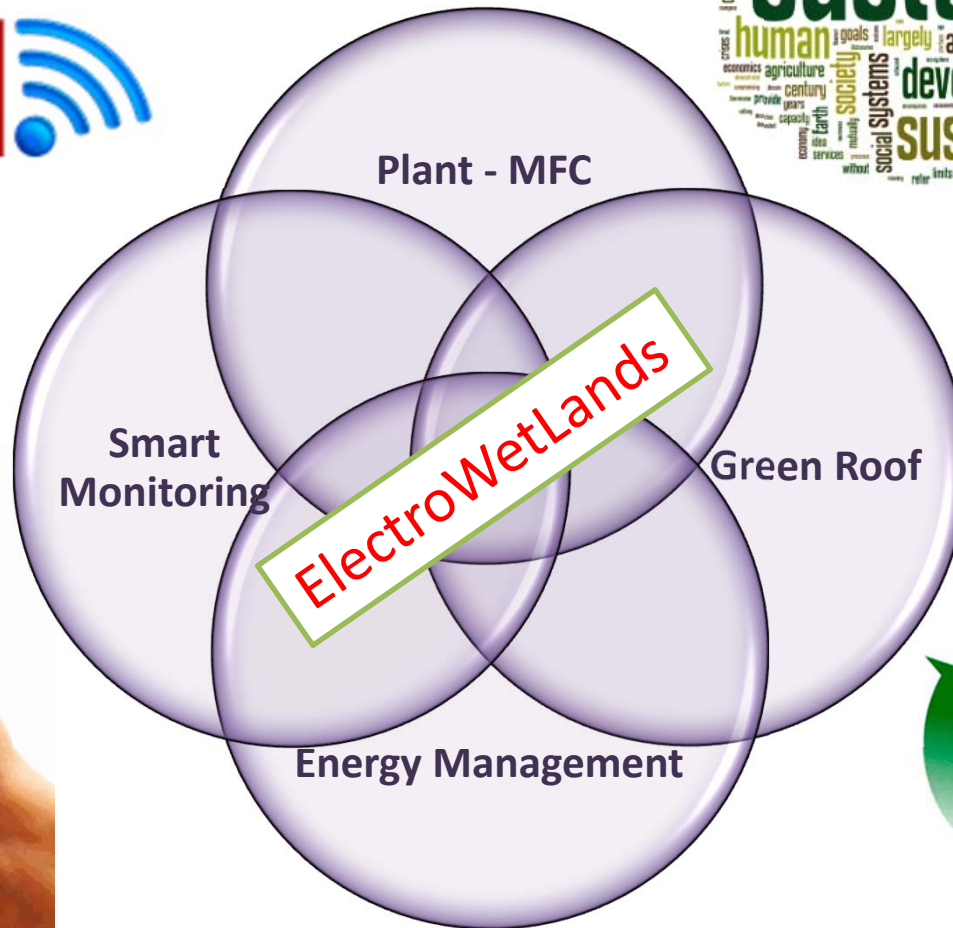
Todas las señales y sistemas necesarios para la gestión de la Eficiencia Energética. Imprescindibles para conseguir ahorrar energía.





CONCEPTO

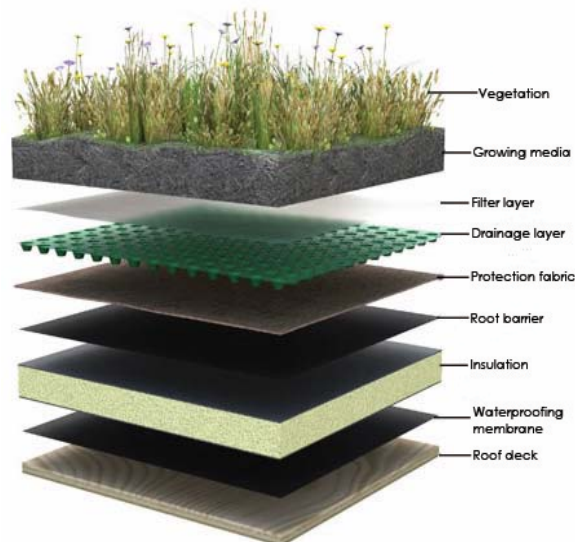
WSN





Green Roofs

- Reduced rain water runoff
- Cleaner air quality
- Improved insulation
- Water purification
- Boosts urban biodiversity
- Sound absorption
- Aesthetic appeal
- Extended roof life
- Recreational space
- Potential to recycle wastewater
- New jobs creation



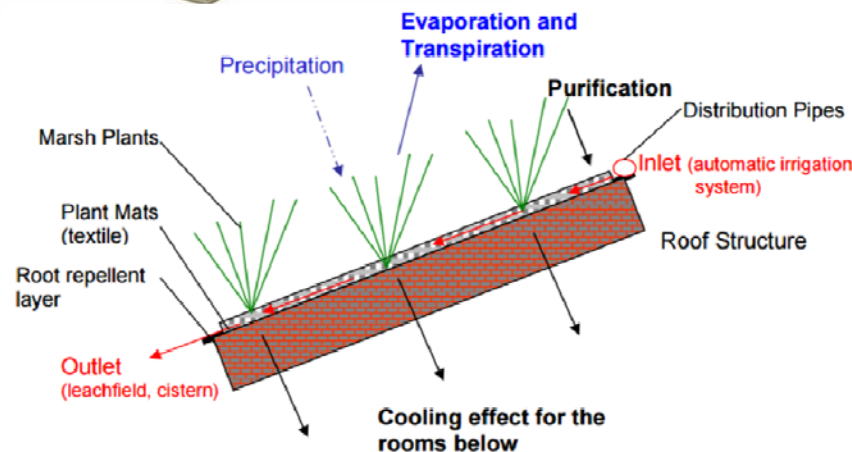
Next step:

Electrowetland roofs



Adding the concept of Plant-Microbial Fuel Cell

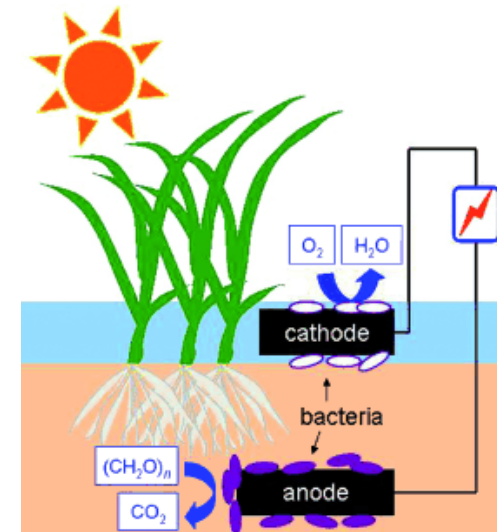
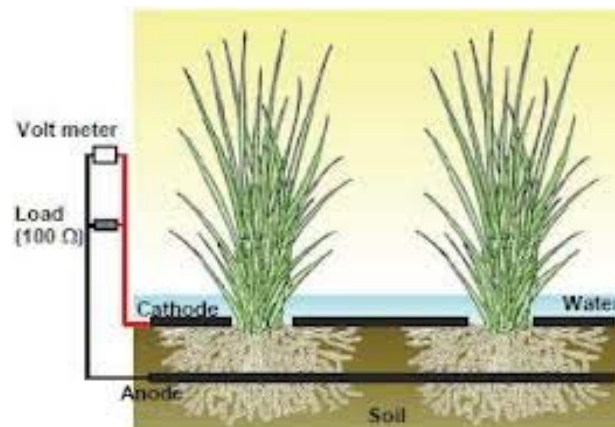
Wetland Roofs





Plant-MFCs State-of-the-Art

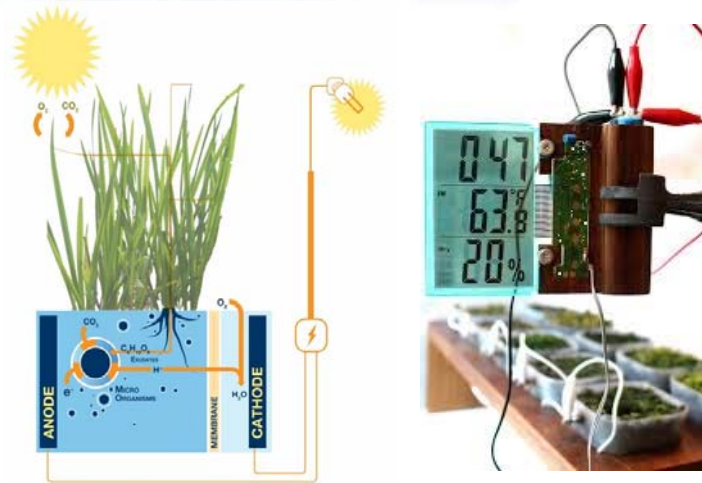
- Novel technology (2008) → light power biogeneration
- Plants produce organic material from photosynthesis, which they excrete as root exudates (70% of C).
- Bacteria transform exudates and donate electrons to the anode → Clean technology.
- *In situ* Electricity generation without removing the plants (24h/day).
- The P-MFC is a waterlogged system ≈ **wetlands**.





Applications

- Different plant species:
 - Rice fields
 - Mangroves
 - Grassy species
- Uses: sensors, illumination, etc



Real demonstration sites

- Dutch Institute for Ecology in Wageningen.
- Modules: 15 m² surface.
- Use: illumination, mobile recharge.





OBJETIVOS

- 1. Maximize energy generation per surface unit.**
- 2. Couple greywater treatment with energy generation processes.**
- 3. Efficient energy management. Link generation/demand -> Storage.**
- 4. Minimize energy consumption of devices.**
- 5. Add secure mechanism in order to increase data integrity within communication process.**
- 6. Renature cities: Boosting green infrastructures in urban environment.**



Technological Challenges in Electrowetlands Roofs

- The main challenge is to **increase the power output** of this system.
 - Maximal theoretical power output: $3,2 \text{ W/m}^2$.
 - Current power output: $0,4 \text{ W/m}^2$.
- For this purpose, several issues have to be addressed:

- Adapting the reactor design and operation.
- Decrease internal resistance.
- Increasing electric efficiency.
- Decreasing P-MFC costs ($70\$/\text{m}^3$) \rightarrow cheaper technology.
- Novel applications: **greywaters** treatment.

Ideas to develop

Materials,
configurations,
etcetera



INNOVATION

In situ domestic **wastewater treatment**
couplet to **energy generation**





Searching for new scenarios: inclusion of Smart Systems

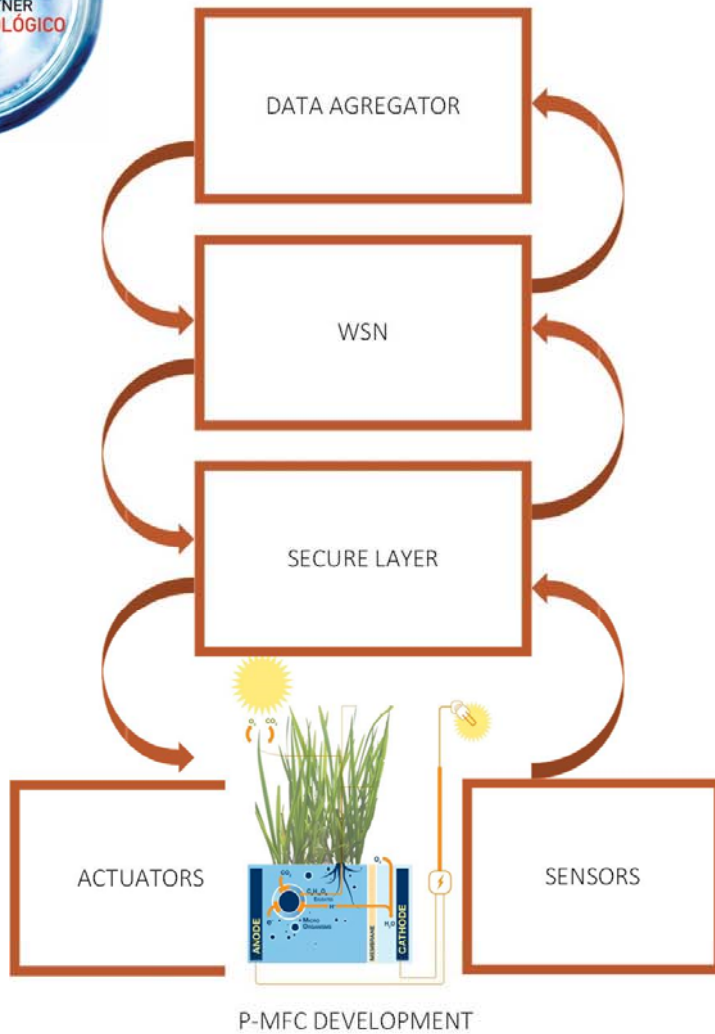
Electrowetlands roofs coupled to TICs to develop & implement:

- Reliable Low Power Wireless Network for building monitoring
 - Communications
 - Smart metering
 - Security
- Low Power Electronics
- Energy efficiency policies
- Energy harvesting





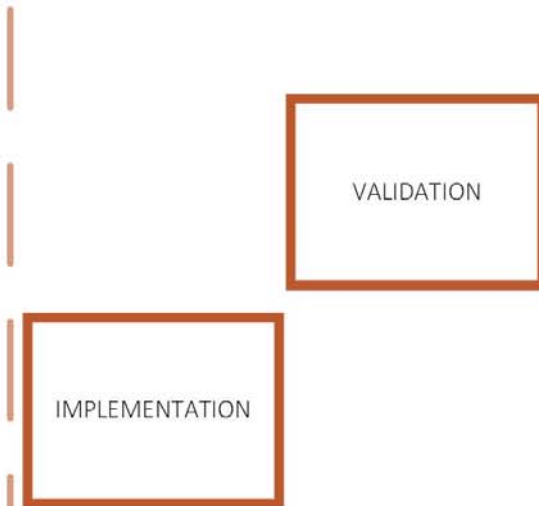
METODOLOGÍA



Activity 1
TECHNICAL DEVELOPMENT



Activity 2
SCENARIO



Activity 3
PILOT



RESULTADOS ESPERADOS

- 1. Autonomous sensor system fed by energy produced from nature-based solutions (electrowetlands)**
- 2. On-site treatment/re-use of greywater.**
- 3. Application of innovative sensors network for the intercommunication between devices**
- 4. Add secure data by the application of cryptographic chips**



RESULTADOS ESPERADOS

Maximize energy production by nature-based and sustainable solution
(ELECTROWETLANDS)





CONVOCATORIA A LA QUE SE PUEDE DIRIGIR

Convocatorias estatales 2016.

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- Programa Estratégico **CIEN** de Consorcios de Investigación Empresarial Nacional (CDTI)
- Convocatoria **Retos-Colaboración** del Programa Estatal de I+D+i Orientada a los Retos de la Sociedad (MINECO)
- Acción Estratégica Economía y Sociedad Digital – **AEESD (MINETUR)**

European calls 2016-2017 -> Horizon 2020

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Sustainable cities through nature-based solutions

- SCC-02a-2016 Demonstrating innovative nature-based solutions for climate and water resilience in cities
- SCC-02b-2017 Nature-based solutions for inclusive urban regeneration



CONSORCIO EXISTENTE, LIDERAZGO Y PERFILES BUSCADOS

Empresas :

Fabricantes de dispositivos

TIC desarrollo software/hardware

Ingenierías /Arquitecturas

Organismo de investigación públicos y privados:

Universidades, Centros tecnológicos, institutos de investigación, etc.

Ciudades que actuen como “runners” & “followers”

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Innpulsio

Ciudad de la Ciencia
y la Innovación
Municipio de Ciencia e Innovación



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THANKS FOR YOUR ATTENTION

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