

# DIVISION OF ENERGY AND ENVIRONMENT

# 1. ABOUT US

2. ALLIANCES & COLABORATIONS

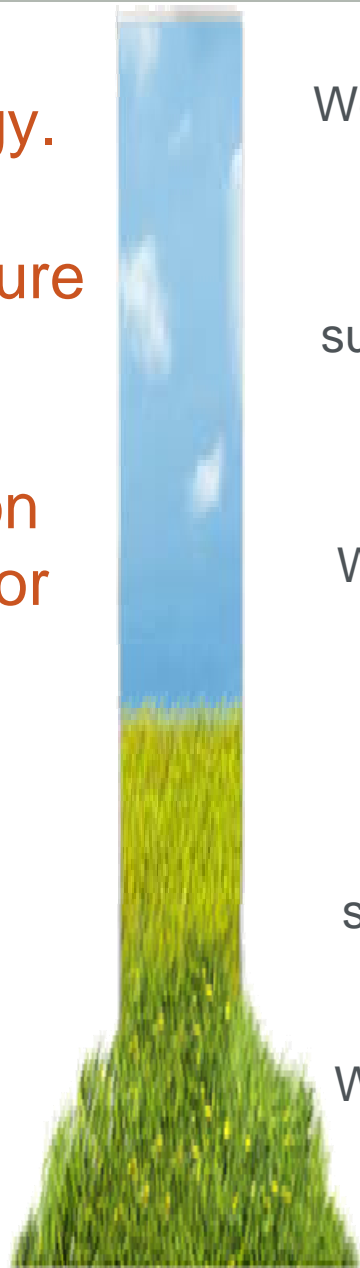
3. WHAT WE DO

4. EXAMPLES OF PROJECTS

Creative Energy.  
Building a  
sustainable future

Echo-innovation  
and creativity for  
sustainable  
development

Clearing  
uncertainties



We specialises in the **development of products, technologies and technological services** for the different actors of the energy sector value chain. We are oriented towards rational and sustainable use of energy resources, focusing on clean generation sources and future energy carriers.

We are a technologically worldwide renew agent through the development of sustainable and innovative solutions to solve environmental problems of the industry and the society; promoting the efficiency in the resources use, supporting the definition of environmental and sustainable strategies and policies at sector and territorial level.

We develop products, technologies and services based on the meteorology, climatology and related sciences.



## Our locations



Derio



Donostia



Miñano



Burtzeña



## Our laboratories in Electric Services



Burtzeña

## 2012 New Laboratories in Smartgrids



INGRID - Derio

**In building**

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Tecnalia's Energy area has participated in numerous activities sponsored by the European Commission: **22 projects in FP6, returning more than 5 M€, and 7 projects in FP7.**

In terms of electrical collaborative networks, we are Europe's leading player in EU projects, working with over **100 different partners across Europe.**

We actively participate in **two energy European Technology Platforms:**

- Smart Grid
- Fuel cell and hydrogen







Click on the network and platform logos for their web page access





U N I K A S S E L  
V E R S I T Ä T



Click on the institution logos for  
their web page access



CEA | CENER | CIC energyGUNE | CIEMAT  
| CNM-UB | CSIC | Lawrence Berkeley  
National Lab | MIT-ILP | Universidad de  
Cardiff | Universidad Jaime I | Universidad  
Rey Juan Carlos | UPC | UPV/EHU | WaveEC



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## MICROGRID: URBAN AREAS AND ECO-COMMUNITIES

### Smart Grids

- Microgrids for efficiency improvement
- Management and operation of electrical networks
- High Potency converters for network connections
- The Future Electrical Network

## HYDROGEN CYCLE

### Energy storage

- High scale energy storage
- Flux batteries
- Converters and control
- Materials and manufacturing process

### Solar Energy

PV



Flat-panel PV systems



Concentration PV systems



Thin-film technology



Solar still



Central tower technology

THERMAL ELECTRIC

## BIOENERGY

Development of advanced processes for biomass gasification. Preparation of new fuels and development of energy applications.

- Biomass transformation
- Organic wastes transformation
- Biorefinery
- Hydrogen production

### Bioenergy



## WAVE ENERGY FARMS

Research and development of different wave energy converter concepts, sea energy farms and components.



## Sea Energy

- Site selection
- Floating Platform Analysis
- Anchorage system design
- Parks design and evaluation
- Wave energy collectors modelling
- Systems for energy transmission.

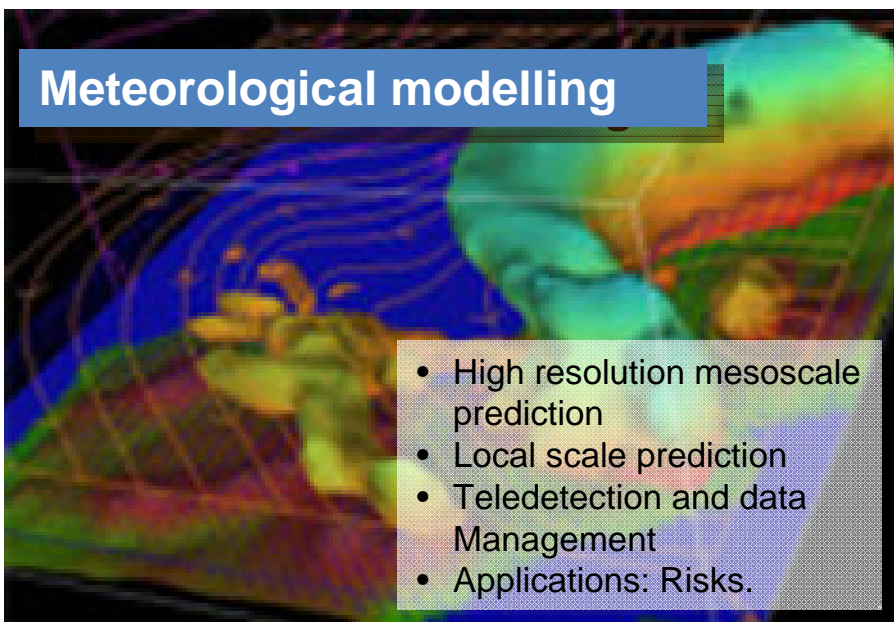
## ELECTRIC MOBILITY



## Sustainable mobility

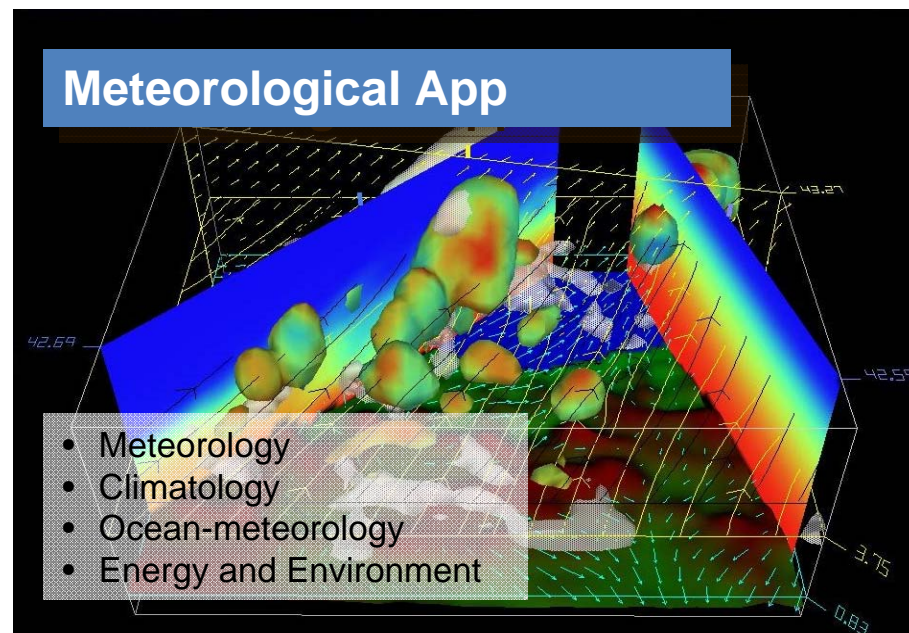
- Vehicle integration on electrical network
- Business Model for EVs
- Equipment for EVs recharge infrastructure
- Knowledge and information Management
- Energy Vehicle Management

## Meteorological modelling



- High resolution mesoscale prediction
- Local scale prediction
- Teledetection and data Management
- Applications: Risks.

## Meteorological App



- Meteorology
- Climatology
- Ocean-meteorology
- Energy and Environment



## Urban Sustainability

- Integrated Solutions for Urban Sustainability
- Urban Metabolism
- Strategic Performance for Urban Planning
- Urban Resilience

## Urban Quality and Comfort

- Air Quality
- Sound & Vibrations
- Light Impact
- Thermal Comfort
- Urban Comfort
- Action Planning
- Sound Barriers
- Urban Design

- Design Supporting for Sustainable Infrastructures
- Visual Impact
- Measures for Impact Attenuation
- Atmospheric & Acoustical Impact
- Working Sites Impact
- Design of Solutions
- Methods for Noise Management in Infrastructures

## Sustainable Infrastructures

- Reduction of Vulnerability
- Adaptation Strategies
- Risk Assessment
- Water Resources
- Heat Islands
- Extreme Events
- Climate & Air Quality

## Climate Change Adaptation

## Land Planning and Regional Sustainability

- Instruments Innovation for Land Planning
- Sustainability Indicators & Integrated Land Analysis
- Landscape Planning & Analysis

## Climate Change mitigation


- CO<sub>2</sub> Capture: development of absorbents, adsorbents, membranes...
- Mineralization of CO<sub>2</sub>
- Valorisation of CO<sub>2</sub>: products obtaining from CO<sub>2</sub>
- Bio-fixation of CO<sub>2</sub>: micro-algae, vegetative reservoirs...





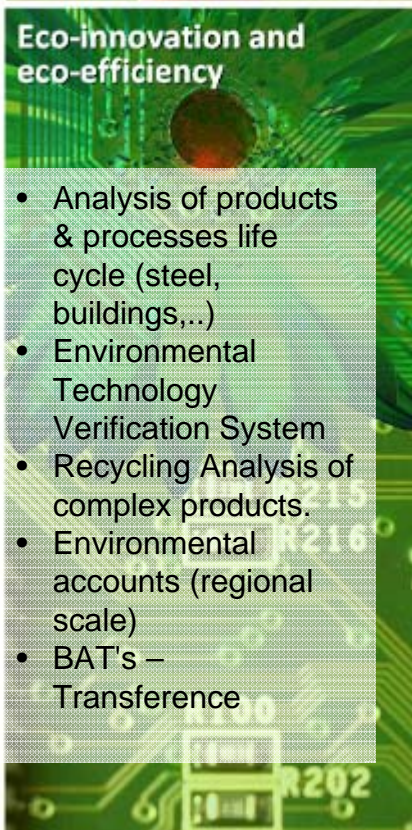
**Environmental Risk Assessment**

- Evaluation of environmental impact associated to waste reuse
- Risk Analysis of soil ecosystems due to chemical pollution
- Environmental Evaluation Impact of Nanotechnologies & Waste Nanomaterials



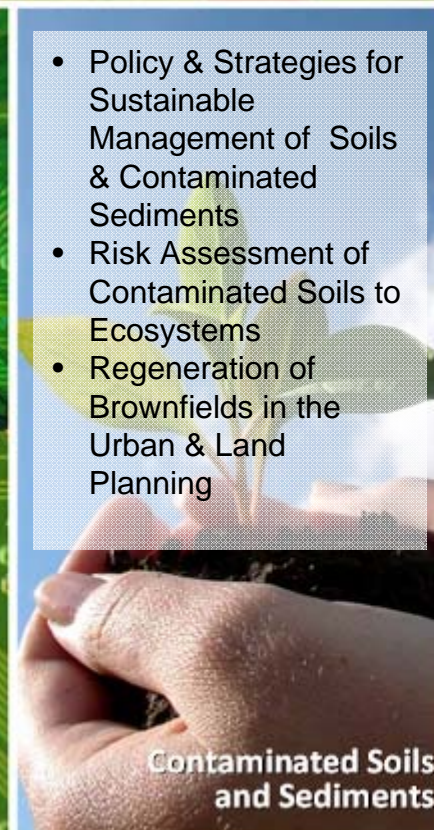
**Water cycle and water treatment**

- Nanotechnology for Water treatment. Photocatalysis
- Nanotechnologies to apply in aqueous effluents. Nanofibres
- Management & treatment of Industrial waters



**Eco-innovation and eco-efficiency**

- Analysis of products & processes life cycle (steel, buildings,...)
- Environmental Technology Verification System
- Recycling Analysis of complex products.
- Environmental accounts (regional scale)
- BAT's – Transference



**Contaminated Soils and Sediments**

- Policy & Strategies for Sustainable Management of Soils & Contaminated Sediments
- Risk Assessment of Contaminated Soils to Ecosystems
- Regeneration of Brownfields in the Urban & Land Planning



**Resource efficiency**

- Waste Materials Recovery
- Energy Valorisation of Slurries & Industrial Wastes
- Wastes Removal

**New materials for environmental applications**

- Electro-synthesis of Organic Molecules.
- Absorbents for Metal Recovery.
- Hydrogels Based on Biopolymers & Synthetic Polymers
- Biocycle Materials Based upon Nanoparticulas with Photocatalysis Activity



# Our activities areas



Wind  
Energy

Power  
Electronics

Our R & D covers  
six main strategic  
lines of research  
and four  
technology  
programs:

BIOENERGY

SMART GRIDS

SOLAR ENERGY

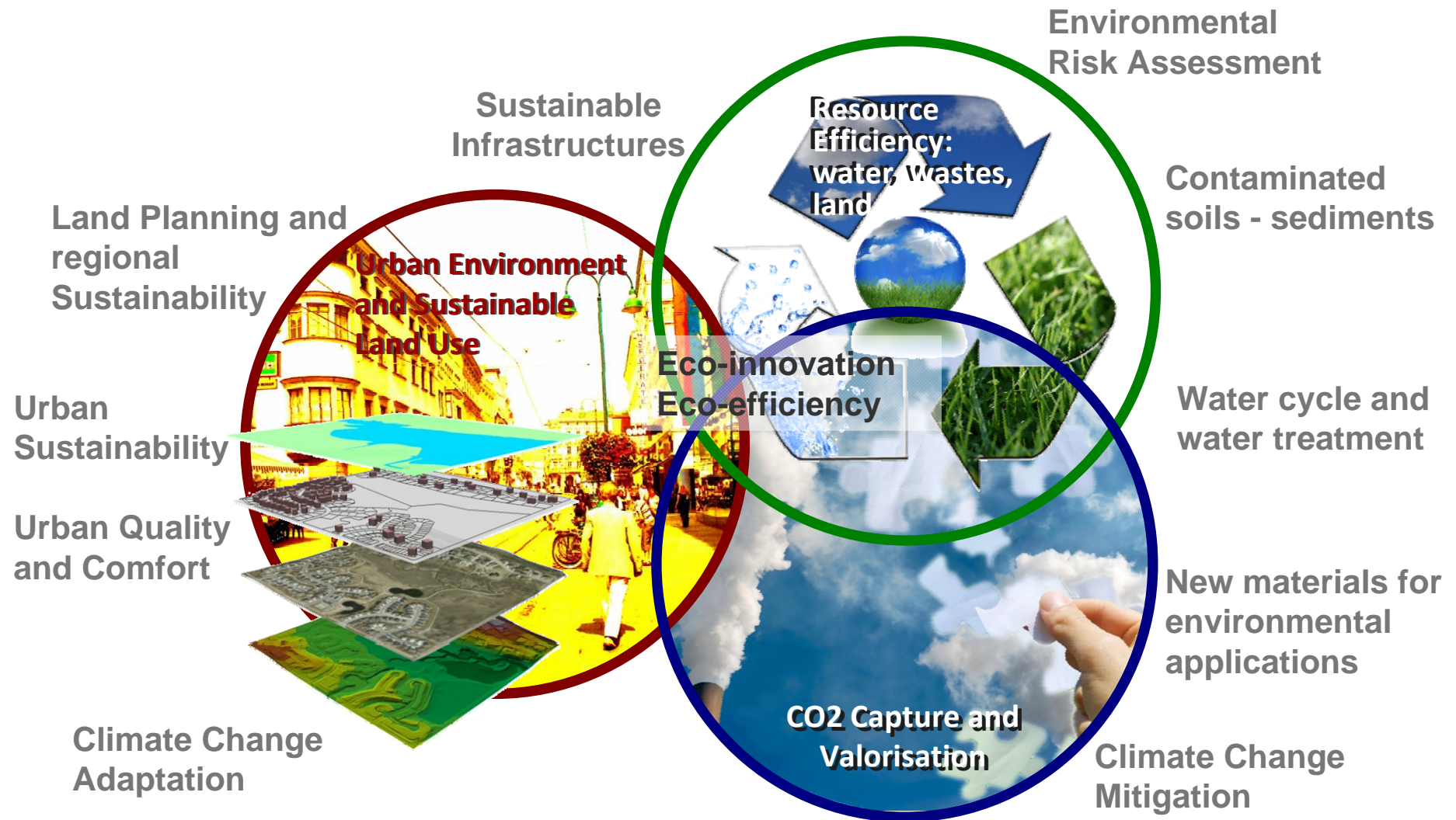
STORAGE

Energy  
Efficiency  
in buildings

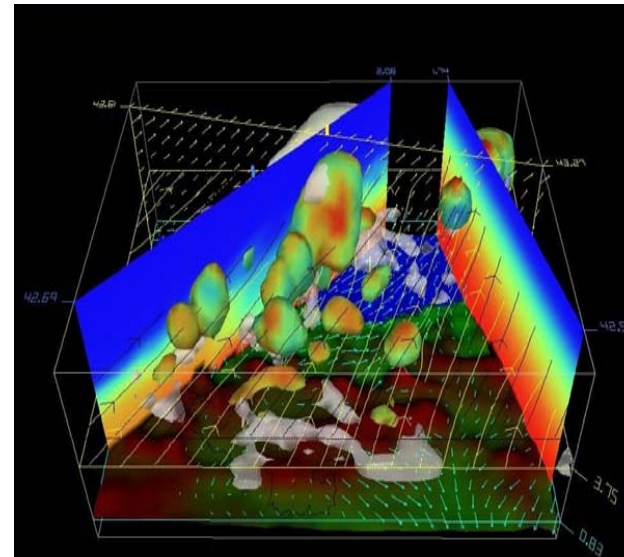
Marine Energy

Materials for  
Energy

Sustainable  
mobility



- **Meteorology**
- **Climatology**
- **Ocean-meteorology**
- **Energy and Environment**



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### URA-Nanofibres

Treatment of waters contaminated with priority and emergent pollutants with innovative technologies based on nanofibres

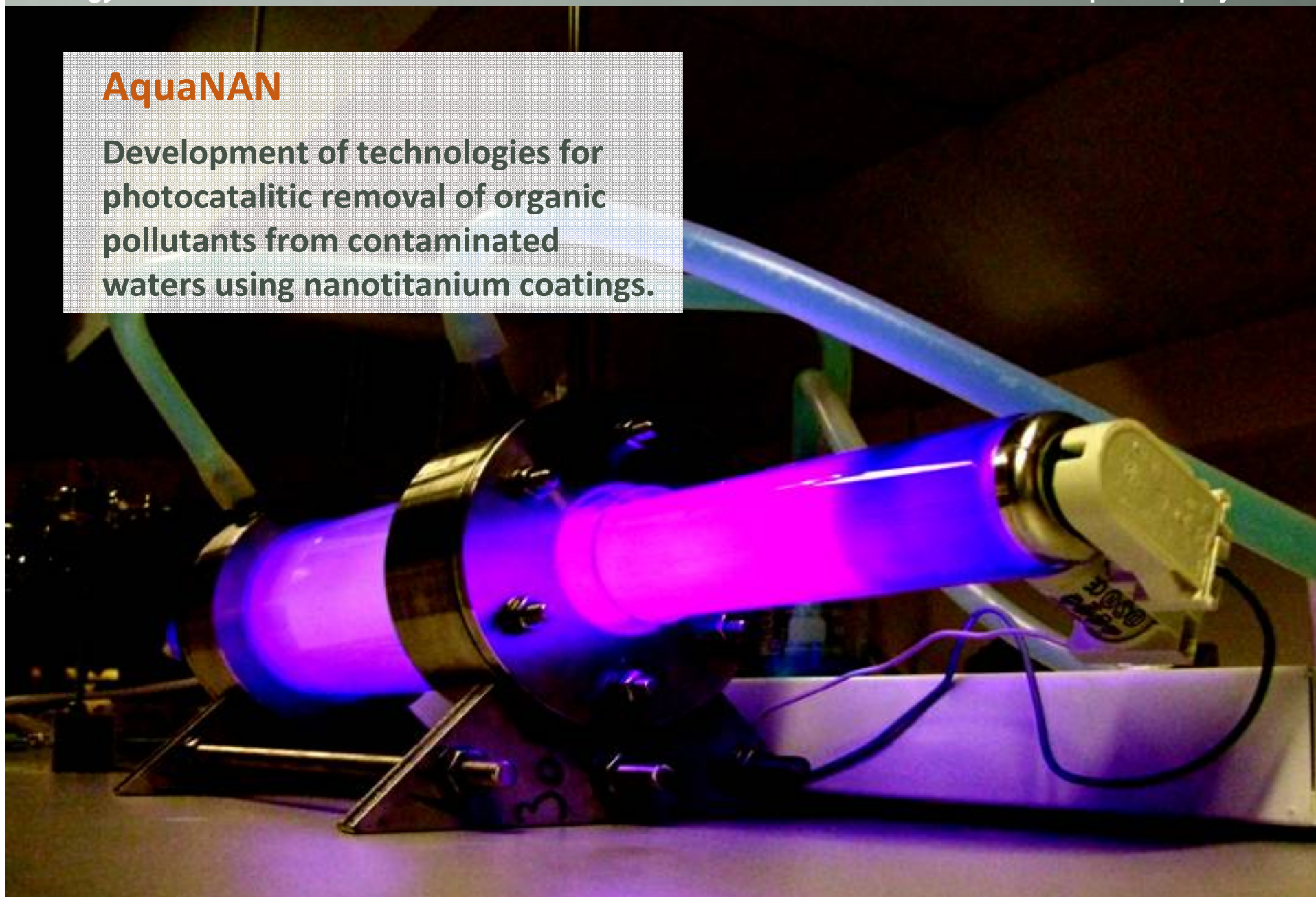
20kV X20,000 1µm

11 30 SEI



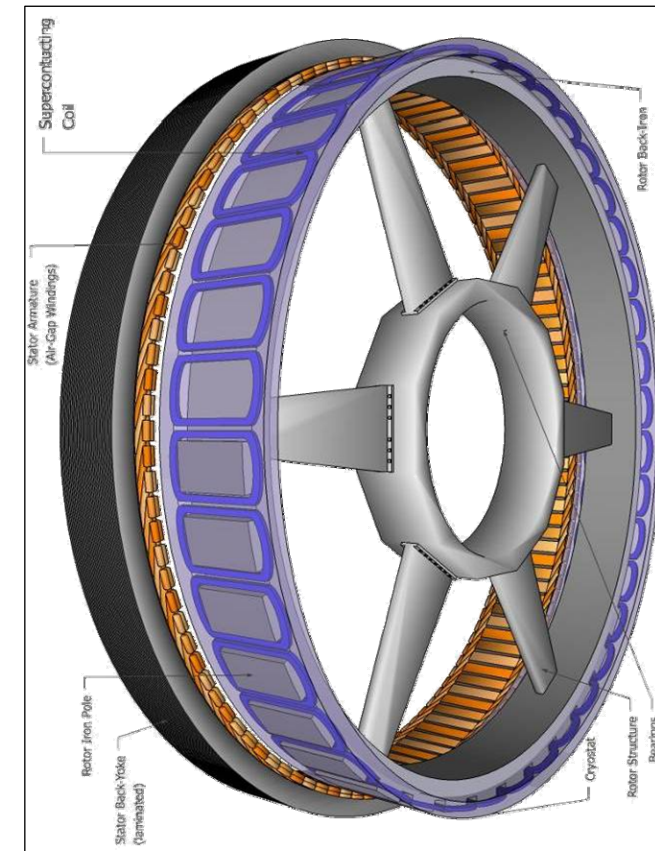
## AquaNAN

Development of technologies for photocatalytic removal of organic pollutants from contaminated waters using nanotitanium coatings.



# SUPERTURBINES

“High performance Superconductive Windturbine”





- Ferrán Adrià
- Enric Ruiz-Geli
- Telefónica
- TecNALIA

**Zero Pollution  
Building**

**elBullifoundation**

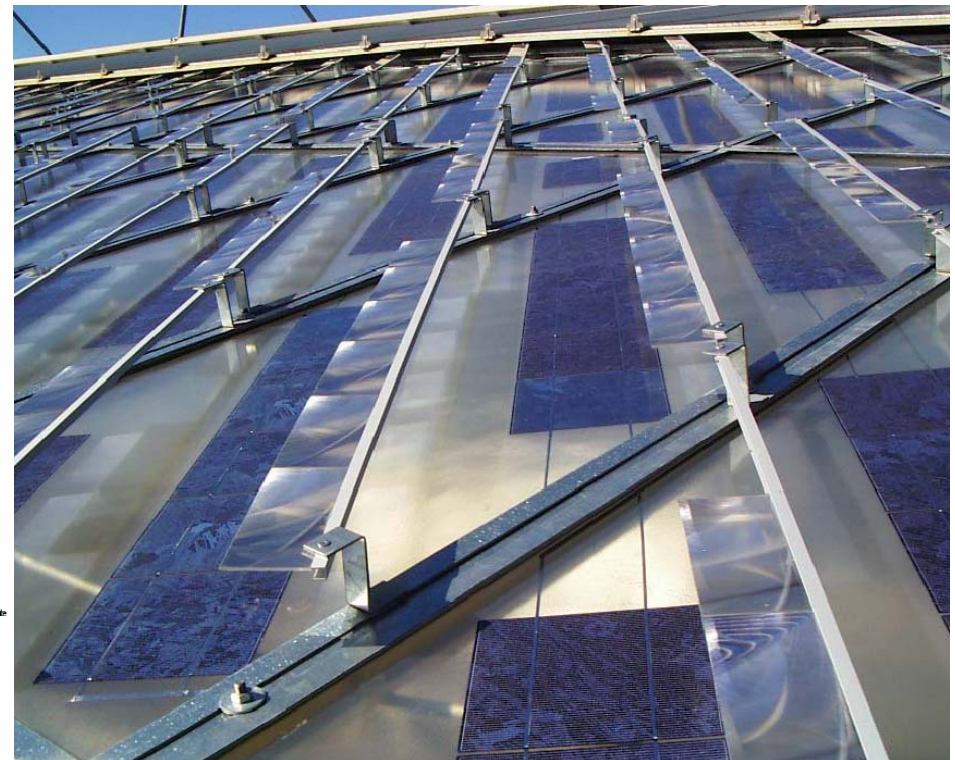
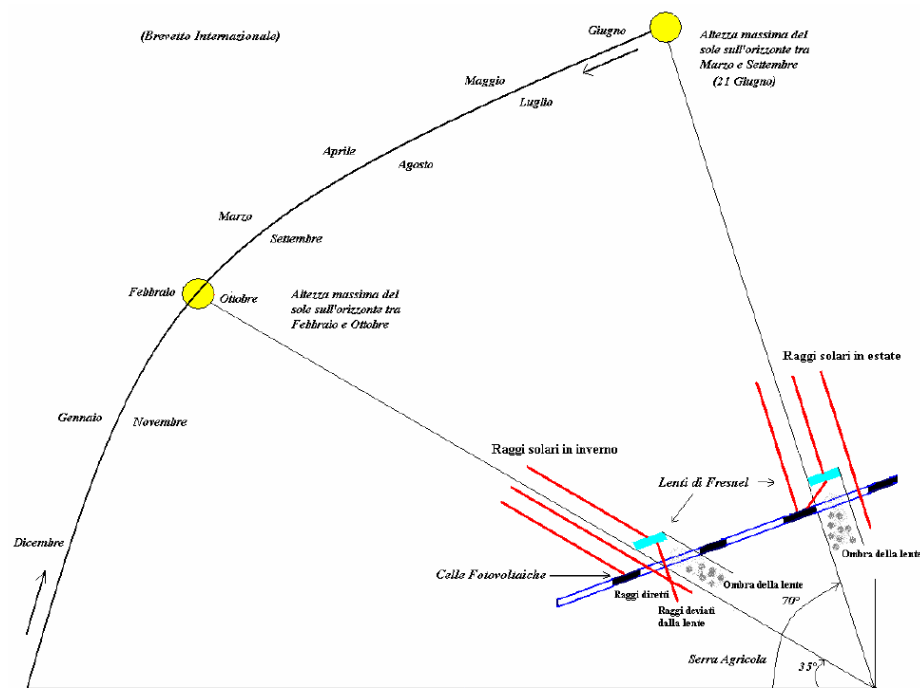
# WINDFOREST

“Mini-eolic in urban environments”

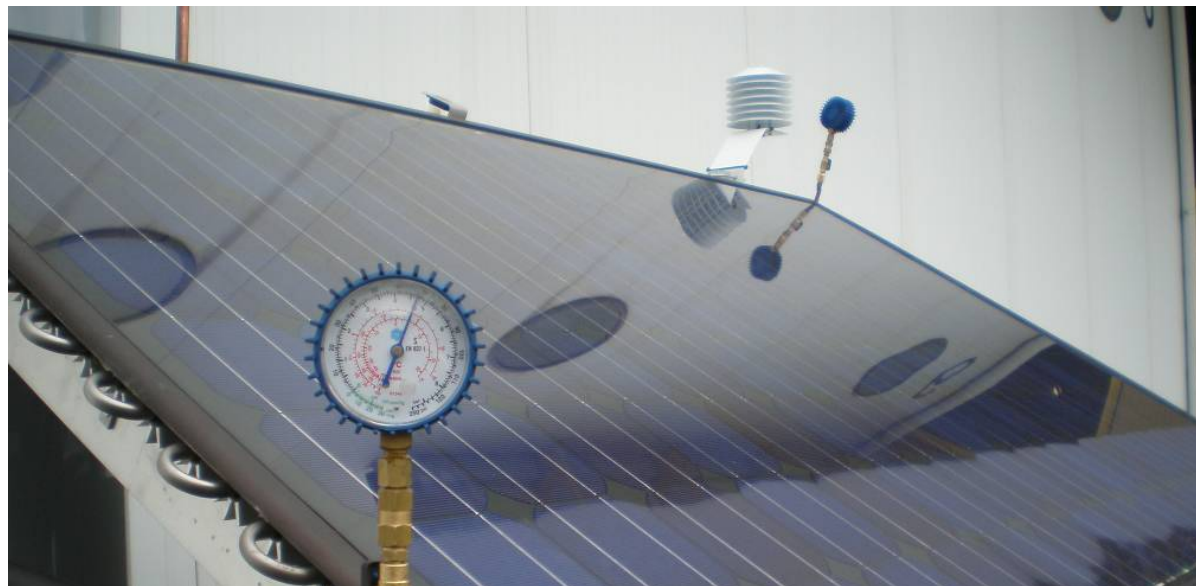




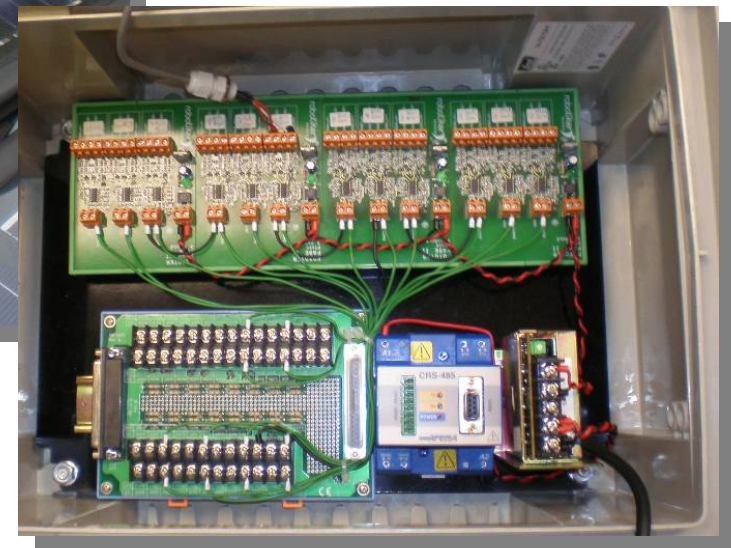
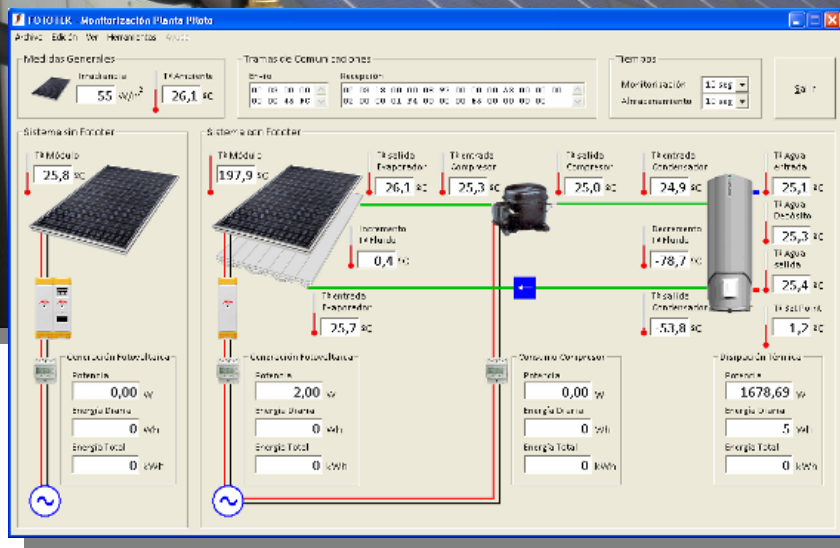
# ECLIPSE. Climate passiv control and improvement of photoVoltaic production



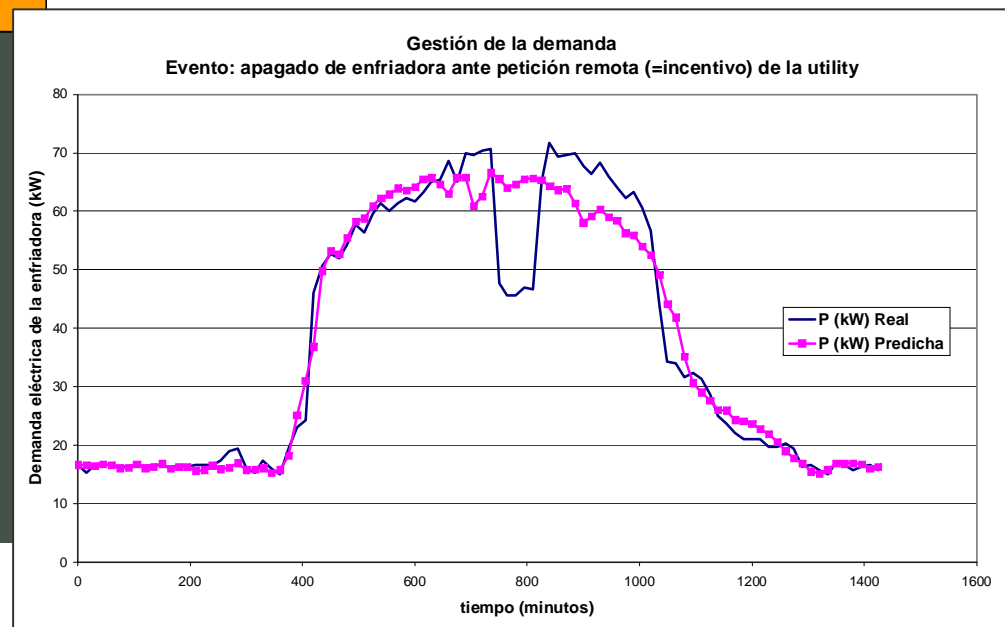
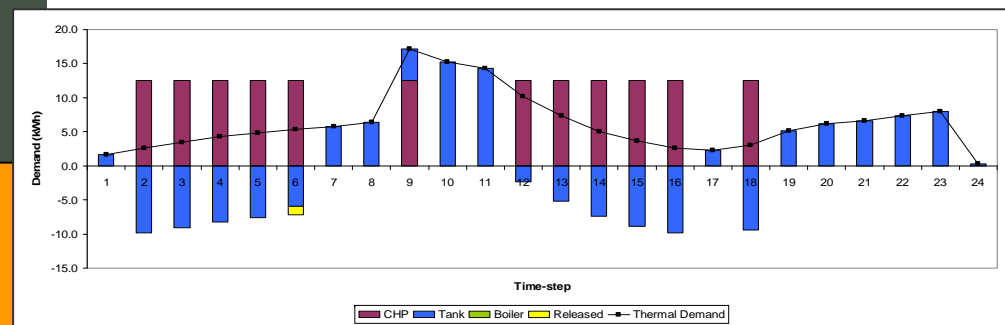
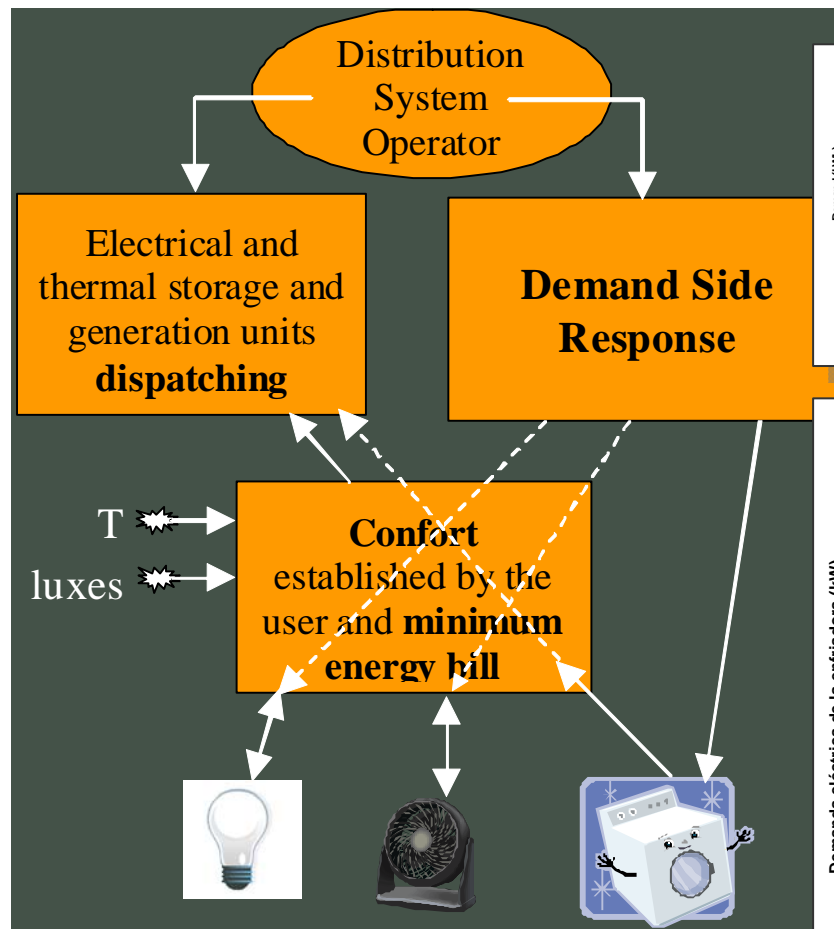




Hybrid systems  
PV –  
Thermodynamic  
(in collaboration  
with SEA)

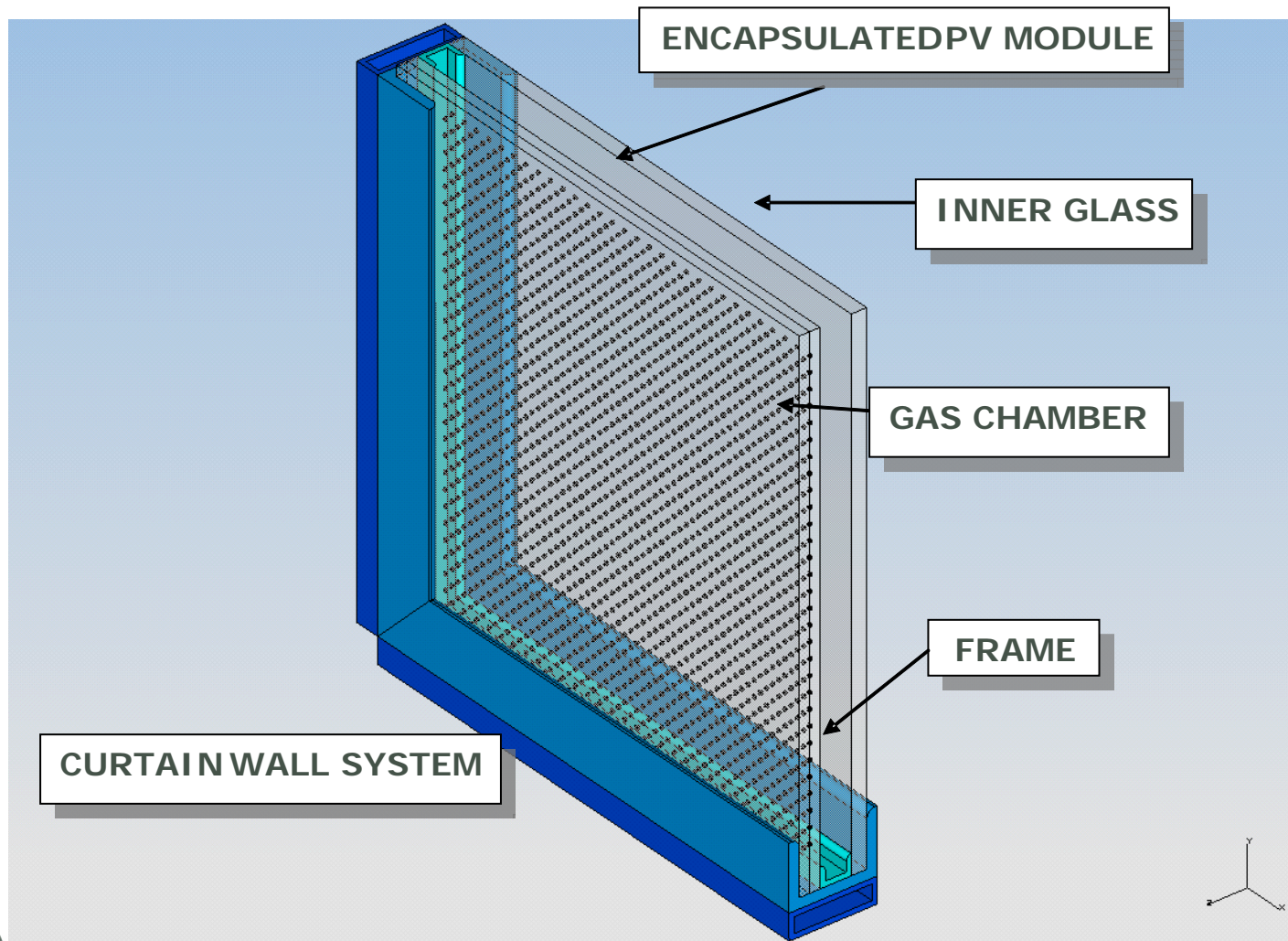


# Building Energy management Systems (Microgrid connected building)

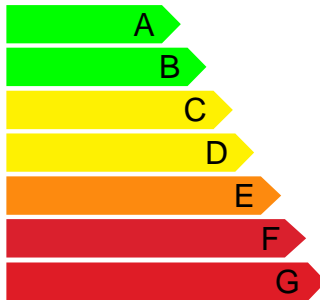
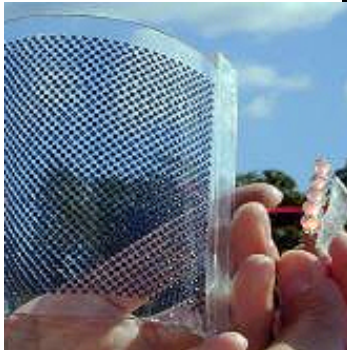




## KYOTEC: “SPHERAL technology in façades”



## Energy and Buildings



**Development of new products** in the energy and building field.

**Energy optimisation and sustainable design** of buildings and neighbourhoods.



Energy Unit

# GENIUS

## Loss energy reduction in BIPV





## KUBIK by Tecnalia



A building-laboratory for the development of new concepts, products and services for energy efficiency in buildings



**New technologies of  
PV cells for cost  
reductions and  
integration  
improvement**

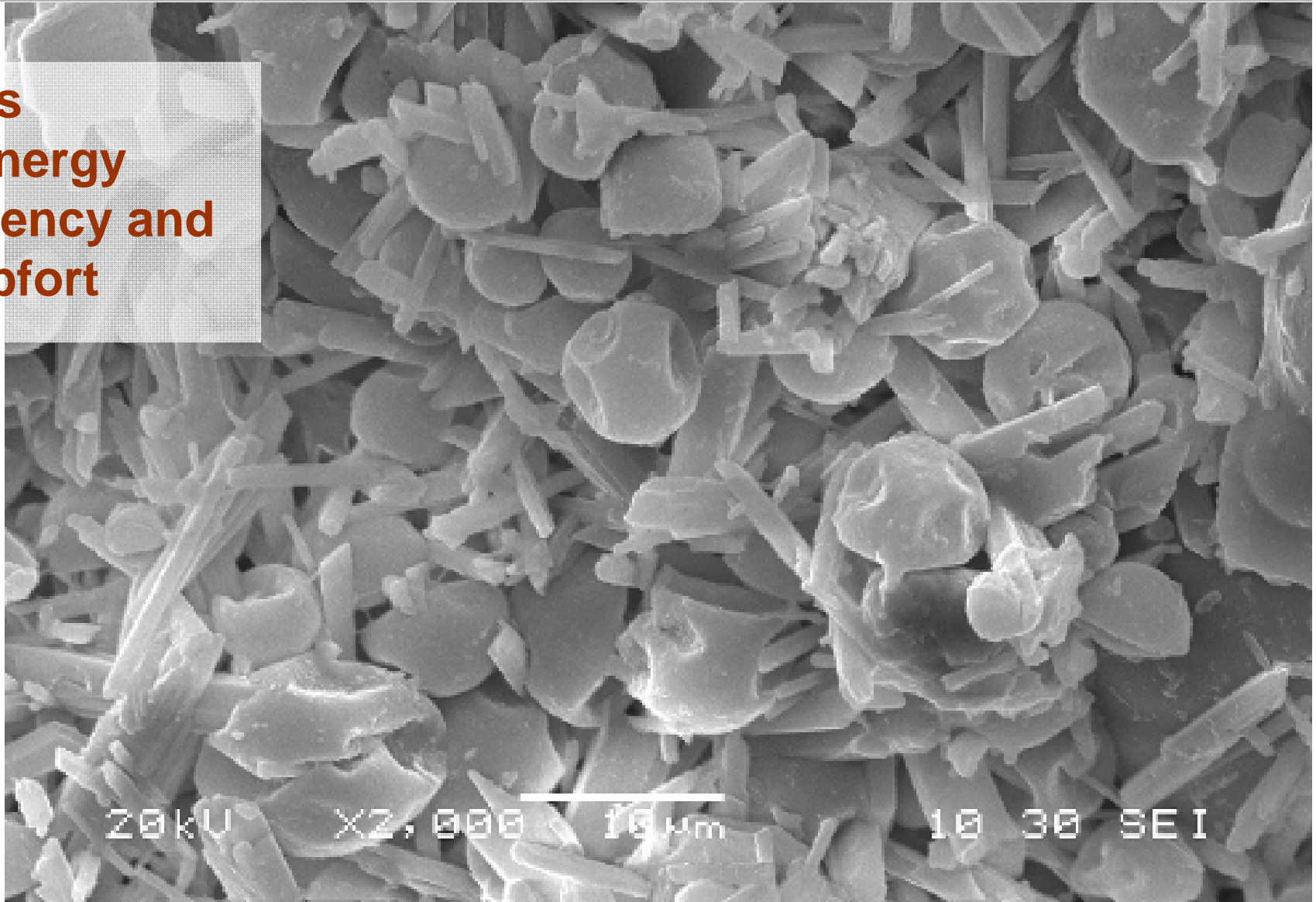
**(f.e. organic cells –  
hybrids DSSC)**

**200 nm**

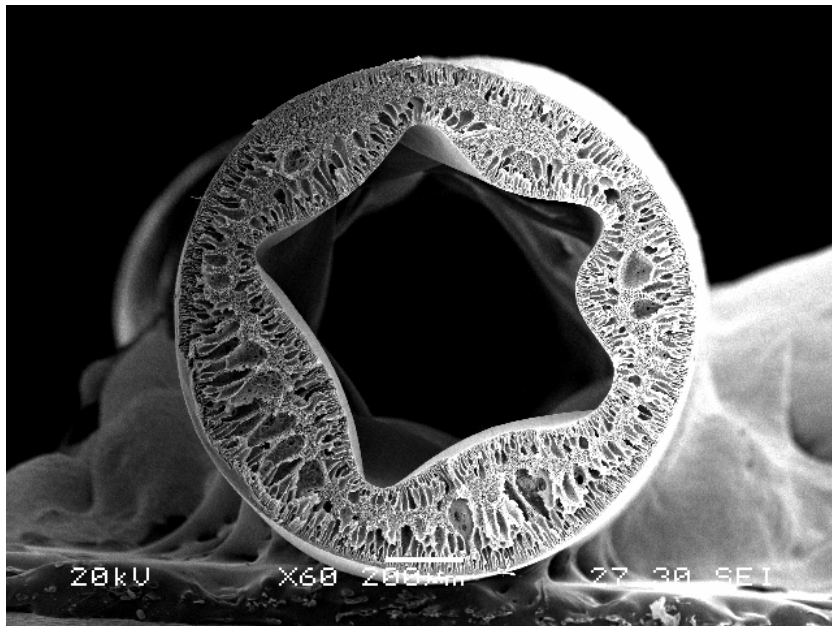




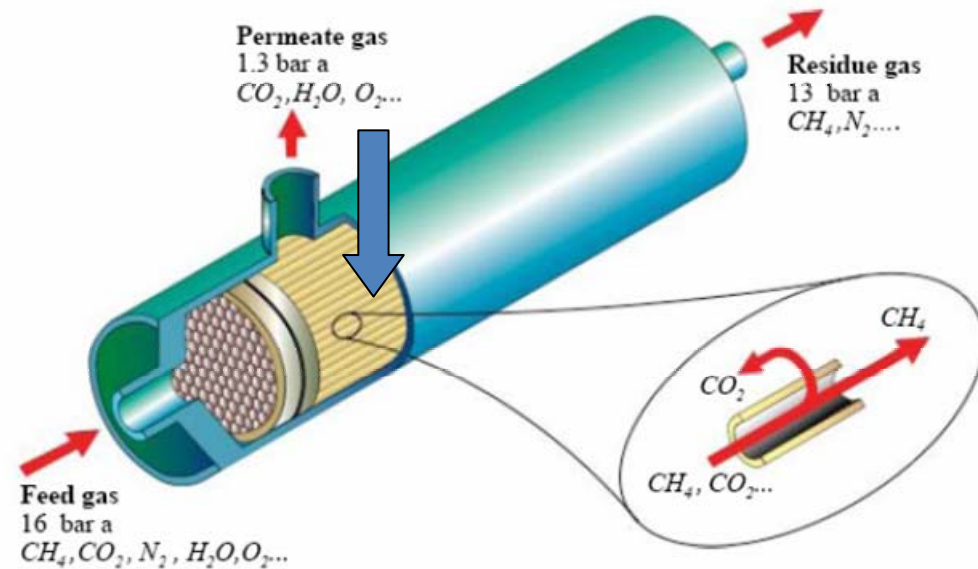
**PCMs  
for energy  
efficiency and  
comfort**



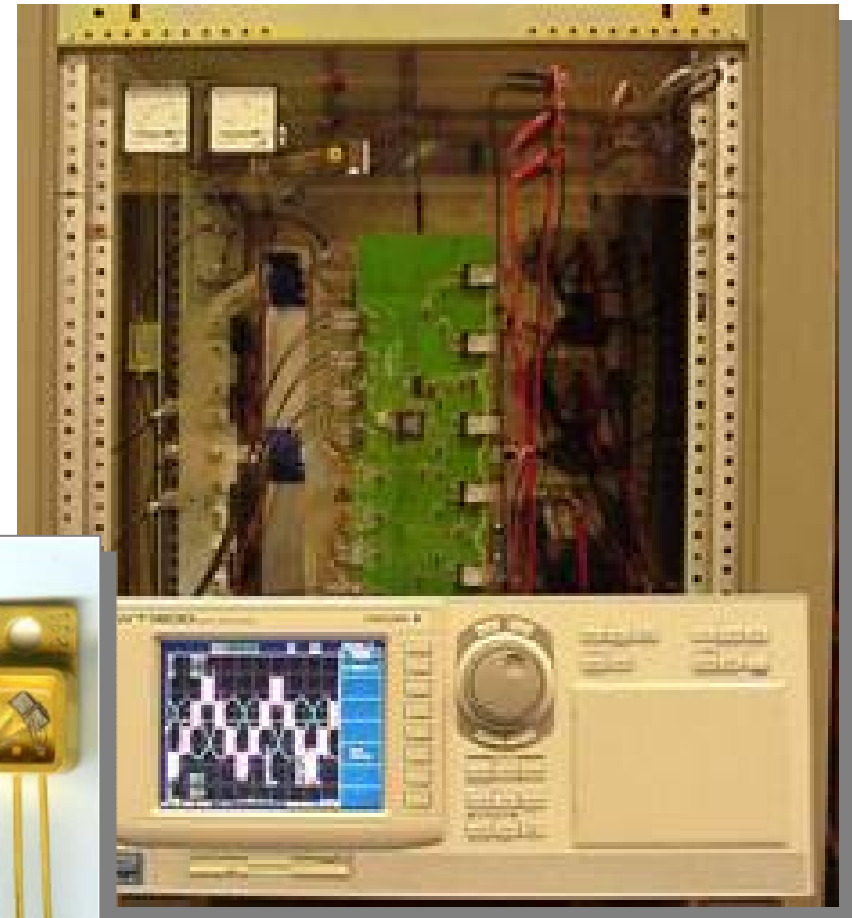
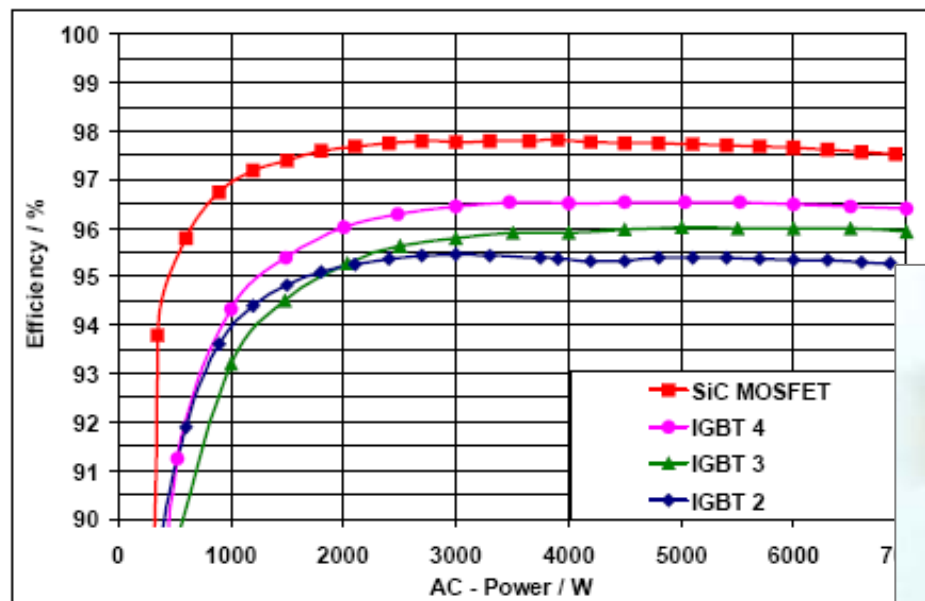




## Simple polymeric membrane module for CO<sub>2</sub> separation



## “Very High efficiency Silicon Carbide Megawatt SUPERCONVERTER”





## Mobility of the future

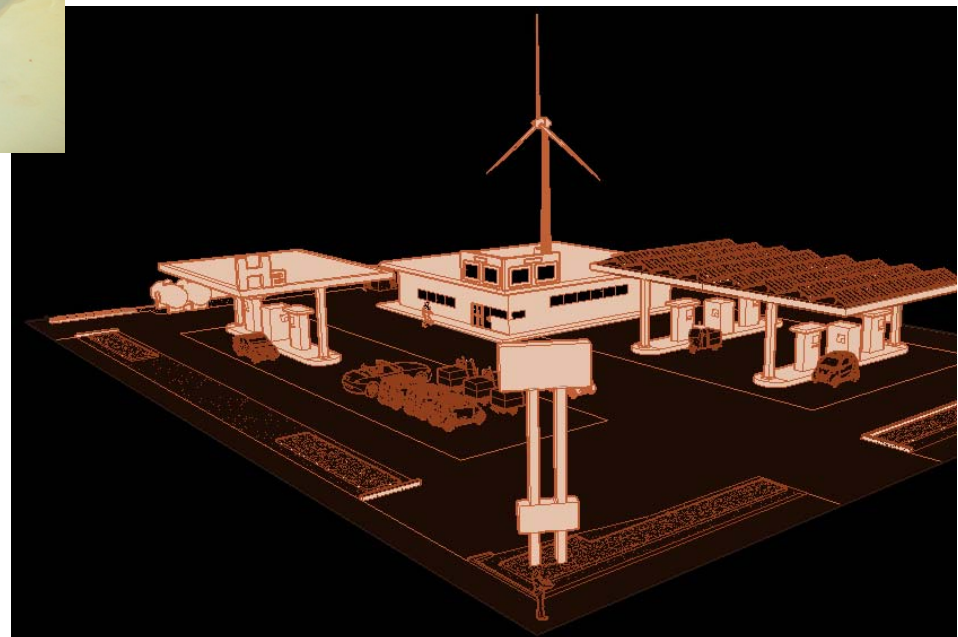


TECNALIA is developing the high performance concept vehicle and the allied supply infrastructures.

**Dynacar**, an electric vehicle that can reach 140 km/hour in 10 secs.

It is a research and development platform for electric vehicle systems: electronic systems, advanced simulation tools, new electric traction architectures...

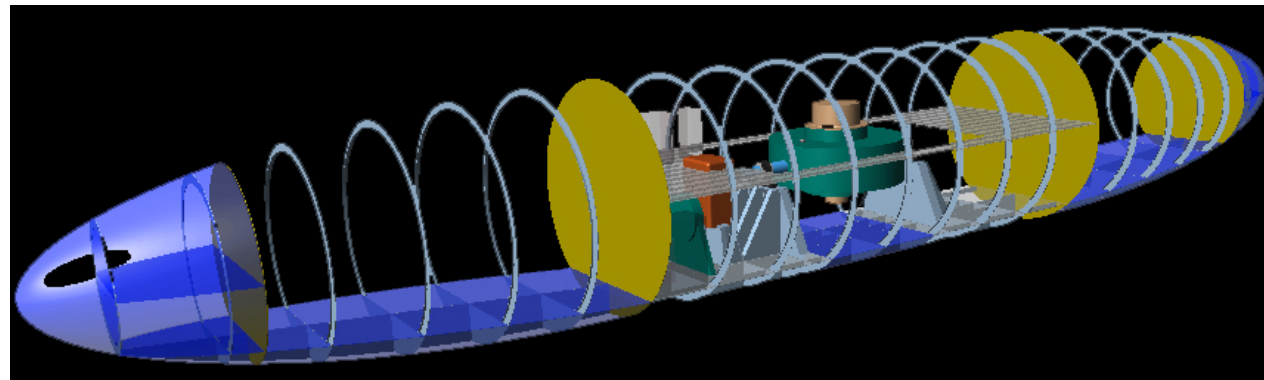
... to be supplied from rapid charge stations, without electrical contact and with integrated management of electricity demand.



OCEANTEC

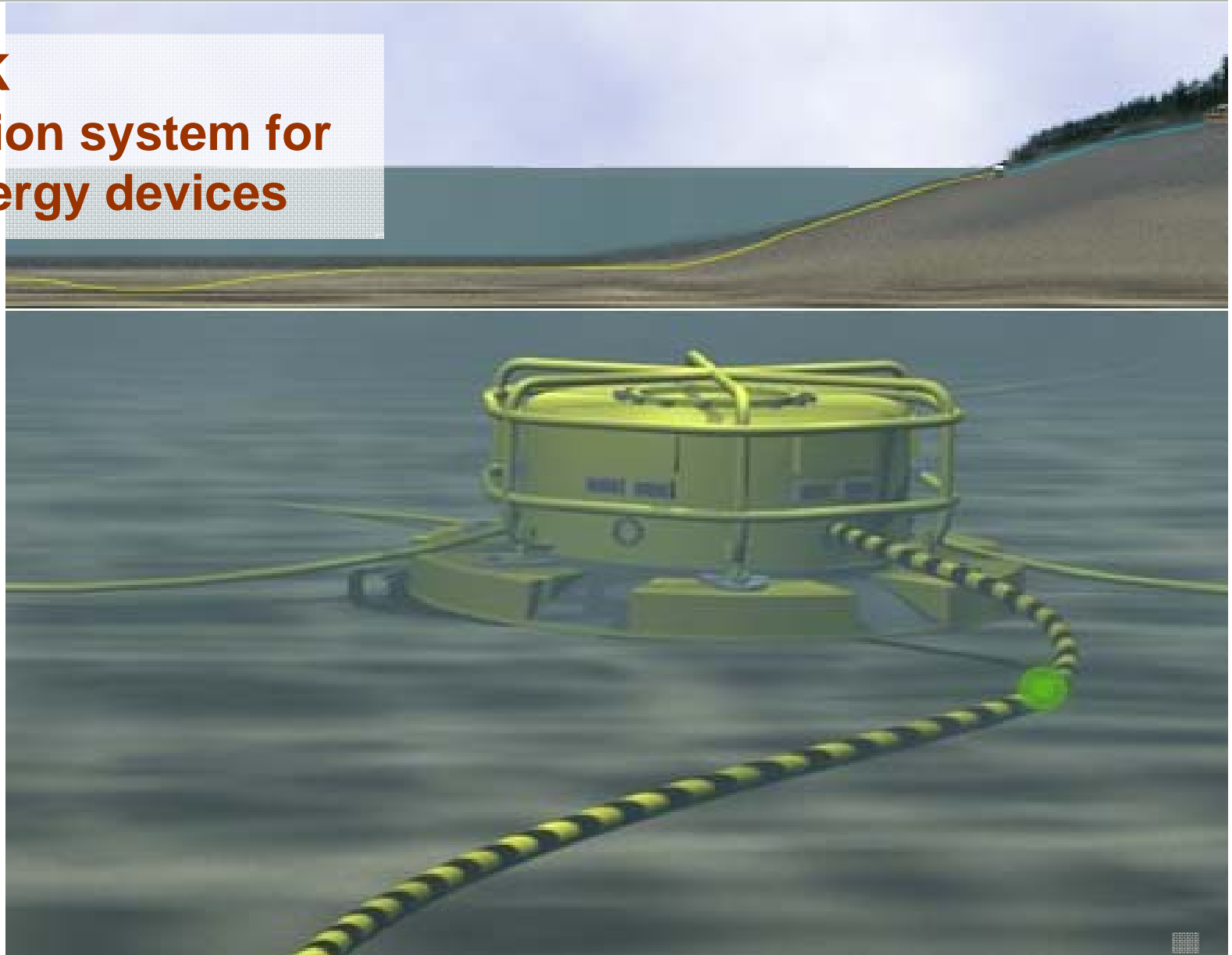
1.5 M € invested by Tecnia over three years to develop technology to **obtain energy form Off-Shore waves.**

**Result:** We have founded a company with 4.5 Million € capital to industrialise and exploit the technology with IBERDROLA owning 67% and TECNALIA 33%.





## SEALINK Connection system for wave energy devices



# SEALINK

## New DC solution for evacuating Energy from marine energy farms





[www.tecnalia.com](http://www.tecnalia.com)

