Water and energy are two key natural resources for sustainable development, they determine economical decisions in agriculture, urban development, tourism and industry. Water-related problems are expected to worsen in the near future and, as a consequence, the energy problems will also aggravate. For this reason, the need to find sustainable solutions to the problem of water and energy is clear.

Water and energy are two interrelated resources: water is needed for energy production and energy is needed to achieve the closure of the integral water cycle. In the XXI century the water-energy nexus is a key factor for the sustainable management of both resources. It is necessary to establish joint policies for allowing the integral planning of these two important resources. Being aware of the importance of this problem, in the frame of the 7th International Congress of ANQUE, which will be held from 13th to 16th June 2010, an international symposium on the topic "Challenges and Opportunities of the water and energy: two key resources for the XXI century" has been organized.

This symposium will constitute a forum for the debate and exchange of information among companies, administrations and public institutions, research centers and universities, in which the latest scientific and technological advances applicable to the water-energy nexus will be presented, identifying to what extent the integral water cycle requires a higher energy consumption to assure the treatment of the water to achieve the required qualities necessary for each application. In this scheme of interdependence, water saving is a synonym of energy saving.

In this event the following topics will be covered:

- The energy system and the integral water cycle.
- Water for energy production.
- Energy consumptions of different water treatments.
- Managing the links between Water and Energy.
- Market opportunities.
- Level of technological development and analysis of technological potential.
# INTERNATIONAL SYMPOSIUM CHALLENGES AND OPPORTUNITIES OF WATER AND ENERGY: TWO KEY RESOURCES FOR THE XXI CENTURY

## Sunday, 13th June

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>18:00 – 20:00 h</td>
<td>Registration</td>
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<tr>
<td>20:00 – 22:00 h</td>
<td>Welcome Reception</td>
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</tbody>
</table>

## Monday, 14th June

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>8:00 – 9:00 h</td>
<td>Registration</td>
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</tbody>
</table>
| 9:00 – 11:00 h | Symposium Water and Energy. Session I  
Chairman: J.L. Cortina                |
| 11:00 – 11:30 h | Coffee Break                                |
Peter A. Wilderer, 2003 Stockholm Water Prize. TU Munich, Germany |
| 13:30 – 15:00 h | Welcome Lunch                               |
| 15:00 – 17:00 h | Symposium Water and Energy. Session II  
Chairman: A. Blanco                    |
| 17:00 – 17:30 h | Coffee Break                                |
| 17:30 – 19:00 h | Congress Round Table: Water in the Mass Media  
Moderator: Manuel Toharia, President of the Príncipe Felipe Science Museum.  
Participants: Luis Balairon (Meteorology National Agency); Antonio Calvo (REE – AECC); To be Confirmed (Nueva España) |
| 20:00 – 21:00 h | Concert                                     |

## Tuesday, 15th June

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</table>
| 8:30 – 10:30 h | Symposium Water and Energy. Session III  
Chairman: A. Bódalo                        |
| 10:30 – 11:00 h | Coffee Break                                |
Tom Vereijken, President of European Water Partnership. Belgium |
| 11:45 – 13:15 h | Congress Round Table: Water Regulatory Framework  
Moderator: Angel Cajigas, ATTA President.  
Participants: Javier Ruza (MARM); Manuel Gutierrez (C.H. Cantabrico); Miguel Solanes (Imdea-Water); Laura Castrillo (FEIQUE); Carlos de Miguel (Uria&Menéndez) |
| 13:15 – 15:00 h | Lunch                                       |
| 15:00 – 17:00 h | Symposium Water and Energy. Session IV  
Chairman: J. Aguado                      |
| 17:00 – 17:30 h | Coffee Break                                |
| 17:30 – 19:00 h | Congress Round Table. Sustainable Water Management  
Moderator: Adrián Baltanás. ASAGUA President.  
Participants: Jorge Marquinez (CHC); Luis Alemany (EMA); Eduardo Ortega (E.ON); Andrés del Campo (FENACORE); Pedro Brufao (AEMS)  
Gala Dinner                                       |
INTERNATIONAL SYMPOSIUM
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OF WATER AND ENERGY:
TWO KEY RESOURCES FOR THE XXI CENTURY

Wednesday, 16th June

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:30 – 10:30 h</td>
<td>Congress Sessions</td>
</tr>
<tr>
<td>10:30 – 11:00 h</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>11:00 – 11:45 h</td>
<td>Congress Plenary Lecture. “Present state of water desalination and its future”. Marc Anderson, University of Wisconsin (USA)</td>
</tr>
<tr>
<td>12:00 – 14:00</td>
<td>Congress Sessions</td>
</tr>
<tr>
<td>14:00 – 15:30 h</td>
<td>Lunch</td>
</tr>
</tbody>
</table>
| 15:50 – 17:00 h  | Congress Round Table. Water Opportunities for R&D+i.  
                     Moderator: Herminio Sastre FICYT Director  
                     Participants: F. García Ochoa (MICINN); To be Confirmed (CDTI); Enrique Hernández (Aqualia) |
| 17:00 – 18:00 h  | Congress Closing Ceremony                                            |

The Symposium Water and Energy is organized in the framework of the VII ANQUE’S International Congress, 5 parallel sessions at the congress every day will cover the following topics:

<table>
<thead>
<tr>
<th>Sustainable water management</th>
<th>Reuse of reclaimed water</th>
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<tbody>
<tr>
<td>Point and diffuse pollution</td>
<td>Water in agriculture</td>
</tr>
<tr>
<td>Drinking water treatment</td>
<td>Water in the industry</td>
</tr>
<tr>
<td>Desalination</td>
<td>Environmental impact of water treatments</td>
</tr>
<tr>
<td>Urban waste water treatment</td>
<td></td>
</tr>
</tbody>
</table>
# International Symposium: Challenges and Opportunities of Water and Energy: Two Key Resources for the XXI Century

## Oral Session I -

### Chairman
José Luis Cortina (CETaqua- Technical University of Catalonia) (ES)

### Keynote
"Unpacking and Managing the Links Between Water and Energy for Resilient Societies"
Hussey, K.1, Pittock, J.1, Petit, C.2
1Crawford School of Economics and Government (Australian National University) (AU); 2Earth System Sciences and Environmental Management (COST Office) (EU)

### Lectures

#### "Food-Water-Energy Synergies in Spain: Challenges, Opportunities, and Creative Local Solutions"
Osann, A.1, Varela, C.2, Garrido, A.2, Aldaya, M.3, Couchoud, M.4, Ruiz-Castellano, J.5, del Campo, A.6, Ariza, M.7, Saenz de Miera, G.8
1University of Castilla La Mancha (ES); 2Technical University of Madrid (ES); 3Complutense University of Madrid (ES) and University of Twente (NL); 4IMDEA (ES); 5IDAE (ES); 6FENACORE (ES); 7SEIASA SyE (ES); 8IBERDROLA

#### "Energetic and Water Cost Related to the Cultivation of Energy Crops: A Case Study in Tuscany Region (Central Italy)"
Orlandini, S.1, Mancini, M.1, Orlando, F.1, Dalla-Marta, A.1, Maracchi, G.2
1Department of Agronomy and Lana Management (University of Florence) (IT); 2Foundation for Climate and Sustainability (IT)

#### "Climate-Energy-Water: Towards Systemic Policy and an Australian Example"
Newell, B.1, Marsh, D.2, Sharma, D.2
1Australian National University (AU); 2University of Technology (AU)

#### "The Energy-Water Nexus in Texas (Including Coastal Desalination and Long-Haul Transfer)"
Stillwell, A.S.1, King, C.W.1, Webber, M.E.1, Duncan, I.J.1, Hardberger, A.2
1University of Texas at Austin (USA); 2Environmental Defense Fund (USA)
INTERNATIONAL SYMPOSIUM
CHALLENGES AND OPPORTUNITIES
OF WATER AND ENERGY:
TWO KEY RESOURCES FOR THE XXI CENTURY

ORAL SESSION II -

Chairman
Ángeles Blanco (Complutense University of Madrid) (ES)

Lectures
“UNDERGROUND THERMAL ENERGY STORAGE (UTES) IN THE NETHERLANDS: ENVIRONMENTAL RISKS AND POLICY”
Bonte, M., van den Berg, G., Hulsmann, A., van Wezel, A.
KWR Watercycle Research Institute (NL)

“OPPORTUNITIES FOR REDUCING GREENHOUSE GAS EMISSIONS RELATING TO THE SUPPLY, USE AND TREATMENT OF WATER AND WASTEWATER IN ENGLAND AND WALES”
Howe, A.
Environment Agency (UK)

“THE HYDROPOWER SUSTAINABILITY ASSESSMENT FORUM AND THE DEVELOPMENT OF A SUSTAINABILITY PROTOCOL: A PROMISING MECHANISM FOR OPTIMIZING ENERGY PRODUCTION AND SUSTAINABLE USE OF WATER”
Locher, H (To be confirmed)
International Hydropower Association (UK)

“SOIL MANAGEMENT STRATEGIES TO MITIGATE CLIMATE CHANGE - SYNERGIES AND TRADEOFFS WITH WATER RESOURCE MANAGEMENT AND ENERGY SECURITY”
Henriksen, C., Holm, P.
Faculty of Life Sciences (University of Copenhagen) (DK)

“THE WATER FOOTPRINT OF SWEETENERS AND BIO-ETHANOL”
Gerbens-Leenes, W., Hoekstra, A.Y., Scholten, W.
The University of Twente (NL) and the Water Footprint Network

“THE ENERGY REQUIREMENT AND WATER FOOTPRINT OF A SWIMMING POOL”
Gerbens-Leenes, W., Asare-Bediako, B., Sun, Y.
The University of Twente (NL)
# International Symposium: Challenges and Opportunities of Water and Energy

## Oral Session III -

**Chairman**

Antonio Bódalo (University of Murcia) (ES)

**Keynote**

“WATER AND NUCLEAR ENERGY: A NECESSARY PAIRING”

González-Jiménez, A.

Spanish Nuclear Industry Forum (ES)

**Lectures**

“WATER IN ENERGY PRODUCTION”

Aguilera, C., Márquez-García, A.A.

Department of Physical Chemistry and Analytical (University of Jaen) (ES)

“THE ROLE OF RENEWABLE ENERGY IN THE WATER TREATMENT”

Domínguez-Ramos, A., Aldaco, R., Irabien, A.

Department of Chemical Engineering and Inorganic Chemistry (University of Cantabria) (ES)

“WATER SYSTEMS OPTIMIZATION IN SOLAR THERMAL ENERGY PLANTS”

Mangas, R. and Martínez, M.F.

Fluor S.A. (ES)

“WASTEWATER TREATMENT AND ELECTRICITY PRODUCTION BY MICROBIAL FUEL CELLS (MFCS)”

Puig, S., Serra, M., Cabré, M., Coma, M., Balaguer, M.D. and Colprim, J.

Laboratory of Chemical and Environmental Engineering (LEQUIA-UdG) (University of Gerona) (ES)
# International Symposium on Challenges and Opportunities of Water and Energy: Two Key Resources for the XXI Century

## Oral Session IV -

**Chairman**
José Aguado (Rey Juan Carlos University) (ES)

**Keynote**
**“ENERGETIC OPTIMIZATION OF THE BIOLOGICAL TREATMENT OF THE CEUTÍ WWTP, AERATION CONTROL BY AN EXPERT PREDICTIVE ADAPTATIVE CONTROL SYSTEM (ADEX)”**
Simón, P., Lardín C., Moreno, B., Rancaño, A.
ACCIONA (ES)

**Lectures**

**“WATER/ENERGY BALANCE OPTIMIZATION OF THE INTEGRAL WATER CYCLE IN URBAN AREAS. CURRENT SITUATION AND FUTURE TRENDS”**
Perez-Bueno, D., Fernandez-Raboso, I.
WASSER, S.A. (ES)

**“CAPACITIVE DEIONIZATION (CDI) WITH ASYMMETRIC Al₂O₃ AND SiO₂ ELECTRODES FOR WATER SOFTENING APPLICATIONS”**
Anderson, M.A.¹, Wouters, J.², Tejedor, M.I.¹, Lado, J.J.²
¹Environmental Chemistry and Technology Program (University of Wisconsin) (USA)
²iMdea-Water (ES)

**“INTEGRATING LOW TEMPERATURE WASTE HEAT AND REDUCING THERMAL POLLUTION OF RECEIVING WATERS IN PAPER PRODUCTION”**
Jung, H., Römer, D., Well, A., Hutter, A.
Papiertechnische Stiftung PTS (DE)

**“ENERGY EFFICIENCY IN WATER PUMPING SYSTEMS: ADJUSTABLE SPEED DRIVES AND EFFICIENT ELECTRIC MOTORS”**
Barreira, C.
Technological center for Energetic Sustainability and Efficiency – ENERGYLAB (ES)

**“THE FLUSHING FLOOD COST: A PROHIBITIVE RIVER RESTORATION ALTERNATIVE?”**
Gómez, C.M.
Economy foundations and Economy History Department (University of Alcalá de Henares) (ES)
VII ANQUE’S INTERNATIONAL CONGRESS
INTEGRAL WATER CYCLE: PRESENT AND FUTURE
“A SHARED COMMITMENT”
13th-16th June 2010 Oviedo, (Spain)

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